

REPUBLIC OF IRAQ

**MINISTRY OF
CONSTRUCTION, HOUSING,
MUNICIPALITIES & PUBLIC WORKS**

ROADS AND BRIDGES DIRECTORATE

**Emergency Operation Development Projects (EODP)
(P155732)**

**SITE SPECIFIC
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
(Limited ESIA)**

**For the
Rehabilitation & Reconstruction
of
North Baghdad Bridge (Al-Muthana Bridge)**

20 September 2016

Revision History

Version	Revision Date	Description or Reason for Change	Discipline Review	Director Review	Approval
00	03/08/2016	Initial Release			
01	08/08/2016	First Revision	Comments addressed partially		
02	10/08/2016	Second Revision	Comments addressed		
03	20/09/2016	Third Revision	RSA comments addressed		

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LIST OF ACRONYMS

AIM	Audit and Inspection Manager
EHS	Environmental Health and Safety
EODP	Emergency Operation for Development Project
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management plan
GOI	Government of Iraq
GRM	Grievance Redress Mechanism
IEODP	Iraqi Emergency Operation Development Project
MOCHPM	Ministry of Construction, Housing and Public Municipalities
MOE	Ministry of Environment
MOST	Ministry of Science and Technology
MSDS	Material Safety Data Sheets
NBB	North Baghdad Bridge (Al-Muthana Bridge)
OP	Operational Policy
PAPs	Project Affected Peoples
PMT	Project Management Team
PPE	Personal Protective Equipment
RBD	Road and Bridges Directorate
RE	Resident Engineer
TOR	Terms of Reference
WB	World Bank
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION

According to the Environmental and Social Management Framework (ESMF) which was prepared for the Emergency Operation for Development Project (EODP) and disclosed locally in Iraq and on the World Bank's InfoShop, a limited site specific Environmental and Social Impact Assessment (ESIA) should be prepared, cleared, publically consulted and disclosed prior to the commencement of any construction activities for the roads and bridges component. The Limited/Simplified ESIA study was carried out according to requirements of the current environmental regulations of the World Bank (WB) and Iraqi regulations.

This ESIA was developed to cover the activities associated with the rehabilitation and reconstruction of **North Baghdad Bridge**. The ESIA identifies key environmental and social impacts of the project activities during both the rehabilitation and the operational phases, and defines the necessary mitigation measures addressing potential negative impacts, as well as monitoring procedures during construction and operation. An Environmental and Social Management Plan (ESMP) is prepared and embedded in this Limited ESIA which should be followed and implemented by all relevant parties.

PROJECT DESCRIPTION

Introduction

The North Baghdad Bridge (NBB) called also Al-Muthana Bridge is located in Baghdad Governorate. It connects Baghdad to Salah Ad-Din governorate and the northern governorates to the central and southern governorates.

The NBB is heavily used for business, commercial and personal purposes. Many students from the surrounding cities in the northern Governorates use also NBB to access the Universities in the City of Baghdad.

NBB is considered as a strategic bridge for military purposes in terms of organizing, supplying and preparing for liberation and rehabilitation of cities close and around Mosul Governorate.

Current Condition of the Bridge

Currently, the NBB is partially accessible to traffic through its non-damaged section. After the bombing of the bridge, the Roads and Bridges Directorate (RBD), with assistance from one of the State Owned companies specialized in bridge construction, closed the damaged sections and removed the obstructing debris while allowing traffic (in both directions) to proceed on the remaining segment of the bridge which was found safe for usage. While this was an urgent and immediately needed measure to reinstate the connectivity across the river, the current situation is not sustainable not only due to the safety aspects but due to the heavy traffic crossing the river using the NBB on daily basis in both directions.

Project Location

The North Baghdad Bridge is located at the North of the City of Baghdad. It crosses Tigris river approximately at point 33°25'42.74"N, 44°20'44.54"E.

Purpose of the project

The purpose of the Project is to rehabilitate/repair the NBB which was damaged by a terror attack that resulted in partial damage to the bridge. This has caused significant disruption to heavy traffic crossing the bridge on daily basis. Following are the anticipated construction activities that are expected to take about 7 months:

1. Structural evaluation of the affected girders that support the spans.
2. Removal of two damaged spans which are simply supported spans and transport of rubble to an assigned dumping area.
3. Replacement of 14 damaged post tension girders by steel girders and 22 rubber pads and reconstruction of the damaged pier No. 3.
4. Casting the deck slab and side walk.
5. Supply of 5,000 m² of wearing surface for damaged span and remaining bridge spans.
6. Repair of expansion joints for the whole bridge with all accessories.
7. Supply of 19,000 m² of wearing surface for the bridge surroundings.
8. Treatment of partially damaged girders (crack injection),
9. Execution of road marking and curbstone.
10. Installation of hand, guard rail and lighting poles, and operational lighting for bridge.
11. Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders)
12. Putting the utility lines into service (three water pipes, 900 mm diameter each) and six power cables.

The construction equipment that will be used are mainly: 30 ton- crane, compressor, jack – hammer, shovel, typical lorry with tipping, skipping, body to load of transport the demolished material, truck mixer, asphalt grinder, bitumen tanker, asphalt finisher, compactor, welding machine, diesel generator, grader, pickups and sedan cars, air shot, bell and bugger.

The construction site will include offices and accommodation for the workers that will be equipped with air conditioning and toilet. Potable water tanks will be provided and septic tanks will be constructed for disposal of human sewage. All these facilities will be installed over state owned land available around the bridge; therefore, there will be no need for land acquisition. *As most of the workers will be from local residents, the need for staff accommodation will be very limited. Most of the workers will reside at their homes.*

BASELINE CONDITIONS

The Project Area

Baghdad city and its suburban area have a long history that dates back to the Mesopotamian civilization. Although it is the capital of Iraq and the industrial sector is the pillar of its economic activity, many other sectors are also active in Baghdad such as agriculture.

The project is located at the North of Baghdad City in an uncongested area. To the east and west of the North Baghdad Bridge there are farms mainly cultivated with palm trees. The touristic area (Jazira area) is just about 1 Km to the north of the bridge and the East Tigris Drinking Water treatment plant is about 1.1 Km to the south of the project.

Environmental and Social Baseline conditions

The environmental baseline section is presented to give clear overview of the environmental and social conditions in the vicinity of the project location prior to commencement of works.

Climate

Baghdad governorate is located in the center of Iraq, and has a subtropical desert (Köppen-Geiger classification: BWh). The average annual temperature is 22.8 degrees Celsius. The Highest temperatures occur in July and August and reach over 48 degrees Celsius while low temperatures can drop to below 0 degrees Celsius during winter.

Rainfall is normally recorded during the months of December to January. Most of the rainfall occurs from November thru February and averages 156 millimeters annually.

The wind regime is characterized by the winds prevailing from the western and north - western direction throughout the year. Mean annual wind velocity reading 2.1-3.9 m/s.

Air Quality

There are no monitoring stations close to the site. As NBB is located in an open area, the concentration of these pollutants are expected to be low due to the good ventilation and potential dispersion of air pollutants.

Site Topography

There are no natural land obstacles in the project area as it is free of mountains, cliffs, and valleys.

Land use

The land use of area surrounding the project is mainly agricultural. There are also some scattered houses within a distance around 200 meters from the project.

Seismic Activities

No Seismic activities had been recorded for more than 40 years.

Floods

The construction of retaining structures on Tigris upstream of Baghdad has reduced the substantiality of floods.

During war, bridges on Tigris River were damaged and large pieces of concrete fell down in the river. Large debris were removed from the river bed but the small parts that remained created obstacles to the flow within the river and enhanced the formation of islands.

Recent researches on Tigris river, from Al-Muthana Bridge to Diyala River predicted that inundation could take place along approximately 9 km of the reach surveyed only if discharges greater than 3,500m³/s are recorded.

Traffic Level

The traffic level is currently moderate as many vehicles (especially heavy trucks) use the alternative road around Baghdad which is about 40 km long and passes through Al-Karkh side of the city. Due to the current situation of the bridge, the traffic moves slowly especially before the bridge.

Noise

Except for the existing normal traffic, there is no other major source of noise in the area. **The nearest sensitive receptors are the workers and contractor staff and the inhabitants. The nearest residential unit is at 100 m from the bridge**

Heritage Environment

Further to site survey and consultation with the relevant authorities, there are no sites of historical or cultural importance in the area of the bridge and its surroundings. Therefore, the rehabilitation and operation of the bridge will not have any impact on archaeology or cultural heritage. No cemeteries, historical-cultural monuments, churches, mosques that exist in the area need to be removed in order to rehabilitate the bridge.

Flora & Fauna

Significant wild life and flora species were not observed in the Project area.

Land Acquisition

The bridge was built on a public land. As the works consist of repair and rehabilitation of an existing bridge, there will be no need for expropriation.

Social Aspects

There are no villages, residential complexes or community structures in close proximity to the bridge. However, there are scattered houses on Al-Karkh side which is far from the damaged spans. There aren't any licensed or unlicensed roadside vendors **that will be displaced**. The surrounding areas on both sides of the bridge are not settled on or utilized by any of the local population. There are no livelihoods in the project vicinity that are likely to be adversely affected by the project, hence neither involuntary nor voluntarily relocation of people is necessary or expected.

The nearest residential unit is at 100 m. distance from NBB. The touristic area (Jazira area) is just about 1 Km to the north of the bridge and the East Tigris Drinking Water treatment plant is about 1.1Km to the south of the project. In addition, Baghdad University is at 9.2 Km from the bridge, and Al-Mustansiriyah University is at 10.2 Km.

There are no objections registered from the local community. In fact all interviewed persons are eager for the works to be completed. No influx of workers to the project area is expected which could result in adverse impact.

Since the repair and rehabilitation activities of the NBB will entail neither permanent nor temporary land acquisition and no impact is expected on the livelihood of the local people, therefore, OP 4.12 does not apply.

LEGAL REQUIREMENTS

In addition to the Iraqi laws and regulations the limited ESIA follows the procedures of the WB, in particular OP/BP 4.01 - covering the environmental assessment procedure, OP/BP4.12 describing the involuntary resettlement, the Grievance Redress Mechanisms (GRM), and the WB Group Environmental Health and Safety (EHS).

IMPACT ASSESSMENT AND MITIGATION MEASURES

Rehabilitation Phase

The environmental and social impacts that are likely to result from the re-construction and rehabilitation of North Baghdad Bridge, are summarized in the following table.

Table E1: Summary of Impact Assessment Matrix – During Construction / Rehabilitation

No.	Environmental Receptor	Impact Significance
1	Air Quality	Low
2	Noise	Low
3	Water Resources	Medium
4	Soil	Low
5	Solid and hazardous wastes	Medium
6	Flora & Fauna	Insignificant
7	Topography and landforms	Insignificant
8	Impacts on local traffic	Medium
9	Health and Safety	High
10	Socio-Economic impacts	Medium
11	Land	Insignificant

Operational Phase

No significant negative environmental or social impacts are anticipated during the operation phase.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Mitigation measures, responsibilities and estimated associated costs

The Resident Engineer (RE) will be assisted by a team of environmental and social officers who will be responsible for supervising the daily activities of the contractor and will report non-compliances to the RE in order to take necessary actions towards the contractor. Regular supervision site visits will also be conducted by the Road and Bridges Directorate Project

Management Team (RBD PMT), in particular the environmental/social officer in association with a qualified environmental and social consultant who will provide technical advice in case there is a need to modify or add new mitigation measures as work necessitates.

The following tables summarize the mitigation measures which are required to be undertaken to avoid any negative impacts on the environment. Responsibilities and estimated costs are also presented.

Table E2: Mitigation Measures for North Baghdad Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US\$
1	Air quality	<ul style="list-style-type: none"> - Open materials storage piles should be watered to increase of the moisture level thus reducing dust levels. - Inactive piles should be placed in enclosure or covered to reduce wind erosion. - Loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of vehicles moving inside and outside of the construction-site. - Signs and speed reduction bumps should be installed for vehicles approaching the site and near residential buildings and farmlands to reduce their speed below 40 km/hr. On site, speed should not exceed 20 km/hr. 	Contractor	Resident engineer	3,000
		<ul style="list-style-type: none"> - Engines of vehicles and other machinery shall be kept turned on only if necessary, avoiding any unnecessary emission. - Machines and equipment should be periodically checked and maintained to ensure their good working condition. - All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications. - Activities should be carried out using the minimum required number of means at the same time. - Electric small-scale machines and technical tools shall be used when available and feasible. 	Contractor	Resident engineer	Included in contractor cost
2	Noise	<ul style="list-style-type: none"> - Construction activities are to take place within reasonable hours during the day. - Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. - Equipment must be run only when necessary. - The noise sources should be placed in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site. 	Contractor	Resident engineer	Included in contractor cost
		<ul style="list-style-type: none"> - Personal protection equipment for workers should be used of especially those who use jack hammers or work near noisy engines or compressors. 	Contractor	Resident engineer	2,000

Table E2: Mitigation Measures for North Baghdad Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US\$
3	Water resources	<ul style="list-style-type: none"> - Damaged sections of the bridge which are immersed in the river should be carefully removed without polluting the river water. - In case of using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval. - No solid wastes are to be thrown into the river. - Paints or chemicals should be used away from the river. However, if non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water and the ground water. - Material storage areas should be well isolated from storm water to prevent the contamination of the runoff - Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies 	Contractor	Resident engineer	Included in contractor cost
		<ul style="list-style-type: none"> - Wastewater from the worker rest areas or construction offices should be contained in septic tank and should be removed regularly from site by means of authorized contractors and disposed in Al-Rustamiyah wastewater treatment plant WWTP which is about 25 km from the site . 	Contractor	Resident engineer	8,000
		<ul style="list-style-type: none"> - In case of the need to change engine oils or refuel some construction equipment, a proper maintenance workshop or shelter should be installed to ensure containment of any fuel or oil spills. 	Contractor	Resident engineer	3,000
4	Soil	<ul style="list-style-type: none"> - Contractor to present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities. - Soil contamination by oil/grease spills, leakages or releases, all manipulations of oil derivatives in the process of construction are to be prevented. - Provision of the fuel to the machines should be performed with maximum care. - Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal. - Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills which is about 30Km to the north of the project area. 	Contractor	Resident engineer	Included in contractor cost

Table E2: Mitigation Measures for North Baghdad Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US\$
		<ul style="list-style-type: none"> - Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction. - Operation of equipment and vehicles outside the designated work areas and roads must be prohibited. 			
		<ul style="list-style-type: none"> - No hazardous waste storage shall take place directly on soils. Appropriate and enclosed containers should be utilized and disposed of in designated locations in cooperation with MOST who in charge for hazard waste disposal. 	Contractor	Resident engineer	1,000
5	Solid and hazardous wastes	<ul style="list-style-type: none"> - On site waste generation shall be minimized. - Simple waste management plan for specific waste streams must be developed. - General waste must be collected and transported to local council approved disposal sites. - Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors. - Waste containers must be located at each worksite. - Chemical wastes must be collected in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service. - Storage, transport and handling of all chemicals must be conducted in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority. - All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as "hazardous". - Transportation and disposal of hazardous wastes should be done through licensed contractors and in close coordination with the relevant local authority and in compliance with the legal requirements and instructions of the coordination with the as ministry of science and technology. - Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards. - A hazardous materials inventory for the construction period must be prepared. - Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers. - Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, 	Contractor	Resident engineer in coordination with the local authority and ministry of science and technology regarding hazardous wastes	6,000

Table E2: Mitigation Measures for North Baghdad Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US\$
		recycling, transport or disposal at approved locations.			
6	Flora & Fauna	Not Applicable	Not Applicable	Not Applicable	Not Applicable
7	Topography & landforms	Not Applicable	Not Applicable	Not Applicable	Not Applicable
8	Traffic	<ul style="list-style-type: none"> - Provide information, to the bridge users to use the alternative route through appropriate signage. - Upgrade the alternative route to be able to receive the additional number of vehicles. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic. - Where practicable, truck deliveries must be restricted to daytime working hours. - Dangerous goods must be transported along routes preferred for dangerous goods. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic. 	Contractor in coordination with the Local Traffic Department	Resident Engineer	500
9	Health & Safety	<ul style="list-style-type: none"> - The speed of the construction vehicles should be limited. - Road signage for drivers and local community should be provided. 	Contractor	Local traffic department & Resident engineer	1,000
		<ul style="list-style-type: none"> - Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues. - Personal protection equipment such as eyeglasses, gloves, hard heads, safety belts and slip-resistant safety footwear must be supplied and continuously used by all workers, technicians, engineers and site visitors. 	Contractor	Resident engineer	3,000
		<ul style="list-style-type: none"> - The contractor should comply with international standards for good construction practices; - The contractor should adhere to local and international guidance and codes of practice on EHS management during construction; especially as concerns management, supervision, monitoring and record-keeping; - EHS procedures should be part of the conditions of contract with contractors and their sub-contractors; - There should be a clear definition of the EHS roles and responsibilities of the companies involved in construction and of individual staff (including the EHS supervisors during construction and an 	Contractor	Resident engineer	Included in contractor cost

Table E2: Mitigation Measures for North Baghdad Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US\$
		<p>EHS coordinator during operation);</p> <ul style="list-style-type: none"> - There should be a pre-construction assessment of the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices; - There should be a regular inspection, review and recording of EHS performance; - Present detailed H&S Manual to be implemented - Implement H&S measures as detailed in Chapter 5 in the ESIA. - Staff working at the sides of the bridges shall put on a safety harness and connect it, via an energy-absorbing lanyard, to a suitable anchor point. - A high standard of housekeeping shall be maintained at all times. 			
		<ul style="list-style-type: none"> - Any accidents shall be reported and treated within site as a first aid procedure. - Appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues should be provided - Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment - First aid items should be available all times onsite and trained staff on emergency aids should be identified. 	Contractor	Resident engineer in coordination with health and safety officials.	2,500
10	Handling Complaints	<ul style="list-style-type: none"> - A complaints register will be kept on site and this will feed into the GRM. Details of complaints received will be incorporated into the audits as part of the monitoring process. 	Resident Engineer	RBD/PMT	Included in contractor cost
Total Cost (Rehabilitation phase)					30,000

Table E3: Mitigation Measures for North Baghdad during Operation Phase

Receptor		Mitigation Measures during Operation Phase	Responsibility	Supervision	Total estimated Cost in US\$
1	Air quality	- During the license issuance or renewal process of vehicles, traffic authorities to ensure that all vehicle engines are in good conditions.	Traffic Department	Traffic Department	No direct cost
2	Noise	- During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions. - Speed limits should be reduced especially near residential buildings. - Limit trucks movement especially at night in coordination with the local traffic authorities.	Traffic Department	Traffic Department	No direct cost
3	Water Resources	- Ensure that any clogged drains are regularly cleaned especially before and during the rainy season	N/A	N/A	N/A
4	Soil	- Not applicable	N/A	N/A	N/A
5	Solid and hazardous wastes	- During the operational period, some littering and waste generation resulting from the repair activities will occur. Littering may occur due to wind action.	Local Authority (Municipality)	Local Authority (Municipality)	Within municipal budget
6	Traffic	- Speed limits and road signs should be in place to prevent or minimize the road accidents.	Traffic Department	Traffic Department	No direct cost
		- The bridge must be provided with suitable post lighting at night to reduce the probability of road accidents.	RBD	RBD	Within RBD budget
7	Flora & Fauna	- Not Applicable	N/A	N/A	N/A
8	Topography and landforms	- Not Applicable	N/A	N/A	N/A
9	Traffic	- Improved traffic conditions	Local Traffic Department	Resident Engineer	No Cost
10	Handling Complaints	- The continued operation of a GRM for one year following opening of the bridge for use will ensure that local community members have an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.	RBD/PMT	Local authorities	No cost

Table E3: Mitigation Measures for North Baghdad during Operation Phase

Receptor	Mitigation Measures during Operation Phase	Responsibility	Supervision	Total estimated Cost in US\$
Total Cost (Operation phase)				No Cost

ENVIRONMENTAL AND SOCIAL MONITORING PLAN

In order to ensure full compliance of the performed activities to the environmental and social requirements, regular monitoring should be performed. For this purpose, an environmental and social monitoring program has been established for the construction phase as shown in the following Table.

ESMP Institutional Arrangements

In order to ensure full compliance with the environmental and social requirements which are described below, RBD PMT nominated a qualified consultant to act as the focal point for environmental and social affairs at the central level. On the field level, RBD PMT nominated engineers to act as environmental and social officers. Those engineers will be trained on monitoring and reporting of environmental and social impacts and how to fill the checklist to be used during field visits before implementation starts.

RBD Resident Engineer will be the officially responsible staff member for ensuring environmental and social compliance. S/He will be assisted by the designated environmental and social field officers.

In addition, a qualified consultant is recruited by the PMT to provide technical assistance and capacity building to the environmental and social team both at the central level and at the field level.

Table E4: Monitoring Activities for North Baghdad Bridge Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
1	Air quality	<ul style="list-style-type: none"> - Open material storage piles are to be inspected - Visual inspection of vehicles and equipment operating or entering the site - Investigate dust complaints from workers and residents - Signs and speed reduction bumps installed near the site and near residential buildings and farmlands - Measurements of exhaust emissions (CO, SO_x, NO_x, PM10, PM2.5) - Engines of vehicles and other machinery periodically checked and maintained 	<ul style="list-style-type: none"> - Visual inspection - Visual inspection - Recorded and documented complaints - Visual inspection - Results of exhaust emissions measurements - Recoded status of equipment and vehicles on site (excessive black or white smoke) 	<ul style="list-style-type: none"> - Daily - Daily - Daily visual inspection - Daily - Monthly measurements - Measurements monthly during implementation period. 	Engineer	PMT	12,000
2	Noise	<ul style="list-style-type: none"> - Investigate noise complaints from workers and neighboring communities in the affected locations - Silencers checked and placement of noise sourced in concealed area - Use of personal protection equipment effective - Measure ambient noise near sensitive receptors (dB) 	<ul style="list-style-type: none"> - Recorded and documented complaints - Visual inspection - Visual inspection - Recorded tests results 	<ul style="list-style-type: none"> - Weekly inspection of complaints - Weekly - Daily - In case of complaint 	Engineer	PMT	6,000
3	Water resources	<ul style="list-style-type: none"> - Investigate implementation of mitigation measures - Damaged immersed sections removed with care 	Site Investigation report	<ul style="list-style-type: none"> - Daily Investigation 	Engineer	PMT	12,000

Table E4: Monitoring Activities for North Baghdad Bridge Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
		<ul style="list-style-type: none"> - Investigate some wastewater disposal like measures - Install litter bins and make sure no wastes are thrown in the river - Installation of a proper maintenance shelter for paints and chemicals and observe any oil or fuel spills. - Water samples (pH, TDS, TSS, BOD, COD) 		<ul style="list-style-type: none"> - Monthly Measurement 			
4	Soil	<ul style="list-style-type: none"> - Monitor the filling up machine with oil - Monitor the oil/grease containers and hazardous waste location and disposal - Monitor the disposal of waste and debris - Assure the origin of purchased soil is from an authorized quarry - Forbid the operation of machinery outside the designated area - Observe any soil contamination with oil or fuel - Observe any accumulation of wastes 	Site Investigation report	Monthly	Engineer	PMT	No cost
5	Solid and hazardous wastes	<ul style="list-style-type: none"> - Maintain records on waste types and quantities - Observe any waste accumulation in un approved locations - Check that the Material Safety Data Sheets (MSDS) for hazardous materials is available on-site and explained to workers. 	<ul style="list-style-type: none"> - Waste management contracts with authorized contractors - Waste delivery receipts from local authorities. - Site Investigation report 	<ul style="list-style-type: none"> - Weekly - Weekly - Weekly 	Engineer	PMT	No cost
6	Flora & Fauna	<ul style="list-style-type: none"> - Record any observation about wild animals or plants on site or nearby and report to the 	Observation report	Upon occurrence	Engineer	PMT	No cost

Table E4: Monitoring Activities for North Baghdad Bridge Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
		Environmental Authority					
7	Topography & landforms	- No monitoring required	N/A	N/A	N/A	N/A	N/A
8	Traffic	<ul style="list-style-type: none"> - Ensure speed limits and warning signs are installed - Monitor the upgrade the alternative route and the signs informing the vehicles to use alternative routes. - Ensure dangerous goods are transported along selected 	Road signs are installed.	Half annual	Engineer	PMT	No cost
9	Health and safety	<ul style="list-style-type: none"> - Speed limit and directional signs installed - Personnel trained for health and safety issues - Ensure compliance of workers to Health and Safety requirements and responsibilities assigned - EHS performance; regularly inspected, reviewed and recorded - Monitor the good housekeeping - Maintain log on accidents - Firefighting and safety equipment regularly checked - First aid kit items regularly checked 	Accidents report	Weekly	Engineer	PMT	No cost
10	Handling Complaints	- Ensure that the GRM is effective and well communicated	Number of complaints received, analyzed and	Weekly	Engineer	PMT	No cost

Table E4: Monitoring Activities for North Baghdad Bridge Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
			responded to.				
Total cost (Operation phase)							30,000

An institutional framework and strategy for the involved official institutions were suggested in order to strengthen the capacity buildings in the field of the environmental monitoring and reporting procedures and methodologies. The suggested capacity development requirement is a consolidated training for all RBD/PMT environmental/social field supervisors to save on the training costs.

Table E5: Capacity development requirement for RBD

Capacity development topic		Provider(s)	Duration	Estimated Cost (US\$)
1	Environmental and social Impact Assessment Environmental and social Management in Construction Sites	Consultant	3 Days	3,000
2	Iraqi Environmental Legal Requirements	Ministry of Environment	1 Day	2,000
3	World Bank Environmental and Social Safeguards	The World Bank	2 Days	10,000 (international travel and accommodation cost for RBD trainees)
Total Estimated Cost				\$15,000

PUBLIC CONSULTATION RESULTS

Objectives of the Consultations

World Bank policies require that broad and open public consultations be held with the project affected peoples (PAPs) on the project. These consultations are to ensure that PAPs are provided with the opportunity to engage in the rehabilitation planning process, to raise questions and receive input and responses to their concerns. However, due to the current security situation in the project area and taking into utmost consideration the safety of the people as public meetings may be targeted by terrorist, the public meeting approach was not achievable.

Consultation Process

In order to fulfil the WB requirements, a one on one interviews with both men and women was adopted to obtain sound information on the possible impacts on the local communities. Accordingly, a questionnaire was formatted to cover the key environmental and social aspects related to the project. The questionnaire was then addressed to a number of the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities.

In addition, the draft ESIA and its translated executive summary were published on the RBD's website to allow for feedback and wider dissemination of information related to the planned activities under this project.

Furthermore, and due to the importance of the NBB, many different programs on different TV broadcasting networks have addressed the importance of rehabilitation of the NBB in order to encourage the decision makers to start the repair of the NBB as

soon as possible. The talk shows emphasized how the reinstatement of normal traffic on the NBB will improve the traffic management in the local area and in Baghdad in general. Similarly, many websites and campaigns in the social media like Facebook have features remarks from the local residents and NBB users expressing their opinion, suggestions, and concerns regarding the rehabilitation activities. Therefore, the social media represent a very good indication and relatively good questionnaire about the rehabilitation of the NBB.

Findings of the Consultations

It can be concluded from these programs, social media webpages and individual interviews that the rehabilitation activities will have a strong positive impact from the social perspectives on the locals and a positive impact on their social daily life. None of the people recorded or alleged regarding the ownership of the land were the bridge in constructed or mentioned to any removing to vegetation covers, crops, plants, trees. All the comments mentioned that the reconstruction of the bridge will enhance the social relationship among the locals, improving their transport. Finally, most people agreed that the bridge will need some additional safety signs and instructions in order to keep the movement on the bridge within safe conditions. Please refer to annex (3) for more details.

GRIEVANCE REDRESS MECHANISM (GRM)

Objectives of the GRM

Bank procedures require that Grievance Redress Mechanisms (GRMs) be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works for third party settlement of disputes arising from resettlement. This GRM should take into account the availability of judicial recourse as well as traditional and community dispute resolution mechanisms.

Accordingly, a GRM will be established at the project level to ensure any grievance can be addressed in an amicable manner. Resolving complaints at community level is always encouraged to address the problem that a person may have during implementation and/or operational phase.

In any case, the PMT must maintain records of grievances and complaints, including minutes of discussions, recommendations and resolutions made.

Distribution of GRM Forms

During individual interviews, information about a grievance mechanism was introduced to interviewed individuals and a translated GRM form was also provided. All interviewed people were informed that they can submit their complaint to either site engineer, or to community leader or to PMT during construction. The community leaders' contact information (mobile phone number) and PMT contact information (office and mobile phone numbers) will be available before implementation starts. There will be signs posted at the entrance of the bridges (Refer to Annex 1 for more details).

CONCLUSION AND RECOMMENDATIONS

The EIA concludes that the proposed rehabilitation and reconstruction of North Baghdad Bridge will have an overall significant positive impact on the affected population. The implementation of the recommended mitigation measures especially during the construction phase will ensure that potential negative environmental impacts are addressed.

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1. INTRODUCTION

According to the ESMF which has been prepared for the EODP and disclosed locally in Iraq and on the World Bank's InfoShop, simplified Environmental and Social Impact Assessment (ESIA) should be prepared, cleared and publically consulted upon prior to the commencement of any construction activities for the roads and bridges component.

The concept of the Environmental and Social Impact Assessment is to propose measures to protect the environmental, social and socio-economic situation of the communities that may be adversely affected by development of the project, and to assist the competent authorities in taking decisions regarding the approval conditions for the project. This ESIA was developed to cover the activities associated with the rehabilitation and operation of **North Baghdad Bridge**.

The ESIA identifies key environmental and social impacts of the project activities during both the rehabilitation and the operational phases, and defines the necessary mitigation measures addressing potential negative impacts, as well as monitoring procedures during construction and operation. The ESIA study was carried out according to requirements of the current environmental regulations of the World Bank (OP 4.01), and Iraqi regulations. In this report the WB, and Iraqi environmental and social standards and regulations were followed to ensure the national and international acceptance and compliances of the ESIA. An Environmental and Social Management Plan (ESMP) is prepared and embedded in this ESIA which should be followed and implemented by all relevant parties.

The objectives of this site specific ESIA are to provide:

- Practical and achievable actions to ensure that the project's adverse environmental and social impacts are properly mitigated.
- An integrated plan for monitoring, assessing and controlling potential impacts.
- Support to Local and State authorities to enable setting approval conditions for the project based on relevant standards and procedures.
- Focus on positive aspects and benefits, mitigate negative impacts and avoid serious and irreversible damage to the environment and people
- An opportunity for holding consultation with the communities to get their input on the project activities.
- Information to the local community about the revised project activities and the environmental measures, socio-economic measures, information on residents' rights for those who might be negatively affected by some project activities and bridge operations,
- Information to the local community of the existence of a Grievance Redress Mechanism (GRM) system through which they might lodge complaints and expect prompt and fair consideration.

This ESIA establishes a framework for the identification of environmental and social protection, mitigation, monitoring measures to be taken during rehabilitation and operational phases of the project. The ESIA includes project description, mitigation measures, monitoring plan, management plans schedule, institutional arrangements, and public consultation. The ESIA will aim to achieve a good environmental and social performance during construction and maintenance. To meet this goal, the following activities, measures and programs must be followed:

- Environmental regulations
- Application of all environmental and social mitigation and management measures.
- Environmental and social monitoring plan.
- Emergency and contingency plan.
- Institutional plan.
- Environmental and safety measures.
- Effective and open consultations with local communities.

Environmental and social monitoring is an important component of the ESIA. It provides the information for periodic review and refinement modification of the ESIA as necessary, ensuring that environmental and social protection is optimized in all project phases through monitoring and early detection and effective remediation of unwanted environmental and social impacts. Lastly, it will also demonstrate compliance with national and international regulatory requirements.

2. PROJECT DESCRIPTION

2.1 Introduction

The North Baghdad Bridge (NBB) called also Al-Muthana Bridge is located within Baghdad Governorate. It connects the northern governorates to the central and southern governorates via a highway. In addition to that, it connects both sides of Baghdad Karkh and Rusafa to the northern districts.

The NBB is heavily used for business, commercial and personal purposes. Many students from the surrounding cities in the northern Governorates use also NBB to access the Universities in the City of Baghdad.

NBB is considered as a strategic bridge for military purposes in terms of organizing, supplying and preparing for the liberation and the rehabilitation of cities close and around Mosul Governorate.

Current Condition of the Bridge

Currently, the NBB is partially accessible to traffic through its non-damaged section. After the bombing of the bridge, the Roads and Bridges Directorate, with assistance from one of the State Owned companies specialized in bridge construction, closed the damaged sections and removed the obstructing debris while allowing traffic (in both directions) to proceed on the remaining segment of the bridge which was found safe for usage. While this was an urgent and immediately needed measure to reinstate the connectivity across the river, the current situation is not sustainable not only due to the safety aspects but due to the heavy traffic crossing the river using the NBB on daily basis in both directions.

2.2 Project Location

The North Baghdad Bridge is located at the North of the City of Baghdad as can be shown in the Figure below.

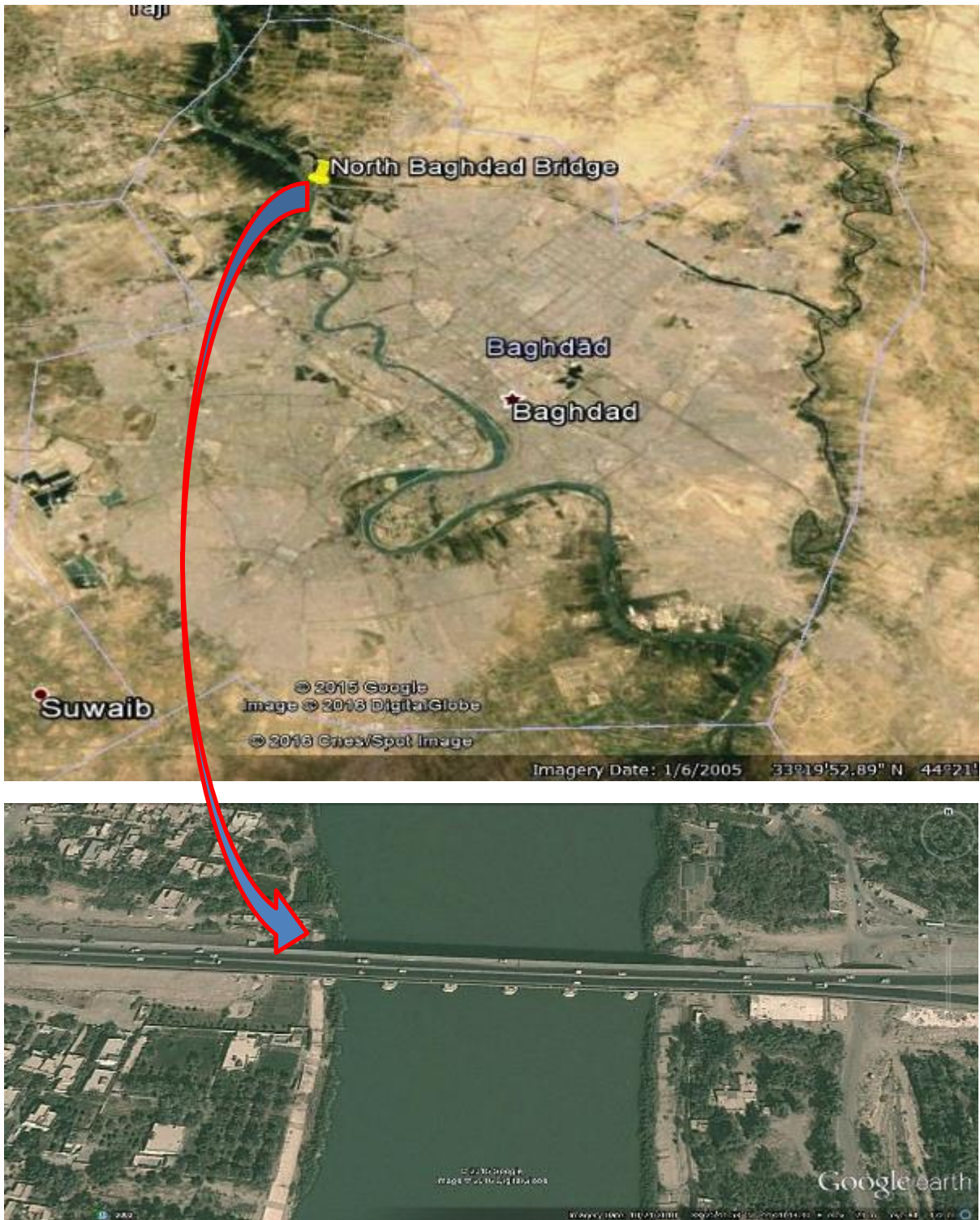


Figure 1: Aerial photo of North Baghdad Bridge location (Google Earth)

2.3 Technical Description of the Bridge

North Baghdad Bridge has a total length about 314m and a width about 22.5m. The bridge is divided into two carriageways and two sidewalks, each carriageway has about 7.2m and consists of two lanes, while each sidewalk has an average width of about 1.5m. The total length of the approaches of the bridge is about 1200m. The superstructure of the bridge consists of 9 spans with post tension concrete girders, eight of these are about 37m long and only one has a length of about 18.5m with simply supported for loading. The substructure of the bridge consists of (8) concrete open walled piers based on 10 piles (1.5m in diameter) and of two concrete abutments which are based on piles.

The following Figures show general views of the bridge and its surroundings.

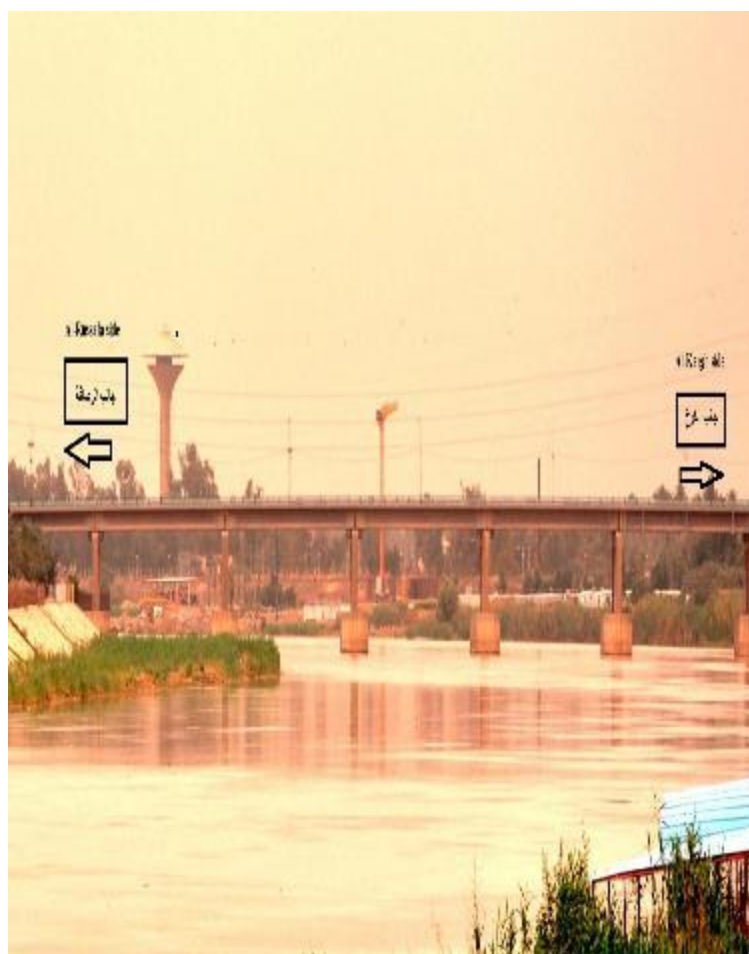


Figure 2: North Baghdad Bridge – Side View



Figure 3: Surroundings of North Baghdad Bridge

Utility lines

There are two major utility lines that cross the bridge and that need to be repaired in coordination with the relevant authorities namely:

- Three potable water pipes, each 900 mm in diameter that supply water to major parts of Baghdad.
- Six electric cables.

2.4 Anticipated construction activities, equipment and facilities

2.4.1 Construction activities

The anticipated duration of construction to finish the project is about 7 months, the rehabilitation works for NBB will include:

1. Structural evaluation for the affected girders at the two damaged spans (third and fourth span) and intermediate pier (p3) which supports these spans.
2. Removal of two damaged spans (third and fourth) which are simply supported spans and transport of rubble to an assigned dumping area.
3. Replacement of 14 damaged post tension girders by steel girders and 22 rubber pads and reconstruction of the damaged pier No. 3.
4. Casting the deck slab (0.25 m thick) and side walk.
5. Supply of 5,000 m² of wearing surface for damaged span and remaining bridge spans.
6. Repair of expansion joints for the whole bridge with all accessories.
7. Supply of 19,000 m² of wearing surface for the bridge surroundings.
8. Treatment of partially damaged girders (crack injection).
9. Execution of road marking and curbstone.

10. Installation of hand, guard rail and lighting poles, and operational lighting for bridge.
11. Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders).
12. Putting the utility lines into service (three water pipes – 900mm diameter each- and six power cables).

2.4.2 Construction equipment

The following is a description of the types and numbers of construction equipment that are expected to be used during the execution of works and their relevant operation period.

Table 1: Equipment to be used in the rehabilitation of NBB

Item No.	Type of Equipment	Quantity	Operation Period
1	30 – ton crane	2	60days
2	Compressor (diesel) 370 Airman	2	60 days
3	Jack – hammer (low noise)	2	20 days
4	Shovel (Kawasaki 70) or equivalent	2	6 months
5	Typical lorry with tipping, skipping Body to load of transport the demolished material	4	7 days
6	Truck mixer	4	7 days
7	Asphalt grinder	1	7 days
8	Bitumen tanker	1	7 days
9	Asphalt finisher	1	10 days
10	Compactor (steel & rubber tube)	2	10 days
11	Welding machine (set)	2	7 months
12	Diesel generator 30 K.V.A	2	7 months
13	Grader (Komatsu)	1	2 months
14	Pickups & sedan cars	3	7 months
15	Air shot, bell, bugger	3	7 months

2.4.3 Construction site facilities

The construction site will include offices and accommodation for the workers that will be equipped with air conditioning and toilet. Potable water tanks will be provided and septic tanks will be constructed for disposal of human sewage. All these facilities will be installed over state owned land available around the bridge; therefore, there will be no need land acquisition. As most of the workers will be from local residents, the need for staff accommodation will be very limited. Most of the workers will reside at their homes.

3. BASELINE CONDITIONS

3.1 The Project Area

Baghdad city and its suburban area have a long history that dates back to the Mesopotamian civilization. Although it is the capital of Iraq and the industrial sector is the pillar of its economic activity, many other sectors are also active in Baghdad such as agriculture.

The project is located at the North of Baghdad City in an uncongested area. To the east and west of the North Baghdad Bridge there are farms mainly cultivated with palm trees. The touristic area (Jazira area) is about 1 Km to the north of the bridge and the East Tigris Drinking Water treatment plant is about 1.1Km to the south of the project.

The following Figure shows the different land uses in the direct area around the bridge.

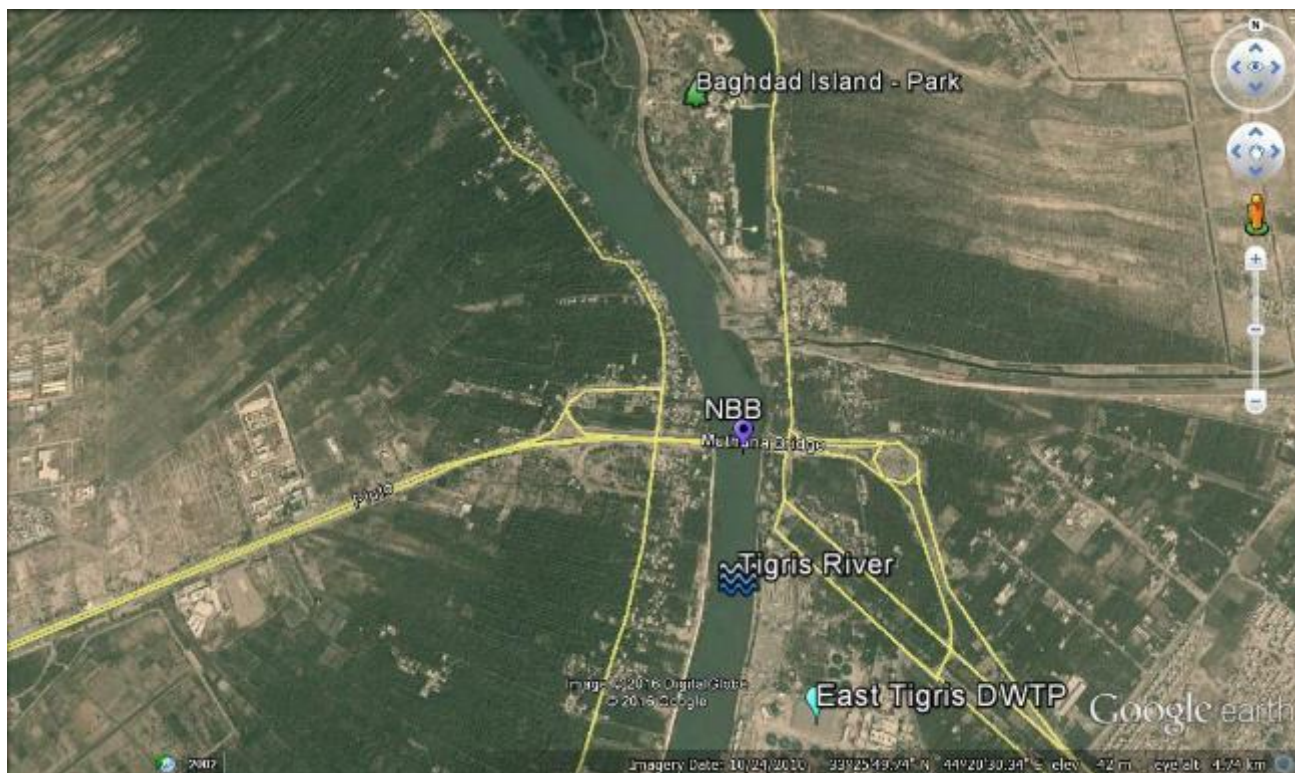


Figure 4: Aerial photo showing the surrounding environmental and social setup (Google Earth)

3.2 Environmental and Social Baseline conditions

The section below gives a clear overview of the environmental and social conditions in the vicinity of the project location prior to commencement of works. The elements of the environment include: climate and meteorology, air quality, surface and groundwater quality, soil, topography, noise and vibration levels, traffic, rivers and waterways, biodiversity including flora, fauna, rare or endangered species, and sensitive habitats. It also includes consideration of socio-economic characteristics such as population and land-use. The following sections present such information.

3.2.1 Climate

Baghdad governorate is located in the center of Iraq, and has a subtropical desert (Köppen-Geiger classification: BWh)

Rainfall

Baghdad is subjected to an average of 156 mm (6.1 in) of rainfall per year, or 13 mm (0.5 in) per month. On average there are 34 days per year with more than 0.1 mm (0.004 in) of rainfall (precipitation) or 2.8 days with a quantity of rain, sleet, snow etc. per month. The driest weather is in June, July & August, September when an average of 0 mm (0 in) of rainfall (precipitation) occurs while; the wettest weather is in February & March when an average of 28 mm (1.1 in) of rainfall (precipitation)¹ occurs.

Wind velocity

The wind regime is characterized by the winds prevailing from the western and north-western direction throughout the year. Mean annual wind velocity reading 2.1-3.9 meter per second,².

Monthly mean wind velocity records in recent years are shown in the following Table¹.

Table 2: Monthly Mean Wind Velocity

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Velocity m/sec	2.0	2.2	3.0	2.8	3.1	5.4	3.2	5.0	2.5	2.3	2.7	2.8

Temperature

The average annual temperature is 22.8 degrees Celsius. The Highest temperatures occur in July and August and reach over 48 degrees Celsius while low temperatures can drop to below 0 degrees Celsius during winter.

Monthly mean temperature records in recent years are shown in the following Table².

Table 3: Monthly Temperature

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average (°C)	10	13	16	22	28	32	34	35	31	25	18	12
Average Max (°C)	16	19	22	29	36	41	43	44	40	34	25	18

3.2.2 Air Quality

There are no monitoring stations close to the site. As North Baghdad Bridge is located in an open area, concentrations of pollutants are not expected because of the good ventilation and potential dispersion of air pollutants. The Table below gives indications of the maximum permissible concentration for SO₂, NO₂ and CO according to WB and Iraqi Standard.

¹ <http://www.baghdad.climatemps.com/precipitation.php>

Table 4: Maximum permissible concentrations for SO₂, NO₂ and CO

Reference	Time	SO ₂ [ppm]	NO ₂ [ppm]	CO [ppm]
World Bank	24 h	125	-	2-
Iraq	8:00:00 AM	0.0023	0.011	0.548
	12:00:00 AM	0.0036	0.038	1.211

3.2.3 Site Topography

The project site area presents an extension of the flat areas that start from the center of Iraq and extend to the center-southern parts of the country. There are no natural land obstacles in the project area such as mountains, cliffs, and valleys.

3.2.4 Land use

The land use of area surrounding the project is used mainly for agricultural purposes although, a number of scattered houses were noticed within a distance less or equal to 200m from Al-Karkh side.

3.2.5 Seismic Activities

No Seismic activities were recorded for more than 40 years.

3.2.6 Floods

The construction of retaining structures on Tigris upstream of Baghdad has reduced the substantiality of floods.

During war, bridges on Tigris River were damaged and large pieces of concrete fell down in the river. Large debris were removed from the river bed but the small parts that remained created obstacles to the flow within the river and enhanced the formation of islands.²

Recent researches on Tigris river, from Al-Muthana Bridge to Diyala River predicted that inundation could take place along approximately 9 km of the reach surveyed only if discharges greater than 3500m³/s are recorded³

3.2.7 Traffic Level

Currently the traffic is moderate because many vehicles (especially heavy trucks) use the alternative road around Baghdad that passes through Al-Karkh and that has a length of about 40km. Due to the current situation of the bridge, the traffic moves slowly especially at its sides.

² Al-Shahrabaly, Q. M.: River discharges for Tigris and Euphrates gauging stations, Ministry of Water Resources, Baghdad, 2008.

³ A, Ali, N.A. Al-Ansari and S. Knutsson (Morphology of Tigris River within Baghdad City) , Hydrol. Earth Syst. Sci., 16, 3783–3790, 2012

3.2.8 Noise

Except for the existing normal traffic, no other source of significant noise generation was identified in the area. The nearest sensitive receptors are the workers and contractor staff and the inhabitants. The nearest residential unit is at 100 m from the bridge.

Table 5: World Bank limits for ambient noise levels

WB Requirements		
Receptor	One hour L_{Aeq} (dBA)	
	Day 07:00– 22:00	Night 22:00 - 07:00
Residential; Institutional; educational	55	45
Industrial; commercial	70	70

3.2.9 Heritage Environment

Further to site survey and consultation with the relevant authorities, it was noted that there are no sites of historical or cultural importance in the area of the bridge and its surroundings, and therefore the rehabilitation and operation of the bridge will not have any impact on archaeology or cultural heritage. No cemeteries, historical-cultural monuments, churches, mosques that exist in the area need to be removed in order to rehabilitate the bridge.

3.2.10 Flora & Fauna

Significant wild life and flora species were not observed in the Project area.

3.2.11 Land Acquisition

As the works consist of the repair and rehabilitation of an existing bridge, there will be no need to purchase additional land.

3.2.12 Social Aspects

There are no villages, residential complexes or community structures in close proximity to the bridge. However, there are scattered houses on AL-Karkh side which is far from the damaged spans. There aren't any licensed or unlicensed roadside vendors that will be displaced. The surrounding areas on either side of the bridge are not settled on or utilized by any of the local population. There are no livelihoods in the project vicinity that are likely to be adversely affected by the project, hence neither involuntary nor voluntarily relocation of people is necessary or expected.

The nearest residential unit is at 100 m from the bridge and the touristic area (Jazira area) is about 1 Km to the north of the bridge. The East Tigris Drinking Water treatment plant is about 1.1Km to the south of the project. Baghdad University is at 9.2 Km, and Al-Mustansiriyah University is at 10.2 Km.

It also important to mention that the bridge is the only way allowed to be used by the heavy commercial trucks freighter with food, medicine supplies and other materials to Salah AL-Din

governorate. In addition, the bridge is the main way that leads to all cities of Ninawa governorate which would put the need to rehabilitation of it at highly priority.

During construction works, alternative routes can be used such as the ones shown in the following Figure and that are currently taken by the heavy vehicles.



Figure 5: Alternative route for heavy vehicles of North Baghdad Bridge

There are no objections registered from the local community which is eager for the works to be completed. The construction will need about 30-40 workers. As priority will be given to local workers from villages around the bridges, it is expected that the needs for workers' accommodation will be very limited because most of the workers will be staying with their families. Those labors are anticipated to be ongoing for the duration of the implementation (7 months). No influx of workers to the project area is expected which could result in adverse impact.

Application of OP 4.12:

Since the repair and rehabilitation activities of North Baghdad Bridge will not entail permanent nor temporary land acquisition and no impact is expected on the livelihood of the local people, therefore, OP 4.12 does not apply.

4. LEGAL REQUIREMENTS

4.1 Iraqi environmental legislations

The work during rehabilitation and operation must follow the Iraqi laws and regulations for the environmental standards. These are:

- Laws of the environment protection No.3 issued in 1997 and the published regulations. The environmental regulations for gaseous emissions, noise and other air pollution standards are not in force and legally binding. However, limits for water disposal in any surface waters and main sewers are subject to regulation no. (25)/1967 and its modifications published by the Ministry of Health (MOH) and the Ministry of Environment (MOE).
- Law of heritage and antiques no. (55) Issued in 2002. This law defines all movable and immovable antiquities, archaeological properties and artifacts in Iraq. It regulates communication channels between the public and the authorities for each type of Contact between the public and the revealed and non-revealed archaeological sites.
- New environmental framework Law No. 27 of 2009 for the Iraqi national government. This Law was introduced but its executive decrees remain to be prepared. The requirements for environmental assessment are not legally binding.
- Regulations governing contact with archaeological sites extend also to encompass developmental activities like road construction and rehabilitation wherever these developmental activities lie within archaeological vicinity.
- Regulations of the MOE on sanitary waste must be followed, and for the rubbles (construction & demolition waste) the regulations, legislations and instruction of MOHE and (Ministry of Construction, Housing and Public Municipalities) MOCHPM.

The following Table presents the Iraqi's laws applicable to the project's activity.

Table 6: Applicable Environmental Laws and Regulations in Iraq

Applicable Iraqi Law	Subject
Law no. 37 of 2008 of MOE	Describes institutional arrangements of the Ministry of Environment and Outlines policies and roles and responsibilities toward protecting the environment.
Instructions issued by the Ministry of Health pursuant of Law no. 25 of 1967	Contamination Limits and Protection of Rivers.
Law no. 27 of 2009	Protection and Improvement of Environment
laws No.3 issued in 1997	of the environment protection
Regulations no. 2 of 2001	Preserving water resources.

Legally, the works under rehabilitation and operation must follow the Iraqi laws and the regulations for the Environmental Standards. These are laws of the environment protection No.3 issued in 1997 and the published regulations. The following should be noted:

- There are no environmental regulations for gaseous emissions, noise and other air pollution standards that are and legally binding.
- Water disposal into any surface waters and main sewers is regulated by regulation by regulation no. (25)/1967 and its modifications released by the Ministry of Health and the Ministry of the Environment.
- The Law of heritage and antiques no. (55) was Issued in 2002,
- The sanitary waste (municipal) disposal should follow the regulations of the MOE
- For rubbles (construction &demolition waste) the regulations, legislations and instruction of both MOHE and MOCHPM must be followed.

It should be noted that legislation related to social safeguards issued in Iraq since 2003 has focused primarily on the ratification of international conventions and protocols on issues such as cultural heritage. Currently, there aren't Law related to social and environmental assessment.

4.2 The World Bank Safeguards Policies

In addition to the Iraqi laws and regulations the ESIA follows the policies and procedures of the World Bank. The following section presents the WB operational policies that are relevant to the rehabilitation of the bridges that ensure that projects proposed for Bank financing are environmentally and socially sound and sustainable.

4.2.1 OP/BP 4.01 - Environmental assessment procedure

The Bank requires environmental assessment of projects proposed for Bank financing. The objectives of the EA are to:

- Inform decision makers of the nature of environmental and social risks.
- Increase transparency and participation of stakeholders in the decision-making process.

4.2.2 OP/BP4.12 - Involuntary resettlement

OP/BP 4.12 focuses on the following principles:

- Involuntary resettlement is avoided wherever feasible, or minimized, exploring all viable alternative project designs;
- Where it is not feasible to avoid involuntary resettlement, activities are conceived and executed as sustainable development programs. Displaced persons are to be meaningfully consulted and have opportunities to participate in the planning and implementing of resettlement programs affecting them; and
- Displaced persons are assisted in their efforts to improve their livelihoods and standards of living, or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. The mechanism of assisting displaced persons is based on full and prior mitigation and compensation for loss of assets or livelihoods.
- OP 4.12 applies whenever, in a Bank-financed project, land is acquired involuntarily or access is restricted in legally designated parks or protected areas.

- However, in this specific project, OP 4.12 will not be applied for the repair and rehabilitation of this bridge as all repair and rehabilitation activities will be within the existing footprint and no additional land acquisition is needed either permanently or temporarily.

4.3 World Bank Group Environmental, Health and Safety (EHS)

The Iraqi requirements on EHS are quite stringent and match, to a large extent, the international best practices on EHS. The World Bank Group Environmental Health and Safety (EHS) Guidelines (General EHS Guidelines: Construction and Decommissioning) provide specific guidance on EHS requirements for construction related activities (Chapter 4). This includes EHS aspects related to:

- a. Environment
 - Noise and Vibration
 - Soil Erosion
 - Air Quality
 - Solid Waste
 - Hazardous Materials
 - Wastewater Discharges
 - Contaminated Land
- b. Occupational Health and Safety
- c. Community Health and Safety
 - General Site Hazards
 - Disease Prevention
 - Traffic Safety

4.4 Grievance Redress Mechanism

Bank procedures require that GRMs be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works. A checklist of issues to be considered in the design of the GRMs includes the following:

- An inventory of any reliable conflict mediation organizations or procedures in the project area is undertaken and an assessment made to determine if any of these entities or procedures might be used, ensuring that complaints were received and addressed in an effective, timely and transparent manner.
- Good practice is to ensure that Project Affected People (PAP) can apply orally and in the local language and to impose explicit time limits for responding to grievances received. Appeal procedures need to be specified, and this information is made publicly available therefore, allow for both verbal and written grievances to be lodged with the local project authorities, who will transmit these to the local level committee for review, consideration and response.

5. IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Construction/Rehabilitation Phase

This section of the report describes the environmental and social impacts that are likely to result from the construction and rehabilitation of the NBB, and the mitigation measures addressing them.

The Environmental actions, procedures and responsibilities as required during the construction phase must comply with the available specifications, legislation, laws issued by the MOHE.

The construction contractor(s) will be responsible for compliance with the ESIA provisions during the rehabilitation phase of the project. The contractor will be also in charge of undertaking work in a manner which complies with all relevant environmental procedures, adheres to all legislative requirements, and ensures that all environmental objectives associated with the contract are achieved. The key environmental and social impacts are described below.

5.1.1 Impacts on Air Quality

Impacts

The main impacts on air quality will result from the emissions of the construction equipment and trucks used to transport construction materials. In addition, dust will be generated from the movement of vehicles and equipment on unpaved roads as well as the demolition and removal of concrete blocks.

The dust and particulate matters may occur also from accumulated piles of stored inert waste material (stockpiles of ground asphalt, rubble, gravel, and also sand) at/ or near the site prior to their removal for disposal,

As the surroundings of the NBB bridge are characterized by agricultural lands and few scattered houses, the impacts on air quality will be temporary (only for few days during the rehabilitation period which is 7 months) and will be reversed once the rehabilitation works are completed.

Therefore, the impacts on air quality are assessed to be of **low significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Engines of vehicles and other machinery are kept turned on only if necessary, avoiding any unnecessary emission;
- Machines and equipment are periodically checked and maintained to ensure their good working condition;
- All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications;

- Activities are carried out using the minimum required number of means at the same time; and
- Electric small-scale mechanization and technical tools are used when available and feasible.

Concerning dust control methods and measures, the following actions are to be taken into account to reduce the generation of dust:

- Rehabilitate unpaved roads, (e.g. detours to access the construction site, which may be utilized for construction vehicles movement or transportation of construction materials) in a way to avoid dust emissions. A sub base layer of 15 cm and wet compaction should take place to get sufficient compaction to avoid dust emissions.
- Maintain the detour(s) in good conditions.
- Watering or increasing the moisture level of the open materials storage piles to reduce dust levels;
- Enclose or cover inactive piles to reduce wind erosion;
- Spray with water all trucks loads transporting dust-generating materials to suppress dust, as well as wheels of means moving inside and outside of the construction-site; and
- Reduce speed for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr.

5.1.2 Noise impacts

Impacts

Currently the only source of noise is the road traffic. Once the rehabilitation works start the nearest sensitive receptors are the workers and contractor staff. On-site the noise level will be expected to exceed the permissible limits. The impact of the noise on the inhabitants will be low due to attenuation. The noisiest equipment that will be used during the rehabilitation being the scraper and the leveler. They generate a noise of 111 dB. By applying the simple inverse square law, and considering that there is no barrier between the bridge and the nearest residential unit, the noise level that will reach the residential unit is estimated at 51 dB. For comparison purposes, the World Health Organization (WHO) Noise level guidelines for residential areas is 55 dB.

However, the noise will not be continuous and noisy activities will not be allowed to take place at night to prevent any inconvenience for the nearest community. As for on-site workers, the personal protective equipment should be used in order to reduce the impact of the noise and for the all period of work. Therefore, the noise level will have minimal impacts on the workers and contractor staff from the emission sources identified and it will be expected to be less than 70 db. The following will be expected to be the main sources for noise impacts on the surrounding receptors:

- Noise emissions from the equipment engines used during the construction activities (earth works, breaking of damaged blocks, use of jack hammers, cutting of steel, etc.);
- Movement of trucks and other equipment from and to the construction site.

Noise impact was evaluated considering the equipment that could operate simultaneously in the construction site. In the following Table equipment typologies and sound power levels are reported.

Table 7: Expected Noise levels of machinery to be used in NBB Project

Machinery	Noise Level Lw (dB)
Excavators	105.9
Truck	105.9
Scrapers and levelers	111
Rollers	99.2
Asphalting machines	100
Truck cranes	108.3
Generating sets	97.3
Motor-driven compressors	99.2
Fork lifts	101

The Lw values were determined based on the equipment model based on equipment with similar features and comparable power. Noise impacts will mainly affect the construction workers and may also affect the nearby houses.

The noise impacts will be temporary, short term and localized therefore it is assessed to be of **low significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Perform construction activities within reasonable hours during the day. Night-time activities near noise sensitive areas, such as residential buildings, should not be allowed.
- Keep equipment in good working order and where appropriate fitted with silencers that should also be kept in good working order.
- Run equipment only when necessary;
- Position the noise sources in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site.
- Implement an effective Grievance Redress Mechanism (GRM) to allow nearby communities to complain about any noise impacts.

5.1.3 Impacts on water resources

Impacts

The potential impacts on the water environment derived from the NBB construction activities are presented in this section with particular reference to:

- **Impacts related to Water Consumption**

During construction phase, water will be needed for domestic and potable use of the staff (estimated at 60 l/d per worker), for soil watering and spraying to suppress dust and to clean the equipment and the work site offices. The water used for domestic purposes are provided

by licensed service providers via trucks. The source of this water is via the local water network in locations identified by the municipality. Normally, the same source of water is used for spraying and equipment cleaning. Drinking water is provided as purified bottled water.

Signage for water conservation will be placed on site to encourage workers to conserve water consumption.

- **Impacts related to Ground Water**

The construction sites will be equipped with worker/engineer's caravans that will be having lavatory facilities (toilets and sinks). Improper wastewater disposal on soils may percolate to ground water and thus causes contamination of subsurface/ground water table.

Contaminated wastewater by engine oils or lubricant after washing of equipment or by accidental spills may percolate to the soil thus polluting the ground waters and affecting its ecosystem.

- **Impacts related to Surface Water**

Contaminated wastewater by engine oils or lubricant may also find its way to the river stream thus polluting its waters and affecting its ecosystem.

If the damaged concrete blocks, currently immersed in the river stream, are broken into small pieces to be able to lift them out of the river, the generated dust will fall into the water stream and will increase the suspended solids which will in turn affect the surface water quality. However, the removal of the remaining debris will reduce the risk of floods.

In addition, improper disposal of any liquid or solid wastes into the river may pollute its waters or block the water flow.

If wastewater collected from construction site is discharged into the water stream, it will cause pollution to the river surface water.

Erosion and runoff due to precipitation is considered of low impact due to the low rate of precipitation and rainfall.

Material storage areas should be well isolated from storm water to prevent the contamination of the runoff

Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies

The overall impact related to surface water is temporary and reversible and is considered negligible because the quantities of water involved are relatively small, and they will be required over a short period of time. However, although the rehabilitation activities are temporary, the pollution of the river water and underground water is assessed to be of **medium significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Remove damaged sections of the bridge which are immersed in the river carefully without polluting the river water.
- In case of big volumes of the damaged sections which need to be broken into smaller size blocks, use geotextile meshes or other suitable means to prevent the dispersion of cement dust into the water stream.
- Monitor the water quality in specific locations upstream and downstream of the site to ensure that water quality is not adversely affected.
- Make sure wastewater from the worker rest areas or construction offices is contained in solid bottom containers and removed regularly from site by means of authorized contractors. The wastewater should be disposed in wastewater treatment plants as determined by the municipality.
- Using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval.
- Install and maintain a proper workshop to maintain the engines (change lubricant or refuel) and a shelter ensure containment of any fuel or oil spills.
- Strictly forbid disposal of solid wastes in the river.
- Use of paints or chemicals should be done away from the river. However, if non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water.
- The contractor shall present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities.
- The contractor to submit to the Resident Engineer for approval a comprehensive emergency plan including all the needed steps and procedures in order to have a good confinement of any emergency situation related to accidents and spillages.
- Isolate material storage areas to prevent the contamination of the runoff
- Wash construction vehicles and machinery only in designated areas where runoff will not pollute natural water bodies

5.1.4 Impacts on soil

Impacts

The removal of vegetation and large-scale excavation activities for the construction may increase of soil erosion. However, there aren't any vegetation in the Project's site hence impact related to soil erosion is insignificant. Furthermore, the construction activities will not cause changes in geomorphologic landforms and site setting.

Improper disposal of solid or liquid wastes may pollute the surrounding soils. Accidental oil and fuel spills may also result in contaminating soils.

Due to the temporary and limited rehabilitation activities, soil contamination impacts are assessed to be of **low significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Use appropriate and enclosed containers for hazardous waste storage. Do not place hazardous waste directly on soils.
- Prevent soil contamination by oil/grease spills, leakages or releases. All manipulations of oil derivatives in the process of construction and provision of the fuel to the machines should be performed with maximum care; leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal;
- Collect construction waste and debris on a regular basis and dispose them of at designated landfills;
- Use authorized quarries only when purchasing soil to be used for embankment, padding, bedding, backfilling during construction;
- Do not operate equipment and vehicles outside the designated work areas and roads.
- The contractor shall present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities.

5.1.5 Solid and hazardous wastes

Impacts

The present section discusses the potential environmental and social impacts of waste associated with the Project construction phase throughout the stages of the waste management process, during temporary storage on the site area and at the disposal of wastes.

The construction phase will be carried out through different activities as civil, mechanical, piping electrical, etc. which in turn will generate volumes of waste with typology characteristic of the nature of each activity.

In general, waste generated during construction phase shall be divided into:

- Construction waste;
- Municipal solid waste;
- Other waste related to the maintenance activities of machines.

Solid construction waste typically includes concrete, asphalt, wood, plastic, glass, metals and other composite materials.

Hazardous waste potentially generated during construction activities includes empty paints/chemical containers, equipment batteries, and trash such as oil contaminated material, and similar. Removed asphalt will also be considered as hazardous wastes.

The quantities of solid and hazardous wastes are expected to be moderate but due to the weaknesses in the capacity of the local authorities in managing solid and hazardous wastes and lack of waste management facilities, the impacts of solid and hazardous wastes are assessed to be of **medium significance**.

Mitigation measures

- Minimize waste generation on site.
- Develop simple waste management plan for specific waste streams.
- **Collect and transport general waste to disposal sites approved by the local municipality**
- Where realistic, collect food wastes, considering health and hygiene issues, for disposal off-site through licensed contractors.
- Locate waste containers at each worksite.
- Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service.
- **Conduct storage, transport and handling of all chemicals in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority.**
- Store all hazardous wastes appropriately in bounded areas and clearly identify them as “hazardous”.
- **Transport and dispose of hazardous wastes through licensed contractors and in close coordination with the relevant local authority and in compliance with the legal requirements and instructions of the coordination with the as Ministry of Science and Technology (MOST).**
- Manage hazardous liquids, such as solvents, rust proofing agents and primer in accordance with the requirements of relevant legislation and industry standards.
- Prepare a hazardous materials inventory for the construction period.
- Explain to workers and make the Material Safety Data Sheets (MSDS) for hazardous materials available on-site during construction
- **Collect hydrocarbon wastes, including lube oils, for safe transport off-site and potential reuse, recycling, transport or disposal at approved locations.**
- The contractor shall present accidents and spill response and cleanup plan of hazardous water to the resident Engineer for approval prior to construction works activities .
- Report accidents due to the hazardous waste dispersion response to resident Engineer

5.1.6 Flora & Fauna

Except for agricultural crops, fruit trees and farmland animals, there is no observed wild life or significant naturally grown plants or flora species due to the human activities and presence in the area.

No rare or endangered species were identified within or nearby the project site.

5.1.7 Topography and landforms

The local topography will not be altered by the project activities

5.1.8 Impacts on local traffic

Impacts

The rehabilitation of the bridge will require the blockage of the traffic over this bridge. This will result in increasing traffic levels in other locations which will be used as alternative routes. Therefore, it is expected that air pollution and noise levels will increase in the alternative routes. In addition, an increase in the travel time due to the traffic diversion may occur which may result in increased transportation costs of goods and passengers. In addition, disturbance and inconvenience to the local population may result due to the route diversion.

The route diversion will be temporary until the rehabilitation activities are completed. Also the alternative route which is selected to be an alternative for this bridge is not far from the existing bridge. Furthermore, the suggestive route diversion will not be close to any farmlands, or passing through any private territories, therefore the overall impacts of the rehabilitation activities on the local traffic is expected to be of **low significance**.

Mitigation measures

Since it is unavoidable to stop traffic on the bridge during rehabilitation works, the following measures can be taken to mitigate the negative impacts of the route diversion:

- Provide information, through appropriate signage, to the bridge users to use the alternative route;
- Upgrade the alternative route to be able to receive the additional number of vehicles.

In order to minimize air and noise impacts associated with traffic generated by the project's machinery and equipment, the following measures must be implemented:

- Where practicable, truck deliveries must be restricted to daytime working hours.
- Dangerous goods must be transported along routes preferred for dangerous goods,
- Clear traffic signs and signs signals must be installed on-site to provide for safe traffic.

5.1.8 Health and Safety

Impacts

During the rehabilitation phase of the project, there are risks to human health

Potential hazards for workers in construction include:

- Falls (from heights);
- Trench collapse;
- Scaffold collapse;
- Electric shock and arc flash/arc blast;
- Failure to use proper personal protective equipment; and
- Repetitive motion injuries.

The above risks are considered of high importance and need appropriate mitigation measures. As for the emission of pollutants in the air, the potential impact of rehabilitation activities was

found to **be low**. If compared to the regulation limits, the expected concentrations of the various pollutants that could be generated from the site, are not expected to overcome the limits overcoming has occurred.

Similarly, the levels of noise that are expected from the site works are expected to be within acceptable limits and the impact is expected to **be low**.

There are no risks or impacts related to workers' accommodation, public health/communicable disease, or working at heights that are expected as all the needed logistics for the proper and healthy working environment will be provided by the contractor on-site.

Mitigation measures

In order to minimize these risks, the following mitigation measures are proposed:

- Limit speed of construction vehicles and provide road signage for drivers and local community.
- Employ qualified personnel for the use of construction equipment, and train them for health and safety related issues.
- Supply personal protection equipment such as eyeglasses, gloves, hard heads and safety belts and continuously monitor their use by all workers, technicians, engineers and site visitors.
- Comply with international standards for good construction practices;
- Adhere to local and international guidance and codes of practice on Environmental Health and Safety (EHS) management during construction including management, supervision, monitoring and record-keeping;
- Implement EHS procedures as a condition of contract with contractors and their sub-contractors;
- Clearly define the EHS roles and responsibilities of the companies involved in construction and to individual staff (including the nomination of EHS supervisors during construction and an EHS coordinator during operation);
- In the Pre-construction phase, assess the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices;
- Provide appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues;
- Provide health and safety information;
- Regularly inspect, review and record EHS performance;
- Putting on a safety harness and connecting it, via an energy-absorbing lanyard, to a suitable anchor point for staff working at the sides of the bridges”
- Provide a comprehensive Health and Safety Manual for approval by the Engineer and implementation by all workers and engineers.

- Maintain standard of housekeeping at all times.
- Prepare an emergency plan that covers all the potential risks that may result from different civil work activities. Such plan must deal with the following items:
 - Reporting on accidents
 - Treat minor injuries on site using a first aid procedure
 - Train the workers on safety
 - Equip fuel and oil changing shelters with necessary firefighting and safety equipment.

Specific health and safety mitigation measures include:

1. Scaffolding

- Scaffold must be sound, rigid and sufficient to carry its own weight plus four times the maximum intended load without settling or displacement. It must be erected on solid footing.
- Unstable objects, such as barrels, boxes, loose bricks or concrete blocks must not be used to support scaffolds or planks.
- Scaffold must not be erected, moved, dismantled or altered except under the supervision of a competent person.
- Scaffold must be equipped with guardrails, midrails and toeboards.
- Scaffold accessories such as braces, brackets, trusses, screw legs or ladders that are damaged or weakened from any cause must be immediately repaired or replaced.
- Scaffold platforms must be tightly planked with scaffold plank grade material or equivalent.
- A "competent person" must inspect the scaffolding and, at designated intervals, reinspect it.
- Rigging on suspension scaffolds must be inspected by a competent person before each shift and after any occurrence that could affect structural integrity to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.
- Synthetic and natural rope used in suspension scaffolding must be protected from heat-producing sources.
- Employees must be instructed about the hazards of using diagonal braces as fall protection.
- Scaffold can be accessed by using ladders and stairwells.
- Scaffolds must be at least 10 feet from electric power lines at all times.

2. Fall protection

- Consider using aerial lifts or elevated platforms to provide safer elevated working surfaces;
- Erect guardrail systems with toeboards and warning lines or install control line systems to protect workers near the edges of floors and roofs;
- Cover floor holes; and/or

- Use safety net systems or personal fall arrest systems (body harnesses)

3. Elevated Surfaces

- Signs are posted, when appropriate, showing the elevated surface load capacity.
- Surfaces elevated more than 48 inches above the floor or ground have standard guardrails.
- All elevated surfaces (beneath which people or machinery could be exposed to falling objects) have standard 4-inch toeboards.
- A permanent means of entry and exit with handrails is provided to elevated storage and work surfaces.
- Material is piled, stacked or racked in a way that prevents it from tipping, falling, collapsing, rolling or spreading.

4. Ladders

- Use the correct ladder for the task.
- Have a competent person visually inspect a ladder before use for any defects such as:
 - Structural damage, split/bent side rails, broken or missing rungs/steps/cleats and missing or damaged safety devices;
 - Grease, dirt or other contaminants that could cause slips or falls;
 - Paint or stickers (except warning labels) that could hide possible defects
 - .
- Make sure that ladders are long enough to safely reach the work area.
- Mark or tag ("Do Not Use") damaged or defective ladders for repair or replacement, or destroy them immediately.
- Never load ladders beyond the maximum intended load or beyond the manufacturer's rated capacity.
- Be sure the load rating can support the weight of the user, including materials and tools.
- Avoid using ladders with metallic components near electrical work and overhead power lines.

5. Head protection

- Be sure that workers wear hard hats where there is a potential for objects falling from above, bumps to their heads from fixed objects, or accidental head contact with electrical hazards.

6. Hazard communication

- A list of hazardous substances used in the workplace is maintained and readily available at the worksite.
- There is a written hazard communication program addressing Material Safety Data Sheets (MSDS), labeling and employee training.

- Each container of a hazardous substance (vats, bottles, storage tanks) is labeled with product identity and a hazard warning(s) (communicating the specific health hazards and physical hazards).
- Material Safety Data Sheets are readily available at all times for each hazardous substance used.
- There is an effective employee training program for hazardous substances.

7. Crane Safety

- Cranes and derricks are restricted from operating within 10 feet of any electrical power line.
- The upper rotating structure supporting the boom and materials being handled is provided with an electrical ground while working near energized transmitter towers.
- Rated load capacities, operating speed and instructions are posted and visible to the operator.
- Cranes are equipped with a load chart.
- The operator understands and uses the load chart.
- The operator can determine the angle and length of the crane boom at all times.
- Crane machinery and other rigging equipment is inspected daily prior to use to make sure that it is in good condition.
- Accessible areas within the crane's swing radius are barricaded.
- Tag lines are used to prevent dangerous swing or spin of materials when raised or lowered by a crane or derrick.
- Illustrations of hand signals to crane and derrick operators are posted on the job site.
- The signal person uses correct signals for the crane operator to follow.
- Crane outriggers are extended when required.
- Crane platforms and walkways have antiskid surfaces.
- Broken, worn or damaged wire rope is removed from service.
- Guardrails, hand holds and steps are provided for safe and easy access to and from all areas of the crane.
- Load testing reports/certifications are available.
- Tower crane mast bolts are properly torqued to the manufacturer's specifications.
- Overload limits are tested and correctly set.
- The maximum acceptable load and the last test results are posted on the crane.
- Initial and annual inspections of all hoisting and rigging equipment are performed and reports are maintained.
- Only properly trained and qualified operators are allowed to work with hoisting and rigging equipment.

8. Forklifts

- Forklift truck operators are competent to operate these vehicles safely as demonstrated by their successful completion of training and evaluation.
- No employee under 18 years old is allowed to operate a forklift.
- Forklifts are inspected daily for proper condition of brakes, horns, steering, forks and tires.

- Powered industrial trucks (forklifts) meet the design and construction requirements established in American National Standards Institute (ANSI) for Powered Industrial Trucks, Part II ANSI B56.1-1969.
- Written approval from the truck manufacturer is obtained for any modification or additions which affect capacity and safe operation of the vehicle.
- Capacity, operation and maintenance instruction plates, tags or decals are changed to indicate any modifications or additions to the vehicle.
- Battery charging is conducted in areas specifically designated for that purpose.
- Material handling equipment is provided for handling batteries, including conveyors, overhead hoists or equivalent devices.
- Reinstalled batteries are properly positioned and secured in the truck.
- Smoking is prohibited in battery charging areas.
- Precautions are taken to prevent open flames, sparks or electric arcs in battery charging areas.
- Refresher training is provided and an evaluation is conducted whenever a forklift operator has been observed operating the vehicle in an unsafe manner and when an operator is assigned to drive a different type of truck.
- Load and forks are fully lowered, controls neutralized, power shut off and brakes set when a powered industrial truck is left unattended.
- There is sufficient headroom for the forklift and operator under overhead installations, lights, pipes, sprinkler systems, etc.
- Overhead guards are in place to protect the operator against falling objects.
- Trucks are operated at a safe speed.
- All loads are kept stable, safely arranged and fit within the rated capacity of the truck.
- Unsafe and defective trucks are removed from service.

9. Electrical Safety

- Work on new and existing energized (hot) electrical circuits is prohibited until all power is shut off and grounds are attached.
- An effective Lockout/Tagout system is in place.
- Frayed, damaged or worn electrical cords or cables are promptly replaced.
- All extension cords have grounding prongs.
- Protect flexible cords and cables from damage. Sharp corners and projections should be avoided.
- Use extension cord sets used with portable electric tools and appliances that are the three-wire type and designed for hard or extra-hard service. (Look for some of the following letters imprinted on the casing: S, ST, SO, STO.)
- All electrical tools and equipment are maintained in safe condition and checked regularly for defects and taken out of service if a defect is found.
- Do not bypass any protective system or device designed to protect employees from contact with electrical energy.
- Overhead electrical power lines are located and identified.
- Ensure that ladders, scaffolds, equipment or materials never come within 10 feet of electrical power lines.

- All electrical tools must be properly grounded unless they are of the double insulated type.
- Multiple plug adapters are prohibited.

Details on the above measures should be included in the H&S manual to be presented by the Contractor and approved by the Engineer.

5.1.9 Socio – Economic Impacts

It is expected that the local community members overwhelmingly support the bridge rehabilitation because of its potentially very significant contribution to local transportation, marketing of local produce, and stimulation of local business opportunities from new passing traffic.

On the short term, during the rehabilitation phase, the Project will generate new employment opportunities for local community residents. These will be for both skilled and unskilled workers. It is agreed that, for both work categories, first preference will be given to local residents.

Anyway, in case any impact was not identified by the present assessment, the local community will be able to communicate complaints through a Grievance Redress Mechanism (GRM) which will be developed by the project and will be easily accessible (see Annex 1).

5.1.10 Land Acquisition

It is not anticipated that involuntary land acquisition will be required. There will be no need to expropriate or rent any land. The existing state land area can be used by the contractor and can accommodate his facilities and construction site offices can be placed in the buffer zone of the roads surrounding the bridge and currently unoccupied.

5.1.11 Summary of Impacts

Based on the above section, the following table presents a summary of the impacts of the works on the environment during operational and their relevant impacts

Table 8: Summary of Impact Assessment Matrix – During Construction / Rehabilitation

No.	Environmental Receptor	Impact Significance
1	Air Quality	Low
2	Noise	Low
3	Water Resources	Medium
4	Soil	Low
5	Solid and hazardous wastes	Medium
6	Flora & Fauna	Insignificant
7	Topography and landforms	Insignificant

8	Impacts on local traffic	Medium
9	Health and Safety	High
10	Socio-Economic impacts	Medium
11	Land	Insignificant

5.2 Operational Phase

5.2.1 Air Quality

Impacts

When the rehabilitation works are completed, the bridge will enter in operation and the traffic is expected to increase and the air emissions from vehicles. It is important to mention that the increase in velocity will however reduce the air emissions.

Mitigation measures

During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.

5.2.2 Noise

Impacts

The operation of the bridge after rehabilitation will increase the traffic volume which in turn will increase noise levels from vehicles.

Mitigation measures

- During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.
- Reduce speed limits especially near residential buildings.
- Limit trucks movement especially at night in coordination with the local traffic authorities.

5.2.3 Water resources

During rainy seasons, runoff water contaminated with oil and grease may cause pollution of the river. Since maintenance of broken vehicles on the bridge is unlikely, the generation of pollution unless in the case of extreme emergency such as oil spills from tankers would be minimal

However, the installed drains (conduits and pipes) for run-off water should be regularly cleaned especially prior to and during the rainy season.

5.2.4 Soil

There are no impacts expected on soil during operation.

5.2.5 Solid and hazardous wastes

Impacts

During the operational period, some littering and waste generation resulting from the repair activities will occur. Littering may occur due to wind action.

Mitigation measures

Collect solid waste and dispose it using municipal trucks and vehicles.

5.2.6 Flora & Fauna

There are no impacts expected on flora or fauna during operation.

5.2.7 Topography and landforms

The local topography will not be altered by the project operation.

5.2.8 Impacts on local traffic

It is expected that the local traffic conditions will significantly improve due to the operation of the bridge.

5.2.9 Health and Safety

Impacts

Road accidents may result due to the operation of the bridge and increased traffic volume.

Mitigation measures

- Limit the speed and place road signs to prevent or minimize the road accidents.
- Provide lighting of the bridge to reduce the probability of road accidents.

5.2.10 Socio-Economic impacts

During the operational period, the project is expected to result in positive socio-economic outcomes for the local communities. However, the GRM will be kept in continued operation for one year after completion of works and will help address the complaints of the local community through an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

6.1 Responsibilities for implementation of mitigation measures

In this section, the identified mitigation measures will be summarized. The responsibility for implementation of the mitigation measures will be mostly upon the contractor. However, the supervision and assurance that the mitigation measures are implemented will be the responsibility of the Resident Engineer who represents the RBD as the Project Owner.

The Resident Engineer will be assisted by a team of environmental and social officers who will be responsible for supervising the daily activities of the contractor and will report non-compliances to the Resident Engineer in order to take necessary actions towards the contractor. Regular supervision site visits will also be conducted by the RBD PMT environmental/social officer in association with a qualified environmental and social consultant who will provide technical advice in case there is a need to modify or add new mitigation measures as work necessitates.

6.2 Cost of mitigation measures

The costs of mitigation measures are estimated based on the average market rates for similar activities in Iraq and can be used as indicative costs. It is the sole responsibility of the contractor to estimate the costs associated with the recommended mitigation measures based on his work experience. The estimated cost of the mitigation measures is 30,000 US\$.

6.3 ESMP

The following tables summarize the mitigation measures which are required to be undertaken to avoid any negative impacts on the environment. Responsibilities and estimated costs are also presented.

Table 9: Mitigation Measures for North Baghdad Bridge Rehabilitation Phase.

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
1	Air quality	<ul style="list-style-type: none"> • Open materials storage piles should be watered to increase of the moisture level thus reducing dust levels; • Inactive piles should be placed in enclosure or covered to reduce wind erosion; • Loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of vehicles moving inside and outside of the construction -site; and • Signs and speed reduction bumps should be installed for vehicles approaching the site and near residential buildings and farmlands to reduce their speed below 40 km/hr. On site, speed should not exceed 20 km/hr. 	Contractor	Resident engineer	3,000
		<ul style="list-style-type: none"> - Engines of vehicles and other machinery shall be kept turned on only if necessary, avoiding any unnecessary emission; - Machines and equipment should be periodically checked and maintained to ensure their good working condition; - All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications; - Activities should be carried out using the minimum required number of means at the same time; and - Electric small-scale machines and technical tools shall be used when available and feasible; 	Contractor	Resident engineer	Included in contractor cost
2	Noise	<ul style="list-style-type: none"> - Construction activities are to take place within reasonable hours during the day. - Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. - Equipment must be run only when necessary; - The noise sources should be placed in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site.. 	Contractor	Resident engineer	Included in contractor cost
		<ul style="list-style-type: none"> - personal protection equipment for workers should be used of especially those who use jack hammers or work near noisy engines or compressors 	Contractor	Resident engineer	2,000
3	Water	<ul style="list-style-type: none"> - Damaged sections of the bridge which are immersed in the river should be carefully removed without polluting the river water. 	Contractor	Resident engineer	Included in contractor

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
	resources	<ul style="list-style-type: none"> - Using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval. - No solid wastes are to be thrown into the river. - Paints or chemicals should be used away from the river and soils. However, if non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water and the ground water. - Material storage areas should be well isolated from storm water to prevent the contamination of the runoff - Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies 			cost
		<ul style="list-style-type: none"> - Wastewater from the worker rest areas or construction offices should be contained in septic tank and should be removed regularly from site by means of authorized contractors and disposed in Al-Rustamiyah wastewater treatment plant which is about 25Km from the site. 	Contractor	Resident engineer	8,000
		<ul style="list-style-type: none"> - In case of the need to change engine oils or refuel some construction equipment, a proper maintenance workshop or shelter should be installed to ensure containment of any fuel or oil spills. 	Contractor	Resident engineer	3,000
4	Soil	<ul style="list-style-type: none"> - Contractor to present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities. - Soil contamination by oil/grease spills, leakages or releases, all manipulations of oil derivatives in the process of construction are to be prevented; - Provision of the fuel to the machines should be performed with maximum care; - Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal - Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills; which is about 30Km to the north of the project area. - Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction; and - Operation of equipment and vehicles outside the designated work areas and roads. Must be 	Contractor	Resident engineer	Included in contractor cost

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
		prohibited			
		- No hazardous waste storage shall take place directly on soils. Appropriate and enclosed containers should be utilized and disposed of in designated locations in cooperation with MOST who in charge for hazard waste disposal.	Contractor	Resident engineer	1,000
5	Solid and hazardous wastes	<ul style="list-style-type: none"> - Waste generation on site shall be minimized - Simple waste management plan for specific waste streams must be developed. - General waste must be collected and transported to local council approved disposal sites. - Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors. - Waste containers must be located at each worksite. - Chemical wastes must be collected in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service. - Storage, transport and handling of all chemicals must be conducted in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority. - All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as “hazardous”. - Transportation and disposal of hazardous wastes should be done through licensed contractors and in close coordination with the relevant local authority and in compliance with the legal requirements and instructions of the coordination with the as ministry of science and technology. - Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards. - A hazardous materials inventory for the construction period must be prepared. - Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers. - Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at approved locations. 	Contractor	Resident engineer in coordination with the local authority and ministry of science and technology regarding hazardous wastes	6,000
6	Flora & Fauna	Not Applicable	N/A	N/A	N/A

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
7	Topography & landforms	Not Applicable	N/A	N/A	N/A

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
8	Traffic	<ul style="list-style-type: none"> - Provide information, through appropriate signage, to the bridge users to use the alternative route; - Upgrade the alternative route to be able to receive the additional number of vehicles. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic - Where practicable, truck deliveries must be restricted to daytime working hours. - Dangerous goods must be transported along routes preferred for dangerous goods, - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic. 	Contractor in coordination with the Local Traffic Department	Resident Engineer	500
9	Health & Safety	<ul style="list-style-type: none"> - The speed of the construction vehicles should be limited - Road signage for drivers and local community should be provided. 	Contractor	Local traffic department & Resident engineer	1,000
		<ul style="list-style-type: none"> - Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues. - Personal protection equipment such as eyeglasses, gloves, hard heads, safety belts and slip-resistant safety footwear must be supplied and continuously used by all workers, technicians, engineers and site visitors. 	Contractor	Resident engineer	3,000
		<ul style="list-style-type: none"> - The contractor should comply with international standards for good construction practices; - The contractor should adhere to local and international guidance and codes of practice on EHS management during construction; especially as concerns management, supervision, monitoring and record-keeping; - EHS procedures should be part of the conditions of contract with contractors and their sub-contractors; - There should be a clear definition of the EHS roles and responsibilities of the companies involved in construction and of individual staff (including the EHS supervisors during construction and an EHS coordinator during operation); - There should be a pre-construction assessment of the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices; - There should be a regular inspection, review and recording of EHS performance; - Putting on a safety harness and connecting it, via an energy-absorbing lanyard, to a suitable anchor point for staff working at the sides of the bridges - Present detailed H&S Manual to be implemented 	Contractor	Resident engineer	Included in contractor cost

Receptor		Mitigation Measures	Responsibility	Supervision	Total Estimated Cost in US\$
9	Health & Safety	- Implement H&S measures as detailed in Chapter 5 in the ESIA. - A high standard of housekeeping shall be maintained at all times.			
		- Any accidents shall be reported and treated within site as a first aid procedure. - Appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues should be provided - Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment - First aid items should be available all times onsite and trained staff on emergency aids should be identified.	Contractor	Resident engineer in coordination with health and safety officials.	2,500
10	Handling Complaints	- A complaints register will be kept on site and this will feed into the GRM. Details of complaints received will be incorporated into the audits as part of the monitoring process.	Resident Engineer	RBD/PMT	Included in contractor cost
Total (rehabilitation phase)					30,000

Table 10: Mitigation Measures for North Baghdad Bridge Operation Phase.

Receptor		Mitigation Measures	Responsibility	Supervision	Total estimated Cost in US\$
1	Air quality	During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.	Traffic Department	Traffic Department	No additional cost
2	Noise	During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions. Speed limits should be reduced especially near residential buildings. Limit trucks movement especially at night in coordination with the local traffic authorities.	Traffic Department	Traffic Department	No additional cost
3	Water resources	Ensure that any clogged drains are regularly cleaned especially before and during the rainy season.	RBD	RBD	Within RBD budget
4	Soil	Not applicable	Not applicable	Not applicable	Not applicable
5	Solid and hazardous wastes	During the operational period, some littering and waste generation resulting from the repair activities will occur. Littering may occur due to wind action.	Local Authority (Municipality)	Local Authority (Municipality)	Within municipal budget
6	Traffic	Speed limits and road signs should be in place to prevent or minimize the road accidents.	Traffic Department	Traffic Department	No cost
		The bridge must be provided with suitable post lighting at night to reduce the probability of road accidents.	RBD	RBD	Within RBD budget
7	Flora & Fauna	Not Applicable	Not Applicable	Not Applicable	Not Applicable
8	Topography and landforms	Not Applicable	Not Applicable	Not Applicable	Not Applicable
9	Traffic	Improved traffic conditions	Local Traffic Department	Resident Engineer	No Cost
10	Handling Complains	The continued operation of a GRM for one year following opening of the bridge for use will ensure that local community members have an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.	RBD/PMT	Local authorities	No cost
Total cost US\$ (Operation phase)					No Cost

7. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

7.1 Environmental and Social Monitoring

In order to ensure full compliance of the performed activities to the environmental and social requirements, regular monitoring should be performed.

In this section, the environmental and social monitoring activities will be presented, the institutional responsibilities will be determined in addition to the necessary resources which need to be in place to perform the monitoring activities. The objectives of the monitoring are as follows:

- To measure the compliance with the ESMP mitigation measures
- To verify the results of the project's environmental and social impact assessment
- To study the trend of construction values of the parameters, which have been identified as critical.
- To ensure that all safety concepts were implemented properly during the bridge operation.
- To ensure no harm is incurred by local communities from bridge operation, including to land, productive plants, infrastructures, and livelihoods.

To ensure the proper implementation of the environmental and social mitigation measures, an environmental and social monitoring program has been established for the construction phase as shown in the Table below.

Table 11: Monitoring Activities for North Baghdad Bridge Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
1	Air quality	<ul style="list-style-type: none"> - Open material storage piles are to be inspected - Visual inspection of vehicles and equipment operating or entering the site - Investigate dust complaints from workers and residents - Signs and speed reduction bumps installed near the site and near residential buildings and farmlands - Engines of vehicles and other machinery periodically checked and maintained - Measurements of exhaust emissions (CO, SOx, NOx, PM10, PM2.5) 	<ul style="list-style-type: none"> - Visual inspection - Visual inspection - Recorded and documented complaints - Visual inspection - Recoded status of equipment and vehicles on site (excessive black or white smoke) - Results of exhaust emissions measurements 	<ul style="list-style-type: none"> - Daily - Daily - Daily visual inspection - Daily - Monthly measurements - Measurements monthly during implementation period. 	Engineer	PMT	12,000
2	Noise	<ul style="list-style-type: none"> - Investigate noise complaints from workers and neighboring communities in the affected locations - Silencers checked and placement of noise sourced in concealed area - Use of personal protection equipment effective - Measure ambient noise near sensitive receptors (dB) - Measure ambient noise near sensitive receptors 	<ul style="list-style-type: none"> - Recorded and documented complaints - Visual inspection - Visual inspection - Recorded tests results - Recorded 	<ul style="list-style-type: none"> - Weekly inspection of complaints - Weekly - Daily - Monthly noise measurement - In case of complaint 	Engineer	PMT	6,000

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
3	Water resources	<ul style="list-style-type: none"> - Investigate implementation of mitigation measures and o - Damaged immersed sections removed with care - Investigate some wastewater disposal like DO - Install litter bins and make sure no wastes are thrown in the river - Installation of a proper maintenance shelter for paints and chemicals and observe any oil or fuel spills. 	Site Investigation report	Daily Investigation	Engineer	PMT	12,000
4	Soil	<ul style="list-style-type: none"> - Monitor the filling up machine with oil - Monitor the oil/grease containers and hazardous waste location and disposal - Monitor the disposal of waste and debris - Assure the origin of purchased soil is from an authorized quarry - Forbid the operation of machinery outside the designated area - Observe any soil contamination with oil or fuel - Observe any accumulation of wastes 	Site Investigation report	Monthly	Engineer	PMT	No cost
5	Solid and hazardous wastes	<ul style="list-style-type: none"> - Maintain records on waste types and quantities - Observe any waste accumulation in un approved locations - Check that the Material Safety Data Sheets (MSDS) for hazardous materials is available on-site and explained to workers. 	<ul style="list-style-type: none"> - Waste management contracts with authorized contractors - Waste delivery receipts from local authorities. - Site Investigation report 	<ul style="list-style-type: none"> - Weekly - Weekly - Weekly 	Engineer	PMT	No cost
6	Flora & Fauna	<ul style="list-style-type: none"> - Record any observation about wild animals or plants on site or nearby and report to the Environmental Authority 	Observation report	Upon occurrence	Engineer	PMT	No cost

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US\$
7	Topography and landforms	- No monitoring required	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
8	Traffic	- Ensure speed limits and warning signs are installed - Monitor the upgrade the alternative route and the signs informing the vehicles to use alternative routes. - Ensure dangerous goods are transported along selected	Road signs are installed.	Half annual	Engineer	PMT	No cost
9	Health and safety	- Speed limit and directional signs installed - Personnel trained for health and safety issues - Ensure compliance of workers to Health and Safety requirements and responsibilities assigned - EHS performance; regularly inspected, reviewed and recorded - Monitor the good housekeeping - Maintain log on accidents - Firefighting and safety equipment regularly checked - First aid kit items regularly checked	Accidents report	Weekly	Engineer	PMT	No cost
10	Handling Complaints	- Ensure that the GRM is effective and well communicated	Number of complaints received, analyzed and responded to.	Weekly	Engineer	PMT	No cost
Total cost (Operation phase)							30,000

7.2 ESMP Institutional Arrangements

In order to ensure full compliance with the environmental and social requirements which are described above, RBD PMT nominated a consultant to act as the focal point for environmental and social affairs at the central level. On the field level, RBD PMT nominated two engineers to act as environmental and social officers. Those engineers will be trained on monitoring and reporting of environmental and social impacts and how to fill the checklist to be used during field visits before implementation starts. RBD Resident Engineer will be the officially responsible staff member for ensuring environmental and social compliance. S/He will be assisted by the designated environmental and social field officers.

In addition, a qualified consultant is recruited by the PMT to provide technical assistance and capacity building to the environmental and social team both at the central level and at the field level.

7.3 Reporting requirements

To ensure that the mitigation and monitoring measures are being carried out effectively with the required frequency, a clearly defined and regular (monthly) reporting and response system must be established.

All inspection and audit reports of environmental performance should be stored in the Audit and Inspection Manager (AIM) system. The AIM is an electronic database that is used to enable corrective actions identified during the inspection\ auditing process to be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities as required. In addition to the monitoring and reporting requirements documented in the relevant sections of the ESMP, the following reporting regime will be implemented:

- All incidents or accidents during the bridge rehabilitation should be reported immediately to relevant authorities.
- All corrective measures must be discussed to ensure compliance with laws and regulations.
- Reports for personnel training on environmental issues or emergency practices must be produced.
- Progress reports, environmental monitoring report and other inspections reports must be produced periodically.

The RBD PMT engineers will provide the Resident Engineer with a weekly report briefing their observations and recommendations for action. Whereas the Resident Engineer shall prepare an environmental and social management progress report on monthly basis to RBD PMT in Baghdad. The environmental and social consultant will prepare a monthly environmental and social supervision report after conducting monthly site supervision visits. RBD PMT shall prepare a quarter environmental and social progress report which will be submitted to the WB for review and disclosure.

7.4 Capacity Development and Resources Requirements

7.4.1 Capacity Development

RBD PMT dedicated sufficient human resources to undertake the environmental and social management requirements as explained above. The assigned RBD staff at the central and field levels are competent in the field of engineering and have variable practical experience. For RBD staff that will be responsible for undertaking the environmental and social tasks, they will need some capacity development.

All construction personnel and contractors are required to undertake appropriate environmental training and induction programs including, especially, on GRM procedures.

All managers and supervisors will be responsible for ensuring that personnel under their control have the requisite competencies, skill and training to carry out their assigned tasks in accordance with the requirements of the ESMP. They will also be responsible for identifying additional training and competency requirements.

All project supervisors and managers will receive additional detailed training on the use and implementation of the ESMP. The following Table presents the proposed institutional strengthening program and capacity development requirements.

Table 12: Capacity Development Requirements for RBD⁴

Capacity development topic	Provider(s)	Duration	Estimated Cost (US\$)
1 Environmental Impact Assessment Environmental and social Management in Construction Sites	Private sector consultant	3 Days	\$3000
2 Iraqi Environmental Requirements	Legal Ministry of Environment	1 Day	\$2000
3 World Bank Environmental and Social Safeguards	The World Bank	2 Days	\$10,000 (international travel and accommodation cost for RBD trainees)
Total Estimated Cost			\$15,000

7.4.2 Required Resources

In order to ensure full compliance of the environmental and social requirements, regular site visits should be conducted. Dedicated office spaces, office equipment and supplies in addition to adequate means of transportation should be made available for the environmental and social management team at the central level and most importantly on the field level. RBD PMT should ensure the allocation of sufficient budget resources to ensure availing the required resources to achieve the required tasks.

⁴ Consolidated training for all RBD/PMT environmental/social field supervisors will be conducted to save on the training costs.

8. PUBLIC CONSULTATION RESULTS

8.1 Objectives of the Consultations

World Bank policies require that broad and open public consultations be held with PAPs on the project. These consultations are to ensure that the project affected peoples (PAPs) are provided with the opportunity to engage in the rehabilitation planning process, to raise questions and receive input and responses to their concerns. However, due to the current security situation in the project area and taking into utmost consideration the safety of the people as public meetings may be targeted by terrorist, the public meeting approach was not achievable.

8.2 Consultation Process

In order to fulfil the WB requirements, a one on one interviews with both men and women was adopted to obtain sound information on the possible impacts on the local communities. Accordingly, a questionnaire was formatted to cover the key environmental and social aspects related to the project. The questionnaire was then addressed to a number of the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities. In addition, the translated executive summary of the draft ESIA has been published on the RBD's website to allow for feedback and wider dissemination of information related to the planned activities under this project.

Furthermore, and due to the importance of the NBB, many different programs on different TV broadcasting networks have addressed the importance of rehabilitation of the NBB in order to encourage the decision makers to start the repair of the NBB as soon as possible. The talk shows emphasized how the reinstatement of normal traffic on the NBB will improve the traffic management in the local area and in Baghdad in general. Similarly, many websites and campaigns in the social media like Facebook have features remarks from the local residents and NBB users expressing their opinion, suggestions, and concerns regarding the rehabilitation activities. Therefore, the social media represent a very good indication and relatively good questionnaire about the rehabilitation of the NBB.

8.3 Findings of the Consultations

It can be concluded from these programs and social media webpages that the rehabilitation activities will have a strong positive impact from the social perspectives on the locals and a positive impact on their social daily life. In these webpages, none of the people recorded or alleged regarding the ownership of the land were the bridge in constructed or mentioned to any removing to vegetation covers, crops, plants, trees. All the comments where mentioned that the reconstruction of the bridge will enhance the social relationship among the locals, improving their transport. Finally, most people agreed that the bridge will need some additional safety signs and instructions in order to keep the movement on the bridge within safe conditions. Please refer to annex (3) for more details.

8.4 Distribution of the GRM Forms

During individual interviews, information about a grievance mechanism was introduced to interviewed individuals and a translated GRM form was also provided. All interviewed people

were informed that they can submit their complaint to either site engineer, or to community leader or to PMT during construction. The community leaders' information (mobile phone number) and PMT contact information (office and mobile phone numbers) will be available before implementation starts. There will be signs posted at the entrance of the bridges (Refer to Annex 1 for more details).

9. GRIEVANCE REDRESS MECHANISM

Bank procedures require that Grievance Redress Mechanisms (GRMs) be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works for third party settlement of disputes arising from resettlement. This GRM should take into account the availability of judicial recourse as well as traditional and community dispute resolution mechanisms.

Accordingly, a GRM will be established at the project level to ensure any grievance can be addressed in an amicable manner. Resolving complaints at community level is always encouraged to address the problem that a person may during implementation and/or operational phase.

The project grievance redressed system should be developed in consultation with communities, which might include the following for written complaints:

1. First, the affected person sends his/her grievance in writing to the communities/community leaders. The grievance note should be signed and dated by the aggrieved person. Where the affected person is unable to write, s/he should obtain assistance from the community to write the note and mark the letter with his/her thumbprint. The community should respond within 14 days.
2. Second, if the aggrieved person does not receive a response or is not satisfied with the solution provided by the community, s/he lodges her or his grievance to PMT which should respond within 14 days.
3. Third, if the aggrieved person is not satisfied with the solution of PMT, s/he can go to the court.

In any case, the PMT must maintain records of grievances and complaints, including minutes of discussions, recommendations and resolutions made.

10.CONCLUSION AND RECOMMENDATIONS

The EIA concludes that the proposed rehabilitation and reconstruction of North Baghdad Bridge (Al-Muthana Bridge) will have an overall significant positive impact on the affected population. The implementation of the recommended mitigation measures especially during the construction phase will ensure that potential negative environmental impacts are addressed.

ANNEXES

Annex (1): Grievance Form

Reference No:	
Full Name Note: you can remain anonymous if you prefer or request not to disclose your identity to the third parties without your consent	My first name _____ My last name _____ I wish to raise my grievance anonymously I request not to disclose my identity without my consent
Contact information Please mark how you wish to be contacted (mail, telephone, e-mail).	By Post: Please provide mailing address: <hr style="border: 1px solid black;"/> By Telephone: _____ By E-mail _____
Description of Incident or Grievance: What happened? Where did it happen? Who did it happen to? What is the result of the problem?	
Date of Incident/Grievance	One-time incident/grievance (date _____) Happened more than once (how many times? ____) On-going (currently experiencing problem)
What would you like to see happen to resolve the problem?	
Signature: _____ Date: _____ Please return this form to: [name], _____ [company name] _____ Address _____: Tel.: _____ or E-mail: _____	

Annex (2): Site photos



Figure 6: Damaged span in the Bridge



Figure 7: Damaged span in Bridge



Figure 8: Damaged span in the Bridge being removed clear the way for traffic

Annex (3): Individual Interviews

الاسم: اسامة بيلاج جميل السيد
المهنة: تصميم
تاريخ الزيارة:

س ١: هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟
نعم كلا

س ٢: هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعودة الارض المقام عليها الجسر / الطريق؟
نعم كلا

س ٣: بسبب اعمال اعادة البناء للجسر / الطريق هل تمت صيانة ازالة لمحاصيل زراعية او اشجار او اي شطاء نباتي تعود عائلته لمواطنين او السكان المحليين؟
نعم كلا

س ٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟
نعم كلا

س ٥: هل هنالك اي بني تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان مستتر بعمامة تاهيل الجسر / الطريق؟
نعم كلا

س ٦: هل ان اعمال اعادة اصار الجسر / الطريق ستسبب باجراءات اعادة لتوطين لشخص (واو) لاشخاص الى مناطق جديدة؟
نعم كلا

س ٧: هل تمت صيانة استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ، علما ان الارض تابعة للدولة؟
نعم كلا

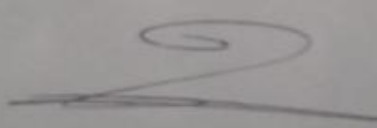
س ٨: هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟
نعم كلا

س ٩: هل هناك تغييرات ديموغرافية أو ضرر في النسيج الاجتماعي من جراء اعادة التأهيل؟
 نعم كلا

س ١٠: ماهي المجالات الأكثر ضغطا و حثيثة التي من المحتمل ان تتأثر باعمال اعادة الاضرار؟
 نعم كلا

س ١١: هل سيتمزج المشروع من عمليات النقل و يقلل من العزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟
 نعم كلا

س ١٢: هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلانات تحذيرية او استدلالية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق
 نعم كلا


 امانة به / احمايل
 قصاب



الاسم: عوي كاظم سيني
المهنة: كاتب

تاريخ الزيارة:

س ١: هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثر ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم كلا

س ٢: هل هناك ادعاءات او مطالبات من قبل السكان المحليين بملئها الارض المقام عليها الجسر / الطريق؟

نعم كلا

س ٣: بسبب اضرار اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي حطاء نباتي تعود عائلته لمواطنين او السكان المحليين؟

نعم كلا

س ٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اضرار البناء؟

نعم كلا

س ٥: هل هناك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان مستقرة بعملية تاهيل الجسر / الطريق؟

نعم كلا

س ٦: هل ان اضرار اعادة اعمار الجسر / الطريق ستمسب بلجارات اعادة لتوطين لشخص (والو) لاشخاص الي مناطق جديدة؟

نعم كلا

س ٧: هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ، علما ان الارض تابعة للدولة؟

نعم كلا

س ٨: هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اضرار اعادة التاهيل؟

نعم كلا

٩: هل هناك تغييرات ديموغرافية أو ضرر في التسويج الاجتماعي من جراء اعادة التأهيل؟
 نعم كلا

١٠: ما هي المجموع الأكثر ضغطا و حثاشة التي من المحتمل ان تتأثر باصل اعادة الاصل؟
 نعم كلا

١١: هل سيتمزج المشروع من صليات النقل و يقلل من التزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟
 نعم كلا

١٢: هل يحتاج المواطنون القريبون بالقرب من الجسر / الطريق الى وضع اعلامات تحذيرية او استدلالية زيادة معدلات الامن و الامان مستخدمى الجسر / الطريق
 نعم كلا

عبد يي كاظم سبيح



الإسم: سهر عبيد يوسف

المهنة: طالبة دراسات

تاريخ الزيارة:

س1: هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثر ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم كلا

س2: هل هناك ادعاءات او مطالبات من قبل السكان المحليين بملئبة الارض المقام عليها الجسر / الطريق؟

نعم كلا

س3: بسبب اضرار اعادة البناء للجسر / الطريق هل تمت حماية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائلته لمواطنين او السكان المحليين؟

نعم كلا

س4: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اضرار البناء؟

نعم كلا

س5: هل هناك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان مستخدمين بحماية تاهيل الجسر / الطريق؟

نعم كلا

س6: هل ان اضرار اضرار الجسر / الطريق ستسبب باجراءات اعادة لتوطين لشخص (واو) لاشخاص الى مناطق جديدة؟

نعم كلا

س7: هل تمت حماية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،علما ان الارض تابعة للدولة؟

نعم كلا

س8: هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اضرار اعادة التأهيل؟

نعم كلا

من ٩: هل هناك تغييرات ديموغرافية أو ضرر في النسيج الاجتماعي من جراء أعمال إعادة التأهيل؟
 نعم كلا

من ١٠: ماهي المجالات الأكثر ضعفا و خشاشة التي من المحتمل ان تتأثر بأعمال إعادة الاضرار؟
 نعم كلا

من ١١: هل سيعزز المشروع من عمليات النقل و يقلل من انعزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟
 نعم كلا

من ١٢: هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلانات تحذيرية او استدلاية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق
 نعم كلا

المهندس طارق دراس



الاسم: أبو رحمن حسن

المهنة: موظف

تاريخ الزيارة:

س1: هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثر ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم كلا

س2: هل هناك ادعاءات او مطالبات من قبل السكان المحليين بعتدية الارض المقام عليها الجسر / الطريق؟

نعم كلا

س3: بسبب اضرار اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائلته لمواطنين او السكان المحليين؟

نعم كلا

س4: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اضرار البناء؟

نعم كلا

س5: هل هناك اي بنى تحتية مزقة او دائمة تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان مستخدمين بعمالة تاهيل الجسر / الطريق؟

نعم كلا

س6: هل ان اضرار اعادة اعمار الجسر / الطريق سببت باجراءات اعادة لتوطين لشخص (واو) لاشخاص الى مناطق جديدة؟

نعم كلا

س7: هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،عما ان الارض تابعة للدولة؟

نعم كلا

س8: هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اضرار التآهيل؟

نعم كلا

س ٩: هل هناك تغييرات ديموغرافية أو ضوئية في التسبب الاجتماعي من جراء اعادة التأهيل؟
 نعم كلا

س ١٠: ماهي المجالات الأكثر ضغطا و هشاشة التي من المحتمل ان تتأثر باصل اعادة الاضرار؟
 نعم كلا

س ١١: هل سيتمزج المشروع من عمليات النقل و يقلل من الحرفية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟
 نعم كلا

س ١٢: هل يحتاج المواطنون المقربون بالقرب من الجسر / الطريق الى وضع اعلانات تحذيرية او استدلالية زيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق
 نعم كلا

أبو راسين هوش
 موهنق

