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# REPUBLIC OF IRAQ

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

## ROADS AND BRIDGES DIRECTORATE

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

## ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

**For the**

## Rehabilitation of a Steel Bridge & a Concrete Bridge in Nareen, Diyala Governorate

**8th September, 2016**

**Revision History**

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# List of Abbreviations

| | |
|---|---|
| **AIM** | Audit and Inspection Manager |
| **ESMP** | Environmental and Social Management Plan |
| **EHS** | Environmental, Health, and Safety |
| **EODP** | Emergency Operation Development Project |
| **ESMF** | Environmental and Social Management Framework |
| **GIIP** | Good International Industry Practice |
| **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 |
| **MSDS** | Material Safety Data Sheets |
| **NO** | Nitrogen Oxides |
| **OP** | Operational Policy |
| **PAPs** | Project Affected Peoples |
| **PPE** | Personal Protective Equipment |
| **RBD** | Road and Bridges Directorate |
| **RE** | Resident Engineer |
| **$SO_2$** | Sulfur Dioxide |
| **TOR** | Terms of Reference |
| **WB** | World Bank |
| **WHO** | World Health Organization |

# Executive Summary

## INTRODUCTION

This executive summary reflects the main issues (project description and activities, baseline conditions, impact analyses, mitigation measures and monitoring arrangements) of the Environmental and Social Management Plan (ESMP) conducted for the rehabilitation of 2 bridges (one steel and one concrete) Bridges in Nareen, Diyala Governorate. The main objective of the ESMP is to examine the environmental and socio-economic impacts of the project (during both rehabilitation and operation phases), and to propose mitigation measures. The project is expected to result in significant socio-economic benefits for the local communities and surrounding areas as it will improve and ease of transport for the locals and the bridges users.

## PROJECT DESCRIPTION

The Project is located in the Governorate of Diyala at northeast of Baghdad. Diyala Governorate is partially drained by Diyala River that is a main tributary to the Tigris. 2 roads in the city of Qarataba cross the Diyala river at the following locations:

- A steel bridge at location 34°24'41.30"N, 44°49'45.70"E. It is a truss bridge with a total length of 85 m.
- A concrete bridge at location 34°27'11.83"N, 44°49'12.19"E that was built in 2009 on Qarataba-Karkuk road. It has a total length of 144 m. The bridge consists of 6 spans, 24 m long each. The actual length of girder is 23.90m. The width of bridge is 12 m. (9m carriage way and 1.50 m sidewalk on each side).

The bridges were destroyed by terrorist attacks. The objective of the Project is to rehabilitate and partially reconstruct the above mentioned steel & concrete bridges. The Project aims at facilitating the following:

- Transport of goods and especially agricultural products
- Access to essential service including health care and education
- Movement of inhabitants and especially students continuing their studies in Baghdad Universities

The rehabilitation works will imply the construction of a camp in the area adjacent to the bridges. The camp will be erected in a state owned land and no additional land acquisition is needed.

The anticipated duration of construction works is about 6 months.

Works on concrete bridge include:

- Demolishment and removal of damages in the sixth span and part of the fifth span (the tow spans are simply supported and have 2 expansions joints (410m² deck, 12 damaged girders, 24 failure rubber pads, asphalt…etc.),
- Installation of new rubber pads (No. 24),
- Installation of pre –cast pre-stressed girders (12 girders),
- Deck slab surfacing (0.20m depth),

- Other works such as lighting, pitching, and setting the expansion joint.

Works on the steel bridge include:

- Lifting damaged panels (No. 3) and reparation,
- Installation of a new steel sections of the panels,
- Checking plate,
- Surfacing works,
- Complete dyeing of all the bridge,
- Maintenance works for the steel pads,
- Reparation of guard rails.

The two bridges are currently not accessible to traffic. Multiple culverts were installed at the vicinity of the bridges and permit the temporary crossings of the seasonal water courses.

## ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

The baseline environmental and social data were collected from published research papers and documents and from site visits.

Diyala governorate is located in the northern mid-east part of Iraq, and has a desert climate. The major rain, totalizing 203 mm yearly, falls from November thru February, with a spread showering in March. The average annual temperature is 22.7 °C.

The ambient air quality is within normal range. Although no baseline measurements were conducted due to security constraints, it can be assumed that the concentration of pollutants is well below guidelines limits since there are no sources of air pollution except for the few vehicles which use the bridges. Similarly, noise levels are expected to be below the guidelines limits.

Land being used for bridges construction is all state-owned land. There are no buildings located within 100m of the project site. None of these buildings are sufficiently close to the bridges construction area to be adversely affected by either the rehabilitation activities or the operation of the bridges once they are in use.

The bridges cross a shallow seasonal watercourse that is flowing during spring season only and for a limited period of time.

There are no protected areas or endangered species in the vicinity of the site. The site adjacent area does not include any historical or cultural sites.

Since the repair and rehabilitation activities of the bridges 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.

## POLICY, LEGAL AND ADMINISTRATIONAL FRAMEWORK

A desk study was carried out to identify and assess the legal and administrative regulations to be applied to project activities. The assessment considered both Iraqi laws and the policies and procedures of the World Bank (WB). The objective of this task would be to ensure the project complies with relevant environmental laws and regulations throughout the rehabilitation and operation phases of the bridges. The Table below presents the relevant and applicable laws and regulations.

Table E1: Summary of Applicable Laws, Regulations and Policies

| LAW | |
|---|---|
| **Applicable Iraqi laws** | |
| Law no. 37 of 2008 | Describes institutional arrangements of the Ministry of Environment and Outlines policies and roles and responsibilities toward protecting the environment. |
| Law no. 27 of 2009 | Protection and Improvement of Environment |
| Regulations no. 2 of 2001 | Preserving water resources |
| Law No.3 issued in 1997 | Environment protection |
| Law No. (55) Issued in 2002 | Heritage and antiques |
| **Applicable WB Policies** | |
| OP 4.01 | Environmental Assessment |
| OP 4.12 | Involuntary Resettlement |
| EHS | Environmental, Health, and Safety guideline |
| GRM | Grievance Redress Service |

## ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS

Overall, based on the previous visits and surveys, the reconstruction of the bridges may have impacts on the surrounding environment but they are temporary, reversible and not severe. They are expected to occur during the rehabilitation and operational phases. It is also anticipated to have significant positive social impacts on the local communities. While a number of minor impacts on the environment may occur during the two phases, these minor impacts will have no significant influence on the environment. The main environmental impacts of the project will be associated with activities during the rehabilitation period. These include air emissions, noise, dust, generation and handling of construction and other wastes, and health and safety concerns associated with construction workers. Mitigation measures will be implemented to minimize the environmental costs by reducing the identified adverse environmental impacts.

The overall assessment of the key environmental and social impacts is summarized in the table below.

Table E2: Summary of Impact Assessment Matrix – During Construction / Rehabilitation

| | Environmental Receptor | Impact Significance |
|---|---|---|
| **1** | Air Quality | Low |
| **2** | Noise | Low |
| **3** | Water Resources | Low |
| **4** | Soil | Low |
| **5** | Solid and hazardous wastes | Medium |
| **6** | Flora & Fauna | Not significant |
| **7** | Topography and landforms | Not significant |
| **8** | Impacts on local traffic | Low |
| **9** | Health and Safety | High |
| **10** | Socio-Economic impacts | Low |

## MITIGATION MEASURES

The required mitigation measures for each of the minor environmental impacts and any adverse socio-economic impacts that may arise have been considered. Furthermore, a complete monitoring and auditing system were suggested for each environmental parameter in order to sustain the environmental situation in the area of the projects. These measures should significantly reduce the identified potential minor impacts. The mitigation measures address the environmental and social impacts of the project.

The following tables present the proposed mitigation measures and their related estimated cost break-down during the rehabilitation and operational phase respectively

Table E3: Mitigation measures during rehabilitation Phase

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| 1 | **Air quality** | • Unpaved roads, e.g. which may be utilized for construction vehicles movement or transportation of construction materials should be prepared in a way to avoid dust emissions. Watering to suppress dust should take place regularly.<br>• Watering or increase of the moisture level of the open materials storage piles to reduce dust levels;<br>• Enclosure or covering of inactive piles to reduce wind erosion;<br>• Loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of means moving inside and outside of the construction-site; and<br>• Speed reduction for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr. | Contractor | Resident engineer | 1,000 |
| | | • Engines of vehicles and other machinery are kept turned on only if necessary, avoiding any unnecessary emission;<br>• Machines and equipment are periodically checked and maintained to ensure their good working condition;<br>• 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;<br>• Activities are carried out using the minimum required number of means at the same time; and<br>• Electric small-scale mechanization and technical tools are used when available and feasible; | Contractor | Resident engineer | Included in contractor cost |
| | | Limit vehicle speed limits to be the minimum (less than 40 km/hr) near residential buildings and farmlands. | Contractor | Resident engineer | Included in contractor cost |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| 2 | Noise | Construction activities are to take place within reasonable hours during the day and early evening. Night-time activities near noise sensitive areas, such as residential buildings, should not be allowed. | Contractor | Resident engineer | Included in contractor cost |
| | | • Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order.<br>• Equipment to run only when necessary; and<br>• Positioning of the noise sources in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site. | Contractor | Resident engineer | Included in contractor cost |
| | | Use of personal protection equipment for workers especially those who use jack hammers or near noisy engines or compressors. | Contractor | Resident engineer | 2,000 |
| 3 | Water resources | Damaged sections of the bridges are carefully removed without blocking water drainage channels. | Contractor | Resident engineer | Included in contractor cost |
| | | Wastewater from the workers' rest areas or construction offices should be contained in solid containers and should be removed regularly from site by means of authorized contractors. | Contractor | Resident engineer | 8,000 |
| | | 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 |
| | | • In case of using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval.<br>• No solid wastes are to be thrown into the drainage channel. | Contractor | Resident engineer | Included in contractor cost |
| 4 | Soil | • To 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 or disposed of by authorized contractors. | Contractor | Resident engineer | Included in contractor cost |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | • Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills;<br>• Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction; and<br>• It must be prohibited to operate equipment and vehicles outside the designated work areas and roads. | | | |
| | | • No hazardous waste storage to take place directly on soils. Appropriate and enclosed containers should be utilized and treated or disposed of by authorized entities. | Contractor | Resident engineer | 1,000 |
| **5** | **Solid and hazardous wastes** | • Minimize waste generation on site.<br>• Simple waste management plan for specific waste streams must be developed.<br>• General waste must be collected and transported to local council approved disposal sites.<br>• Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors.<br>• Waste containers must be located at each worksite.<br>• 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.<br>• 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.<br>• All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as “hazardous”.<br>• 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. | Contractor | Resident engineer in coordination with the local authority and ministry of science and technology regarding hazardous wastes | 6,000 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | • Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards.<br>• A hazardous materials inventory for the construction period must be prepared.<br>• Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers.<br>• Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at approved locations. | | | |
| **6** | **Flora & Fauna** | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| **7** | **Topography and landforms** | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| **8** | **Traffic** | • Provide information, through appropriate signage, to the bridges users to use the alternative route;<br>• Clear traffic signs and signs signals must be installed on-site to provide for safe traffic<br>• Where practicable, truck deliveries must be restricted to daytime working hours.<br>• 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 and Safety** | • Limit speed of construction vehicles and provide road signage for drivers and local community. | Contractor | Local traffic department in coordination with the Resident engineer | 1,000 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | • Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues.<br>• Personal protection equipment such as eyeglasses, gloves, hard heads and safety belts must be supplied and continuously used by all workers, technicians, engineers and site visitors. | Contractor | Resident engineer | 3,000 |
| | | • compliance with international standards for good construction practices;<br>• adherence to local and international guidance and codes of practice on Environmental Health and Safety (EHS) management during construction;<br>• Management, supervision, monitoring and record-keeping;<br>• implementation of EHS procedures as a condition of contract with contractors and their sub-contractors;<br>• clear definition of 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);<br>• 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;<br>• provision of appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues;<br>• provision of health and safety information;<br>• regular inspection, review and recording of EHS performance;<br>• Maintenance of a high standard of housekeeping at all times. | Contractor | Resident engineer | Included in contractor cost |
| | | • Any accident to be reported and treated within site as a first aid procedure.<br>• Safety training for the workers.<br>• Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment<br>• 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 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| **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 cost US$ (Rehabilitation phase)** | | | | | **28,000** |

Table E4: Mitigation measures during operation Phase

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated |
|---|---|---|---|---|---|
| **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 cost |
| **2** | **Noise** | During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.<br>Speed limits should be reduced especially near residential buildings.<br>Limit trucks movement especially at night in coordination with the local traffic authorities. | Traffic Department | Traffic Department | No cost |
| **3** | **Water resources** | Ensure Storm water from bridges spans is collected in drains and disposed of in a network and not in the water courses | Not applicable | Not applicable | Not applicable |
| **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 bridges 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 bridges 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** |

## MONITORING & INSTITUTIONAL STRENGTHENING

A complete monitoring, auditing and reporting program will be set forward in order to ensure proper implementation of mitigation measures, and maintain or improve the environmental and the socio-economic characteristics of the area adjacent to the bridges during the rehabilitation and operation phases of the project.

The monitoring program will focus on noise impact, air quality and any emerging socio-economic adverse effects. The monitoring activity will monitor the application of environmental and social mitigation measures and the result of monitoring activities shall be reflected in the monthly reports. 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 following tables summarize the proposed environmental and social monitoring programs and the need for institutional strengthening.

Table E5: Monitoring activities during rehabilitation Phase

| Receptor | | Monitoring Activities | Monitoring Indicators | Frequency | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|---|---|
| **1** | **Air quality** | • Investigate dust complaints from workers and residents<br>• Visual inspection of vehicles and equipment operating or entering the site and Measurements of exhaust emissions (CO, SOx, NOx, PM10 , PM2.5) | • Recorded and documented complaints<br>• Record the status of equipment and vehicles on site (excessive black or white smoke) | • Daily visual inspection<br>• Measurements every 3 months. | Resident Engineer | PMT | 12,500 |
| 2 | **Noise** | • Investigate noise complaints from workers and neighboring communities in the affected locations | • Recorded and documented complaints<br>• Recorded tests results | • Weekly inspection of complaints<br>• In case of complain | Resident Engineer | PMT | 1,500 |
| **3** | **Water resources** | • Investigate noise complaints from workers and neighboring communities in the affected locations<br>• Investigate implementation of mitigation measures and observe any oil or fuel spills.<br>• Investigate wastewater disposal measures<br>• Conduct water analysis for the river water | • Recorded and documented complaints<br>• Site Investigation report<br>• Recorded tests results | • Daily Investigation<br>• Monthly Measurements | Resident Engineer | PMT | 5,000 |

| Receptor | | Monitoring Activities | Monitoring Indicators | Frequency | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|---|---|
| **4** | **Soil** | • Observe any soil contamination with oil or fuel<br>• Observe any accumulation of wastes | Site Investigation report | Daily | Resident Engineer | PMT | No cost |
| **5** | **Solid and hazardous wastes** | • Maintain records on waste types and quantities<br>• Observe any waste accumulation in un approved locations | • Waste management contracts with authorized contractors<br>• Waste delivery receipts from local authorities. | • Weekly<br>• Weekly | Resident Engineer | PMT | No cost |
| **6** | **Health and safety** | • Ensure compliance of workers to Health and Safety requirements<br>• Maintain log on accidents | Observation report<br>Accidents report | Weekly | Resident Engineer | PMT | No cost |
| **7** | **Flora & Fauna** | Record any observation about wild animals or plants on site or nearby and report to the Environmental Authority | Observation report | Upon occurrence | Resident Engineer | PMT | No cost |
| **8** | **Topography and landforms** | No monitoring required | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| **9** | **Traffic** | Ensure speed limits and warning signs are installed | Road signs are installed. | Half annual | Resident Engineer | PMT | No cost |

| Receptor | | Monitoring Activities | Monitoring Indicators | Frequency | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|---|---|
| **10** | **Handling Complaints** | Ensure that the GRM is effective and well communicated | Number of complaints received, analyzed and responded to. | Weekly | Resident Engineer | PMT | No cost |
| **Total cost US$ (Rehabilitation/Maintenance phase)** | | | | | | | **19,000** |

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 E6: Capacity development requirement for RBD

| Capacity development topic | | Provider(s) | Duration | Estimated Cost (US$) |
|---|---|---|---|---|
| 1 | Environmental and social Impact Assessment<br>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<br>(international travel and accommodation cost for RBD trainees) |
| **Total Estimated Cost** | | | | **$15,000** |

## PUBLIC CONSULTATIONS AND GRIEVANCE MECHANISM

According to the WB policies, it is required 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 difficulties and security constraints, this approach was not achievable.

In order to fulfill the WB requirements, a one on one interview 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. It was difficult to conduct the questionnaire with women due the fact that it is not easy to take the women's opinions freely due to the tribe's habits that exist in the area of the project. The questionnaire was then addressed to vehicle-road users and the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities.

The results of the questionnaires revealed that the local community agreed that the rehabilitation activities will have a positive impact on their social daily life. None of the locals expressed any reservations against the project and did not specify any negative impact that might affect him or his family. All locals agreed that the two bridges will need some additional safety signs and instructions in order to keep the movement on the bridges within safe conditions. Findings of the consultation process that took place in April 2016 are presented in Annex 3.

During public consultation, information about a grievance mechanism was introduced to local people and informed them that they can submit their complaints to either site engineer, or to community leader or to PMT during construction. A hard copy of the translated document was provided to them and disclosed at the project site for feedback and comments if any.

The community leaders' information and PMT contact information was also made available. (Please refer to Annex 1 for more details).

In addition, the draft ESMP 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. In addition, the translated summary of the draft ESMP was disclosed at the project site for feedback and comments if any.

## CONCLUSION AND RECOMMENDATIONS

The EIA concludes that the proposed rehabilitation and reconstruction of Nareen Bridges 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 Environmental and Social Management Framework (ESMF) which was prepared for the Emergency Operation for Development Project (EODP) and disclosed locally and on the InfoShop, an Environmental and Social Management Plan (ESMP) should be prepared, cleared and publically consulted upon and disclosed prior to the commencement of any construction activities for the roads and bridges component.

This ESMP was developed to cover the activities associated with the rehabilitation and operation of two bridges (**one Steel & one Concrete) in Nareen,** Diyala Governorate. The ESMP 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 ESMP was carried out by an independent consultant 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 ESMP. The ESMP should be followed and implemented by all relevant parties.

The objectives of this ESMP 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 who might be negatively affected by some project activities and bridges 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.

The ESMP establishes a framework for the identification of environmental protection, mitigation, monitoring measures to be taken during rehabilitation and operational phases of the project. The ESMP includes project description, mitigation measures, monitoring plan, management plan, institutional arrangements, and public consultation. The ESMP 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.
- Application of Environmental and social monitoring plan.
- Preparation of emergency and contingency plan.
- Application of Institutional plan.
- Application of Environmental and safety measures.
- Effective and open consultations with local communities.

Environmental and social monitoring is an important component of this ESMP. It provides the information for periodic review and refinement modification of the ESMP 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

The Project is located in the Governorate of Diyala at northeast of Baghdad. Diyala River that is a main tributary to the Tigris River, flows through Diyala Governorate. 2 roads in the city of Qaratabа cross seasonal tributaries to Diyala river at the following locations:

- A steel bridge at location 34°24'41.30"N, 44°49'45.70"E. It is a truss bridge with a total length 85 m.
- A concrete bridge at location 34°27'11.83"N, 44°49'12.19"E that was built in 2009 on Qaratabа-Karkuk road. It has a total length of 144 m. The bridge consists of 6 spans, 24 m long each The actual length of girder is 23.90m. The width of bridge is 12 m. (9m carriage way and 1.50 m sidewalk on each side).

The following figure shows the locations of the 2 bridges in Nareen, subject of this study.


**Figure 1: Bridges locations (Google Earth)**

## 2.1 Current Condition of the two Bridges

The 2 bridges are currently inaccessible to traffic. Multiple culverts were installed at the vicinity of the bridges and permit the crossing of the temporary water course as shown in the following photo.


**Figure 2: View on the damaged steel bridge and the temporary road currently used**

## 2.2 Objective of the Maintenance Works

As the bridges were destroyed due to the terrorist actions, the objective of the Project is to rehabilitate and partially reconstruct the above mentioned steel & concrete Bridges. The Project aims at facilitating the following:

- Transport of goods and especially agricultural products
- Access to essential service including health care and education
- Movement of inhabitants and especially Students continuing their studies in Baghdad Universities

The rehabilitation works will imply the construction of a worker's camp in the areas adjacent to the bridges. The camp will be erected in a state owned land and no additional land acquisition is needed.

## 2.3 Scope of Work

The anticipated duration of construction works is about 6 months.

Works on concrete bridge include:

- Demolishment and removal of damages in the sixth span and part of the fifth span (the tow spans are simply supported and have 2 expansions joints (410m² deck, 12 damaged girders, 24 failure rubber pads, asphalt…etc.),
- Installation of new rubber pads (No. 24),
- Installation of pre –cast pre-stressed girders (12 girders),
- Deck slab surfacing (0.20m depth),
- Other works such as lighting, pitching, and setting the expansion joint.

Works on the steel bridge include:

- Lifting damaged panels (No. 3) and reparation,
- Installation of a new steel sections of the panels,
- Checking plate,
- Surfacing works,
- Complete dyeing of all the bridge,
- Maintenance works for the steel pads,
- Reparation of guard rails.

## 2.4 Design Data

Bridges design has been prepared and works will be executed according to the standard specifications for Roads and Bridges (1983), (B.S) 5400, AASHTO (ASD 2002) and Iraqi standard specification for axial loadings.

# 3. BASELINE CONDITIONS

## 3.1 The Project Area

The Project is located in the governorate of Diyala that is sited in eastern-central Iraq, bordering Iran to the East and sharing internal boundaries with the governorates of Baghdad, Salah Al-Din, Sulaymaniyah and Wassit.

The Diyala River and a number of other smaller rivers intersect Diyala, while the Tigris River crosses the southwestern borders of the governorate. Irrigated farmland stretches along these rivers. Agriculture has traditionally been one of the main economic activities in Diyala The main productions are dates and citrus.

The 2 bridges cross a temporary watercourse. The project is within an open area. There are few houses in the area surrounding the bridges at a distance higher than 100 m from the project location.

## 3.2 Environmental and Social Baseline Conditions

The environmental baseline section is presented to give 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, topography, noise levels, traffic, rivers and waterways, biodiversity including flora, fauna, rare or endangered species, and sensitive habitats. It also includes consideration of socio-economic characteristics.

### 3.2.1 Climate

Diyala governorate is located in the north-eastern part of Iraq, and has a desert climate.

The major rain falls from November thru February, with a spread showering in March, totalizing around 203 mmm annually.

Monthly wind velocity record in recent years is shown in the following table.

**Table 1: Monthly Mean Wind Speed**

Observation station: Diyala station Monthly mean wind velocity (m/sec)[1]

| YEAR | JAN. | FEB. | MAR. | APR. | MAY. | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2007** | 3.1 | 2.6 | 2.3 | 1.9 | 3.5 | 1.8 | 2.1 | 2.1 | 2.5 | 1.3 | 2.3 | 2.9 |
| **2008** | 2.7 | 1.2 | 1.8 | 1.7 | 1.8 | 1.2 | 1.4 | 1.4 | 2.4 | 2.5 | 1.4 | 2.4 |
| **2009** | 3.2 | 1.1 | 1.9 | 2.2 | 3.2 | 2.5 | 1.6 | 1.9 | 1.9 | 2.1 | ==== | 1.4 |
| **2010** | 2.0 | 2.1 | 2.1 | 1.8 | 2.1 | 1.4 | 3.2 | 1.9 | 2.3 | 1.00 | 1.3 | 1.1 |
| **2011** | 21.8 | 2.6 | 1.9 | 2.9 | 1.4 | 1.4 | 2.4 | 1.3 | 1.4 | 1.5 | 1.5 | 1.3 |

[1] Diyala Environmental Authority

The average annual temperature is 22.7 °C. Highest temperatures occur in July and August and reach over 41 degrees centigrade.

**Table 2: Monthly Mean Temperature**

Observation station: Diyala station monthly means Temperature (°C)[2]

| YEAR | JAN. | FEB. | MAR. | APR. | MAY. | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2008** | 12 | 13.2 | 23.3 | 29.3 | 30.2 | 38.3 | 40.2 | 40.9 | 39.2 | 34.1 | 25.2 | 20.9 |
| **2009** | 13.3 | 12.8 | 22.2 | 28.9 | 30.4 | 39.3 | 40.3 | 41.0 | 39.5 | 33.2 | 25.2 | 18.1 |
| **2010** | 14.2 | 14.2 | 24.2 | 28.2 | 30.2 | 39.4 | 40.4 | 41.1 | 39.3 | 33.1 | 25.3 | 19.2 |
| **2011** | 13.2 | 14.5 | 23.4 | 29.3 | 30.2 | 39.8 | 40.6 | 41.2 | 39.2 | 34.4 | 25.6 | 19.3 |
| **2012** | 12.5 | 13.2 | 24.5 | 28.9 | 30.7 | 39.9 | 41.0 | 41.2 | 39.4 | 33.0 | 24.1 | 19.9 |

### 3.2.2 Air Quality

As the steel & concrete Bridges in Nareen are located in an open area, the expected concentration of pollutants are low. The Tables below give the Maximum permissible concentrations of some pollutants as per the Iraqi guidelines and the WB.

**Table 3: Maximum permissible concentrations for $SO_2$, $NO_2$ and CO**

| | 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

Within the project area there are some mountains, cliffs, and valleys.

### 3.2.4 Land use

The land use of area surrounding the project is not in use over a 100m diameter from each bridge.

### 3.2.5 Seismic Activities

The territory of Iraq, especially the east of Iraq, although not directly located on a dense cluster of recent earthquake epicenters; is subject to seismic activities. Some of those were recorded in the past as a result of movement of some tectonic plates in neighboring country, Iran. However, their impacts were insignificant to human and infrastructures.

### 3.2.6 Flooding

Sometimes, during spring season, the shallow canal beneath the bridges works as a drain channel (with a low water flow). There are no records of flooding that occurred previously in the area.

[2] Diyala Environmental Authority

### 3.2.7 Noise

Currently, there is no traffic from both sides of both bridges and consequently the noise level is not high.

### 3.2.8 Heritage Environment

Further to site visits and discussion with locals, it was noted that there are no sites of historical or cultural importance in the area. There are no cemeteries, historical-cultural monuments, churches, mosques near the project that need to be removed in order to rehabilitate the bridges.

### 3.2.9 Traffic Level

Currently, the 2 bridges are not accessible to traffic. However, traffic congestion is not expected during the rehabilitation phase as the temporary alternative routes that were innovated and that are currently used, can be also be used during rehabilitation phase.

### 3.2.10 Land Acquisition

The rehabilitation activities of the Bridges in Nareen will be within their existing footprints. These bridges were built on state-owned lands. 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 construction camp will be established near the bridges on vacant state-owned lands for storage of equipment and construction materials. 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.

### 3.2.11 Social Aspects

Although there are no villages, residential complexes or community structures in close proximity to the bridges, there are some scattered houses at about 100m distances from the bridges. The bridges are being constructed on state land, and no land or property expropriation will be necessary. In addition, no roadside vendors, either licensed or non-licensed will be displaced. The surroundings areas on both sides of the bridges are not utilized by any of the local population. All the areas around and within the sites remain clear of any settlement or economic use and are ready for rehabilitation works, no interference were registered from the local community which is eager for the works to be completed. No agriculture activity of any kind was initiated for about 250 m around the steel bridge and about 200m around the concrete bridge.

Since the repair and rehabilitation activities of the bridges 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 ASPECTS

## 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 MOE and the Ministry of Construction, Housing and Public Municipalities (MOCHPM).

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

Table 4: 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.

## 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. ENVIRONMENT and SOCIAL IMPACT ASSESSMENT

## 5.1 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 steel & concrete Bridges in Nareen, 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 ESMP 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 majority of environmental and social impacts will be of low severity nature, limited to the rehabilitation sites, temporary and reversible. The most significant impacts are concerned with disposal of solid and hazardous wastes resulting from the construction activities as well as from the worker camps, disposal of domestic sewage from the worker camps and potential pollution of the water course from the different rehabilitation activities.

The overall assessment of the key environmental and social impacts is summarized below.

**Table 5: Summary of Impact Assessment During Construction / Rehabilitation**

| | Environmental Receptor | Impact Significance |
|---|---|---|
| 1 | Air Quality | Low |
| 2 | Noise | Low |
| 3 | Water Resources | Low |
| 4 | Soil | Low |
| 5 | Solid and hazardous wastes | Medium |
| 6 | Flora & Fauna | Not significant |
| 7 | Topography and landforms | Not significant |
| 8 | Impacts on local traffic | Low |
| 9 | Health and Safety | High |
| 10 | Socio-Economic impacts | Low |

## 5.2 Operational Phase

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

During the operational period, the project is expected to result a positive socio-economic outcome for the local communities. Socially harmful consequences of the bridges operation

are not anticipated. However, the continued operation of a GRM for one year following opening of the bridges 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.

# ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

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 Road and Bridges Department (RBD) as the Project Owner.

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 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.

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 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 6: Mitigation Measures during Rehabilitation Phase.**

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| 1 | **Air quality** | • Unpaved roads, e.g. which may be utilized for construction vehicles movement or transportation of construction materials should be prepared in a way to avoid dust emissions. Watering to suppress dust should take place regularly.<br>• Watering or increase of the moisture level of the open materials storage piles to reduce dust levels;<br>• enclosure or covering of inactive piles to reduce wind erosion;<br>• loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of means moving inside and outside of the construction-site; and<br>• Speed reduction for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr. | Contractor | Resident engineer | 1,000 |
| | | • Engines of vehicles and other machinery are kept turned on only if necessary, avoiding any unnecessary emission;<br>• Machines and equipment are periodically checked and maintained to ensure their good working condition;<br>• 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;<br>• Activities are carried out using the minimum required number of means at the same time; and<br>• Electric small-scale mechanization and technical tools are used when available and feasible; | Contractor | Resident engineer | Included in contractor cost |
| | | Limit vehicle speed limits to be the minimum (less than 40 km/hr) near residential buildings and farmlands. | Contractor | Resident engineer | Included in contractor cost |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| 2 | **Noise** | Construction activities are to take place within reasonable hours during the day and early evening. Night-time activities near noise sensitive areas, such as residential buildings, should not be allowed. | Contractor | Resident engineer | Included in contractor cost |
| | | • Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order.<br>• Equipment to run only when necessary<br>• Positioning of the noise sources in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site. | Contractor | Resident engineer | Included in contractor cost |
| | | Use of personal protection equipment for workers especially those who use jack hammers or near noisy engines or compressors. | Contractor | Resident engineer | 2,000 |
| 3 | **Water resources** | Damaged sections of the bridges are carefully removed without blocking water channels. | Contractor | Resident engineer | Included in contractor cost |
| | | Wastewater from the workers' rest areas or construction camps should be contained in solid containers and should be removed regularly from site by means of authorized contractors. | Contractor | Resident engineer | 8,000 |
| | | 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 | 3000 |
| | | • In case of using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval.<br>• No solid wastes are to be thrown into the drainage channel. | Contractor | Resident engineer | Included in contractor cost |
| 4 | **Soil** | • To 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 | Contractor | Resident engineer | Included in contractor cost |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | 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;<br>• Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills;<br>• Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction; and<br>• It must be prohibited to operate equipment and vehicles outside the designated work areas and roads. | | | |
| | | • No hazardous waste storage to take place directly on soils. Appropriate and enclosed containers should be utilized and disposed of by authorized entities | Contractor | Resident engineer | 1,000 |
| **5** | **Solid and hazardous wastes** | • Minimize waste generation on site.<br>• Simple waste management plan for specific waste streams must be developed.<br>• General waste must be collected and transported to local council approved disposal sites.<br>• Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors.<br>• Waste containers must be located at each worksite.<br>• 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.<br>• 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.<br>• All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as "hazardous".<br>• Transportation and disposal of hazardous wastes should be done through licensed contractors and in close coordination with the relevant local authority | Contractor | Resident engineer in coordination with the local authority and ministry of science and technology regarding hazardous wastes | 6,000 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | and in compliance with the legal requirements and instructions of the coordination with the as ministry of science and technology.<br>• Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards.<br>• A hazardous materials inventory for the construction period must be prepared.<br>• Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers.<br>• Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at approved locations. | | | |
| **6** | **Flora & Fauna** | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| **7** | **Topography and landforms** | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| **8** | **Traffic** | • Provide information, through appropriate signage, to the bridges users to use the alternative route;<br>• Clear traffic signs and signs signals must be installed on-site to provide for safe traffic<br>• Where practicable, truck deliveries must be restricted to daytime working hours.<br>• 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 and Safety** | • Limit speed of construction vehicles and provide road signage for drivers and local community. | Contractor | Local traffic department in coordination with the Resident engineer | 1,000 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | • Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues.<br>• Personal protection equipment such as eyeglasses, gloves, hard heads and safety belts must be supplied and continuously used by all workers, technicians, engineers and site visitors. | Contractor | Resident engineer | 3,000 |
| | | • compliance with international standards for good construction practices;<br>• adherence to local and international guidance and codes of practice on EHS management during construction;<br>• Management, supervision, monitoring and record-keeping;<br>• implementation of EHS procedures as a condition of contract with contractors and their sub-contractors;<br>• clear definition of 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);<br>• 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;<br>• provision of appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues;<br>• provision of health and safety information;<br>• regular inspection, review and recording of EHS performance;<br>• Maintenance of a high standard of housekeeping at all times. | Contractor | Resident engineer | Included in contractor cost |
| | | • Any accidents to be reported and treated within site as a first aid procedure.<br>• Safety training for the workers.<br>• Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment | Contractor | Resident engineer in coordination with health and safety officials. | 2,500 |

| Receptor | | Mitigation Measures | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|
| | | • First aid items should be available all times onsite and trained staff on emergency aids should be identified. | | | |
| **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 cost US$ (rehabilitation phase)** | | | | | **28,000** |

**Table 7: Mitigation Measures during 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 cost |
| **2** | **Noise** | During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.<br>Speed limits should be reduced especially near residential buildings.<br>Limit trucks movement especially at night in coordination with the local traffic authorities. | Traffic Department | Traffic Department | No cost |
| **3** | **Water resources** | Ensure Storm water from bridges spans is collected in drains and disposed of in a network and not in the water courses | Not applicable | Not applicable | Not applicable |
| **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 bridges 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 bridges 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** |

# 6. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

## 6.1 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. For this purpose, an environmental and social monitoring program has been established for the construction phase. to ensure the proper implementation of the environmental and social mitigation measures.

**Table 8: Monitoring Activities during Rehabilitation Phase.**

| Receptor | | Monitoring Activities | Monitoring Indicators | Frequency | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|---|---|
| **1** | **Air quality** | • Investigate dust complaints from workers and residents<br>• Visual inspection of vehicles and equipment operating or entering the site and Measurements of exhaust emissions (CO, SOx, NOx, PM10 , PM2.5) | • Recorded and documented complaints<br>• Record the status of equipment and vehicles on site (excessive black or white smoke) | • Daily visual inspection<br>• measurements every 3 months. | Resident Engineer | PMT | 12,500 |
| 2 | **Noise** | • Investigate noise complaints from workers and neighboring communities in the affected locations | • Recorded and documented complaints<br>• Recorded tests results | • Weekly inspection of complaints<br>• In case of complain | Resident Engineer | PMT | 1,500 |
| **3** | **Water resources** | • Investigate implementation of mitigation measures and observe any oil or fuel spills.<br>• Investigate wastewater disposal measures<br>• Conduct water analysis for the river water | • Recorded and documented complaints<br>• Site Investigation report<br>• Recorded tests results | • Daily Investigation<br>• Monthly Measurements | Resident Engineer | PMT | 5,000 |
| **4** | **Soil** | • Observe any soil contamination with oil or fuel | Site Investigation report | Daily | Resident Engineer | PMT | No cost |

| Receptor | | Monitoring Activities | Monitoring Indicators | Frequency | Responsibility | Supervision | Total estimated Cost in US$ |
|---|---|---|---|---|---|---|---|
| | | • Observe any accumulation of wastes | | | | | |
| **5** | **Solid and hazardous wastes** | • Maintain records on waste types and quantities<br>• Observe any waste accumulation in un approved locations | • Waste management contracts with authorized contractors<br>• Waste delivery receipts from local authorities. | • Weekly<br>• Weekly | Resident Engineer | PMT | No cost |
| **6** | **Health and safety** | • Ensure compliance of workers to Health and Safety requirements<br>• Maintain log on accidents | Observation report<br>Accidents report | Weekly | Resident Engineer | PMT | No cost |
| **7** | **Flora & Fauna** | Record any observation about wild animals or plants on site or nearby and report to the Environmental Authority | Observation report | Upon occurrence | Resident Engineer | PMT | No cost |
| **8** | **Topography and landforms** | No monitoring required | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| **9** | **Traffic** | Ensure speed limits and warning signs are installed | Road signs are installed. | Half annual | Resident 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 | Resident Engineer | PMT | No cost |
| **Total cost US$ (Rehabilitation/Maintenance phase)** | | | | | | | **19,000** |

## 6.2 ESMP Institutional Arrangements

In order to ensure full compliance with the environmental and social requirements which are described above, RBD PMT nominated an engineer to act as the focal point for environmental and social affairs at the central level. On the field level, RBD PMT nominated two engineers in Diyala 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 consultant is recruited by the PMT at the central level to provide technical assistance and capacity building to the environmental and social team both at the central level and at the field level.

## 6.3 Reporting requirements

To ensure that the mitigation and monitoring measures are being carried out effectively with the required frequency, a clearly defined and regular reporting and response system must be established. The needed frequency of report generation for inspection and environmental/social monitoring is to be monthly, and for auditing to be once during project life-time (6 months).

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:

a. All incidents or accidents during the bridges rehabilitation should be reported immediately to relevant authorities.
b. All corrective measures must be discussed to ensure compliance with laws and regulations.
c. Reports for personnel training on environmental issues or emergency practices must be produced.
d. 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.

On monthly basis, RBD PMT shall prepare an environmental and social progress report which will be submitted to the World Bank for review and disclosure.

## 6.4 Capacity Development and Resources Requirements

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 who will be responsible for undertaking the environmental and social tasks, they will require some capacity development.

All construction personnel and contractors are required to undertake appropriate environmental training and induction programs including, importantly, 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 9: Capacity Development Requirements for RBD3**

| Capacity development topic | | Provider(s) | Duration | Estimated Cost (US$) |
|---|---|---|---|---|
| 1 | Environmental Impact Assessment<br>Environmental and social Management in Construction Sites | Private sector consultant t | 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<br>(international travel and accommodation cost for RBD trainees) |
| **Total Estimated Cost** | | | | **$15,000** |

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

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.

# 7. PUBLIC CONSULTATION RESULTS

According to the WB policies, it is required that broad and open public consultations be held with PAPs on the project. These consultations are to ensure that the 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 difficulties and security constraints, this approach was not achievable.

In order to fulfill the WB requirements, a one on one interview 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. It was difficult to conduct the questionnaire with women due the fact that it is not easy to take the women's opinions freely due to the tribe's habits that exist in the area of the project. The questionnaire was then addressed to vehicle-road users and to a number of the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities.

According to the results revealed from these questioners, the local community individuals agreed that, the rehabilitation activities will have a positive impact on their social daily life. None of the locals expressed any reservations against the project and did not specify any negative impact that might affect him or his family. All locals agreed that the two bridges will need some additional safety signs and instructions in order to keep the movement on the bridges within safe conditions. The following are the main findings of the consultation process which took place in April 2016.

a. All questioned locals agreed that the reconstruction activities will have a strong positive impact from the social perspectives on the locals.
b. No claims from any locals were recorded or alleged regarding the ownership of the land where the bridges are constructed; all agreed that is governmental land property.
c. No vegetation covers, crops, plants, trees…etc. will be removed in order to execute the rehabilitation activities of the bridges.
d. The interests of the locals will not be affected in any way by the reconstruction activities.
e. No infrastructure within the bridges area will be affected negatively due the reconstruction activities.
f. No deportation, dislocation of any of the local community will be needed due to these activities.
g. The reconstruction of the bridges will enhance the social relationship among the locals, improve their transport.
h. All locals agreed that the bridges will need more traffic and instructional signs for the bridges users' safety. Please refer to annex 3 for more details.

During public consultation, information about GRM was introduced to local people and they 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

and PMT contact information will be available before implementation starts. (Please refer to Annex 1 for more details).

The contact information of the designated GRM personnel was also posted at the project site for any complaint and redress

In addition, the draft ESMP 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.

A translated summary of the draft ESMP was also disclosed at the project site for feedback and comments if any and hard copies were distributed in municipalities and mosques to allow further disclosure

# 8. CONCLUSION AND RECOMMENDATIONS

The EIA concludes that the proposed rehabilitation and reconstruction of Rehabilitation of a Steel Bridge & a Concrete Bridge on 2 temporary watercourses in Nareen, Diyala Governorate 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**<br><br>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**_____<br><br>**My last name**_____<br><br>**I wish to raise my grievance anonymously**<br><br>**I request not to disclose my identity without my consent** |
| **Contact information**<br><br>**Please mark how you wish to be contacted (mail, telephone, e-mail).** | **By Post: Please provide mailing address:**<br><br>_____<br><br>**By Telephone:** _____<br><br>**By E-mail** _____ |
| | |

| | |
|---|---|
| **Description of Incident or Grievance:**<br>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_____)**<br><br>**Happened more than once (how many times? ___)**<br><br>**On-going (currently experiencing problem)** |
| | |
| **What would you like to see happen to resolve the problem?** | |
| | |
| Signature: _____<br><br>Date: _____<br><br>**Please return this form to:** [name], _____[company name] _____<br><br>Address_____: Tel.:_____ or E-mail: _____ | |

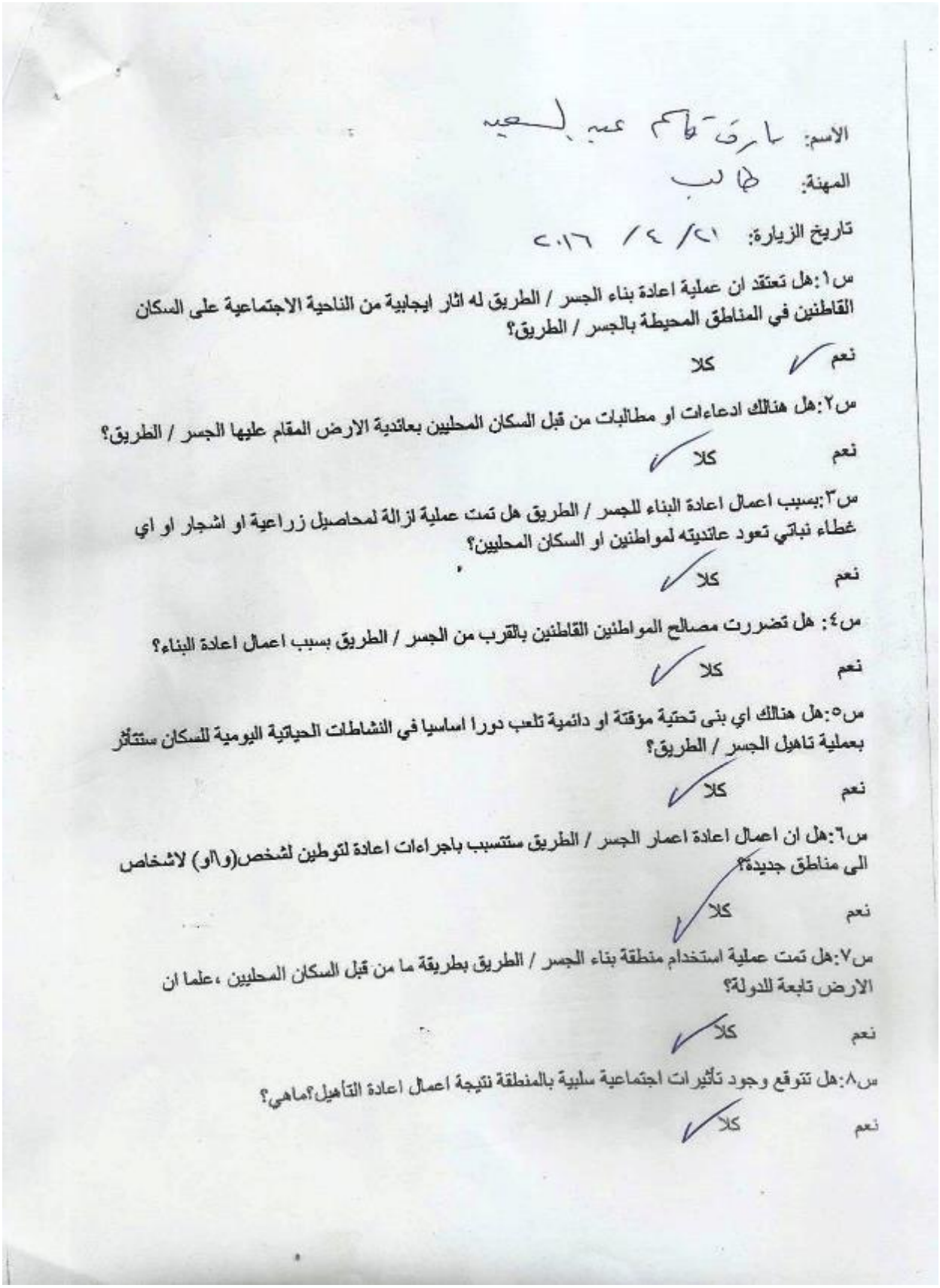
## Annex (2): Site photos

**Figure 3: General View of the steel bridge**

**Figure 4: Side view of the damage on the concrete bridge**

**Figure 5: View of the damage on the concrete bridge**

## Annex (3): Individual Consultations



الاسم: سارة حاكم عبد السعيد

المهنة: طالب

تاريخ الزيارة: ٢٠١٦/٤/٢١

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم ✓ كلا

س٢:هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعائدية الارض المقام عليها الجسر / الطريق؟

نعم كلا ✓

س٣:بسبب اعمال اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائديته لمواطنين او السكان المحليين؟

نعم كلا ✓

س٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟

نعم كلا ✓

س٥:هل هنالك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان ستتأثر بعملية تاهيل الجسر / الطريق؟

نعم كلا ✓

س٦:هل ان اعمال اعادة اعمار الجسر / الطريق ستتسبب باجراءات اعادة لتوطين لشخص(و/او) لاشخاص الى مناطق جديدة؟

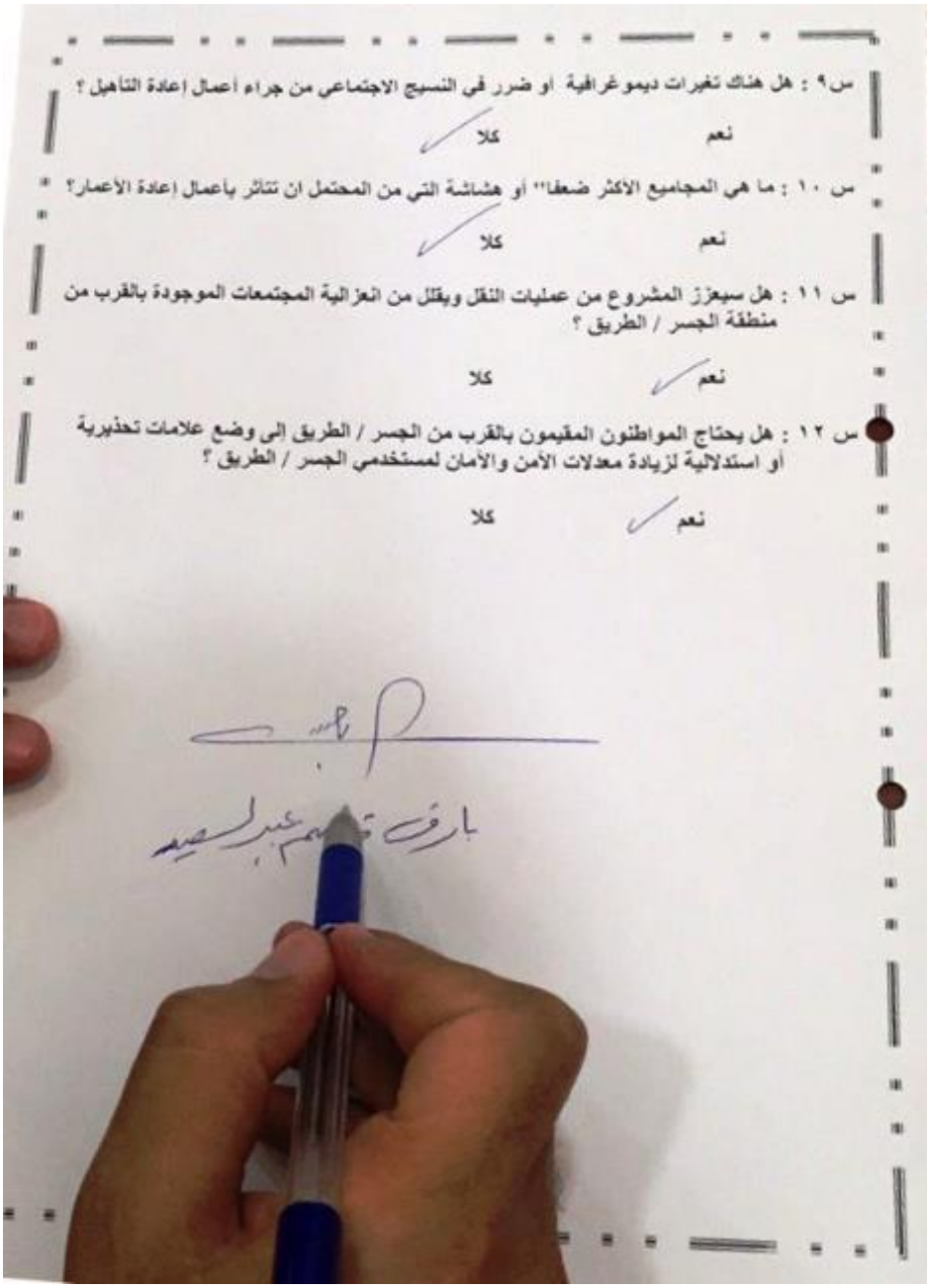
نعم كلا ✓

س٧:هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،علما ان الارض تابعة للدولة؟

نعم كلا ✓

س٨:هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟ماهي؟

نعم كلا ✓



س٩ : هل هناك تغيرات ديموغرافية او ضرر في النسيج الاجتماعي من جراء أعمال إعادة التأهيل ؟

نعم ✓ كلا

س ١٠ : ما هي المجاميع الاكثر ضعفا" أو هشاشة التي من المحتمل ان تتاثر بأعمال إعادة الأعمار؟

نعم ✓ كلا

س ١١ : هل سيعزز المشروع من عمليات النقل ويقلل من العزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق ؟

نعم ✓ كلا

س ١٢ : هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق إلى وضع علامات تحذيرية أو استدلالية لزيادة معدلات الأمن والأمان لمستخدمي الجسر / الطريق ؟

نعم ✓ كلا

الاسم: حسن عبد الحميد محمود

المهنة: كاتب

تاريخ الزيارة: ١٤/٤/١٠

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

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نعم ✓

كلا

الاسم: عبد الكريم خليل

المهنة: طالب

تاريخ الزيارة: ٢٠١٤/٤/١٠

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

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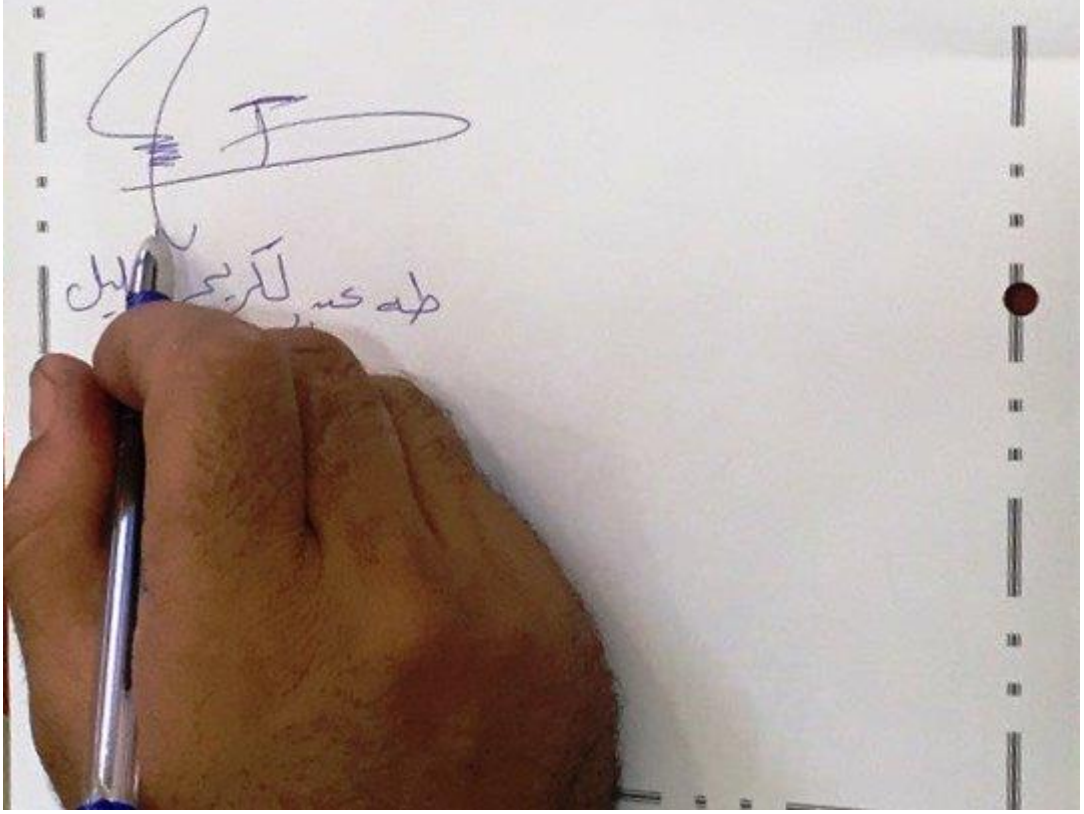

الاسم: حسين عامر مرهون

المهنة: كاتب

تاريخ الزيارة: ١٦/٤/١٠

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نعم ✓ كلا

حسين عامر مرهون

الاسم: طارق نجيب احمد

المهنة: [illegible]

تاريخ الزيارة: ٢١/ ٤/ ٢٠١٦

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

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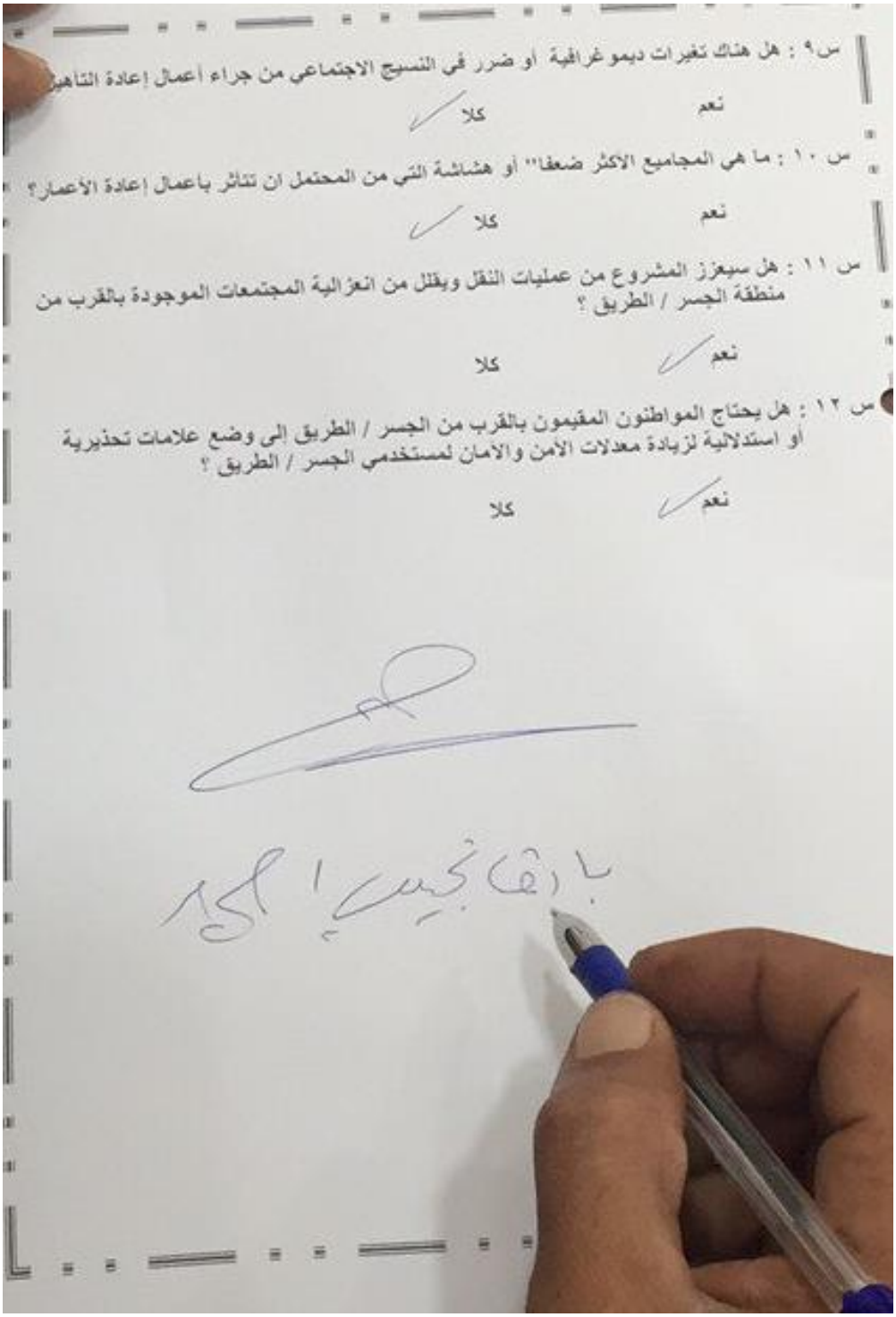
س٧:هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،علما ان الارض تابعة للدولة؟

نعم كلا ✓

س٨:هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟ماهي؟

نعم كلا ✓


س٩ : هل هناك تغيرات ديموغرافية او ضرر في النسيج الاجتماعي من جراء أعمال إعادة التاهيل

نعم كلا ✓

س ١٠ : ما هي المجاميع الاكثر ضعفا" أو هشاشة التي من المحتمل ان تتاثر باعمال إعادة الأعمار؟

نعم كلا ✓

س ١١ : هل سيعزز المشروع من عمليات النقل ويقلل من انعزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق ؟

نعم ✓ كلا

س ١٢ : هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق إلى وضع علامات تحذيرية أو استدلالية لزيادة معدلات الأمن والامان لمستخدمي الجسر / الطريق ؟

نعم ✓ كلا