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***Research paper***

# Environmental impact assessment of Nagarpur bridge construction over the Dhaleshwari river at Tangail in Bangladesh

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## Abstract

The study was conducted to investigate the potential environmental impacts of the proposed bridge during the pre-construction, construction and operation phase using the matrix method. The study also aims to formulate an environmental management plan (EMP) to minimize the probable impacts on the construction of the proposed bridge. A field mobilization was conducted in proposed project area to find out the environmental baseline (surface water, ground water, soil, sediments, air, noise and ecology) information and identification of possible impacts. The focused group discussions (FGDs), questionnaire survey (QS) and key informants interview (KII) were conducted to collect relevant information. Secondary data were also collected from different books, journals, Local Government Engineering Department (LGED), Upazila Agriculture Office (UAO), Upazila Fisheries Office (UFO) and Department of Environment (DoE). All the samples were analyzed in the laboratory of the Department of Environmental Science and Resource Management, Mawlana Bhashani Science and Technology University, Tangail-1902, Bangladesh. The study showed that the proposed bridge will be able to connect three Upazila (Nagarpur, Mirzapur and Dhamrai Upazila) directly and will be an easy communication way for local community, along with socio-economic and health facilities development. The EIA study also found major negative impacts of the study area that would be pollutions (air, surface water, ground water, sediments, noise and soil), accidents and soil erosion. The study also found that the dust and exhaust emission may have profound effect on flora, fauna, fish breeding, water flow, wastewater, solid waste from labor camp, construction waste, and noise during pre-construction, construction and operation phase. The EIA study found that possible negative impacts are considerable and the project can be implemented. The EIA study also suggested some defined EMPs that will minimize the probable adverse impacts of the bridge construction project over the Dhaleshwari River, Tangail, Bangladesh.

***Keywords***: *EIA; Environment; EMP; Bridge Construction; Mitigation.*

## 1. Introduction

Environmental impact assessment (EIA) is a process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of proposed projects and physical activities prior to major decision and commitments being made (Saha 2007). The EIA has widely proven an effective tool of sustainable environmental planning and management (Toro et al. 2012). A more realistic conception of decision making embraces political realities and recognizes that the ultimate purpose of EIA is not just to assess impact; it is to improve the quality of decision (Formby 1990). The EIA is considered as a new planning and decision making tool which was first established in the United States under the National Environmental Policy Act of 1969 (Islam 2007). At present, all developed countries have environmental laws whereas most of the developing countries are still adopting it (Lee 1995). It goes without saying that the development process in developed and developing countries is now highly depended on the performance of EIA (Morgan 2012) and, its play a pivotal role for making development project environmentally feasible and acceptable (Phylip Jones and Fischer 2013). EIA is now well established that legislation is the essential pre-cursor to an effective EIA system, in developing countries just as it is in developed countries (Wood 2002).

Bangladesh is a developing country with it faster economic transition in last decade and the policy of foreign open market investment has been increased, particularly in industrial and infrastructure sectors which have significant environmental and social impact (Tullos 2009). Department of Environment (DoE) was established within the Ministry of Environment, Forest and Climate Change as the regulatory body responsible for enforcing the ECA (1995). EIA has been practiced in Bangladesh since the late 1980s but it is through the enactment of the Environment Conservation Act (1995) and the Environment Conservation Rules (1997) and EIA gained formal status in the country (Momtaz 2002). Under the ECA (1995), the response is grow environmental concern and demand from the 'donors' agencies for better environmental performance (Aminuzzaman 2010). When a construction project is proposed and designed, that project may affect

the environment; including the impacts on water or air quality, economic disruption for a community, or even impacts on social interactions. These possibilities need to be evaluated so that negative impacts can be minimized. The main purpose of this study is to find out the adverse environmental impact during the construction operation and maintenance phase of the project. Depending upon location, size, and severity of pollution loads, projects/activities have been classified in ECR '97 into four categories: Green, Orange A, Orange B and Red respectively, to nil, minor, medium and severe impacts on important environmental components (ECR 1997). According to the green category project do not require initial environmental examination (IEE) and EIA. On the other hand, Red category projects, which require both IEE and EIA (DoE 2010). The red category project includes the bridge over 100 meters in length, and orange B category project include the bridge less than 100 meters in length (DoE 2010).

The project is located in Dhaleshwari River at Nagarpur Upazila which area is totally deprived of modern transportation facilities. It has been a long desire of the local people to improve the modern communication facilities among the Nagarpur, Chainage, Mokna, Rathura Bazar, and Natang Road. Because of mass number of people are travelling to one place to another by boat but they did not reached at a time due to unavailability of boat. Sometimes, people have to wait on an average one and an hour even more. The proposed Nagarpur Bridge will play a vital role in economic development as well as modern communication facilities for local people. It also saves time and money for transportation of people and goods services. New employment opportunities will be generated for the local people. After the completion of the bridge, the commercial vehicles (bus, truck, minibus, and car etc.) and non-motorized vehicles (by-cycle, cart and rickshaws etc.) will be able to give more trips and people will be able to reach their destination within a short time. The proposed Bridge over the Dhaleshwari River on Mokna Union Parishad Office to Rathura bazar via Natang road is more than 100 meters long. So, it is included in the red category. That's why environmental impacts assessment (EIA) is required to ensure that impacts are evaluate in order to protect the environment and the quality of life for humans and organisms in that vicinity and beyond of the study area. This paper examines the present status of project site and evaluates the impacts, identifies the constraints and proposes some remedies by effective environmental management plan.

## 2. Materials and Methods

### 2.1. Study area

The proposed 200m bridge would be constructed over the Dhaleshwari River on Mokna Union Parishad Office-Rathura bazar via Natang road under Nagarpur Upazila of Tangail district. The proposed bridge site is located at Pakutia Union of Nagarpur Upazila under Tangail District (LGED 2019). The physical setting around the proposed project site is described as follows: - East and West: Dhaleshwari River (Pakutia, Nagarpur, Tangail); North: Approach Road (Manora, Pakutia, Nagarpur, Tangail); South: Approach Road (Rathura, Pakutia, Nagarpur, Tangail). Besides, the proposed Bridge will also connect Tangail, Manikgonj with Dhaka district and others parts of Bangladesh. The Project site lies within geographical coordinates 24°02'9.50"N and 90°00'13.01"E in Northern end where Southern end is 24°02'2.81"N and 90°00'12.46"E (LGED 2019).

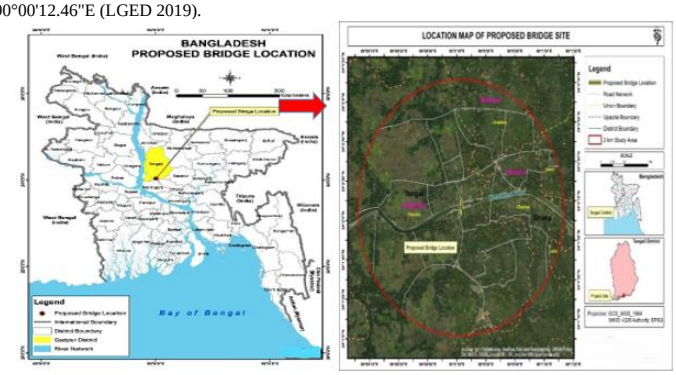


**Fig. 1:** Map Showing the Study Area of Nagarpur Upazila in Tangail District.

### 2.2. Data collection

Data were collected from primary and secondary sources. Primary data were collected from household questionnaire survey, consulting locally affected people at project area, Focus Group Discussions (FGD) with the local community, and key informants interview with Upazila Fisheries, Education and Agriculture office at Nagarpur in Tangail. Furthermore, semi-structured questionnaire was used for collecting information from local people who are directly or indirectly influenced by the proposed study. Therefore, several consultations meeting was arranged in order to find out the damage and benefit from this study. Different types of experts who have specialized knowledge (wildlife, ecology and river morphology) were participated with consultations meeting. Experts were consulted through individual and group meetings including the project panel of experts, selected individuals, and an organization with professional knowledge of EIA process.

Secondary data were collected from Bangladesh Bureau of Statistics (BBS), bridge construction authorities, construction manager, and project manager, chief engineer of bridge construction project, Local government and engineering department (LGED) and from relevant articles. On the other hand, the baseline environmental situation of the project place was drawn according to the information accumulated from secondary and primary information sources via literature review, field investigations, and consultations with different stakeholders.

### 2.3. Environmental impact assessment process

To assess impacts, initially weighting the all environmental components to the general environment that was supported the consultation among the environmental impact assessment skilled members. The weightage of environmental elements varies from 1-5 according to the importance of the element within the project setting. Secondly, the degree of impacts on environmental elements because of the project activities has been measured by qualitative consultations of EIA skilled members and therefore, the conception and environmental setting of the similar massive project, as an example, Jamuna, Paksey, Padma, Paira, etc. in Bangladesh. Accordance with the knowledge and skilled opinion, the degree of impact is assessed as positive and negative and therefore, the impact level is 0- indicate significance or nil, 1- indicate low, 2- indicate medium and 3- indicate high (Table 2). Thirdly, assessing the character of the impacts on environmental elements supported temporal (short/long term) and mitigability extent (partially/ totally mitigatable). Moreover, assessing composite rating value to environmental elements supported 3 variables like degree, duration and mitigatable of impact (Table 1).

**Table 1:** Prioritization Procedure for Assessing Key Environmental Impacts

| Composite value | Degree of impact | Temporal | | Mitigation | |
|---|---|---|---|---|---|
| | | Short-term | Long-term | Partiality | Fully |
| -1 | Low (-1) | √ | | √ | √ |
| -2 | Medium (-2) | √ | √ | √ | √ |
| -3 | High (-3) | | √ | √ | |
| Positive Impact | | | | | |
| Composite value | Degree of impact | | Temporal | | |
| | | | Short-term | Long-term | |
| +1 | Low (+1) | | √ | | |
| +2 | Medium (+2) | | √ | √ | |
| +3 | High (+3) | | | √ | |

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Furthermore, calculating the impact value for environmental component by using following equation-
Impact value = Weightage value × Composite rating scale
Finally, prioritization and categorization of impacts is using the following scale-

**Table 2:** Prioritization and Categorization of Impacts

| Impacts | Impact value |
|---|---|
| **Negative impact** | |
| Yellow category or low negative components | -1 to -5 |
| Pink category or moderately negative components | - 6 to -10 |
| Red category or highly negative components | > - 10 |
| **Positive impact** | |
| Yellow category or low negative components | -1 to -5 |
| Pink category or moderately negative components | - 6 to -10 |
| Red category or highly negative components | > - 10 |

## 3. Results and Discussion

### 3.1. Impact assessment during pre-construction phase

Land acquisition and resettlement is required for the approach road and the establishment of the labor camp. Therefore, the impact on land resource due to the land acquisition is assessed to be medium-high significant. Most of the people in the project area depend on agriculture crop production as their primary livelihood activities. In preconstruction stage, the land will be perceived due to the acquisition of agricultural land and clearing the sites for starting construction activities in order to project implementation. Likewise, the agriculture production will be badly impacted for produce food for their home which will highly affect the poor village people.
However, site cleaning is impacted on the aesthetic beauty and soil quality is assessed to be highly negative. Improper management of solid and liquid waste from the labor camp can pollute the environment in the project area. On the other hand, influx of workers and setting up labor camp in a settlement area can create social conflict. The impact of the labor camp establishment is assessed to be moderately negative. The bridge alignment and its approach are selected in such a way that no trees will be affected by the proposed project implementation. Therefore, this will affect the income and livelihood condition specially of the local people in the project area. In preconstruction stage land acquisition and resettlement might have brought a strong negative impact due to require a large amount of land for implementation of the project (Faisal et al. 2018). However, there will be a high positive impact since all the affected people involuntarily shifted in the resettlement site. An EIA study found that due to the construction of Golachipa Bridge over the Golachipa River the floral biodiversity would be affected highly (Faisal et al. 2018).

### 3.2. Impact assessment during construction phase

During the construction phase, the major impacts on the air quality will generate from the earthwork, piling, transportation of construction materials, unloading of construction materials, brick and stone crashing and mixing plant etc. Ambient air quality will also be impacted from the exhaust emission from the construction vehicles, machinery and equipment. During the construction period, the major noise generation will be from the transportation facilities, civil construction including concrete mixing plant, brick and stone crushing machine, etc. Vibration and Noise will be generated from the movement of heavy vehicles, instruments, and machinery. Construction wastes, such as metal cutting, debris, packaging materials which may contaminate soil at the site of construction. Liquid and solid wastes will be generated from the construction labor camp facilities and improper disposal during the construction phase can pollute soil quality as well as the surface water quality. Ground water at the bridge sites may be polluted due to seepage from cement concrete mixing, piling activities, accidental spillage of chemicals and hazardous liquid from working sites and seepage of untreated waste from construction camp. Quantity of the ground water may change for the abstractions for the community use. In Baga ferry Ghat, Water will be mainly affected by disposal of dredge materials and dredging for slope preparation and overall impact is tolerable. Owing to excavation of sedi-

ments from the river bed in a dredging process degrades the water quality (Hasan et al. 2018). Furthermore, the negative impact will increase during construction due to fill pond and flood plain, improper disposal of dredging materials, pile driving activities and create high underwater noise for development of project sites ((Faisal et al. 2018)). Similarly, at the time of rive training works the river will be affected due to dredging the river bed and Char land by disposal of dredging materials in river water. As a result, the aquatic life will be highly affected due to disturb the aquatic sanctuary (Faisal et al. 2018).

Accidental spillage or inappropriate management of fuels, engine oil, and hazardous chemicals during the maintenance and replacement of vehicles and equipment's can pollute the surface soil. Construction activities on the river bed (piling, excavation, concreting work), accidental spillage of hazardous chemicals like fuel oil and lubricant from the construction vehicles, improper storage and disposal of construction waste (debris, cement), solid and liquid waste from the workers facilities can mixed with rainfall water and it can accumulate on the river bed by the runoff. Turbidity of the surface water can be increased by the surface soil erosion during rainfall. The impact on sediment quality due to construction activities has been considered as moderately low. The local community near the proposed bridge site will be impacted by the proposed bridge construction activities. Due to the movement of construction vehicles for the transportation of construction materials at the project site the number of vehicles will be increased and traffic congestions may occur.

**Table 3:** Interaction Matrix Analysis of EIA on Physical Components

| Project Activities | Physical Components | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aesthetic and visual values | Soil quality | Sediment quality | Air quality | Surface water quality | Ground water quality | Landscape | Greenhouse gas emission | Vibration level | Noise level | Drainage pattern |
| **Pre-construction Phase** | | | | | | | | | | | |
| Land acquisition | -8 | | | | | | -4 | | | | |
| Site cleaning/preparation | -12 | -15 | -8 | -5 | -3 | | -7 | | | | |
| Removal of vegetation/trees | -2 | -3 | | | | | | | | | |
| Setting up labor camp and influx of labor | -6 | -8 | | -5 | -6 | | -2 | | | | |
| **Construction Phase** | | | | | | | | | | | |
| Maintenance of labor camp | -7 | -5 | | | -6 | | -6 | | | | |
| Carrying of construction materials by road | -3 | -8 | -5 | -12 | -10 | | | -9 | -6 | -10 | |
| Temporary sites used for storage of bulk construction materials (bricks, stones, cement, sand etc.) | -7 | -12 | -8 | -10 | -12 | | | | | | |
| Operation of heavy machineries | -2 | | | -12 | -6 | | | -8 | -15 | -15 | |
| Abstraction of ground and surface water | | | | | -5 | -8 | | | | -10 | |
| Generation, storage and disposal of construction waste | -12 | -10 | -8 | -2 | -12 | -8 | | | | | |
| Generation of solid and liquid waste from labor camp and disposal | -7 | -8 | -5 | | -8 | -6 | | | | | |
| Employment generation | | | | | | | | | | -8 | |
| Approach roads | 7 | -8 | | -3 | | | | | | | -3 |
| **Operation Phase** | | | | | | | | | | | |
| Movement of vehicles | -7 | -2 | | -12 | -6 | | | -10 | -9 | -10 | |
| Transportation of products | -8 | -2 | | -12 | -4 | | | -8 | -7 | -10 | |

**Table 4:** Interaction Matrix Analysis of EIA on Biological Components

| Project Activities | Biological Components | |
|---|---|---|
| | Aquatic ecology | Terrestrial ecology |
| **Pre-construction Phase** | | |
| Land acquisition | | -3 |
| Site cleaning/preparation | | -2 |
| Removal of vegetation/trees | | -4 |
| Establishment of labor camp and influx of workers | | -3 |
| **Construction Phase** | | |
| Maintenance of labor camp | | |
| Transportation of construction materials by road | -5 | -5 |
| Temporary sites used for storage of bulk construction materials (bricks, stones, cement, sand etc.) | | -7 |
| Operation of heavy instrument and machineries | | |
| Abstraction of ground and surface water | -6 | -3 |
| Generation, storage and disposal of construction waste | -7 | -6 |
| Generation of solid and liquid waste from camp and disposal | -8 | -9 |
| Employment generation | | |
| Approach roads | | -2 |
| **Operation Phase** | | |
| Movement of vehicles | | -2 |
| Transportation of products | | -3 |

In addition, road accidents may be occurred due to movement of construction vehicles with construction materials and equipment, on the roads and diversions and operation of machineries and equipment's during construction stage. Specially the school going children's are the victim of accidents in the approach road. A first aid box must always be available at the site. The safety of the students from dust, noise and staking of rod and sands must be ensured by the contractors. Noise and dust pollution will be impacted on the local community (Table 3). Communicable diseases can spread among the local community from the influx of the construction workers and improper management of construction camp. The impacts on the community health and safety can be assessed to be Medium-Low. The proposed project site does not cover any ecologically sensitive area. Though this site does not cover any ECA's, construction activities like noise, vibration, dust and wastes from heavy machineries and equipment operation, piling, excavation, concrete work, construction of the internal road network, physical presence of workers, improper storage and management of wastes may have impact upon the ecosystem. Therefore, according to site visit and secondary literature review (IUCN Red Book), it may say that no major adverse impacts are envisaged on terrestrial and aquatic ecology. A moderately negative impact on aquatic ecology for storage, abstraction of surface, ground water and generation of solid and liquid waste. Land use highly negative impact for the Approach road. Occupational and health safety will be risk in time of heavy machine running and highly air pollution. Personal Protective Equipment must be used in time of bridge construction. The construction phase will be created employment opportunities for the skilled, semi-skilled and unskilled workers. The project construction phase will also be able to generate indirect employment opportunities (small shops like tea stalls, hotels, the supply of intermediate raw materials, repair outlets, hardware stores, etc.) apart from direct employment. This will be a positive socio-economic development for the region.

**Table 5:** Interaction Matrix Analysis of EIA on Socio-Cultural Components

| Project Activities | Socio-cultural Components | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Land acquisition and resettlement | Land uses | Traffic (road and river) | Occupational and health safety | Economy and livelihood | Employment | Population displacement | Social /cultural structure |
| **Pre-construction Phase** | | | | | | | | |
| Land acquisition | -12 | -10 | | | | | | |
| Site cleaning/preparation | | -5 | | -2 | | | | |
| Removal of vegetation/trees | | | | | | | | -2 |
| Establishment of labor camp and influx of workers | | -10 | | | | | | -7 |
| **Construction Phase** | | | | | | | | |
| Maintenance of labor camp | | -8 | | | | | | -2 |
| Transportation of construction materials by road | | -2 | -10 | | | | -2 | |
| Temporary sites used for storage of bulk construction materials (bricks, stones, cement, sand etc.) | | -15 | | -12 | -5 | | | |
| Operation of heavy instrument and machineries | | | | -10 | | | | |
| Abstraction of ground and surface water | | | | | | | | |
| Generation, storage /disposal of construction waste | | -7 | | | | | | |
| Generation of solid and liquid waste from labor camp and disposal | | -6 | -7 | | | | | |
| Employment generation | | | | -10 | 8 | 8 | | 6 |
| Approach roads | -15 | -15 | -8 | | | | -2 | |
| **Operation Phase** | | | | | | | | |
| Movement of vehicles | | | -9 | | | | | 5 |
| Transportation of products | | | -9 | | 8 | | | 8 |
| Employment generation | | | | | 8 | 8 | | |

### 3.3. Impact assessment during operation phase

After completion of the proposed bridge construction work on the Dhaleshwari River will be open for all. Due to the improved condition of the bridge and approach road traffic will be increased which will impact the air quality (dust, particulate matter, nitrogen oxides, hydrocarbons, carbon monoxide, sulfur dioxide, lead) affecting the immediate vicinity of the bridge site. In Baga ferry Ghat the water quality will be mainly affected by the construction of substructure and disposal of wastes and the average impact on water is low. During black carpeting air will be mainly polluted as a result of the gases emitted from bituminous. The air quality will be affected during the construction phase with the emission of dust particles from machinery like excavators, electric grinders and equipment (Hasan et al. 2018). Noise and vibration will be increased at the bridge site due to the increasing number of vehicles. The cultural/religious sites (mosques, schools, and madrasas etc.), business structures (shops) and those inhabitants who are living very close (within 50 m) to the proposed bridge area will be affected. Hazardous materials spilled by accidents at the bridge site and washed into water sources will result in water pollution. In Baga ferry Ghat due to construction of superstructure and road structure, the local economy will be impacted but the overall impact is very low. There is a very less probability of accidents during construction (Hasan et al. 2018). By the implementation of the proposed project, the employment and business opportunities will be definitely increased in the study area, which will help to improve their social status.

3.4. Environmental Management Plan (EMP)

The main objective of the EMP is to ensure that the stress/load on the ecosystem is within its permissible assimilative capacity i.e. its carrying capacity, to create good working conditions for employees, to plan out the complete strategy to take care of stakeholder engagement, to contribute significantly to sustainable development. Environmental management plan prepared to minimize and control of negative impacts during pre-construction, construction and operation/management stages for its sustainability (Islam et al. 2017).

**Table 6:** Environmental Management Plan (EMP) for Sustainable Development

| Potential Negative Impacts | Proposed Mitigation Measures |
|---|---|
| Solid and liquid waste from the labor camp | - Labor camp should be constructed at a distance from the water body;<br>- Avoid productive land and away from the settlement during the selection of land for the setup of labor camp;<br>- No solid and liquid waste discharge into the water bodies;<br>- Instruct workers to maintain a clean environment in the camp and its surrounding area. |
| Air pollution | - Fit vehicles with appropriate exhaust systems and emission control devices;<br>- Maintain vehicles and construction equipment in good working condition including regular servicing;<br>- Operate the vehicles in a fuel-efficient manner;<br>- Impose speed limits at 20 km/hour on vehicle movement at the worksite to reduce dust emissions;<br>- Construction equipment causing excess pollution (e.g. Visible smoke) will be banned from construction site immediately prior to usage;<br>- Water spray to the dry earth/material stockpiles, access roads and bare soils as and when required to minimize the potential for environmental nuisance due to dust;<br>- Stored materials such as: excavated earth, dredged soil, gravel and sand shall be covered and confined to avoid their wind drifted;<br>- Restore disturbed areas as soon as possible by vegetation. |
| Noise pollution and vibration | - Create noise barrier and consider the minimum noise levels at sensitive receptor sites (e.g. school, mosque, temple, health center etc.);<br>- The Stone breaking machine should be confined within a temporary shed so that noise pollution could be kept minimum.<br>- Protection devices (ear plugs or ear muffs) shall be provided to the workers operating in the vicinity of high noise generating machines during construction;<br>- Construction equipment and vehicles shall be fitted with silencers and maintained properly;<br>- Instruction to the drivers to avoid unnecessary horn. |
| Surface pollution and groundwater pollution | - Any wastes should not be throwing into the river other than dump into the designated waste dumping area;<br>- Construction work should be preferred during dry season;<br>- Store the oil and petroleum product in a separate location cover by a concrete structure. |
| Soil pollution | - Avoid the productive land, agricultural land, archaeological sites, protected area, forest area, natural habitat etc.;<br>- Soil from the fallow land should be used in earthwork in approach road or by dredge soil from the river bed;<br>- Re-vegetation the exposed area as early as possible to reduce the soil erosion. |
| Sediment pollution | - Instruct the workers to ensure minimum disturbance during the construction activities on the river bed;<br>- Immediately remove all the construction debris from the construction site as well as from the water bodies in a planned way;<br>- Any wastes should not be throwing into the river other than dump into the designated waste dumping area;<br>- Store the oil and petroleum product in a separate location cover by a concrete structure;<br>- Create a barrier for reducing the sedimentation into the river. |
| Improper storage, handling of solid, liquid and hazardous waste | - Any wastes should not be throwing into the river other than dump into the designated waste dumping area;<br>- Organic waste should be managed by composting method and converted into fertilizer and will be used by the farmers;<br>- Inorganic waste should be given to the authorized vendor for free of cost for recycling;<br>- Provide appropriate PPE to the construction personnel for handling construction materials;<br>- Accidental spillage of hazardous waste should be managed by spreading wood powder on the surface of the oil and this powder mixed with oil must store in a designated concrete room. |
| Influx of construction workers and prevalence of diseases | - Trained the workers by providing health and safety training on communicable diseases;<br>- Educating project personnel, and area residents on risks, prevention and available treatment for vector-borne diseases;<br>- No child and/or forced labor will be employed by the contractor. |
| Road traffic and accidents | - Establish speed breaker and road safety sign;<br>- Keep provision of walk way both sides of the bridge for the peoples' movement. |

## 4. Conclusions

The major negative impacts of this project are loss of land and resettlement, loss of aquatic habitat, potential impact on ecological resources, impact on fish migration, impact on migratory winter birds, impact on surface and ground water quality, noise generation, impact on air quality, loss of top soil, change in land use pattern in pre-construction, construction and operation phase due to dust and exhaust emission, wastewater, solid waste from labor camp, noise from dismantling and construction activities. After construction of bridge the pillars may be reduce the water flow. As a result the new char land may arise and fish production may be hampered. Mitigation measures regarding the adverse impacts are use of fallow land and prepare them for cultivation, preservation of wet land and create new tree plantation at both side of the approach road, alternative livelihood for displaced person, provide compensation for resettlement, compensate the loss of crop production, encourage women participation in construction works, choose the pile construction period with the exception of breeding time, making open ground for migratory birds, prevent the mixing of waste and other materials with water, reduction of pollutant in the air, establishment of sanctuary and char land visitor center, cover haul vehicles carrying materials, minimum grudging of char land and minimum disturbance to habitat, provide temporary noise barriers near the sensitive areas, use good quality vehicles, machineries and equipment, unused concrete should not dispose into the river water, ensure that dredging materials do not contain heavy metals, proper handling of contaminated soil, modification of cultivation system, provide appropriate drainage structure at appropriate locations to avoid local flooding, emergency response plan is pre-pared for road accidents, regular monitoring of morphological change of river at the bridge location. These problems would be overcome by taking proper mitigation measures as stated in EMP.

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