Environmental Assessment Report

Union Road (UNR)

Name of the Sub-project : **Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur.**

Slice No. : **UNR-24 (A)**
Upazila : **Phulpur**
District : **Mymensingh**

Second Rural Transport Improvement Project

Local Government Engineering Department

Contents

1. Sub Project Description

Name of the Sub-project : Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur
ID No. : 361813004
District Name : Mymensingh
Name of the Upazila : Phulpur
Length of the Road : 10.375 km (Effective length)

Location of the sub-project

Phulpur Upazila is located at 24.9500°N 90.3500°E and bounded by Haluaghat, Dhobaura, Purbadhala, Gauripur, Mymensingh Sadar and Nakla Upazila. The road is 10.375 km long, starts at Bhaitkandi UP and ends at Charguadanga Bazar [details are listed in **Table-1.1**].

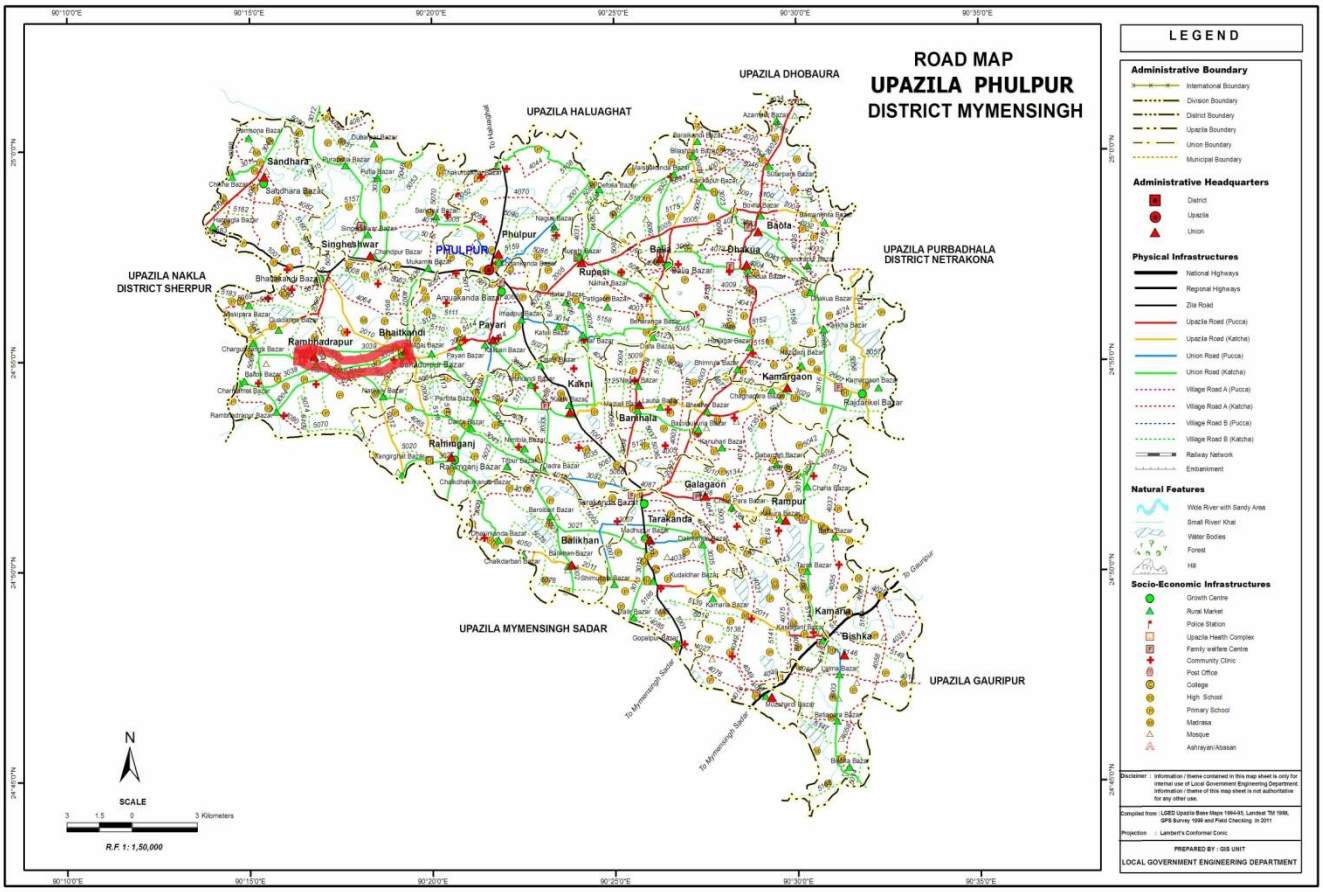
Name of the unions the road passes through	Name of the road side villages (at least 5 nos)	Starting point of the road	End point of the road	Year of construction/Last maintenance	Major items included in estimates
Bhatikandi & Rambhadrapur	Bahadurpur, Shyampur, Jarua, Ramnathpur, Charbahadurpur, Rambhadrapur, Char Niamat & Charguadanga	Bhaitkandi UP	Charguadanga Bazar	No Maintenance	Earth Work, WBM, ISG, Brick on End Edging, Dense Carpeting, Seal Coat & Surface Drain

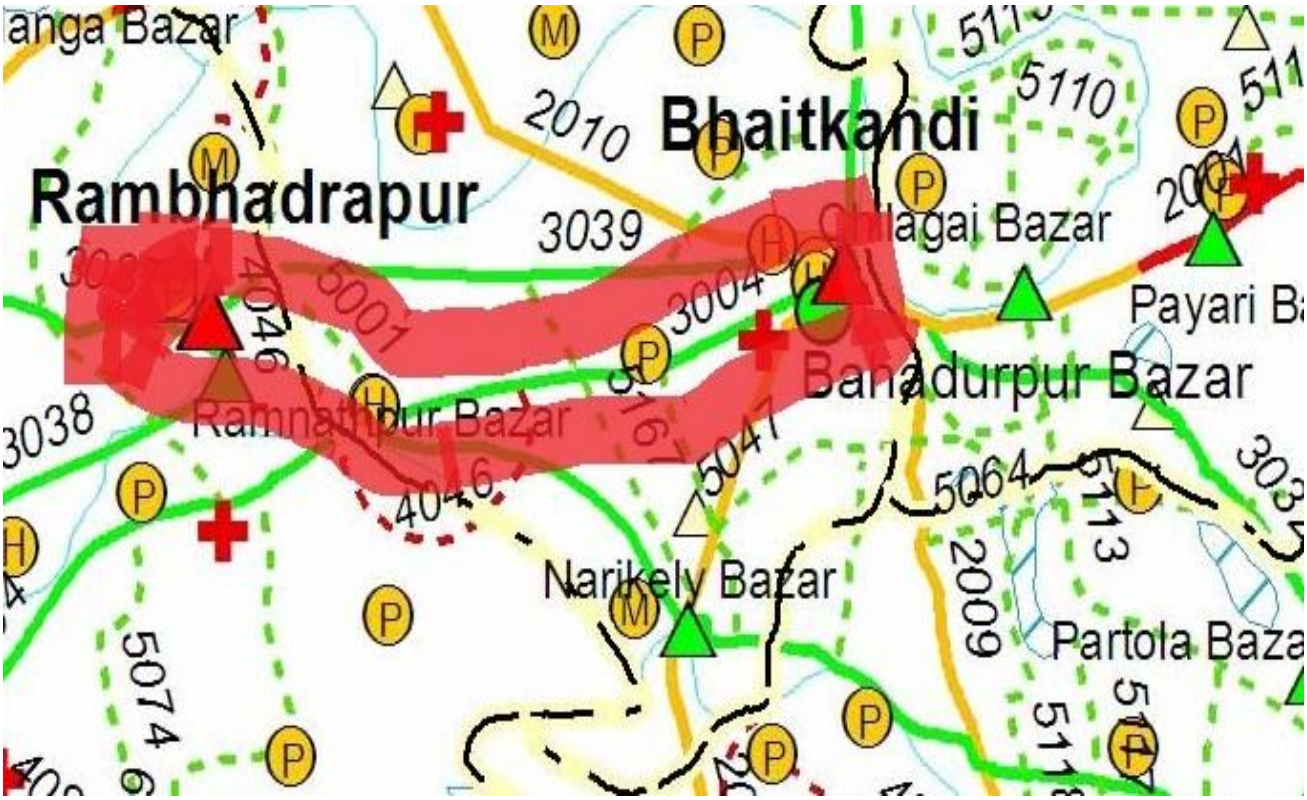
Table-1.1

Brief Description of the sub project

Union road (UNR) improvement includes construction of bituminous road on the existing earthen road. The road has a length of 10.375 km. Major components of the works includes earthwork (earth volume 18233.60 Cum), base coarse Improve sub grade, Brick at edge, 25mm dense carpeting etc. Drainage Structure such as thirteen numbers of cross drain at chainage 768m, 840m, 934m, 1952m, 2185m, 2310m, 5150m, 5420m, 7476m, 8505m, 8875m, 10009m and 10129m is required to avoid water accumulations or congestion. One Box-Culvert at chainage 7750m is also required. Protective work such as Palisading work is required at chainage 1730m to 1751m (21m, L/S), 1955m to 1980 (25m, R/S), 3095m to 3131m (36m, R/S), 5260m to 5296m (36m L/S), 7325m to 7348m (23m, L/S) and 8420m to 8449m (29m, R/S) and Guide wall is required at chainage 3510m to 3540m (30m, L/S).

Photograph of the proposed Road





Location map of the sub project

2. Detail Environmental Features

Detail Environmental features within 100m of the both sides from the centre line were collected @300m longitudinal intervals. The findings of the survey for the aforementioned road could be seen in the table below:

Chainage	Right	Left	Environmental Features
00-300	√		Shop, Bhatikandi UP office, House, Pond
		√	Shop, Bahadurpur GPS & High School, House
300-600	√		House, Agricultural Land
		√	House, Pond, Agricultural Land
600-900	√		House, Mosque, Agricultural Land
		√	House, Pond, Agricultural Land
900-1200	√		House, Pond
		√	House, Agricultural Land
1200-1500	√		House, Pond, Madrasha, Chotto Chillagai GPS, Agricultural Land
		√	Shop, House
1500-1800	√		Shop, House, Rice Mill, Shyampur Garor Bazar
		√	Shop, House, Shyampur Garor Bazar, Saw Mill
1800-2100	√		House, Agricultural Land, Pond
		√	House, Agricultural Land, Pond
2100-2400	√		House, Agricultural Land, Pond
		√	House, Agricultural Land
2400-2700	√		House, Agricultural Land
		√	House, Agricultural Land, Pond
2700-3000	√		House, Agricultural Land, Box Culvert
		√	House, Agricultural Land, Pond
3000-3300	√		Shop, House, Agricultural Land
		√	House, Jarua Junior High School, Jarua GPS, Pond
3300-3600	√		House, Agricultural Land, Shop, Pond
		√	House, Pond, Box Culvert, Agricultural Land
3600-3900	√		House, Agricultural Land
		√	House, Agricultural Land, Culvert
3900-4200	√		House, Agricultural Land, Culvert
		√	Agricultural Land
4200-4500	√		Agricultural Land, Bridge, Box Culvert, Fishery
		√	Agricultural Land, Ditch, Khal
4500-4800	√		Agricultural Land, Shop, House
		√	Agricultural Land, Chaina Bazar, House
4800-5100	√		Agricultural Land, Pond, House
		√	House, Agricultural Land, Pond
5100-5400	√		Shop, House, Agricultural Land, Pond, Char Bhadurpur GPS
		√	House, Agricultural Land, Pond
5400-5700	√		House, Agricultural Land
		√	House, Agricultural Land, Pond
5700-6000	√		Agricultural Land
		√	House, Agricultural Land, Pond

Chainage	Right	Left	Environmental Features
6000-6300	√		House, Agricultural Land, Madrasha
		√	House, Agricultural Land, Shop
6300-6600	√		House, Agricultural Land
		√	House, Agricultural Land
6600-6900	√		House, Agricultural Land, Pond
		√	House, Agricultural Land
6900-7200	√		House, Agricultural Land, Shop, Pond
		√	House, Agricultural Land, Rambhadrapur Bazar, Mosque
7200-7500	√		House, Shop
		√	House, Pond, Rambhadrapur GPS and Rambhadrapur High School
7500-7800	√		Agricultural Land, Kharia River
		√	Agricultural Land, Kharia River
7800-8100	√		House, Agricultural Land
		√	House, Agricultural Land
8100-8400	√		Agricultural Land, Pond
		√	Agricultural Land, Pond
8400-8700	√		Shop, House
		√	Shop, House
8700-9000	√		House, Agricultural Land
		√	House, Agricultural Land, Pabsas Office, Clinic
9000-9300	√		Kathaltoli Bazar, Shop, House
		√	Bazar, Shop, Mosque, Kinder Garden School
9300-9600	√		House, Agricultural Land
		√	House, Agricultural Land
9600-9900	√		House, Agricultural Land
		√	House, Agricultural Land
9900-10200	√		House, Agricultural Land, Bazar
		√	House, Agricultural Land
10200-10350	√		House, Agricultural Land
		√	Agricultural Land, Bazar, Charguadanga GPS, Fazil Madrasha, Land Office

3. Baseline Data

3 (a) Physical Environment

3. a.1 Atmosphere and Climate

Meteorological conditions of the area are more or less similar to the central part of the country with respect to temperature, rainfall and humidity. The subproject area is situated in humid sub-tropical climate with large variations between summer and winter temperatures and significantly influenced by monsoons during the months of May to September when most of the rainfall occurs. The annual average maximum temperature is about 33.33^0C and minimum temperature is about 12^0C. Annual rainfall is about 1,479 mm (ref. Mymensingh, 2012).

3.a.2 Topography

The sub-project area mainly comprises of plain agricultural land and almost flat with few undulations. River Kharia flows nearby the sub-project area. The depressions and canals are dominated by organic clay and peats. Most depression and canals are tectonically controlled. The average ground elevation of the project area is about 13m PWD. According to the information collected through public consultation, this area is considered as a flood affected area and partially affected in severe floods of 1998. A general topographic condition is found in the flowing photograph.

3.a.3 Drainage

Water logging and drainage congestion was observed in several places on the road. At chainage 768m, 840m, 934m, 1952m, 2185m, 2310m, 5150m, 5420m, 7476m, 8505m, 8875m, 10009m and 10129m water logging was observed on the road due to insufficient drainage facilities. Water logging was also observed at chainage 7750m as the road lacks adequate opening to drain out water.

3.a.4 Water Quality

3.a.4.1 Ground Water: Information on ground water quality of the nearest tube-wells along the road has been collected on spot discussion and consultation with the villagers. The depth of ground water level varies from 4m to 6m. Potable ground water is available at an average depth of 40m to 100m. Ground water quality of HTWs for drinking purposes is provided in the following table:

Drinking water quality parameters	Average contents of HTW water (mg/L)	Permissible limit (mg/L), Bangladesh standard	Comments
Arsenic	0.013	Up to 0.05	Within permissible limit
Iron	1.64	Up to 1.00	Exceed permissible limit
Chloride	6.00	150-600	Below the standard limit

Source: Bangladesh Drinking Water Quality Survey, 2009, BBS & UNICEF

3.a.4.2 Surface Water: The road sub project crosses large number of water bodies such as small and medium ponds which are used for multiple purposes. The surface water in ponds is not saline but is not suitable for drinking purposes. All the ponds are man-made and used for fishing, water supply and domestic use. River Kharia is situated very close to the sub-project area. There are no remarkable sources of water pollution such as industries, brick fields, etc observed in the sub-project area.

3.a.5 Noise

Noise is not a major impediment for the quality of the environment in the study area. Vehicles such as motor cycle, tempo, mini truck, votvoti, tractor trailer etc move on the road during day and night. These vehicles generate noise in the subproject area but within tolerable limit in most cases. No other perceptible sources of noise generation such as factories, industries, etc found near by the sub-project area.

3.a.6 Air Quality

Ambient air quality data was not available. Quality of air appears to be clean but due to poor condition of road surface, dust is generated, especially during the movement of vehicles that causes air pollution. There are no remarkable sources of air pollution such as heavy industries, brick fields, etc observed in the sub-project area.

3.Base line data:(b) Biological Environment

Flora & Fauna

The project area has some flora of commercial importance. The major tree species found in the area are Mahogany, Betel nut, Rain-tree and (in Bengali and colloquial) Simul, Sishu, Arjun, Minjiri, Jarul, Hizal, Sheora, Krishnachura Chambal,Kadam,Royna,Koroi, Shil koroi, Debdaru, Bot, Eucalyptus, Shil koroi,Siris etc. No endangered floral species are reported. The dominant fruit-bearing trees include Mango, Jackfruit, Banana,Guava, Pine apple, Date, Palm, Coconut, Papaya etc.

Besides domestic animals, wild dogs, jungle cat, jackal, mongoose and rodents like ants and snakes of various species are reported, though having a decreasing trend. The endangered

animals like Wild cow, Wild Buffalo, Pea fowl, Mugger Crocodile etc. are not reported. Mammal species like Monkey, Squirrel,Forest cat, Mongoose are available to a lesser extent. Amphibians including Kola bang, Gecho bang and Sona bang are also found to fewer extent. Some birds found in common having Bangala name Chorui, Doel, Holud pakhi, Chil, Dahuk, Babui, Koel, Kath thokra, Ghugu, Shalik, Chil, Pecha, Tia, Bok, Kak, Tuntuni, Bulbuli, Kokil etc.

3(c) Stakeholder Consultation:

During the data collection, public consultation meeting were held at Fakirer Bazar, Rambhadrapur Bazar & Charguadanga Bazar. The list of participants, photograph and details of the discussion meeting are attached as Annex-1 and their recommendations are highlighted below.

- Adequate drainage facilities should be provided to avoid water accumulations or congestion.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Noise pollution should be effectively mitigated in order to reduce up to a tolerable limit.

4. Screening Format

Screening format was administered for identifying the impacts and their extents and the screening data sheet for this subproject is given below:

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
A. **Potential Environmental Impacts during planning and design phase/ Sub-project sitting**. Is the sub-project area adjacent to or within any of the following environmentally sensitive areas?						
▪ Protected Area (Forest)		√				The area is not included in designated protected area.
▪ Wetland (Beel, Haor)		√				The area is not located in designated Wetland.
▪ National Park		√				The road has no encroachment of any national park.
▪ Wildlife sanctuary		√				The road is not included in any wildlife sanctuary.
▪ Buffer zone of protected areas		√				The area does not belong to buffer zone of any protected area.
▪ Special area for protecting biodiversity		√				The area does not belong to any special area for protecting biodiversity.
B. Potential Environmental Impacts from construction of new roads. Will the sub-project cause……						
▪ Loss of agricultural land?		√				Required earth will not be collected from agricultural land.
▪ Negative effects on rare (vulnerable), threatened or endangered species of flora or their habitat?		√				No rare species of flora and fauna occur near by the sub-project area.
▪ Negative effects on designated wetlands?		√				The area is not included in any designated wetland.
▪ Negative effects on wildlife habitat, populations, corridors or movement?		√				No wildlife habitat reported to exist nearby the sub-project area.
▪ Negative effects on locally important or valued ecosystems or vegetations?	√				√	Care will be taken, so that local important or valued ecosystem or vegetation is not

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
						damaged. Turfing will be done to compensate the loss of vegetation.
▪ Destruction of trees and vegetation?	√					Vegetation may be removed during construction of road. Turfing will be done after the construction.
▪ Impact on fish migration and navigation?		√				The sub-project does not cross any water bodies.
▪ Obstruction of natural connection between river and wetlands inside project area?		√				The sub- project does not cause any obstruction to any natural connection between river and wetlands
▪ Water logging in areas?	√				√	Baseline data shows that water are logged at 768m, 840m, 934m, 1952m, 2185m, 2310m, 5150m, 5420m, 7476m, 8505m, 8875m, 10009m, 10129m and 7750m. Water logging may also occur due to construction activities. Drainage structure and sufficient opening to drain out water at the above mentioned chainage will be provided to avoid water logging.
▪ Insufficient drainage?	√				√	From baseline date it has been observed that there is insufficient drainage at the above mentioned chainage. So, drainage structure will be provided to increase drainage facility.
▪ Negative effects on surface water quality?	√				√	No liquid / solid waste will be disposed off in water bodies
▪ Negative effects on groundwater quality, quantity or movement?		√				Liquid / solid waste will not be allowed to dispose in ground directly.
▪ Loss of existing buildings, property, economic livelihood?		√				No land acquisition or resettlement is required
▪ Increased soil erosion and/or sedimentation?	√				√	Soil may erode during earth work at slope but turfing and compaction will be carried out

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
						after completion of earth work.
▪ Negative impact on soil stability and compactness?	√				√	Turfing on embankment top and slope will be provided to mitigate negative impact on soil stability and compactness.
▪ Impacts on sustainability of associated construction waste disposal?		√				Construction waste will be disposed in safe place.
▪ Traffic disturbances due to construction material transport and wastes?	√				√	Minimum disturbance is anticipated
▪ Increased noise due to transportation of equipment and construction materials?	√				√	Occur some disturbance within acceptable limit
▪ Increased noise due to day-to-day construction activities?	√				√	Occur some noise disturbance but within acceptable limit
▪ Increased wind-blown dust from material (e.g. fine aggregate) storage areas?	√				√	Proper environmental code of practice will be in place by spraying of water during construction to reduce dust emission.
▪ Health risks to labors involve in activities?	√				√	Some risk during construction is anticipated which will be taken care of by adopting remedial measures incorporated in the contract
C. Potential Impacts of the Improved road. Will the improved road cause …….						
▪ Negative effects on neighborhood or community characters?		√				No negative effect anticipated
▪ Negative effects on local business, institutions or public facilities?		√				Improved road will increase the local business
▪ Potential social conflict between occupational groups-farmers vs. fisheries?		√				The proposed road will not cause any conflict between occupational groups, e.g. farmers and fishermen
▪ Degradation or disturbance of historical or culturally important sites (mosque, graveyards, monuments	√				√	There exists no historical or cultural important sites to be

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
etc.)?						damaged/degraded by the proposed road., there exist mosques, where some care to be involved during construction, where communication will be improved afterwards.
▪ Blockage of navigation system?		√				No navigation system will be blocked by the road. However, if such issue arises the road alignment to diverted to avoid blockage of navigation
▪ Impediments to movements of people and animals?	√				√	No impediment to movement of people and impediment to movement of animals will be negligible since the road is not wide enough.
▪ Conflicts in water supply rights and related social conflicts?		√				Will not create any social conflict over water supply rights.
▪ Air quality?	√				√	Construction work will involve Earth work, WBM, Brick on end Edging, Carpeting and Surface drain etc. will lead to increase in dust/suspended particulate matter (SPM) around the construction site. Spraying of water; bituminous burning unit to be placed away from residential area, educational/religious institutions to reduce air pollution.

Assessment:

The proposed sub-project (Road improvement) is not located within any environmentally sensitive area and thus will not create intimidation to important environmental features. In some locations drainage congestion has been observed and drainage system will be developed to minimize the water logging of those particular locations. Some earthwork will be involved, but no agricultural productive soil will be used for the purpose. Earth will be compacted for stabilization. The inputs will be mainly at construction phase and limited within project boundary. Moreover mitigation measures will be taken according to the EMP for minimizing the air, dust and noise pollution.

5. Specific Impact and Mitigation

The sub-project involves the improvement work of 10.375 km road, which passes through different types of environmental features like pond, agricultural land, shop/ bazar, mosque, educational institutions etc. For the purpose environmental studies have been carried out (with all the details of individual environmental components) since it is apprehended that, some adverse environmental effects will take place on the existing physical environment during the construction activities. The possible impacts of the improvement work on this road and their mitigation measures have been discussed (component-wise) below:

5.1 Earth Work: The road improvement work consists of earth excavation, earth filling and cutting, removal of unsuitable materials or top soil, preparation of embankment layer, hard shoulder preparation, protective work, etc. These works lead to slope erosion, silt deposition on crop fields, dust blowing, noise and vibration disturbing the local people. As no massive earth work is involved at any specific location, several small volumes of earth from different areas will be arranged by the contractor. However, if large volume of earth is required, the borrow pit may be converted to deeper pond (suitable for fish cultivation).

Mitigation:

- Proper care will be taken during cutting and filling so that slope or toe of the road embankment remain within the right of way and does not disturb the crop.
- Turfing & compaction will be done on the shoulder and slope.

5.2 Temporary interruption of natural drainage and local drainage congestion: There was water logging observed at chainage 768m, 840m, 934m, 1952m, 2185m, 2310m, 5150m, 5420m, 7476m, 8505m, 8875m, 10009m and 10129m on the road that often contribute to local drainage congestion. Drainage congestion was also observed at chainage 7750m surrounding the area of the sub-project due to lack of adequate opening to drain out water. Temporary interruption of natural drainage and local drainage congestion may also occur during construction of drainage structures.

Mitigation:

- Thirteen numbers of cross drain at chainages 768m, 840m, 934m, 1952m, 2185m, 2310m, 5150m, 5420m, 7476m, 8505m, 8875m, 10009m and 10129m will be provided to avoid water accumulations or congestion.
- One Box-Culvert at chainage 7750m will be provided to avoid water accumulations or congestion. These will be constructed newly, where no such structures exist in the locations.
- Proper diversion structure and sufficient opening to drain out water should be developed during construction work to avoid water congestion.

5.3 Pollution from construction materials: Dumping of construction spoils, including accidental leakage of bitumen, fuel etc in equipment yards, is an important hazard. Both surface and groundwater might be polluted from these contaminants.

Mitigation:

- Safe transport, storage and disposal provisions for construction materials, equipment especially bitumen, fuel etc have to be carried out in order to avoid accidental spillage and loss.
- Bitumen, fuels, lubricants etc and other hazardous materials have to be stored over raised platform not directly on the ground.
- The playground of the educational institutions shall not be allowed to use as a stack yard or work camp site.

5.4 **Dust:** Different construction activities, machinery movement and other works generate dust and impair the air quality. Road improvement work involves breaking up, digging, crushing, transporting and dumping of materials.

Mitigation:

- Water will be sprayed to control the dust, which is the main way to suppress dust in the working site.

5.5 **Noise:** Movement of vehicles generates noise. However, in this sub-project sensitive areas like various School, Mosque, Madrasha, Health Complex etc. are likely to be affected from the road side noise.

Mitigation:

- Transportation of the construction materials have to be carried with scheduled time, mainly day time.
- All powered mechanical equipment and machinery shall be fitted with noise abating gear such as mufflers for effective sound reducing.
- Boundary wall at chainage 20m to 50m (30m), 3140m to 3180m (40m), 5257m to 5282m (25m) and 8900 to 8940m (40m) at School would be provided to minimize noise and to improve traffic safety

5.6 **Water Quality:** The road passes by few number of water bodies and no remarkable sources of water pollution has been found. The water quality may deteriorate if construction materials including borrow/fill materials and sand, construction waste, effluent from work camps, food waste etc are allowed to dump in the water bodies.

Mitigation:

- Proper construction management including waste management, training of operators and other workers will be provided to avoid pollution of water bodies.
- Construction waste will be managed in specified bins opening a ditch (not in water bodies or lowland), for which contractor will be made aware.

5.7 **Occupational Safety and Sanitation**: It involves the safety problems of the construction workers and the provision for sanitation and drinking water facilities at work sites. Lack of the latter facilities might severely affect the construction workers' health condition and work efficiency.

Mitigation

- Provision for tube well to ensure potable drinking water and separate toilets for male and female to maintain proper sanitation condition will be made.
- First Aid Box with health facility at each camp site will also be made available.
- Ensure wear of proper PPE (helmet, gloves, safety glass, safety shoes etc) of all workers during work to avoid any personal as well as construction related accident.

6. Environmental Management Plan

Specific Environmental Management Plan (EMP) has been prepared to eliminate, reduce or regulate the adverse impacts for this subproject. This EMP shall be a part of contract document.

6.1 Environmental Mitigation Plan

One of the components of Environmental Management Plan is Environmental Mitigation Plan. The environmental activities and management measures for this sub-project of RTIP-II are addressed and shown in the table below:

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Preconstruction					
Construction of labour camp	May occur loss of agricultural land, improper waste disposal may affect environment. Also improper sanitation facility will generate health hazard situation for the workers and the area.	Identify the location of construction camps so that minimum disturbance on agricultural land. Camps shall not be located near settlements or near water supply intakes. Place will be kept neat and clean strictly to ensure good sanitary condition. Proper toilet and water supply facilities required.	As shown in section-7	Contractor	LGED & D & SC
Removal of Vegetation	May cause soil erosion and their deposition on nearby crop field, affecting soil quality and productivity.	Vegetation will be removed from the ROW before the commencement of construction after obtaining necessary permissions	As shown in section-7	Contractor	LGED & D & SC
Setting up of Hot mix Plants and crushers	Emission of hot and polluting fumes affecting air quality, causing health hazard and damaging green habitation.	Hot mix plants, crushers and batching plants shall be located at a safe distance from the nearest habitation and dense tree area. The contractor shall obtain necessary approvals from LGED.		Contractor	LGED & D & SC
Identification of debris dumping sites	Indiscriminate dumping may cause nuisance to human habitat, cause hindrance to natural drainage of the surrounding areas.	Location of debris dumping sites shall consider the following and approved by the LGED. • Shall not be located within designated forest areas. • Dumping shall not impact natural drainage courses. Settlements are located at least 1 km away from the site.	As shown in section-7	Contractor	LGED & D & SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Construction					
Earthwork	Slope erosion, silt deposition on crop fields, dust blowing	Proper care will be taken during cutting and filling so that slope or toe of the road embankment remain within the right of way and does not damage the crop.	As described in GCC and in Section 7	Contractor	LGED & D & SC
Material sources	Improper transportation of construction materials may cause environmental pollution through dust generation and spillage	Adequate safety precautions shall be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material shall be covered to prevent spillage. Operations to be undertaken as per the direction and satisfaction of the LGED		Contractor	LGED & D & SC
Disposal of Debris	Improper disposal of debris may cause pollution of surrounding environment, particularly pollution of nearby water courses and hindrance to traffic.	The disposal of debris shall be carried out only at sites identified for the purpose. All arrangement for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary will be considered incidental to the work and should be planned and implemented as approved and directed by LGED.	As shown in Section 7	Contractor	LGED & D & SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Dust	Cause air pollution	• Vehicles delivering materials should be covered to reduce spills and dust blowing off the load. • In laying sub-base, water spraying is needed to aid compaction of the material. After the compaction, water spraying should be carried out at regular intervals to limit the dust to below • Plants, machinery and equipment shall be so handled (including dismantling) as to minimize generation of dust	As shown in Section 7	Contractor	LGED&D &SC
Noise	Increase of noise level of the construction site	• Noise standard at processing sites, eg. Aggregate crushing plants, batching plant, hot mix plant , any machinery will be strictly monitored to prevent exceeding of noise standards. • Workers in vicinity of loud noise, and workers working with or in crushing, compaction, concrete mixing operations shall wear	As described in GCC	Contractor	LGED&D &SC
Surface water	Contamination of surface water	• No excavation from the bund of the water bodies. • No debris disposal near any water body. • Prior written permission from authorities is required for use of water for construction activity. • Construction labours to be restricted from polluting the source or misusing the source • Labour camps will be located away from water bodies	As described in GCC	Contractor	LGED&D &SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Water Logging	During construction work or in rainy season water logging may take place	Drainage structure will be built to drain out the rain water. During construction work, diversion structure and sufficient opening should be developed to drain out water	As per BOQ of bidding document	LGED	LGED&D &SC
Construction Safety	Improper stack yard (without fence, light, signboard) may cause accident/health hazard. Improper equipment (not conforming the relevant standard) may lead to environmental pollution leakage of fuels, lubricants and emitting black smoke.	• Adequate precautions will be taken to prevent danger from electrical equipment. • No material or any of the sites will be so stacked or placed as to cause danger or inconvenience to any person or the public. • Fencing and lights shall be provided to protect the public. • All machines to be used in the construction will conform to the relevant Standards, will be free from defect, will be kept in good working order, will be regularly inspected and properly maintained as per norms and to the satisfaction of LGED.			
Health and Safety Measures	Working without health safety gear (PPE) may cause injury to the workers	• At every workplace, a readily available first aid unit including an adequate supply of sterilized dressing material and appliances will be provided as per the Labour Act-2006. • Adequate safety measures and PPE for workers during handling of materials at site will be taken up.	As described in GCC	Contractor	LGED&D &SC

Sub-project Activity	Potential Environmental Impact(s)	Mitigation Measures	Estimated Mitigation Cost	Responsibility	
				Implementation	Supervision
Operation Phase					
Traffic Movement	Road accidents may increase due to higher number of vehicles using the roads at increased speeds.	Sight views should be clear and speed breaker/rumble strip should be provided at some crowdy places. Traffic sign to be installed		LGED	LGED
	Noise levels may also marginally increase as more vehicles use the road at higher speeds	Awareness building and administrative measures should be taken		LGED	LGED

6.2 Environmental Monitoring Plan

Environmental Monitoring Plan for this sub-project will help to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following table has been prepared for monitoring the operation & maintenance phase activities of the sub-project:

Environmental Indicator	Parameters/Units	Means of Monitoring	Frequency / Duration Standards	Responsibilities		Estimated Cost
				Implementation	Supervision	
Air Quality	Measurement PM	Inspection	Once	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Dust Control	Spraying of water	Visual	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Noise Control	Measurement db	Inspection	Once	Contractor	D&SC & LGED	According to GCC
Waste management	Monitoring of collection, transportation and disposal of solid waste. Inspection of construction camp.	Inspection	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report
Health and safety	Monitoring health and safety of workers	Inspection	Daily	Contractor	D&SC & LGED	According to GCC and clause 7 of this report

7 Cost of Environmental Enhancement Works and Mitigation Measures in BoQ's of Bidding Document

In consideration to the above mentioned environmental impacts and their mitigation measures for this sub-project, the following items are included in the BOQ of this sub-project.

Item No.	Description of Item	Costs (Tk)
	ENVIRONMENTAL MITIGATION & ENHANCEMENT WORKS	
1	Overall environmental management in addition to compliance to the clauses 27 & 29 of GCC to the entire satisfaction of E-I-C	
	a) Temporary camp site waste disposal facility improvement 1nos@Tk.50,000.0	5,0000.00
	b) Dust suppression measures [10.00 km @Tk. 2000.00/Km]	20,000.00
	c) Prevention of spillage, leakages of polluting materials	10,000.00
2	Providing and maintaining adequate potable water supply and sanitation facilities at camp site and work site to the entire satisfaction of E-I-C	
	a) Water supply: 2 nos of Tube well @Tk.10,000.00	20,000.00
	b) Sanitation: 4 nos. of Toilet (2 nos for women and 2 nos for men) @Tk. 5000.00	20,000.00
3	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp to the entire satisfaction of the Engineer in charge	30,000.00
4	Drainage facilities improvement: Thirteen numbers of Cross-drain and one Box-Culvert would be provided.	6919958.00
5	Turfing on embankment top and slope [51409.56 sqm @Tk. 15.5/sqm]	796848.18
6	Clearing and grubbing	54313.35

Annex-1: Public Consultation

Public Consultations Findings for Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur Road

Site: Chaina Bazar (chainage 4+630 km)
Road: Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur
Date: 02. 09. 2013
Time: 11.00 a.m. to 1.00 p.m.

A public consultation meeting was held during 11.00 a.m. to 1.00 p.m. on 2nd September, 2013 at Chaina Bazar located in the sub-project area. Around 15 people participated in the meeting. Md. Rokonuzzaman, UP Chairman was selected by the participants to chair the meeting. Md. Golam Kibria, a Businessman, Md. Khalilur Rahman, UP member and Md. Shah Ali, a Businessman were nominated by the participants to speak for them.

Field Engineer Md. Al Nomani and Lab Technician Md. Enamul Kabir, were present as Facilitators.

The participants were spontaneous and appreciated the proposed road improvement subproject. According to them, it will provide them improved communication mode along with various socio-economic development. At present they are facing difficulties due to poor conditions of the road.

During consultation meeting various environmental issues like water pollution, air pollution, improper waste disposal, noise pollution etc. were discussed, which are likely to be affected during the road construction activities.

According to the local people, noise pollution is not considered to be a important pollution and they also offered their best possible cooperation to reduce the environmental hazards during construction activities. They also expected that LGED will take all possible measures to reduce/avoid the environmental degradation during the road improvement works.

. Queries of the participants were answered by Mr. Enamul Kabir, Lab. Technician.

The summary of the important suggestions during discussion are as follows:

- Adequate drainage facilities to be provided to avoid water accumulations or congestion.
- Effective measure to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Noise pollution should be effectively mitigated in order to reduce up to a tolerable limit.

List of Participants-01

Focus Group Discussions (FGDS)
List of Participants

Focus Group ৩। Date of Time 02-09-2013

Location Chaina Bazar 11:0AM to 1:0PM.

SL.No	Name Address & Telephone No	Occupation	Signature
1.	মো: কালাম কিবরিয়া-০১৭২৫৬৭৬৬৭	ব্যবসায়ী	
2.	॥ হাবিবুর রহমান- ০১৭২৬৫৬৫৬৬০	ইউপি চেয়ারম্যান	
3.	॥ খাইরুল ইসলাম - ০১৪২২৫৪৭০৮৬	ব্যবসায়ী	
4.	॥ নুরুল ইসলাম - ০১৮৬৩৭৬৬৭৬৮	ব্যবসা	
5.	॥ আব্দুছ ছাত্তার-প্রেক্ষি.	ব্যবসা	
6.	॥ মো: সামাদ -০১৮৩২২৩৮২৬	ব্যবসায়ী	
7.	॥ কাহার আলী - ০১৮২৫২৭৫৫৪০	ব্যবসা	
8.	॥ খলিলুর রহমান-০১৮৪৬৫৮০১৬৬	ইউপি সদস্য	
9.	॥ রুস্তম আমীন-০১৭৩২৩৬৬২৫	॥ ॥	
10.	॥ হাবিবুর রহমান ০১৭৩৫৯৬৮৭৪৭	॥ ॥	
11.	॥ মুসলিম উদ্দিন - ০১৭৩৫৪৫৫৬৭০	॥ ॥	
12.	মোছা: সুলেমান খাতুন - ০১৭৫৮২৬৬২২৬	॥ ॥	
13.	মো: মনিরুজ্জামান-০১৮৪৬৪৯২৬৫৬	ব্যবসা	
14.	॥ গুলফাম উদ্দিন - ০১৭৪০৫৫৬৯১৪	ইউপি সদস্য	
15.	॥ খলিলুর রহমান-০১৭২০৯৩৬২৬৬	॥ ॥	

Photograph of the Public Consultation

Annex-2: Public Consultation

Public Consultations Findings for Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur Road

Site: Rambhadrapur Bazar (chainage 7+350 km)
Road: Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur
Date: 02. 09. 2013
Time: 1.30 p.m. to 2.30 p.m.

A public consultation meeting was held during 1.30 p.m. to 2.30 p.m. on 2nd September, 2013 at Rambhadrapur Bazar located in the sub-project area. Around 14 people participated in the meeting. In consultation meeting; environmental and social issues were discussed. The main focus was to dig out information on how does indiscriminate use of natural resources cause poverty and environmental degradation by declining the homestead forests, depleting biodiversity and decreasing livelihood of people. The issue on potential impact of maintenance works has also been raised.

During the consultation the participants appreciated the road improvement project explaining their desires and expectations. The subproject will increase and improve the quality of their life. Currently, the main medium of transport is foot and some people use motor cycle for long distance travel. The sub-project will ease their turmoil and reduce their commuting time. Moreover, barrier for transporting goods and products will be removed.

From the consultation meeting, it is evident that not much people have knowledge and idea about noise pollution. Most of them are willing to tolerate noise pollution to some extent. Another problem they raised is air pollution during the maintenance work. Some of them suggested that spraying of water can minimize the dust pollution. For minimize the water pollution they expect necessary measure will be taken during maintenance work.

Field Engineer Md. Al Nomani and Lab Technician Md. Anamul Kabir, were present as facilitators. Md. Nazmul Islam, UP Chairman was selected by the participants to chair the meeting. The participants were spontenious and gave their full consent regarding the road improvement project.

Mrs. Rokea Parvin, a UP member, Md. Saydul Islam, a Teacher and Md. Ali Azgar, a student were nominated by the participants to speak for them. They spoke on the project and its impact like noise and dust involved during the operation stages. Their quarries were answered by Mr. Kabir up to their satisfaction.

The summary of the important suggestions during discussion are as follows:

- Adequate drainage facilities should be provided to avoid water accumulations or congestion.
- Effective measure to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Noise pollution should be effectively mitigated in order to reduce up to a tolerable limit.

List of Participants-02

Focus Group Discussions (FGDS)
List of Participants

Focus Group: 02 **Date:** 02-09-2013

Name	Gender	Social Status	Contact Number	Signature/LTI
MD. Nazmul Islam	male	UP Chairman	01711488732	
Mrs. Rokaia parvin	Female	UP women member	01725206767	
MD. Abdur Rahman	male	Up member	01734158807	
MD. Sharaf uddin	Male	UP Member	01720098805	
MD. Saroare Jahan	Male	Honourable person	01720954527	
MD. Ali Akber	Male	Honourable person	01731210325	
MD. Jahangir Alam (Sabuj)	male	Service	01735358608	
MD. Sirajul Islam	male	Bussiness	01713522284	
Mr. Saydul Islam	male	Teacher	01720005288	
Mr. Taofiqul Islam	male	Doctor	01713536944	
Rowel Morong	male	Indigenous people (garo)	01838854778	
Mohammad Ali	male	Business	01722162449	
Ali Azgor	male	student	01826803744	
S. Hafijur Rahaman (Liton)	male	Business	01729330894	

Photograph of the Public Consultation

Annex-3: Public Consultation

Public Consultations Findings for Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur Road

Site: Charguadanga Bazar (chainage 10+125 km)
Road: Bhaitkandi UP-Charguadanga Bazar Road via Rambhadrapur
Date: 02. 09. 2013
Time: 3.00 p.m. to 4.00 p.m.

A public consultation meeting was held during 3.00 p.m. to 4.00 p.m. on 2nd September, 2013 at Charguadanga Bazar located in the sub-project area. Around 13 people participated in the meeting. In consultation meeting; environmental and social issues were discussed. The main focus was to dig out information on how does indiscriminate use of natural resources cause poverty and environmental degradation by declining the homestead forests, depleting biodiversity and decreasing livelihood of people. The issue on potential impact of maintenance works has also been raised.

During the consultation the participants appreciated the road improvement project explaining their desires and expectations. The subproject will increase and improve the quality of their life. Currently, the main medium of transport is foot and some people use motor cycle for long distance travel. The sub-project will ease their turmoil and reduce their commuting time. Moreover, barrier for transporting goods and products will be removed.

From the consultation meeting, it is evident that not much people have knowledge and idea about noise pollution. Most of them are willing to tolerate noise pollution to some extent. Another problem they raised is air pollution during the maintenance work. Some of them suggested that spraying of water can minimize the dust pollution. For minimize the water pollution they expect necessary measure will be taken during maintenance work.

Field Engineer Md. Al Nomani and Lab Technician Md. Anamul Kabir, were present as facilitators. Md. Moslem Uddin, UP Member was selected by the participants to chair the meeting. The participants were spontenious and gave their full consent regarding the road improvement project.

Md. Arif, a farmer, Md. Abdul Karim, a businessman and Md. Mansoor Ali, a student were nominated by the participants to speak for them. They spoke on the project and its impact like noise and dust involved during the operation stages. Their quarries were answered by Mr. Kabir up to their satisfaction.

The summary of the important suggestions during discussion are as follows:

- Adequate drainage facilities should be provided to avoid water accumulations or congestion
- Effective measure to be taken to minimize all the adverse impact of construction works.
- Steps to be taken for minimizing the air pollution by spraying water at the construction sites.
- Noise pollution should be effectively mitigated in order to reduce up to a tolerable limit.

List of Participants-03

Focus Group Discussions (FGDS)
List of Participants

Focus Group: 03

Date and Time: 02-09-2013

Name	Gender	Social Status	Contact Number	Signature/LTI
MD. Moskem uddin	Male	UP. Member	01735450670	
MY. Momtaj	Male	Business		
MD. Arif	Male	Farmer		
MD. Akraul Islam	male	Sarvice.	01811238548	
MD. Shariful	Male	Mission.	01789702468	
MD. Kamrul Islam	male	Driver	01748909479	
MD. Salim Miah	Male	Mission.	01840554992	
MD. Ejjat Ali	male	Mission	01742373339	
Mr. Abdul Karim	Male	Business	01750851800	
Mr. Rasel	Male	Business	01836208938	
Mr. Hussain Ali	Male	Business		
Mr. Ripon	Male	Student	01725469780	
MD. Mansoor Ali	Male	Student	01753844510	

Photograph of the Public Consultation