Volume 8

GOVERNMENT OF BANGLADESH

MINISTRY OF LOCAL GOVERNMENT, RURAL DEVELOPMENT & CO-OPERATIVES

LOCAL GOVERNMENT ENGINEERING DEPARTMENT

Rural Transport Improvement Project

Case Study for Sample Sub-projects
(Volume-II: Appendix)

March 2003

Environmental Analyses Reports of 1st Year FRB Sub-projects of Bogra District

Environmental Analyses Report---Birgram- Kharna-Majira hat, Bogra Sadar, Bogra

1.0 INTRODUCTION

1.1 Sub-project Description

Under the Bogra Sadar Upazila of Bogra District, Birgram- Kharna-Majira hat Road starts from Birgram at Bogra- Natore high way and ends at Mazirhat The total length, average width, height and batter slope are 6.88 km, 6.5m, 1m and 1:1.5 respectively. The RL (Reduced Level) of the road is 17m and the HFL (High Flood Level) is 16 m. No part of the road falls below HF. 5.6 km (Ch. 0-5.6km) km of it goes through agriculture lands and the rest through non-agricultural lands mainly residential areas It is relatively straight but at few locations there are sharp curves

The road is fully operational throughout a year and has an average daily vehicular traffic of 200; 75% of it are non-motorized It connects two highways (Bogra-Natore and Bogra-Dhaka) through a shortage distance and serves the village population to reach these highways

Of the total length of the road, 658m is HBB; 1442m is earthen and the rest is BC. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are·

1. To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is flood plain (Flat land). First 5 6 km of the road goes through agricultural lands and the remaining part through non-agricultural residential area and 2 GCMs. Within the Ch. 3+700 to Ch 5+050 km, a total of 88 pucca, semi-pucca and tin-sheds are at the left side of the road where at the same length a drainage canal at the right side belonging to the Bogra Army Cantonment, is there The road at this length has 4 9m width. Symmetric widening of the road at this part will require displacing residences at the left side and filling of drainage canal at the right side

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area lies on high floodplain land It is free from annual river flooding Flood occurs here very rarely, and only in the extreme flooding condition of the country

In general drainage condition of the roadside area is good, except at a

location between Ch.1+180-1+280 km, where drainage congestion occurs and water remains stagnant there for 3 months during monsoon. Roadside area between these changes is very low-lying and lacks in sufficient water opening of cross-drainage structure Additional water opening on the road at this location would solve the problem.

The road has a total 12 numbers cross drainage structures with a total opening 22.07m. The proposed improvement of the road includes an additional opening of 0.25 m only.

2.3 Wetlands

There is no natural wetland, but roadside ponds and ditches There are two canals, one is along the roadside (At Ch. 3+450 surrounding the army cantonment) and the other one cuts the road at (Ch.2.215km).

2.4 Erosion and Siltation

Since the area is free from annual river flooding and soil is highly clayey, it does not have any erosion and siltation. Even during heavy rainfall, rain cut to the road embankment does not occur.

2.5 Navigation and Boat Communication

The road does not cross any canal that has any use for boat communication.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road.

2.6.2 Avenue trees/bushes

A good number of roadside tress, 500/km (totaling 3000), with an average distance of 3 9m from C/L of the existing embankment are there Also good grass coverage over slopes of the embankment is there.

2.7 Borrow Areas

Irregular borrow areas in the form of ditches (4mx3mx1m) are along the roadside. Some borrow areas have been converted into ponds and are used for pisciculture The remaining borrow areas can be converted into ponds for pisciculture, bathing and washing.

2.8 Construction Materials

2.8.1 Soil

Potential source of soil for use in road construction is the roadside low-productive agricultural lands

2.8.2 Sand

Potential source of sand for use in road construction is the Karotoa river, 3km away from the road Sands are collected both by manual and mechanical dredging.

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from crushing of blustered rocks of India

2.9 Brickfields

Brickfields are located at a distance of 3km away from the road with good road accessibility.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental Assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table 2:List of Environmental Resources to be Affected

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	3+500	930			20	R		A
	4+750	250			20	R		A
Ponds	0+560	10			20	R		A
	0+095	30			40	L		A
	0+445	40			3.75	L		A
	1+180	15			3.75	L		A
	1+295	15			20	L		A
	3+280	30			40	L		A
	4+130	10			4.75	L		B

Note
*data to be collected
A do widening of the embankment towards opposite side of the pond without affecting it
B do widening of the embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

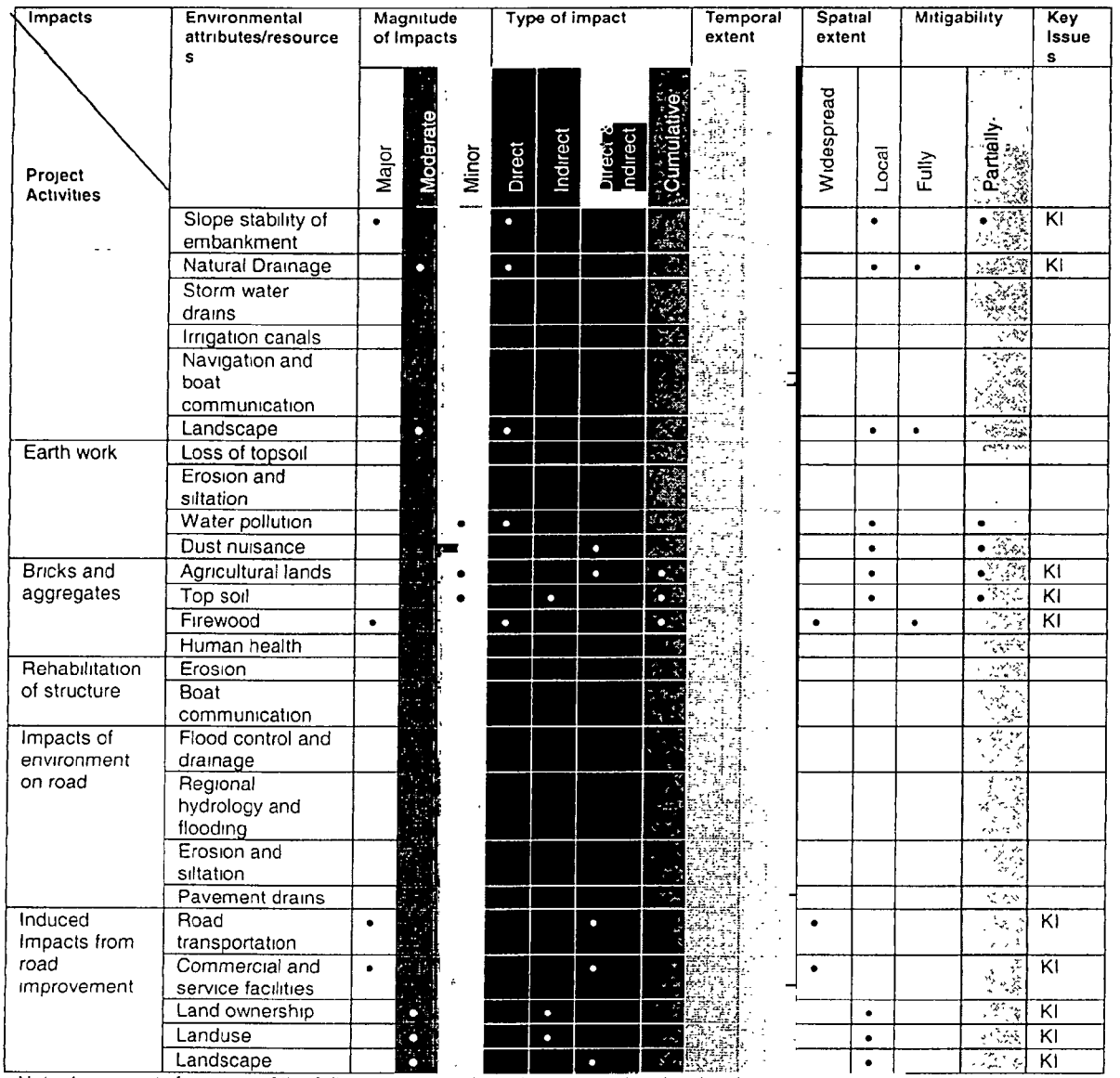
There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•							•		•	KI
	Roadside Ponds		•		•							•		•	KI
	Natural wetlands/fish habitats														
	Fisheries			•	•							•		•	
	Forest														
	Vegetation		•		•							•	•		KI



Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts: Major	Moderate	Minor	Type of impact: Direct	Indirect	Direct & Indirect	Cumulative	Temporal extent	Spatial extent: Widespread	Local	Mitigability: Fully	Partially	Key Issues
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage		•		•						•	•		KI
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape		•		•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution			•	•						•		•	
	Dust nuisance						•				•		•	
Bricks and aggregates	Agricultural lands			•			•	•			•		•	KI
	Top soil			•		•		•			•		•	KI
	Firewood	•			•			•		•		•		KI
	Human health													
Rehabilitation of structure	Erosion													
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			KI
	Landuse		•			•					•			KI
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations.
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Drainage congestion and water logging at Ch 1+180-1+280	Cross-drainage structures suggested	Considered	

4.6 Analyses of Alternatives

This road has three major problems for which alternatives have been suggested as described below

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
By-pass	Ch 3+450—5+000	Right side of the road is a large drainage canal belonging to Army Authority and left	(1) Do widening towards canal side in consultation with Army Authority and	Option (2) is preferable because this involves only a displacement of 12 roadside semi-pucca structures compared to

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
		side comprises of a large number of roadside residences	provide earth-retaining structure to minimize canal filling. (2) Bypass this critical location by following alternative existing route connecting Khrana GCM with Bogra_Dhaka Highway at Majhira, a new Upazilla.	the requirement of displacement of 88 structures if the existing alignment is followed. Also it will connect an Upazilla, although the length is 650m more than the existing length of alignment

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 7532.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

Road widening along the fist 1.2km will require displacement of large number of roadside houses and will do the loss of drainage canal (constructed by Army Authority), for which an alternative alignment using an existing route has been proposed as discussed in the above table. Following the alternative route will not result in any environmental harm.

Environmental Analyses Report---Dhupchanchia-Tindighi-Namoja, Bogra.

1.0 INTRODUCTION

1.1 Sub-project Description

Dhupchanchia-Tindighi-Namoja Road starts from Dupchanchia and ends at Namuja under the district of Bogra.. The total length, average width, height and batter slope are 13 15 km, 7 21m, 1 2m and 1:1 respectively The RL (Reduced Level) of the road is 16 65m and the HFL (High Flood Level) is 15 30m.No part of the road falls below HFL Except last 326m (residential area) majority of the whole road go through agriculture lands

The road of its pucca pavement is fully operational throughout a year and the kucha part is only operational for 9 months of a year The road has an average daily traffic of 1615, 70% of it are non-motorized

The road consists of HBB (0-2278m), BC (2278-4092m) and earthen (4092-13150m). Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are.

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The general topography of the subproject area is flat Land is relatively high and flat Over 90% of road side lands are used for agricultural use At some locations roadside residential areas, borrow pits, ponds and ditches are there Between ch 12+800km-ch 13+126km roadside residential areas are there only The road also goes through two GCM, one at Tindighi It also crosses an irrigation canal namely, Nagor Nadir canal (ch 9+950)

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area consists of relatively high land and free from annual river flooding No part of the road goes under water even during high flood since the RL of the road is 16 65m where as HFL is 15 30m The roadside areas in general free from drainage congestion and waterlogging except at residential areas in between Ch. 12+800-13+126 km, which get drainage congestion and waterlogging during heavy rainfall The area is low-lying relatively to the nearby FRA Road (the proposed road meets with it at its end) and its adjacent areas

The road has a total 36 cross drainage structures with a total opening 58.96m. The proposed improvement of the road includes an additional opening of 2m

2.3 Wetlands

There is no natural wetland but a few roadside ponds and ditches The ponds are used for pisciculture, bathing and washing mainly.

2.4 Erosion and Siltation

The area consists of high clayey soil and free from annual river flooding As such there is no erosion and siltation from river flooding in the area The road embankment does not get any rain-cut even due to heavy local rainfall. This is due to the fact that soil is highly clayey and batter slopes have very good grass coverage, and many trees are on shoulders and slopes

2.5 Navigation and Boat Communication

The road does not cross any canal of use for boat communication.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

The road has a very good number of roadside avenue trees and grass coverage on shoulders and batter slopes. On average 400 numbers of trees (average 10 years old) per km length of the road are along the road with an average distance of 3 5m from the C/L of the road Forest department, BRAC and Thangamara (NGOs) planted these trees in 1992 Of the trees a substantial amount comprise of euclepteus, which must be cleared for they are very harmful to the soil and trees near to them

2.7 Borrow Areas

Some roadside irregular borrow areas (average size 15mx3mx2m) in the form of ditches are there These borrow areas usually contain water hyacinth As per community views, these borrow areas have high potentiality for use as ponds if they are dug further.

2.8 Construction Materials

2.8.1 Soil

As is the usual practice by the contractor in the area, roadside lands are the potential source of soils for use in road construction by the contractors Soils also may be collected from the existing borrow-pits with an intention to convert them borrow-pits into ponds That will be an environmental enhancement for this sub-project

2.8.2 Sand

Potential source of sands is the river, 1 km away from the road

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There are three roadside brickfields along this road with road accessibility Barren lands are used for brickfields in this area, which are rehabilitated with the application of organic fertilizer

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	9+950	30			2 5	L		A
Ponds	0+775	30			4 0	R		A
	0+900	20			5.0	R		A
	1+00	45			2 5	L		A
	1+150	50			5.0	L		A
	3+825	23			4.0	R		A
	7+010	80			4 5	L+R		B
	8+450	22			5 0	R		A
	8+500	35			3 0	L		A
	8+650	33			5 0	L		A
	10+280	100			2 0	L		A
	12+850	15			3 0	L+R		B
	12+950	25			4 0	L		B
	13+000	35			4.5	R		
	13+075	30			4 5	R		A
	13+100	15			4 0	L		A

Note
*data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•			•		•	KI
	Roadside Ponds	•			•						•		•	KI
	Natural wetlands/fish habitats										•		•	
	Fisheries				•						•		•	KI
	Forest				•						•		•	
	Vegetation	•			•						•	•		KI
	Slope stability of embankment				•						•		•	KI
	Natural Drainage		•		•						•	•		
	Storm water drains	•			•						•	•		KI
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape				•						•	•		
Earth work	Loss of topsoil					•		•			•		•	KI
	Erosion and siltation		•			•					•		•	
	Water pollution		•		•						•		•	
	Dust nuisance						•				•		•	KI
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil	•				•		•			•		•	KI
	Firewood	•			•			•		•		•		KI
	Human health				•						•		•	KI
Rehabilitation of structure	Erosion		•		•						•		•	
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding					•					•		•	
	Erosion and siltation				•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			
	Landuse		•			•					•			
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Storm water drains		• Causes damage to road • Drainage congestion and waterlooging in the roadside residential areas/shops/markets	• Provide side-drains and cross-falls on embankment slopes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch. 12+850-13+150: Drainage congestion and waterlogging in the roadside residential areas during heavy rainfall. Also water remains stagnant on road	Provide roadside drains and keep the existing drainage facilities along the road intake.	Considered for integration	

4.6 Analyses of Alternatives

This road has drainage congestion and waterlogging problem at a location for which analysis of alternatives has been performed as below:

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Drainage congestion and waterlogging	Ch. 12+850-13+150	Drainage congestion and waterlogging in the roadside residential areas during heavy rainfall Also water remains stagnant on road..	(1) Provide roadside drains and keep the existing drainage facilities along the road intact (2) Do widening with slab drains along roadside	Option (2) is preferable because it will allow spaces for widening as well as provide better drainage facilities

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 15000

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has one major problem relating to drainage congestion and water logging as referred in the above table With the integration of the suggestion with the design of this road, the road can be implemented under 1st year program of RTIP.

Plate 1. Roadside euclepteus trees required felling, as they are harmful to environment

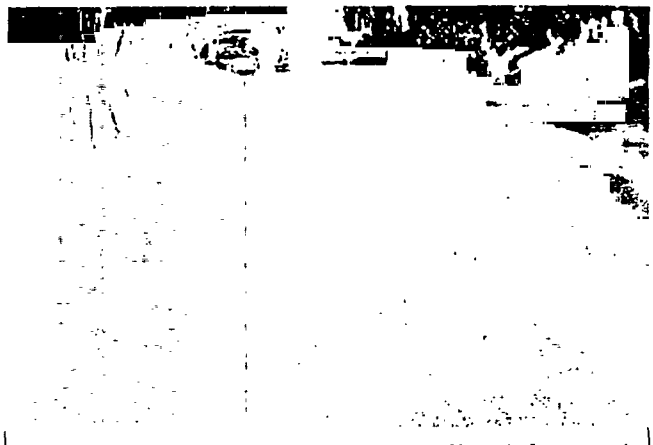


Plate 2 Roadside kucha drains to be affected from road improvement that may cause waterlooging permanently

Environmental Analyses Report---Sariakandi-Chandanbasia Road, Sariakandi, Bogra

1 Introduction

1.1 Sub-project Description

Sariakandi-Chandanbasia Road, Sariakandi Road (FRB) starts from Upazila Sariakandia under Bogra districts and ends at Chandanbashia The total length, average width, height and batter slope are 13 35 km, 3 93-7 21m, 1-3m, 1.1-1:3 respectively After following few hundred meters of the existing route, the road follows the existing BWDB embankment up to Chainage 6.5 km, and then go through the low-lying floodplain of mainly agricultural use Except the BWDB part, the road is zig-zag in alignment with nine sharp curves

The road is fully operational for nine months of a year and has an average daily traffic of 842, 86% of it are non-motorized It connects several villages and two Growth Center Markets (GCMs).

The road is earthen and has a height of 1 m for Ch 6.5-13 350 km, where raising is required. Improvement interventions include height raising, widening and slope corrections This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the case study

The main purposes of the case study are

1) To identify the key environmental issues in the sub-projects.
2) To determine the magnitude of actual and potential impacts.
3) To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4) To categorize the sub-project; and
5) To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information picked from the field investigations, secondary information were also collected and analyzed

2.0 Environmental Setting of the Sub-project

2.1 Topography and land use

The sub-project area is flat and floodplain of Jamuna and Bangali rivers The area is protected from river flooding by a BWDB embankment along the Jamuna River in 1998 General landuse includes for agriculture on lowland and homesteads on high lands The BWDB embankment contains a large number of homesteads (slums) on its berm

2.2 Regional hydrology, flooding, drainage congestion and water logging

There is seasonal variation of water levels in the rivers that governs flood extent and depth outside the flood protection embankment Within the protected area flood is caused by rainfall runoff. Road embankment obstructs the free flow of internal flood. A certain section of the road embankment gets washed away due to heavy water pressure from internal rainfall, which is due to inadequate opening of the cross drainage structure or its improper location that causes drainage congestion

The road has a total 10 numbers of cross drainage structures with a total opening 51.6 m

2.3 Wetlands

The area outside the BWDB embankment is very low-lying experiencing seasonal river flooding Except this part, the roadside areas have a total of 26 ponds and some marshy lands. There is a marshy land in between Ch 10 15—10 250 km at which the road gets damaged almost every year It appears that inadequate water opening of the cross drainage structure at that location causes this damage.

2.4 Erosion and siltation

Outside the BWDB embankment is an area subjecting to active erosion and siltation process from Jamuna and Bangali river flooding Other than the BWDB embankment erosion to road results from rain-cut, which is due to poor compaction of sand-silty soil and lack of proper grass coverage Road gets damaged at the pond locations due to absence of required slope protection works.

2.5 Navigation and boat communication

Except the BWDB embankment, the road does not cross any channel of boat communication use However, in extreme flooding condition when the low-lying areas get flooded, small boats are seen plying over the wetlands connecting different villages and communities A large number of passenger and good carrying boats ply over the Jamuna and Bangali Rivers and landed on roadside ghat from where goods are transported using road transport There is a large important ghat at the Bank of the Jamuna River adjacent to Sariakandi groyne The proposed road will provide a better communication for the passengers and goods landed on this ghat

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road.

2.6.2 Avenue trees/bushes

There is good grass turfing on the slope of the BWDB embankment Except the BWDB embankment, the road has no good grass turfing This part mainly contains large number of different sized trees and bushes

2.7 Borrow areas

2.7.1 Soil

The current practice is to use roadside agriculture lands as borrow areas for collection of soils for use in road construction However the potential source of soils may be the roadside low-productive barren lands and/or existing borrow areas

2.7.2 Sand

Charlands (Sandbars) of Jamuna and Bangali rivers are the potential sources of sands Chars are cut manually for collection of sands, trucks and boats are used for transportation of sands

2.7 Aggregate

Two types of aggregates are used in road construction brick aggregates and stone aggregates. Brick aggregates are made from crushing of local bricks. Stone aggregates are not widely used because of its high price and scarcity Stone aggregates are made from crushing of Sylhet stones Black aggregates which are made from crushing of Pakur rocks (blustered rocks imported from India) are also used in the road construction

2.8 Brick-fields

Existing brickfields are located within 1 km from the road, which may be the potential source of brick-supply Both firewood and coal are used for brick

burning in the brickfields

Brickfields are rehabilitated with the use of organic fertilizers like cow-dung and water hyacinth It takes 2-3 years for being used as productive agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from edge of the existing road embankment	Left/ Right	Potential impact	Mitigation strategy
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+035	43			2	R		A
	0+195	15			2	L		A
	0+420	44			2	L		B
	0+440	15			2	R		
	0+632	95			2	L		B
	0+664	66			2	R		A
	5+340	10			1	R		
	5+800	20			1	L		A
	5+920	30			2	R		A
	6+750	35			1.5	R		A
	8+040	50			0	R		B
	8+060	27			0	L		
	8+100	110(4 ponds)			0	R		A
	8+215	28			2	R		A
	8+238	24			2 5	L		A
	8+273	70(3)			1 9	L		A
	8+515	30			1 9	L		A
	8+770	60			1 9	L		A
	9+120	20			1 0	R		A
	9+565	55			1 50	R		A
	10+000	100			0	R		B
	11+000	60			1 0	L		
	11+890	27			1 5	R		A

A widening of the embankment towards opposite side of the pond without affecting the pond
B widening of the embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures at the same pond location

4.3 Analyses of Environmental Hotspots

Location in chainage	Issue Description	Alternative options	Preferred option	Rational
Ponds at both sides of the road at Ch 450m and 700m (Sketch-1)	Embankment toe will extend 6m into each pond from the existing position (Sketch-1)	(1) Construct road embankment (slope 1 2) without slope cut-off/earth retaining structure (2) Provide earth-retaining structure on both sides of road to minimize loss of ponds (3) Do one side widening towards the pond that would have less effect from road improvement and provide earth-retaining structure at the same pond location	Option (2)	-Stable bank -No loss of pond -No realignment of the road required
Ponds at both sides of the road at Ch 700m	Proposed embankment toe will extend 5 m from the existing toe (sketch 2)	(1) Construct road embankment (slope 1 2) without slope cut-off/earth retaining structure (2) Provide earth-retaining structure on both sides of road to minimize loss of ponds (3) Do one side widening towards the pond that less exposed length to the embankment and provide earth-retaining structure at the same pond location	-Ditto-	-Ditto-
Drainage Ch 7+592	Drainage congestion occurs at this location although a box-culvert (4 8x3 6m) is already there	(1) Box-culvert of at least same size is recommended at appropriate location (2) Two box culverts at two locations with a total opening more that than the existing opening can be provided	Option (2)	Water will pass through different locations, relieving waterlogging
Ch 10+100-10+350	Road gets damaged at this location from waterlogging though a box-culvert is there	(1) Straighten the road with construction of a large bridge (40m as per LGED field engineer) is recommended (Sketch-3) (2) The existing alignment may be used with a large water opening	Option (1)	It avoids the sharp turn as well as reduces the road length

4.4 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Widespread	Local	Fully	Partially			
Road widening and/height raising	Agricultural land	•			•			•		•		•			KI
	Roadside Ponds	•			•					•		•			KI
	Natural wetlands/fish habitats			•						•		•			
	Fisheries				•					•		•			KI
	Forest				•					•		•			
	Vegetation	•			•					•	•				KI
	Slope stability of embankment	•			•					•		•			KI
	Natural Drainage				•					•	•				KI
	Storm water drains				•					•	•				
	Irrigation canals				•					•	•				

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Navigation and boat communication				•						•	•		
	Landscape	•			•						•	•		KI
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation	•				•					•		•	KI
	Water pollution		•		•						•		•	KI
	Dust nuisance		•				•				•		•	KI
Bricks and aggregates	Agricultural lands		•				•				•		•	KI
	Top soil	•				•					•		•	KI
	Firewood	•			•					•		•		KI
	Human health		•		•						•		•	KI
Rehabilitation of structure	Erosion		•		•						•		•	KI
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage	•			•						•		•	KI
	Regional hydrology and flooding					•					•		•	
	Erosion and siltation				•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			KI
	Landuse		•			•					•			KI
	Landscape	•					•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide conventional slope protection measures and/or earth retaining structures at the pond/canal locations

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal if any • Provide adequate cross-drainage structures
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Rehabilitation of structure	Erosion		• Increases the turbidity of water	• Provide erosion measures
Impacts of environment on road	Flood control and drainage		• Saves the road from flood damage	
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

There is no important recommendation/suggestion on any environmental issue come from the local community

4.6 Analyses of Alternatives

Alternatives	Location	Description of the problems	Recommended options	Preferred option
Resettlement/ social issue	Ch 0-200m	The road will require displacement of approximately 20 nos of pucca and semi-pucca shops for widening up to 7 87m	(1) Compromise design standards (2) Do displacement (3) Bypass the existing route ~~(Sketch-4)~~	Option (3) is preferable because it solves this problem as well as the other problems within the first few hundred meters of the road
Road safety issue	Ch 150	A sharp turn and sight-distance problem	(1) Put a smooth curve in the design (Sketch 5) (2) Displace the shops (3) Bypass the existing route ~~(Sketch-4)~~	-Ditto-
	Ch 7+200 m	Two sharp turns within 50m length of the road that has ditches on both sides of the road	(1) Smooth the curve (sketch ~~5~~ 2) (2) Do nothing	Option (1) is better because it solves the problem
	Ch 5+900	A sharp turn	(1) Smooth the curve (2) Do nothing	-Ditto-
Bypasses	Ch 9+650-9+950	Road goes through a GCM, Kutubdiar by name, and will require displacing 50 shops Inaccessibility of the vehicular traffics during hat day The GCM can be bypassed by following an existing alternative route widening/improvement of which will require displacing only 8 shops Following this route will reduce a road length of 108m ~~(Sketch 7)~~	(1) Road through the GCM (2) Bypass the GCM	Option (2) is better because it solves the problem

5 TREE PLANTATION

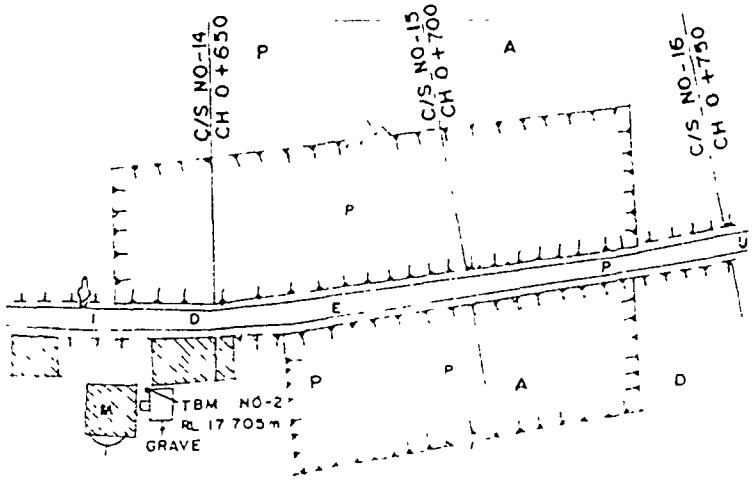
Assuming the practice of LGED under previous RRMIMP-II project also to be followed for this project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 18090

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care taking of the trees (for two years engaging two local destitute women).

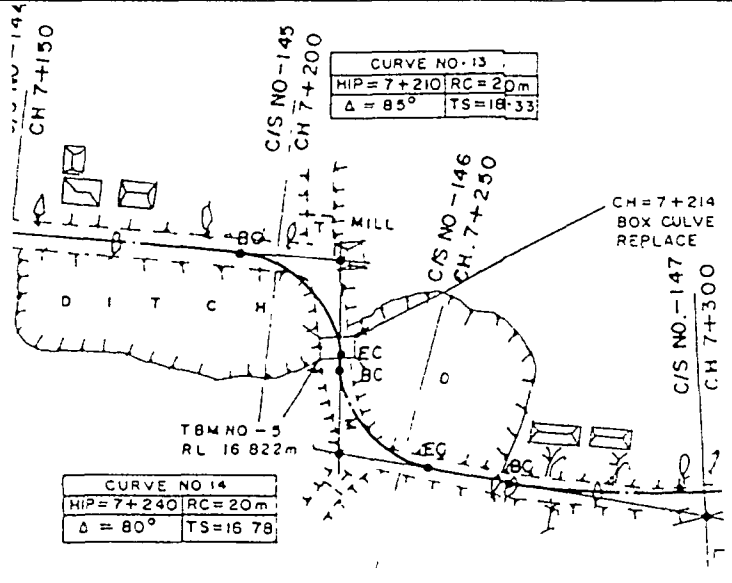
For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has different types of problems/issues including road safety, widening problems, drainage congestion and water logging At two locations the road needs bypasses on widening and road safety grounds Bypasses of the existing routes are not a problem from environmental consideration However s study on social point of view may be required The road can be undertaken for implementation under the 1st year program of RTIP subject to the solutions of the existing problems



Sketch1 Road containing ponds at both sides requires a special treatment to reduce the pond loss as well as to ensure road durability



Sketch 2 Road, with tow snarp turns within 50 m and two ditches at both sides, requires a special treatment to ensure road safety at this location

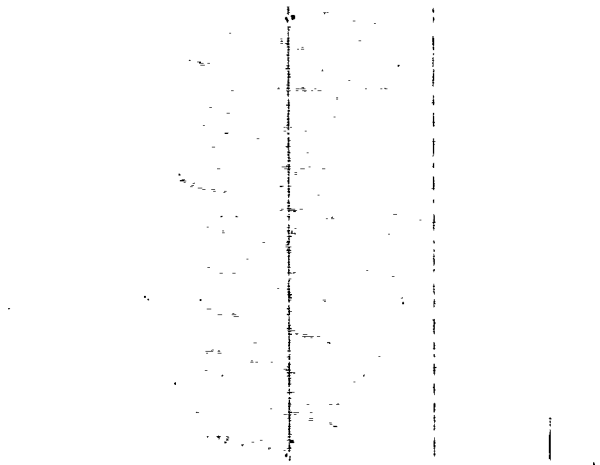


Plate 1 Roadside large pond to be affected from road improvement

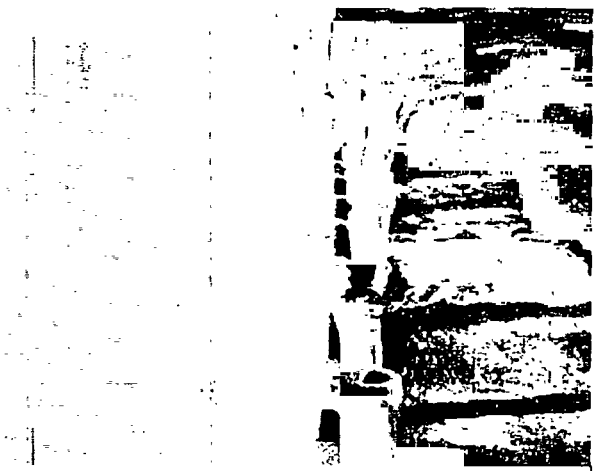


Plate 2: Slope protection of the road embankment at a water body location using gunny bag rip-rap

Plate 3: Extensive damage to road affecting road durability at a large pond location

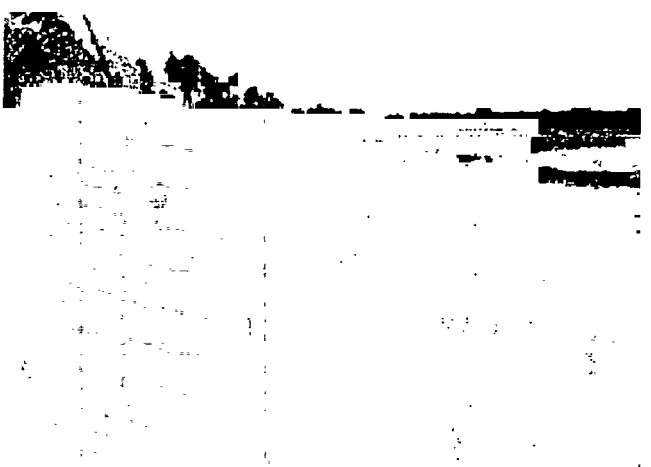


Plate 4. Extensive coverage of long-grass over BWDB embankment proposed as road

Plate 5 Houses of shelter-less people on berm of the BWDB embankment

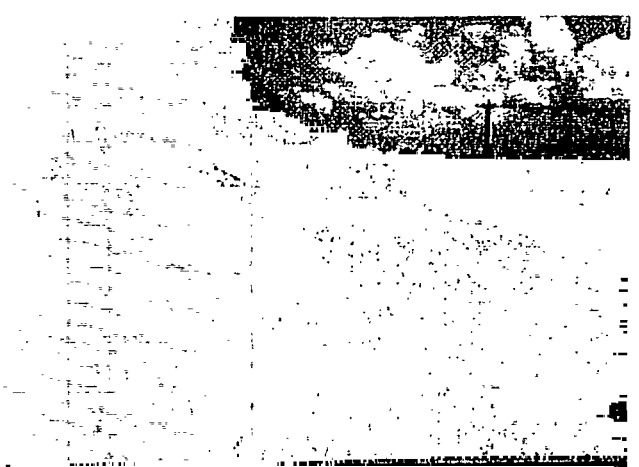


Plate 6. View of the junction point of the old alignment (left) and the new proposed alignment (BWDB embankment) running towards groyne

Environmental Analyses Report---Sultanganj-Perirhat road, Bogra Sadar, Bogra

1.0 INTRODUCTION

1.1 Sub-project Description

Sultanganj-Perirhat Road starts from a GCM on Dhaka-Bogra National Highway and ends at Perirhat another GCM The total length, average width, height and batter slope are 9 15km, 7m, 1 2-1.5m and 1 1 5 respectively. The RL (Reduced Level) of the road is 17 62m and the HFL (High Flood Level) is 17 02m About 6.5 km of it goes through agricultural lands and the rest through non-agricultural lands including hat - and residential area. It is relatively straight.

The road is fully operational throughout a year and has an average daily traffic of 400, 77% of it are non-motorized. It connects 5 roadside villages with two GCMs at the ends of the road

Of the total length of the road, 5km is BC, 3.7 km is earthen and the rest is HBB. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are.

1 To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is low-lying on low-lying flood plain Roadside land use includes agricultural lands (6 5 km) and non-agricultural lands (3 35km) including homesteads, markets

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is on the low-lying flood plain of the Korotoa River but free from annual river flooding, except a few km near the Perirhat GCM, where the land is excessively low-lying. At ch 250m the road will cross Korotoa River with a bridge over it.

Some roadside areas get drainage congestion during heavy rainfall Water remains stagnant usually over 12 hours causing crop damage as reported by local people The road at these locations cut the natural drainage gradients perpendicularly Insufficient drainage opening and absence of the drainage canal along the road are the main causes of such drainage congestion.

The road has a total 27 cross drainage structures with a total opening 109.8m. No additional opening for cross drainage structures has been proposed in the road improvement.

2.3 Wetlands

There are some wetlands in the form of ponds, ditches and depressed areas. Along the road side between Ch. 3-4km is the Korotoa River Ponds are used for pisciculture where the natural wetlands such as river, low-lying beels are the habitats of some native fisheries such as Koi, Taki, Shoil, Magur, Sing, Puti, Boal, etc.

2.4 Erosion and Siltation

Erosion and siltation from river flooding is not significant in the area But erosion to road in the form of rain-cut at some locations is there due to sandy-silt soil and lack of vegetation coverage

2.5 Navigation and Boat Communication

The road has crossed the Korotoa river, which is used for boat communication The proposed bridge undertaken by other project under LGED should have adequate navigation clearance above High Flood Level (HFL) .

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

The road has 500 numbers of trees per km of its length, totaling to 45000, with a distance of 3 7m from centerline of the embankment Some of the trees belong to the roadside homesteads and majority were planted by Department of Forest and Tangamara (NGO)

2.7 Borrow Areas

Some irregular borrow areas are along the roadside Some of these are used for pisciculture and the other have the potentiality of being used as fish-pond if dug into deep

2.8 Construction Materials

2.8.1 Soil

Roadside low-productive agricultural lands and the barren lands in the area are the potential sources of soil to be used in the road construction The soil is sandy-silt by characteristics

2.8.2 Sand

Potential source of sands to be used in the road construction is the Korotoa river, which is located very near to the road, some 50 m away from it The riverbank is stable and does not erode much

2.8.3 Aggregates

Brick and stone aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates are from crushing of stones Some black aggregates are also used which are made from crushing of the blustered rocks in India

2.9 Brickfields

There is no roadside brick-field along this road Some brickfields are located along other roads and 1 5 km away from the proposed road

The brickfields are left abundant after use It usually takes 4-5 years to come for agricultural use in the natural process of rehabilitation

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table : List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
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Storm water drainage/ Irrigation channel	3+620	350			2.0	R		A
	4+930	15			2.0	L		A
	4+945	155			2.0	L+R		B
	5+100	60			2.0	L		A
Ponds	0+360	30			3.0	R		A
	2+475	30			3.0	L		A
	2+616	32			2.0	R		A
	2+650	38			3.0	R		A
	8+285	40			3.0	L		A
	8+790	50			3.0	L		A

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
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	Roadside Ponds				•			•			•		•	KI
	Natural wetlands/fish habitats													
	Fisheries													
	Forest													
	Vegetation													
	Slope stability of embankment				•						•		•	KI
	Natural Drainage				•						•	•		KI
	Storm water drains													

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Irrigation canals													
	Navigation and boat communication	•			•						•	•		KI
	Landscape	•			•						•	•		KI
Earth work	Loss of topsoil					•		•			•		•	KI
	Erosion and siltation					•					•		•	KI
	Water pollution				•						•		•	KI
	Dust nuisance						•				•		•	KI
Bricks and aggregates	Agricultural lands													
	Top soil					•		•			•		•	KI
	Firewood				•			•		•		•		KI
	Human health				•						•		•	KI
Rehabilitation of structure	*Erosion*													
	Boat communication	•			•						•	•		KI
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding					•					•		•	KI
	Erosion and siltation				•						•		•	KI
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership					•					•			KI
	Landuse					•					•			KI
	Landscape	•					•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes.
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Rehabilitation of structure	Boat communication		• Temporal disruption in I boat communication	• Keep opening for the boat passage
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
During high rainfall at some location of the road water remains stagnant and causes damage to roads	Raise the road height and provide cross-drainage structure	The road has already been designed taking HFL into account	
Ch 1+050 two sharp turns within 50 m of road length, risk for road accidents (Sketch 1)	Do realignment by providing one smooth curve replacing the two curves	Already considered for realignment.	
Ch. 1+300—1+500· Two sharp turns and some roadside houses on the sight distance of the road Potential risk of accidents (Sketch 2)	Do realignment for this length in such a way that minimum number of roadside houses are affected.	---Ditto--	
Ch. 8+800—9+150 Improvement of the existing alignment in the Prerirhat GCM will do a displacement of large number of roadside shops Also on hat day problem to vehicle movement will occur	Bypass the Perirhat GCM and use the existing alternative route	-----Ditto---	

4.6 Analyses of Alternatives

This road has three major problems for which alternatives have been suggested as described below·

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Road safety issue	Ch 1+050	two sharp turns within 50m of road length, risk for road accidents	(1)Replace two sharp turns by a single turn (2) Provide a very smooth curve	Preferred Option (2) is safer although it involves more land acquisition for curve setting
Road safety issue	Ch. 1+300—1+500	Two sharp turns and some roadside houses on the sight distance of the road Potential risk of accidents	(1) Realignment towards left (2) Realignment towards right.	Option (1) is more preferable over option (2) because it involves displacement of fewer roadside residences and it is more economical and requires less land acquisition
By-pass	Ch	Improvement of the	(1) follow the	Option (2) is preferable

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
issue	8+800—9+150	existing alignment in the Prerirhat GCM will require displacing of large number of roadside shops. Also on hat day problem to vehicle movement will occur.	existing alignment through GCM (2) Follow the alternative route bypassing the GCM	because it involves no displacement of roadside shops and vehicles can move through this route uninterruptedly

5 TREE PLANTATION

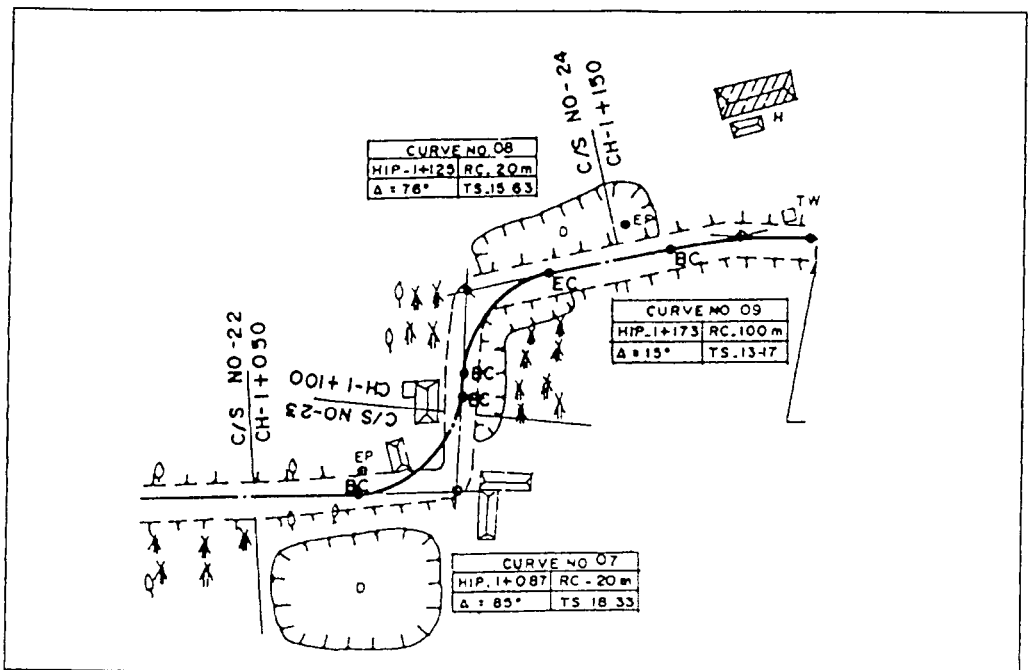
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 6750.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

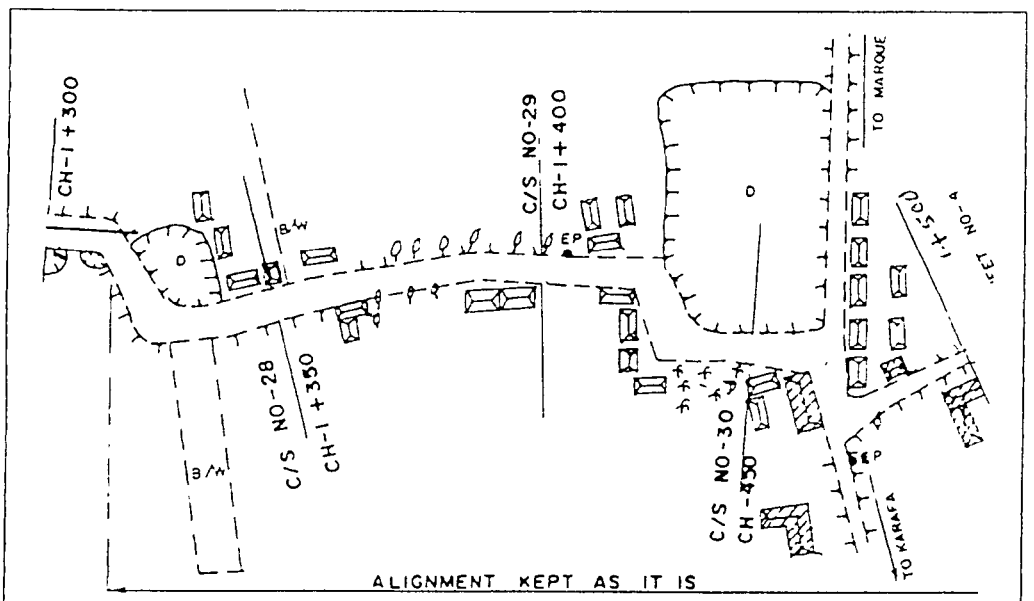
For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

The road can be undertaken for implementation under 1st year program of with integration of suggestions/recommendations made earlier



Sketch1 Road within a very short distance has two sharp turns along with two tin-sheds that needs curve smoothening to reduce associated risk of road accident



Sketch 2 Two sharp turns along with roadside houses would cause problem relating to sight distance of operating vehicles, a potential area of road accident

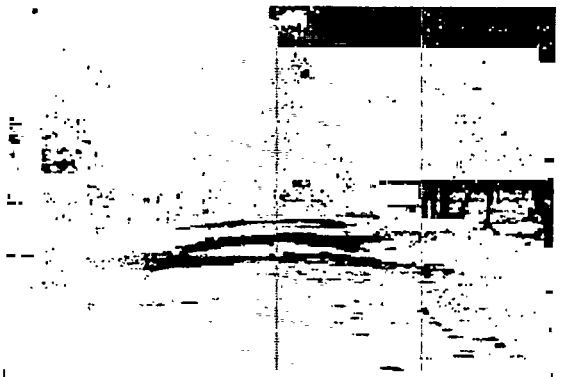


Plate 1. Roadside avenue trees on slope of embankment that needs to fell from road improvement

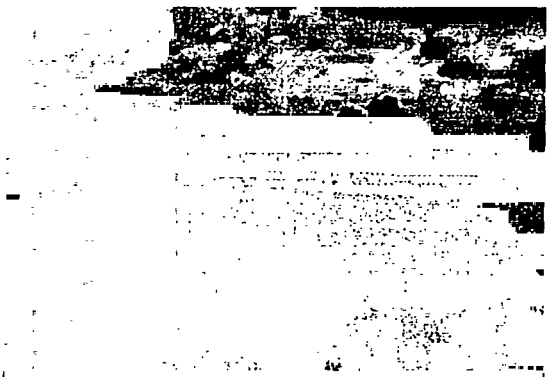


Plate 2· View of the roadside vast wetland that may get polluted from construction activities of the road

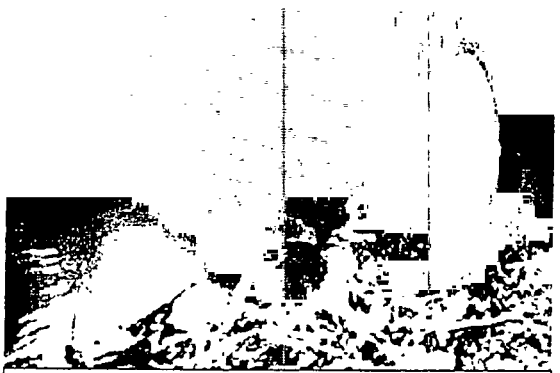


Plate 3 Failure of the road embankment slope due to high rainwater pressure caused by inadequate water opening of a pipe-culvert

Plate 4 Damage to road from rainwater flow due to inadequate compaction and lack of erosion protection vegetation coverage

Plate 5 View of the proposed bridge (under large bridge project) location at the starting point of the road and boat communication between two banks of the Korotoa River

Plate 6 Truck being loaded with riverbed sands of the Korotoa River for use in construction work of the area, and river floodplain agricultural lands

Environmental Analyses Reports of 1st Year FRB Sub-projects of Dhaka District

Environmental Analyses Report---Dhaka Aricha Highway - Kalatipara GCM, Savar, Dhaka.

1.0 INTRODUCTION

1.1 Sub-project Description

Dhaka Aricha Highway - Kalatipara GCM Road starts from Dhaka Aricha Highway and ends at Kalatipara GCM The total length, average width, height and batter slope are 8.5 km, 6m, 2.85m and 1:1.25 respectively The RL (Reduced Level) of the road is 10 2m and the HFL (High Flood Level) is 10m No part of the road falls below HFL. 2 km of it goes through agriculture lands and the rest 6 5 km through non -agricultural lands. It is zigzag in alignment with a few sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 2800, 41% of it are non-motorized. It connects an important GCM and roadside villages with Dhaka Aricha Highway

The road is Earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are:

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The sub-project area is low-lying flood plain. Of the total 8 5 km, 6 5 km of roadside landuse includes non-agricultural lands including homesteads, borrow pits, ditches and long canals, and the remaining is agricultural lands.

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is low-lying flat flood plain and gets flooded during monsoon. It has several natural depressions also

Some parts of the road get drainage congestion and water logging that causes crop damage during monsoon Putting cross drainage structure along with roadside canal could improve the situation

The road has a total 17 cross drainage structures with a total opening 296.34m. No additional opening for cross drainage structures has been proposed in the road improvement.

2.3 Wetlands

There are some natural wetlands in the form of depression areas, canals,

but ponds along the roadside The canal is adjacent to the road and the flooded natural depressions are at 0 5-1 km away from the C/L of the road

2.4 Erosion and Siltation — Road along the canal gets some erosion during monsoon. Besides due to sandy soil and lack of vegetation coverage, it gets rain cut during heavy rainfall and it requires maintenance almost every year.

2.5 Navigation and Boat Communication — Engine boats use canals for communication and transportation of goods, especially during monsoon. Therefore construction of any large structure (bridge) on the road needs to provide adequate navigation clearance above HFL for non-obstruction to boat communication.

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road

2.6.2 Avenue trees/bushes — About 900 numbers of roadside trees, of average age 2-3 years, are along the road embankment Grass turfing over some parts of the embankment is there.

2.7 Borrow Areas — There are several roadside borrow areas in the form of ditches along this road

2.8 Construction Materials

2.8.1 Soil — Soils may be collected from roadside non-productive agriculture lands These borrow areas may be later on converted into useful ponds.

2.8.2 Sand — There is no potential sand source in the area Sands come from a long distance, Padma river at Aricha

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields — There is one roadside brick-field located at 50 m away from the road Both firewood /coal is used in the brick fields

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table 1: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	0+845	355			5 0	R		A
	1+415	220			4 0	R		A
	2+550	450			5 0	L		A
	3+000	500			4 5	L		A
	4+125	295			5 0	L		A
Ponds	None							

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land				•			•			•		•	KI
	Roadside Ponds			•	•						•		•	
	Natural wetlands/fish habitats										•		•	
	Fisheries			•	•						•		•	
	Forest				•						•		•	
	Vegetation				•						•	•		
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage	•			•						•	•		KI
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication	•			•						•	•		KI
	Landscape			•	•						•	•		
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation	•				•					•		•	KI
	Water pollution				•						•		•	KI
	Dust nuisance						•				•		•	KI
Bricks and aggregates	Agricultural lands			•			•				•		•	KI
	Top soil					•					•		•	KI
	Firewood	•			•					•		•		KI
	Human health				•						•		•	KI
Rehabilitation of structure	Erosion	•			•						•		•	KI
	Boat communication				•						•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding	•				•					•		•	KI
	Erosion and siltation	•			•						•		•	KI
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			KI
	Landuse		•			•					•			KI
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Rehabilitation of structure	Erosion		• Increases the turbidity of water	• Provide erosion measures
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

There is no important recommendation/suggestion on any environmental issue come from the local community

4.6 Analyses of Alternatives

This road has one major erosion problem for which alternative solutions have been suggested as described below

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Damage to road	Ch 845, (Sketch 1) 2+550.	A total of 1800m of the road is along the canal	(1) Widening towards opposite of the canal with slope	Option (1) is preferable over option (2) because it will allow road widening

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
	3+000, 4+125, 1+415	where damage to road occurs due to wave action of the canal	protection/earth retaining structure along the canal side (2) Widening both sides without earth retaining structures/slope protection work.	as well as do protect the road from damage due to canal

5 TREE PLANTATION

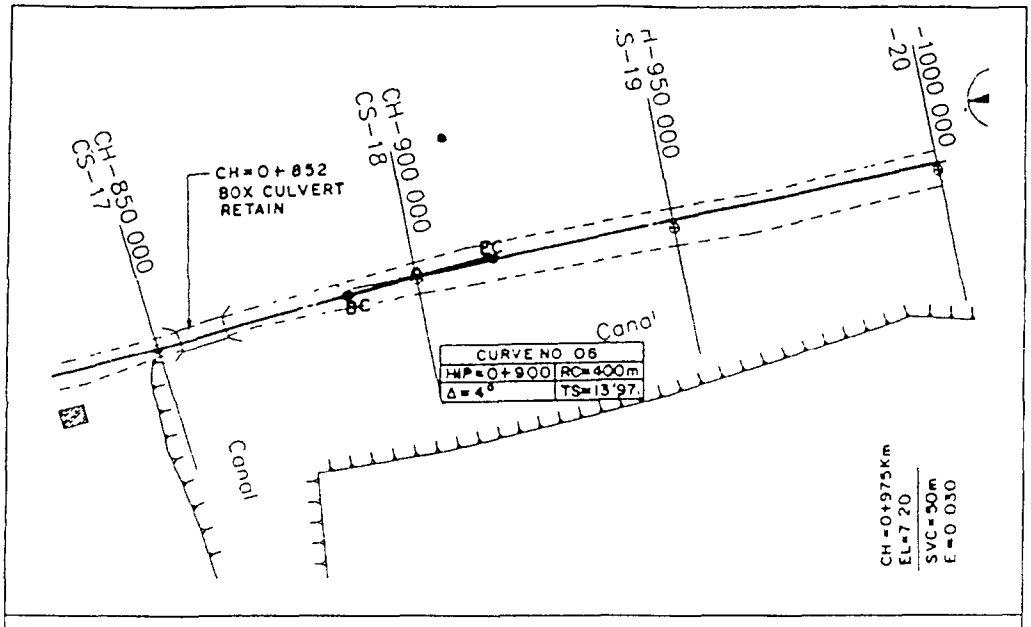
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 12195

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

With the integration of the suggestions made earlier with the design of the road, it can be implemented under 1st year program of RTIP



Sketch 1 Roads needs widening opposite to the canal side (1800m abutting length) to save it from filling and ensure slope stability of the road at the canal location

Environmental Analyses Report---Dhaka Aricha R&H – Mugrakanda Road, Savar, Dhaka

1.0 INTRODUCTION

1.1 Sub-project Description

Dhaka Aricha R&H – Mugrakanda Road starts from Dhaka Aricha R&H and ends at Mugrakanda The total length, average width, height and batter slope are 4 5km, 5 2-6 5m, 2 5m and 1 1 25 respectively The RL (Reduced Level) of the road is 10 3m and the HFL (High Flood Level) is 10m No part of the road falls below HFL 3 km of it goes through agriculture lands and the rest 1 5 km through non-agricultural lands It is relatively straight in alignment.

The road is fully operational throughout a year and has an average daily traffic of 820 68% of it are non-motorized

Except 500 m of the road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are:

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is flood plain low land mainly Of the total 4 5 km, 4km goes through the flood plain Road side land use characteristics includes agricultural land (3km) and non agricultural land (1 5km)

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Since the area is flood plain low-lying land, annual river flood occurs here during monsoon, for 6 – 8 months Road gets damaged due to flood

2.3 Wetlands

There is no natural wet lands except road side canals and a very few ponds

2.4 Erosion and Siltation

Due to occurrence of river flooding erosion and siltation occurs in the area Erosion to road occurs also due to wave action of its adjacent canal Such erosion is major in some parts of the road Sandy silt soil is there

2 5 Navigation and Boat Communication

Mechanized boats used the canals and river in the area But the road within total length 4 5km, has not crossed any canal or river

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road

2.6.2 Avenue trees/bushes About 400 number of homestead trees of average age 6 years are along the road embankment

2.7 Borrow Areas A long continues borrow pit (1000m X 30m X 2m) between Ch 2+50 – 3+100 is adjacent to the embankment Due to its continuous and regular shape it has the potentiality of being converted into a drainage canal or potential fishpond

2.8 Construction Materials

2.8.1 Soil As is the usual practice, the roadside barren lands are the potential source of soil to be used in the road construction for the contractors

2.8.2 Sand There is no potential source of sand collection in the vicinity of the area However potential source of sand is the Padma River, which far away from the proposed sub-project road

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There is a brickfield along the roadside at a distance of 30m form it To reach the brickfields approach road is required

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	0+00	500			2 0	R		A
	0+600	280			2 0	R		A
	4+900	100			2 0	L		B

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Ponds	1+940	50			3 0	R		A

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•			•		•	KI
	Roadside Ponds			•	•						•		•	
	Natural wetlands/fish habitats						•				•		•	
	Fisheries			•	•						•		•	
	Forest				•						•		•	
	Vegetation		•		•						•	•		
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage	•			•						•	•		KI
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication	•			•						•	•		KI
	Landscape		•		•						•	•		
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation	•									•		•	KI
	Water pollution		•		•						•		•	KI
	Dust nuisance		•				•				•		•	KI
Bricks and aggregates	Agricultural lands		•				•	•			•		•	KI
	Top soil		•			•		•			•		•	KI
	Firewood		•		•			•		•		•		KI
	Human health		•		•						•		•	KI
Rehabilitation of structure	Erosion				•						•		•	
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding	•				•					•		•	KI
	Erosion and siltation	•			•						•		•	KI
	Pavement drains				•						•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership		•			•						•			KI
	Landuse		•			•						•			KI
	Landscape		•				•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
	Pavement drains		• Reduction in the durability of the pavement	• Provide side-drains and cross-falls on embankment slopes
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

There is no important recommendation/suggestion on any environmental issue come from the local community

4.6 Analyses of Alternatives

This road has one major erosion problem for which alternative solutions have been suggested as described below

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Damage to road	Ch 4+900 0+000	A total of 890m of the road are along the canal where damage to road occurs due to wave action of the canal	(1) Widening towards opposite of the canal with slope protection/earth retaining structure along the canal side (2) Widening both	Option (3) is preferable because it allows road widening as well as does protect the road from damage due to canal at low expenses

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
			sides without earth retaining structures/slope protection work (3) Do widening the road towards opposite of the canal, with extensive slope protection measures at the canal side	

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 6450

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has a major erosion problem along the roadside canal, which is likely to increase further if the road is widened to the canal side Therefore widening to the opposite side of the canal has been suggested with slope protection measures along the embankment along the canal side by special type of large grass `binna, and good compaction of the embankment soil

Environmental Analyses Reports of 1st Year FRB Sub-projects of Gazipur District

Environmental Analyses Report---Kaliganj- Jamalpur Road, Kaliganj, Gazipur

1.0 INTRODUCTION

1.1 Sub-project Description

Kaligonj -Jamalpur Road starts from Kaliganj and ends at Jamalpur. The total length, average width, height and batter slope are 3 65 km, 5.45m, 1 75m and 1:1 respectively The RL (Reduced Level) of the road is 7 85m and the HFL (High Flood Level) is 7 25 km.No part of the road falls below HFL Major portion of it go through agricultural lands It is zigzag in alignment.

The road is fully operational throughout a year and has an average daily traffic of 1770, 62% of it are non-motorized

The road is black topped but damaged Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2 0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

In general the road lies on flat land, free from annual river flooding Land use of the road side areas includes agricultural lands mostly and roadside homelands/ shops

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is free from annual river flooding The RL of the road is 7 85 m while HFL 7 25 No part of the road is below HFL

Along the road side areas between ch 0+650 – 1+250km there is water logging for 3 months during raining season, owing to the natural depressions

The road has a total 12 cross drainage structures with a total opening 14m No additional cross drainage structure has been suggested

2.3 Wetlands

Along the roadside most are high land except a few locations where there are natural depressions which get flood water during monsoon and habitat open water fisheries

2.4 Erosion and Siltation	The soil is silty clayey The road at few locations get erosion due to heavy local rainfall, mainly due to low grass turfing on slopes and steep slope (1 1)
2.5 Navigation and Boat Communication	No impact from the road on navigation and boat communication
2.6 Vegetation	
2.6.1 Forest	No forest area is along any part of the road Bur Gazipur district (the sub-project area) has natural forest area
2.6.2 Avenue trees/bushes	About 4000 number of roadside trees of average age 8 years are along the road Also a good grass turfing over some parts of the embankment is there
2.7 Borrow Areas	There is no borrow pit Potential borrow areas for this subproject road may be the high land in the area.
2.8 Construction Materials	
2.8.1 Soil	As is the usual practice in the area, soils may be collected from roadside non-productive agriculture lands These borrow areas may be later on converted into useful ponds
2.8.2 Sand	Potential source of sand for use in road construction is the river. 1km away from the road
2.8.3 Aggregates	Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India
2 9 Brickfields	There is no roadside brick-fields along this road Potential brickfields are located at a distance of 1 km from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	none							
Ponds	None							

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.3 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•			•		•	KI
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats			•			•				•		•	
	Fisheries				•						•		•	
	Forest				•						•		•	
	Vegetation	•			•						•	•		KI
	Slope stability of embankment			•	•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape	•			•						•	•		KI
Earth work	Loss of topsoil			•		•		•			•		•	KI
	Erosion and siltation			•		•					•		•	
	Water pollution			•	•						•		•	KI
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil		•			•		•			•		•	KI
	Firewood		•		•			•		•		•		KI
	Human health			•	•						•		•	
Rehabilitation	Erosion				•						•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
of structure	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding			•		•					•		•	
	Erosion and siltation				•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership	•				•					•			KI
	Landuse	•				•					•			KI
	Landscape	•					•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing bushes and tree plantation
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.4 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch 0+850, 1+130; 1+325, 1+730, 1+840, 2+200, 3+300 Sharp turns, high potentiality of road accidents	Sharp curves on this road to be smoothened	Under consideration	

4.5 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 5475

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSION AND RECOMMENDATION

The road has no major environmental problems from road improvement At some locations of the road, there are some sharp turns, which the community people have suggested for smoothing for safety reason With this suggestion the road can be undertaken under 1st year program of RTIP

Environmental Analyses Report---Kapasia –Monohordi Road, Kapasia, Gazipur

1.0 INTRODUCTION

1.1 Sub-project Description

Kapasia-Monohordi Road starts from Kapasia and ends at Monohordi The total length, average width, height and batter slope are 14 288 km, 1 82-3 67m, 1 5m and 1:1 5 respectively The RL (Reduced Level) of the road is 8 5m and the HFL (High Flood Level) is 8 75 m It is zigzag in alignment

The road is fully operational throughout a year and has an average daily traffic of 1471 40% of it are non-motorized

The road has BC but damaged Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects;
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The sub project is located on flat topography and consists mainly of flood plain A substantial part of the road goes through agricultural lands It has numerous road side human settlements The road has gone through some 5 markets

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Some parts of the area get flooded during monsoon from bank spillage of river and some parts remain flood free RL of the road is 8 5m while HFL is 8 75m (1998) The road alignment in general, is parallel to the drainage line except at bridge location where it cuts the drainage line perpendicularly There are some road side depression areas (Borrow pits) where water remains stagnant during monsoon

The road has a total 35 cross drainage structures with a total opening 219 1m An additional opening of 5 m has been propped in the road improvement

2.3 Wetlands

The area has three number of natural wet lands along the roadside, which support fisheries Also a number of canals / khals are there and crossed by the road Pisciculture is done during the monsoon and agriculture during dry season

2.4 Erosion and Siltation

Erosion to road occurs due to wave action from the canal Due to sandy-silt soil erosion to the embankment, in the form of rain-cut, also occurs

2.5 Navigation and Boat Communication

Mechanized boats move in the monsoon in the area As per community's observation on the boats over wetland of floodplain, they have suggested a minimum navigation clearance of 0 75 m above HFL for the bridge structures

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

About 7200 number of homestead trees of average age 8 years are 4 5 m away from the central line of the road Grass turfing over some parts of the embankment are there

2.7 Borrow Areas

Some irregular shaped borrow areas are 1 m away from the road toe These borrow areas are in the form of ditches which are left without use but can be converted into ponds for use of Pisciculture

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand

Adjacent river, 0 5 km away from the road, is the potential source of sands Sands are collected through mechanical dredging and transported to the site by road transport

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There is no roadside brick-fields along this road A number of brick-fields with good accessibility are 1 km away from the road
Low-productive agricultural lands are used as brickfields Brick-fields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	1+250	50			6 0	L		A
	1+700	55			3 0	L		A
Ponds	None							

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options as per FGD/KII	Preferred options/Comments
1+700 (Sketch 1)	One side khal and the other side graveyard	(1) Do protection work at the canal side and perform restricted widening so that graveyard is not affected (2) Do filling the canal as per requirement without protection work	Option (1) is better because it will not affect the drainage capacity of the canal as well as will save the graveyard from disturbance by road

4 4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•			•		•	KI
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats						•				•		•	
	Fisheries				•						•		•	
	Forest				•						•		•	
	Vegetation	•			•						•	•		KI
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage		•		•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication		•		•						•	•		KI
	Landscape		•		•						•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Earth work	Loss of topsoil					•		•			•		•	
	Erosion and siltation		•			•					•		•	KI
	Water pollution				•						•		•	KI
	Dust nuisance						•				•		•	KI
Bricks and aggregates	Agricultural lands						•	•			•		•	KI
	Top soil	•				•		•			•		•	KI
	Firewood	•			•			•		•		•		KI
	Human health		•		•						•		•	KI
Rehabilitation of structure	Erosion			•	•						•		•	
	Boat communication			•	•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding			•		•					•		•	
	Erosion and siltation		•		•						•		•	KI
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			KI
	Landuse		•			•					•			KI
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Impacts of environment on road	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch. 500-600. road gets damaged and drainage congestion occurs for want of drainage structures	Widen the road and provide drainage structure	Considered for integration with design	
Ch 11+500. Traffic congestion and drainage congestion	Parking space and drainage structure suggested	-Ditto-	

4.6 Analyses of Alternatives

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Re-settlement	Ch 4+950 & Ch 11+200	Road alignment in the market will do displacement of some pucca structures	(1) Do restricted widening and provide with road safety measures (3) Displace the structures (4) Bypass the market	Option (1) is preferable over others, as it will not displace the people and shops and also is cost-effective over others.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 21342

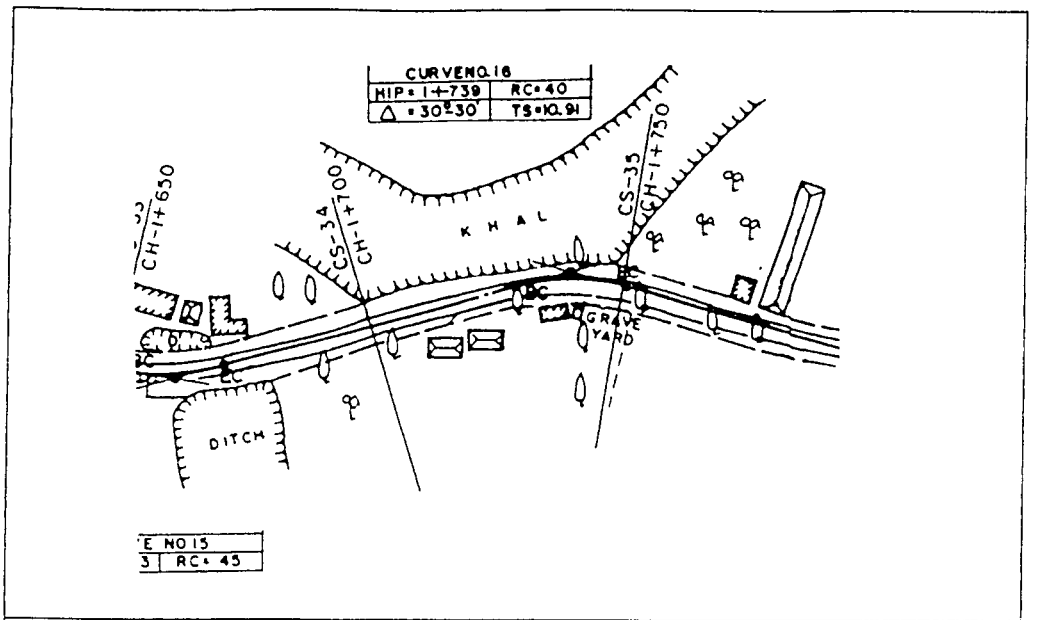
As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

5 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental implications from its improvement, but there is a scope for some solutions to the existing problems, which have been suggested, in the above tables Integration of these suggestions with the design will improve the overall environmental condition

The road can be undertaken for implementation under 1st year program of RTIP with incorporation of the suggestions discussed above



Sketch 1 Road needs widening towards canal side with a slope cutoff to reduce the canal-loss and ensure slope stability of the road embankment, and to save the graveyard at the other side

Environmental Analyses Reports of 1st Year FRB Sub-projects of Manikganj District

Environmental Analyses Report---Balirteck- Harirampur Road, ManikganjSadar, Manikganj

1.0 INTRODUCTION

1.1 Sub-project Description

Batirteck- Harirampur Road starts from Batirteck and ends at Harirampur, Manikganj. The total length, average width, height and batter slope are 3.011 km, 2.75m, 3m and 1.1.25 respectively The RL (Reduced Level) of the road is 9 24m and the HFL (High Flood Level) is 8.40 km. Major portion of it goes through non-agriculture lands Overall it is straight road, but sharp turns at two points.

The road is fully operational throughout a year and has an average daily traffic of 500; 60% of it are non-motorized

The road is black topped. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the flood plain Along the road most are agricultural lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Flood occurs due to over bank spillage of rivers Marginal to medium damage to road occurs due to river flooding

No drainage congestion and water logging along any part of the road is reported

The road has a total 2 cross drainage structures with a total opening 90m No additional opening for cross drainage structures has been proposed in the road improvement

2.3 Wetlands

A total of 2 large (not adjacent or to be affected) ponds are along the roadsides that are used for pisciculture, bathing and washing mainly

2.4 Erosion and Siltation

At ch 400, where Isamati River falls into Kaliganj river and where the road has a sharp right turn, riverbank erodes significantly Some parts of the road get rain cut, although silty-clayey soil is there The reasons for such

	erosion are steep batter slope, wave action and lack of vegetation coverage
2.5 Navigation and Boat Communication	No impact from the road is on navigation and boat communication.
2.6 Vegetation	
2.6.1 Forest	No forest area is along any part of the road
2.6.2 Avenue trees/bushes	About 2000 number of roadside trees of average age 5 years, at an average distance of 3 0m from C/L of the road embankment. Few bushes and good grass turfing over some parts of the embankment are also there
2.7 Borrow Areas	Some irregular borrow areas of average size (10mx7mx2 5m) at an average distance of 2m from embankment toe are there, which can be rehabilitated into ponds
2.8 Construction Materials	
2.8.1 Soil	Soils may be collected from roadside non-productive agriculture lands. These borrow areas may be later on converted into useful ponds
2.8.2 Sand	Potential source of the sands are 2 km away from the road, which are the river-beds and sandbars. Manual dredging is the usual practice
2.8.3 Aggregates	Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.
2.9 Brickfields	There is no roadside brick-field along this road Potential brickfields are located at a distance of 3 km from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project has been shown on respective Upzilla map

4.2 Environmental Assets along the Road

The following is a list of environmental assets to be affected from the sub-project

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Storm water drainage/ Irrigation channel	None							
Ponds	2+900	50			9 0	L		A

Note
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

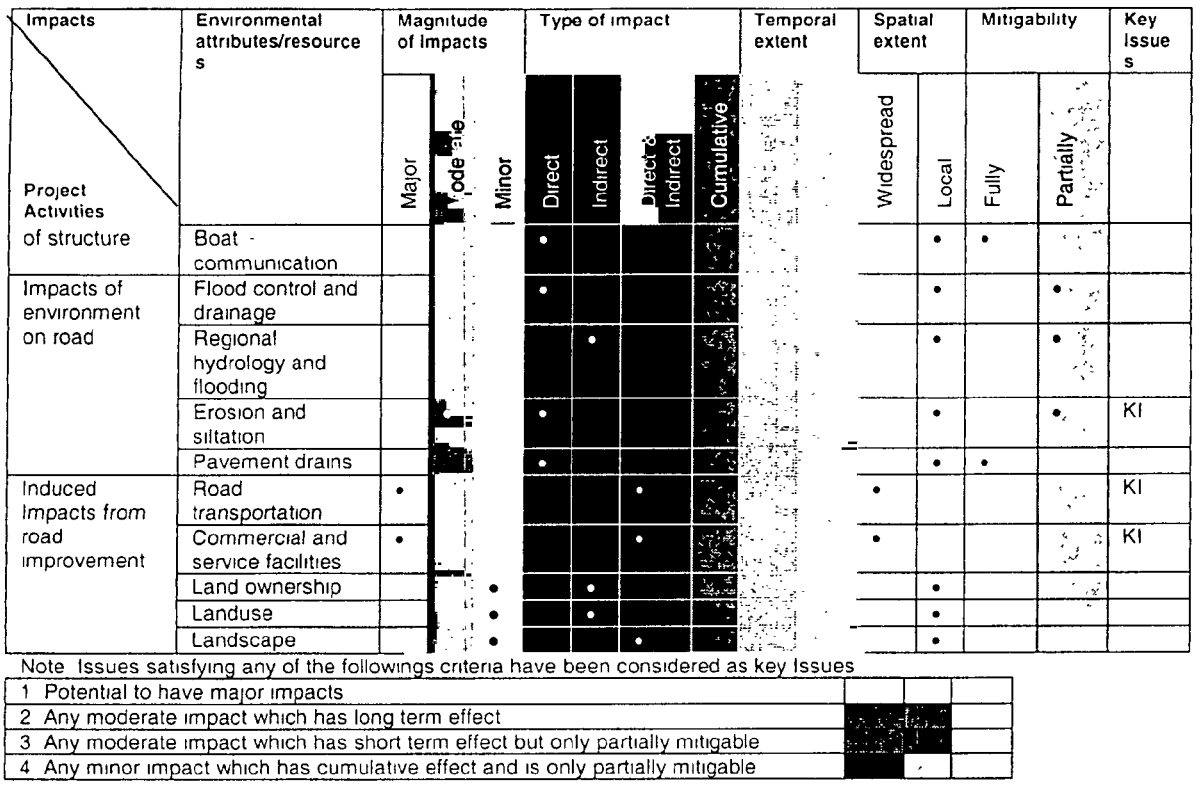
Location in Chainage (m)	Issue description	Alternative options	Preferred option with rational
2+900 (Sketch 1)	One side graveyard and the other side pond	(1) graveyard to be saved (2) pond to be filled up (3) Retaining structure to be provided at the pond side	Preferred (3) although costly, but save the road against damage

4.4 Key Issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•	•	•			•			•		•	KI
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats										•		•	
	Fisheries			•	•						•		•	
	Forest				•						•		•	
	Vegetation	•			•						•	•		KI
	Slope stability of embankment			•	•						•		•	
	Natural Drainage			•	•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape	•			•						•	•		KI
Earth work	Loss of topsoil			•		•		•			•		•	KI
	Erosion and siltation		•			•					•		•	KI
	Water pollution			•	•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands		•				•	•			•		•	KI
	Top soil					•		•			•		•	
	Firewood				•			•		•		•		
	Human health				•						•		•	
Rehabilitation	Erosion				•						•		•	



Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
Impacts of environment on road	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

There is no recommendation from the community

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass.

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 4517

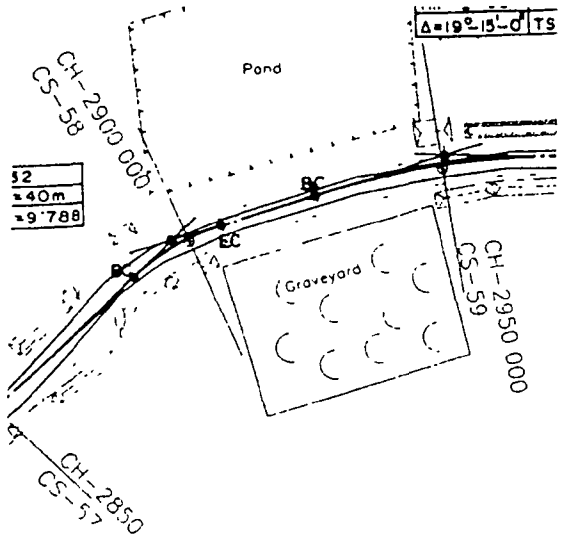
As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

The road has a 50m long roadside pond and widening of the road at the pond location will do pond-loss as well as will occur instability of embankment if slope protection measure is not undertaken at the same pond location. At this particular part, the road has been suggested for widening to the opposite side of the pond and have its slope protection measure at the pond location by good compaction and vegetation coverage, specially Binna This will allow the widening of the road without pond loss as well as will stabilize the road at pond location

With integration of this suggestions with the design the road can be undertaken for implementation under 1st year program of RTIP.



Sketch 1 Roads needs widening towards pond side with slope cutoff to reduce pond-loss as well as to ensure slope stability of the road embankment, and to protect the graveyard at the other side from road improvement

Environmental Analyses Report---Ghior-Jabra Road, Ghior, Manikganj

1.0 INTRODUCTION

1.1 Sub-project Description

Ghior-Jabra Road Road starts from Ghior and ends at Jalora. The total length, average width, height and batter slope are 8 4 km, 3.96m, 0.95m and 1:1 respectively. It is zigzag in alignment.

The road is fully operational 11 month in a year and has an average daily traffic of 300; 30% of it are non-motorized.

First 3.3 km road is earthen and next 5 1 km is B.C Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are·

1. To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and low-lying floodplain area Major roadside landuse is for agriculture

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Flooding occurs due to over bank spillage of river water during monsoon Major part (7 8 km) of the road has cut natural drainage line

Reduced level of the road is below the HFL

The road has a total of 15 cross drainage structures with a total opening of 141 9m. An additional opening of 10 m has been proposed in the road improvement

2.3 Wetlands

A total of 15 ponds are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly The area is low-lying that gets annually flooded during monsoon

2.4 Erosion and Siltation

The area in general does not get any significant erosion and siltation Even the road does not have any major rain-cut due to heavy local rainfall

2.5 Navigation and Boat Communication

No navigation and boat communication problem is there due to the road But as per local community information, a navigation clearance of 1 5 m

above HFL for is required for the bridge on the road.

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road

2.6.2 Avenue trees/bushes About 3200 number of trees of average age 10 years are along the road embankment are at an average distance of 4.5 m from C/L of the road Batter slope conditions are good.

2.7 Borrow Areas Some irregular shaped borrow areas of average size (29 5mx10 25mx1.95m) are adjacent to the road embankment. The borrow areas have no water hyacinth coverage and have the potentiality to use for pisciculture if converted into ponds

2.8 Construction Materials

2.8.1 Soil Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after use

2.8.2 Sand Taraghat and Aricha ghat, 10 km and 20 km respectively away from the road, are the potential sources of sands. During dry season sands are collected from riverbed by manual dredging, while during wet season it is collected through mechanical dredging Road transport is used for transportation of sand

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet)

2.9 Brickfields There are no roadside brick-fields along this road. Some potential brickfields are located at a distance of 5 km from the road and they have good road accessibility

Low-productive agricultural lands are used as brickfields Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table: List of Environmental Resources to be Affected

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	3+750	50			3 0	R		A
Ponds	2+695	20			7.0	R		A
	2+880	30			3.0	L		A
	3+700	15			0 0	R		B
	3+940	16			4.0	L		A
	4+500	55			4 0	L		A
	4+750	20			4.0	L		A
	5+550	45			5.0	R		A
	5+750	35			5.0	R		A
	5+850	50			5 5	R		A
	5+950	15			4 0	L		A
	6+250	50			5 0	R		A
	6+800	20			6 0	L		A
	7+850	35			4 5	L		A
	8+050	12			5 5	R		A
	8+350	22			4 5	L		A

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures
C widening embankment towards opposite of the pond in consultation with property owners going to be affected
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options as per FGD/KII	Preferred option
0+500	One side Eidgah and the other side graveyard	(1) Shift the alignment towards the Eidgah (2) Design compromise (restricted widening)	(1) is preferable with due compensation to the Eidgah

4.4 Key Issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•			•		•	KI
	Roadside Ponds	•			•						•		•	KI
	Natural wetlands/fish habitats						•				•		•	
	Fisheries			•	•						•		•	
	Forest				•						•		•	
	Vegetation	•			•						•	•		KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage			•	•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals			•	•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil	•				•		•				•		•	KI
	Firewood				•			•			•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding		•			•						•		•	KI
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•	•							•			
	Landuse			•		•						•			
	Landscape		•				•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.4 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
0+480 , there is a turn near the box-culvert	Should be realigned.	Already realigned in the design	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 12612

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental implications from road improvement except a few locations, as discussed above, where the road needs a special care for its design. With integration of these suggestions with the design the road can be implemented under 1st year program of RTIP.

Environmental Analyses Reports of 1st Year FRB Sub-projects of Moulovibazar District

Environmental Analyses Report---Munshibazar- Mokambazar Road, Rajnagar, Moulavibazar

1.0 INTRODUCTION

1.1 Sub-project Description

Munshibazar- Mokambazar Road starts from Munshibazar and ends at Mokambazar The total length, average width, height and batter slope are 10 25 km, 3.05m, 0 8-1 5m and 1 1-1.1.5 respectively. 5 km of the road remains under water during high flood level (HFL) The road is relatively straight but has 9 sharp turns

1 8 km of the road is fully operational throughout a year and the rest of the road is only operational during 4 months (Jan-April). It has an average daily traffic of 380, 60% of it are non-motorized.

The road has both BC and earthen surface. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and depressed that is flooded annually During dry season they are cultivated for paddy Besides there are several beels that support natural fisheries in the project area

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Regional hydrology and flooding is mainly governed by the river water levels during monsoon.

In general the drainage is good along the road, but between ch 3 5-5.5km road adjacent areas get drainage congestion, which is apparently due to inadequate cross-drainage structure

The road has a total of 15 cross drainage structures with a total opening of 141.9m An additional opening of 10 m has been proposed in the road improvement

2.3 Wetlands

There are three types of wetlands in the area. They are Haor, Beel, and river Famous haors are Chara, Burbur Beel, Barabeel, Dolua beel and Hingua beel, rivers are Burijhuri, Munia The water levels of the wet lands are maintained by the river water levels that seasonallu fluctuates They

support natural fisheries like Kai, Magur, Tengra, Boail, Bain, Cheetol etc.

2.4 Erosion and Siltation

Both erosion and siltation occur in the area due to movement of flood water. Some parts of the road get damage due to erosion from wave action, poor batter slope, boat anchorage, particularly between ch. 3.5-5.0 and ch. 6 5-7.5 km, at Burburi Beel location and at Chaman Beel location, respectively

2.5 Navigation and Boat Communication

Small boats ply over the beel and haor during monsoon. Road causes a barrier to their movement particularly between ch. 5.56-5.90 km and ch 6 45-7.5 km.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

About 140 number of trees of average age 7 years is on the shoulders and slopes of the road embankment

2.7 Borrow Areas

Some irregular borrow areas of average size (6mx1.83mx1m) are 1 5 m away from the road toe. These borrow areas are covered with water hyacinth. As per Information received from local community, this water hyacinth damages paddy, and causes health hazard and support snakes People also use this as green manure after composting and use as a cow feeds.

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after collection of soil

2.8.2 Sand

This area is famous for good quality of coarse sand that has high demand in the construction works all over Bangladesh Current practice is to collect the sand from river beds This sand comes with flood water from hilly areas. Sand dredging from river is environment improving as it keeps the river navigable.

2.8.3 Aggregates

Brick and stone aggregates are used in the road construction Brick aggregates are from crushing of local bricks; stone aggregates from crushing of stones available in the area

2.9 Brickfields

There is no roadside brick-fields along this road Potential brick-fields with existing accessibility are 10km away from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Environmental assets along the road

There are no roadside pond and tube wells to be affected by the subproject. Along the roadside some irrigation canals are there to be affected by the road Majority of the roadside areas constitutes wetlands, which would be affected from road improvement

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds			•	•							•		•	
	Natural wetlands/fish habitats	•					•					•		•	KI
	Fisheries		•		•							•		•	KI
	Forest			•	•							•		•	
	Vegetation			•	•							•	•		
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage		•		•							•	•		KI
	Storm water drains				•							•	•		
	Irrigation canals			•	•							•	•		
	Navigation and boat communication		•		•							•	•		KI
	Landscape			•	•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation		•			•						•		•	KI
	Water pollution			•	•							•		•	
	Dust nuisance		•				•					•		•	
Bricks and aggregates	Agricultural lands			•			•	•				•		•	KI
	Top soil		•			•		•				•		•	KI
	Firewood	•			•			•			•		•		KI
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding	•				•						•		•	KI
	Erosion and siltation /	•			•							•		•	KI
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Natural wetlands/fish habitats		• Reduction in breeding, nursery and feeding ground in flood plain	• Minimize land-take of wetland by providing steep slopes • Do widening to the opposite side of the wetlands
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication.	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH 2 65km boat anchorage to the road at a roadside grave yard location	(1) Provide provision for boat landing at this location (2) Provide approach road to the graveyard	Considered for integration based upon a detailed investigation	
CH 6+450. water requirement for irrigation and pisciculture	(1) Sluice gate/regulator suggested to retain water for irrigation and pisciculture	-Ditto-	
Drainage congestion between homestead areas	(1) Provide cross drainage structure on the approach road to the homesteads near to the road embankment	Locations to be identified for incorporation of the suggestion in the design	
Slope protection of the road embankment	Provide CC blocks or palasetting structures	--Ditto-	

4.6 Analyses of Alternatives

There is no requirement of analyses of alternatives for this road.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9029.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road can be implemented under 1st year program of RTIP with incorporation of the above suggestions in the design. This will not only help improve the service of road but will also ensures the road from further damage due to erosion.

Environmental Analyses Reports of 1st Year FRB Sub-projects of Munshiganj District

Environmental Analyses Report---Betka-Tongibari Road, Tongibari, Munshiganj

1.0 INTRODUCTION

1.1 Sub-project Description

Betka-Tongibari Road starts from Betka and ends at Tongibari. The total length, average width, height and batter slope are 3 85 km, 5 5m, 4 0m and 1 1 5 respectively The RL (Reduced Level) of the road is 6 5m and the HFL (High Flood Level) is 7.0 m Out of 3.85 km, 3.0 km goes through non-agriculture lands and the rest 0.85 km through agricultural lands.

The road is fully operational for Nov-May of a year and has an average daily traffic of 1400, 43% of it are non-motorized.

The road is a B C One but in a very poor condition Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are·

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the floodplain General roadside landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

River flooding governs the regional hydrology of the area The road is 0 5 m below HFL; during 1998 flood 1 5 km of the road went 0 6 m below water

Some of the roadside areas are reported to have received waterlogging for 5 months during monsoon

The road has a total of 3 cross drainage structures with a total opening of 43 6m No additional opening of cross drainage structures has been proposed in the road improvement

2.3 Wetlands

A total of 16 ponds are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly One long drainage canal (161m) also goes parallel to the road Vast roadside areas become flooded during monsoon and habitat different types of open water fishes Famous beels like Betka are also in the area

2.4 Erosion and Siltation — Although surrounding areas of the road gets annually flooded, erosion to the road does not occur so much. This is because the slope is almost stable due to silty-clayey soil.

2.5 Navigation and Boat Communication — There is no worth-mentioning boat communication in the area Still while providing any bridge structure on the road, a navigation clearance of 1 m is suggested from the community.

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road

2.6.2 Avenue trees/bushes — Some large trees are on the both sides of the road embankment Grass turfing over some parts of the embankment are there

2.7 Borrow Areas — Some continuous borrow areas of more than 4m long along the road embankment with 1m away from embankment toe

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands for road construction

2.8.2 Sand — Charlands (Sandbars) of Meghna River at Gojaria Thana, 15km away from the road are the potential sources of sands. Soils are collected through mechanical dredging and transported to the Munshiganj ghat by river transport, from where it comes to the site as per its connectivity

2.8.3 Aggregates — Brick and stone aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet)

2.9 Brickfields — There is no roadside brick-fields along this road A brick-field located at the bank of Dhaleswari, 5km away from the road can be a potential source for brick supply. Both water trnsport and road transport can be used for collection of bricks.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	0+550	180			-	-		A
	2+685	161			1 0	R		B
	3+150	160			2 5	R		A
Ponds	0+396	54			2 0	R		A
	0+520	40			-	-		D
	1+130	70			-			A
	1+590	52			3 0	L		A
	1+660	85			3.5	L		A
	1+900	102			3 5	R		A
	2+132	42			2.5	R		B
	2+147	28			3.5	L		B
	2+228	17			4 0	R		A
	2+310	43			3 5	L		B
	2+320	45			2.5	R		B
	2+385	70			1 0	R		A
	2+460	80			2.0	R		A
	2+590	25			2 5	L		A
	2+717	28			2.5	L		B
	2+907	63			4.5	L		A
	3+090	50			2 5	R		D

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options as per FGD/KII	Preferred option
3+100 (Sketch 1)	Pond at one side and graveyard at other side.	(1) widening into the pond with earth retaining structure (FGD) (2) widening into the pond without earth retaining structure (Eng).	(1) costly but save the road from getting damaged and save the pond from huge loss

4.4 Key issues, Potential Impacts and Mitigation

The following tables present the key issues, their potential impacts and preventive/mitigation measures for the negative impacts

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land			•	•			•			•		•	KI
	Roadside Ponds	•			•						•		•	KI
	Natural wetlands/fish habitats										•		•	
	Fisheries				•						•		•	KI
	Forest				•						•		•	
	Vegetation			•	•						•	•		
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage				•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape			•	•						•	•		
Earth work	Loss of topsoil					•		•			•		•	KI
	Erosion and siltation					•					•		•	KI
	Water pollution				•						•		•	KI
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil					•		•			•		•	KI
	Firewood				•			•		•		•		
	Human health			•	•						•		•	
Rehabilitation of structure	Erosion				•						•		•	
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding					•					•		•	KI
	Erosion and siltation			•	•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities						•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
and/height raising	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Road at pond locations gets damaged.	Earth retaining structures	Where required would be given but widening to the opposite side of the ponds along with slope protection by local grass at the pond locations is the preference	------

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

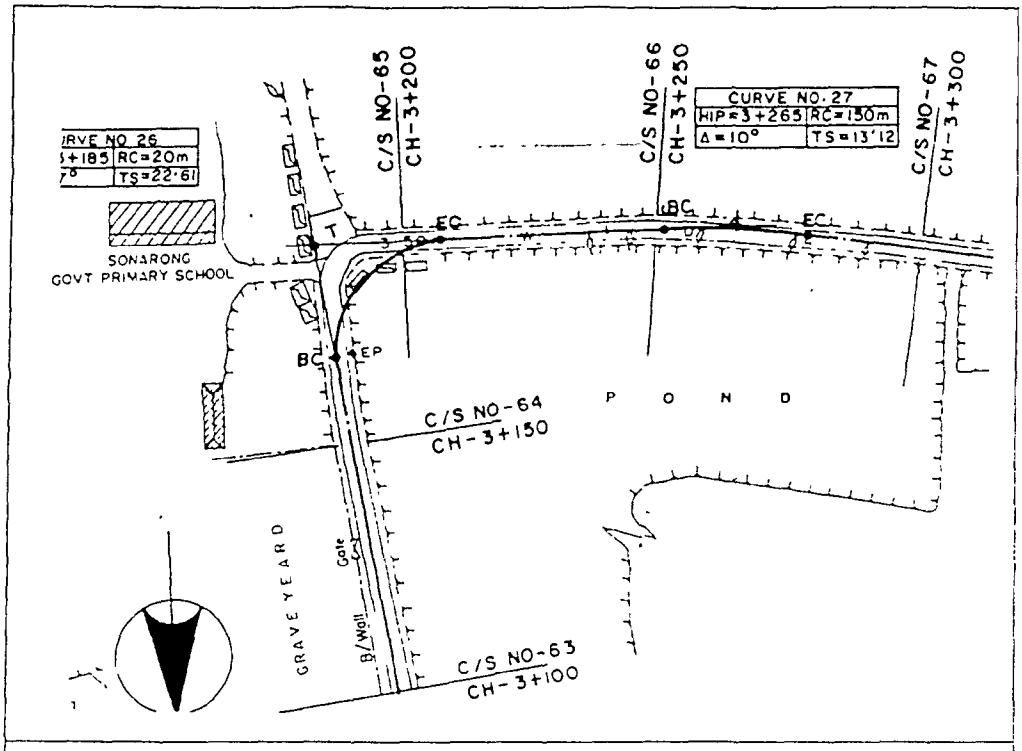
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 5775.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental impacts from its improvement except at the pond locations where road widening will do the pond-loss as well as will affect the slope stability of road embankment. At these locations widening to the opposite side of the ponds along with slope protection measures by local grass, 'binna' has been suggested. With incorporation of this suggestion the road can be implemented under 1styear program of RTIP.



Sketch 1 Roads needs widening towards pond side with slope cutoff to reduce pond-loss as well as to ensure slope stability of the road embankment, and to protect the graveyard at the other side from road improvement

Environmental Analyses Report---Laujang -Goalimandra hat Road, Munshiganj

1.0 INTRODUCTION

1.1 Sub-project Description

Louhaganj-Goalimundra Hat Road starts from Louhaganj and ends at Goalimundra The total length, average width, height and batter slope are 2.195 km, 4 46m, 1 8m and 1 1 respectively The RL (Reduced Level) of the road is 6 4 m and the HFL (High Flood Level) is 7 6m. West side of the road has residential areas and has several homestead gardens, and the east side are low-lying land and canals/depressions etc

The road is fully operational during dry period only and has an average daily traffic of 701, 67% of it are non-motorized

The road is totally earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects.
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

Flat and low-lying flood plain is the general topography of the area West side of the road contains canal along the road and opposite side contains human settlement To avoid resettlement, west side may be widened but that will require filling of canals

2.2 Regional Hydrology, Flooding. Drainage Congestion and Water Logging

The area gets flooded due to overflowing of the river of Padma During 1998 flood the road went 0 6 m below water

No part of the road has any drainage congestion and water logging, but water remains in the low-lying depressed area during flood season

The road has a total of 3 cross drainage structures with a total opening of 38 25m No additional opening has been proposed in the road improvement

2.3 Wetlands

A total of 2 ponds (going to be affected from road improvement) are along the road that is used for pisciculture, bathing and washing mainly. During flood season the low-lying areas become wetland and support fisheries resource, during dry season they become agricultural lands

2.4 Erosion and Siltation — No significant erosion and siltation from flood occurs along the road Due to heavy rainfall some parts of the road embankment get erosion

2.5 Navigation and Boat Communication — Local community, as per their observation on boat size, has suggested a minimum navigation clearance of 0 6 m above HFL under any of the large bridges on this road It is observed that small boats ply over the wetlands during monsoon

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road

2.6.2 Avenue trees/bushes — The road has roughly1000 trees of age 4-20 years on it's some parts, which belong to private owners

2.7 Borrow Areas — The road has a canal (was a borrow area while the road is constructed) all along its length—1 645 km adjacent to the road and the remaining 0 55 km away from the road

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas. It is suggested to re-excavate the roadside canal to collect soils from these, which would help the canal to be navigable round the year and would support the pisciculture

2.8.2 Sand — Potential source of sand is the Meghna River (Gojaria, Munshiganj) The source is 4 km away from the road

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields — There is no roadside brick-field along this road There are 4 operational brickfields at the roadside of Dhaka-Mawa Highway Bricks may be supplied from there

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	0+270	380			2 0	L		A
Ponds	1+950	40			3 75	R		A
	2+050	25			3 75	R		D

Note
A widening opposite side of the pond without affecting the pond
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options as per FGD/KII	Preferred options
0+350-0+500	On east side wall and west side canal	(1) Road to be widened towards canal side with earth retaining structures (2) Road widening towards wall side	Option (2) is economical and safe for road if the canal does not shift its bank If canal shift the bank , option (1) is preferable

4.4 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Continuous	Intermittent	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land			•	•			•	•			•		•	KI
	Roadside Ponds			•	•				•			•		•	
	Natural wetlands/fish habitats	•					•					•		•	KI
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage		•		•							•	•		KI
	Storm water drains				•							•	•		
	Irrigation canals	•			•							•	•		KI
	Navigation and boat communication			•	•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil					•		•				•		•	
	Firewood				•			•			•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding	•				•						•		•	KI
	Erosion and siltation	•			•							•		•	KI
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership					•						•			
	Landuse					•						•			
	Landscape						•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Natural wetlands/fish habitats		• Reduction in breeding, nursery and feeding ground in flood plain	• Minimize land-take of wetland by providing steep slopes • Do widening to the opposite side of the wetlands
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Natural Drainage		• Causes drainage congestion and waterlogging • Causes erosion to the abatement of road structures	• Stop filling of drainage canal • Provide adequate cross-drainage structures
	Irrigation canals		• Reduction in/obstruction to flow of irrigation water	• Provide adequate cross-drainage structures over the irrigation canals • Stop filling the irrigation canal
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

There is no important recommendation/suggestion on any environmental issue come from the local community

4.6 Analyses of Alternatives

There is no requirement of analyses of alternatives for this road

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 3293

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

This road would have a major problem regarding slope stability (380m length) along the canal and pond side (65m length) The road needs widening to the opposite side along with slope protection measures along the canal side With integration of this suggestion with design the road can be undertaken for implementation under 1st year program of RTIP

Environmental Analyses Report---Sreenagar – Tantar Road, Sreenagar, Munshigonj.

1.0 INTRODUCTION

1.1 Sub-project Description

Sreenagar– Tantar Road starts from Sreenagar and ends at Tantar The total length, average width, height and batter slope are 8 723 km, 5 05m, 1 5m and 1 1 respectively The road was entirely flooded during 1998 flood The road goes through low-lying flood plain area The road is relatively straight but 4 sharp turnings are there

The road is fully operational during dry season (nov-may) and has an average daily traffic of 1180, 96 4% of it is non-motorized

The road is totally earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are.

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat within the low-lying flood plain General roadside landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is annually flooded from riverbank over topping During monsoon some parts of the road goes under water.

Water remains in the low-lying area /depressed area (Borrow pit) both sides along the road during monsoon, but this is not water logging

The road has a total of 13 cross drainage structures with a total opening of 248 6m An additional opening of 4 2m has been proposed in the road improvement

2.3 Wetlands

No roadside pond, but ditch is there The low-lying area surrounding the road habitat open water fisheries Aquatic birds like pankour, dahuk, bok are seen in flood season During dry season this low-lying areas are used as agricultural lands

2.4 Erosion and Siltation

Rain-cut occurs over a substantial part of the embankment due to sandy soil Boat anchorages along the road also cause erosion to road

embankment. Erosion to the embankment also occurs due to wave action from roadside flood water during monsoon

2.5 Navigation and Boat Communication

Small country boats ply over the wetlands of flood plain during monsoon. As per community's observation on boat size, they have suggested a minimum navigation clearance of 1 5 m for the bridges, if any, on the road

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

There is no tree along the road alignment Grass turfing over some parts of the embankment is there

2.7 Borrow Areas

Some continuous borrow pits of average width 10m and depth 1 5m Water hyacinth is seen in the borrow pits This water hyacinth is used as agriculture manure for cultivation of potato

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand

Rivers in the area are the potential source of sand collection such sources are 8km away from the road. Sands are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

Brickfields are 15 km away from the road Land is rented for used as brick-breaking yard usually for 6 months of a year

Low-productive agricultural lands are used as brickfields. Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	none							
Storm water drainage/ Irrigation channel	none							
Ponds	none							

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation				•							•	•		
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage			•	•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication			•	•							•	•		
	Landscape				•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation		•			•						•		•	KI
	Water pollution		•		•							•		•	KI
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil	•				•		•				•		•	KI
	Firewood				•			•			•		•		
	Human health				•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding	•				•						•		•	KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
–	Erosion and siltation	•			•							•		•	KI
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership		•			•						•			KI
	Landuse		•			•						•			KI
	Landscape		•				•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Boat passage during flood	Bridge/culvert with navigation clearance	Yes/no	
Damage to road due to insufficient opening of the existing culvert at 2+250m	Bridge with large opening	Requires detailed investigation	
Damage to road due to wave action, boat anchorage	Good slope protection work through erosion protective plants suggested	Requires detailed investigation	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 13085

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

This road can be undertaken for implementation under 1st year program with special measures for slope protection (good vegetation coverage/binna planting) along the canal, where damage to embankment's slope occurs due to wave action from this canal

Environmental Analyses Reports of 1st Year FRB Sub-projects of Naogaon District

Environmental Analyses Report---Abadpukur – Kaliganj hat Road, Rani Nagar, Naogaon

1.0 INTRODUCTION

1.1 Sub-project Description

Abadpukur – Kaligonj road starts from Abadpukur and ends at Kaligonj. The total length, average width, height and batter slope are 7 95 km, 6 94m, 1 5m and 1:1 respectively The RL (Reduced Level) of the road is 12 37m and the HFL (High Flood Level) is 12 21 Km No part of the road falls below HFL. 7 km of it goes through agriculture lands and 0 25 km through non-agricultural lands It is straight in alignment.

The road is fully operational for 7 months of a year and has an average daily traffic of 648, 68% of it are non-motorized.

Except first 3 28 km the road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The subproject area is located on high flood plain Of total length 7 95km, 7.7 km of road goes through agricultural lands and remaining part through nonagricultural area, mainly residential araes

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is free from external annual river flooding Flood occurs here in extreme flooding condition as in 1998 and 1988 The RL of the road is 12 37 m while the HFL is 12 2m

Drainage congestion and water logging do not occur along the roadside, except at a location (7+800 – 7+850) where the land is very low and water gets accumulated there during heavy rainfall A cross drainage structure would solve the problem

The road has a total of 5 cross drainage structures with a total opening of 15 4m No additional opening for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

The area is virtually upland and has no wet land except between ch 7 7-7 89 km The road side areas along this part is very low lying

2.4 Erosion and Siltation

Erosion and Siltation from external river flooding is absent. Due to clayey soil, low height of embankment and good vegetation cover, the road embankment does not get any raincut even during heavy rainfall

2.5 Navigation and Boat Communication

The road does not cross any canal Between ch. 7 00 – 9.50 km there is a Nagor river close to the road, the river is used for boat communication and has a ghat along the road side

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

The road has a very good vegetation coverage on shoulders and slopes in the form of grass, bushes and a large number of trees A total of 1462 trees of average age 7 years are within the embankment toe A total of 20000 new trees have been planted 2 months before also on the embankment slope.

2.7 Borrow Areas

Some borrow areas in the form of ditches (average size 15m X 6m X 1 5m) are adjacent to the road These are covered with water hyacinth Water hyacinth has an use as green fertilizers the farmers apply to the agricultural lands

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand

Potential source of sand to be used in the construction of road is the Nagar river Such source is 4km away form the road

2 8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There is no roadside brick-fields along this road But potential sources of bricks to be used in the road construction are in other areas of the Upazila

Low-productive agricultural lands are used as brickfields Brick-fields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	7+850	50			5 0	R		A
	7+910	45			4 0	R		A

Note
* Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4 4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•	•	•			•	•			•		•	KI
	Roadside Ponds		•	•	•				•			•		•	
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest				•				•			•		•	
	Vegetation		•		•							•	•		KI
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage				•				•			•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•				•			•	•		
	Navigation and boat communication				•				•			•	•		
	Landscape			•	•							•	•		
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands		•				•	•				•		•	KI
	Top soil			•		•		•				•		•	KI
	Firewood			•	•			•	•		•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment	Flood control and drainage				•							•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Widespread	Local	Fully	Partially	
environment on road	Regional hydrology and flooding					•					•		•	
	Erosion and siltation				•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership			•		•					•			
	Landuse		•			•					•			KI
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch 7 8-7 85km: Drainage congestion and waterlogging	Provide a cross-drainage structure at the location	Considered for integration	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9029.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

Since the road has no major environmental complications from its improvement, from environmental point of view it can be undertaken under 1st year program of RTIP As suggested earlier, incorporation of these suggestions in the design will improve the overall environment of the road setting

Plate 1 Roadside trees and vast agricultural lands

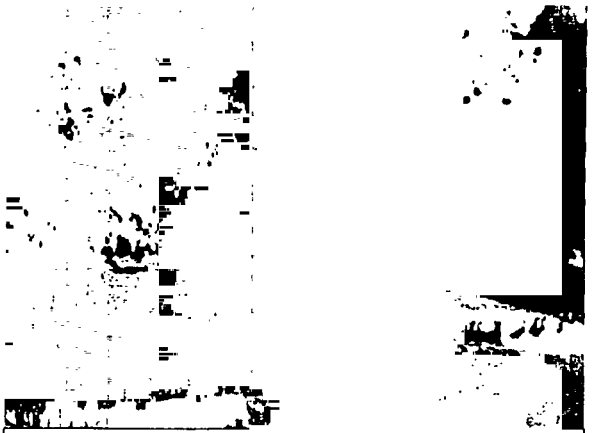


Plate 2 Roadside trees, goose and agricultural lands, some common elements of rural environment

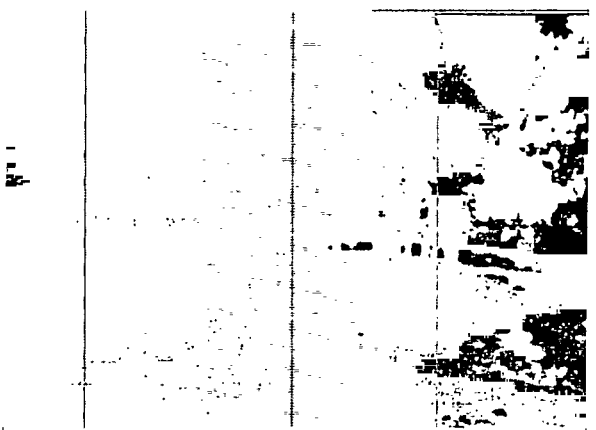


Plate 3 Extreme bad condition of the road saying for its urgent improvement

Environmental Analyses Report---Chatra - Mohadebpur Road (konjobon) , Mohadebpur, Naogaon

1.0 INTRODUCTION

1.1 Sub-project Description

Chatra - Mohadebpur road starts from Chatra and ends at Mohadebpur of Mohadebpur Upazilla under Naogaon district. The total length, average width, height and batter slope are 13 53 km, 7 1m, 2m and 1 1 respectively About 90% of the total road embankment goes through agricultural lands and the rest through village and beel areas

The road is fully operational throughout 8 months in a year and has an average daily traffic of 1719, 76 56% of it are non-motorized

The road is fully earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is low lying flood plain These are some minor inducting areas at some road sides Existing road side land used includes agriculture But along few length, there are homesteads and beel area

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Due to flood protection embankment by BWDB this area is free from external river flooding In the extreme floods some local depressed (beel) areas get flooded for 6 - 8 months The area was lastly flooded in 1995 from embankment breeching at a regulator High water pressure is the main cause to the embankment breaching

Drainage congestion along some road side areas occurs due to heavy local rainfall Water remains stagnant in the low (lying) areas (depressions, borrowpits) for 4-6 months in monsoon

The road has a total of 22 cross drainage structures with a total opening of 175m No additional opening has been proposed in the road improvement

2.3 Wetlands

First 1 5km of the road goes through natural wet land (beel) area During monsoon a vast area on both sides of this length of the road remains inundated water Except this there are some local depressions along the road

2.4 Erosion and Siltation

At ch. 0+500m (ghat location) road embankment gets damaged due to a pond used by people. Besides ch 0+260-1+400km the road receives wave action from beel and erosion occurs, but not to a great extent, due to clayey soil and good special type of erosion protective grass coverage over the batter slopes of embankment
Special type of grass turfing (Binna by local name) can be provided over batter slopes as erosion protection measure in the beel section and BWDB embankment section (end part of the road).

Some hundreds meters of road is the BWDB embankment along the Atrai river, which has extensively rain cut

2.5 Navigation and Boat Communication

Boats passe under the bridge over the beel only This bridge has been proposed to replace by a new one A minimum navigation clearance of 1.5m is required above high flood level (HFL) for this bride

2.6 Vegetation

2.6.1 Forest

The road does not go through forest area

2.6.2 Avenue trees/bushes

About 10,000 number of different type of native trees have been along the road side, with an average distance of 3 5m from center line of the embankment. At some location bushes are there Grass turfing over slopes is also good.

2.7 Borrow Areas

Some irregular borrow areas (56mx12mx1 1m average) with 0 5-1.0m distance from the embankment toe are there These borrow areas are covered with water hyacinth usually Water hyacinth is used for composting. The borrow areas can be converted in to ponds for use of pisciculture which will help reduce poverty

2.8 Construction Materials

2.8.1 Soil

Potential source of soil for use in road construction could be road side agricultural lands Contrator usually collect soil from agricultural lands near to the embankment

2.8.2 Sand

Potential source of sand for use in road construction is the river 0 5km away from the road

2.8.3 Aggregates

Brick and stone aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing of stones available in the area

2.9 Brickfields

There are four brick-fields along the road side, two at ch 1km . of the other two one at ch 12 5km and the other one at ch 13 4km
The brick field in this area are rehabilitated for agricultural land use in the natural process of flooding which takes usually 4 - 5 years

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table 1: List of Environmental Resources to be Affected,

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	13+300	70			5m	R		A

Note
* data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land			•	•			•				•		•	
	Roadside Ponds			•	•							•		•	
	Natural wetlands/fish habitats						•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment			•	•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication			•	•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil	•				•		•				•		•	KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
	Erosion and siltation			•		•						•		•	
	Water pollution		•		•							•		•	KI
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil	•				•		•				•		•	KI
	Firewood	•			•			•			•		•		KI
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion		•		•							•		•	KI
	Boat communication	•			•							•	•		KI
Impacts of environment on road	Flood control and drainage	•			•							•		•	KI
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities		•				•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape	•					•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts	
2 Any moderate impact which has long term effect	
3 Any moderate impact which has short term effect but only partially mitigable	
4 Any minor impact which has cumulative effect and is only partially mitigable	

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing bushes and tree plantation
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Rehabilitation of structure	Erosion		• Increases the turbidity of water	• Provide erosion measures
	Boat communication		• Temporal disruption in l boat communication	• Keep opening for the boat passage
	Flood control and drainage		• Effective flood control keeps road flood damage	
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
During high flood large boats can not pass under bridge over the beel	Bridge with adequate navigation clearance above HFL is suggested	Considered for feasibility	

4.6 Analyses of Alternatives

This road does not have any major problem for which realignment or bypass is required

5. TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 8,000.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

This road has no major environmental implication likely to occur from its improvement. Only a special affective regarding slope protection of embankment is required in the beel area and for BWDB embankment. A special type of local species of grass, Binna has been found very effective against erosion to road embankment in this area This can be used also for this road improvement

With incorporation of this suggestion, the road can be implemented under 1st year program of RTIP

Plate 1 Rain-cut to the BWDB embankment proposed for use as RTIP road and the river at 50 m away from the road

Plate 2 Road requires saving from slope failure at pond location, or pond require saving from its filling

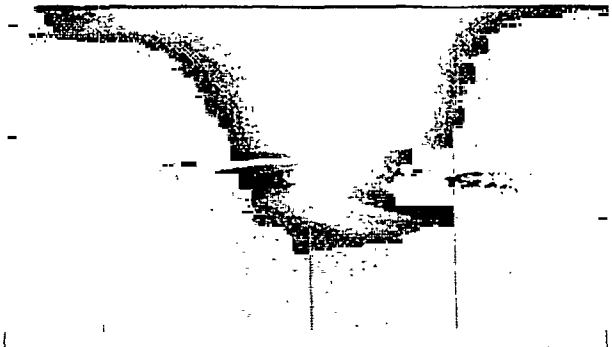


Plate 3 Road separating beel area require slope protection work for its durability

Plate 4 Road running through beel area and having slope protection work by special type of long grass binna, found very cost-effective measure against embankment slope failure in waterbodies

Environmental Analyses Reports of 1st Year FRB Sub-projects of Narayanganj District

Environmental Analyses Report---Kanchan GC– Chandpara R&H Road, Rupganj, Narayanganj

1.0 INTRODUCTION

1.1 Sub-project Description

Kanchar - Sharnakhali Road starts from Kanchar and ends at Sharnakhali. The total length, average width and batter slope are 8 09 km, 5.0m and 1 1 respectively. The RL (Reduced Level) of the road is 6 2 m and the HFL (High Flood Level) is 5.8 m It is zigzag in alignment with 2 sharp turns

The road is fully operational throughout a year and has an average daily traffic of 330; 65% of it are non-motorized.

Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are·

1. To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the floodplain General landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Flood occurs due to over bank spilling of rivers Marginal to medium damage to road occurs due to river flooding

No drainage congestion and water logging along any part of the road is reported

The road has a total of 25 cross drainage structures with a total opening of 76 55m An additional opening of 0 7m has been proposed in the road improvement

2.3 Wetlands

There is no pond along the roadside Few ditches and some irregular borrow pits are along the roadside (1m away from the embankment toe) Also a canal is along the road

2.4 Erosion and Siltation

The area in general does not get any significant erosion and siltation But road embankment is eroded due to wave action on the batter slope.

2.5 Navigation and Boat Communication

No major impact from the road on the navigation and boat communication Only 100m road interferes the boat communication

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road.

2.6.2 Avenue trees/bushes — About 1618 number of trees, average age 10 years, are along the road embankment. Grass turfing over some parts of the embankment is there

2.7 Borrow Areas — Some irregular shaped borrow areas of average size (15mx6mx2m) are 1m away from the road toe.

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand — Shitalakha river, 10km away from the road, is the potential source of sands Sands are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields — There is no roadside brick-fields along this road Low-productive agricultural lands are used as brickfields. Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4 -5 years

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	2+500	60			0 25	R		A
Ponds	None							

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy:

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short	Long	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats						•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals			•	•							•	•		
	Navigation and boat communication			•	•							•	•		
	Landscape			•	•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands			•			•	•				•		•	KI
	Top soil			•		•		•				•		•	KI
	Firewood			•	•			•			•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding		•			•						•		•	KI
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH 2+450 Damage to road at bridge location	Rehabilitation of the bridge is suggested	Already proposed for replacement	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option
	CH 2+080-2+150 (Sketch-1)	A tank on left side and two tin-sheds on right side at a junction point At this location the existing road has a sharp left turn and a rural road meet with this	Option1 Do a realignment of the road over the tank Option2 Do a slight smoothening of the curve and provide a safety measure at the	Option 3 is preferable. Because it will allow smooth passage of vehicles as well as will ensure road safety Also it is cost-effective over others and has no requirement of

Alternatives	Location	Problem description	Recommended options	Preferred Option
		junction	road junction point. Option3: Remove the house from the junction point and provide a road safety measure on the same point	realignment

5 TREE PLANTATION

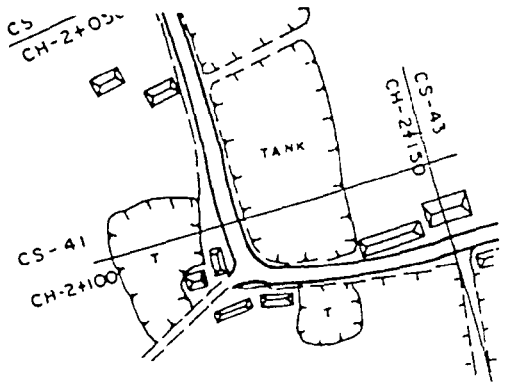
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 12135

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

Since the road has no major problem from its improvement it can be undertaken for implementation under 1st year program of RTIP There are some improvements have been suggested by local community which need to incorporate in the design for the overall improvement of the traffic operation



Sketch 1 Road having one sharp turn along with two tanks located on both sides of the road and a village road meeting with it has a potential risk associated with road accident

Environmental Analyses Report---Taltola – Ananda bazar Road, Sonargaon, Narayangang.

1.0 INTRODUCTION

1.1 Sub-project Description

Taltola – Ananda bazar Road starts from Taltola and ends at Ananda bazar The total length, average width and batter slope are 15 85km, 6.3m and 1.1 respectively The RL (Reduced Level) of the road is 6 2m and the HFL (High Flood Level) is 5 8m It is zigzag in alignment with 16 number of sharp turns

The road is fully operational throughout a year and has an average daily traffic of 1351, 63% of it are non-motorized.

Pavement condition of the road is BC Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and low-lying flood plain General landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Regional hydrology is governed by the water levels of surrounding river Due to local rainfall during monsoon, low-lying areas, internal channel/river all get flooded, in addition to the river flooding

No location of the road embankment gets any drainage congestion

The road has a total 27 cross drainage structures with a total opening 314 9m The proposed improvement of the road includes an additional opening of 21 5m

2.3 Wetlands

A total of 19 ponds are along the roadsides (going to be affected from the road improvement) that are used for pisciculture, bathing and washing mainly

2.4 Erosion and Siltation

Due to sandy-silt soil, poor soil compaction and less grass turfing some parts of the road get rain-cut

2.5 Navigation and Boat Communication No navigation and boat communication problem is there due to the road

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road

2.6.2 Avenue trees/bushes About 5550 number of trees of average age 12 years is 3 5m away from the centerline from the road . Grass turfing over some parts of the embankment is there

2.7 Borrow Areas Some irregular shaped borrow areas of average size (15mx10mx2 5m) are adjacent to the road embankment

2.8 Construction Materials

2.8.1 Soil Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand Meghna river, 20km away from the road, is the potential source of sands

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There are no roadside brickfields along this road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/ Attributes	Chainage	Length (m)	Name of village*	Name of owner *	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	11+720	295			4 5	R		A
Ponds	0+680	30			4 0	R		A

Env. Resources/ Attributes	Chainage	Length (m)	Name of village*	Name of owner *	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
	1+700	50			4.0	L		A
	1+925	20			3 5	L		A
	2+480	30			5 0	L		A
	3+320	20			2	L		A
	3+375	15			3.5	L		A
	4+710	60			4.0	R		A
	8+910	30			2.75	R		B
	11+035	50			2 5	L		A
	11+525	10			3 0	R		A
	12+500	25			3 5	L		B
	12+525	20			3.0	L		A
	12+560	30			1.5	L		A
	12+840	95			2.0	R		A
	13+355				2.5	L		A
	14+190	85			3 0	R		A
	14+500	15			3.0	R		A
	14+655	60			1	R		A
	14+810	70			5	R		A
	15+360	30			5 0	R		A
	15+620	30			5.0	L		
	15+704	41			2 5	R		
	15+770	60			3 0	L		

Note:
* Data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds	•			•							•		•	KI
	Natural wetlands/fish habitats		•				•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment		•		•							•		•	KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Natural Drainage			•	•						•	•		
	Storm water drains			•	•						•	•		
	Irrigation canals			•	•						•	•		
	Navigation and boat communication			•	•						•	•		
	Landscape			•	•						•	•		
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation		•			•					•		•	KI
	Water pollution			•	•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands			•			•	•			•		•	KI
	Top soil			•		•		•			•		•	KI
	Firewood			•	•			•		•		•		KI
	Human health			•	•						•		•	
Rehabilitation of structure	Erosion			•	•						•		•	
	Boat communication			•	•						•	•		
Impacts of environment on road	Flood control and drainage			•	•						•		•	
	Regional hydrology and flooding	•				•					•		•	KI
	Erosion and siltation	•			•						•		•	KI
	Pavement drains			•	•						•	•		
Induced Impacts from road improvement	Road transportation		•				•			•			•	KI
	Commercial and service facilities		•				•			•			•	KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH 13+400 Boat communication problem due to low navigation clearance of a bridge	Adequate navigation clearance suggested	Replacement of the bridge has already been proposed Flow opening should be increased	
CH 14+000 Damage to road at bridge location	Rehabilitation of the bridge suggested	Replacement of the bridge has already been proposed Flow opening should be increased	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option
	CH 6+600-6+700 (Sketch-1)	A sharp turn towards left. On the left side of the turning a power loom factory	(1) Remove the factory. (2) Do a smoothening of the curve and avoid the factory	Option (2) is preferable because it will not disturb power factory loom But this may costlier option Recommendation is made

Alternatives	Location	Problem description	Recommended options	Preferred Option
		area A potential area of road accidents.		for further detailed investigation.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 23373

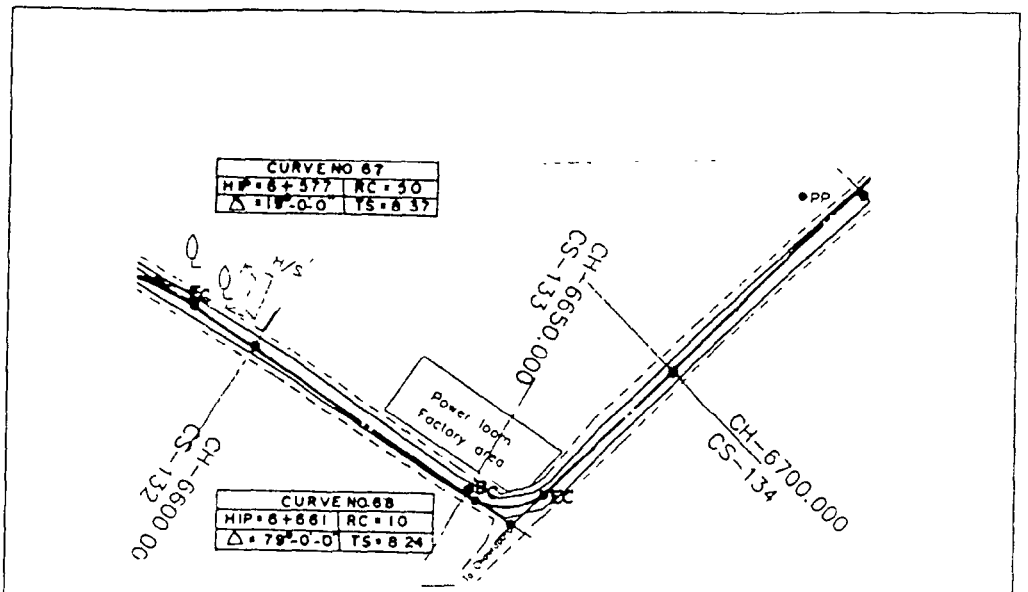
As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental problems There are many roadside ponds where the road needs widening opposite of the pond Also at a location road realignment may need to do to save a power loom factory A further investigation is suggested here

With this recommendation the road can be implemented under 1st year program of RTIP



Sketch 1 Road has one sharp turn along with a power loom factory and a village road meeting with the turning point, possesses a potential risk associated with road accidents. Both sides widening of the road will affect the industry also

Environmental Analyses Reports of 1st Year FRB Sub-projects of Narshingdi District

Environmental Analyses Report---Madhobdi - Kharia Road, Narshingdi

1.0 INTRODUCTION

1.1 Sub-project Description

Madhabdi –Kharia Road starts from Madhabdi and ends at Kharia. The total length, average width, height and batter slope are 5 95 km, 3 5m, 1 18m and 1.1 respectively. The RL (Reduced Level) of the road is 6 837m and the HFL (High Flood Level) is 7.1m 3.469 km of it goes through agriculture lands and the rest 2.55 km through non-agricultural lands. It is zigzag in alignment with 18 nos. of sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 523; 79 34% of it are non-motorized

The road is totally HBB Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and floodplain The road has gone totally through flood plain area

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

River flood occurs in the area owing to the natural depressions RL of the road is 6 8 while HFL is 7 1m This makes the road of its 4 8 km gone under water during HFL

Total road has gone perpendicularly to the drainage line/flood flow But no location of the road receives any drainage congestion/waterlogging due to local rainfall or floodwater

The road has a total 32 numbers of cross drainage structures with a total opening 46 11m The proposed improvement of the road includes an additional opening of 4.15m

2.3 Wetlands

A total of 6 ponds and 50 ditches are along the road at an average distance of 3m Ponds are used for pisciculture Average embankment height at the pond locations is 5 50m

2.4 Erosion and Siltation — No part of the road receives any severe erosion, except rain-cut elsewhere, due to sandy silt soil and poor compaction and grass coverage

2.5 Navigation and Boat Communication — The road does not cross any channel/river.

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road

2.6.2 Avenue trees/bushes — About 2700 number of trees, of average age 7 years, are on the road shoulders and batter slope Few bashes are also on the shoulders and batter slopes

2.7 Borrow Areas — Some irregular shaped borrow areas of average size (10mx4mx0 6m), at an average distance of 0 5m from embankment toe, are there. These are used for pisiculture.

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand — Potential source of sands are 20km away from the road

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet)

2.9 Brickfields — There is no roadside brick-fields along this road Brick-fields are located at a distance of 6km from the road.
Low-productive agricultural lands are used as brickfields Brick-fields are left for rehabilitation through natural process of flooding which usually takes 4-5 years to be used as agriculture lands.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
	0+070				3	R		Displace

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
	0+070				3	R		Displace
Tube wells	0+198				2 5	B		Displace
	2+812				3	R		Displace
Storm water drainage/ Irrigation channel	none							
Ponds	none							

4.3 Analyses of Environmental Hotspots

The road does not have any environmental hot spot along the road

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats						•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment		•		•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation	•				•						•		•	KI
	Water pollution				•							•		•	
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands						•	•				•		•	KI
	Top soil		•			•		•				•		•	
	Firewood				•			•			•		•		
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
	Flood control and drainage				•							•		•	
	Regional hydrology and flooding		•			•						•		•	KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Erosion and siltation		•		•							•		•	KI
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities		•				•				•				KI
	Land ownership		•			•						•			KI
	Landuse		•			•						•			KI
	Landscape	•					•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table: Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The re is no important suggestion come from community consultations.

4.6 Analyses of Alternatives

At many locations of the road there are many roadside settlement and textile industries Widening of this road to desirable width will do the displacement of these roadside industries On the other hand bypass will involve huge cost and land acquisition Therefore doing limited / widening is the preferable one

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9029

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road may be under taken under 1st year program of RTIP with incorporation of the suggestion as referred under "Analysis of Alternatives "

Environmental Analyses Report---Shibpur-Jallara bazar- Balaboo Road, Shibpur, Narshingdi

1.0 INTRODUCTION

1.1 Sub-project Description

Shibpur-Jallara bazar – Balaboo Road starts from Shibpur and ends at Belaboo. The total length, average width, height and batter slope are 13 188 km, 3.6-5.7m, 0 8m and 2 3 respectively The RL (Reduced Level) of the road is 10.0m and the HFL (High Flood Level) is 6 93m Total length of the road goes through agriculture lands. It is relatively straight in alignment, but 6number of sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 706, 74% of it are non-motorized

Some portion of the road is BC, other portion is earthen and WBM. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is rolling and upland The road has gone through agricultural land totally Of the total length, the first 6km is wet land and rest is flood free upland

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

River flooding occurs in the low-lying flood plain RL of the road is 10m While HFL is 6 932m This indicates that the road never goes under water during high flood

Major part of the road cut the drainage line The remaining parts (5+875 - 6+ 375km, 8+500-8+750km, 9+625-9+975km) are parallel to the drainage line

The road has a total 35 numbers of cross drainage structures with a total opening 132 26m The proposed improvement of the road includes an additional opening of 21 27m

2.3 Wetlands

Fast 6 km of the road goes through the flood plain that is flooded annually There are two natural wet lands One is 100m away from the road embankment that support fisheries and irrigation The road has isolated an area of 2000 acres fish habitats

2.4 Erosion and Siltation

The soil is clayey, except at ch-4+800km, bridge approach, the road in general does not have any erosion from flooding but rain cut at some locations. Erosion at bridge approach appears to occur from flow opening constriction that increases the flow velocity or turbulence near the bridge location.

2.5 Navigation and Boat Communication

The road does not cross any river/channel that is used for boat passage

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

About 1800 number of trees (location 2+ 500 - 4+200), of average age 1 year, are 3 3m away from the centerline of the road Few bushes and grass turfing over some parts of the embankment are there.

2.7 Borrow Areas

Some irregular shaped borrow areas of average size (20mx2mx2m) are adjacent to the road embankment These are not covered with water hyacinth These borrow areas can be converted into ponds for pisciculture

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after use.
Potential source of soil can be road side agricultural land

2.8.2 Sand

Potential sources of sand are 20 km away from the road

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.

2.9 Brickfields

There is no roadside brick-field along this road Brickfields are located 11 00km away from the road

Low-productive agricultural lands are used as brickfields Brick-fields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

There is no roadside water body (pond/canals) to be affected by the sub-project improvement

4.3 Analyses of Environmental Hotspots

Table: Analyses of environmental hot spots

Location in Chainage (m)	Issue Description	Recommended options	Preferred option with rationales
10+540 (Sketch 1)	School building on right side of the road	(1) Do widening towards opposite side of the building (2) Do no widening	Option (1) is preferable, because it allows widening as well as saves the school building from breaking

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•			•		•	KI
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats						•				•		•	
	Fisheries				•						•		•	
	Forest				•						•		•	
	Vegetation		•		•						•	•		
	Slope stability of embankment				•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape		•		•						•	•		
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation		•			•					•		•	
	Water pollution		•		•						•		•	
	Dust nuisance		•				•				•		•	
Bricks and aggregates	Agricultural lands	•					•	•			•		•	KI
	Top soil					•		•			•		•	
	Firewood				•			•		•		•		
	Human health		•		•						•		•	
Rehabilitation of structure	Erosion				•						•			
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding					•					•		•	
	Erosion and siltation			•	•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Land ownership		•			•						•			
	Landuse		•			•						•			
	Landscape		•				•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table: Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

No recommendation on any issue has come from community consultations

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 19677.

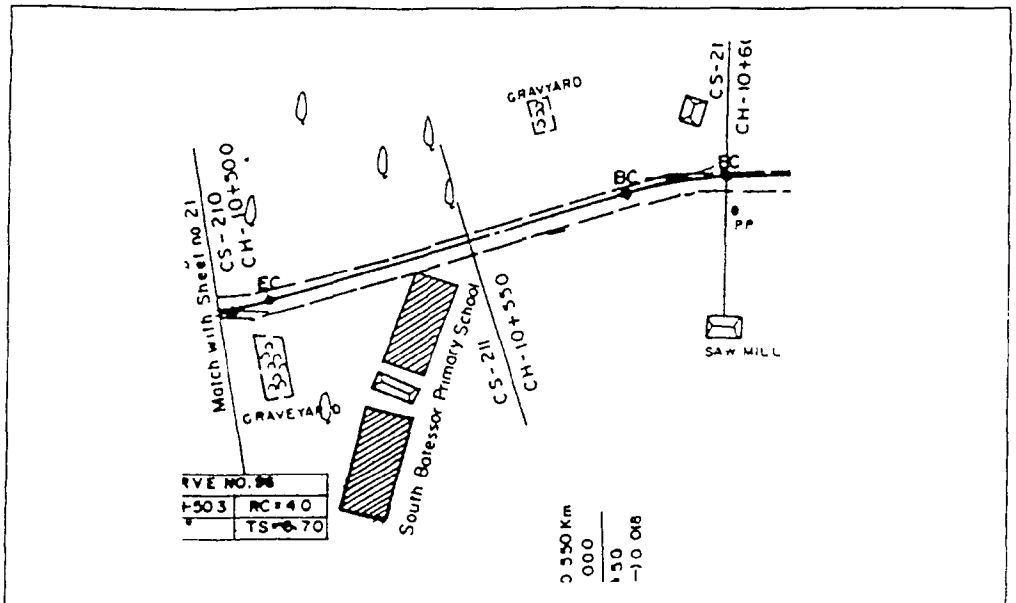
As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major problems/issue from road improvement

The road can be implemented under 1st year program of RTIP, with integration of the recommendation/suggestion mentioned above



Sketch 1 Road needs widening towards opposite side of the school building to save it from being demolished from road improvement

Environmental Analyses Reports of 1st Year FRB Sub-projects of Natore District

Environmental Analyses Report---Chowgram - Kaliganj GC Road, Singra, Natore

1.0 INTRODUCTION

1.1 Sub-project Description

Chowgram - Kaligonj Road starts from Chowgram and ends at Kaligonj The total length, average width, height and batter slope are 7 69 km, 5 8m, 2m and 1·0 5- 1 1 respectively. The RL (Reduced Level) of the road is 12 6m and the HFL (High Flood Level) is 12 3 Km No part of the road falls below HFL More than 90% of it goes through agriculture lands

The road is fully operational 7 months of a year and has an average daily traffic of 800-1000, 80% of it are non-motorized

Except first 100 m, the road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are:

1. To identify the key environmental issues in the sub-projects.
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and floodplain The road itself is flat During monsoon the low lying area is flooded and during dry season the area is cultivated for paddy A substantial part of the road contains borrow pits/ drainage canal along the roadside

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area gets flooded annually from river flooding During monsoon , except the road all surrounding areas go under water Highest flood level (HFL) is 12 3m while RL is 12 6m

Along the roadside, no area receives any drainage congestion and waterlogging

The road has a total 5 numbers of cross drainage structures with a total opening 39 9m The proposed improvement of the road includes no additional opening

2.3 Wetlands

The area is very low lying and get flooded annually, water remains there for 6 months This area falls under Chalanbeel , once upon a time was very famous for wetland resources such as fisheries , aquatic birds etc

Still this low-lying area is famous for open water fisheries in the region

2.4 Erosion and Siltation

The soil is clayey – silt and rain cut to the road slope even due to heavy rainfall does not occur During monsoon many parts of the road get substantial damage due to wave action from annual floodwater

2.5 Navigation and Boat Communication

During monsoon a large number of boats use the roadside canal for communication with many villages 5-6 km of the road interferes the boat communication Any bridge/ large structure needs a navigation clearance of at least 1 5m above HFL.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

There is a good grass turfing (a special type of large grass, locally called binna on the slopes About 2200 number of roadside trees of average age 3-7 years are at a distance 3 6-4 2m from the centerline

2.7 Borrow Areas

A large number of continuous borrow pits adjacent to the road (size 2000-6000m^2) are there During flood season they get fully flooded and work as canal while during dry season they become fully dried

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after use Potential source of soil may be the roadside borrow lands, as is the usual practice

2.8.2 Sand

Potential source of sands for use in road construction could be the nearest river bed/ sandbars, suca as Padma, Bangali river

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There are no roadside brickfields along this road A number of brickfields with good road accessibility are 10-15 km away from the road

Low-productive agricultural lands are used as brickfields Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	8+040	30			3 0	R		A
	8+070	15			3 75	R		A
	8+085	60			2 5	R		A
	8+145	50			2 5	R		A
	8+630	50			4	L		A
	8+690	60			4 0	R		A
	11+415	30			5	L		A
	11+450	20			5	L		A
	11+540	55+20			4 0	L+R		B
	11+600	45			3 5	L		A
	13+060	20			3 0	L		A
	13+235	40			4 0	R		A
	13+730	25			4 0	R		A
	13+770	40			5 0	L		A
	14+015	40			4 5	L		A
	14+025	20			4 5	L		A
	14+160	75			4 5	R		A
	14+215	20			3	L		B
	15+535	45			3 0	R		A

Note
* Data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent			Mitigability	Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds	•			•			•				•		•	KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
raising	Natural wetlands/fish habitats		•				•				•		•	KI
	Fisheries		•		•						•		•	KI
	Forest				•						•		•	
	Vegetation		•		•						•	•		
	Slope stability of embankment	•			•						•		•	KI
	Natural Drainage				•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication	•			•						•	•		KI
	Landscape		•		•						•	•		
Earth work	Loss of topsoil	•				•		•			•		•	KI
	Erosion and siltation	•		•		•					•		•	
	Water pollution		•		•						•		•	KI
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil					•		•			•		•	
	Firewood				•			•		•		•		
	Human health				•						•		•	
Rehabilitation of structure	Erosion				•						•		•	
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage				•						•		•	
	Regional hydrology and flooding					•					•		•	
	Erosion and siltation				•						•		•	KI
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities		•				•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape		•				•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts	
2 Any moderate impact which has long term effect	
3 Any moderate impact which has short term effect but only partially mitigable	
4 Any minor impact which has cumulative effect and is only partially mitigable	

Table: Key issues, potential impacts and their mitigation/preventive measures

Activities/Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Natural wetlands/fish habitats		• Reduction in breeding, nursery and feeding ground in flood plain	• Minimize land-take of wetland by providing steep slopes • Do widening to the opposite side of the wetlands
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
Impacts of environment on road	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch 9+200 Drainage congestion and water logging	Box-culvert suggested	Considered	
Ch 1+550-1+565, Storm water drainage problem	Side drains of road suggested	Considered	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 11921.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

This road has a long drainage canal almost all along the roadside Although the drainage canal would not be affected directly from road improvement but it has the impact on road in terms of wave actions Therefore a special care for slope protection of road embankment is required along this roadside canal With the incorporation of this suggestion, the road can be implemented under 1st year program of RTIP.

Plate 1 Road, at a large pond location, protected against slope failure with standard RCC palasetting of LGED

Plate 2 Road protected with a gunny bag rip-rap from slope failure at a canal location

Plate 3 View of roadside long canal running at an angle, used for boat communication between different villages and the road, during monsoon

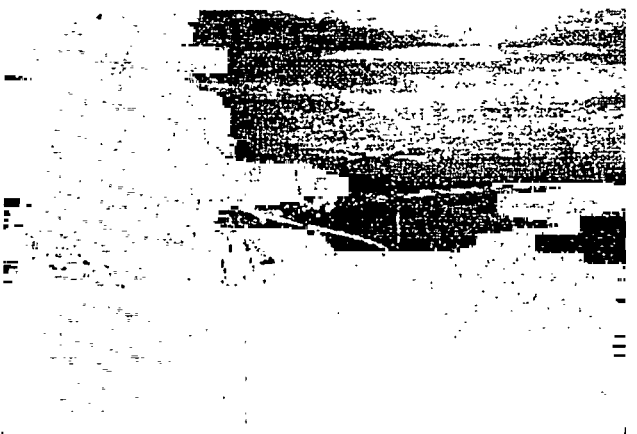


Plate 5 Roadside long canal running parallel to the road and used for boat communication and as drainage channel

Environmental Analyses Report---Dorabpur R&H-Laxmipur GC, Natore Sadar, Natore

1.0 INTRODUCTION

1.1 Sub-project Description

Dorabpur R&H-Laxmipur GC Road starts from Dorabpur and ends at Laxmipur. The total length, average width, height and batter slope are 7.36 km, 5 6m, 1-1.5m and 1.0 5-1.1 respectively. No part of the road falls below HFL The road generally goes through the agricultural land. It is relatively straight.

The road is fully operational throughout a year and has an average daily traffic of 700; 82% of it are non-motorized. It connects several roadside villages with a GCM and RHD road.

The road is fully earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

Although the area is flood plain but it is high land and free from annual river flooding Roadside land use includes agriculture mainly Some homesteads (rural villages) also are at some locations of the road.

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is flood free, even not flooded in recent high floods (1995 &1998) Along the road side there is no drainage channel but some 13 ponds There is also no perpendicular drainage line cut by the road

Along the roadside there is no drainage congestion and waterlogging even due to local heavy rainfall

The road has a total 7 numbers of cross drainage structures with a total opening 6 90m The proposed improvement of the road includes an additional opening of 0.50m

2.3 Wetlands

The area has no wet land except the roadside ponds

2.4 Erosion and Siltation Due to being free from external river flooding and clayey soil the area does not have any erosion and siltation problem There is no rain-cut along the road

2.5 Navigation and Boat Communication There is no canal/river crossed by the road

2.6 Vegetation

2.6.1 Forest The road does not go through any forest area

2.6.2 Avenue trees/bushes A large number of avenue trees (7-10 years) are within 2 8-3 8 m from the C/L of the road embankment. Also a good number of bushes are there along with good grass turfing over road slopes

2.7 Borrow Areas Some irregular borrow areas in the form of ponds and ditches are along the roadside. They are almost adjacent to the embankment toe

2.8 Construction Materials

2.8.1 Soil As is the usual practice, potential source of soil may be from the roadside barren lands

2.8.2 Sand Potential sources of sand are the Padma River, which is located at a distance of 40-50 km from the road.

Manual dredging is usually done for collection of sands from the Padma River

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There is no roadside brickfield along the road Potential location of brickfields is 3-5 km away from the road and they have good road accessibility Coal and firewood are used in the brickfields

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following table show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be affected.

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+070	25			6.0	L		A
	1+802	14			3 0	L		A
	2+046	34			00	R		A
	2+277	25			4.0	R		A
	2+450	15			3 0	R		A
	3+125	20			2 0	R		A
	3+395	30			3 0	R		A
	3+590	15			5 0	L		A
	3+705	25			3.0	R		A
	4+145	25			2 0	L		A
	4+695	15			4 0	R		A
	4+860	25			4 0	L		A
	5+084	26			2 0	R		A

Note
* Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

No environmental hotspot along the roadside has been found

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds		•		•			•				•		•	KI
	Natural wetlands/fish habitats						•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil			•		•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands			•			•	•				•		•	KI
	Top soil	•				•		•				•		•	KI
	Firewood	•			•			•			•		•		KI
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding					•						•		•	
	Erosion and siltation				•							•		•	
	Pavement drains				•							•	•		KI
Induced Impacts from road improvement	Road transportation	•					•				•				
	Commercial and service facilities		•				•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape	•					•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Landscape		• Landscape disfiguration by irregular borrow pits deep cuts, fills	• Do one side widening and/or replant disfigured surfaces

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Impacts of environment on road	Pavement drains		• Reduction in the durability of the pavement	• Provide side-drains and cross-falls on embankment slopes
Induced Impacts from road improvement	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch 3+400 Damage to road at pond location	Earth retaining structure along the pond suggested	Considered for the best solution	

4.6 Analyses of Alternatives

This road has no major problem and therefore no alternative regarding realignment or bypass has been suggested

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 8550

As per Annexure-A tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major problem/issue except that there are large number of roadside ponds while widening towards the pond would result in pond loss and the road embankment may get damaged at the locations Road should get widened to opposite side of the pond locations. With incorporation of this suggestion/recommendation, this road may be undertaken for implementation under first year program of RTIP

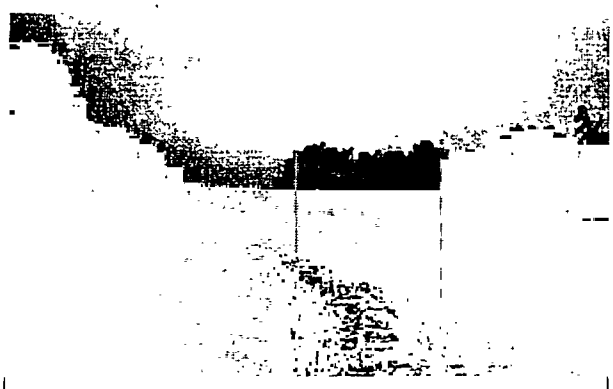


Plate 1 Roadside special type of toll grass binna' effective for slope protection especially for embankment at the waterbodies (ponds/canals/rivers)

Plate 2 Road meeting with RHD road where improvement of the road would require displacement of roadside shops

Environmental Analyses Report---Gurudaspur – Dharabarisha Road, Gurudaspur, Natore

1.0 INTRODUCTION

1.1 Sub-project Description

Guruduspur– Dharabarisha Road starts from Gurudaspur and ends at Dharabarisha The total length, average width, height and batter slope are 6 75 km, 5 8-7.5m, 1-2m and 1·05-1·1 respectively The RL (Reduced Level) of the road is 12 5m and the HFL (High Flood Level) is 12.3m It is zigzag in alignment.

The road is fully operational 9 to 10 months in a year and has an average daily traffic of 1500, 90% of it are non-motorized.

The road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and floodplain The road complete goes on the flood plain On the roadsides There are homesteads, ponds/ditches/canals

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is free from external river flooding, but due to local rainfall the low-lying areas get flooded during monsoon Some parts of the road have drainage congestion and water logging problem, which are due to inadequate drainage structure To local people this is not of much concern, as they are belittled from pisciculture of the waterlogged low lying areas

The road has a total of 5 cross drainage structures with a total opening of 11m No additional opening for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

A total of 35 ponds are along the roadsides that are used for pisciculture, bathing and washing mainly Besides at the end of the road there is a high depressed area (beel) which is very resourceful for open water fisheries including Kai, Magur Shing Bain, Boal, Puti, Pabda (local name)

2.4 Erosion and

The area in general does not receive any noticeable erosion and siltation

Siltation	The road does not get any significant slope erosion, but erosion to slopes at the pond location is observed. This is due to the lack of good grass turfing and as people use that locations as ghat
2.5 Navigation and Boat Communication	The road does not cross any channel/river that is used for boat communication
2.6 Vegetation	
2.6.1 Forest	No forest area is along any part of the road.
2.6.2 Avenue trees/bushes	About 4050 number of trees of average age 4 years are on the shoulders and slopes of the embankment with an average distance of 3 0m from the C/L of the road embankment. Few bushes and grass turfing over some parts of the embankment are there
2.7 Borrow Areas	Some irregular borrow areas of average size 2000m^2 and avg depth 2 5m are adjacent to the road embankment Some of there are used as pisciculture and some are left with no use and covered with water hyacinth Water hyacinth in this area is used for production of green manure for agriculture use, and also for cow feeding and direct application to the potato fields.
2.8 Construction Materials	
2.8.1 Soil	Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after collection of soils Potential source of soil collection for this road would be the road side low productive/barren land
2.8.2 Sand	Nandakuza river, 4 km away from the road, is the potential source of sand Sands are collected through manual dredging and transported to the site by road transport
2.8.3 Aggregates	Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing of stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India
2.9 Brickfields	There is a brickfield 0 5km down from the starting point of the road Low-productive agricultural lands are used as brickfields Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years for rehabilitation

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+600	35			4 5	R		A
	0+950	35			2 0	R		C(H)
	1+000	60			3 5	R		A
	1+050	45			4.0	R		A
	1+200	35			4 0	R		A
	1+250	45			4 0	R		A
	1+350	55			5 5	R		A
	1+500	50			4 0	R		A
	1+600	40			4 0	R		A
	1+650	45			3 0	R		A
	1+700	25			1 5	R		A
	1+800	35			4 0	R		A
	1+950	35			3 0	R		A
	2+300	18			2 0	L		A
	2+650	75			5 0	L		A
	3+625	32			3 5	R		A
	3+800	50			4 5	L		A
	3+850	65			4 0	R		A
	3+950	40			3 5	L		A
	4+550	35			4 5	R		A
	4+600	70			3 0	L		A
	4+650	25			2 5	L+R		A
	4+700	55			5 0	L		A
	5+100	40			3 0	L		D
	5+150	55			4 0	L		C (H)
	5+200	40			3 5	L		A
	5+250	55			3 5	L		A
	5+500	70			3 5	L		A
	5+600	35			4 4	L		A
	5+650	85			4 0	L		A
	5+750	50			4 5	L		A
	6+000	45			2 5	L		A
	6+340	25			2 5	L		-
	6+750	80			3 5	L		C (H)
	6+850	15			3 0	L		A

Note

*data to be collected

A widening opposite side of the pond without affecting the pond

B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

C widening embankment towards opposite of the pond in consultation with property owners going to be affected

D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options	Preferred option
0+915 (Sketch 1)	One side pond and the other side semi-permanent structure	(1) Widening opposite side of the pond (2) Filling the pond up to the requirement.	(2) because it is economic and provides road sustenance as well
5+150	One side pond and the other side rice mill	(1) Widening opposite side of the pond (2) Filling the pond up to the requirement.	(2) because it is economic and provides embankment sustenance

4.4 Key issues, Potential Impacts and Mitigation

The following tables presents the identification of the key issues as well as the potential impacts of the road improvement on these key issues and the corresponding mitigation measures

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long Term	Short Term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds	•			•							•		•	KI
	Natural wetlands/fish habitats		•				•					•		•	KI
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape		•		•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation		•			•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands			•			•	•				•		•	
	Top soil			•		•		•				•		•	
	Firewood		•		•			•			•		•		KI
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment	Flood control and drainage				•							•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
environment on road	Regional hydrology and flooding		•			•						•		•	KI
	Erosion and siltation		•		•							•		•	KI
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities		•				•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Natural wetlands/fish habitats		• Reduction in breeding, nursery and feeding ground in flood plain	• Minimize land-take of wetland by providing steep slopes • Do widening to the opposite side of the wetlands
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
	Erosion and siltation		• Causes damage to road and embankment • Affects stability of road	• Do strong erosion protective measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Slope instability of road embankment at the pond/ditch side	Provide earth retaining structure/Pallasetting	Yes, after detailed investigation (location, extent, etc)	

4.6 Analyses of Alternatives

This road has no major problem and therefore no alternative regarding realignment or bypass has been suggested

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 8550

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

There are a large number of roadside ponds, which need special attention while doing the road improvement Road widening into these ponds will do pond-loss as well as instability of the road embankment Widening to the opposite side of these ponds along with good compaction and plantation of erosion protective local grass (Binna) will stabilize the embankment at the pond sides This type of mitigation measures is also cost effective compared to the construction of earth retaining structures to minimize the pond-loss as well as to do stabilization of road embankment With the integration of this suggestion with the design, the road can be implemented under 1st year program of RTIP

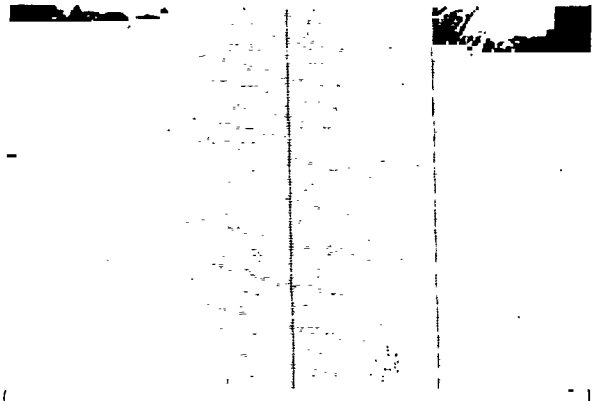


Plate 1 Roadside long pond covered with water hyacinth and grass 'binna' for slope protection of embankment

Plate 2 Roadside pond used for pisciculture and bathing and washing

Plate 3 Roadside long pond used for pisciculture

Plate 4 View of long wetland adjacent to the road

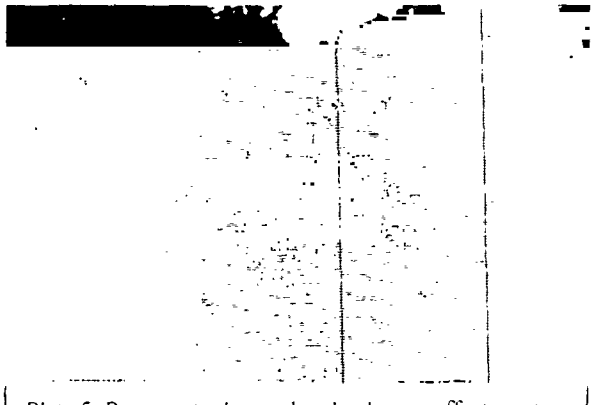


Plate 5 Rain-cut to the road embankment affecting its stability

Environmental Analyses Reports of 1st Year FRB Sub-projects of Chapai Nawabganj District

Environmental Analyses Report---Bongpur-Dobar Morh Road, Gomostapur, Nawabganj

1.0 INTRODUCTION

1.1 Sub-project Description

Bongpur-Dobar Morh Road starts from Bongpurl and ends at Dobar Mohr of Gomostapur. The total length, average width, height and batter slope are 7.255 km, 6.5m, 1 9m and 1:1.75 respectively 1 Km of the road goes under water. 4.725 km of it goes through agriculture lands and the remaining 2 5 km through non-agricultural lands.

The road is fully operational throughout a year.

2 2 km of the road is BC and the rest is earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are.

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is, in general, flood plain. 1 km of the road lies on the low-lying area and the remaining on relatively high flood plain. 4 725 km of the road goes through agriculture lands and the remaining 2 5 km through non-agricultural lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area gets annual flooding from local rainfall as well as from over back spillage of the river 1 km of the road gets annually inundated due to low RL

There is no drainage canal perpendicularly cut by the road Along the road there are some ponds/wet lands

The road has a total of 11 cross drainage structures with a total opening of 33m. No additional opening for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

There are 4 natural and 14 artificial wetlands (ponds) along the roadside They are used for pisciculture, bathing and washing only

2.4 Erosion and Siltation

The area does not have erosion and siltation problem, although it gets annually flooded The soil is highly clayey in nature, which may be one of the main reasons why erosion does not occur

2.5 Navigation and Boat Communication The road does not cross any canal/river. It also does not provide any obstruction to the boat movement over low-lying flooded area.

2.6 Vegetation

2.6.1 Forest No forest area.

2.6.2 Avenue trees/bushes There are extensive tree coverage along the road side The trees are, on average, 10 years old and 4.5 m away from the C/L of the road embankment. These were planted in 1992 by Barendra Bohumukhi Unnayan Kartipakha.

2.7 Borrow Areas There is no road side borrow pit

2.8 Construction Materials

2.8.1 Soil Potential source of soil to be used in road may locate at high land.

2.8.2 Sand Potential source of sand is the Mohananda River Char (Mokarrompur), which is 6 km away from the road

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields Potential brick-fields with good approach road are located 6 km away from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+103	53			20	L		A

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
	0+240	40			5.0	R		A
	0+310	30			3.0	R		A
	2+950	125			4 0	L		A

Note
* data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•	•			•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation				•							•	•		
	Slope stability of embankment				•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape			•	•							•	•		
Earth work	Loss of topsoil		•			•		•				•		•	
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance		•				•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil			•		•		•				•		•	KI
	Firewood		•		•			•			•		•		KI
	Human health		•		•			•				•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities		•				•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•				•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2. Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
Induced Impacts from road improvement	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch 3+500-4+500. Road gets damaged due to flood.	Protection measures for the road embankment slopes	Considered	

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
	are suggested.		
Ch 2+300: there is a sharp turn at this location and has the potentiality of road accident. (Sketch 1)	The harp tun to be relatively straightened.	Considered.	
Ch. 1+050 A pond is adjacent to the road, at the same location a rural road meets with this road During rainy season water from the pond gets over-bank spillage and causes damage to the rural road (Sketch 2)	A culvert is suggested on the rural road at this location	Considered	
Ch.5+300-5+335: A large size pond is adjacent to the road and causes damage to road.	Slope protection work to road embankment is suggested.	Considered.	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option
Realignment	Ch 5+300-5+440	A large pond on the left side does damage to the road	(1) Do widening both sides (2) Do slope protection work on the pond side without filling the pond and do widening to the other side	Option (2) is preferable, because it protects the road from damage as well as allows widening No loss of pond also This option is costlier than the option (1)

5 TREE PLANTATION

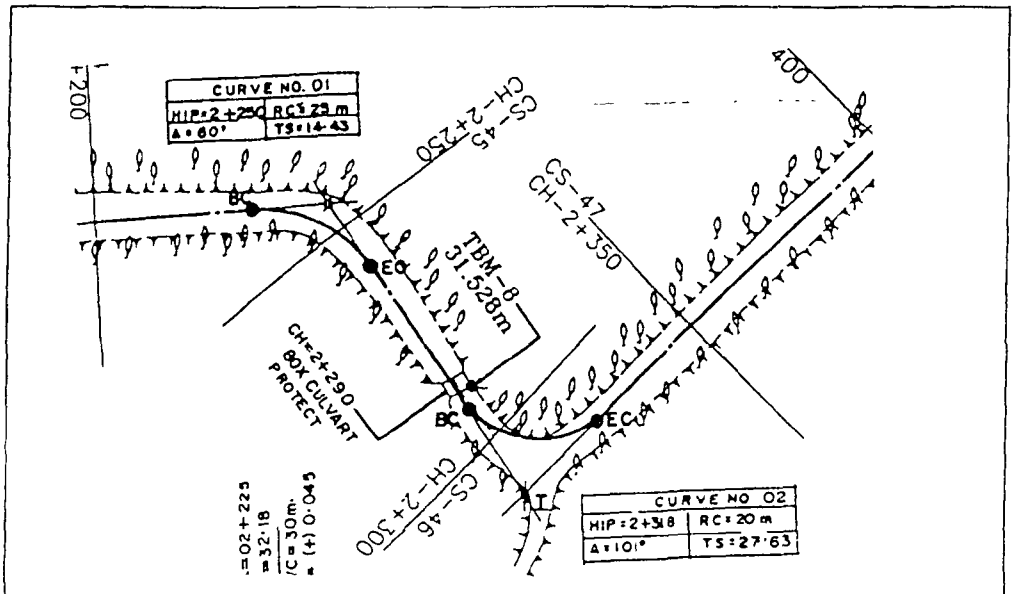
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9029

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

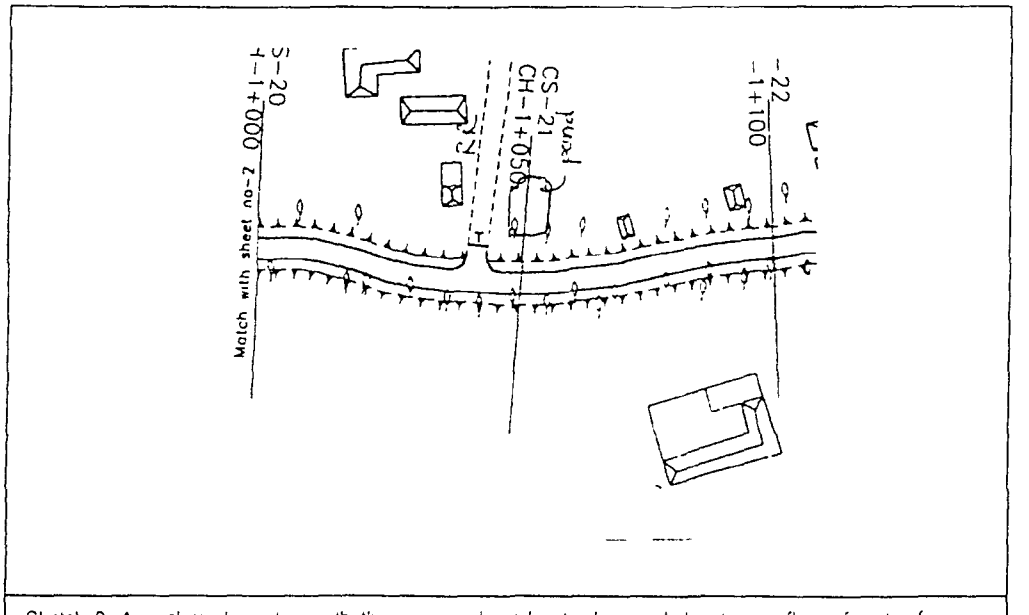
For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road does not have major environmental implications from its improvement At few locations there are some existing problems which need attention in the design for the overall improvement of the road performance after its improvement. With incorporation of these issues in the design the road can be undertaken for implementation under 1st year program of the RTIP



Sketch 1 Road with a sharp turn has the potential risk associated with road accidents Road requires being straight at this location



Sketch 2 A rural road meeting with the proposed road gets damaged due to overflow of water from an adjacent pond A culvert on rural road would solve the problem

Environmental Analyses Report---Kansarghat - Khaser Hat Road, Shibganj, Chapainawabgonj.

1.0 INTRODUCTION

1.1 Sub-project Description

Kansarghat - Khaser Hat Road starts from Kansarghat and ends at Khaser Hat The total length, average width, height and batter slope are 8.56 km, 5 9m, 1.2m and 1:1 respectively The RL (Reduced Level) of the road is 22.83 m and the HFL (High Flood Level) is 24.09 m. 4 3 km of it goes through agriculture lands and the rest 4.26 km through residential areas.

The road is fully operational 9 months of a year and has an average daily traffic of 1500; 45% of it are non-motorized.

4.5 km road is BC, 500m road is HBB and the rest of the road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are·

1. To identify the key environmental issues in the sub-projects;
2 To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD). Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and floodplain First 200m go through the agricultural lands and majority of the rest goes through mango gardens Chapai Nawabgonj is famous for mangoes in Bangladesh and it supplies mangoes all over Bangladesh

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is low lying flood plain and gets flooded annually, specially the very low-lying depressed areas Total length of the road goes under water in the high flooding situation (HFL) such as in 1998 flood.

Very low-lying areas around the residential areas (1 km along the road) inundated during monsoon for 3-4 months

The road has a total 12 numbers of cross drainage structures with a total opening 169 1m The proposed improvement of the road includes an additional opening of 19.2m

2.3 Wetlands

Except the low-lying lands, there are no roadside ponds / wetlands in the sub project area

2.4 Erosion and

Due to high clayey –silt soil of embankment and good grass turfing over

Siltation batter slopes, the road embankment does not have any significant rain-cut /erosion.

2.5 Navigation and Boat Communication The road has crossed a river (ch. 0+270 – 0+725) A large bridge (150m long) is under construction from other project. An adequate navigation clearance for boat passage is required for this bridge.

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road.

2.6.2 Avenue trees/bushes About 856 number of homestead trees of average 10 years old is along the road embankment. Grass turfing over some parts of the embankment are there

2.7 Borrow Areas There is no roadside borrow-area along this road. It might have been that while the road embankment was constructed the soils were collected from high land.

2.8 Construction Materials

2.8.1 Soil Soils are usually collected from roadside low-productive agriculture lands in the project area.

2.8.2 Sand Potential sources of sands to be used in road construction are Mohananda and Padma rivers, which are 15 km and 18 km respectively away from the road Manual dredging is done for sand collection

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.

2.9 Brickfields A brick field is located at a distance of 70m from the road Bricks for use in the road construction can be supplied from this brick field

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential Impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	2+025	100			3 5	L		A
Ponds	None							

Note
* Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment			•	•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•				•			•	•		
	Navigation and boat communication	•			•				•			•	•		KI
	Landscape			•	•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands			•			•	•				•		•	
	Top soil	•				•		•				•		•	KI
	Firewood	•			•			•			•		•		KI
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion	•			•							•		•	KI
	Boat communication	•			•							•	•		KI

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Impacts of environment on road	Flood control and drainage			•	•						•		•	
	Regional hydrology and flooding		•			•					•		•	
	Erosion and siltation		•		•						•		•	
	Pavement drains			•	•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities		•				•			•				
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table: Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Erosion		• Increases the turbidity of water	• Provide erosion measures
Rehabilitation of structure	Boat communication		• Temporal disruption in l boat communication	• Keep opening for the boat passage
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch. 0+429-715: A 150 m long bridge is under construction at this location. A gap of 300 m will be there after bridge construction.	A remaining 150m gap must be filled up.	Would be undertaken if this gap is not filled up in the form of approach road from that project.	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 12843.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The project has no major problems/issue except that the road gets inundated during high flood (1998) Under the RTIP road improvement in terms of raising and widening will be done. The road can be under taken for implementation under 1st year program of RTIP.

Environmental Analyses Reports of 1st Year FRB Sub-projects of Pabna District

Environmental Analyses Report---Dubila-Sreekol -Ataikula Road, Pabna Sadar, Pabna

1.0 INTRODUCTION

1.1 Sub-project Description

Dubila-Sreehol-Ataikula Road starts from Dubai and ends at Ataikula. The total length, average width, height and batter slope are 10.27 km, 6 31m, 1.57m and 1:1 respectively. The RL (Reduced Level) of the road is 10.43m and the HFL (High Flood Level) is 9.51m. 6.02 km of it goes through flood plain agricultural lands and the rest 4 km through non-agricultural lands. It is zigzag in alignment with 27 nos. of sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 540; 80 37% of it are non-motorized. It connects several roadside villages.

Except first 1 3 km, which is WBM, the road is earthen Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the road adjacent lands affecting the environmental resources thereon.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects;
2 To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD). Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the floodplain of Padma River. This flood plain, once a upon time, was very famous wetland resourced with aquatic birds and fisheries, after the construction of BWDB embankment this wetland has been converted into agricultural lands

Roadside landuse includes agricultural lands, homesteads, ponds, waterbodies etc

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Due to flood protection embankment, the area is free from river flooding But because of local rainfall during monsoon, low-lying areas, internal channel/river all gets flooded

No location along the road embankment receives any drainage congestion and water logging

The road has a total of 16 cross drainage structures with a total opening of 53 5m An additional opening for 1.55m has been proposed in the road improvement.

2.3 Wetlands

A total of 18 ponds are along the roadsides that are used for pisciculture, bathing and washing mainly. As mentioned earlier, the flood plain was once upon a time very resourceful wetlands and harbored various species of aquatic flora and fauna. After the construction of BWDB embankment this wetland has been converted into agricultural lands.

2.4 Erosion and Siltation

The area in general does not receive any prominent erosion and siltation after the BWDB embankment. Because of silty clay even the embankment slope does not have any rain cut during heavy rainfall

2.5 Navigation and Boat Communication

The road at Ch. 3.20 km has crossed a canal where small boats pass under the bridge. As per local community views, a navigation clearance of 1.5 m is suggested here.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road.

2.6.2 Avenue trees/bushes

There are about 1370 number of roadside trees of average age 6 years and girth size 0.6m, at an average distance of 3.55 m from C/L of the embankment Few bushes and grass turfing over some parts of the embankment are there

2.7 Borrow Areas

Some irregular borrow areas of average size (20mx12mx1.5m) are adjacent to the road embankment the borrow areas are covered with water hyacinth and have a potentiality of becoming ponds with initiatives from the project.

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas These borrow areas can be converted into drainage canals with initiatives from the project

2.8.2 Sand

Charlands (Sandbars) of Padma River, 6 5km away from the road, are the potential sources of sands Soils are collected through manual dredging and transported to the site by road transport.

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There is no roadside brickfield along this road

Brickfields are in other areas of the upazilla . Low-productive agricultural lands are used as brickfields Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Environmental Assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table 1: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+070	18			4 0	R		A
	0+110	18			3.5	L		A
	0+350	40			3.0	R		A
	0+775	20			4.0	R		A
	1+650	45			2 5	L		A
	2+500	45			3 0	R		A
	2+550	60			3.0	L		B
	2+650	54			4.5	L		A
	2+950	32			3 5	R		A
	3+200	45			3 0	L		A
	4+200	28			3 5	L		A
	4+230	30			3 5	L		A
	4+550	26			4.5	L		A
	4+600	30			3 5	L		A
	5+300	25			3 5	L		A
	7+050	35			3 0	L		A
	8+775	10			3 5	L		A
	9+350	55			5 0	R		A

Note

* data to be collected

A widening opposite side of the pond without affecting the pond

B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

The following table presents analyses of roadside hotspots of the subproject

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options	Preferred options
CH 0+350	Within 80 m of road length two sharp turns are there A pond on right side at the turning location and also a village road meet with the same point (South-1)	(1) Provide retaining structure at the pond location and replace two curves by one smooth curve. (2) Fill the pond and take alignment over there	Option (1) is preferable because it serves the purpose without pond-loss

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•	•			•		•	KI
	Roadside Ponds		•		•				•			•		•	KI
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage			•	•				•			•	•		
	Storm water drains			•	•							•	•		
	Irrigation canals			•	•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation		•			•						•		•	KI
	Water pollution		•		•							•		•	KI
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil	•				•		•				•		•	KI
	Firewood	•			•			•	•		•		•		KI
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage		•		•							•		•	KI
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		KI
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape		•				•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations.
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates	• Use mask while doing brick/stone crushing
Impacts of environment on road	Flood control and drainage		• Effective flood control keeps road flood damage	
	Pavement drains		• Reduction in the durability of the pavement	• Provide side-drains and cross-falls on embankment slopes
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Chainages: 1225, 7630, 7912, 8840m: Road safety issue from sharp turnings at these locations	The turnings at these locations need to be addressed by smooth curve setting.	Considered	

4.6 Analyses of Alternatives

This road has no major problems that need an attention for realignment or by-pass.

5 TREE PLANTATION

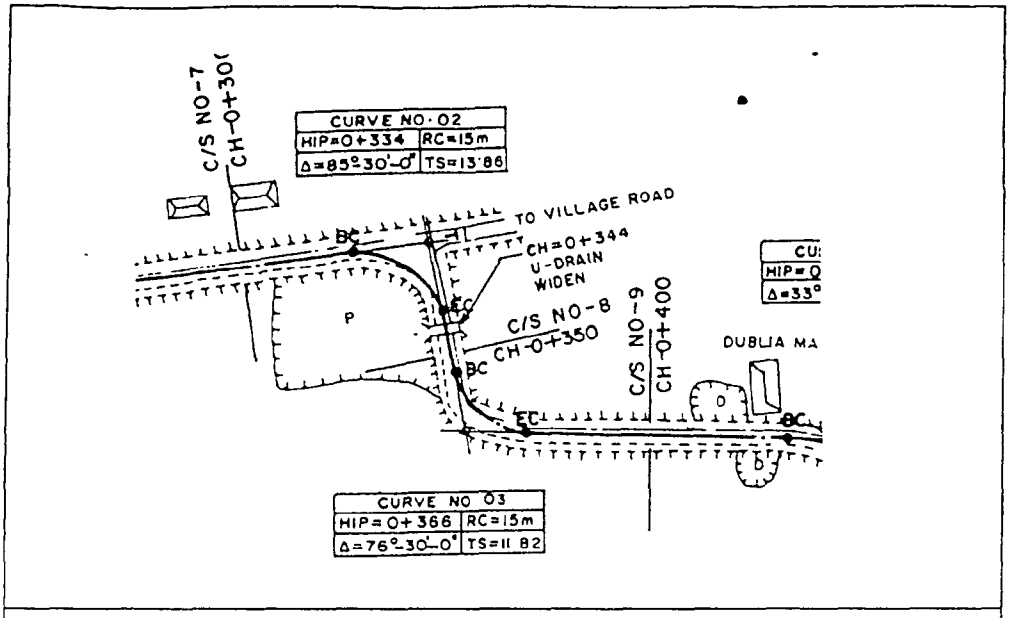
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 8550.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 Conclusions and Recommendations

The road has no major environmental complications from its improvement. From road safety consideration there is an improvement required in the alignment which as been analyzed earlier With integration of this suggestion with the road design, the road can be implemented under the 1st year program of RTIP.



Sketch 1 Road has two sharp turns alongwith a pond and a village road meeting wit it at the turning point, possesses a potential risk associated with road accidents

Plate 1 Roadside vast agricultural land, once this was wetland before BWDB embankment along the Padma

Plate 2 Roadside a large number of trees to come under cutting from road improvement

Plate 3 View of the road along with homestead fruit trees to come under cutting for road improvement

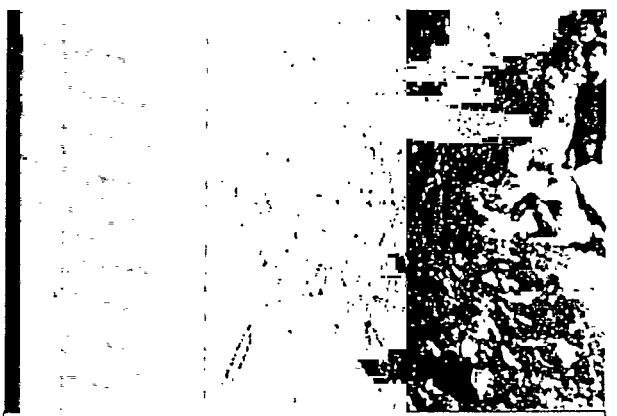


Plate 4 Roadside bushes and jungles ideal habitat of some local wild species will be affected from road widening

Plate 5 View of the narrow section of the road running through a village

Plate 6 Road in wet season being extremely muddy, is not accessible to vehicle

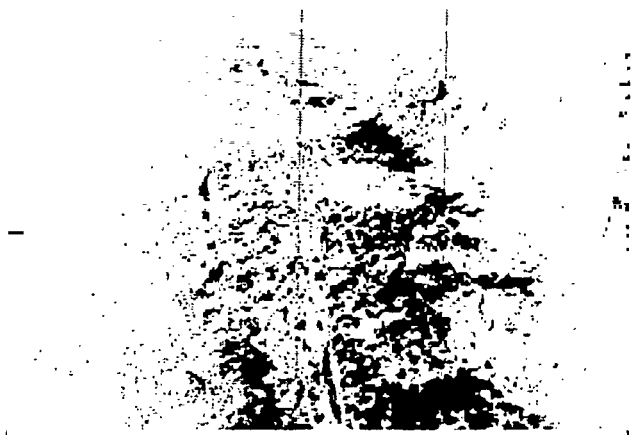


Plate 7 Extensive roadside bushes and trees require clearing for road improvement

Plate 8 Large Banyan tree on the edge of the road people take the advantage of shade and take rest under it

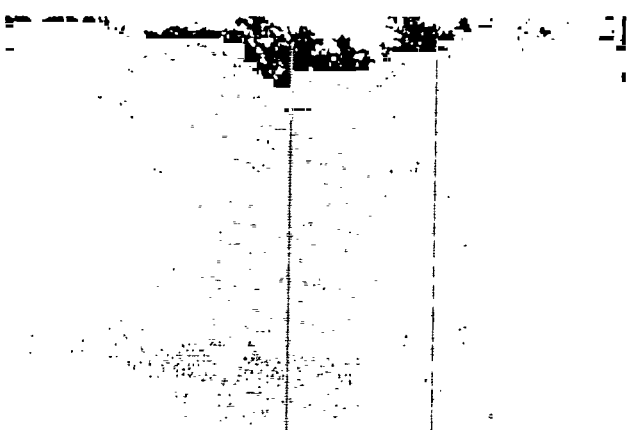


Plate 9 Large roadside pond used for pisciculture bathing and washing, to be affected from road widening

Plate 10 Home stead gooses that use the homestead pond

Plate 11 Road cut to encourage rainwater drainage

Plate 12 Rural destitute women find their living means from earnings from road maintenance under LGED

Environmental Analyses Report---Santhia 24 mile- Azahar Afsar Road, Pabna

1.0 INTRODUCTION

1.1 Sub-project Description

Sathia 24mile-Azahar Afsar Road starts from Santhia Pourashava and ends at National Highway at Azahar The total length, average width, height and batter slope are 10.84 km, 4.5 m, 1.9m and 1:1 respectively. The RL (Reduced Level) of the road is 10.46m and the HFL (High Flood Level) is 10.5 m. 6 5 km of the road goes through agricultural lands and the rest 4.35 km through residential areas. The road is zigzag in alignment with 9 sharp turns

The road is fully operational throughout a year and has an average daily traffic of 2200, 67% of it are non-motorized. It connects several roadside villages and Sathia 24 mile with National Highway at Azahar-Afsar location

Except first 7.1 km, which is BC, the road is earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are.

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and located on the floodplain of Padma Roadside areas are very low-lying agricultural lands flooded during monsoon. General land use includes agriculture on lowlands and homesteads on high lands Some depressions are there and usually used as fish habitats.

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Regional hydrology is governed by the water level of the surrounding river Due to local rainfall during monsoon, low-lying areas, internal channel/river all get flooded, in addition to the river flooding

The roadside areas between ch 6+000-7+300km are reported to receive waterlogging during heavy rains It appears that additional cross-drainage structures are required to relieve this waterlogging

The road has a total of 14 cross drainage structures with a total opening of 89 55m No additional opening for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

A total of 37 ponds and canals are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly. Also natural wetlands in the form of large extent depressions are in the surrounding areas of the road that habitats different types of openwater fisheries (local name Tengra, Puti, Magur, Chingri, Bain, Kai Chanda etc) and aquatic birds (local name Balihash, Pankouri, Bak etc.).

2.4 Erosion and Siltation

No part of the road is reported to receive any erosion because of clay to silty clayey soil. In the roadside areas there is no erosion and siltation.

2.5 Navigation and Boat Communication

At ch. 7+350 km there is a bridge with navigation clearance 2.5 for boat passage under it.

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road.

2.6.2 Avenue trees/bushes

About 1875 number of trees of average age 12 years are along the road embankment. Few bushes and grass turfing over some parts of the embankment are there

2.7 Borrow Areas

Some irregular shaped borrow areas of average size (10mx6mx1 5m) are at a distance of 0 86 m from the toe of the embankment. These have the potentiality to be used as ponds Potential borrow areas may be agricultural lands at a distance of 6.20 m from the road embankment

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after use

2.8.2 Sand

Charlands (Sandbars) of Jamuna River, which are 15km away from the road, are the potential sources of sands Soils are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields

There is no roadside brickfield along this road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table 1: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	5+735	1725			3 0	L		A
	7+800	460			3 0	L		A
	8+490	130			3 0	L		A
	8+820	100			3 0	L		A
	9+065	895			3 0	L		A
Ponds	0+701	10			2 0	L		A
	0+860	15			2.0	L		A
	1+130	20			2 0	R		A
	1+530	10			2 0	L		B
	1+540	7			2.0	R		B
	1+560	10			2.0	L		A
	1+580	15			2.0	R		B
	1+920	20			3 0	L+R		B
	2+010	10			2.0	L		A
	2+510	5			1.5	L		A
	3+245	5			1.5	R		A
	3+270	8			1 5	R		A
	3+330	6			2 0	L		A
	3+390	10			2.0	R		A
	3+445	15			2 0	R		A
	3+510	20			2 0	R		A
	3+560	10			2 0	L		A
	3+880	10			2 0	R		A
	3+995	5			2 0	R		A
	4+520	10			2.0	L		A
	4+770	10			2 0	L		A
	6+890	10			2 0	R		D
	7+550	33			2 0	R		A
	7+650	30			2.0	L		A
	7+825	25			3 5	R		A
	8+025	27			3 0	R		D
	8+250	20			1 5	R		D
	8+550	20			3 0	R		D
	8+700	60			3 0	L		A
	8+950	60			1 0	L		A
	9+100	30			3 0	R		D
	9+250	50			5.0	R		D
	9+400	35			00	R		D
	9+525	13			3 0	R		D
	10+000	8			3 0	L		A
	10+100	35			2 5	L		A
	10+275	15			4 0	L		A

Note
* data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures
C widening embankment towards opposite of the pond in consultation with property owners going to be affected
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds	•			•							•		•	KI
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries		•		•							•		•	KI
	Forest				•							•		•	
	Vegetation			•	•							•	•		
	Slope stability of embankment				•							•		•	KI
	Natural Drainage			•	•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals			•	•							•	•		
	Navigation and boat communication		•		•							•	•		KI
	Landscape			•	•							•	•		
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands		•				•	•				•		•	KI
	Top soil		•			•		•				•		•	KI
	Firewood		•		•			•			•		•		KI
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding		•			•						•		•	KI
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse		•			•						•			KI
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table : Key Issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations.
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication.	• Provide bridge with adequate navigation clearance on over the important routes
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Impacts of environment on road	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Road safety	Speed breaker and traffic sign are suggested at important location	Yes	

Plate 1 Damage to road embankment due to slope failure at a long roadside pond

Plate 2. Roadside long wetland used for pisciculture and irrigation water

Plate 3 Road adjacent market, road at this location requires a measure for smooth flow of vehicular traffic

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option/Remarks
Bypass	Ch. 0+00-1+00 (Sketch 1)	First 1km of the road belongs to the Pourashava Authority. The road is very narrow here. Widening of this part will require displacement of a huge number of roadside houses.	(1) Do displacement of the roadside houses and widen the road. (2) By pass this part by an alternative route (3) Do improvement of the road after this part and provide a bus station at the starting point	Option (3) is preferable over others as it allows the smooth passage of vehicles on the road and eliminates the bottlenecks of road improvement of the first 1 km.

5 TREE PLANTATION

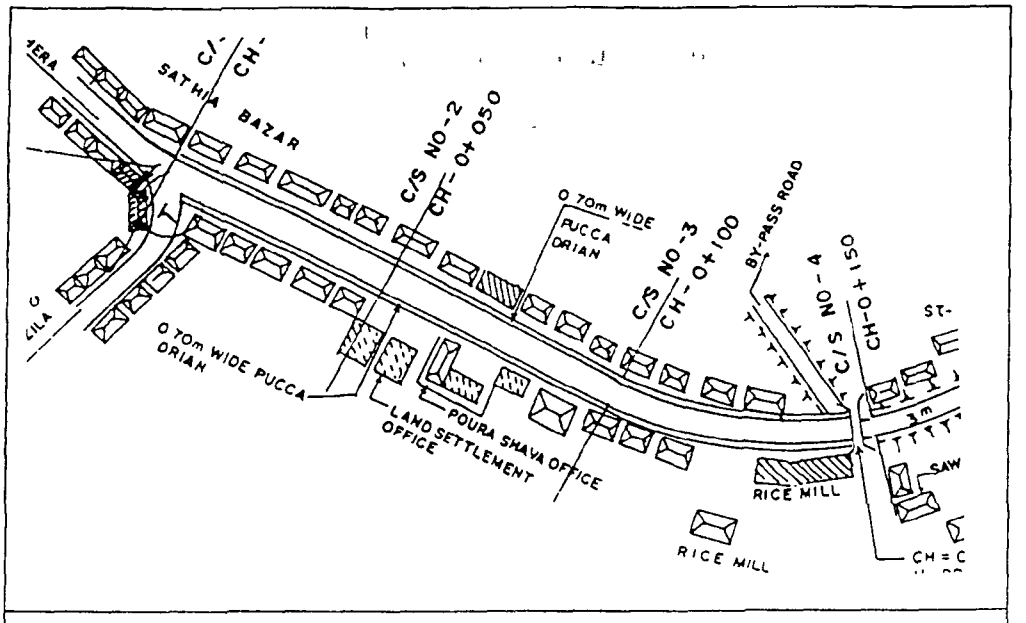
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 16259.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has a major problem of its 1st 1km that belongs to the Pourashava Authority This stretch is very narrow and improvement of the road will require displacement of a large number of roadside settlements It has been recommended that the road be improved after this length with a provision of bus station at the starting point. The road contains a large number of roadside ponds and widening will do pond loss for which it has been proposed to widen the road to the opposite side of ponds and have a slope protection measures by good vegetation coverage and plantation of 'binna' on the slopes of the embankment along the pond sides



Sketch 1 Bothside widening of the road would result in displacement of a large number of roadside houses and filling in a 0.7m wide drain

Environmental Analyses Reports of 1st Year FRB Sub-projects of Rajshahi District

Environmental Analyses Report---Anulia - Mohangong Road, Durgapur, Rajshahi.

1.0 INTRODUCTION

1.1 Sub-project Description

Anulia - Mohangonj Road starts from Anulia and ends at Mohangonj. The total length, average width, height and batter slope are 9 5 km, 6.3m, 1 6m and 1:1 respectively It is straight in alignment

The road is fully operational throughout a year and has an average daily traffic of 800; 68% of it are non-motorized.
The road is earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are:

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts;
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is high flat land Road side landuse includes homesteads educational institutions, ponds, dtches and agricultural lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is relatively high land and free from annual river flooding Flood occurs here only during abnormal high flood from Padma river

Drainage congestion and water logging occurs at some locations along the road , particularly at the residential areas, during heavy rainfall due to want of cross drainage structure

The road has a total of 13 cross drainage structures with a total opening of 27 4m An additional opening of 4.145m for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

A total of 25 ponds (going to be affected from road improvement) are along the roadsides that are used for pisciculture, bathing and washing mainly

2.4 Erosion and Siltation

Because of clayey soil and due to absent of annual river flooding the area is free from erosion and siltation of river flooding

Erosion to the road embankment is also absent due to clayey soil and good grass turfing over batter slope

2.5 Navigation and Boat Communication The road does not cross any canal/ river.

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road.

2.6.2 Avenue trees/bushes The areas falls under the process of desertification, for which both government and non—government organizations have taken many programs for tree plantation. Under such programs, trees were planted along the road by BMDA during 1998 –2000.

2.7 Borrow Areas Since the area is high land, borrow pits along the roadside are almost absent Some high land can be used as borrow areas for soil collection to be used in road.

2.8 Construction Materials

2.8.1 Soil Potential sources of the soils to be used in the road construction may be the high land of the sub-project area

2.8.2 Sand Potential source of sand is the Padma river which is 40 km away from the road.

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction. Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There is no roadside brick-fields along this road Brick-fields are located 10 km away from the road and they have road accessibility.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table : List of roadside environmental resources to be affected

Env. Resources/Attributes	Chainage	Length (m)	Distance from proposed C/L	Left/ Right	Mitigation
Tube wells	None				
Storm water drainage/ Irrigation channel	None				
Ponds	0+560	45	4.0	L	A
	2+027	113	4 0	L	A
	2+240	50	3 0	L	A

Env. Resources/Attributes	Chainage	Length (m)	Distance from proposed C/L	Left/ Right	Mitigation
	2+598	14	3 0	L	A
	2+490	10	3.0	L	A
	3+435	43	2 0	R	A
	3+700	65	4.0	R	A
	4+187	25	3 0	L	A
	4+304	16	2.0	R	B
	4+310	15	4 0	L	B
	4+325	15	3.0	L	A
	5+170	45	2 0	L	A
	5+652	41	3.0	R	A
	6+935	20	4 0	L	A
	7+428	10	4 0	L	A
	6+955	30	3 0	L	A
	7+438	5	3 0	L	A
	7+521	35	2.0	L	D
	7+928	60	2 0	R	A
	8+255	50	4 0	L	A
	8+350	46	4 0	L	A
	8+452	20	3 0	R	A

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

The road does not have any environmental hot spot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds	•			•							•		•	KI
	Natural wetlands/fish habitats						•					•		•	
	Fisheries		•		•							•		•	KI
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage				•							•	•		
	Storm water drains		•		•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		

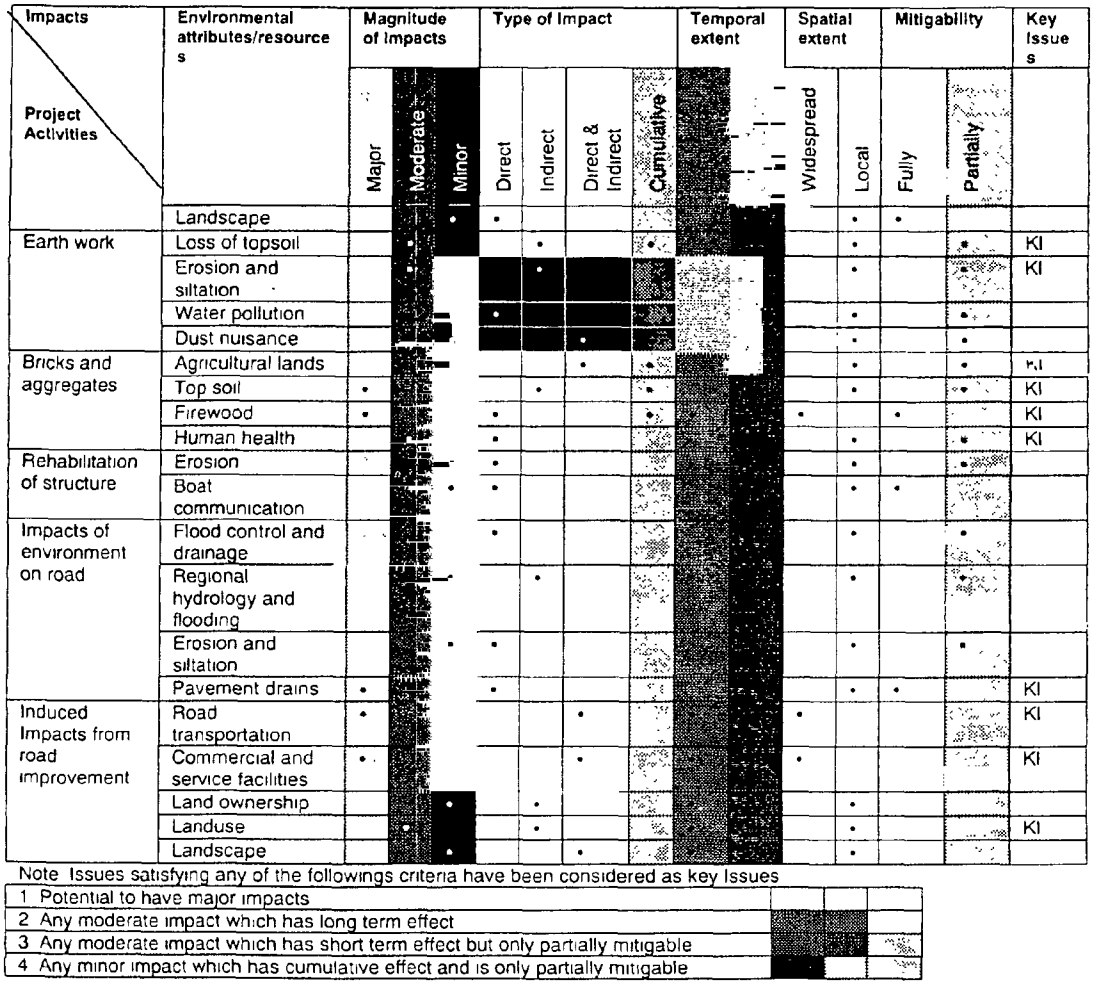


Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Fisheries		• Reduction in fish yield of the affected ponds	• Compensate the loss by fish culture • Convert the borrow-pits/ditches into ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates .	• Use mask while doing brick/stone crushing
Impacts of environment on road	Pavement drains		• Reduction in the durability of the pavement	• Provide side-drains and cross-falls on embankment slopes
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch.180 Houses get drainage congestion and waterlogging due to road	Roadside drains along with cross-falls are suggested	Considered	
Borrow-pits	Convert the existing borrow-pits into ponds by taking soil for road construction from them	Incorporated in the construction clause	
Ch 1700 Houses get waterlogging due to drainage congestion from road	Provide pipe culvert	Considered	
Ch 2900 Traffic jam due to using a part of road as parking space	Roadside parking space is suggested	Considered	
Ch 3900: Drainage congestion; and problem for traffic movement	Existing culvert to be replaced by a bridge	Considered	
Houses get drainage	Culvert suggested	Considered	

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
congestion and waterlogging due to road			

4.6 Analyses of Alternatives

There is no requirement for major realignment or by-pass for this sub-project road and as such no alternative analyses has been performed

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9029.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

5 CONCLUSIONS AND RECOMMENDATIONS

This road has no major environmental complications from its improvement and hence can be undertaken for 1st year program of RTIP Some suggestions have been made earlier, which require integration with design for over all improvement of the site-specific issues as discussed earlier

Environmental Analyses Report---Aranī – Galimpur Ferry Ghat Road, Bagha, Rajshahi

1.0 INTRODUCTION

1.1 Sub-project Description

Arani – Galimpur Ferry Ghat Road starts fromArani and ends at Galimpur The total length, average width, height and batter slope are 1.5 km, 5 7m, 1.73m and 1:1.25 respectively. The RL (Reduced Level) of the road is16.85m and the HFL (High Flood Level) is 16 82 Km No part of the road falls below HFL. 1.3 km of it goes through agriculture lands and the rest 0 2 km through residential areas.

The road is fully operational throughout a year and has an average daily traffic of 300; 90% of it are non-motorized. Arani GCM is a big GCM and traders of adjacent upazillas, Lalpur and Basatipara do business at this market using this road.

The road is fully earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects;
2 To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is lying on flood plain Out of the total length 1 5km , 1 3km of the road goes through agricultural land and the rest through residential area(near the adjacent GCM) In between ch 0+24 and ch 0+350 there is a road side canal

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Although the area is lying on flood plain , it is free from river flooding

The area is apparently free from drainage congestion and water logging, however during heavy rainfall drainage congestion occurs at some locations, particularly at ch 0+320

The road has a total of 1 cross drainage structures with a total opening of 2 2 m An additional opening of 4 025 for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

There is no pond or ditch but a road side canal (ch 0+24 –0+350)

2.4 Erosion and Siltation There is no erosion and siltation process from annual river flooding as the area is flood free. However erosion to the road embankment occurs from wave action of the road adjacent canal during monsoon.

2.5 Navigation and Boat Communication The road does not cross any river/ canal of boat communication.

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road

2.6.2 Avenue trees/bushes About 450 number of homestead trees of average age 4 years are along the road, with a distance of 1.5m from C/L of the road

2.7 Borrow Areas There is no road side existing borrow areas . It appears that soils are collected from upland faraway from the road for road construction.

2.8 Construction Materials

2.8.1 Soil Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand Potential source of sand is the Padma river, at a distance of 15 km from the road

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There is no roadside brick-field along this road Brickfields are located at a distance of 10 km away from the road, which have road accessibility

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Storm water drainage/ Irrigation channel	0+024	338			5 0	L		A
Ponds	None							

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/ strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds														
	Natural wetlands/fish habitats														
	Fisheries		•		•							•		•	
	Forest														
	Vegetation		•		•							•	•		
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage	•			•							•	•		
	Storm water drains														KI
	Irrigation canals														
	Navigation and boat communication														
	Landscape		•		•							•	•		
Earth work	Loss of topsoil														
	Erosion and siltation		•			•						•		•	
	Water pollution		•		•							•		•	
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands														
	Top soil														
	Firewood		•		•			•			•		•		KI
	Human health		•		•							•		•	
Rehabilitation of structure	Erosion														
	Boat communication														
Impacts of environment on road	Flood control and drainage														
	Regional hydrology and flooding														

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent			Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative				Widespread	Local	Fully	Partially	
	Erosion and siltation															
	Pavement drains															
Induced Impacts from road improvement	Road transportation	•					•				•					KI
	Commercial and service facilities	•					•				•					KI
	Land ownership					•							•			KI
	Landuse			•		•							•			
	Landscape	•					•						•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Storm water drains		• Causes damage to road • Drainage congestion and waterlooging in the roadside residential areas/shops/markets	• Provide side-drains and cross-falls on embankment slopes
Earth work	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Ch. 0+24—0+300 Damage to road from a canal adjacent to the road	Protect the road by providing earth-retaining structure along the canal side	Preferred solution will be applied: Road will be widened on the other side of the canal and slope protection work will be applied to canal side.	

4.6 Analyses of Alternatives

This road has one major problem for which alternatives have been suggested as described below

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Damage to road	Ch. 0+24—0+300	Damage to road from a canal adjacent to the road	1) Protect the road by providing earth-retaining structure along the canal side 2) Road will be widened on the other side of the canal and slope protection work will be applied to canal side	Option (2) will allow the widening as well as do slope-protection of the embankment

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 675

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road can be undertaken for implementation under 1st year program with some scope protection measures along the cannel side

Environmental Analyses Report---Jholmolia hat-Mollapara hat Road, Puthia, Rajshahi

1.0 INTRODUCTION

1.1 Sub-project Description

Jholmolia hat-Mollapara hat Road at starts from Basapara-Natore R&H at Jholmolia hat and ends Mollapara hat. The total length, average width, height and batter slope are 16.5km, 4.8m, 1m and vertical respectively. The RL (Reduced Level) of the road is 15 88m and the HFL (High Flood Level) is 13.98m Almost total length of it goes through agriculture lands It is zigzag in alignment with sharp turns at several locations.

The road is fully operational throughout October-May (because of not flood but muddy due to local rainfall) and has an average daily traffic of 300, 90% of it are non-motorized It connects several roadside villages including Zhalmolia, Zenpara, Sharishabari, modhukhali, Syedpur, Baraputhia, Bilwarea, Harigathi and Khoksha with national highway.

The road is fully earthen. Road improvement interventions include height raising, widening, slope corrections (1:1.5) and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The sub-project area is flat The area empresses of high land and is free from annual river flooding Roadside land use includes mainly for agricultural land Roadside residential areas and educational institutes are also there

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Because of high land, annual river flooding does not occur here The area gets external river flooding during abnormally high flood

Drainage congestion and coater logging not occur along the roadside even during heavy rainfall

The road has a total of 25 cross drainage structures with a total opening of 59 8m No additional opening for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

As the area does not fall under floodplain of river, it has no wetland along the roadside or in the area

2.4 Erosion and Siltation

Due to being flood free area, no erosion and siltation from river flooding occurs here. Even in the extreme flooding condition, the area does not have any significant erosion and siltation, because of silty clayey soil.

Rain-cut is also absent almost allover the road which approximately due to high clayey soil and good vegetation coverage on slopes.

2.5 Navigation and Boat Communication

The road does not cross any channel/river used for boat communication.

2.6 Vegetation

2.6.1 Forest

The road does not go through forest area.

2.6.2 Avenue trees/bushes

Roadside avenue trees include different types of native trees Approximately 4000 nos. of trees (age 6-7 years) are along the embankment with a distance of 1.75m from C/L of embankment There is a good coverage of grass on slopes but no bushes.

2.7 Borrow Areas

On the roadside there are many ditches and ponds which apparently appeared to be the borrow areas while this road was constructed. This indicates that contractor will collect soil from roadside agricultural lands leaving these as ditches unless otherwise instructed from the RTIP.

2.8 Construction Materials

2.8.1 Soil

The field practice of collecting soil for road construction is to use roadside agricultural lands This practice comes out of the economic reason of soil collection· no transportation cost is associated The contractor manages the land for soil collection in many cases, by influences.

2.8.2 Sand

Potential sources of sand collection are the Char of the rivers and/or riverbank Such sources are located 20km away from the road

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.

2.9 Brickfields

Potential brickfields are located 2km away from the road They have existing approach roads

Current rehabilitation practice f brickfields is not known, but perhaps brickfields are left for rehabilitation in the natural process In absence of flooding, this may take a longer time than that required under flooding condition

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table : List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	15+050	50			8 0	L		A
Ponds	None							

Note
*Data to be collected
A widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options	Preferred options
0+765	Mosque close to the road	(1) Widening opposite side (2) Mosque can be displaced to other location	(1) Economic and widening to opposite side is possible
3+125	Road widening will affect the deep tubewell adjacent to road.	(1) Wall of pump house can be removed for road widening (2) Widening opposite side of deep TW	(2) Economic No effect on existing DTW and its wall
3+910	Mimber of Eidgah will be affected	(1) Mimber can be demolished in consultation with people. (2) Widening to opposite side	(1) Economic and local people agree
7+000	Road get damaged at the pond location	(1) Simply widening in to the pond (2) Provide earth-retaining structure (KII). (3) Widening to opposite side	(2) Widening opposite economic
10+200 (Sketch 1)	Sharp turning at the bridge location	(1) Shift the bridge towards south. (FGD) (2) Need detailed investigation	(2) Needs detailed investigation to find the preferred solution
14+455	REB electric pole on road.	(1) Discussion with REB for shifting the pole (2) Realignment	(1) Economical

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/ strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds		•		•							•		•	KI
	Natural wetlands/fish habitats						•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage			•	•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape		•		•							•	•		
Earth work	Loss of topsoil	•				•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance		•				•					•		•	KI
Bricks and aggregates	Agricultural lands						•					•		•	
	Top soil		•			•						•			KI
	Firewood	•			•			•			•		•		KI
	Human health			•	•							•			
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation				•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership		•			•						•			KI
	Landuse			•		•						•			
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts			
2 Any moderate impact which has long term effect			
3 Any moderate impact which has short term effect but only partially mitigable			
4 Any minor impact which has cumulative effect and is only partially mitigable			

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations.
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Dust nuisance		• Health hazards due to dust pollution • Damage to trees and vegetation along the road	• Do watering the surface during construction
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area

Attached table presents the environmental resources/attributes, their potential impacts from the sub-project road and corresponding mitigation strategy

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Road gets eroded at pond locations (FGD)	Earth retaining structures at pond locations.	Yes, where widening to opposite side not possible	-----
Road through a congested market at Jhalmolia	By pass	Already considered and bypass done	-----

4.6 Analyses of Alternatives

Table : Analyses of Alternatives

Issues	Location	Problem description	Recommended options	Preferred Option &rationales
Bypass	Jhalmolia at Ch.0+000	The road goes through a very market, which is highly congested with shops. The road in this market is extremely narrow and on hat day vehicle passages not possible or difficult	(1) Road through the existing market (2) Road bypassing the market	Option (2) is preferable because it will not displace so many roadside shops and will allow the passage of vehicles uninterruptedly all the time, which by option is mot possible.

5 TREE PLANTATION

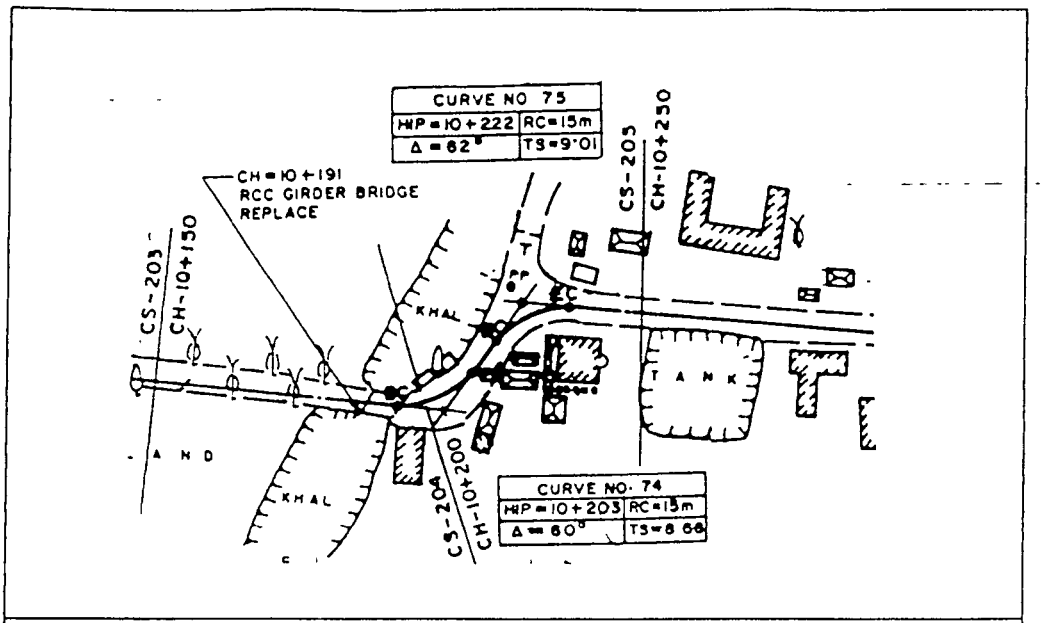
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 4,000.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure

6 CONCLUSION AND RECOMMENDATION

The road has no major environmental problems and as such can be undertaken for implementation under RTIP of its first year program.



Sketch 1 The road needs to be relatively straight at bridge location for a easy passage of vehicles

Environmental Analyses Report---Rajabari - Kakonhat Road, Rajshahi

1.0 INTRODUCTION

1.1 Sub-project Description

Rajabari - Kakonhat Road starts from Rajabari of Godagari and ends at Kakonhat. The total length, average width, height and batter slope are 13.39 km, 4.86m, 0.7m and vertical respectively The RL (Reduced Level) of the road is 28.02m and the HFL (High Flood Level) is 22.8m. No part of the road falls below HFL 8 4 km of it goes through flood plain and the rest 5.00 km through rolling lands It is zigzag in alignment with 10 numbers of hair pin bends.

The road is fully operational throughout 7 months of a year and has an average daily traffic of 200, 90% of it are non-motorized It connects several roadside villages and gives a good access to the upazilla and districts.

The road is fully earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are·

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4. To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The topography of the area is flood plain (flat land) and rolling (undulating land) The area in general is a high land and free from annual river flooding General land use characteristics along the road include agricultural land mostly and roadside human settlement at some locations After running some 500m along the road a large canal has been crossed by the road

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Although a part of the area lies on flood plain, flood occurs here very rarely because of highland Flood occurs only in abnormal high flooding situation

There is no drainage congestion and water logging along the roadside Only at few locations, where homesteads are close to the road and located at higher land (compared to the road) Storm water remains stagnant on road temporarily causing harm to the road Providing Roadside drains may be a good solution to this problem

The road has a total of 19 cross drainage structures with a total opening of

81.3m No additional opening for cross drainage structure has been proposed in the road improvement.

2.3 Wetlands The area is flood and wet level free except that a canal has been there along the roadside for some 500 m. and then has been crossed by the road. Except this, there is no wetland.

2.4 Erosion and Siltation Due to absent of external flooding and silty - clayey soil, the area is free from erosion and siltation process of river flooding. The road embankment also does not get rain cut even during high rainfall because of clayey-silt soil and good grass turfing over the slopes of embankment.

2.5 Navigation and Boat Communication The road does not cross any channel that is used for boat communication

2.6 Vegetation

2.6.1 Forest The road does not go through any forest area.

2.6.2 Avenue trees/bushes On average 1 km of the road contains 500 numbers of roadside trees with an average distance 1.75m. from the center line of the proposed embankment. These trees are 6.7 years old and planted by BNDA.

2.7 Borrow Areas Compared to the most first year FRB roads under RTIP, the road contains a very few number of borrow areas in the form of ponds, ditches, and these are not closed to the road embankment

2.8 Construction Materials

2.8.1 Soil As is the usual practice of the area, the contractor is likely to collect soil from agricultural lands near to the road There are some uplands, which can be cut for making them plain, and soil can be collected from there

2.8.2 Sand Potential source of sand collection is the riverbed and charlands (sandbars), which is 15 km away from the road

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There are no roadside brickfields Potential brick fields are located at 10km away from the road

Brickfields are located on agricultural land

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)*	Name of village*	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	8+250-8+800							A
Ponds	2+950	28			3.0	L		A
	4+050	32			5.0	R		A
	4+350	20			6 0	R		A
	4+500	23			2.5	L		A
	4+650	20			2.0	R		A
	5+075	20			4 0	L		A
	6+300	13			4.0	R		A
	6+315	13			4.5	L		A
	6+460	18			4 0	R		A
	6+850	20			4.5	R		A
	7+370	15			3.0	R		A
	7+780	15			3.0	R		D
	7+860	25			3.0	R		A
	10+650	28			6 0	L		A
	12+250	10			6.0	L		A
	12+425	5			7.0	R		A
	12+650	52			3 5	L		A

Note
*data to be collected
A widening opposite side of the pond without affecting the pond
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

Location in Chainage (m)	Description of hot-spot	Recommended options as per FGD/KII	Preferred option
8+250-8+800	Erosion to road embankment due to wave action from roadside canal	(1) Slope protection work. (2) Realignment	Option (2) Cost-effective
2+500-	Drainage congestion.	(1) 2.5 m box culvert suggested (KII) (2) Pipe culvert (3) Detailed investigation	Option (3) but to know the exact requirement, investigation on this issue suggested.
6+220	One side mosque and the other side house.	(1) House can be displaced (2) Mosque can be shifted (Eng)	Option (1) may be implemented in consultation with the house owner

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, their potential impacts and mitigation measures.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long Term	Short Term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds		•		•			•				•		•	KI
	Natural wetlands/fish habitats						•					•		•	
	Fisheries			•	•							•		•	
	Forest			•	•							•		•	KI
	Vegetation	•			•							•	•		KI
	Slope stability of embankment		•		•							•		•	KI
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	KI
	Top soil	•				•		•				•		•	
	Firewood				•			•			•		•		
	Human health		•		•							•		•	KI
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding					•						•		•	
	Erosion and siltation				•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership		•			•						•			KI
	Landuse			•		•						•			
	Landscape		•				•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts	
2 Any moderate impact which has long term effect	
3 Any moderate impact which has short term effect but only partially mitigable	
4 Any minor impact which has cumulative effect and is only partially mitigable	

Table : Key Issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Forest		• Reduction in forest cover • Disruption of forest ecology	• Find alternative route to avoid forest area
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills.	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Human health		• Health hazards of the workers in brick-fields due to smoke • Health hazard of the workers while crushing aggregates.	• Use mask while doing brick/stone crushing
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Borrow materials	Cutting upland	Construction claim	
Embankment damage	RCC retaining	1 Realignment	

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
at pond locations.	structures.	(priority). 2. RCC retaining structure.	
Narrow bridge at ch. 5+600	Width of the bridge to be increased.	Already proposed for replacement.	
Road gets damaged at ch. 10+400	Cross drainage structure suggested.	To be integrated upon investigation.	

4.6 Analyses of Alternatives

There is no requirement for analyses of alternatives regarding realignment and/or by bypass.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 20078.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental implications for its improvement, but attention needs to give at pond and canal locations, where it has been recommended to widen the road to the opposite side of these water bodies in order to protect them. Slope protection measures by required amount of compaction along with planting of grass (binna) has been suggested to stabilize the embankment slopes at the side of these water bodies With these design improvement, the road can be implemented under 1st year program of RTIP

Environmental Analyses Reports of 1st Year FRB Sub-projects of Sirajganj District

Environmental Analyses Report---Boalia R&H-Solonga GC Road, Ullapara, Sirajganj

1.0 INTRODUCTION

1.1 Sub-project Description

Boalia R&H-Solonga GC Road starts from Sirajganj-Pabna Regional Highway at Boalia and ends at Solonga GC. The total length, average width, height and batter slope are 6.43 km, 5.5m, 1.5m and 1.1 25 respectively. The RL (Reduced Level) of the road is 12.0m and the HFL (High Flood Level) is 11.5m. Approximately 5.2km of it goes through agriculture lands and the rest 1.23 km through non-agricultural lands It is zigzag in alignment with 8 sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 432; 69.44 %of it are non-motorized.

1.35km of the road is BC and the rest is earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts;
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is located on the flat river floodplain General landuse includes for agriculture on lowland and homesteads on high lands Along the roadsides majority of the lands is very low-lying that are annually flooded during wet season and cultivated for crops during dry season A large number of ponds, borrow-areas and drainage canals also are lying adjacent to and near the roadside

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area is low-lying and flooded by river water as well as by local rainfall Some agriculture lands experience damage to crops due to occasional early flooding

Roadside areas at some parts of the road receive drainage congestion and waterlogging due to either insufficient cross-drainage opening or improper locations of drainage structures

The road has a total of 9 cross drainage structures with a total opening of 27 4m An additional opening of 0 5m for cross drainage structure has

been proposed in the road improvement.

2.3 Wetlands

A total of 8 ponds are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly Besides, a large number of ditches and drainage canals all also are lying adjacent to and near the roadside.

2.4 Erosion and Siltation

The area in general does not have any significant erosion and siltation from flooding water. However due to steep batter slope, sand-silty soil, poor soil compaction and less grass turfing some parts of the road get rain-cut during heavy rainfall.

2.5 Navigation and Boat Communication

During monsoon, at a location, some 300m from the starting point, some passenger boats (small to medium size) connecting different villages reach the road. A bridge with adequate navigation clearance can be provided here to allow the boats to pass under the bridge to go opposite side of the road and to have direct connection with the Highway. Alternatively a roadside ghat can be constructed here for loading and unloading of the passengers. This will also save the road embankment from damage due to boat anchorages with the road

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road

2.6.2 Avenue trees/bushes

About 1300 number of trees, average age 8 years, located on shoulders and slopes (3 25m away from the C/L of the road) are along the road

2.7 Borrow Areas

Some irregular borrow areas, average size (600mx10mx1.3m), are adjacent to and near the road embankment They are like roadside drainage canal and therefore can be rehabilitated/improved by joining together and connecting to the nearby cross-drainage structure to improve/enhance the drainage pattern

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas after use

As per local community, potential sources of soils are the low-productive agriculture lands, 10 m away from the embankment toe

2.8.2 Sand

Dhangora River, 15 km away from the road, is the potential sources of sands. Soils are collected through manual dredging and transported to the site by road transport.

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.

2.9 Brickfields

There is one roadside brickfield along this road, 150m away from the road and on the floodplain.

Low-productive agricultural lands are used as brickfields Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Environmental assets along the road

Following table show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	1+665	45			3 5	L		A
	1+710	40			5 0	L		A
	1+750	75			2 0	L		A
	1+825	85			5 0	L		A
	1+950	450			0	R		A
	2+500	155			4 0	I		A
Ponds	4+925	65			2 0	L		B
	4+945	55			2 0	R		

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key issues, their potential impacts and preventive/mitigation measures for the negative impacts

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds			•	•							•		•	
	Natural wetlands/fish habitats	•					•					•		•	KI
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment		•		•							•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
	Natural Drainage			•	•							•	•		
	Storm water drains			•	•							•	•		
	Irrigation canals		•		•							•	•		KI
	Navigation and boat communication		•		•							•	•		KI
	Landscape			•	•							•	•		
Earth work	Loss of topsoil	•				•						•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands			•			•					•		•	KI
	Top soil			•		•						•		•	KI
	Firewood			•	•						•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion			•	•							•		•	
	Boat communication			•	•							•	•		
Impacts of environment on road	Flood control and drainage		•		•							•		•	
	Regional hydrology and flooding		•			•						•		•	
	Erosion and siltation		•		•							•		•	
	Pavement drains			•	•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Natural wetlands/fish habitats		• Reduction in breeding, nursery and feeding ground in flood plain	• Minimize land-take of wetland by providing steep slopes • Do widening to the opposite side of the wetlands
	Irrigation canals		• Reduction in/obstruction to flow of irrigation water	• Provide adequate cross-drainage structures over the irrigation canals • Stop filling the irrigation canal
	Navigation and boat communication		• Disruption in cheap mode of communication • Adverse impact on communication	• Provide bridge with adequate navigation clearance on over the important routes

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
	Top soil		• Affects agricultural production	• Collect top soil from barren lands
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement.

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH. 3+752, 3+750, 4+900 km Waterlogging and damage to road	Box culverts suggested at these locations	Considered initially but further investigation needed	
CH 5+275 The road crosses Hatikumrul-Bonpara Highway at Ranirchar, where in recent past, several road accidents occurred and people died there (Sketch 1)	Provide appropriate road safety measure at the crossing location in consultation with RHD	Considered for integration with design	
Arsenic contamination of groundwater in the villages of Boalia, Kechubali, Manikdiar, Chotgoza,, Mashiakandi and Ranirchar	Roadside ditches/borrow-pits to be converted into ponds for use as source of arsenic free drinking water	Considered for integration in the construction clause	

4.6 Analyses of Alternatives

There is no alternative suggested for realignment or bypass as it is not required.

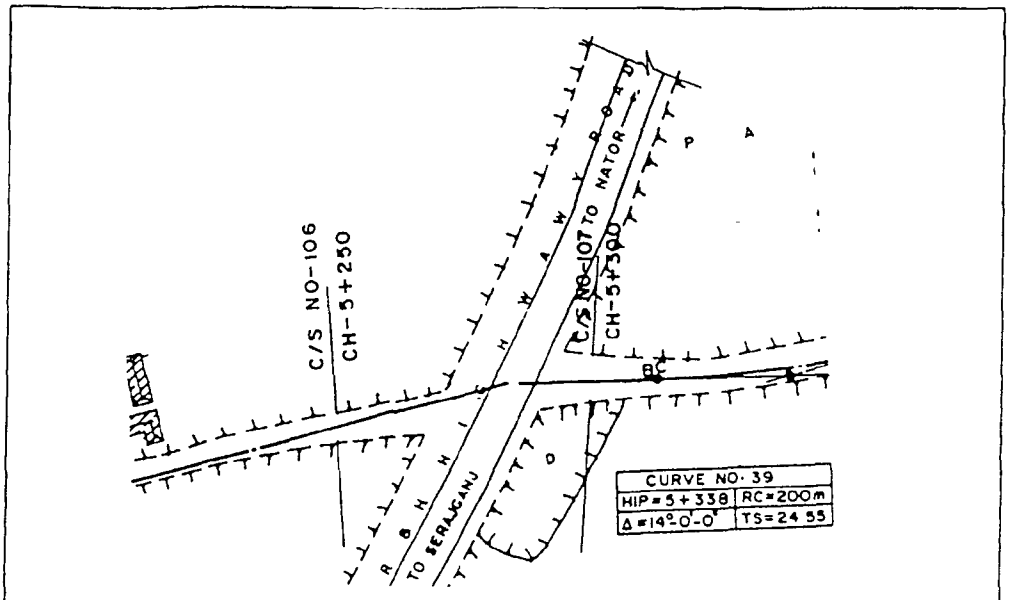
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9644

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental implications from the road improvement. However there are some suggestions as discussed earlier, for improvement of the existing environmental conditions which need to incorporate in the design. With incorporation of these suggestions the road can be undertaken for implementation under 1st year program of RTIP.



Sketch 1 Road at the crossing point with the Sirajganj-Natore highway requires a special measure to ensure road safety, Several accidents took place at this location in recent past

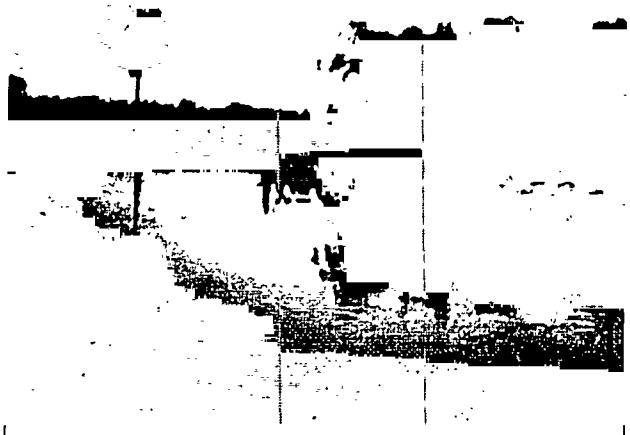


Plate1 Boats over floodplain during monsoon used as cheap communication means to reach the road

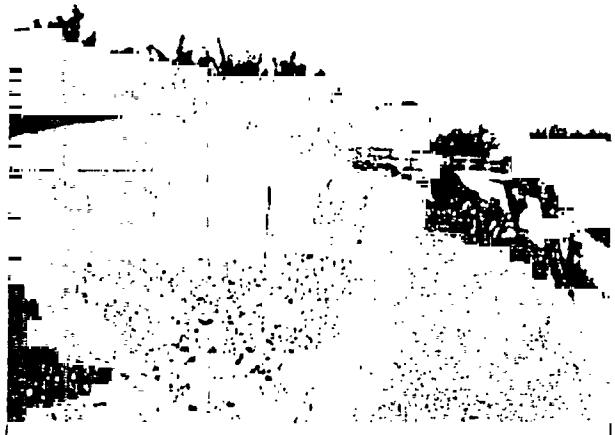


Plate2· A sharp left turn of the road at a bridge location, a road safety issue

Plate3 Roadside graveyard to save from road improvement by widening of the road opposite to it

Plate4 Rain-cut to the road embankment due to lack of proper compaction cross-fall drain and vegetation coverroad

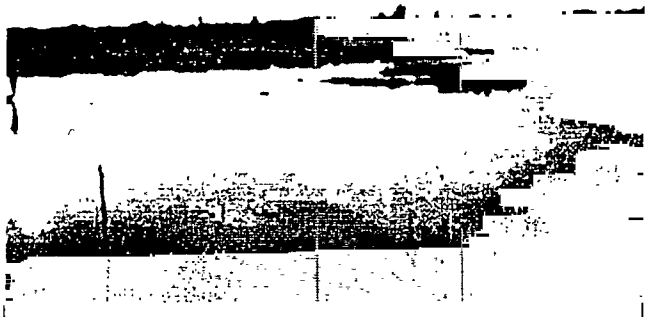


Plate 5 Roadside brickfields over low-lying agricultural lands a potential source of agricultural land loss from brick-use in road construction

Plate 5 Roadside brickfields over low-lying agricultural lands a potential source of agricultural land loss from brick-use in road construction

Environmental Analyses Report---Harinathpur-Dhekuria Roadd, Kazipur, Sirajganj

1.0 INTRODUCTION

1.1 Sub-project Description

Harinathpur-Dhekuria Road starts from Harinathpur GCM and ends at Dhekuria of Kazipur Upzilla of Sirajganj District. The total length, average width, height and batter slope are 6.41 km, 5 5 m, 1 35 m and 1:1.25 respectively. Average RL is 14 2m, which is 0.4 m high above HFL. 0.3 km of the road is below the HFL only. 4.23 km of it goes through agriculture lands and the rest 1.81 km through non-agricultural lands. It is zigzag in alignment with 13 sharp turns.

The road is fully operational throughout a year and has an average daily traffic of 187; 68% of it are non-motorized It connects several roadside villages; and Harinathpur and Dhekuria at its two ends

Except first 875m the road is earthen. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are.

1) To identify the key environmental issues in the sub-projects;
2) To determine the magnitude of actual and potential impacts,
3) To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4) To categorize the sub-project, and
5) To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the floodplain of Jamuna River. The area is protected from river flooding by a BWDB embankment, namely Brahmaputra Right Embankment (BRE) constructed along the Jamuna River General landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Due to flood protection embankment along the Jamuna, the area is free from river flooding Due to local rainfall during monsoon, low-lying areas, internal channel/river all gets flooded. However, flood occurs in the area due to breaching in BWDB embankment by abnormally high river flood

The roadside areas between Ch 3+325-3+861km are reported to have received waterlogging It appears that additional cross-drainage structures are required to relieve this waterlogging

The road has a total of 21 cross drainage structures with a total opening of

81.2m. No additional opening for cross drainage structure has been proposed in the road improvement.

2.3 Wetlands — A total of 13 ponds are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly..

2.4 Erosion and Siltation — The area in general does not receive any significant erosion and siltation after the BWDB embankment However due to sandy-silt soil, poor soil compaction and less grass turfing some parts of the road get rain-cut.

2.5 Navigation and Boat Communication — As per community observations, the road obstructs to the boat passage under bridge at Ch. 3+325. Small boats ply over the wetland of floodplain during monsoon.

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road.

2.6.2 Avenue trees/bushes — About 3700 number of homestead trees, average age 5 years and girth size 0 3m, are along the road embankment. Few bushes and grass turfing over some parts of the embankment are there Some of the trees were planted during 1999-2001 by PROSHIKA, an NGO.

2.7 Borrow Areas — Some regular shaped borrow areas, of average size (200mx6mx2m), are adjacent to the road embankment

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand — Charlands (Sandbars) of Jamuna River are the potential source of sands Soils are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields — There is no roadside brickfield along this road A number of brickfields with good accessibility are along the Sirjaganj-Bogra R&H

Low-productive agricultural lands are used as brickfields. Brickfields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter.

4 0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village	Name of owner	Distance from proposed C/L	Left/ Right	Potential impact	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+060	30			4 0	L		A
	1+730	25			2.0	L		C
	1+764	10			3.0	L		A
	1+802	18			3 5	L		A
	1+836	28			3.0	R		C
	2+046	15			3 0	L		A
	2+106	66			3.0	L		A
	2+170	30			3 0	L		A
	2+356	28			3 0	L		A
	2+446	20			2 5	R		A
	3+320	25			2.0	R		H
	3+665	15			2 0	R		B
	3+672	35			1.0	L		B

Note
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures
C widening embankment towards opposite of the pond in consultation with property owners going to be affected
D provide earth-retaining structures at the pond/canal location

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key issues, their potential impacts and preventive/mitigation measures for the negative impacts

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short	Long	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds		•		•						–	•		•	KI
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest			•	•							•		•	
	Vegetation			•	•							•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Slope stability of embankment			•	•						•		•	
	Natural Drainage			•	•						•	•		
	Storm water drains				•						•	•		
	Irrigation canals				•						•	•		
	Navigation and boat communication				•						•	•		
	Landscape			•	•						•	•		
Earth work	Loss of topsoil		•			•		•			•		•	KI
	Erosion and siltation		•			•					•		•	
	Water pollution			•	•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands		•				•	•			•		•	KI
	Top soil			•		•		•			•		•	
	Firewood		•		•			•		•		•		KI
	Human health			•	•						•		•	
Rehabilitation of structure	Erosion				•						•		•	
	Boat communication				•						•	•		
Impacts of environment on road	Flood control and drainage	•			•						•		•	KI
	Regional hydrology and flooding		•			•					•		•	KI
	Erosion and siltation			•	•						•		•	
	Pavement drains				•						•	•		
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership	•				•					•			KI
	Landuse			•		•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields
Impacts of environment on road	Flood control and drainage		• Effective flood control keeps road flood damage	
	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH. 3+325 Poranpur boat passage problem remains Moreover two culverts within 25m with a turning there. Road safety problem	A large bridge with navigation clearance may replace two culverts	Based upon a detailed investigation, the suggestion may be integrated with design.	
CH 3+861. problem relating to boat passage due to low-height culvert	A bridge with adequate navigation clearance above HFL is suggested	The site needs a detailed investigation Construction of a bridge with navigation clearance is suggested	
CH.5+370 Bhutbari, problem relating to vehicle movement because of a sharp turn close to an existing culvert. (Sketch 1)	Provide a smooth curve and construct a box culvert over there	Requires a detailed investigation.	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option
Realignment	Ch 0+300-0+400	A sharp turn at the junction. Road safety problem	(1) Provide one smooth curve. (2) Provide one smooth curve with safety measures at the road junction point.	Option (2) is preferable because it allows road safety more than the second one.
	Ch. 4+175-4+200	Two sharp turns within 25m Road safety problem.	(1) Provide a smooth curve (2) Place a road divider over the sharp length	Option (2) is preferable because it is cost-effective, takes no additional land and ensures road safety.
	Ch. 4+310-4+350 (Sketch 2)	Two sharp turns within 40m. Road safety problem.	(3) Provide a smooth curve (4) Place a road divider over the sharp length	Option (2) is preferable because it is cost-effective, takes no additional land and ensures road safety

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 9000

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

The road can be implemented under 1st year program of RTIP with design modification at the required locations as suggested earlier

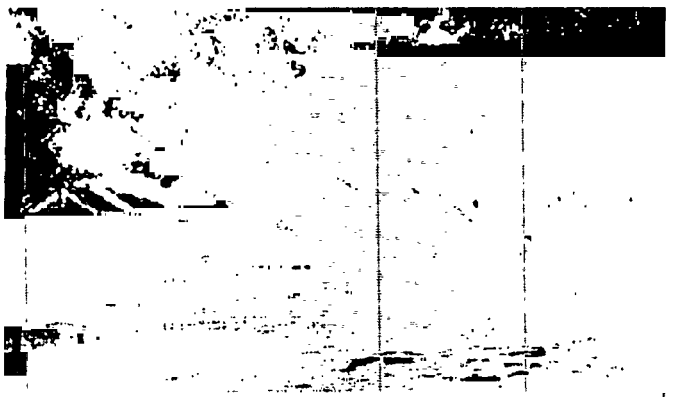


Plate1 Horinathpur hat connected with the road, proposed for development under the project

Plate 2 Roadside pond being used for pisciculture and bathing and going to be affected from road improvement

Environmental Analyses Report---Sealcola R&H-Bohuli hat Road, Sirajganj Sadar, Sirajganj

1.0 INTRODUCTION

1.1 Sub-project Description

Sealcola R&H-Bohuli Hat Road starts from Sirajganj-Bogra R&H at Sealkhol and ends at Bohuli Hat. The total length, average width, height and batter slope are 3.25 km, 5m, 1.6m and 1:1 25 respectively. 2 km of it goes through agriculture lands and the rest 1.25 km through non-agricultural lands. It is zigzag in alignment.

The road is fully operational throughout a year and has an average daily traffic of 453; 67% of it are non-motorized. It connects several roadside villages and Bohuli Hat (GCM) with Sirajganj Sadar HQ through Sirajganj-Bogra R&H.

Except first 150 m (BC) the road is earthen. Road improvement interventions include height raising (above HFL), widening (7.32m), slope corrections (1 2) and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are:

1) To identify the key environmental issues in the sub-projects,
2) To determine the magnitude of actual and potential impacts;
3) To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4) To categorize the sub-project, and
5) To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002. The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD). Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The terrain of the project area is flat and located on the floodplain of Jamuna River The area is protected from river flooding by a BWDB embankment, namely Brahmaputra Right Embankment (BRE) constructed along the Jamuna River General landuse includes agriculture on lowland and homesteads on high lands

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Due to flood protection embankment along the Jamuna, the area is free from river flooding Due to local rainfall during monsoon, low-lying areas, internal channel/river all gets flooded.

The roadside areas between Ch 1+800-3+000m are reported to have received waterlogging It appears that additional cross-drainage structures are required to relieve this waterlogging

The road has a total of 2 cross drainage structures with a total opening of 123 5m An additional opening of 0 5m for cross drainage structure has been proposed in the road improvement

2.3 Wetlands

A total of 4 ponds are along the roadsides (going to be affected from the project) that are used for pisciculture, bathing and washing mainly. The road at Ch. 200m has a large bridge of 120m span over a river. Vast natural wetlands remain at u/s and d/s of the bridge that support various aquatic plants, birds and fisheries.

2.4 Erosion and Siltation

The area in general does not receive any significant erosion and siltation after the BWDB embankment. However due to sand-silty soil, poor soil compaction and less grass turfing some parts of the road get rain-cut.

2.5 Navigation and Boat Communication

The bridge at Ch. 200m has sufficient navigation clearance and the river has navigability during monsoon. Only small country boats use the river

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the road.

2.6.2 Avenue trees/bushes

About 400 number of homestead trees, of average age 4 years and girth size 0.6m, are along the road embankment. Few bushes and grass turfing over some parts of the embankment are there.

2.7 Borrow Areas

Some regular shaped borrow areas of average size (200mx6mx2m) are adjacent to the road embankment

2.8 Construction Materials

2.8.1 Soil

Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand

Charlands (Sandbars) of Jamuna and Pangashi Rivers are the potential sources of sands Soils are collected through manual dredging and transported to the site by road transport.

2.8.3 Aggregates

Brick and stone/rock aggregates are used in the road construction Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India.

2.9 Brickfields

There is no roadside brick-fields along this road. A number of brick-fields with good accessibility are along the Sirjaganj-Bogra R&H

Low-productive agricultural lands are used as brickfields Brick-fields are left for rehabilitation in the natural process of flooding which usually takes 4-5 years to be used as agriculture lands

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table : List of Environmental Resources to be Affected

Env. Resources/Attributes	Chainage	Length (m)	Name of village *	Name of owner *	Distance from proposed C/L	Left/ Right	Potential impact*	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+046	57			2.0	R		A
	2+000	70			2.0	R		A
	2+933	70			1.5	R		A
	3+125	105			3.0	R		A

Note
* data to be collected
A *widening opposite side of the pond without affecting the pond*

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds		•		•							•		•	KI
	Natural wetlands/fish habitats						•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment			•	•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape			•	•							•	•		
Earth work	Loss of topsoil		•			•		•				•		•	KI
	Erosion and siltation		•			•						•		•	KI
	Water pollution			•	•							•		•	

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands		•				•					•		•	KI
	Top soil					•						•		•	
	Firewood				•						•		•		
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage		•		•							•		•	KI
	Regional hydrology and flooding		•			•						•		•	KI
	Erosion and siltation				•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership	•				•						•			KI
	Landuse		•			•						•			KI
	Landscape	•					•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Erosion and siltation		• Siltation of canal beds and agricultural lands	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Agricultural lands		• Reduces agricultural lands • Reduces employment in agriculture	• Take barren lands for brick-fields
Impacts of environment on road	Flood control and drainage		• Effective flood control keeps road flood damage	
	Regional hydrology and flooding		• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations

Activities/ Item	Environmental key Issues	Quantity	Potential impacts	Mitigation measures /strategy
Induced impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement.
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area.
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Waterlogging at Niamotpur, Chakchandi, Bohuli and Alokdia, between ch 1+850-3+000m.	Two culverts are suggested between these locations	Requires a detailed hydrological investigation.	
Storm water and blackish water from a home runs over the road and damages it.	Roadside drains suggested	Considered for integration	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option/Remarks
Realignment	0+46 (Sketch 1)	A symmetric widening will require a pond (50mx30m) filling by about 40% and demolition of a brick wall on the opposite side.	(1) Fill the pond and do widening (2) Break the wall and do widening at this side (3) Limit the widening	Option (2) is preferable because it will save the pond as well as allow widening
Realignment	0+840—1+100	Right side of the road has a deep wetland and the left side is relatively high ground	(1) Do symmetric widening (2) Do widening to the left side	Option (2) is preferable because it is economy and land loss is low.

5 TREE PLANTATION

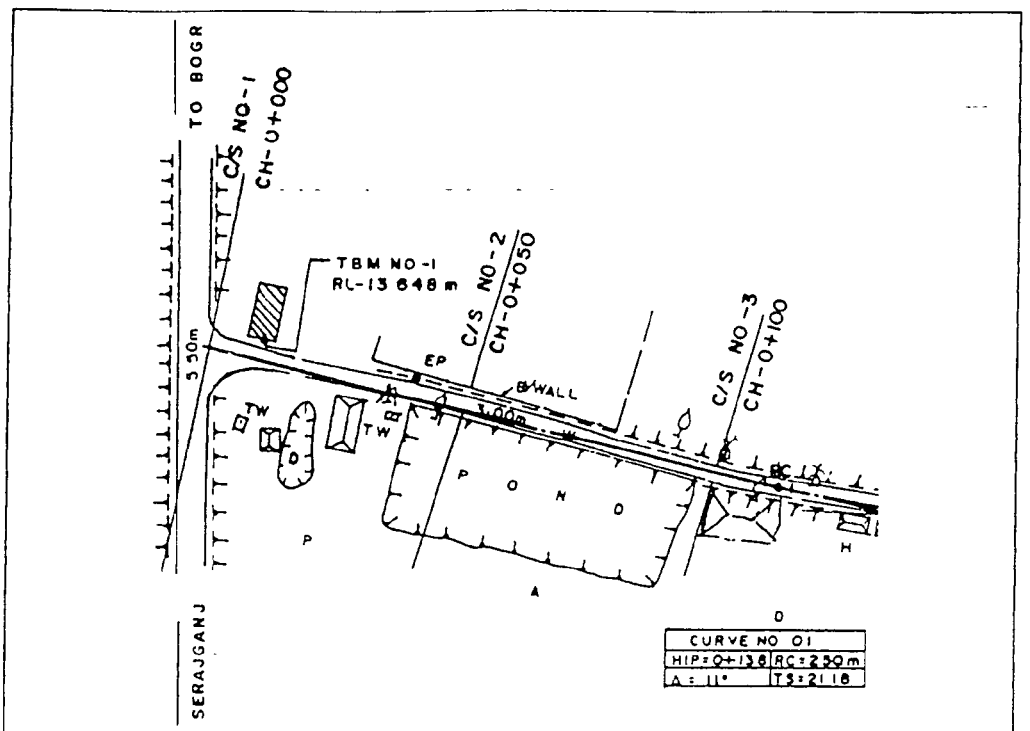
Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 9644.

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women).

For species selection see the Annexure attached with this Annexure.

4 CONCLUSIONS AND RECOMMENDATIONS

The sub-project can be undertaken for implementation under 1st year program of RTIP with integration of the suggestion as discussed earlier with design



Sketch 1 Road needs widening towards the wall side to reduce the pond-loss and ensure slope stability of the road embankment Widening to pond-side would require displacement of a semi-pucca house adjacent to the pond

Plate 1 View of roadside vast wetland to be affected from road improvement

Plate 2. View of same wetland towards right of the road

Plate 3 Roadside school building and adjacent pond

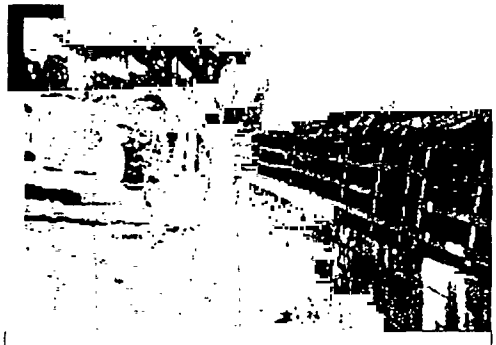


Plate 4 Roadside handloom industry requiring road widening opposite to it to save it

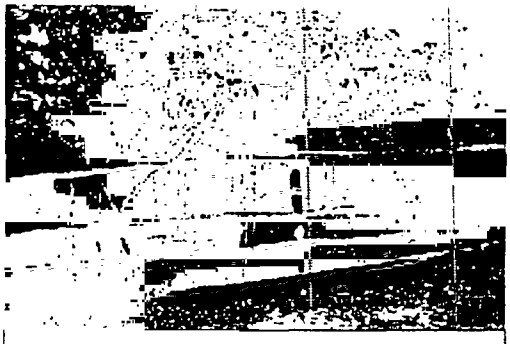


Plate 5 Roadside plant-nursery required to be removed if road is widened both sides

Environmental Analyses Reports of 1st Year FRB Sub-projects of Sylhet District

Environmental Analyses Report---Atgram-Zokiganj Road, Zokiganj, Sylhet

1.0 INTRODUCTION

1.1 Sub-project Description

Atgram-Zokiganj Road starts from Atgram of Sylhet and ends at Zokiganj The total length, average width, height and batter slope are 12.05 km, 5.66 m, 1.5m and 1:1 respectively. The RL (Reduced Level) of the road is 15 78 and the HFL (High Flood Level) is 15.48 m The road goes through flood plain and low lands and haor area. The road is zigzag in alignment

The road is fully operational throughout a year and has an average daily traffic of 1200, 33% of it are non-motorized. It connects several roadside villages

Throughout its length the road is BC Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are:

1. To identify the key environmental issues in the sub-projects;
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4. To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD). Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The project area is flat and floodplain, haor From Ratongonj to Lamagram Madrasa is low lying land and the remaining is relatively upland Roadside land use includes for agriculture and homesteads (rural village) mainly

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

River flooding occurs in the haor area. The RL of the road is above 0 3 m above HFL 15 48 m

2.3 Wetlands

A total of 26 ponds are along the roadsides (going to be affected from road improvement) that are used for pisciculture, bathing and washing mainly. Besides, there are some low-lying depressed areas, which support as fish habitats and fish stock

2.4 Erosion and Siltation

The surrounding area of the road is free from river erosion/siltation Because of good grass turfing and silty soil, no rain cut is seen along the road

2.5 Navigation and Boat Communication The road does not cross any channel/river used for boat communication.

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road.

2.6.2 Avenue trees/bushes About 600 number of trees, of average age 6 years, are along the road embankment. Few bushes and good grass turfing over all along the embankment are there.

2.7 Borrow Areas Some irregular borrow areas of average size (3mx3mx2m) are adjacent to the road embankment

2.8 Construction Materials

2.8.1 Soil Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas.

2.8.2 Sand Potential source of sand is Kushiara river, 5km away from the road Sands are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates Brick and stone aggregates are used in the road construction. Brick aggregates are from crushing of local bricks, stone aggregates from crushing of Sylhet stones.

2.9 Brickfields There is no roadside brick-field. However some brick-fields are in the area and 5km away from the road.

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement

Table : List of Environmental Resources to be Affected

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							
Storm water drainage/ Irrigation channel	None							
Ponds	0+212	25			1 75	L		A

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
	0+260	75(3)			2.5	L		A
	0+380	18			1.75	L		A
	1+732	25			1.75	L		A
	1+800	60			2.0	L		A
	2+756	59			3.0	L		A
	2+760	45			3.0	R		A
	3+020	35			2 0	L		A
	3+580	35			1.75	L		A
	3+825	100			3 5	L		A
	4+048	43			1.75	R		A
	4+784	64(3)			3 5	R		B
	4+960	40			3.0	R		A
	5+125	25			3 0	L		A
	8+035	95(3)			3.5	R		A
	8+298	97			3 5	R		A
	10+673	32			6 0	R		A
	10+743	32			5 5	L		A
	10+835	90(4)			5 0	L		A

Note
* Data to be collected
A widening opposite side of the pond without affecting the pond
B widening embankment towards that pond which has less length (along the embankment) and provide earth-retaining structures

4.3 Analyses of Environmental Hotspots

There is no hotspot found along this road

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Short term	Long term	Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land	•			•			•				•		•	KI
	Roadside Ponds	•			•							•		•	KI
	Natural wetlands/fish habitats			•			•					•		•	
	Fisheries			•	•							•		•	
	Forest				•							•		•	
	Vegetation		•		•							•	•		
	Slope stability of embankment	•			•							•		•	KI
	Natural Drainage			•	•							•	•		
	Storm water drains				•							•	•		
	Irrigation canals											•	•		
	Navigation and boat communication				•							•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative	Long term	Short term	Widespread	Local	Fully	Partially	
	Landscape			•	•							•	•		
Earth work	Loss of topsoil	•			•	•		•				•		•	KI
	Erosion and siltation			•	•	•		•				•		•	
	Water pollution			•	•			•				•		•	
	Dust nuisance			•	•		•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil					•		•				•		•	
	Firewood				•			•			•		•		
	Human health				•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•		•	
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership			•		•						•			
	Landuse			•		•						•			
	Landscape			•			•					•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Roadside Ponds		• Reduction in fish-yield of ponds	• Provide earth retaining structure at pond locations • Do widening of the road to the opposite side of ponds
	Slope stability of embankment		• Damage to road • Affects the traffic passage	• Provide slope protection measures and/or earth retaining structures at the pond/canal locations
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
Induced Impacts from road improvement	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Road safety	Speed breaker and traffic sign are suggested at important location	Yes	

4.6 Analyses of Alternatives

This road has no major problem for which realignment or by-pass is required.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 17925

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

The road has no major environmental implication from its improvement There are many roadside ponds, where road embankment requires widening towards opposite site of these, to set the pond from filling. With this suggestion integrated with design, the road may be under taken for implementation under 1st year program of RTIP.

Environmental Analyses Report---Kumargaon-Badaghat-Shiber Bazar, Sylhet Sadar, Sylhet.

1.0 INTRODUCTION

1.1 Sub-project Description

Kumargaon-Badaghat-Shiber Bazar Road starts from Kumargaon and ends at Shiber Bazr of Sylhet. The total length, average width, height and batter slope are 7.8 km, 6.0m, 2.5m and 1.1 respectively. The RL (Reduced Level) of the road is 12.73 and the HFL (High Flood Level) is 13.73m. No part of the road falls below HFL. 5.3 km of it goes through flood plain agriculture lands and the rest 2 5 km through non-agricultural lands. It is straight in alignment.

The road is fully operational throughout a year and has an average daily traffic of 2000; 50% of it are non-motorized It connects Sylhet Sadar with Sheber Bazar GCM.

Throughout its length the road is BC. Road improvement interventions include height raising, widening, slope corrections and Bituminous Carpeting as appropriate. This will encroach into the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are·

1. To identify the key environmental issues in the sub-projects;
2. To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads improvement, Longitudinal profile of road between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed.

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The the project area is flat and located on the floodplain of Surma River Majority of the road goes trough the floodplain agricultural lands Roadside land use includes agricultural land and ponds and canal mainly Near the Shiber bazaar, many roadside shops are there which will require to be displaced for road improvement in terms of widening both sides equally

The road will cross Surma River at Badhaghat where RHD is constructing a large bridge over the same river.

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Flooding occurs due to riverbank over spilling and sustains for 15 days during high flood. Along the roadside there is no drainage congestion and water logging.

The road has a total of 12 cross drainage structures with a total opening of 30 4m No additional opening for cross drainage structure has been proposed in the road improvement.

2.3 Wetlands

A total of 5 ponds are along the roadsides that are used for pisciculture,

bathing and washing mainly.

2.4 Erosion and Siltation — Due to sand-silty soil, poor soil compaction and less grass turfing some parts of the road get rain-cut.

2.5 Navigation and Boat Communication — At Badaghat, RHD is constructing a large bridge with high navigation clearance for Cargo passing over Surma river. The bridge approach will meat with this road up of the Badaghat.

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road.

2.6.2 Avenue trees/bushes — About 214 number of trees of average age 10 years and girth size 0 6m are along the road embankment

2.7 Borrow Areas — Some irregular shaped borrow areas of average size (100mx10mx1.5m) are adjacent to the road embankment Potential borrow areas may locate over agricultural land at 15m away from road

2.8 Construction Materials

2.8.1 Soil — Soils are usually collected from roadside low-productive agriculture lands that are left as borrow areas

2.8.2 Sand — Potential source of sand is located at Bholagnj, 15km away from the road Sands are collected through manual dredging and transported to the site by road transport

2.8.3 Aggregates — Brick and stone aggregates are used in the road construction Brick aggregates are from crushing of local bricks, stone aggregates from crushing of Sylhet stones

2.9 Brickfields — There is a roadside brick-field 100m away from this road over agricultural land

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Environmental assets along the road

Following tables show the important environmental resources along the existing road to be affected from road improvement.

Table: List of Environmental Resources to be Affected, Name of Road:

Env. Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Tube wells	None							

Env Resources/Attributes	Chainage	Length (m)	Name of village*	Name of owner*	Distance from proposed C/L	Left/ Right	Potential impact *	Mitigation
Storm water drainage/ Irrigation channel	4+365	85			3 25	L		Restrict width
Ponds	5+545	25			2 75	L		A
	5+580	20			2.75	L		A
	5+610	20			2.75	L		A
	5+630	25			2.75	L		A
	7+020	60			4.0	R		A

Note:
* Data needs to be collected
A. widening opposite side of the pond without affecting the pond

4.3 Analyses of Environmental Hotspots

Table : Analyses of environmental hot spots

Location in Chainage (m)	Description of hot-spot	Recommended options	Preferred option
At Badhagat	On left side of the road is a drainage canal while on right side of the same is a drainage-cum-irrigation canal.	(1) Do widening on both sides of the road (2) Do road improvement without widening	Option (2) is preferable because it will not affect both of the canals. Widening at this length is virtually not required because an RHD bridge over Surma River is under construction whose approach road will bypass this length and meet with the RTIP road at up.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land		•		•			•				•		•	KI
	Roadside Ponds				•							•		•	
	Natural wetlands/fish habitats		•				•					•		•	
	Fisheries				•							•		•	
	Forest				•							•		•	
	Vegetation	•			•							•	•		KI
	Slope stability of embankment		•		•							•		•	
	Natural Drainage				•							•	•		
	Storm water drains				•							•	•		

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of Impact				Temporal extent		Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative			Widespread	Local	Fully	Partially	
	Irrigation canals				•							•	•		
	Navigation and boat communication				•							•	•		
	Landscape	•			•							•	•		KI
Earth work	Loss of topsoil			•		•		•				•		•	KI
	Erosion and siltation			•		•						•		•	
	Water pollution			•	•							•		•	KI
	Dust nuisance			•			•					•		•	
Bricks and aggregates	Agricultural lands						•	•				•		•	
	Top soil		•			•		•				•		•	KI
	Firewood		•								•		•		KI
	Human health			•	•							•		•	
Rehabilitation of structure	Erosion				•							•		•	
	Boat communication				•							•	•		
Impacts of environment on road	Flood control and drainage				•							•			
	Regional hydrology and flooding			•		•						•		•	
	Erosion and siltation			•	•							•		•	
	Pavement drains				•							•	•		
Induced Impacts from road improvement	Road transportation	•					•				•				KI
	Commercial and service facilities	•					•				•				KI
	Land ownership	•				•						•			KI
	Landuse	•				•						•			KI
	Landscape	•					•					•			KI

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
Road widening and/height raising	Agricultural land		• Permanent loss of agricultural lands	• Minimize agricultural land-take by providing steep slopes of embankment
	Vegetation		• Felling of roadside trees • Increase in surface and slope erosion of embankment	• Do grass turfing, bushes and tree plantation
	Landscape		• Landscape disfiguration by irregular borrow pits, deep cuts, fills	• Do one side widening and/or replant disfigured surfaces
Earth work	Loss of topsoil		• Affects agricultural production	• Do not take earth from agricultural lands and do deep-borrow pits
	Water pollution		• Increases turbidity of water	• Do vegetation coverage immediately after cutting earth
Bricks and aggregates	Top soil		• Affects agricultural production	• Collect top soil from barren lands
	Firewood		• Reduction in forest/tree coverage	• Use coal in the brick-fields

Activities/ Item	Environmental key issues	Quantity	Potential impacts	Mitigation measures /strategy
	Road transportation		• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
Induced Impacts from road improvement	Commercial and service facilities		• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement.
	Land ownership		• Inequitable distribution of project benefits	• Regulation of land ownership transfer in the project area
	Landuse		• Conversion of agricultural lands into roadside residential areas and markets/shops	• Apply the existing act of landuse regulation
	Landscape		• Unplanned growth of shops and other services	• Do planned roadside development

4.5 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated with sub-project	Reasons if suggestions not integrated in the sub-project.
The existing alignment is through the Shiberbazar, where road widening will require displacement of large number of roadside shops/residences. Even they are displaced, vehicle might not be able to move through the market on hat day .	There is a canal on right side of the road started at 50m up of the market The canal may be filled up and a bypass road can be constructed following an alignment over the canal	From environmental point of view it is OK	

4.6 Analyses of Alternatives

Table: Analyses of Alternatives

Alternatives	Location	Problem description	Recommended options	Preferred Option/Remarks
Bypass	Near Shiber bazar	The existing alignment is through the Shiberbazar, where road widening will require displacement of large number of roadside shops/residences. Even they are displaced, vehicle might not be able to	(1) A right side very narrow drainage canal may be replaced by slab drain and the road can follow an alignment over there. (2) The road can go through the market without widening (3) The road can go	Option (1) is preferable over others because it allows easy passage of traffics as well as offset the requirement of displacement of large number of roadside shops and houses

Alternatives	Location	Problem description	Recommended options	Preferred Option/Remarks
		move through the market on hat day .	through the market with required improvement..	

5 ENVIRONMENTAL MANAGEMENT PLAN

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road. The total number of trees to be planted along the road is 6797.

As per Annexure-A, tree plantation will be done. The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

With integration of the suggestion as discussed earlier the road can be implemented under 1st year program of RTIP.

Environmental Analyses Reports of
RR1 Improvement Sample Sub-projects

Environmental Analyses Report---Kakon Dorgapara—Chanduria Para Road, Godagari, Rajshahi

1 Introduction

1.1 Sub-project Description

Kakon Dargapara-Chandoria para road (RR1) is situated at Rishikul Union of Godabari Upazilla Under Rajshahi Districts The total length of road is 8.6 km, existing top width 4 7 m, toe-to-toe width is 5 2 m and existing batter slope is 1 1 The average height of the road is 1 5 m The road starts from Rajshahi-Kakon hat road and end at Chanduria para The alignment of the earthen road is straight and Zig-zag with one sharp curve and it connect with several villages Both motorized (10%) and non-motorized (90%) vehicle are plying on the road and 10 month operational out of 12 month There are 8 existing culverts (5 box and 3 pipe culverts)

1.2 Purpose of the case study

The main purposes of the case study are

1. To identify the key environmental issues in the sub-projects,
2. To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects;
4 To categorize the sub-project, and
5 To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the study

A team of four person consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of rural roads improvement, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII) and Focus Group Discussions (FGD) Besides the primary information collected from the field investigations, secondary information were also used and analyzed

2.0 Environmental Setting of the Sub-project

2.1 Topography and land use

The physiograpgy of the region is flood plain The terrain of the Sub-project area is low land flat and beel area General land use includes agriculture on lowland and homesteads on high lands.

2.2 Regional hydrology, flooding, drainage congestion and water logging

The regional hydrology is unknown. There is seasonal variation of water levels in the rivers and consequently floodwater spreads to the surrounding areas Road embankment obstructs the free flow of storm water during rainy season None of the roadside areas is reported of water logging The road has a total No of 8 drainage structures

2.3 Wetlands

There is one natural wetland at Bill Dhuboil which is located at 3 m from the center line of the road, is used for pisciculture including shrimp culture and irrigation Both the side of the road is seasonally flooded low-lying area, and along the road contains with ponds and ditches

2 4 Erosion and siltation

No major changes occur in erosion and siltation pattern after road construction. Erosion and sedimentation occurred only during the heavy monsoon and wave action during flooding on the existing road alignment specially near the channel and where the road not compacted properly On some section of the road, erosion occurs mainly from rain-cut, owing to poorly compacted silt mixed sandy soil But the extent is varying and is limited

2.5 Navigation and boat communication

The road does not cross any navigation and boat communication channel However, in the occasion of very high flood small boats are seen plying on the flood water to communicate between villages and roads. The proposed road will provide a better communication for the villagers and transportation of goods to the different places

2.6 Vegetation

2.6.1 Forest

No forest area is along any part of the existing rural road

2.6.2 Avenue trees/bushes

Good grass turfing and trees are planted both side of the road

2.7 Borrow areas

2.7.1 Soil

The current practice is to use agriculture lands as borrow areas for collection of soils to be used in the construction work of road The contractor usually use agriculture lands for collection of soil unless otherwise instructed

2.7.2 Sand

The potential source of sand is the Padma river, which is around 20 km from the road. Chars are cut manually for collection of sands, trucks and boats are used for transportation of sands

2.7 Aggregate

Brick aggregates are made from crushing of bricks Local brick-fields located within 4 km from the road Stone aggregates are not widely used because of high cost When required, stones are supplied from Sylhet and other places

2.8 Brick-fields

Brickfields are within 4 km from the road. Coal is used for brick burning in the brickfields The practice of production brick is used as agricultural soil

Brickfields are rehabilitated with the application of organic fertilizers like cow-dung and water hyacinth It takes 2-3 years for becoming agriculture lands

3.0 Categorization of the Sub-project

The sub-project falls into RTIP Environmental Category 3 as analyzed in Chapter 3 of the main report

4.0 Identification and Analyses of Key Environmental Issues

4.1 Environmental sensitivity mapping

Environmental sensitivity map/road strip map has been sketched, potential key features to be affected from road improvement have been shown there As no widening of the road is proposed, so no direct physical impact is expected on any area/pond/canal/embankment located

4.2 Analyses of environmental hot-spots

The following table shows the hot-spot analyses

Hot-spots and their locations	Description	Protection/mitigation option	Preferred option	Rational
Near Ch 0+850	A 6 m foot bridge	(1) Construct a culvert by replacing foot bridge	Option (1)	
Rishikul primary school	Another box culvert near the existing Rishikul primary school is proposed for construction	Box-culvert of at least same size is recommended	--	Based on community consultation

Pond at 4 5 km	Embankment erosion	Slope protection work needed		Capacity of the existing SRR is not adequate

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table :Identification of Key Issues of the Sub-project

Impacts	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
Project Activities		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land				•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation		•		•						•	•		
	Slope stability of embankment				•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape				•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance		•				•				•		•	
Bricks and aggregates	Agricultural lands		•				•	•			•		•	
	Top soil		•			•		•			•		•	
	Firewood		•		•			•		•		•		
	Human health		•											
Rehabilitation of structure	Erosion													
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership					•					•			
	Landuse					•					•			
	Landscape		•				•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1	Potential to have major impacts
2	Any moderate impact which has long term effect
3	Any moderate impact which has short term effect but only partially mitigable
4	Any minor impact which has cumulative effect and is only partially mitigable

There is no major/key environmental issues that need to address, associated with the improvement of the road With the improvement of the road, transportation and commercial and service facilities will get improved which is the positive impact of the road improvement

5 Recommendations from Community Consultations

The following table summarizes the environment related issues/problems rose in the community consultations and associated recommendations/suggestions they made.

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Communication problem	Construct culvert	Proposed a culvert	
Drainage problem in the old culvert at Saha para near house of Naimuddin	Increase the size of culvert	Increase the size of culvert	
Water can not flow swiftly in the GI pipe	Construct new culvert	Construct new culvert	
Drainage problem at Rishikul Bilabo pile road	Increase the size of the culvert	Increase the size of the culvert	
Damages the road near Hishikul primary school	Fill up the damages site by earth and protect the pond	Fill up the damages site by earth and protect the pond through retaining wall	

6 Analyses of Alternatives

The following table provides an analysis of the alternatives regarding suggested realignment and bypasses

Nature of problem	Location	Description of hot-spot	Recommended options as per analyses of FGD/KII	Preferred options/Comments
Road safety issue	Near Ch 0+850	A 6m Foot bridge	-Construct a culvert -Dismantle the existing one	Need further analyses
	Between Ch 0+850 – 1+300	One sharp turns within short length	-Provide smooth the curve	
Cross road	Ch 10+ 100	Sharp curve	Provide smooth curve	

7 Integration of Environmental Considerations into the Sub-project Design

The following table presents the issues that have been considered for integration in the design (Typical only)

Potential Impact from the road improvement	Changes to road design due to environmental and social issues
Erosion and sedimentation	Proper compaction is important

8 Conclusion and Recommendation

The sub-project has no major environmental issue that is difficult to solve and hence falls under Environmental Category-3. However slope protection works for the road embankment at pond location and some other measures as suggested earlier are needed to ensure a road without any environmental problem

Environmental Analyses Report--- Maizgaon—Ghila Channa Road RR1 Road Improvement

1.0 INTRODUCTION

1.1 Sub-project Description

Constructed 20 years before by BCIC and starting from the Maijgaon Railstation, Upazila.Fenchuganj, Dist. Sylhet, the road ends at NGFF under the same Upazila and is an important and only road connecting between the Railway Station and the Fertilizer Industry It traverses through several villages such as Maijgaon, Faridpur, Shanifganj, Cherag, Parishail, The length and width of the road is 3 85km and 7m. The road lies on the hilly area and as such there is no road embankment and it is free from river/rainwater flooding It is relatively straight but there is only one sharp-turn

The road is fully operational through out a year and has an average vehicular traffic volume of 1500 per day of which 34% are non-motorized

The road is totally BC (Bituminous carpeting) Road improvement interventions include height raising, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein.

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team comprising of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive environmental checklists for feeder road improvement, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The road lies on the hilly area and as such is free from river or storm water flooding. The adjacent land of the road is also high and hence the road has no embankment

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Along any part of the road does not receive any drainage congestion/waterlogging There is only a 12m long bridge on the road

2.3 Wetlands

No wetland is there.

2.4 Erosion and Siltation

The soil of the area is the silt mixed with clay The road does not have any erosion at any part of it

2.5 Navigation and

The road does not cross any channel that is used for boat communication

Boat Communication

2.6 Vegetation

2.6.1 Forest	The road does not go through forest area
2.6.2 Avenue trees/bushes	There is no avenue trees/bushes along the roadside
2.7 Borrow Areas	Since the road lies on the hilly area, it did not require earthwork while constructed and therefore there is no borrow-pit for the road
2.8 Construction Materials	
2.8.1 Soil	The road does not require any major earthwork However soils can be collected from roadside areas
2.8.2 Sand	Sands for use in the road construction are to be collected from outside the area
2.8.3 Aggregates	Both brick-aggregates and stone-aggregates are used in the road construction Local stones are available Aggregates are made from crushing of the stones and bricks
2.9 Brickfields	There is a brickfield, which is located 4km far from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

An alignment of the road showing the site features is attached with this report

4.2 Environmental Assets along the road

Only some small hills, locally called tila, are along the both sides of the road Improvement of the road would not cause any impact on these tials

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land				•			•			•		•	
	Roadside Ponds				•								•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation			•	•						•	•		
	Slope stability of embankment				•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape				•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands			•			•	•			•		•	
	Top soil			•		•		•			•		•	
	Firewood			•	•			•		•		•		
	Human health			•										
Rehabilitation of structure	Erosion													
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership					•					•			
	Landuse					•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

There is no major/key environmental issues that need to address, associated with the improvement of the road With the improvement of the road, transportation and commercial and service facilities will get improved which is the positive impact of the road improvement.

4.5 Recommendations from Community Consultations

Local community does not raise any major issue/problem associated with the road However they want its improvement for smooth passage of traffic. Also two years before there is a collision between a bus and a moving train and therefore local community wants a high safety measure at the crossing location to be integrated with the road improvement.

4.6 Analyses of Alternatives

Regarding alignment or any other problem there is no requirement for alternative solutions.

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 7532

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

Improvement of this RR1 Road would not cause any environmental problem Improvement of road transportation and commercial and service areas are two major achievements from the improvement While improving the road a safety measure at the crossing location between the and the railway has to be provided

Environmental Analyses Report--- Savar-Birulia, Svar RR1 Road, Dhaka

1.0 INTRODUCTION

1.1 Sub-project Description

The road is located at Savar Upazila of Dhaka district Its length, width height and batter slope are 10.20km, 6m, 1.25m and 1 1.25 respectively The roadside land comprises of lands for commercial use and those for residential and agricultural purpose. The road is overall straight in alignment.

The road is fully operational through out a year and has an average vehicular traffic volume of 4450 per day of which 45% are non-motorized

7km of the total length of the road are BC and the rest 3 20km is HBB Road improvement interventions include height raising, slope corrections and Bituminous Carpeting as appropriate This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are.

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project; and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team comprising of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive environmental checklists for feeder road improvement, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD). Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The area is mixed with upland and low-lying land The roadside land comprises of lands for commercial use between Ch 0--2 0 km and those for residential and agricultural purpose between 2—10 2km

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area gets flooded in only the very-lying depressed areas during monsoon for 6 months, however the roadside areas are upland and free from river/storm water flooding Due to roadside commercial built-up area between Ch 0-2km of the road, the road needs side drains for draining out the storm water

In general the road does not have drainage congestion or waterlooging along any part of the roadside areas

2 3 Wetlands

Both sides of the road contain natural wetlands and they are located between 1 to 5 km of the road These wet lands are resourceful for different type of native fisheries and aquatic birds, etc. Improvement of the road would not impact on these wetlands

2.4 Erosion and

The soil of the area is clayey, high plastic and reddish in color and hence

Siltation	erosion does not occur in the area No part of the road does get damaged from erosion, even rain-cut is also absent.
2.5 Navigation and Boat Communication	The road does not cross any channel that is used for boat communication
2.6 Vegetation	
2.6.1 Forest	The road does not go through forest area.
2.6.2 Avenue trees/bushes	Planted in 1998-200 by LGED the roadside trees have grown up much
2.7 Borrow Areas	The roadside areas do not contain borrow-pits
2.8 Construction Materials	
2.8.1 Soil	The road does not require any major earthwork However soils can be collected from non-agricultural lands of the area or from outside the area
2.8.2 Sand	Potential source of sand is Hemayetpur, Gabtoli, Turag, Aricha They are far way from the road and have the road accessibility
2.8.3 Aggregates	Both brick-aggregates and stone-aggregates are used in the road construction Stones are imported from Sylhet while black stones like Pakur are imported from India Aggregates are made from crushing of the stones and bricks
2.9 Brickfields	There is a roadside brickfield, which is located at 0 5 km far from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

An alignment of the road showing the site features is attached with this report

4.2 Environmental Assets along the road

There is no roadside important environmental assets that can be impacted by the proposed road improvement

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside.

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land				•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation			•	•						•	•		
	Slope stability of embankment				•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape				•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance		•				•				•		•	
Bricks and aggregates	Agricultural lands		•				•	•			•		•	
	Top soil		•			•		•			•		•	
	Firewood		•		•			•		•		•		
	Human health		•											
Rehabilitation of structure	Erosion													
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership					•					•			
	Landuse					•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts	
2 Any moderate impact which has long term effect	
3 Any moderate impact which has short term effect but only partially mitigable	
4 Any minor impact which has cumulative effect and is only partially mitigable	

There is no major/key environmental issues that need to address, associated with the improvement of the road With the improvement of the road, transportation and commercial and service facilities will get improved which is the positive impact of the road improvement.

4.5 Recommendations from Community Consultations

Local community suggests for construction of roadside drains at Ch.0-2km. This is due to the fact that the roadside area along this stretch is highly built-up commercial area which need improved pucca drains for draining of storm water

4.6 Analyses of Alternatives

Regarding alignment or any other problem there is no requirement for alternative solutions

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 7532

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure.

6 CONCLUSIONS AND RECOMMENDATIONS

Improvement of this RR1 Road would not cause any environmental problem Improvement in road transportation and commercial and service areas are two major achievements from the road improvement Local community suggests for construction of roadside drains at Ch.0-2km. This is due to the fact that the roadside area along this stretch is highly built-up commercial area which need improved pucca drains for draining of storm water

Environmental Analyses Report--- Shuptola RHD---Petrobangla Road (RR1)

1.0 INTRODUCTION

1.1 Sub-project Description

The road is located at Beanibazar Upazila of Sylhet District Its length, width height and batter slope are 1.30km, 5m, 0.30m and 1;1 respectively and it traverses through one village, Khasaripara The road requires height raising between Ch 0+200---0+700 and 1+100—1+300m due to these parts being below HFL (High Flood Level). It is slightly zig-zag with two sharp turns.

The road is fully operational through out a year and has an average vehicular traffic volume of 400 per day of which 50% are non-motorized

The road is totally HBB Road improvement interventions include height raising, slope corrections and Bituminous Carpeting as appropriate. This will affect the adjacent lands affecting the environmental resources therein

1.2 Purpose of the Case Study

The main purposes of the case study are:

1 To identify the key environmental issues in the sub-projects,
2 To determine the magnitude of actual and potential impacts;
3 To ensure that environmental considerations are given adequate weight in selection and design of proposed sub-projects,
4 To categorize the sub-project, and
5. To recommend the type of environmental analysis recommended for the sub-project

1.3 Approach of the Study

A field team comprising of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive environmental checklists for feeder road improvement, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The topography of the area is a mixed type comprising of low-lying flooding areas and tila (small hillock) Roadside areas include homestead areas mainly, with ponds at some locations

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Due to low-lying depressions, flooding occurs in the area in the event of flush flood However this flood is not so much damaging This flood occurs during monsoon

There is no drainage line along the length of the road The road contains a drainage structure (box-culvert) at Ch 1 25km.

The road does not have in general drainage congestion or water logging problem along the roadside, however due to the road parts between Ch 0+200m—0+700m, and 1+100m-1+300m lying below HFL, these parts get flooded during flush flood and cause severe problems traffic flow. Raising of the embankment height above HFL is the solution to this problem

2.3 Wetlands

No natural wetland is there. There are 4 ponds along the road which are located 8m from the C/L of the road embankment and which are used for

	pisciculture such as Rhui, Katla, Mrigel, Grass-Curf. Improvement of the road would not impact on these ponds
2.4 Erosion and Siltation	The soil of the area is the silty sand The road does not have any erosion at any part of it.
2.5 Navigation and Boat Communication	The road does not cross any channel that is used for boat communication
2.6 Vegetation	
2.6.1 Forest	The road does not go through forest area.
2.6.2 Avenue trees/bushes	There is no avenue trees/bushes along the roadside
2.7 Borrow Areas	The road does not have any borrow-pits along the roadside Since the road would not be widened and raising of the road height would be very limited at the limited sections, earthwork for the road would be very limited Roadside non-agricultural lands can be used for borrow-pits
2.8 Construction Materials	
2.8.1 Soil	The road does not require any major earthwork However soils can be collected from roadside areas
2.8.2 Sand	Potential source of sand is a khal (khal), which is located 10km far from the road
2.8.3 Aggregates	Both brick-aggregates and stone-aggregates are used in the road construction Local stones are available Aggregates are made from crushing of the stones and bricks.
2.9 Brickfields	There is no roadside brickfield

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

An alignment of the road showing the site features is attached with this report.

4.2 Environmental Assets along the road

There are graveyard, mosque, tila, pond along the roadside, but because they are outside the road corridor area and due to the fact that no widening of the road will be done, they will not be impacted from the road improvement

4.3 Analyses of Environmental Hotspots

There is no environmental hotspot along the roadside

4.4 Key issues, Potential Impacts and Mitigation

The following tables show the key environmental issues, potential impacts and their mitigation measures/strategy.

Table :Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Road widening and/height raising	Agricultural land				•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation		•		•						•	•		
	Slope stability of embankment				•						•		•	
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape				•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance		•				•				•		•	
Bricks and aggregates	Agricultural lands		•				•	•			•		•	
	Top soil		•			•		•			•		•	
	Firewood		•		•			•		•		•		
	Human health		•											
Rehabilitation of structure	Erosion													
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road improvement	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership					•					•			
	Landuse					•					•			
	Landscape		•				•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

There is no major/key environmental issues that need to address, associated with the improvement of the road. With the improvement of the road, transportation and commercial and service facilities will get improved which is the positive impact of the road improvement.

4.5 Recommendations from Community Consultations

Local community raises flooding issue of the road parts between Ch. 0+200—0+700 and Ch.1+100---1+300 and suggests for height raising of the road embankment at these parts

They also highly demand for the extension of the road from the existing 1+300 m to 1+700 m as to meet it upto the Pourashava area

4.6 Analyses of Alternatives

Regarding alignment or any other problem there is no requirement for alternative solutions

5 TREE PLANTATION

Assuming the practice of LGED under previous RRMIMP-II project, a total of 1500 number of trees per km of the length will be planted along the road The total number of trees to be planted along the road is 7532

As per Annexure-A, tree plantation will be done The Annexure gives a detail of the plantation procedure and the care-take of the trees (for two years engaging two local destitute women)

For species selection see the Annexure attached with this Annexure

6 CONCLUSIONS AND RECOMMENDATIONS

Improvement of this RR1 Road would not cause any environmental problem Improvement in road transportation and commercial and service areas are two major achievements from the road improvement The road requires height raising between Ch 0+200—0+700 and Ch 1+100---1+300

Appendix-Environmental Analyses Reports of Periodic Maintenance of Selected (Samples) FRB Roads

Environmental Analyses Report---Maintenance of Kasba-Akhaura-Chandura DC Road, Upazilla Akhaura, District Brahmanbaria

1.0 INTRODUCTION

1.1 Sub-project Description

Under Upazilla Akhaura of Brahmanbaria district Kasba-Akhaura-Chandura DC Road starts from Kasba and ends at Chandura DC The total length, average width, height and batter slope are 8.7 km, 4 42m, 2m and 1 1 respectively. The slope of the road is partly fair and partly eroded Some parts of the road length have good grass coverage and trees on slopes and shoulders; some parts have only good grass coverage and some parts have only trees The road is relatively straight, but there are some hairpin bends and one sharp turn

The road is operational throughout a year and has an average daily vehicular traffic of 2206, 56% of it are non-motorized

Except between CH. 9+282 and CH 11+280 (this part consists of RCC pavement), the road is BC.

The road has been proposed for periodic maintenance under RTIP Typical maintenance work for all FRB Road will include carriage-way treatment, shoulders and slope corrections/rejuvenation, widening and height raising to the limited sections to remove the bottlenecks of vehicle passage (as and where required) and maintenance work of culverts/bridges In general the road will be rehabilitated to its original operating condition through this maintenance work In view of this type of interventions it is very likely that environmental impacts will be very limited and insignificant

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-project,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in the maintenance work of the selected road.

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads maintenance, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The road lies on the flat flood plain Between CH 0+000-4+075 km the road lies on floodplain low land and between CH 9+282—13+910Km lies on flood free high land

Roadside landuse includes agricultural lands, ponds, canals, housing areas, shops, etc

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The regional hydrology is characterized by flooding from river and local rainfall 6 7 km of the road goes perpendicular to the drainage line where as 2 km is parallel to the drainage line

Drainage congestion occurs in the roadside areas between CH 1 365-

	1.565km, CH.3 1—3.2km, 9.850—10km, 10 78—10.88 and at CH 12 850 km.
2.3 Wetlands	14 ponds and several canals along the road and perpendicular to the road are there.
2.4 Erosion and Siltation	The soil type is silty clay Erosion occurs at the canal side and also at pond locations Near Singarbil bazar, boats get anchored with the road This causes erosion at this location Embankment toe wall can be effective against such erosion.
2.5 Navigation and Boat Communication	The road disrupts boat communication, but as per community, this is not a great concern.
2.6 Vegetation	
2.6.1 Forest	No forest area is along any part of the road.
2.6.2 Avenue trees/bushes	There are some trees along the roadside, on average 3 0m away from the C/L of the road Some large trees (20 years old) are along the roadside and at a distance of 2-3m from the C/L of the road
2.7 Borrow Areas	There are some roadside borrow-pits in the form of ditches. Potential borrow areas for the road maintenance work may be roadside barren lands
2.8 Construction Materials	
2.8.1 Soil	Given the fact that the maintenance works will include a very limited amount of earthwork, potential source of soil for use in road maintenance may be the barren lands
2.8.2 Sand	Potential source of sand is the Ganga sagar and Karnel Bazar Haora river They are about 8 km away from the road.
2.8.3 Aggregates	Brick and stone/rock aggregates are used in the road maintenance Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India
2.9 Brickfields	There is no brickfield along the roadside Bricks are transported from brickfields located at Azampur-Akhaura, which is located at a distance of 10 km from the road

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Shoulders and slope correction	Agricultural land			•	•			•			•		•	
	Roadside Ponds			•	•						•		•	
	Natural wetlands/fish habitats													
	Fisheries			•	•						•		•	
	Forest													
	Vegetation			•	•						•	•		
	Slope stability of embankment				•						•		•	Improved
	Natural Drainage				•						•	•		
	Storm water drains													Improved
	Irrigation canals													
	Navigation and boat communication													
	Landscape			•	•						•	•		
Earth work	Loss of topsoil			•										KI
	Erosion and siltation			•										
	Water pollution			•	•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands			•			•	•			•		•	
	Top soil			•		•		•			•		•	KI
	Firewood			•	•			•		•		•		
	Human health			•										
	Boat communication													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding	•											•	KI
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road maintenance	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape						•				•			

Note Issues satisfying any of the followings criteria have been considered as key issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key Issues, potential impacts and their mitigation/preventive measures

Activities/Item	Environmental key issues	Potential impacts	Mitigation measures /strategy
Impacts of environment on road	Regional hydrology and flooding	• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation	• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities	• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.3 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard

Table2: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
CH 13+910 Road gets damaged due to wave action from boat movement	Slope protection measure suggested	Would be considered for inclusion in the construction	
Rail school Existing total width 3-3 5m, both sides of the road have pond	Required widening as well as slope protection measure	Would be considered for construction	
Several locations of the road Road gets damaged at slope ponds locations	Slope protection measure suggested	Would be considered for identification of the potential locations	
CH 2397 Accidents occur at bridge location because of sight distance problem	Long approach road suggested	Would be considered for construction	
CH 13+700km near to Aziz's house Culvert constructed in British period gets damaged	Replacement of the culvert suggested	Would be considered for construction	
CH 9+850—10+000km Water remains stagnant (0 305—0 7m) on road during heavy rainfall	Road raising and providing side drains	Considered for construction	
Road safety issue died 25-30, disabled 200 and injured 800 during last 5 years	Needs a detailed investigation on the causes for ensuring desired road safety	Would be considered for detailed investigation	

5 CONCLUSIONS AND RECOMMENDATIONS

Given the fact that the periodic maintenance of the road is very limited and to the requirement for bringing the road to its original operating condition, the negative environmental impacts from such interventions are very limited Scopes for environmental improvement through the intended periodic maintenance work remain there The intended environmental benefits from the interventions are the removal of the drainage congestion and waterlogging, widening of the limited sections to a standard one and an operating road condition enabling the vehicles to smooth passage.

Environmental Analyses Report---Miantenance of Nagorbari-Trimohoni-Sluice gate via Badergaht Road, Upazilla Bera, District Pabna

1.0 INTRODUCTION

1.1 Sub-project Description

Under Upazilla Bera of district Pabna Nagorbari-Trimohoni-Sluice gate via Badergaht Road starts from Nagorbari and ends at Trimohoni Sluice gate The total length, average width, height and batter slope are 10 78km, 7.30m, 4 89m and 1 1 85 respectively The slope of the road is generally fair Turfing and bushes are on the batter slopes of the road embankment Trees and bushes are on the shoulders 7.54 km of the road goes through the agricultural lands and 3.24km from non-agricultural lands The road is straight in alignment

The road is fully Black topped (BC). It is operational throughout a year and has an average daily vehicular traffic of 3000, 6 67% of it are non-motorized

The road has been proposed for periodic maintenance under RTIP Typical maintenance work for all FRB Road will include carriage-way treatment, shoulders and slope corrections/rejuvenation, widening and height raising to the limited sections to remove the bottlenecks of vehicle passage (as and where required) and maintenance work of culverts/bridges. In general the road will be rehabilitated to its original operating condition through this maintenance work In view of this type of interventions it is very likely that environmental impacts will be very limited and insignificant

1.2 Purpose of the Case Study

The main purposes of the case study are·

1 To identify the key environmental issues in the sub-project;
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in the maintenance work of the selected road

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads maintenance, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The total road lies on the flat flood plain Roadside land includes agricultural lands (7.54km) and non-agricultural lands (3 24km)

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The area gets flooded from riverbank over spillage as well as from local rainfall during monsoon (April-September) In general the road is perpendicular to the flood flow

Between CH 3+00---5+230km, roadside areas get drainage congestion and waterlogging for 3 months during monsoon

2.3 Wetlands

There are both artificial and natural wetlands in the area Artificial wetlands include ponds mainly Natural wetlands include the low-lying land that gets flooded during monsoon. These wetlands habitat different types of local species of fisheries and some aquatic local species of birds

2.4 Erosion and Siltation — The soil is silty clay. Generally the area does not have any erosion either from river flooding or from local rainfall The road also does not have any rain-cut because of silty-clayey nature of soil and good vegetation coverage

2.5 Navigation and Boat Communication — Only during high flood a very small number of boats ply over the flood plain water Road does have a very insignificant impact on the boat communication

2.6 Vegetation

2.6.1 Forest — No forest area is along any part of the road

2.6.2 Avenue trees/bushes — There are some 4850 number of trees along the roadside, on average 5 87m away from the C/L of the road These trees were planted by BWDB and local people

2.7 Borrow Areas — There are many irregular roadside borrow-pits (average size, 14mx8mx1 2m) which are on average 16m away from the embankment toe. These are at present used for pisciculture, washing and bathing

2.8 Construction Materials

2.8.1 Soil — Given the fact that the maintenance works will include a very limited amount of earthwork, potential source of soil for use in road maintenance may be the roadside barren lands

2.8.2 Sand — Potential source of sand is the Jamuna River, 12 km away from the road

2.8.3 Aggregates — Brick and stone/rock aggregates are used in the road maintenance Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields — There is no roadside brickfield along the road However bricks are available from brickfields at other locations of the area

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Shoulders and slope correction	Agricultural land			•	•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation		▬		•						•	•		
	Slope stability of embankment	•			•						•		•	Improved
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape			•	•						•	•		
Earth work	Loss of topsoil			•										
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance		▬				•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil			•		•		•			•		•	KI
	Firewood			•	•			•		•		•		
	Human health													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding	•												KI
	Erosion and siltation			•										
	Pavement drains													
Induced Impacts from road maintenance	Road transportation		▬				•			•				KI
	Commercial and service facilities		▬				•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•		▬		•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts	
2 Any moderate impact which has long term effect	▬
3 Any moderate impact which has short term effect but only partially mitigable	
4 Any minor impact which has cumulative effect and is only partially mitigable	

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/Item	Environmental key issues	Potential impacts	Mitigation measures /strategy
Impacts of environment on road	Regional hydrology and flooding	• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation	• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities	• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.3 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
Problems regarding vehicle movement, transfer of patients and goods, all owing to the extremely poor condition of the road	Road to be rehabilitated to operating condition	Would be considered for rehabilitation to the original condition	

5 CONCLUSIONS AND RECOMMENDATIONS

The maintenance work of the road would have no negative environmental impacts Due to the road being located on the floodplain, where regional flooding has an influence on the environment, regional hydrology and flooding would have impact on the road and its durability. The maintenance related environmental impacts are manageable with the best environmental management practice (ECP) The intended periodic maintenance work of the road would have positive impact on road transportation, and associated service and commercial facilities in the area

Environmental Analyses Report---Miantenance of Kathalkhair-Syedpur Bazar, Upazilla Jagannathpur, District Sunamganj

1.0 INTRODUCTION

1.1 Sub-project Description

Under Upazilla Jagannathpur of Sunamganj district, Kathalkhair-Syedpur Bazar Road starts from Kathalkhair and ends at Syedpur. The total length, average width, heght and batter slope are 9.29 km, 5.96m, 1.2m and 1.1 respectively. The slope of the road is fair. The road has good grass coverage and trees on slopes and shoulders Over 90% of the road have gone through agricultural lands It is zigzag in alignment with 3 sharp turns

The road is fully BC The road is operational throughout a year and has an average daily vehicular traffic of 800, 12% of it are non-motorized

The road has been proposed for periodic maintenance under RTIP Typical maintenance work for all FRB Road will include carriage-way treatment, shoulders and slope corrections/rejuvenation, widening and height raising to the limited sections to remove the bottlenecks of vehicle passage (as and where required) and maintenance work of culverts/bridges. In general the road will be rehabilitated to its original operating condition through this maintenance work. In view of this type of interventions it is very likely that environmental impacts will be very limited and insignificant

1.2 Purpose of the Case Study

The main purposes of the case study are

1 To identify the key environmental issues in the sub-project,
2 To determine the magnitude of actual and potential impacts,
3 To ensure that environmental considerations are given adequate weight in the maintenance work of the selected road

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads maintenance, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The road lies on the flat flood plain. The area is basically low-lying

Roadside landuse includes agricultural lands, housing areas, market areas/shops, etc

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

The regional hydrology is characterized by flooding from river and local rainfall during monsoon

Drainage congestion occurs in the roadside market areas, housing areas It is apparent that construction of roadside drains could solve the problem

2.3 Wetlands

There is no artificial or natural wetland along the roadside The floodplain low-lying areas get flooded during monsoon only

2.4 Erosion and Siltation

The soil type is silty clay Erosion to road embankment occurs in the form of rain-cut during heavy rainfall There is no significant erosion and siltation from river flooding

2.5 Navigation and Boat Communication	The road interferes boat communication, particularly for the large boats, at one location near Nayabazar, where there is structure..
2.6 Vegetation	
2.6.1 Forest	No forest area is along any part of the road
2.6.2 Avenue trees/bushes	There are some trees, 20 numbers/km (6-8 years old), along the roadside, on average 2.8m away from the C/L of the road No bushes are there
2.7 Borrow Areas	There are some roadside irregular borrow-pits (average size 30mx6mx1.7m) with a distance of 0.6-1m from the embankment toe They are in the form of ditches and remain covered with water hyacinth Potential borrow-areas for the road maintenance work may be roadside barren lands
2.8 Construction Materials	
2.8.1 Soil	Given the fact that the maintenance works will include a very limited amount of earthwork, potential source of soil for use in road maintenance may be the roadside barren lands
2.8.2 Sand	Potential source of sand is the Biwambharpur of Tahirpur Upazilla, which is 50 km far from the road Sands are transported from the source by waterway and then by roadway.
2.8.3 Aggregates	Brick and stone/rock aggregates are used in the road maintenance Brick aggregates are from crushing of local bricks; stone aggregates from crushing stones
2.9 Brickfields	There is no brickfield along the roadside Bricks are transported from brickfields located at a distance of 5 km

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached).

4.2 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
Shoulders and slope corrections	Agricultural land			•	•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation			•	•						•	•		
	Slope stability of embankment	•			•						•		•	improved
	Natural Drainage				•						•	•		
	Storm water drains													
	Irrigation canals													
	Navigation and boat communication													
	Landscape				•						•	•		
Earth work	Loss of topsoil			•										
	Erosion and siltation		▬											
	Water pollution			•	•						•		•	
	Dust nuisance		▬				•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil			•		•		•			•		•	KI
	Firewood			•	•			•		•		•		KI
	Human health			•										
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding		▬											
	Erosion and siltation		▬											
	Pavement drains													
Induced Impacts from road maintenance	Road transportation		▬				•			•				KI
	Commercial and service facilities		▬				•			•				KI
	Land ownership			•		•					•			
	Landuse			•		•					•			
	Landscape			•			•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/Item	Environmental key issues	Potential impacts	Mitigation measures /strategy
Bricks and aggregates	Top soil	• Affects agricultural production	• Collect top soil from barren lands
	Firewood	• Reduction in forest/tree coverage	• Use coal in the brick-fields
Induced Impacts from road improvement	Road transportation	• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities	• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.3 Recommendations from Community Consultations

The following table presents some important issues/problems as raised by the local community and the suggestions/recommendations they made in this regard.

Table: Recommendations from local community

Issues/Problems	Suggestions/Recommendations	Suggestions integrated in sub-project	Reasons if suggestions not integrated in the sub-project
General Inadequate road width created traffic movement problem	Widening of the road suggested	Would be considered	
General Accidents occur due to lack of maintenance	Maintenance work to be taken up to rehabilitate the road to its original condition	Maintenance work essentially includes this	

5 CONCLUSIONS AND RECOMMENDATIONS

The periodic maintenance of the road would have no major negative environmental impacts except those associated with maintenance related works which can be managed with environmental code impacts. Use of bricks and brick-aggregates would cause impact on agricultural lands in terms of topsoil loss, and on firewood in terms of its reduction The positive impacts on road transportation and associated commercial and service facilities are the intended benefits of the maintenance work

Environmental Analyses Report---Rajshahi-Nawabganj R&H at Baliaghata to Balighata GC Road Miantenance, Upazilla Godagari of Rajshahi

1.0 INTRODUCTION

1.1 Sub-project Description

Under Upazilla Godagari of Rajshahi district, Rajshai-Nawabganj R&H at Baliaghata to Balighata GC Road Road starts from RHD road and ends at Baliaghat GC The total length, average width, height and batter slope are 0 55 km, 6.16m, 0 9m and 1·1 respectively The slope of the road is fair and grass turfing is over there. The RL (Reduced Level) of the road is 30m and the HFL (High Flood Level) is 22.79m It is a straight road

The road is operational throughout a year and has an average daily vehicular traffic of 3000, 75% of it are non-motorized

The road is fully BC The road has been proposed for periodic maintenance Typical maintenance work for all FRB Road will include carriage-way treatment, shoulders and slope corrections/rejuvenation, widening and height raising to the limited sections to remove the bottlenecks of vehicle passage (as and where required) and maintenance work of culverts/bridges. In general the road will be rehabilitated to its original operating condition through this maintenance work In view of this type of interventions it is very likely that environmental impacts will be very limited and insignificant

1.2 Purpose of the Case Study

The main purposes of the case study are.

1 To identify the key environmental issues in the sub-project,
2 To determine the magnitude of actual and potential impacts,
3. To ensure that environmental considerations are given adequate weight in the maintenance work of the selected road

1.3 Approach of the Study

A field team consisting of an Assistant Engineer, Sociologist, a community organizer and a sub-assistant engineer made extensive field investigations on the road using descriptive checklists of feeder roads maintenance, between 10-20 October, 2002 The investigation tools used were site observations and spot analyses, Key Informants Interview (KII), Focus Group Discussions (FGD) Besides the primary information from the field investigations, secondary information were also collected and analyzed

2.0 ENVIRONMENTAL SETTING OF THE SUB-PROJECT

2.1 Topography and Landuse

The road lies on the flood plain and flat land Roadside areas include shops and houses

2.2 Regional Hydrology, Flooding, Drainage Congestion and Water Logging

Although the road lies on floodplain, it is free from river flooding, as land is high

Roadside areas are free from drainage congestion and waterlogging

2.3 Wetlands

Roadside areas do not include any wetland (natural or artificial)

2.4 Erosion and Siltation

Since the area is free from annual river flooding and soil is highly clayey, it does not have any erosion and siltation Even during heavy rainfall, rain cut to the road embankment does not occur

2.5 Navigation and Boat Communication

The road does not cross any canal or river

2.6 Vegetation

2.6.1 Forest No forest area is along any part of the road.

2.6.2 Avenue trees/bushes The road contains roadside avenue trees with an average distance of 3.5m from C/L of the existing embankment. Also good grass coverage over slopes of the embankment is there

2.7 Borrow Areas There is no roadside borrow area along this road

2.8 Construction Materials

2.8.1 Soil Given the fact that the maintenance works will include a very limited amount of earthwork, potential source of soil for use in road maintenance may be the barren lands

2.8.2 Sand Potential source of sand is the Padma river

2.8.3 Aggregates Brick and stone/rock aggregates are used in the road maintenance Brick aggregates are from crushing of local bricks, stone aggregates from crushing stones (usually from Sylhet) and rock aggregates (locally known as black aggregates) are from blustered rocks of India

2.9 Brickfields There is no brickfield along the roadside

3.0 CATEGORIZATION OF SUB-PROJECT

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

4.0 IDENTIFICATION AND ANALYSES OF KEY ENVIRONMENTAL ISSUES

4.1 Environmental Sensitivity Mapping

The sub-project road has been shown in the Upazilla map (attached)

4.2 Key issues, Potential Impacts and Mitigation

Table : Identification of Key Issues of the Sub-project

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts: Major	Moderate	Minor	Type of impact: Direct	Indirect	Direct & Indirect	Cumulative	Temporal extent	Spatial extent: Widespread	Local	Mitigability: Fully	Partially	Key Issues
Shoulder and slopes corrections	Agricultural land				•			•			•		•	
	Roadside Ponds				•						•		•	
	Natural wetlands/fish habitats													
	Fisheries				•						•		•	
	Forest													
	Vegetation				•						•	•		
	Slope stability of embankment				•						•		•	Improved
	Natural Drainage				•						•	•		
	Storm water drains											•		Improved
	Irrigation canals													
	Navigation and boat communication													

Impacts / Project Activities	Environmental attributes/resources	Magnitude of Impacts			Type of impact				Temporal extent	Spatial extent		Mitigability		Key Issues
		Major	Moderate	Minor	Direct	Indirect	Direct & Indirect	Cumulative		Widespread	Local	Fully	Partially	
	Landscape				•						•	•		
Earth work	Loss of topsoil													
	Erosion and siltation													
	Water pollution				•						•		•	
	Dust nuisance			•			•				•		•	
Bricks and aggregates	Agricultural lands						•	•			•		•	
	Top soil					•		•			•		•	
	Firewood				•			•		•		•		
	Human health													
Impacts of environment on road	Flood control and drainage													
	Regional hydrology and flooding													
	Erosion and siltation													
	Pavement drains													
Induced Impacts from road maintenance	Road transportation	•					•			•				KI
	Commercial and service facilities	•					•			•				KI
	Land ownership		•			•					•			
	Landuse		•			•					•			
	Landscape						•				•			

Note Issues satisfying any of the followings criteria have been considered as key Issues

1 Potential to have major impacts
2 Any moderate impact which has long term effect
3 Any moderate impact which has short term effect but only partially mitigable
4 Any minor impact which has cumulative effect and is only partially mitigable

Table : Key issues, potential impacts and their mitigation/preventive measures

Activities/Item	Environmental key issues	Potential impacts	Mitigation measures /strategy
Impact of the environment on road	Regional hydrology and flooding	• Increases duration, severity and frequency of flood • Changes flooding pattern and ground water recharge	• Provide adequate number of required openings at the required locations
Induced Impacts from road improvement	Road transportation	• Development of all weather conditioned good road network • Reduces poverty	• Do integrated road development in coordination with RHD (Roads and Highways Department)
	Commercial and service facilities	• Increase economic activities • Reduces poverty	• Provide additional road linkage to the commercial and service facilities as per requirement

4.3 Recommendations from Community Consultations

The community has not raised any important issue regarding the road

5 CONCLUSIONS AND RECOMMENDATIONS

The proposed periodic maintenance would not cause any environmental damage The intended work would bring the road back to its original operating condition resulting in improvement of road transportation and associated service and commercial facilities, which will help reduce the poverty of rural people

Appendix-Environmental Analyses Reports of Sample Large Bridge Construction Sub-projects

Environmental Analysis Report--- 45.0 m Bridge at Ch. 4+020 Km on Shaper Bazar-Betka Road, Upazila : Sirajdikhan, District : Munshiganj

1. Introduction

Shaper Bazar-Betka Road, located in Upazila Sirajdikhan, District Munshiganj is an important road which would connect two important GCMs, namely Shaper Bazar and Betka after the construction of this bridge at Ch 4+020km Due to a wooden bridge at the proposed bridge location, roadway transportation of goods from these two markets is disturbed which affect the socio-economic condition of the local people including rural poor Thus if the bridge is constructed at this location there will be a positive effect in the area.

2. Purpose of the Case Study

i) To develop screening criteria
ii) To identify and assess the key environmental issues relating to bridge construction
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of Key issues and their assessment

3.1 Land use of the bridge site

The bridge-site is mainly agricultural land, which gets inundated during monsoon Water hyacinth was observed at the proposed bridge location while site visit was made. For construction of the approach road, some private agricultural lands would be required to do acquisition

3.2 Bank stability of the river/canal

The riverbank is stable Local people observed no scouring/erosion at the bridge location for last 3 years They observed that the river at the proposed bridge location is getting little bit silted up

3.3 Navigability of the river/canal and waterway transport

Trawlers and boats carrying goods and passengers ply over the river during monsoon for five months in a year An adequate navigation clearance for this bridge would be required to allow these waterway transports to pass under it

4. Recommendation from community consultation

Local people did not raise any major environmental issue associated with bridge construction They demanded for urgent construction of the bridge at the proposed location

5. Mitigation measures

Since the proposed bridge location does not have any erosion/scouring problem, it does not require any significant bank protection measure However, conventional measure including revetment construction would be required for ensuring safety of the bridge and its approach against normal bank scouring/erosion, if any, occurs in future

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and

implementation, and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusion and Recommendation

Construction of the bridge at the proposed location would not cause any environmental hazard Morover, due the stable bank at the proposed bridge location, the bridge would not require any major river bank protection work at the proposed site. It would require providing adequate navigation clearance for the trawlers and boats plying over the river. Construction of approach road would loss private agricultural lands and would involve land acquisition.

Environmental Analysis Report----Name of Bridge: Construction of 75.0 m Bridge at Ch. 3+650 Km over Buri River on Bottoli-Bitghar Road, Upazila:Nabinagar, District: Brahmanbaria

1. Introduction

With the construction of this bridge inhabitants of 5 unions of Nabinagar Upaizla will get benefited, once the bridge is constructed the road will be the shortest route to the Upazila Head Quarter for marketing of agricultural products, fisheries and others. Therefore, in the opinion of the local people it is urgently needed to construct this bridge According to peoples' views, the bridge will help to reduce the rural poverty through ensuring better and shortest access to the markets

2. Purpose of the Case Study

i) To develop screening criteria
ii) To identify and assess the key environmental issues relating to bridge construction
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of key issues and their assessment

3.1 Land use of the bridge site

Adequate khas land is available for the construction the bridge and the approach road Both sides of the road, there exists agricultural lands. In addition to the available khas land, additional private land may be required to be acquired to align the approach road straight to the bridge

3.2 Bank stability of the river

The bridge is located in the low-lying region over Buri River The river is meandering in nature and have both erosion and siltation characteristics The river, at the bridge location, has been getting silted up over the last 10 years, which has made this particular section narrower by 15 m

3.3 Navigability of the river and waterway transport

Engine boats, Launches, Cargo use the river for transportation of goods There is a seasonal variation of the use of waterway volume of transportation of goods increases in monsoon Considering the size of the boats and cargoes, a navigation clearance of 3m above HFL is required under this bridge.

4 Recommendations from community consultation

Although the river at the proposed bridge location is stable, as per community opinion there is a need for the slope protection works for the bridge and the approach road This is due to the uncertain morphological behavior of the river of Bangladesh that tends to change the river-course over time

5. Mitigation measures

Construction of the bridge does not have any major issue and there is no need for special mitigation measures Conventional way of bank protection work for the bridge and its approach would work well

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—B. This means that sub-project would require a Limited Environmental Analyses (LEA).

6. Conclusions and Recommendations

The bridge may be constructed under RTIP with conventional protection measures as suggested

Environmental Analysis Report---30.0 m long Bridge at Ch. 3+900 Km over Irrigation Canal on Jonail-Dharabaria Road,Upazila : Baraigram, District : Natore

1. Introduction

Jonail-Dharabaria Road located in Upazila Baraigram, District: Natore connects two important GCMs of the same Upazila Due to a 30m gap (over an irrigation canal which has water flow for 9 months of a year) on this road at Ch.3+900km, the roadway transportation of the goods from these two GCMs gets disturbed affecting the socio-economic condition of the local people including the poor. Moreover the existing gap affects the students of local schools, colleges and Madrashas (religious educational institutes) of going to their educational institutes Thus construction of the bridge at the proposed location would remove the bottlenecks of transportation of goods and would benefit a large number of students by providing all weather smooth access to their educational institutes

2. Purpose of the Case Study

i) To develop screening criteria
ii) To identify and assess the key environmental issues relating to bridge construction
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of key issues and their assessment

3.1 Land use of the bridge site

Construction of the bridge and its approach roads at the proposed location would not involve any land acquisition. Moreover the proposed site does not contain any shops, houses or large trees, and consequently there would not arise any social and environmental issues associated with bridge and its approach road construction

3.2 Bank stability of the canal

Although the irrigation canal is little bit meandering in nature, it does not have bank-shifting tendency at the proposed bridge location Even in the events of large floods like in 1998 and 2000, the canal bank at the proposed bridge location did not get any erosion At the proposed location the canal is getting silted-up slightly.

During monsoon floodwater inundates the low-lying areas on both sides of the approach road and the approach road gets eroded from wave action of the floodwater This indicates that the approach road needs erosion protection measure from wave action of floodwater

3.3 Navigability of the river/canal and waterway transport

Although the canal has water flow for nine months of a year, boats ply on the canal for 5-6 months during monsoon mainly Local people have suggested a navigation clearance of at least 1 5m above HFL for the bridge

4. Recommendation from community consultation

Given the fact that existing approach road towards the gap gets eroded from wave action of the flood water (of both sides of the road) during monsoon, the local community highly recommended for the slope protection work of the road embankment

5. Mitigation measures

In order to protect the approach road from erosion due to wave action of floodwater, any of the following slope protection measures may be appropriate

- Retaining wall
- CC block
- RCC palasetting
- Gunny bag rip-rap
- Plantation of special type of erosion protection grass along with erosion protection trees

However the final choice of the type and extent of protection measures required would depend on detailed site investigation of the road It is recommended to do a detailed site investigation in this respect

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and implementation; and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusion and Recommendation

The canal at the proposed bridge location is stable and construction of the bridge would not require any major bank protection work The approach road gets erosion from wave action of flood water during monsoon and appropriate slope protection measure for this approach road as suggested above needs to be undertaken

Environmental Analysis Report---- 40.0 m long Bridge at Ch. over Andhamonu river, Gobindapur-Atghar-Ratgaon Road. Upazila : Moulavibazar Sadar,District : Moulavibazar

1. Introduction

Gobindapur-Atghar-Ratgaon Road located in Upazila Moulavibazar Sadar, District Moulavibazar is an important road connecting between two GCMs, Gobindapur GCM and Ragaon GCM, of the same Upazila has a gap of 40m over the Andhomonu River Apart from providing uninterrupted roadway transport of the goods to these GCMs, construction of the proposed bridge over this river would facilitate roadway transport of the harvested paddy of the haor area to nearest markets, Mulovibazar and Shamserganj Bazar; and thus would contribute to the socio-economic improvement of 40000 people of 8 mouzas of the same Upazila directly.

2. Purpose of the Case Study

i) To develop screening criteria
ii) To identify and assess the key environmental issues relating to bridge construction
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of Key issues and their assessment

3.1 Land use of the bridge site

The proposed bridge site contains agricultural lands Improvement of the bridge approach would not require land acquisition since available khas land is there.

3.2 Bank stability of the river

The riverbank at the proposed bridge location is stable Not only that scouring/bank erosion at the proposed location is not occurring, the river at this location is getting silted up for last 6 years, which has caused the river bed up by 3-4m Siltation of the riverbed still continues The approach road gets eroded from wave action of flood water

3.3 Navigability of the river and waterway transport

Non-mechanized and mechanized boats ply over the river during monsoon (6 months in a year) mainly Construction of the bridge at the proposed location would require an adequate navigation clearance for these boats for an uninterrupted waterway in the river

4. Recommendations from community consultation

Local people recommended for a navigation clearance of at least 1m above HFL for the proposed bridge They also suggested taking slope protection work of the approach road since during monsoon the approach road suffers from erosion due to wave action of monsoon floodwater

5. Mitigation measures

Construction of the bridge over the proposed location of the river would not require any major riverbank protection work since the riverbank is stable at this location. However, slope protection work of approach embankment would be required since the approach road gets eroded from wave action of monsoon floodwater In order to protect the approach road from erosion due to wave action of floodwater, any of the following slope protection measures may be appropriate

- Retaining wall
- CC block
- RCC palasetting
- Gunny bag rip-rap
- Plantation of special type of erosion protection grass along with erosion protection trees

However the final choice of the type and extent of protection measures required would depend on detailed site investigation of the road It is recommended to do a detailed site investigation in this respect

In order to maintain an uninterrupted waterway communication in the river the bridge would also require an adequate navigation clearance for the boats plying over the river

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and implementation, and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusions and Recommendations

The proposed bridge can be implemented under the RTIP project with mitigation measures as suggested

Appendix ---Environmental Analysis Reports of construction of the Sample Structures on Rural Roads

Environmental Analysis Report---Construction of 3 structures at Ch. 3155m, 3355m and 3975m on Thakurpara-Tamaibazar Road of Belkuchi Upazila, Sirajganj District

1 Introduction

The proposed three SRRs (structure on Rural Road) would be constructed at Ch 3155m, 3355m and 3975m on Thakurpara-Tamaibazar Road of Belkuchi Upazila of Sirajganj District The road is operational throughout a year and an important road in the area that connects several villages of the Upazila At the three proposed locations of the structures there are three-U-type structures, first one on a drainage canal, second one on agricultural land and the third one on a relatively large canal, which are observed inadequate to cope with water drainage problem during heavy rainfall In between 2nd and 3rd structures there is 8m long box culvert which is 250 m far from the 2nd structure It has been proposed that first two structures would be box-culverts that have the dimensions such as 5mX1 5mx1 5m, 9mX1 0mx1 0m and the third one would be a 15m long bridge With the construction of these three structures the existing drainage congestion and waterlogging problem would get relieved, which would save the agricultural crops from damage from this waterlogging Moreover, construction of a 15 bridge over the canal would allow boat passage, which would facilitate the boat communications among the villages during monsoon

2. Purpose of the Case Study

i) To categorize the sub-project
ii) To identify and assess the key environmental issues relating to construction of the structures
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of key issues and their assessment

3.1 Land use of the structure site

Both sides of the proposed three locations of the structures contain low-lying agricultural lands that get inundated during annual flooding

3 2 Erosion and siltation at the proposed structure location

Erosion to the road at the proposed location may occur during construction work of the structures Given the fact that a limited amount of construction work would be needed for the first two structures, the erosion will be minor in magnitude and that will occur only if the construction work takes place in rainy season

It is observed that road gets soil erosion from wave action during high flood, which indicates that approach roads towards the structures require slope protection work

3.3 Navigability of the river/canal and waterway transport

Although a defined canal crosses the road at the 1st structure location, a navigation clearance for this structure is not needed since the canal is not used for boat communication The 2nd structure would be on the low-lying agricultural land, which indicates that navigation clearance for this structure is irrelevant The 3rd structure would be a bridge-type and located over a canal that is used for boat communication

4. Recommendation from community consultation

Given the fact that roadside agricultural lands get waterlooging due to inadequate opening of the existing cross-drainage structures that causes crop damage, local community highly recommended for urgent construction of the aforesaid structures at the proposed locations to relief waterlogging and thus save their agricultural crops from damage from this waterlogging

5. Mitigation measures

There is no major environmental issue associated with structure construction. However, measures are required to protect the slopes of approach roads from soil erosion from wave action during monsoon. Any of the following slope protection measures of the approach roads may be appropriate depending on the site conditions and economic feasibility It is recommended to do a detailed site investigation prior to selecting the type of final measure

- Retaining wall
- CC block
- RCC palasetting
- Gunny bag rip-rap
- Plantation of special type of erosion protection grass along with erosion protection trees

Apart from the above, a navigation clearance of at least 1m above HFL is suggested for the bridge to allow boat passage during monsoon

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-projects have been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and implementation, and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusion and Recommendation

There is no key environmental issue associated with the construction of the proposed structure However, to protect the slopes of approach roads of the structures from wave action during monsoon, it is recommended to implement slope protection measures as suggested In this respect, it is recommended to do a detailed site investigation prior to selecting the final slope protection measure For the proposed bridge at Ch 3975m it is suggested to provide a navigation clearance of at least 1m above HFL to allow uninterrupted boat communication using the respective canal during monsoon

Environmental Analysis Report--<12m box-culvert at a suitable location between Ch. 450m and 600m on Mediasulai-- Kanchanpur road of Chapahar union, Kaliakoir Upazilla, Gazipur district.

1 Introduction

The proposed SRR (structure on Rural Road) would be constructed at a suitable location between Ch. 450m and 600m on Mediasulai-- Kanchanpur road of Chapahar union, Kaliakoir Upazilla, Gazipur district The road is an important road in the area that connects of 10-12 villages of the union with Kaliakoir Upazila H/Q Due to want of a cross-drainage structure at the proposed location on the road, roadside beels get over-flooded during heavy rainfall in monsoon resulting in waterlooging and caused crop damage in the surrounding agricultural lands It is expected that the construction of this structure would remove the waterlooging and prevent the agricultural crops from associated damage, which would impact positively on socio-economic condition of the rural people

2. Purpose of the Case Study

i) To categorize the sub-project
ii) To identify and assess the key environmental issues relating to construction of the structure
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of key issues and their assessment

3.1 Land use of the structure site

West-side of the proposed structure location is beel area and east-side is the baor area The location of the proposed structure is low land, which means that construction of the structure would provide water balance between these two areas and remove waterlogging

3.2 Erosion and siltation at the proposed structure location

The proposed structure would a box-culvert (<12m) and there is no defined channel at the proposed location However, erosion to the road at the proposed location may occur during construction work of the structure Given the fact that a limited amount of construction work would be needed for the structure, the erosion will be minor in magnitude and that will occur only, if the construction work takes place in rainy season

3.3 Navigability of the river/canal and waterway transport

It is not required to provide any navigation clearance for the proposed structure since there is no boat communication between the two sides of the road via the proposed structure location

4. Recommendation from community consultation

Given the fact that roadside beel area gets waterlooging due to want of a cross-drainage structure at the proposed location that causes crop damage, local community highly recommended for construction of a cross-drainage structure to relief waterlogging and thus save their agricultural crops from damage from this waterlogging

5. Mitigation measures

Since there is no major environmental issue associated with structure construction However, measure may be required to protect the approach road from soil erosion from excessive water pressure caused by water flow near the structure location. Any of the following slope protection measures of the approach roads may be appropriate depending on the site conditions and economic feasibility It is recommended to do a detailed site investigation prior to selecting the final measure

- Retaining wall
- CC block
- RCC palasetting
- Gunny bag rip-rap
- High compaction of embankment slopes coupled with plantation of special type of erosion protection grass along with erosion protection trees

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and implementation; and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusion and Recommendation

There is no key environmental issue associated with the construction of the proposed structure. However, it may happen that approach road towards the structure may get slope erosion and mitigation measures as suggested may be needed In this respect, it is recommended to do a detailed site investigation prior to selecting the final measure

Environmental Analysis Report---3mx2.5mx2m box-culvert at a suitable location at Ch.1200m on the Lasker chala-Rayerchala road of Madhay para union of Kaliakoir Upazilla under Gazipur district.

1 Introduction

The proposed SRR (structure on Rural Road) would be constructed at Ch 1200m on the Lasker chala-Rayerchala road of Madhay para union of Kaliakoir Upazilla under Gazipur district . The road is an important road in the area that connects of 9 villages of the union with Kaliakoir Upazila H/Q. Due to want of a cross-drainage structure at the proposed location on the road, roadside beels get over-flooded during heavy rainfall in monsoon resulting in waterlooging and caused crop damage in the surrounding agricultural lands It is expected that the construction of this structure would remove the waterlooging and prevent the agricultural crops from associated damage, which would impact positively on socio-economic condition of the rural people

2. Purpose of the Case Study

i) To categorize the sub-project
ii) To identify and assess the key environmental issues relating to construction of the structure
iii) To recommend appropriate mitigation measures for the identified key environmental impacts

3. Identification of key issues and their assessment

3.1 Land use of the structure site

Both sides of the proposed structure location are wetlands that get flooded during monsoon and cultivated for agricultural during dry season The location of the proposed structure is low land, which means that construction of the structure would provide water balance between these two areas and remove waterlogging

3.2 Erosion and siltation at the proposed structure location

The proposed structure would a box-culvert of 3mx2mx2 5m and there is no defined channel at the proposed location However, erosion to the road at the proposed location may occur during construction work of the structure Given the fact that a limited amount of construction work would be needed for the structure, the erosion will be minor in magnitude and that will occur only if the construction work takes place in rainy season

3.3 Navigability of the river/canal and waterway transport

It is not required to provide any navigation clearance for the proposed structure since there is no boat communication between the two sides of the road via the proposed structure location

4. Recommendation from community consultation

Given the fact that roadside beel area gets waterlooging due to want of a cross-drainage structure at the proposed location that causes crop damage, local community highly recommended for construction of a cross-drainage structure to relief waterlogging and thus save their agricultural crops from damage from this waterlogging

5. Mitigation measures

Since there is no major environmental issue associated with structure construction. However, measure may be required to protect the approach road from soil erosion from excessive water pressure caused by water flow near the structure location Any of the following slope protection measures of the approach roads may be appropriate depending on the site conditions and economic feasibility It is recommended to do a detailed site investigation prior to selecting the final measure

- Retaining wall
- CC block
- RCC palasetting
- Gunny bag rip-rap
- A high compaction of soils coupled with plantation of special type of erosion protection grass along with erosion protection trees.

6. Sub-project categorization

Applying the screening criteria and sub-project categorization principles as described in Chapter 3 of the case study report, this sub-project has been categorized as Category—C This means that sub-project would not require any detailed environmental analyses for its design and implementation; and application of the standard Environmental Codes of Practice (ECP) would mange the construction related environmental issues

7. Conclusion and Recommendation

There is no key environmental issue associated with the construction of the proposed structure However, it may happen that approach road towards the structure may get slope erosion and mitigation measures as suggested may be needed In this respect, it is recommended to do a detailed site investigation prior to selecting the final measure

Appendix-Environmental Analysis Reports of Sample Growth Center Market Improvement Sub-projects

Environmental Analyses Report: Chandabaha GCM, Upazilla: Kaliakoir District: Gazipur

1 Introduction

Chandabaha GCM is located at the bank of Bangsai River, Upazila Kaliakoir of Gazipur District Compared to most others GCM of Bangladesh the market has very small number of visitors: 700-800 on hat day and 250-300 on non-hat day.

The market area is 2.acre (of which 1 acre is khas land) over which 25 tin-shed are placed

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits.

An estimated number of 4000-5000 visitors will visit the GCM after the development.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions;
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map. Upon consultation with the local people and analyzing the field situation the team did need assessment. In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

As per information of market users, a Madrasa (religious institute) has been constructed in the GCM khas land and the present GCM is facing land scarcity within the GCM for market development There is low-lying land around the GCM which can be filled up and used for placement of facilities under the GCM.

4.2 Analyses of the existing landuse

The GCM is located at the side of a road, the road is connected with Dhaka-Tangail RHD road through a tertiary and secondary road There is a steel bridge under construction adjacent close to the GCM

There is no khas land available for use of GCM development· a Madrasa is using a substantial part of the GCM khas land Around the GCM low-lying land belonging to the GCM is there.

4.3 Connectivity

The GCM would have very good road connectivity after the construction of a steel bridge (the bridge is now under construction) which is adjacent to the GCM, as shown in the attached map

4.4 Cattle marketing	There is no cattle market in the GCM.
5 Existing environmental condition	
5.1 Water supply	The GCM has no tubewell for its own area. People and traders use the tubewell of the Madrasa.
5.2 Sanitary latrine	There is no latrine for use in the GCM. As usual practice, people in the emergency use latrines of others (mosques, school, etc) on request
5.3 Solid wastes management	There is no solid wastes management system in the GCM
5.4 Slaughter waste management	No cow/goat is slaughtered in the GCM
5.5 Community's awareness about slaughter wastes	Not applicable.
5.6 Storm water drainage system	There is no significant drainage congestion from storm water in the GCM
5.7 Drainage condition of tubewell water	There is no tubewell in the GCM
5.8 Water pollution from GCM	The surrounded land of the GCM is low-lying and wastes are discharged into it. But as waste volume is low and no slaughtering is done, it is likely that water pollution is not so much in the Bangshai river There might be seasonal variation of water pollution with the volumetric amount of water and its flow in the river.
5.9 Presence of ecologically sensitive and cultural areas	No ecological and cultural sensitive area is in the area There are 10 trees in the GCM.
5.10 Erosion and siltation of the GCM	Since the GCM will require earth filling for development, erosion particularly rain-cut will occur. It is recommended to provide earth retaining structure while doing earth filling Also Bangshai river at which bank, the GCM is located, has the bank erosion during monsoon Bank protection work may be needed for the safety of the GCM
6 Growth Center Planning	
6.1 Justifications for development of the GCM as per community	The GCM has very good road connectivity With the market development trading activities will increase which will help rise in lease value and the local people will be benefited Local people have a long time demand for the market development
6.2 Objectives of the planning of the GCM as per community	Due to land scarcity within the existing area of GCM, the surrounding low-lying areas have to filled up for accommodating the marketing facilities to accommodate more traders therein
6.3 Need assessment based on public demand	At present700-800 people visit the market on hat day and 250-300 people on non-hat day After development of the GCM an estimated visitors of 4000-5000 will come on hat day. Marketing facilities in accordance with that are required As per market users views, low-lying

lands (50mx30mx5m) are required filling up for accommodating marketing facilities, fish-sheds, meat-shed and multipurpose sheds and environmental improvement facilities such as tubewells, sanitary latrines, solid wastes management facilities and storm water drainage facilities. In addition they demand for existing GCM connecting FRB road improvement for transportation of commodities from/to the GCM.

6.4 Public views regarding accommodation of the required facilities

Existing low-lying lands surrounding to the GCM have to be raised with protection work against riverbank erosion for accommodation of the facilities to be planned and constructed.

6.5 Sketch of planned growth center

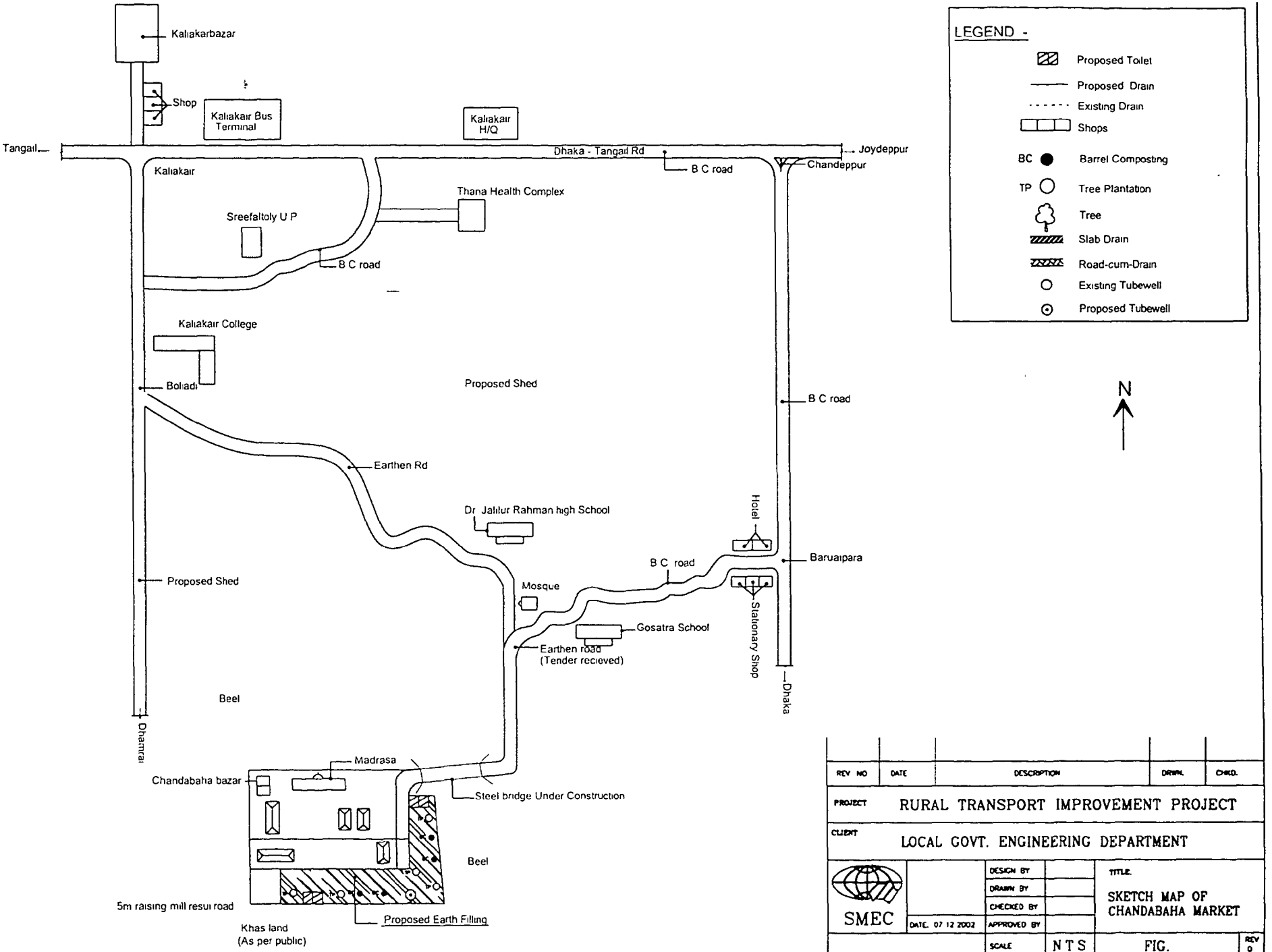
Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report.

7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 3 1 of the same chapter.

8 Conclusion and Recommendation

The GCM can be developed under RTIP. Because of space constraint for development, the low-lying land surrounding the GCM has to be developed and made it available for market development. Before doing this an areas must has to be done on river bank protection requirement and possible sustainability of the GCM



REV NO	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT	RURAL TRANSPORT IMPROVEMENT PROJECT
CLIENT	LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC	DATE: 07 12 2002	DESIGN BY		TITLE: SKETCH MAP OF CHANDABAHA MARKET
		DRAWN BY		
		CHECKED BY		
		APPROVED BY		
		SCALE	NTS	FIG.

REV 0

Environmental Analyses Report: Kansut GCM, Upazilla: Shibganj, District: Chapai Nawabganj

1 Introduction

Kansut GCM is located in the upazilla of Shibganj under the district of Chapai Nawabganj It is a big market· On hat day the number of visitors is 30,000 and on non-hat day it is 10000 As per market users, trading volume in terms of money is Tk.60 lakh and Tk 25 lakh for hat-day and non-hat respectively

The khas land of the market 6.15 acre of which 3 5 acre is being used 800 numbers of shops: among them 150 are pucca structures, 250 are semi-pucca structures and 175 are tin-sheds Current lease value of the market is Tk 10 lakh per annum

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

An estimated number of 150 distressed women, 5000 low-income people and 10,000 middle-income people will be benefited from the market.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM. The team investigated the GCM and prepared base map. Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED.

4 Some Relevant Issues

4.1 Khas Land availability

The total market area is 250m by 125m of which 200m by 100m is being used at present An open space of 125m by 90m is also being used for trading temporarily

4.2 Analyses of the existing landuse

Within the market a total of 800 shops are located of which 150 is pucca structures, 250 is semi-pucca structures and 175 is tins-sheds Apart from these shops, there are one play-ground, one Maadrasa (religious institute), two ponds, one Land Office, one health center, one truck stand (along roadside), some residences (around the market) are there as shown in the attached sketch

On the west of the market there is river, namely Pagla, (100m away from the GCM) and on the north of the GCM a canal is there

In general the GCM has a very good accessibility from all sides of the market.

4.3 Connectivity

The GCM has both waterway and road way connectivity. Close to the market two roads have passed: one to Chapai Nababganj (towards south) and the other one to Somajpur (towards East). The market has a truck-stand on the east. The GCM is also connected by a FRB road, Kansaghat-khaserhat to the west, which is proposed for development under the RTIP project

4.4 Cattle marketing

This not a cattle market.

5 Existing environmental condition

5.1 Water supply

There are 3 tube wells for use in this market, all are functional Groundwater level is 7 m and the installation depth of the tube-wells is 35m. As per information from the market users the water of the tube wells is free from arsenic, but contains a small amount of iron. About 4000 people use the tube-wells on hat day; the number on non-hat day is 2000

It is not clear whether arsenic test has been done on the tubewell water

5.2 Sanitary latrine

Although a large number of visitors visit the market, only one functional latrine is there for use The Leasee and the trade union clean the latrine, hiring sweeper as per requirement

About 1000 people use the latrine on hat day, the number on non-hat day is 500

5.3 Solid wastes management

As per trading volume of goods, a large volume of solid wastes is generated in the market.

There is no effective solid waste management system in the GCM Sweepers clean the market

5.4 Slaughter waste management

Approximately 20 number of cows and goats are slaughtered on hat day, while on non-hat day the number is approximately 10 These animals are slaughtered on the open space of the market.

Bloods from slaughtering of animals are put underground and the other wastes are taken away for ultimate disposal.

5.5 Community's awareness about slaughter wastes

People are not aware of the diseases from the contact of slaughter-wastes

5.6 Storm water drainage system

There is no storm water drainage system in the market As such during heavy rainfall, some places of the market get waterlogging

5.7 Drainage condition of tubewell water

There are three functional tube-wells. Around the tubewell is pucca so that water can not get accumulated around it

5.8 Water pollution from GCM

Within the market there are two ponds which might be polluted from the wastewater from the market As per community views, the Pagla River also does not get any pollution from the wastewater of market since it is

far from the market. Water of this river is used for irrigation purpose.

5.9 Presence of ecologically sensitive and cultural areas

There are some small and large trees surrounding the GCM.

On the west side of the market there is a mosque, on the north a Madrasa and on the south side there is a theater-cum-club in the market

5.10 Erosion and siltation of the GCM

At a distance of 100 m from the market there is a river, namely Pagla, which is meandering in nature, but does not erode the bank at the market side.

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

Consut Shibganj is a big growth center and has a direct communication with Nanbabganjsadar, Gomastapur and Bholahat Upazilla and Soanamasjid Sthalbandar (Landport). The market is famous for mango and guur trading. With the development of the market there will be a significant turnover in the trade transaction Also the environmental condition of the market will improve substantially.

6.2 Objectives of the planning of the GCM as per community

The planning objective is to provide some typical market facilities as well as to improve the environmental condition by providing storm water drainage facilities, improved sanitary latrines, and solid waste management system This all will help increase the revenue earning of the government from the market.

6.3 Need assessment based on public demand

People demand for multipurpose sheds, fish shed, meat shed, slaughter shed, tube wells (7 more), latrines and toilets as shown in the attached sketch The exact number they have not given Apart from these they also demand for mango market

6.4 Public views regarding accommodation of the required facilities

An amount of khas land 125m by 90m is available for market development This land can be used for accommodation of trading facilities

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied. Such criteria have been described in the main report.

7 Sub-project Categorization

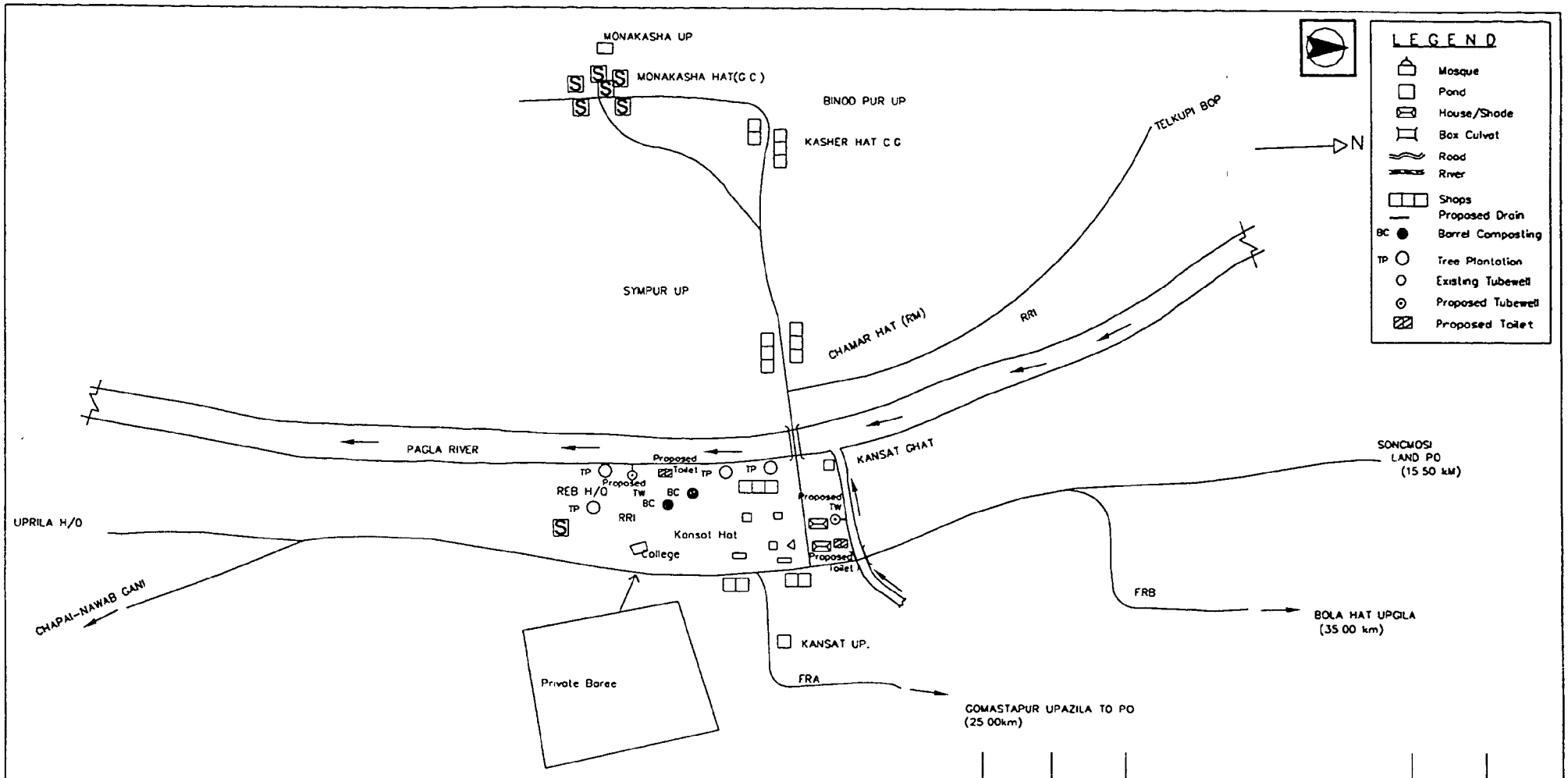
Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 3.1 of the same chapter.

8 Conclusion and Recommendation

There is available khas land in the GCM for market development. Apart from the typical trading facilities such as different types of sheds, toilets, and water facilities, the market needs facilities for mango trading since a large amount of mango transaction occurs here in the mango season

It is always suggested to go on for placing the trading facilities as per local demand of the market, not the typical trading facilities irrespective of market demand

The market can be taken for development under RTIP.



REV NO	DATE	DESCRIPTION	DRWN	CHKD

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT ENGINEERING DEPARTMENT

SMEC

DATE 07 12 2002

DESIGN BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	
SCALE	N.T.S

TITLE: LOCATION MAP OF KANSAT HAT, SHIBGANJ, NAWABGANLJ

FIG.

REV 0

Environmental Analyses Report:Golambari GCM, Village:Golambari, Upazilla:kalai, Dist: Joypurhat

1 Introduction

Golambari GCM is located in the village of Golambari Upazilla: Kalai, District. Joypurhat It is a developed market under the previous project RDP-11. It serves a total population of 45,000 under 7 villages including Golambari, Jindarpur, Ramondanga, Ghaturia, Atahar, Karimpur and Raghra

There are 5 multipurpose sheds, 2 meat-sheds, 2 fish-sheds, one women corner over a market area of . . acre in addition to the environmental facilities such as slaughter shed, drains, tubewell, latrine . Current year lease value of the market is 11,25,000Tk.

The main purpose of the analyses of this developed market is to see the benefits likely to occur in the selected markets under RTIP, by comparing this developed market with non-developed markets.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions;
2) To identify and analyze site constraints for development, if any,
3) To evaluate the GCM with respect to its development objective and intended environmental improvement
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM taking earlier prepared planned GCM map under RDP-11 and evaluated the market in consultation with local people, market users In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

The market is already developed, under previous project RDP-11, over the khas land

4.2 Analyses of the existing landuse

The GCM is fully developed and have all typical facilities of a GCM There are 5 multipurpose sheds, 2 meat-sheds, 2 fish-sheds, one women corner over a market area of acre in addition to the environmental facilities such as slaughter shed, hard surface, drains, tubewell, latrine

4.3 Connectivity

The GCM has very road connectivity It lies on the roadside of Bogra-Joypur RHD Road

4.4 Cattle marketing

There are two areas in the market currently being used as cattle sales yard As per local community the spaces are not adequate to meet the current need; additional 1 acre area is required.

5 Existing environmental condition

5.1 Water supply

There are 5 Tara hand-pumps in the market of which 4 are non-

functional. Tara pumps are costly pumps and require skilled people for their repairmen; in many cases such local skilled manpower is not available. Also this type of tube-wells is not user-friendly and their performance, compared to the low cost hand tube-wells, is not up to the satisfaction and in many cases even poor.

The tube-wells have an installation depth of 25 m below the ground level The water is arsenic free.

5.2 Sanitary latrine

There are two latrines in the market. one near to the Women Corner and the other near to the UMMC office. Both are being used very effectively. One person has been given a charge to maintain the cleanliness of the latrine, which he does spontaneously, for the users pay him (0.5-1.0 Tk for each time use) for the use of latrine This model may have a very good replicability Study is needed as to this can be replicated in other GCMs including those taken under RTIP.

5.3 Solid wastes management

Solid wastes are generated from vegetable wastes and slaughtering wastes mainly The amount on hat day is 40 kg approximately and on non-hat day 10 kg only. Sweepers ,appointed by the trade committee of the market, collect the vegetable wastes and dump them into the garbage pit, for which they are paid from the traders. Wastes from slaughtering are used as fish-food and therefore people collect them for use in their fishponds.

5.4 Slaughter waste management

On hat day 8-10 number of goats and 4-5 number of cows are slaughtered. The amount increases during the time of paddy and potato sales in the market

5.5 Community's awareness about slaughter wastes

People are not aware of the diseases from the contact of slaughter-wastes

5.6 Storm water drainage system

Drains do not work in the market because they have not effective outlet A canal is 1.5 km away from the market, which, as per local community, if used as the drainage outlet, the drains can work well. But this may not be a feasible solution as per the distance of the canal An alternative solution may be sought

5.7 Drainage condition of tubewell water

There is only one functional tubewell with drain to get water discharged, but due to the ineffective outlet, this drain is not working.

5.8 Water pollution from GCM

Water pollution occurs in the ponds, which is due to dumping of slaughter wastes of the GCM into them But this is not a concern to the pond owners since they feel that organic waste in the ponds work as fish-food and they do not pollute water

5.9 Presence of ecologically sensitive and cultural areas

Only a mosque is in the GCM, which will not get affected due to market development There are also two large trees. Their branches have broken and accidents may occur People are in the opinion of uprooting the trees But the tress should be in the GCM, because they contribute a lot towards maintaining a healthy environment in the market.

No other ecologically sensitive area is there

5.10 Erosion and siltation of the GCM

Kalai a flood free area. The soil of the GCM is clayey. There is no river or canal adjacent to or in the vicinity of the GCM. Consequently the GCM is completely free from soil erosion

6 Impact Evaluation of the developed GCM (under RDP-11)

6.1 Impacts as observed by market users

Economic activities have increased in the GCM after its development. Many traders have established their own shops around the market, because demand for commodities has increased after market development The traders have increased by 20%.

6.2 Comment on whether planning objectives are met up

The planning objectives of the GCM as per local community have been fulfilled. This is because all the facilities are there and they are being used effectively; there is an improvement of environment, though drainage of storm water is still a problem. Above all, market lease value has increased

6.3 Comment on whether traders' demand meet up

Cloth-traders informed that there is one shed for their use, which is not adequate At least three shades are required to accommodate them. This has reduced their trading volume At present the paved area is used for trading of clothes, but during rainy days this does not become possible

During the potato and paddy seasons there is a huge demand for space But due to limited space trading of these goods becomes a great problem.

Due to limited space, private land has been taken as lease for use for cattle trading

7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 3 1 of the same chapter

8 Conclusions and Recommendations

Development of GCMs in the rural areas plays a contributing role to the reduction of poverty With the development of GCMs economic activities in and around the GCM increase substantially that establishes and accelerates the backward linkage development

Although the facilities are given for environmental development in the GCMs, still improvement in some areas is not to the satisfactory level and even after development remains the same as before Storm water and sullage drainage and solid waste management are the two key areas where more attention should be paid while planning and designing the market Planning and design of storm water system should focus on integration with the outlet of storm water Planning and design of solid waste management system should pay a special attention to where the wastes will ultimately go, simply providing dustbins is not the solution to the problem Dustbins are the secondary collection points

Environmental Analyses Report: Kalma GCM, Upazilla: Lauhaganj, Munshiganj

1 Introduction

Kalma GCM is located in the Upazilla of Lauhojang of Munshiganj District. It serves population of 5 villages namely Kalma, Dohri, Ghorakanda, Nawpara, Bhabakor.

The total market area is 4.61 acre of which 2.40 acre is khas land. Lease value of the market is 40,000Tk/annum.

At present the market is over congested and there is no khas land for development in the market.

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM. The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED.

4 Some Relevant Issues

4.1 Khas Land availability

There is no khas land available for development of the market Near the market there is a khal which is getting silted up. Local people opines that if the khal is filled up, some 0.25 acre of land will be available for market development and 20 shops can be placed over there

4.2 Analyses of the existing landuse

The market is located adjacent to the FRB (BC) road which has met perpendicularly with a FRA road 7km (to the north side) up of the market On the west side there is a canal along a HBB road (the road is adjacent to the market) On the south side there is a school Within the market there is Agrani Bank and rice mill also and others, all have been shown in the attached map.

4.3 Connectivity

The GCM has very road connectivity. It is directly connected with a FRB (BC) Road which after running about 7km meets with a FRA Road, Munshiganj-via-Tongibari (the road connects Lauhajaung Upazilla HQ)

4.4 Cattle marketing

There is a cattle market in the GCM.

5 Existing environmental condition

5.1 Water supply	There is only one arsenic-free tubewell for use in the GCM.
5.2 Sanitary latrine	There are two latrines for use in the GCM. The trade committee of the market takes the responsibility of operation and maintenance of these latrines. These two latrines are functional.
5.3 Solid wastes management	Solid wastes are generated from vegetable wastes and slaughter wastes mainly. Both types of wastes are directly dumped into the nearby canal. Market Management Committee has appointed sweepers for cleaning operation of the market.
5.4 Slaughter waste management	Slaughtering is done on the bank of canals and wastes from it are directly dumped into nearby canals. On hat day approximately 10 number of cows and 8 number of goats are slaughtered
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact of slaughter-wastes
5.6 Storm water drainage system	There is one drain in the GCM, which has the outlet to the nearby canal The drain is filled up with wastes and sands and lose its functionality
5.7 Drainage condition of tubewell water	There is only one tubewell around which water remains stagnant due to want of drain. The drains are also not kept clean
5.8 Water pollution from GCM	Water pollution occurs in the canal, which is due to dumping of solid wastes from the GCM into it
5.9 Presence of ecologically sensitive and cultural areas	A large banyan tree is on the north side of the GCM, which has cultural value for it is too old. The tree will not come under cutting while developing the GCM
	No other ecologically sensitive area is there
5.10 Erosion and siltation of the GCM	The GCM is adjacent to the canal but the canal is free from erosion. Erosion from local heavy rainfall is also absent in the GCM and adjacent area It is important to note that the canal is also being filled up with high volume of wastes and by the natural siltation process
6 Growth Center Planning	
6.1 Justifications for development of the GCM as per community	Although there is space constraints for market development, still the market users want the market development for environmental improvement
6.2 Objectives of the planning of the GCM as per community	The planning objectives as per local community are to provide tubewell, latrines, improved storm drainage drains, different types of sheds and parking facilities of vehicles
6.3 Need assessment based on public demand	Market users demand for all types of facilities in the GCM as shown in the following table, although space availability is a major constraint In addition to those shown in the table, they also demand for the internal pucca road, internal drain, parking space for rickshaw, van, cycle, tampoo, etc
6.4 Public views regarding accommodation of the required facilities	According to the market users, in the GCM both khas land and private lands are there Private land can be used for market development, but the landowner should get the priority of using the facilities to be provided thereon. Landowners do not want to sale the land to the government for

market development. People also suggest for filling the nearby canal since it has been nuisance from environmental pollution. As per community suggestions, if this canal is filled up, a piece of land amounting to 0.25 acre will be available for market development.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied. Such criteria have been described in the main report.

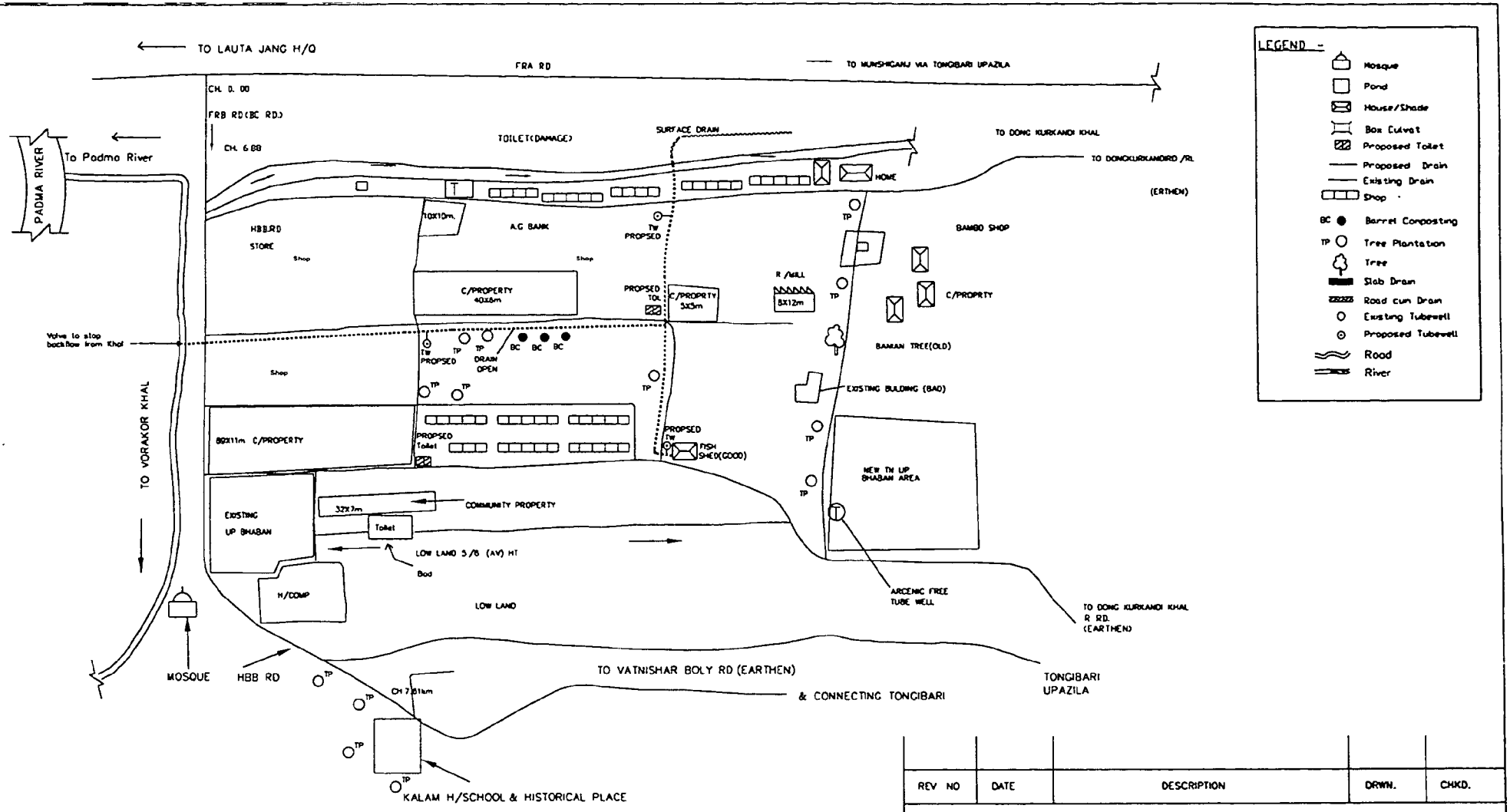
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 3.1 of the same chapter.

8 Conclusion and Recommendation

There is no available khas land in the market for use of infrastructure development in this market. Suggestion comes for filling of a drainage canal along the GCM, for creating khas land since it is already getting silted up and filled up by the dumping of wastes. However that is likely to deteriorate the environmental condition further. It is suggested that this canal be re-excavated and dumping of wastes be stopped there

Under the RTIP project this market only can be taken for environmental improvement, in terms of introduction of improved solid wastes management systems, improved storm water drainage facilities, paving the open earthen surfaces, construction of internal drainage-cum-road, latrines,, and tube wells, etc



REV NO	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

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TITLE: SKETCH OF KALAM BAZAR, LOUHAJONG, MUNSHIGANJ

FIG.

REV 0

Environmental Analyses Report: Matrai GCM, Village: Matrai, Upazilla: kalai, District: Joypurhat

1 Introduction

Matrai GCM is located in the village of Matrai, Upazilla: Kalai, District: Joypurhat It serves a total population of 40,000 under 9 villages including Matrai, birala, Ragunathpur, Indahar, Shalgam, Verendah, Ullipur, Shaogram, Sdhamashira,

There are 17 semi-pucca structures, 200 tin-sheds and 300 kucha shops over a market area of 3.42 acre (the total market area is khas land). Current year lease value of the market is 156000Tk.

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map. Upon consultation with the local people and analyzing the field situation the team did need assessment. In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats.

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED.

4 Some Relevant Issues

4.1 Khas Land availability

An estimated amount of khas land (150mx55m) is available for development in the market As per community views, this land is enough for accommodation of the required facilities

4.2 Analyses of the existing landuse

There are 17 semi-pucca structures, 200 tin-sheds and 300 kucha shops over a market area of .. acre Shops are placed in unplanned way and as such there are much spaces in between shops. There are enough spaces that have been occupied by the temporary shops Both on the north and south there are two ponds. Also an Agrani Bank Branch office, UP office, Political Party Office, Hotel, Union Health Sub-Center, private house are placed very adjacent to the market on the south side.

The hat area is earthen and during heavy rainfall this becomes a nuisance for the market users.

If planned, there would be enough spaces for placing marketing facilities in this GCM

4.3 Connectivity	The GCM has very road connectivity. On the north of the market it is directly connected a FRB road connecting between Pathan para and Rajabirat. On the eastside a FRB Road proposed for development under RTIP (other than 1st year road) connects it with Kalai H/Q.
4.4 Cattle marketing	There is no cattle market in the GCM, but potentiality of cattle marketing is there if developed
5 Existing environmental condition	
5.1 Water supply	There is only one arsenic-free tubewell (as per community, but arsenic test was not done) belonging to this GCM. In addition to this, there are four tube wells of private ownership in the GCM which people also use. The tubewell abstract water from approximately 20m below the ground level
5.2 Sanitary latrine	There is no toilet for use by the traders and visitors in the GCM One toilet is belonging to the UP office which UP people use and do its O&M
5.3 Solid wastes management	Solid wastes are generated from vegetable wastes mainly. The amount on hat day is 40 kg approximately and on non-hat day 10 kg only Sweepers appointed by Leasee collect the wastes and dump them into the nearby pond on the north
5.4 Slaughter waste management	On hat day 8-10 number of cows and goats are slaughtered These are slaughtered outside the market and therefore wastes from the slaughtering are not accumulated in the market.
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact of slaughter-wastes
5.6 Storm water drainage system	There is no pucca drain in the GCM Kucha drains are there which have the outlet into the nearby pond There is no drainage congestion and/or water logging in the market as well
5.7 Drainage condition of tubewell water	There is only one tubewell for use in the GCM around which water remains stagnant due to want of drain.
5.8 Water pollution from GCM	Water pollution occurs in the ponds, which is due to dumping of slaughter wastes of the GCM into them But this is not a concern to the pond owners since they feel that organic waste in the ponds work as fish-food and they do not pollute water
5.9 Presence of ecologically sensitive and cultural areas	Three large banyan trees (60-60 years old) are in the market, which may need to cut in the interest of the market development But these trees must be kept intact since they might have cultural as well as historical values Moreover they provide shade in the area and keep the hat cool with gentle breeze A mosque is in the GCM which will not get affected due to market development. No other ecologically sensitive area is there.
5.10 Erosion and siltation of the GCM	Matrai is a flood free area The soil of the GCM is clayey There is no river or canal surrounding or adjacent to the GCM Consequently the GCM is completely free from soil erosion

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

Approximately 300 traders, mainly the poor, do business in the market. Also 10 women tailors work in the GCM. Women also come for selling milk. After the development of the market the business activities will increase, which will help reduce the poverty of the poor including the distressed women. As per UP Chairman, if the market is developed an estimated amount of 12000-15000 people will get benefited from it.

6.2 Objectives of the planning of the GCM as per community

The planning objectives as per local community are to provide tubewell, latrines, improved storm drainage drains, different types of sheds and parking facilities of vehicles.

6.3 Need assessment based on public demand

Market users demand for all types of usual marketing facilities in the GCM as shown in the following table. In addition to those shown in the table, they also demand for open pucca space for vegetable marketing, cattle sales yard, internal pucca roads, internal drains, parking space for rickshaw, van, cycle, tampoo, etc

6.4 Public views regarding accommodation of the required facilities

Since a large number of unplanned private kucha shops are located on the khas lands, if these shops are removed and better planned infrastructures along with required environmental services are provided for the use of these removed shop-owners, this would be a sustainable market development

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report

7 Sub-project Categorization

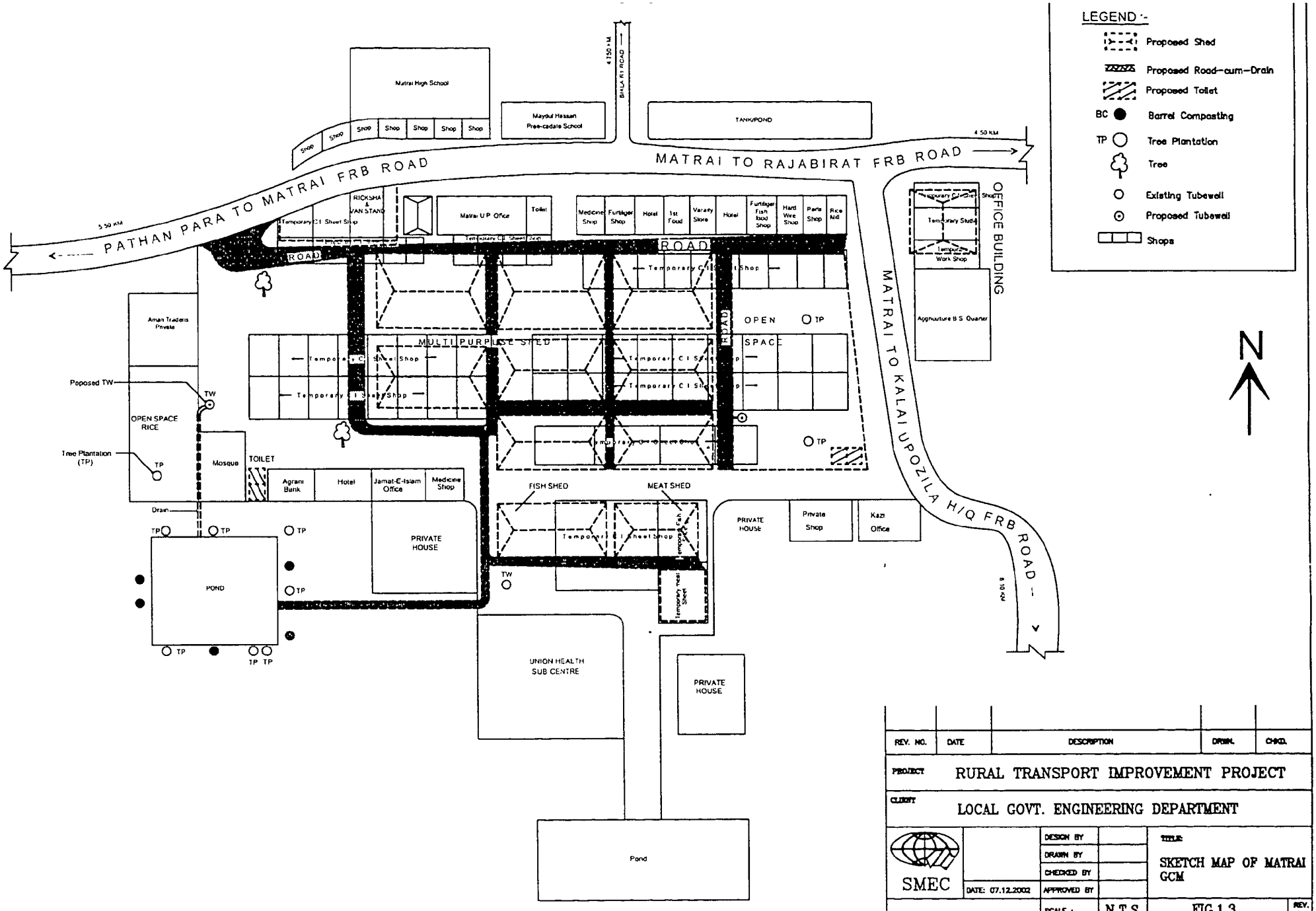
Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 3.1 of the same chapter

8 Conclusion and Recommendation

There are some temporary kucha shops as well as open spaces on the khas land of the market. There are no constraints for market development

In addition to the usual marketing facilities, the market also needs a substantial environmental improvement in terms of introduction of improved solid wastes management systems, improved storm water drainage facilities, paving the open earthen surfaces, construction of internal drainage-cum-road, latrines, and tube wells

Three large banyan trees (60-60 years old) are in the market, which trees must be kept intact since they might have cultural as well as historical values Moreover they provide shade in the area and keep the hat cool with gentle breeze



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TITLE: SKETCH MAP OF MATRAI GCM

FIG.1.3

REV. 0

Environmental Analyses Report: Munshibazar GCM, Upazilla: Rajnagor and District Moulovibazar

1 Introduction

Munshibazar GCM is located at the roadside of Rajnagor-Fenchuganj-Sylhet Road in the Upazilla· Rajnagor and District Moulovibazar

The market area is 7.25 acres (of which 5.25 acre is khas land) over which 33 pucca, 55 semi-pucca, 56 Tong and 23 open sheds are located. The total land of the market is 7.25 acre of which 5 25 acre is khas land. The GCM has per annum lease value TK 183000.

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

An estimated number of 50,000 local people will get benefited from market development

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM. The team investigated the GCM and prepared base map. Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

2.5 acres of khas land are available for market development At present, there are 40 temporary sheds (Tongi ghar) over these khas lands As per traders, all these Tongi ghar will be removed before the market development. There is an existing damaged fish-shed which will also be demolished before development of the GCM

4.2 Analyses of the existing landuse

Within the market there are 33 pucca, 55 semi-pucca, 56 Tong and 23 open sheds, open sales yard (40m by 15 m) Also a cattle yard (40mby 60m) is there

Surrounding the market a mosque on the south side, a Kali Mandir (temple) on the north side, UP office, Land office, High School area are also there

On the west side Rajnagar-Fenchuganj_Sylhet Road, on the north side a FRB Road going through the market, and some private lands on south side are the over all landuse features for the GCM.

4.3 Connectivity

The GCM has good road connectivity. On the eastside of the GCM Rajnagor-Fenchuganj-Sylhet Road passes and from this road Munshibazar-Sonatiki-Mokambazar Road (proposed for development under 1st year program of RTIP) starts at the market location. Also through the market a FRB Road, namely Lohani-Munshibazar Road goes towards the tea garden.

4.4 Cattle marketing

This is a cattle market. An open space of 40 m by 60 m is used as cattle yard.

5 Existing environmental condition

5.1 Water supply

There is no tubewell for use of GCM. Two hand tube wells, one belonging to the UP office and the other one belonging to the mosque are there Market users use this tube wells

It is not clear whether these tube wells are arsenic and fluoride free.

5.2 Sanitary latrine

There is no latrine for use of GCM: one latrine belonging to the UP office and the other one belonging to the mosque Market users are not allowed to use them.

5.3 Solid wastes management

There is no solid waste management system in the GCM.

An estimated amount of 3 metric tons of solid wastes are generated in the GCM on hat-day. MMC have employed some sweepers to collect and dump these wastes in the surrounding low-lying areas of the GCM, mainly ditches and ponds, and sometimes on the paddy field.

5.4 Slaughter waste management

On hat-day, on average 10-15 cattle are slaughtered along the roadside, in the open sales yards. On non-hat day the figure is 2-3. There is no treatment facilities or improved system for managing these wastes Usually bloods are buried into the ground and the other wastes (cow-dung) are taken away for dumping into the low-lying areas

5.5 Community's awareness about slaughter wastes

People are not aware of the diseases from the contact of slaughter-wastes

5.6 Storm water drainage system

There is no storm water drainage system in the market. During heavy rainfall, drainage congestion occurs due to lack of drainage outlet mainly Also the unplanned shops and inappropriate landuse are responsible for the deteriorating storm water drainage.

5.7 Drainage condition of tubewell water

There are two tube wells, one for use of the mosque and the other for use of UP office As the ground of these tube wells is not pucca, and there is no drain for draining out water, groundwater might have polluted .

5.8 Water pollution from GCM

The pond water gets polluted from dumping of solid wastes into it Groundwater also might be polluted from the leachate of decomposed solid wastes

5.9 Presence of ecologically sensitive and cultural areas

There is no ecologically sensitive area in and around the market. One mosque, one temple, one high school and one tea garden are along the periphery of the market.

5.10 Erosion and siltation of the GCM

The soil is silty-clayey The GCM is not located along any river/canal bank

The GCM is free from erosion and siltation of any nature.

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

This is an important GCM located at the junction of 3 unions, namely Uttarbash, Munshibazar and Rajnagor. Also it is along the Dhaka-Sylhet National Highway and there is FRB road connectivity with this GCM. All indicate that there is a high potentiality for multi-folded increase in trade-transaction if the market is developed.

6.2 Objectives of the planning of the GCM as per community

At present the market is not arranged in a planned way and the environmental condition is very poor The planning objectives, as per community, are for environmental improvement including removing drainage congestion and waterlogging problem, introduction of a better solid-waste management system, and also accommodating many traders by the construction of a multistoried market Market users showed interest to contribute to the establishment of the multi-storied market

6.3 Need assessment based on public demand

Market users demand for 6 multi-purpose shops, one fish-shed, one multipurpose shopping complex, one pucca cattle yard, one toilet but no tubewell.

8.4 Public views regarding accommodation of the required facilities

If the market is planned in an appropriate way, it is possible to provide many traders in the limited market area.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report

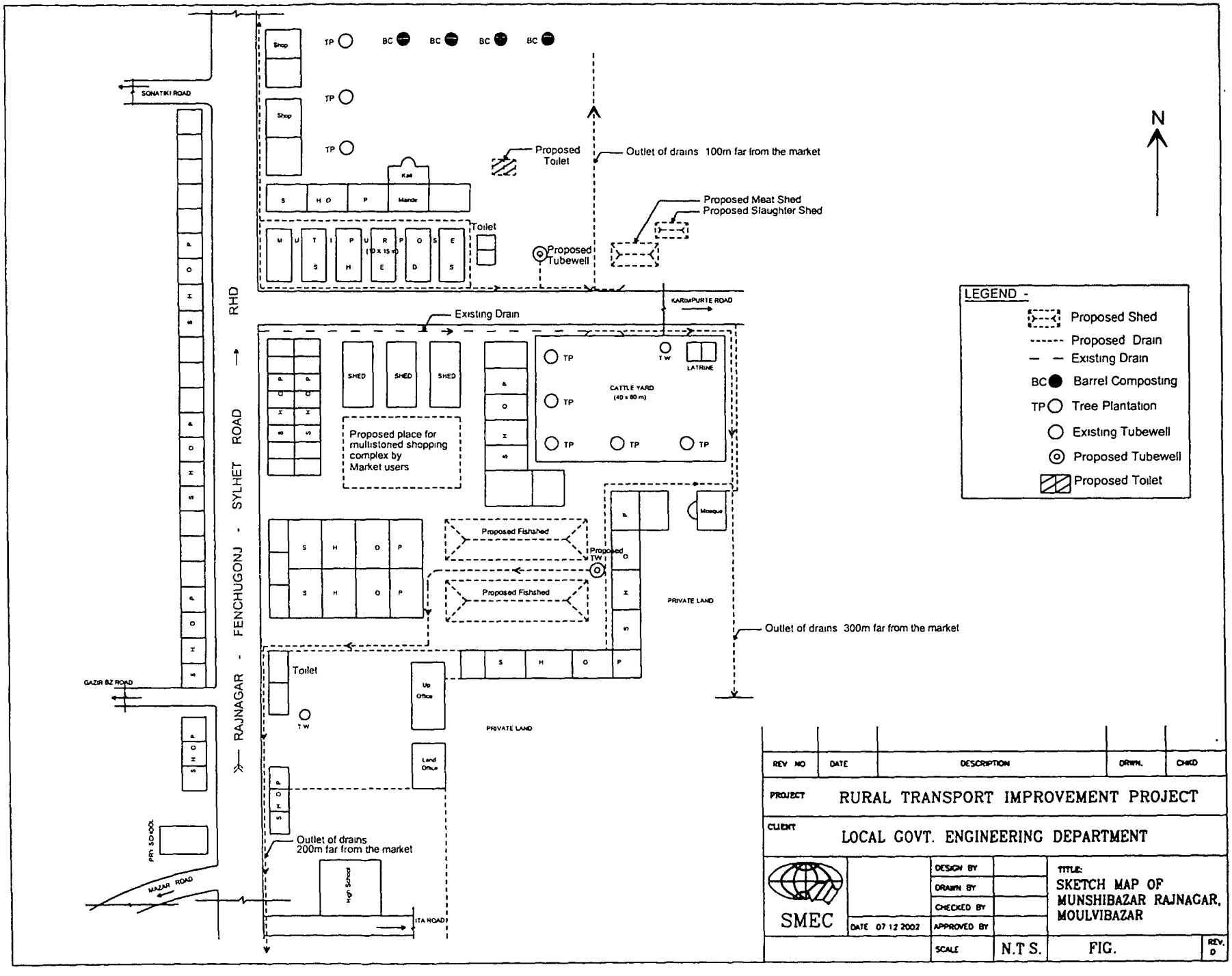
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4 1 of the same chapter

8 Conclusion and Recommendation

There is no available khas land in the market for use of infrastructure development. Suggestion comes from market users for displacement of a large number of temporary shops that will create available land for placing trading facilities and accommodating more traders in the limited space They also demand for a multistoried shopping complex and in this regard they show their willingness to contribute in terms of money.

Under the RTIP project this market can be taken for infrastructure development as well as environmental improvement, in terms of introduction of improved solid wastes management systems, improved storm water drainage facilities, paving the open earthen surfaces, construction of internal drainage-cum-road, latrines,, and tube wells, etc



REV NO	DATE	DESCRIPTION	DRWN.	CHKD

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

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DATE 07 12 2002

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TITLE: SKETCH MAP OF MUNSHIBAZAR RAJNAGAR, MOULVIBAZAR

FIG.

REV. 0

Environmental Analyses Report: Pthakata GCM, Village: Mohadevpur, Upazilla: Mohadevpur, Naogaon

1 Introduction

Pathakata GCM is located in the village, Mohadevpur, Upazilla: Mohadevpur and District Naogaon. It serves a total population of 50,000 of several villages including Pathakata, Sreenagor, Chalkshially, Prashadpur, Mathur, Krishnapur, Mathurpur, Eswar Luximpur, Dakhhin Luximpur, Hamidpur, Phapuri.

The market area 8.61 acre (total land is khas land) over which 20 tin-sheds, 270 temporary sheds, 42 permanent sheds, 270 movable and 62 non-movable shops are placed. The GCM has per annum lease value TK 333000

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits.

An estimated number of 2500 poor people 25-30 disables, 250 women and 1000 tribes will get benefited from market development.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions;
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

A piece of khas land (100mx82m) is available for market development Temporary shops occupy these lands Besides, some poor people are using khas land of the market illegally But they have been living here since the liberation in1971 and displacement of these people will trigger social conflicts, affecting the market development Some of them consented that they would move other places if compensation is given to them; while some others do not agree

4.2 Analyses of the existing landuse

Within the market a total of 20 tin-sheds, 270 temporary sheds, 42 permanent sheds are located.

Atrai River is to the west of the market; to the north is the human settlement, behind of that agricultural land; to the south is canal, and to the east is primary school/high school and human settlement.

	At present, shops are located in unplanned manner. When the market will be developed and these shops will be displaced, then within the same area more traders will be able to do trade
4.3 Connectivity	The GCM has roadway connectivity
4.4 Cattle marketing	There is a cattle market in the GCM
7 Analyses of existing environmental conditions	
5.1 Water supply	There are 5 tube wells for use in this market, of which 3 are functional and 2 are non-functional. These tube wells abstract water from 60 ft below the ground. Water contains iron. During dry season water table falls and some TWs do not have water As per community information, TWs need to install 75-90 below the ground to get water in all seasons No arsenic and fluoride test has been performed on tubewell water.
5.2 Sanitary latrine	There are two latrines for use in the GCM. The trade committee of the market takes the responsibility of operation and maintenance of these latrines These two latrines are functional.
5.3 Solid wastes management	On hat day an estimated amount of 550kg and on non-hat day 40 kg of solid wastes are generated in the GCM Over 90% of wastes are organic in nature and constitute vegetable wastes and slaughtering wastes mainly There is no effective solid waste management system in the GCM No sweeper is there for cleaning of the market Even the leasee doe not appoint any one although he is responsible for cleaning the market Traders with their own initiatives clean the market just before hat-day Wastes are dumped into the low-lying area and surrounding canal During flood season there is no major water pollution in the canal, as flow remains enough During dry season the pollution of water might be high enough
5.4 Slaughter waste management	On hat-day, on average a 12 number of cows and 20 number of goats are slaughtered There is no treatment facilities or improved system for managing these wastes On hat day about 100 kg of slaughter wastes are generated These wastes are simply dumped into the low-lying area and canal
5.5 Community's awareness about slaughter wastes	Market users and traders informed that from the contact with slaughter wastes no body in the area has suffered from diseases In fact people are not aware of the diseases from the contact of slaughter-wastes
5.6 Storm water drainage system	The drains in the market are non-functional. There is drainage congestion in the market and sometimes the situation gets worse since water comes from the canal in the form of back flow (through the drainage outlet falling into the canal). In extreme condition water remains stagnant in the GCM for up to 8 days
5.7 Drainage condition of tubewell water	There are 3 functional tube wells. Due to lack of drainage facilities water around the tube-wells remains stagnant During rainy days the market situation turns into severe the market area becomes fully muddy which overall affect the trading activities

5.8 Water pollution from GCM

Water pollution occurs in the canal due to dumping of wastes into it. There are two hat days in a week and on average 500kg of solid wastes per hat day, over which 90% is organic, goes to the canal. On non-hat day the average amount comes down to 40 kg/day.

5.9 Presence of ecologically sensitive and cultural areas

There are 6 large size trees in the GCM, which have been sold by the DC Office recently.

There is one mosque and one temple adjacent to the GCM.

5.10 Erosion and siltation of the GCM

The GCM is free from river erosion and siltation. Local erosion from heavy rainfall is not also there. The GCM is within the flood protection area, flood protection embankment by BWDB is there which has CC Blocks on its slope as riverbank protection works.

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

As per community views, there will be improvement in the three areas from market development (1) Lease value of the market will increase (2) Muddy problems during rainy days will remove if the market area is fully made hard (3) Waterlogging problem will remove.

6.2 Objectives of the planning of the GCM as per community

The market should be developed for environmental improvement including removing drainage congestion and waterlogging problem, introduction of a better solid-waste management system, removing of the muddy problem in the hat days and also placement of more traders in the limited area with better planning.

6.3 Need assessment based on public demand

An estimated land of 100 m by 75 m is required for placement of different sheds and other environmental improvement facilities

On hat day about 1700 persons visit the market and on non-hat day 200 persons

As per survey work it is not clear how many traders are there and how many sheds and other facilities are required.

In a typical market at least two latrines, two tube wells (one close to the latrine and the other for drinking purpose), two multipurpose sheds, one fish shed, one meat shed, one slaughter- shed, improved storm water drainage facilities, sullage drainage facilities, hard surface, open sales yard, internal pucca road, and should be there

The market has been designed and planned as per above minimum requirement.

6.4 Public views regarding accommodation of the required facilities

If the market is planned in an appropriate way, it is possible to provide many traders in the limited market area.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied. Such criteria have been described in the main report.

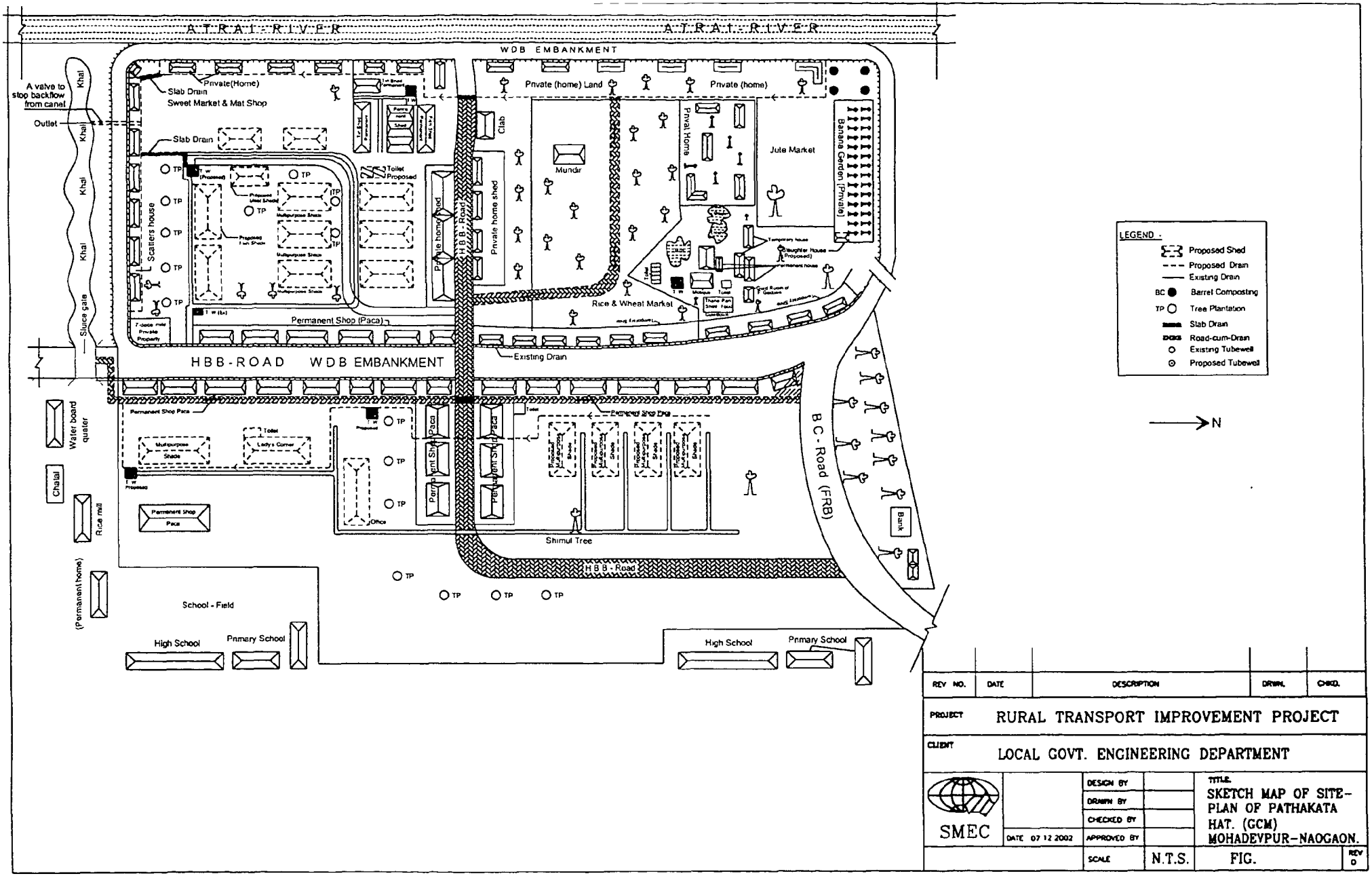
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4.1 of the same chapter.

8 Conclusion and Recommendation

There is no available khas land in the market for use of infrastructure development in this market. Suggestion comes from market users for displacement of a large number of poor who are occupying the khas lands since liberation However these poor people do not agree to be displaced even they are paid for.

Under the RTIP project this market only can be taken for environmental improvement, in terms of introduction of improved solid wastes management systems, improved storm water drainage facilities, paving the open earthen surfaces, construction of internal drainage-cum-road, latrines,, and tube wells, etc



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SCALE: N.T.S.

TITLE: SKETCH MAP OF SITE-PLAN OF PATHAKATA HAT. (GCM) MOHADEVPUR-NAOGAON.

FIG.

REV 0

Environmental Analyses Report: Rajbarihat GCM, Upazilla: Nachol, District: Chapainawanganj

1 Introduction

Rajbarihat GCM is located in the upazilla of Nachol under the district of Chapainawabganj. It is an important market and has a very good road connection with three upazillas namely Nachol (Chapainawabganj), Noamotpur (Naogaon) and Tanore (Rajshahi). On hat day the number of visitors is 10,000 and on non-hat day it is 2500. As per market users, trading volume in terms of money is 60 lakh and 10 lakh for hat-day and non-hat respectively. After the development of the market, the trading volume in the market will increase at least 1.5 times of the present one.

The total market area is 8.50 acres (of which khas land is 2.50 acre) over which 980 numbers of shops are located and out of this only 10 are permanent and the rest are temporary Current lease value of the market is Tk 2.14 lakh per annum.

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits.

An estimated number of 1000 distressed men, 100 distressed women and 5000 low-income people will get benefited from the market development.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM. The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment. In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

The khas land of the market 2 17 acre over which 980 numbers of shops are located and out of this only 10 are permanent and the rest are temporary As per market users, 1 acre of private land is close to the market which can be used for market development

4.2 Analyses of the existing landuse

Within the market 980 numbers of shops are located and out of this only 10 are permanent and the rest are temporary.

On the north side of the market a FRB Road, school, temple and residential areas are there; on the south side of the market there are residential areas along with good number of trees; on the east side there are ponds and agricultural lands; and on the west side there are residential areas and agricultural lands. On the south-east corner of the

market there is a mosque and a Mazar.

4.3 Connectivity

The GCM has very good road connectivity. It is connected with Nachole H/Q and Nachole GCM by a road developed under RDP-7; this road meets with another Roadr at Nachole H/Q connecting between Amnura and Adda. The GCM has several other rural road connections with it.

4.4 Cattle marketing

This not a cattle market

5 Analyses of existing environmental conditions

5.1 Water supply

There are 3 tube wells and one well in this market, of them 2 tube wells are functional and the well is non-functional. These tube wells abstract water from 35 m below the ground, although groundwater table is 25m below the ground. As per information from the market users the water of the tube wells is free from arsenic, but contains a small amount of iron. About 1000 people use the tube-wells on hat day; the number on non-hat day is 400.

It is not clear whether arsenic test has been done on the tubewell water

5.2 Sanitary latrine

Although a large number of visitors visit the market, only two toilets are there, which are about non-functional

Although the toilets are about non-functional, about 300 people use the latrines on hat day, the number on non-hat day is 150

5.3 Solid wastes management

As per trading volume of goods, a large volume of solid wastes is generated in the market.

There is no effective solid waste management system in the GCM. Sweepers clean the market once in a week.

5.4 Slaughter waste management

Approximately 8-10 animals are slaughtered on hat day. There is no slaughter shed and the animals are slaughtered on the open space of the market People inform that nobody got any disease from the contact of slaughter wastes.

Bloods from slaughtering of animals are put underground and the other wastes are taken away for ultimate disposal

5.5 Community's awareness about slaughter wastes

In true sense, people are not aware of the diseases from the contact of slaughter-wastes

5.6 Storm water drainage system

There is no storm water drainage system in the market. As such during heavy rainfall, some places of the market get waterlogging but to a small extent

5.7 Drainage condition of tubewell water

There are two functional tube-wells. Water gets accumulated around it.

There is no sullage drain in the market.

5.8 Water pollution from GCM

On the eastside of the GCM, there is a large pond, which receives wastewater from the market. But as per people, this is not a concern to them.

5.9 Presence of ecologically sensitive and cultural areas

There are two large (100 years old) Pikor trees, one mosque, one Mazar within the market. Near the market there are one high school, one primary school, one temple. People are in the opinion of cutting these trees. But from environmental point of view they should be preserved since they might have some cultural values for their elderliness.

5.10 Erosion and siltation of the GCM

Most of the soil is highly clayey and the remaining is clayey-silt. The market is also not located at a river or canal bank. As such there is no erosion or siltation in the market or any of its adjacent areas

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

Rajbarihat GCM is located in the upazilla of Nachol under the district of Chapainawabganj. It is an important market and has a very good road connection with three upazillas namely Nachol (Chapainawabganj), Noamotpur (Naogaon) and Tanore (Rajshahi). On hat day the number of visitors is 10,000 and on non-hat day it is 2500. As per market users, trading volume in terms of money is 60 lakh and 10 lakh for hat-day and non-hat respectively. After the development of the market, the trading volume in the market will increase at least 1.5 times of the present one.

6.2 Objectives of the planning of the GCM as per community

The planning objective is to provide some typical market facilities as well as to improve the environmental condition by providing storm water drainage facilities, improved sanitary latrines, and solid waste management system. This all will help increase the revenue earning of the government from the market.

6.3 Need assessment based on public demand

People demand for three multipurpose sheds, one fish shed, one meat shed, one slaughter shed, three tube wells and one latrine as shown in the attached sketch.

6.4 Public views regarding accommodation of the required facilities

At present there is 2 17 acre of khas land for the market Besides this, there is also 1 acre of private land, which according to the market users, none has the possession. This land can also be used for market development

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report

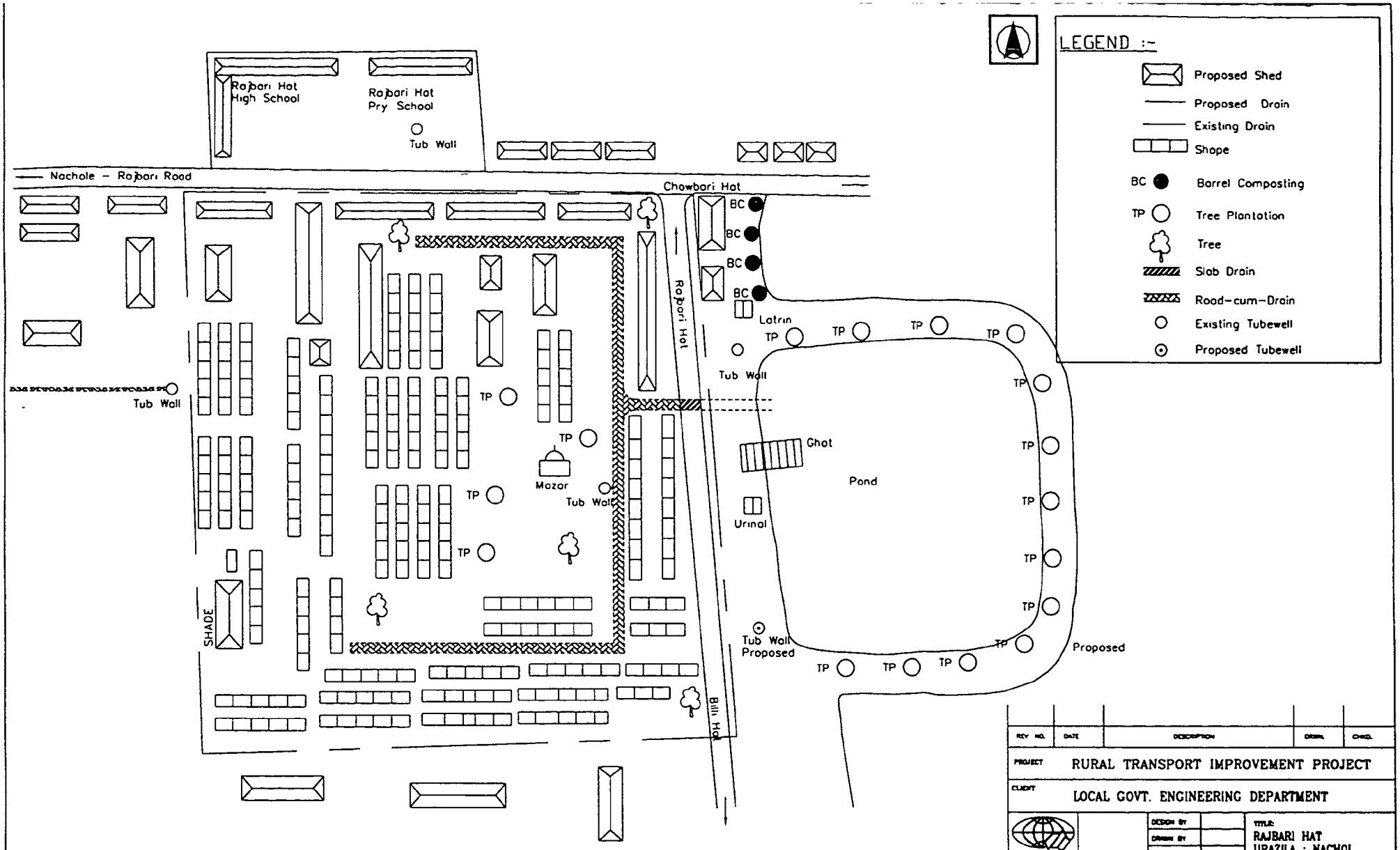
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4.1 of the same chapter.

8 Conclusion and Recommendation

The market has a great potentiality of development and khas land is there for development of trading facilities and environmental improvement

The market can be taken for development under RTIP


Rajbari Hat
High School
Rajbari Hat
Pry School
Tub Wall
Nachole – Rajbari Road
Chowbari Hat
BC
BC
BC
BC
Latrin
TP
TP
TP
TP
Tub Wall
Rajbari Hat
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SHADE
Bilti Hat
LEGEND :-
Proposed Shed
Proposed Drain
Existing Drain
Shape
BC Barrel Composting
TP Tree Plantation
Tree
Slab Drain
Road-cum-Drain
Existing Tubewell
Proposed Tubewell
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PROJECT
RURAL TRANSPORT IMPROVEMENT PROJECT
CLIENT
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DRWN BY
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APPROVED BY
DATE 07.12.2002
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N.T.S.
TITLE:
RAJBARI HAT
UPAZILA : NACHOL,
DIST : CHAPAINAWABGANJ
FIG.
REV 0

Environmental Analyses Report: Rajniganj GCM Upazilla: Derai, District: Sunamganj

1 Introduction

Rajniganj GCM is located at the bank of kalne River, Upazila Derai of Sunamganj District. It serves a total of about 11000 population of 3 villages including Rajniganj (3000),Sakitpur (4500) and Matiapur (3400).

The total market area is 4 0 acres (of which 1.32 acres is khas land), over which 3 pucca buildings, 15 semi-pucca buildings, 5 tin-sheds and 4 kucha shops are placed. The GCM has per annum lease value Tk115000/annum.

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits.

An estimated number of 120 traders would be benefited from the GCM development

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

Within the main part of the GCM no khas land is available for use for infrastructure placement. In the backyard of the market some open khas land is there, but subject to major earth filling it can be used.

4.2 Analyses of the existing landuse

The GCM is surrounded by the Kalne River to west, a canal to the east, football field and primary school to the south as shown in Sketch-A These all prohibit the expansion of the GCM to any side

On a rough figure, 60% of land is for agriculture use, 20% for waterbodies and the rest 20% for residential use

Spaces suggested for development requires earth filling of low-lying khas lands along the river and canal. No khas land within the GCM is available for infrastructure placement.

4.3 Connectivity

Waterway is the main route to the GCM for commodity transport. However, rural road connection is there serving the population of the

	GCM catchment area. For FRB connection with this GCM, a large bridge of more than 200m length over the Kalne River is required.
4.4 Cattle marketing	There is no cattle market in the GCM.
5 Analyses of existing environmental conditions	
5.1 Water supply	Only one tubewell belonged to a mosque that has iron-free water from deep aquifer (>150m depth) is serving the GCM. No test has been done on arsenic and fluoride content of the TW. But the area is believed arsenic free as water is collected from deep aquifer
5.2 Sanitary latrine	There is no latrine for use in the GCM. As usual practice, people in the emergency use latrines of others (mosques, school, etc) on request
5.3 Solid wastes management	Major part of solid wastes comes from vegetable handling, wastes from kitchens of hotels. Wastes remain scattered on the ground. Virtually there is no system for solid waste management in the GCM
5.4 Slaughter waste management	No slaughter shed is in the GCM. A Very few cattle are slaughtered, occasionally 2-3 times in a month. Wastes from slaughtering are buried in the ground.
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact with slaughter wastes
5.6 Storm water drainage system	No storm water drainage system is in the market During heavy rainfall rainwater remains stagnant for few hours causing severe problems to the market users.
5.7 Drainage condition of tubewell water	Around the tubewell of mosque, water remains stagnant for want of drains.
5.8 Water pollution from GCM	It is likely that water of Atrai river gets polluted from the discharge of organic wastes into it, particularly during lean period, when the pollution assimilation capacity gets down because of low flow During high flow, pollution is not so much.
5.9 Presence of ecologically sensitive and cultural areas	No ecological and cultural sensitive area is in the area
5.10 Erosion and siltation of the GCM	Kalne river has a very defined shape with a outward turning, with a slight bank eroding tendency at the GCM. As per community concerns, no bank protection work at the GCM is required
6 Growth Center Planning	
6.1 Justifications for development of the GCM as per community	As per community views, development of this GCM is justified for (1) lease value would increase after development; (2) environmental condition will improve (3) entrepreneurship development by women will occur.
6.2 Objectives of the	To provide the market with improved marketing facilities for intended

planning of the GCM as per community

rise in lease value, provide business facilities for the women and improve the environmental condition.

6.3 Need assessment based on public demand

At present 2500-3000 people visit the market on hat day and 400-500 people on non-hat day. Although space availability is a major constraint for market development, market users still set a demand for 1 multipurpose shed, 2 latrines, 2 tube wells, some drains as minimum requirements.

6.4 Public views regarding accommodation of the required facilities

Market users suggested for renovation of the existing fish-shed and make it extended to use as multipurpose shed. They also want to use a very small part (adjacent to the market) of a large play ground of the primary school for market extension and development In this connection they refer that school committee is willing to leave this piece of land for hat development. At present this part is used as vegetable market on hat day.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied. Such criteria have been described in the main report.

7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4.1 of the same chapter.

8 Conclusion and Recommendation

From transport of goods consideration, FRB connectivity requirement as necessary condition for market development, the decision for undertaking the GCM for development under RTIP may need to rethink further.

Space constraint is a major problem for the development of this GCM. Present environmental condition is substantially poor and no facilities are there for maintaining better environment As such there is an absolute requirement of environmental improvement in the GCM, even though infrastructure development is not undertaken

Environmental Analyses Report: Rupsha GCM, Faridganj, Chandpur

1 Introduction

Rupsha GCM is located in the upazilla of Faridgabj, District. Chandpur. It is a congested market of an area 1.66acre. It has 20 numbers of pucca shops, 50 number of semi-pucca shops and 480 number of kucha shops. On hat day approximately 4000 people visit the market.

The total market land is 5.17 acres of which 2 35 acre is khas land. Annual lease value of the market is 141000Tk.

The market has a very good turnover of goods: 15-ton paddy, 100 number of cows and 6-7 ton of fishes. This indicates the importancy of market development

Standard development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits.

An estimated number of 1500 people of 6 unions are expected to get benefited from the market development.

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions;
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand (from community consultations and market standards);
4) To analyze different technology alternatives,
5) To analyze different management/institutional alternatives for sustainable use of the facilities;

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment. In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED.

4 Some Relevant Issues

4.1 Khas Land availability

The GCM has a total of 1 66 acre of khas land, which are in the scattered form As per information of the community people about 65 traders have occupied this land and established approximately 300 shops over there Thus there is no available khas land for market development. As per community, removal of these shops may arise a great social conflict, which might hinder the market development

4.2 Analyses of the existing landuse

Within the market area, 20 numbers of pucca shops, 50 number of semi-pucca shops and 480 number of kucha shops are there The surrounding areas of the GCM comprises of agricultural lands and residential areas (mostly) and also a pond.

4.3 Connectivity

4.4 Cattle marketing There is a cattle market in the GCM.

5 Analyses of existing environmental conditions

5.1 Water supply There are 5 shallow tube wells and one deep tubewell for use in this market. Shallow tube wells are installed at a depth of 35 m from the ground level and deep tubewell at a depth of 250 m. Water from shallow aquifer contains iron and arsenic where that from deep aquifer is arsenic free. UP office usually maintains the tube wells.

5.2 Sanitary latrine There is one latrine for use in the GCM MMC carries out the maintenance work of the latrine.

Approximately 200 peoples use the latrine on hat day and 50 on non hat-day.

5.3 Solid wastes management On hat day, an estimated amount of 2 metric ton and on non-hat day 500 kg of solid wastes are generated in the GCM, over 90% of which are vegetable wastes Sweepers collect the wastes and dispose them into the nearby canal

5.4 Slaughter waste management On hat day, on average 10 numbers of cows are slaughtered in the GCM, which generates an amount of 200 kg of wastes. Appointed sweepers collect these wastes and dump them into the nearby canal

5.5 Community's awareness about slaughter wastes As per community views regarding the pollution from slaughter wastes, canal water is not polluted so much and there is no evidence of disease from the contact of slaughter wastes or use of canal water.

In fact people are not aware of the diseases from the contact of slaughter-wastes

5.6 Storm water drainage system The market lacks in storm water drainage system During heavy rainfall, water remains stagnant in the GCM for up to 3 days

5.7 Drainage condition of tubewell water There are 5 functional tube wells Due to lack of drainage facilities water around the tube-wells might have remained stagnant But as per community views there is no evidence of groundwater pollution from this stagnant wastewater.

5.8 Water pollution from GCM Water pollution occurs in the Romar canal, 150 m away from the GCM, due to dumping of solid wastes (both vegetable and slaughter wastes) into it

5.9 Presence of ecologically sensitive and cultural areas There is ecologically sensitive and cultural area in and around the GCM

5.10 Erosion and siltation of the GCM The soil of this area is silty-clayey. The area is free from river flooding due to a BWDB embankment, namely CIP. As a result, there is no erosion and siltation from river flooding. Local erosion and siltation from heavy rainfall also does not occur due clayey-silt soil.

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

As per community views, there will be improvement in the three major areas from market development (1) Expansion of trading will occur; (2) Income-generating activities of the women will increase. (3) Farmers will get the right price of their goods and (4) Trading activities will enhance if shades are constructed

6.2 Objectives of the planning of the GCM as per community

The planning objectives of this GCM are to place the shades, slaughter house, drains, latrines, tube wells and other physical structures appropriately in an integrated fashion so that they collectively serve the overall purpose of the market development.

6.3 Need assessment based on public demand

People do not mention of their specific needs to be fulfilled by market improvement.

6.4 Public views regarding accommodation of the required facilities

If the market is planned in an appropriate way, it is possible to provide many traders in the limited market area.

6.5 Sketch of planned growth center

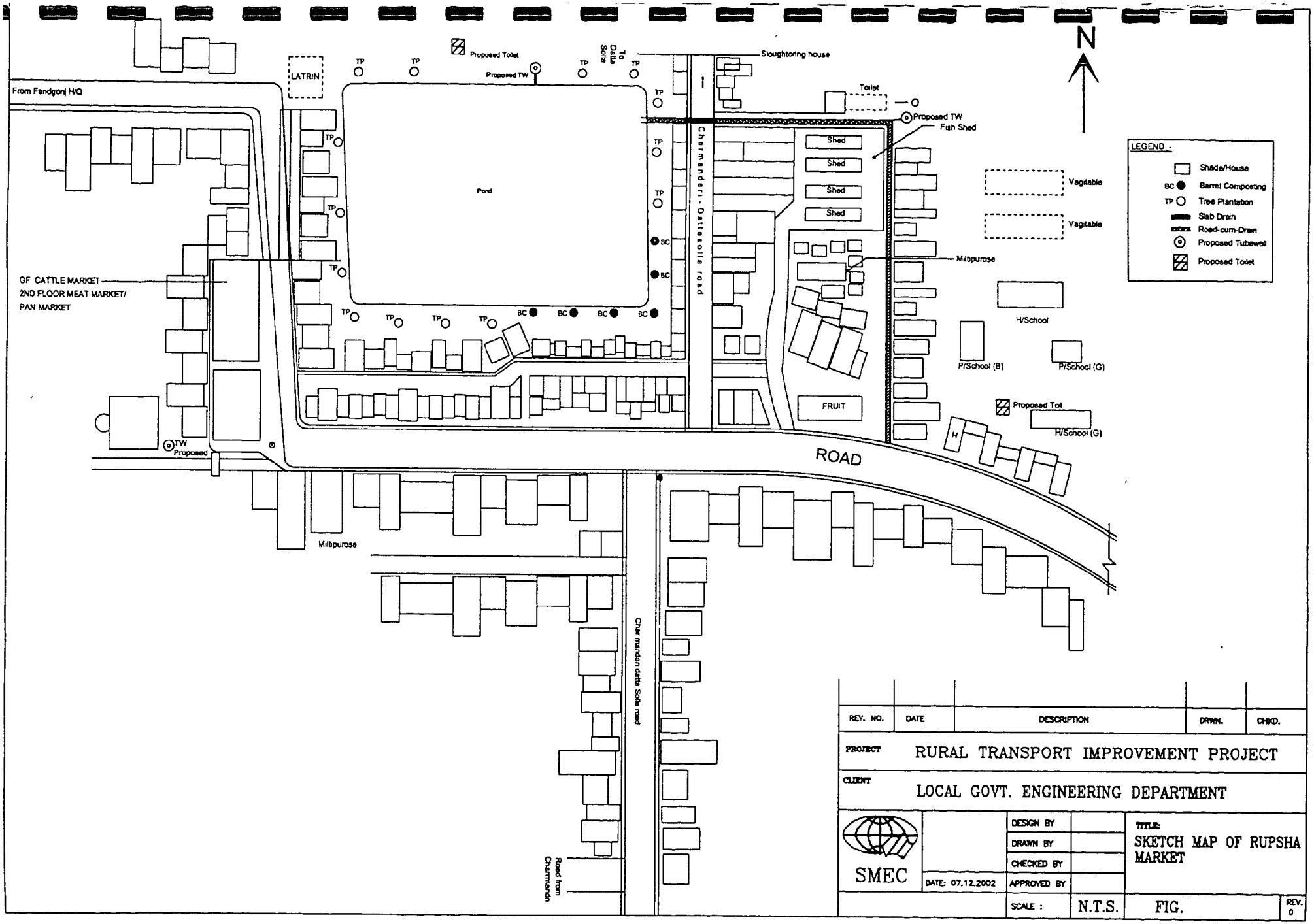
Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied. Such criteria have been described in the main report.

7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4.1 of the same chapter.

8 Conclusion and Recommendation

The market can be undertaken for implementation under the RTIP, with the environmental improvement measures as suggested along with the required infrastructure development.



REV. NO.	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE: 07.12.2002

DESIGN BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	
SCALE :	N.T.S.

TITLE: SKETCH MAP OF RUPSHA MARKET

FIG.

REV. 0

Environmental Analyses Report: Samajpara GCM Upazilla: Atrain District: Naogaon

1 Introduction

Samajpara GCM is located at the bank of Atrai River, Upazila Atrai of Naogaon District. It serves 15000 population of 11 villages including Mohongonesh, Khalpara, Vanjangal, Horipur, Dubai, Khaskhaniar, Islampur, Islamgati, Poisata, Jaganthpur, Majgram.

The market area is 2.85 acre, which is the khas land, over which 105 nos of temporary and 77 nos of permanent shops are placed The GCM has per annum lease value Tk 5,000

Development of GCM would be in terms of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any;
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map. Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED.

4 Some Relevant Issues

4.1 Khas Land availability

Once the temporary kucha shops are removed, khas land is available for infrastructure placement.

4.2 Analyses of the existing landuse

The GCM is surrounded by the Atari River to the south; High School, Bank, UP Office to the west, ponds, football field and primary school to the north; and canal and human settlement to the east as shown in Sketch-A These all prohibit the expansion of the GCM to any side

Spaces suggested for development contains temporary low-valued kucha shops, replacement of which are suggested for development. The shopkeepers are willingly to replace in the interest of overall market development.

4.3 Connectivity

Only waterway connection is there with the GCM.

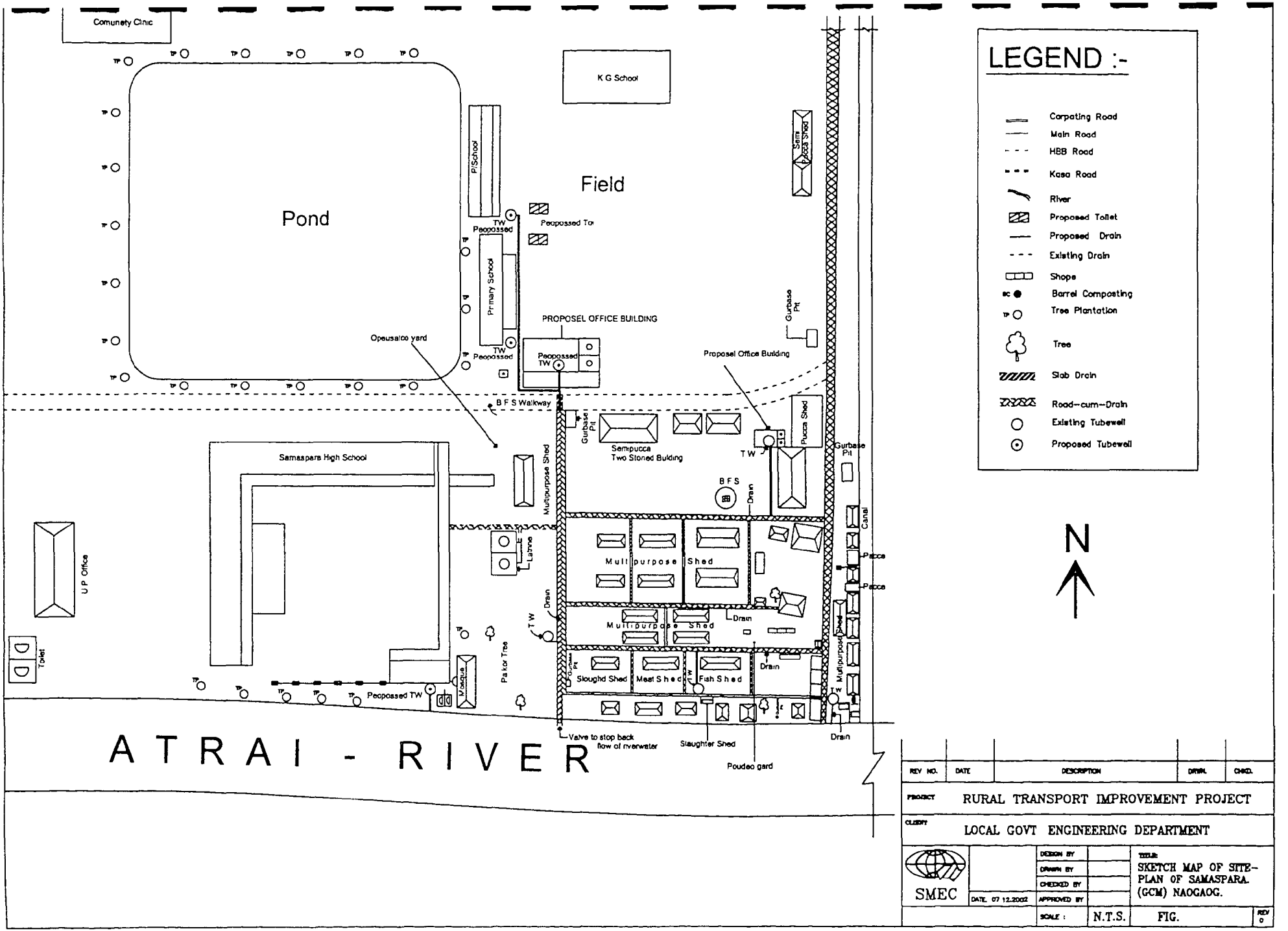
4.4 Cattle marketing

There is no cattle market in the GCM.

7 Analyses of existing environmental conditions

5.1 Water supply	Only one tubewell that has iron-free water from a shallow aquifer (10m depth) is in the GCM. No test has been done on arsenic and fluoride content of water
5.2 Sanitary latrine	There is no latrine for use in the GCM. As usual practice, people in the emergency use latrines of others (mosques, school, UP office, etc) on request.
5.3 Solid wastes management	Bulk volume of solid wastes is mainly from vegetable marketing that amount 150-kg on hat day and 10 kg on non-hat day. Sweeper collects the wastes and disposes into Atrai river directly He collects money for this service from the sellers.
5.4 Slaughter waste management	On hat-day slaughter wastes are generated from slaughtering and meat processing of 3 cows while the same from 5 goats on non-hat day People collect the wastes and use in the pisciculture of fishponds
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact with slaughter wastes
5.6 Storm water drainage system	No functional storm water drainage system is in the market A non-functional drain having out-fall into the Atrai river is there Solid wastes and sands are deposited in the drain which needs routine cleaning for operation In absence of cleaning it does not function During heavy rainfall rainwater remains stagnant for few hours Because of sandy soil and the nearby river and ponds it gets soaked ultimately
5.7 Drainage condition of tubewell water	Around the tubewell water remains stagnant for want of drains
5.8 Water pollution from GCM	It is likely that water of Atrai river gets polluted from the discharge of organic wastes into it, particularly during lean period, when the pollution assimilation capacity gets down because of low flow During high flow, pollution is not so much
5.9 Presence of ecologically sensitive and cultural areas	Only four large shed trees are in the market, which keep the area cool and gentle breezed As per community consultations, the trees need to keep saved while developing the GCM.
5.10 Erosion and siltation of the GCM	Atrai is a meandering river with unstable bank at the GCM side GCM gets eroded almost every year from the Atrai river The river at the GCM has a curvature, which causes riverbank erosion As per community consultations, it is perceived that bank protection work at the GCM is required for the protection of market from further erosion
6 Growth Center Planning	
6 1 Justifications for development of the GCM as per community	As per community views, development of this GCM is justified for (1) lease value would increase after development, (2) muddy (during rainy season) and sandy (during dry season) walkways will be removed by hard surface, (3) Better water supply will be there (4) environmental condition will improve
6.2 Objectives of the planning of the GCM as per community	To provide the market with improved marketing facilities for intended rise in lease value and subsequently improve the environmental condition
6.3 Need assessment	Market users set a demand for 12 multipurpose sheds, 1 fish-shed, 1

based on public demand	meat-shed as well as environmental improvement by providing internal pucca drain-cum-road, 2 garbage pits, 2 latrines, 4 tube wells, as planned and shown in sketch-A.
6.4 Public views regarding accommodation of the required facilities	If the existing temporary sales-sheds are removed and market is properly planned and developed, it would be possible to accommodate more sellers within this land
6.5 Sketch of planned growth center	Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure. In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report
7 Sub-project Categorization	Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4 1 of the same chapter
8 Conclusion and Recommendation	The market has good potentiality for development, but unless it is ensured that GCM is safe from river erosion, it would not be wise to go on for investment on the GCM. Riverbank protection work should be done before development of GCM, because it will save the market, investment and some other existing community facilities From transport of goods consideration, FRB connectivity requirement as necessary condition for market development, the decision for undertaking the GCM for development under RTIP may need to rethink further For storm water drainage, instead of placing of deep drains, road-cum-drains with outlets into the nearby canal and river should be provided



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DATE: 07.12.2002

DESIGN BY | DRAWN BY | CHECKED BY | APPROVED BY

TITLE: SKETCH MAP OF SITE-PLAN OF SAMASPARA (GCM) NAOGAOG.

SCALE: N.T.S.

FIG.

REV 0

Environmental Analyses Report: Sharoper GCM Upazilla: Beanaibazar, District: Sylhet

1 Introduction

Shariper GCM is located at the bank of Sunai River, Upazila Beanaibazr of Sylhet District Sunai river is a meandering river originated from hills of India and has very unstable bank surrounding villages

The market area is 7 acres (of which 4 acres is khas land) over which 107 pucca shops, 20 semi-pucca shops, and 4 kucha shops are placed The GCM has per annum lease value Tk.65000.

Standard development of GCM is likely to take place in form of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

An estimated number of 20000 populations would be benefited from the GCM development

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions,
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

There is no avalable khas land for market development Some private lands are adjacent to the GCM which, as per market users, can be used for market expansion, but which is the out of the scope of RTIP

4.2 Analyses of the existing landuse

The GCM on the east is surrounded by Sunai river and on other sides by residential and agricutural area Two roads, one from Beanaibazar and the other from Nayagram meet with the GCM

The market is congested with a high numbers of pucca, semi-pucca and kucha shops There is no available khas land for market development

4.3 Connectivity

Both waterway through Sunai river and roadway from Beanaibazr can be used to reach the GCM

4.4 Cattle marketing

There is no cattle market in the GCM

5 Analyses of existing environmental conditions

5.1 Water supply	There are three tubewells with installation depth 60m in the GCM. Water is good with little iron content. No arsenic and fluoride test is done
5.2 Sanitary latrine	There is no latrine for use in the GCM. As usual practice, people in the emergency use latrines of others (mosques, etc.) on request
5.3 Solid wastes management	On hat day 500kg of wastes, major from vegetable wastes and on non hat day 200kg of wastes are generated in the GCM. For cleaning of ewatse in the GCM, two sweepers work They collect wastes and dispose into the Sunai river
5.4 Slaughter waste management	On hat day 3-4 and non hat day 1-2 cattle are slaughtered Blood from slaughtering are put in hole and covered with soil People think that with this system of slaughter waste management no pollution or diseases takes place.
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact with slaughter wastes but in general they have the feeling that if wastes are kept underground it does not create any harm
5.6 Storm water drainage system	In the market there is no storm water drainage system but still the market is free from drainage congestion or waterlogging
5.7 Drainage condition of tubewell water	Tubewell water gets well drained into the Sunai river, as it is located on the riverbank
5.8 Water pollution from GCM	All types of wastes, organic wastes, slaughtering wastes (except blood) and human wastes get into the Sunai river As a result the river water gets highly polluted particularly during lean period when river loses it pollution assimilation capacity.
5.9 Presence of ecologically sensitive and cultural areas	No ecological and cultural sensitive area is in the area
5.10 Erosion and siltation of the GCM	The GCM is located on the bank of Sunai river, which is very meandering and originated from hills of India Because of meandering characteristics the riverbank is very unstable, lands aeration at one side and land degradation at other side The river at GCM is very unstable causing erosion to the GCM for last 3-4 years if this trend of bank erosion continues on, the GCM as per opinion of local people will go totally into the river

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community	As per community views, development of this GCM is justified for (1) the market is highly congested requiring re-arrangement of shops for accommodation of more in the limited area, 2) environmental condition will improve in terms of improved water supply and sanitary system, waste management system
6.2 Objectives of the planning of the GCM as per community	Accommodation of more traders through better planing for better and effective use of limited space that will increase the visitors and lease values

6.3 Need assessment based on public demand

As per local community, the GCM at present can serve 3000 visitors but if developed it can serve 8000 visitors effectively. In this regard, the ultimate level of GCM showed be 400m long and 200m wide. Because of lack of land availability people do not demand for any shed but 5 tube wells and bank protection work to save the market from being into river in future.

6.4 Public views regarding accommodation of the required facilities

Market users suggested for renovation of the existing fish-shed and make it extended to use as multipurpose shed They also want to use a very small part (adjacent to the market) of a large play ground of the primary school for market extension and development. In this connection they refer that school committee is willing to leave this piece of land for hat development. At present this part is used as vegetable market on hat day.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report

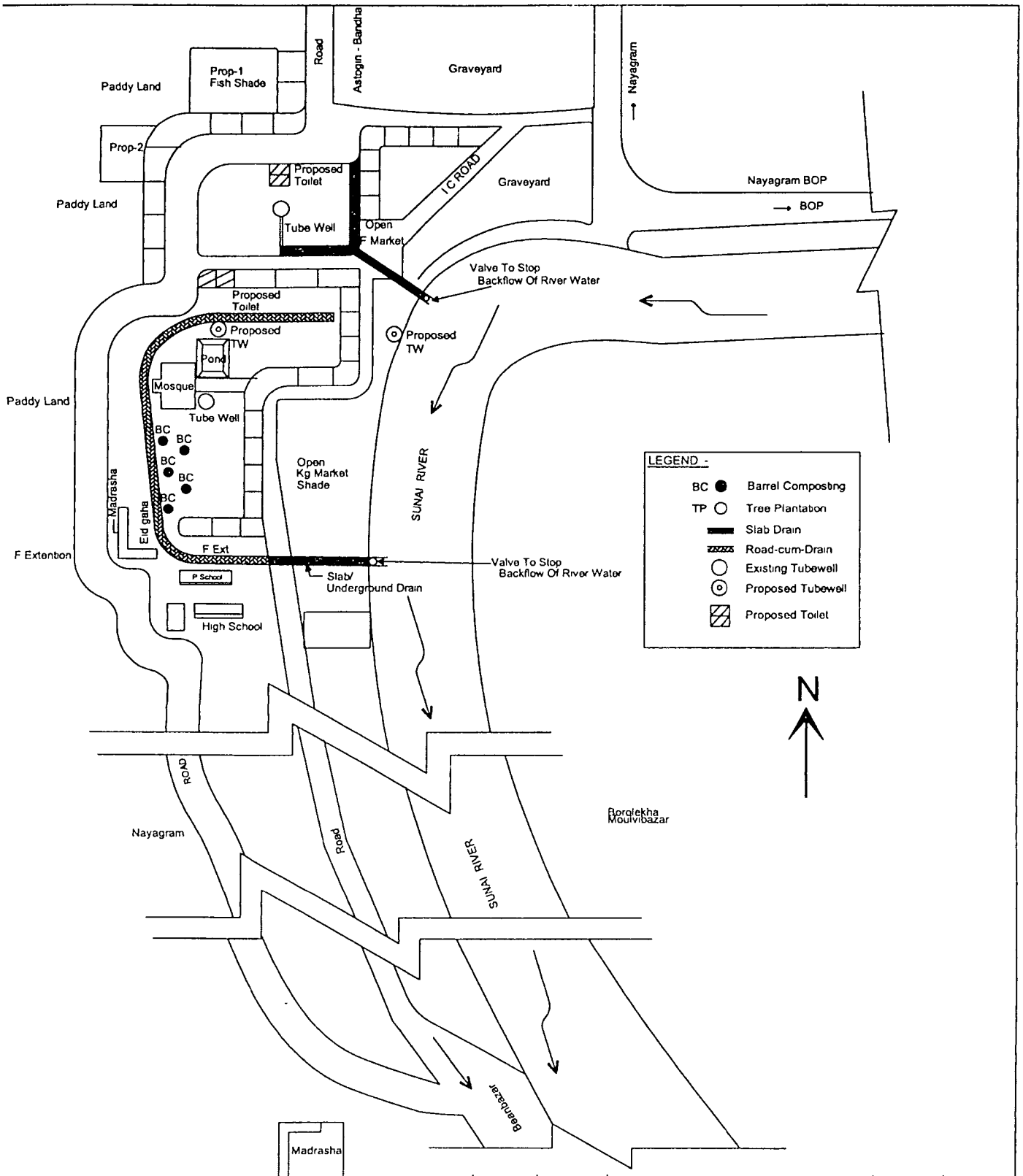
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4 1 of the same chapter

8 Conclusion and Recommendation

From transport consideration of marketing goods, FRB connectivity requirement as necessary condition for market development, the decision for undertaking the GCM for development under RTIP may need to rethink further

Space constraint is a major problem for the development of this GCM. Present environmental condition is substantially poor and no facilities are there for maintaining better environment As such there is an absolute requirement of environmental improvement in the GCM, even though infrastructure development is not undertaken



REV NO	DATE	DESCRIPTION	DRWN	CHKD

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE: 07 12 2002

DESIGN BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	
SCALE	N T.S.

TITLE: SKETCH MAP OF SAROPAR BAZAR

FIG.

REV 0

Environmental Analyses Report: Upgram Hadarpar GCM, Upazilla: Goainghat, District: Sylhet

1 Introduction

Upagram GCM is located at the bank of Pian River, Upazila Goainghat of Sylhet District Pian river is meandering originated from Dauki of Meghaloy, India

The GCM is a famous market A stone query at Bishama Kandi is located close to the GCM It is close to the border of India and Bangladesh On hat day about 15000 visitors visit the GCM, while on other days 3000 only

The market area is 2 84.acre (of which 2 34 is khas land) over which 25 pucca, 125 semi-pucca, 130 kutcha structures The GCM has per annum lease value Tk 512000

Standard development of GCM is likely in the form of providing multipurpose shed, fish shed, meat shed, sanitary latrines, tube wells, garbage pits, paved surface, as per requirement and as space availability permits

As per FGD, an estimated number of 3000 people would be benefited from the GCM development, both directly and indirectly

2 Objectives of the case study

1) To analyze the GCM of existing landuse, environmental conditions;
2) To identify and analyze site constraints for development, if any,
3) To plan the GCM for providing different necessary facilities as per demand of the local community
4) To categorize the GCM

3 Approach of the case study

A four-member team, consisting of Assistant Engineer (of respective District the GCM is located at), District Sociologist, Community Organizer and sub-assistant Engineer (of the same district), was given a three-day orientation training at LGED H/Q at Dhaka and sent to field to investigate the GCM The team investigated the GCM and prepared base map Upon consultation with the local people and analyzing the field situation the team did need assessment In addition, the team collected pertinent information through conducting FGD and KII, recorded them in the descriptive checklists of GCM, FGD and KII reporting formats

The basis of this case study is the collected field information and some relevant secondary information drawn from 'Growth Center Planning Manual' of LGED

4 Some Relevant Issues

4.1 Khas Land availability

Within the market there is no available vacant khas land for infrastructure development

4.2 Analyses of the existing landuse

The GCM is located on the east bank of the Pian River On the other side of the GCM residential areas and agricultural lands are there West side of the market has a rural road

Existing market is over congested by shop 25 pucca, 125 semi-pucca and 130 kutcha shops are over an area of . Acre Some pucca buildings are two storied There are some internal roads in the GCM and shops are located on both sides of the roads
There is no tubewell and latrine in the GCM A mosque is adjacent to the GCM and water supply and sanitary latrine are there Visitors of GCM use these facilities in the emergency on request

4.3 Connectivity	Waterway is the only route to the GCM for commodity transport. At present there is an FRB road under construction, from Goainghat to Pian River. To reach the GCM by road from this location two large bridges (span>100m) are required to construct over the same Pian River.
4.4 Cattle marketing	This is a cattle market as well
5 Analyses of existing environmental conditions	
5.1 Water supply	There is no tubewell and latrine in the GCM. A mosque is adjacent to the GCM and water supply and sanitary latrine are there Visitors of GCM use these facilities in the emergency on request Water is available at a depth 15-30m. As per community, water is little bit saline and if tubewell is installed at deep aquifer, good quality of water may be found.
5.2 Sanitary latrine	There is one tubewell in the GCM, which is non-functional Market users use a latrine belonging to a mosque adjacent to the GCM
5.3 Solid wastes management	On the hat day an amount of 500kg solid wastes are generated and on non-hat day 100kg Majority of wastes from vegetable wastes and slaughtering of cattle There is no solid waste management system in the market A sweeper appointed by the shopkeepers collects wastes and dispose them into the Pian River.
5.4 Slaughter waste management	On hat day 10-12 and non hat-day 2-3 cattle are slaughtered Slaughtering is done at the bank of the Pian river and blood goes into the river
5.5 Community's awareness about slaughter wastes	People are not aware of the diseases from the contact with slaughter wastes or the water pollution from waste disposal into the river.
5.6 Storm water drainage system	In the market there no storm water drainage system Nevertheless, no significant storm water drainage congestion occurs basically due to good out fall (river) and also sandy soil
5.7 Drainage condition of tubewell water	Around the tubewell of mosque, water remains stagnant for want of drains
5.8 Water pollution from GCM	It is likely that water of Pian river gets polluted from the discharge of organic wastes into (500kg on hat day, 100kg on non hat day) it, particularly during lean period, when the pollution assimilation capacity gets down because of low flow During high flow, pollution is not so much
5.9 Presence of ecologically sensitive and cultural areas	No ecological and cultural sensitive area is in the area
5.10 Erosion and siltation of the GCM	Pian river is a meandering river and has a very bank-shifting tendency As per information from community, a major part of the GCM went into the river in last 15-20 years However in recent 2-3 years bank erosion at the GCM has been slow down.

6 Growth Center Planning

6.1 Justifications for development of the GCM as per community

As per community views, development of this GCM is justified, (1) Upagram GCM is famous in the area; (2) A stone query, at Bishamakandi, is very near to the GCM where many labors work, (3) GCM has been congested too much, (4) Requires good water supply and sanitation system.

6.2 Objectives of the planning of the GCM as per community

Through the development of the GCM the local community will be benefited from improved trading and business

6.3 Need assessment based on public demand

At present 15000 people visit the GCM on hat day and if market is developed it would rise to 30000. But space is the major constraint for development people desires for improved water supply and sanitation system, but not the infrastructures They also want the GCM to be protected from river erosion by bank protection work.

6.4 Public views regarding accommodation of the required facilities

As the space is the major constraint, people demand for the market expansion 500m long and 300m wide. But as per landowners, it is not possible to expand the market on private land
Under such condition, the market users advice to develop the existing cattle market into hard surface, the internal kucha paths into paved ones, tubewells and some latrines at suitable locations, slaughter shed adjacent to the river bank. They opined that all will compromise the environmental condition of the GCM Some suggested for re-arrangement of the shops for market development, but this will cause for social conflicts

In view of the current bank instability of the Pian river at GCM side, the market users were very vocal for bank protection work to save the market from further river erosion.

6.5 Sketch of planned growth center

Based on the site constraints and the requirement of the minimum environmental services of a GCM an environmental planning sketch has been drawn as shown with the attached figure In selection of the location of a facility, corresponding criteria for location suitability and integrity with other facilities have been applied Such criteria have been described in the main report

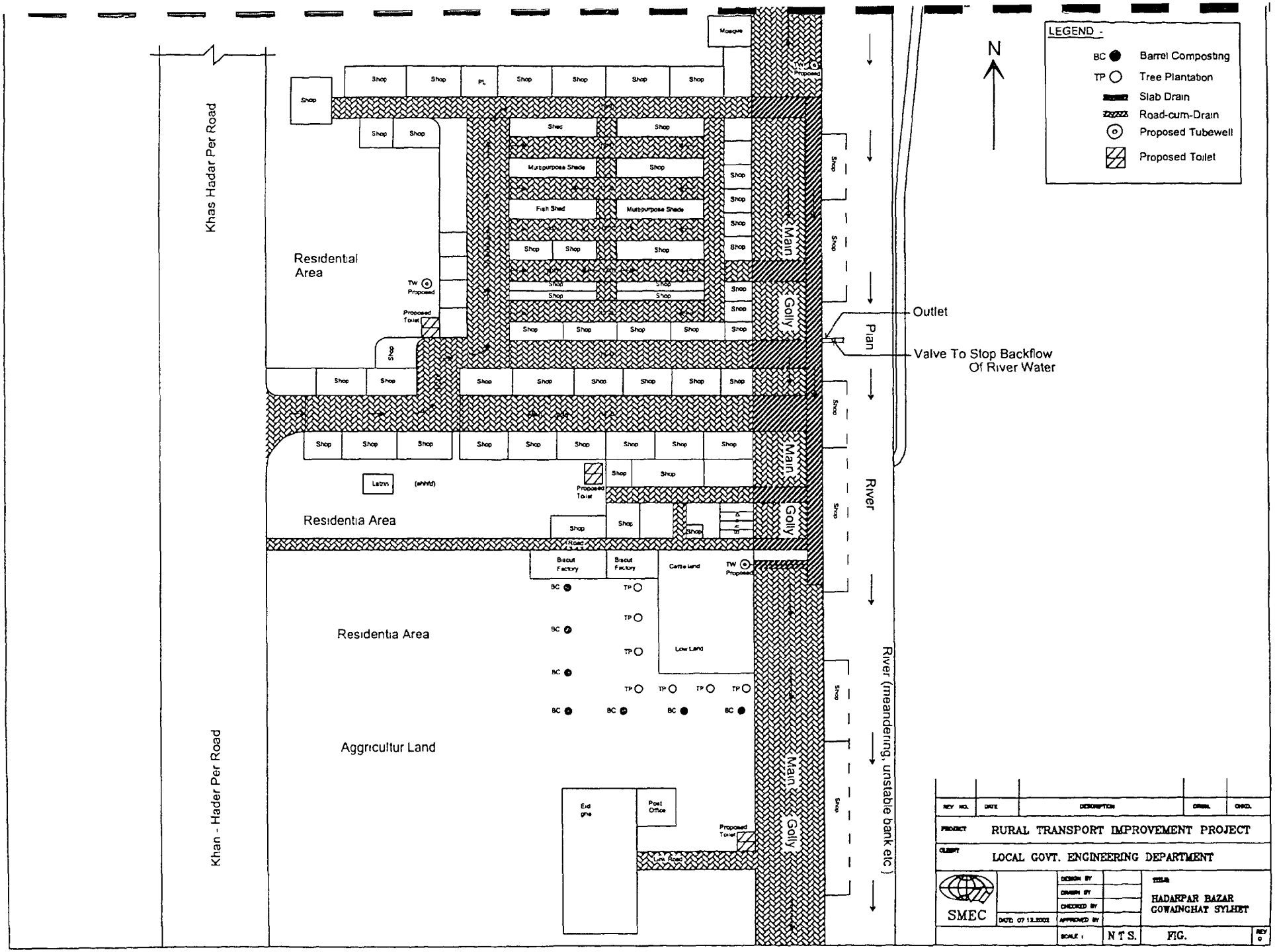
7 Sub-project Categorization

Applying the screening criteria for GCM and its categorization principles as described in Chapter 4 of the main report, the GCM has been categorized as presented in Table 4 1 of the same chapter

8 Conclusion and Recommendation

For marketing of the goods FRB connectivity is a prime requirement for market improvement, which is not fulfilled for this GCM because two large bridges are required to construct over Pian river Thus the decision for undertaking the GCM for improvement under RTIP may need to rethink further

Space constraint is a major problem for the improvement of this GCM Present environmental condition is substantially poor and no environmental services are in the market for maintaining better environment As such there is an absolute requirement for environmental improvement in the GCM, even though infrastructure development is not possible to undertake because of space limitations


LEGEND -
BC Barrel Composting
TP Tree Plantation
Slab Drain
Road-cum-Drain
Proposed Tubewell
Proposed Toilet
N
Khas Hadar Per Road
Khan - Hader Per Road
Residential Area
Residentia Area
Residentia Area
Aggricultur Land
Main Golly
Outlet
Valve To Stop Backflow Of River Water
River
River (meandering, unstable bank etc)
Shop
Shed
Multipurpose Shede
Fish Shed
Mosque
Proposed Toilet
Latrin
Biscuit Factory
Cattle land
Low Land
Eid gha
Post Office
Link Road
RURAL TRANSPORT IMPROVEMENT PROJECT
LOCAL GOVT. ENGINEERING DEPARTMENT
SMEC
HADARPAR BAZAR
GOWAINGHAT SYLHET
N T S.
FIG.

Appendix-Environmental Analyses Reports of Sample Ghat/Jetty Improvement Sub-projects

Environmental Analysis Report----Azmirganj Ghat, Upazila:Aazmirganj, Dist. Hobiganj

1 Introduction

This ghat is located at 1 km far from Azmiriganj upazila H/Q and connected with Azmiriganj GCM During hat day about 20000 nos. of people, 500 nos motorized boat and 100 nos. non-motorized boats use the ghat. Labors and passenger are facing many problems since there is no permanent facilities for loading and unloading of the goods and passengers at this ghat The ghat receives a slight erosion from wave action of the river during monsoon Local people have been demanding the ghat development

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development,

II To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of Key issues and their assessment

3.1 River Bank Stability

Although the bank at the ghat location receives slight erosion from wave action of the river, the bank is stable at the ghat location

3.2 Navigability of the river

The river is navigable round the year although there is a substantial amount of seasonal water level fluctuation in the river

3.3 Traffic

Mechanized and non-mechanized boats use this ghat throughout a year and their respective numbers are 500 and 100 on hat-day, and 300 and 50 on non-hat-day

3.4 Land availability

Present khas land area is 3000m^2, which as per requirement of the ghat development, i e, for placing the ghat infrastructure is adequate

3.5 Service facilities

The ghat has some infrastructure facilities developed by the private people At present a total of 7 residential hotels, 18 tubewells are located close to the ghat As per community, rainwater and tubewell water drainage facilities are required while developing the ghat

3.6 Road connectivity

Although a 1 km long approach road towards the nearest Azmirganj GCM is from the ghat, a further 183 m long road is needed to connect this ghat with this approach road.

4 Recommendation from community consultation

The community recommends for the construction of the aforesaid 183m long road and a rain-shed for the ghat users, interrogated with the ghat development.

5 Mitigation measures

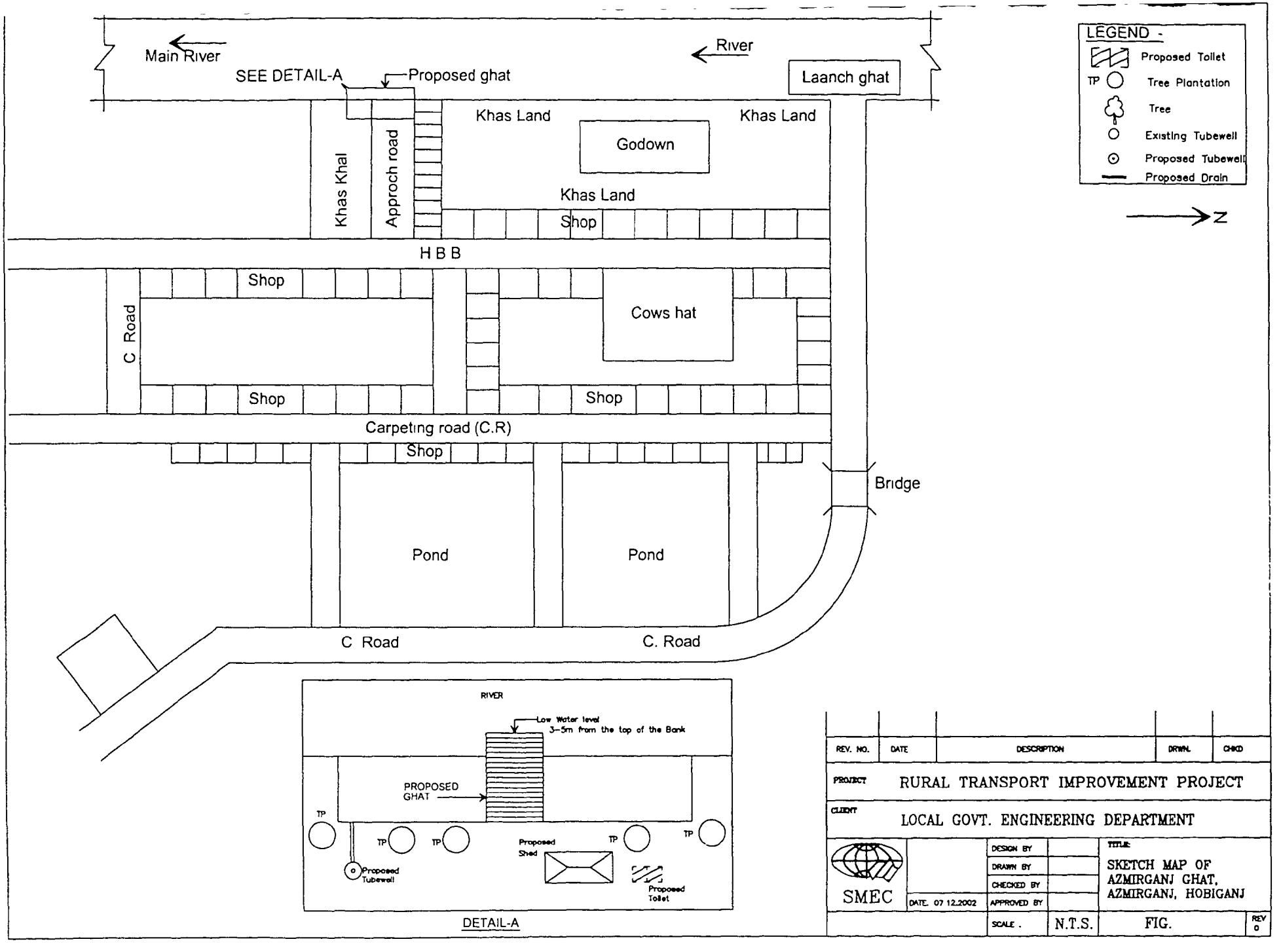
It has not been suggested any mitigation measure, since the ghat has no specific environmental issue

6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

6 Conclusions and Recommendations

The Ghat may be taken up for development under RTIP with the incorporation of the community demand for the construction of the aforesaid 183m long road and a rain-shed



REV. NO.	DATE	DESCRIPTION	DRWN.	CHKD

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE: 07.12.2002

DESIGN BY
DRAWN BY
CHECKED BY
APPROVED BY
SCALE: N.T.S.

TITLE: SKETCH MAP OF AZMIRGANJ GHAT, AZMIRGANJ, HOBIGANJ

FIG.

REV 0

Environmental Analysis Report---Bangali Ghat, Bangali River, Upazila: Sariakandi, Dist: Bogra

1 Introduction

Bangali ghat is located at the bank of the Bangali river, Upazila Sariakandi, District Bogra This is an important ghat and serves 70 mechanized boats and 20 non-mechanized boats on hat day, 40 mechanized boats and 12 non-mechanized boats on non-hat day; 1950 people on hat day and 825 on non-hat day Since long the ghat-users having been experiencing many problems from loading and unloading of the passengers and goods due to absence of loading and unloading facilities at the ghat It is important to mention that a FRB Road, Sariakandi-Chandanbasia Road, which is very close to the ghat, has been proposed for improvement under RTIP. After the improvement of this road the necessity of the ghat would increase multifold. It is expected that after the ghat development, a substantial increase in passengers and goods would occur, which would help reduce the poverty of the poor in the area

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development,

II To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of key issues and their assessment

3.1 River Bank Stability

The Bangali River is meandering in nature The riverbank at the ghat location is unstable and receives erosion

3.2 Navigability of the river

Navigability of the river is 8 months and mainly during monsoon (flood season) A seasonal variation in passengers and goods is seen at the ghat

3.3 Traffic

The ghat serves 70 mechanized boats and 20 non-mechanized boats on hat day, 40 mechanized boats and 12 non-mechanized boats on non-hat day, 1950 people on hat day and 825 on non-hat day

3.4 Land availability

Available khas land is at the ghat location for use in ghat improvement

3.5 Service facilities

At present the ghat lacks in the service facilities like tubewell and latrines, rain-shed

3.6 Road connectivity

The ghat has the road connectivity with its nearby roads by a WBM road, which needs a periodic maintenance for its better functionality

4 Recommendation from community consultation

The ghat users recommended for urgent improvement of the ghat by constructing loading and unloading facilities for the goods and passengers They opined that with the improvement of the ghat the traffic volume of the ghat would increase by 1 5 times of the present one

5 Mitigation measures

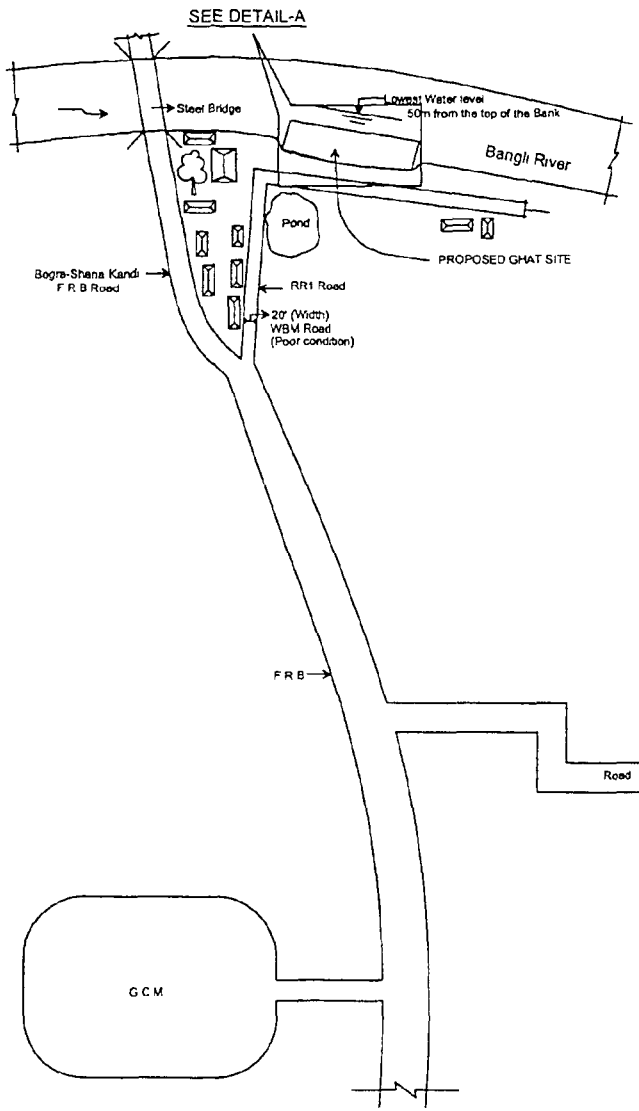
Bank protection measure at the ghat location is required along with the ghat improvement, since the riverbank at the ghat location is unstable

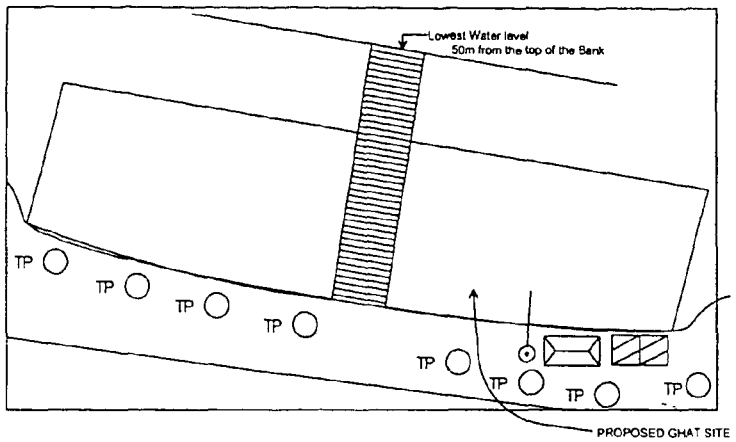
6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

7 Conclusion and Recommendations

The ghat can be undertaken for its improvement under the RTIP, with the integration of the riverbank protection measure at the ghat location However, prior to the improvement of the ghat, a study is needed to define the appropriate type and extent of the bank protection measure required for the ghat





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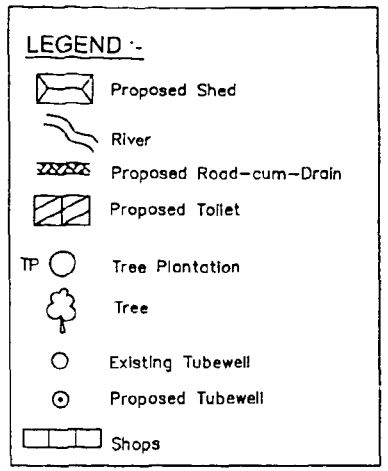

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REV NO.	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE: 07.12.2002

DESIGN BY		TITLE: SKETCH MAP OF BANGLI GHAT	
DRAWN BY			
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APPROVED BY			
SCALE :	N.T.S.	FIG.1.3	REV. 0

Environmental Analysis Report---Chandgram Ghat, Sunai River,Upazila: Barlekha, Dist.: Moulavibazar

1. Introduction

Chandgram ghat is located at the bank of the Sunai River, Upazila: Barlekha , Moulavibazar and it is adjacent to Chandgram GC Waterway is the main communication route to reach this GCM through this ghat An estimated amount of 8000 kg of paddy, 1000 kg of agricultural product, 2000 kg of cement, 10,000 kg of fertilizer, 50,000 kg of sand, 20 numbers of cattle are unloaded at the ghat on hat day Since long the ghat-users have been experiencing many problems from loading and unloading of so large volume of goods due to lack of the required loading and unloading facilities, and also from some essential service facilities like, water supply and sanitary latrines It is expected that after the improvement of the ghat the present volume of goods and passengers would increase 1.5-2 times, which would have an important role to reduce the poverty of the poor in the area.

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development,

II To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of Key issues and their assessment

3.1 River Bank Stability

The riverbank is stable and getting silted up at the ghat location, which may cause disturbance to reaching of boats at the ghat location in future

3.2 Navigability of the river

The river is meandering in nature, and has the siltation at the ghat location and bank scouring to the opposite bank of the ghat However the river is navigable throughout a year

3.3 Traffic/Goods handled

An estimated amount of 8000 kg of paddy, 1000 kg of agricultural product, 2000 kg of cement, 10,000 kg of fertilizer, 50,000 kg of sand, 20 numbers of cattle are unloaded at the ghat on hat day

3.4 Land availability

An amount of 180m^2 khas land is available for use in ghat improvement This land is adequate for providing the loading and unloading facilities of the goods and passengers at the ghat

3.5 Service facilities

The ghat lacks in any type of service facilities such as water supply and sanitary latrines, rain-shed, boat anchoring facilities

3.6 Road connectivity

The ghat is adjacent to the GCM. However the GCM lacks in road connectivity.

4 Recommendation from community consultation

The ghat users demanded for the ghat improvement along with provision for the desired facilities for water supply and sanitary latrines

5 Key Issues and their mitigation measures

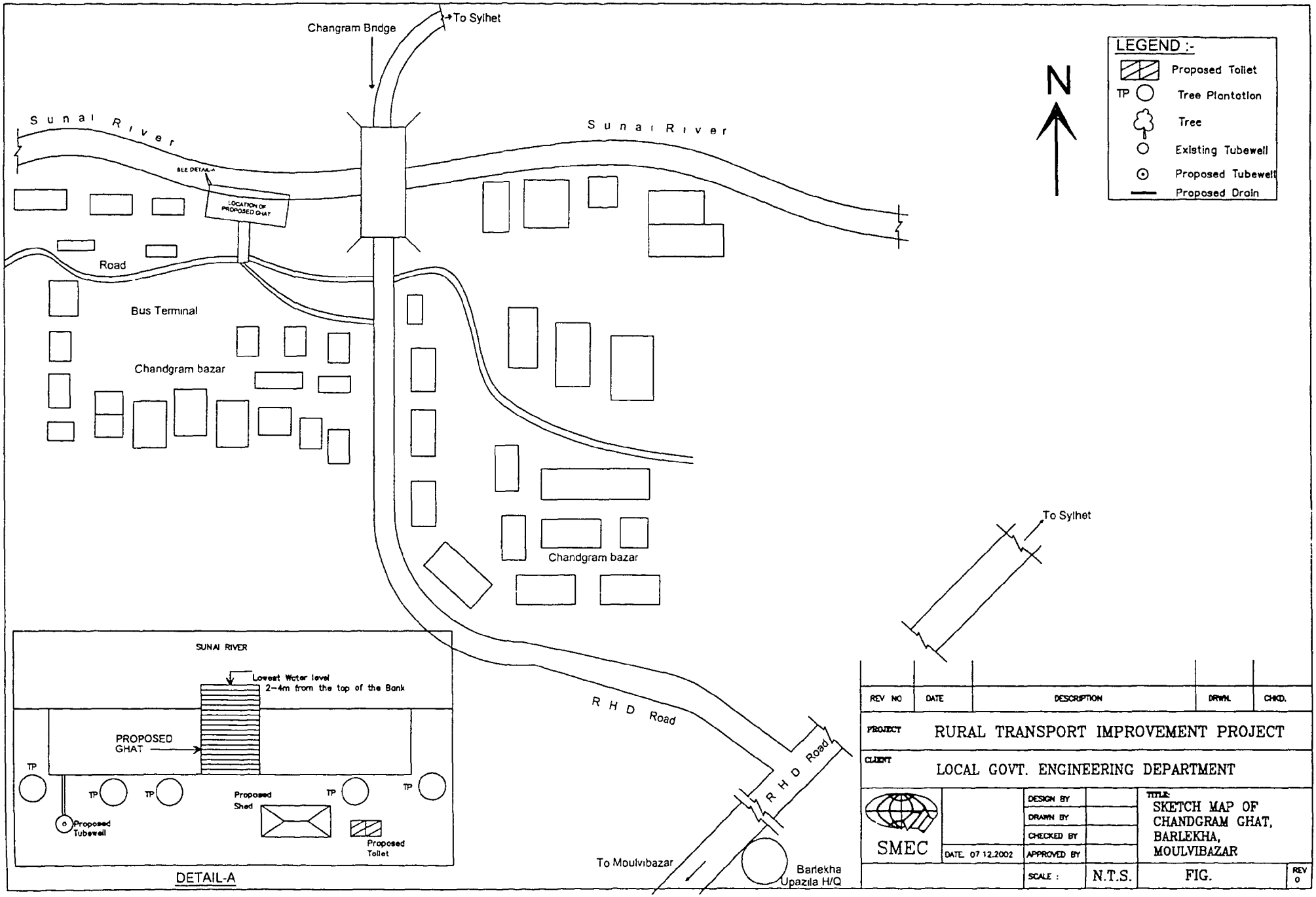
The river at the ghat location is getting silted up, which, if continues on, could cause problem to reaching the boats at the ghat and thus could disturb the business in future Dredging of the river at the ghat location may be required in future

6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter

7 Conclusions and Recommendations

The ghat may be undertaken for improvement under RTIP since it has high importancy in the area and since waterway is the main communication route in the area However, a study is needed to define the siltation level of the river at the proposed location of the ghat and the mitigation option for this



REV NO	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE 07.12.2002

DESIGN BY		TITLE: SKETCH MAP OF CHANDGRAM GHAT, BARLEKHA, MOULVIBAZAR	
DRAWN BY			
CHECKED BY			
APPROVED BY			
SCALE :	N.T.S.	FIG.	REV 0

Environmental Analysis Report---Kolakopa Ghat, Shitalaxmia River,Upazila :Nawabgonj, District.: Dhaka

1. Introduction

Kolakopa ghat is located at the bank of the Shitalaxmia River, Upazila· Nawbganj, district Dhaka It is an important ghat in the area and serves about 40 numbers of Cargo, 6-8 nos of Launch, 40 numbers of engine boats and 250 numbers of non-mechanized boats on non-hat day which increases about twice on hat-day of its nearest GCM. Due to lack in required facilities for the passengers and goods, the ghat users have been experiencing problems since long It is expected that with the improvement of the ghat, the present volume of traffics would increase by 25-30%, which would help facilitate the trading activities in the area

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development,

II. To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of Key issues and their assessment

3.1 River Bank Stability

The river at the ghat location has a bank-shifting tendency with distinct scouring and erosion problems

3.2 Navigability of the river

Although there is a seasonal variation in water levels of the river, the minimum water depth of the river at the ghat location remains at 6m Moreover the river is navigable throughout a year

3.3 Traffic

The ghat serves about 40 numbers of Cargo, 6-8 nos of Launch, 40 numbers of engine boats and 250 numbers of non-mechanized boats on non-hat day, which increases to about twice on hat-day of its nearest GCM

3.4 Land availability

Present khas land is 4 acre, which is enough for the improvement of the ghat

3.5 Service facilities

The ghat lacks in the service facilities like water supply and sanitary latrines, rain-shed

3.6 Road connectivity

BC and HBB road is connected with the ghat to transport the goods to other places

4 Recommendation from community consultation

Local people/ghat users recommended for the urgent improvement of the ghat along with a provision for water supply, sanitary latrines and rain-shed

5 Mitigation measures

The ghat requires riverbank protection work at its location along with the construction of the jetty, since the riverbank at the ghat location is very unstable with distinct scouring and erosion problem

6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

7 Conclusions and Recommendations

The ghat can be undertaken for improvement under the RTIP, with incorporation of the suggestion for riverbank protection work at the ghat location An engineering investigation to define the type and extent of the bank protection work required at the ghat location is required to undertake prior to the implementation of the ghat improvement work

Environmental Analysis Report: Toknayan Ghat, Shitalaxmia River, Upazila: Kapasia, District:Gazipur

1 Introduction

Tiknayan ghat is located at the bank of the Shitalaxmia River, Upazila. Kapasia, District Gazipur, and adjacent to the Tiknayan GCM developed under RDP-11. The GCM has both waterway communication (using this ghat) and roadway communication (through its connecting road) Since the transportation of goods using waterway is cheaper than that by roadway, people prefer transportation of goods to and from the GCM using this ghat In absence of the landing facilities of the ghat and required water supply and sanitary latrines, ghat users have been experiencing problems since long

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development,

II To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of Key issues and their assessment

3.1 River Bank Stability

The river is meandering in nature and has the bank-scouring problem at the ghat location

3.2 Navigability of the river

The river is navigable through out a year although there is a seasonal fluctuation of water levels in it

3.3 Traffic

The ghat serves 100 number of mechanized boats, 50 number of non-mechanized boats, 50 number of passenger boats and 70 number of cargo on hat day, and 50 number of mechanized boats, 30 number of non-mechanized boats on non-hat day

3.4 Land availability

Present khas land is 3000 m^2, which is enough for improvement of the ghat

3.5 Service facilities

The ghat lacks in service facilities like water supply and sanitary latrine Ghat users demanded for these facilities while improving the ghat by the project

3.6 Road connectivity

The ghat is adjacent to Tiknayan GCM developed under RDP-11 and the GCM has a good road connection

4 Recommendation from community consultation

Ghat users demanded for the urgent improvement of the ghat along with provision of service facilities like water supply, sanitary latrine and rain-shed

5 Mitigation measures

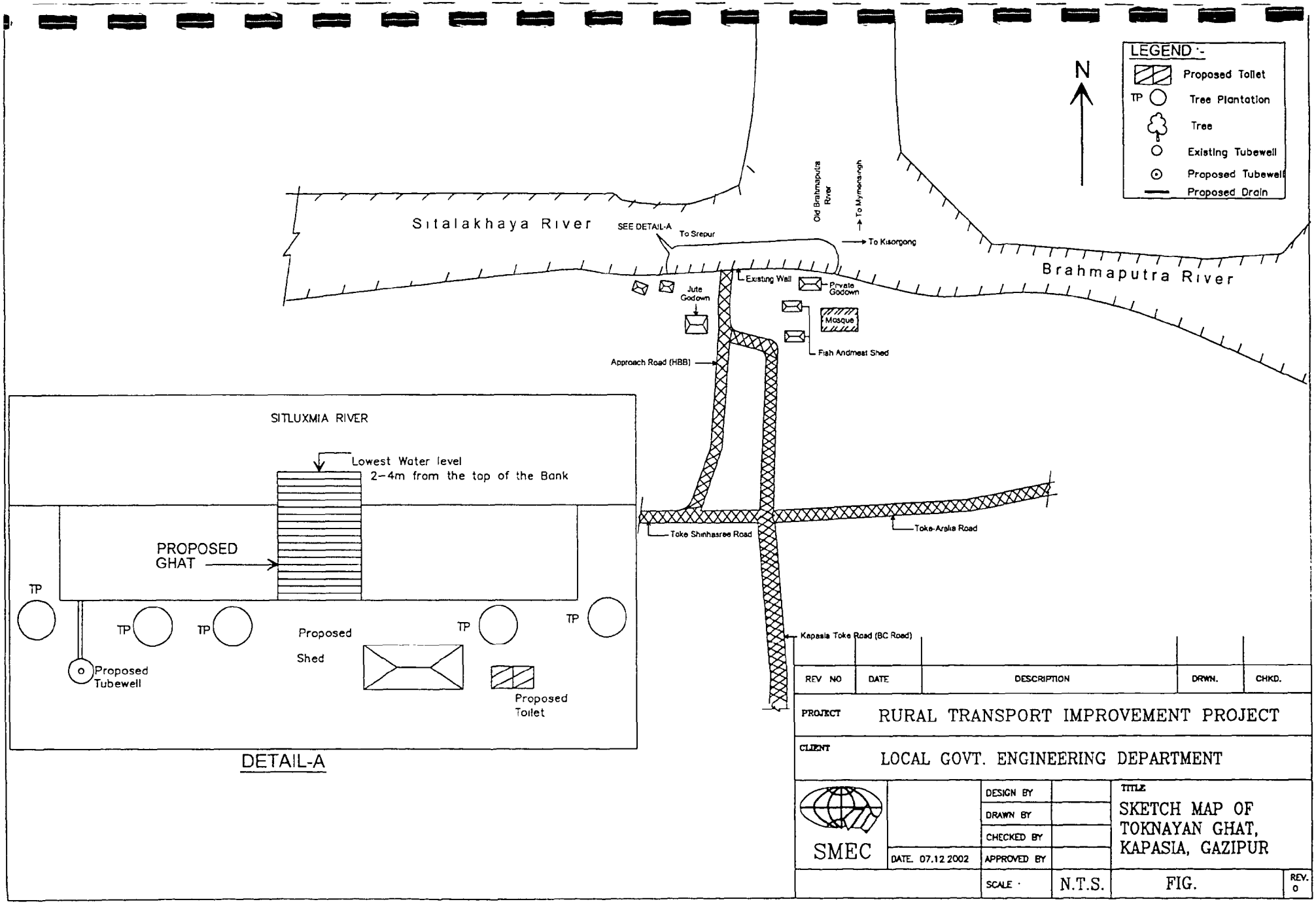
The ghat may require riverbank protection work at its location since the river at the ghat location is unstable

6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3.1 of the same chapter

7 Conclusions and Recommendations:

The ghat can be undertaken for improvement under RTIP, with incorporation of the suggestion for riverbank protection work at the ghat location However, prior to the implementation of the sub-project, an engineering study is required to detail out the type and extent of the required bank protection work



REV NO	DATE	DESCRIPTION	DRWN.	CHKD.

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE. 07.12.2002

DESIGN BY
DRAWN BY
CHECKED BY
APPROVED BY
SCALE : N.T.S.

TITLE: SKETCH MAP OF TOKNAYAN GHAT, KAPASIA, GAZIPUR

FIG.

REV. 0

Environmental Analysis Report---Zamsha Ghat, Kaligonga River,Upazila : Singair, District: Manikganj

1 Introduction

Zamsha ghat is located at the bank of the Kaligonga River, Upazila·Singair, District. Manikganj The ghat is connected with its nearest GCM, Zamsha GCM, by a road and the GCM is connected with Nawabganj Upazila of Dhaka District by a connecting road The ghat is important in the area as it is used for transportation of goods to different places by waterway At present the ghat serves about 6000 people, 70 cargo, 150 mechanized boats and 300 non-mechanized boat on a hat-day, and 3000 people, 50 cargo, 300 mechanized boat and 50 non-mechanized boats on non-hat day. Due to absence of the landing facilities for the goods and passengers the ghat users have been experiencing problems since long, and they demand for the urgent improvement of the ghat along with the service facilities like water supply and sanitary latrines, rain-shed

2 Objectives of the Case Study

Three main objectives are

I To identify and assess the key environmental issues relating to the ghat development;

II To recommend the possible mitigation measures for the identified key issues,

III To categorize the sub-project (ghat) to asses the level of environmental analyses it requires

3 Identification of Key issues and their assessment

3.1 River Bank Stability

Although the river is meandering in nature, it has no bank-shifting tendency at the ghat location The riverbank is stable at the ghat location as observed during last 5 years

3.2 Navigability of the river

Despite the seasonal variation in water levels of the river, the ghat operates throughout a year, as the river is navigable throughout this period

3.3 Traffic

The ghat serves about 6000 people, 70 cargo, 150 mechanized boats and 300 non-mechanized boat on a hat-day, and 3000 people, 50 cargo, 300 mechanized boat and 50 non-mechanized boats on non-hat day

3.4 Land availability

The area at the ghat location is 5600 m^2, however khas land is not available for improvement of the ghat But people are eager to sacrifice their land for ghat improvement

3.5 Service facilities

There is no latrine or rain-shed, but one tubewell at the ghat area

3.6 Road connectivity

The connecting road with the GCM is a katcha road, which needs improvement

4 Recommendation from community consultation

The community recommended for loading and unloading facilities, anchorage facilities, waiting shed/rain-shed, toilet, parking area, approach road, office building and tubewell to be undertaken under the ghat improvement sub-project

5 Mitigation measures

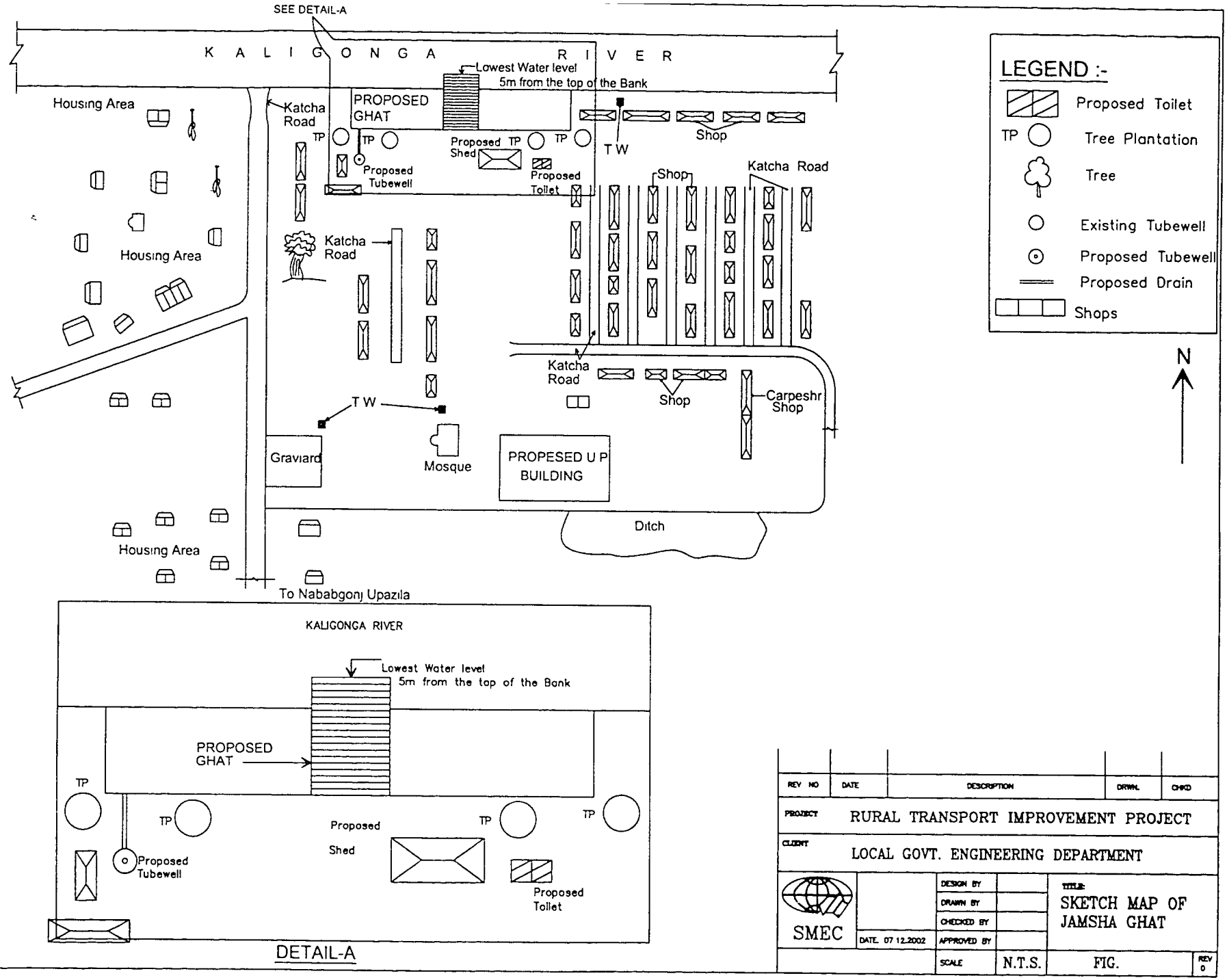
It does not need any measure for the riverbank protection at the ghat location since the riverbank is stable at the location of the ghat

6 Categorization of sub-project

The sub-project has been environmentally categorized as per procedure described in Chapter 3 of the main report and as shown in Table 3 1 of the same chapter.

7 Conclusions and Recommendations

The ghat has no environmental problem from its improvement and hence it can be undertaken for improvement under the RTIP



REV NO	DATE	DESCRIPTION	DRWN.	CHKD

PROJECT: RURAL TRANSPORT IMPROVEMENT PROJECT

CLIENT: LOCAL GOVT. ENGINEERING DEPARTMENT

SMEC

DATE: 07.12.2002

DESIGN BY | DRAWN BY | CHECKED BY | APPROVED BY

SCALE: N.T.S.

TITLE: SKETCH MAP OF JAMSHA GHAT

FIG.

REV 0