Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Co-operatives
Local Government Division
Local Government Engineering Department (LGED)

City Region Development Project (CRDP)
ADB Loan No. 2695-BAN

Environmental Safeguards Assessment
Initial Environmental Examination (IEE) Report

ROAD AND DRAINAGE SUBPROJECT

Package No: CRDP/LGED/DHK/ICB/2012/W-01
And
CRDP/LGED/DHK/NCB/2013/W-02

Savar Upazilla

July 2013

CURRENCY EQUIVALENTS

(as of 31 March 2013)

Currency unit	–	BDT
BDT 1.00	=	$ 0.0127
$1.00	=	BDT 79

ABBREVIATIONS

ADB	–	Asian Development Bank
BDT	–	Bangladesh Taka
BOD	–	biological oxygen demand
BOQ	–	Bill of Quantities
CEO	–	Chief Executive Officer
CRDP	–	City Region Development Project
DCC	–	Dhaka City Corporation
DMDP	–	Dhaka Metropolitan Development Plan
DOE	–	Department of Environment
DPHE	–	Department of Public Health Engineering
DSMC	–	Design, Supervision and Management Consultant
DWASA	–	Dhaka Water Supply and Sewerage Authority
EARF	–	Environmental Assessment and Review Framework
ECR	–	Environmental Conservation Rules
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IEE	–	initial environmental examination
LGED	–	Local Government Engineering Department
LGI	–	Local Government Institution
MDSC	–	Management, Design and Supervision Consultant
NGO	–	nongovernment organization
NOC	–	no objection certificate
O&M	–	operations and maintenance
PIU	–	Project Implementation Unit
PMCU	–	Project Management Coordination Unit
REA	–	Rapid Environmental Assessment
ROW	–	right of way
RPM	–	respiratory particulate matter
RSS	–	resettlement support staff
SPS	–	Safeguard Policy Statement
SWM	–	Solid Waste Management

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General

ES-01. Construction of the Ashulia Road and Drainage subcomponent comprises ten Roads divided into two packages: W-01 and W-02. The Subproject involves resurfacing and widening two roadways in package W-01 that connect the Dhaka-Aricha and Ashulia Highways as they pass through Savar Upazilla. Drainage improvements are proposed to be implemented at the same time as roadways are rebuilt. The two roads are approximately parallel some 3 km apart, each approximately 5 km in length. Package W-02 involves rebuilding eight internal roads in Yearpur, Damsona and Ashulia Unions, all of which pass through the industrial, commercial and residential areas of Savar upazila. The work will take place within well-established right-of-ways, and no additional width will be needed. The proposed road and drainage infrastructure will improve passage along the roadways, currently in poor repair, and provide better access to homes, workplaces and schools for a significant resident population in the area. Typical construction related impacts are associated with the type of civil works anticipated. Impacts are of limited intensity and short duration, and can be mitigated by appropriate measures including enforced traqffic management by the contractor and adoption of good construction practices related to protection of community health and safety. None of the subproject interventions are proposed within locations in or near sensitive and valuable ecosystems. The subproject has been categorized as 'B' in accordance with ADB's Safeguard Policy Statement (2009) and an IEE is carried out that provides mitigation measures for impacts and a monitoring and reporting protocol.

ES-02. The subproject in package W-01 does not involve any special considerations regarding planning and location, since it occupies an existing right-of-way that is generally clear, and for which no acquisition or easement for land is required. In some stretches it may be difficult to obtain the full 8.5 m road width, in which case the engineer will narrow the width based on available land in problematic areas, manage the problem locally with the landowner, or reduce the dimension of gutter or hard shoulder; but in any case there is no generalized solution to the problem and it will be dealt with on a case by case basis (see project technical report). All the subprojects in package W-02 are in the existing right of way. Width of the roads varies from 5.50 m for one road and 3.70 m for the remaining seven roads. There is a high degree of certainty that the improvements can be made without affecting permanent structures.

ES-03. Construction presents the greatest potential for the subproject to exert a negative environmental impact. These are generally associated with maintaining the flow of traffic through the construction zone, safety, convenience and local air quality impacts (dust). Impacts can be mitigated through environmental measures that are set out in the construction contract tender documents. These measures address the following key areas: worker provisions, use of land for construction purposes, sediment controls, community health and safety, site conditions, quarries and haul routes, and other factors. A set of these provisions for use in the subproject tender documents is found in Appendix 3.

ES-04. Once in operation the improved roadways may be responsible for an increase in noise and air emissions from increased vehicular traffic; however it is nearly certain that conditions once the roads are improved will be much better for local residents than would be the case without improvements, by removing severe traffic congestion that is a feature of the current condition, thereby reducing vehicle noise (honking of horns) and air pollution (idling vehicles). Roadway safety will be enhanced by clearly delineated lane widths, improved signage and shoulders that provide room for pedestrians and slow moving vehicles. Still, speed limits will need to be controlled in order to prevent accidents along the roadways.

ES-05. The overall conclusion of the IEE is that if the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some benefits from recommended mitigation and enhancement measures, and major improvements in quality of life and individual and public health once the scheme is in operation.

I. INTRODUCTION

A. Background

1. The Government of Bangladesh (GOB) has undertaken the City Region Development Project (CRDP) (the Project) with financial assistance from the Asian Development Bank (ADB) (Loan No. 2695-BAN) together with co-financing from KfW. The CRDP emphasizes economic growth in Dhaka and Khulna city regions of Bangladesh through (i) creation of an enabling environment towards improved governance and capacity building of the local governments, and (ii) prioritized investments in infrastructure sectors in the two regions. The objectives of CRDP are: (i) to improve the regional economic and social context through long-term development plans and investment programs, set within an institutional and regulatory context that will ensure implementation and review; (ii) to improve the capacity and mandate of local government to govern and to invest in improved economic activity at local level; (iii) to improve the economic context for sustainable commercial and industrial growth; and (iv) to meet the economic and social needs of the urban population, as an inclusive aspect of the CRDP. The Project is active in the following City Corporations: Dhaka City Corporation (North), Dhaka City Corporation (South), Narayanganj City Corporation, Gazipur City Corporation and Khulna City Corporation; pourashavas are: Tarabo, Sonargaon, Kanchon, Narshingdi, Kaliakoir, Singair, Manikgonj, Savar, Jessore, Jhikargacha, Mongla Port, and Nowapara, as well as in 35 numbers of smaller urban centers (in upazilas) of Dhaka and Khulna City Regions.

2. The Project is formulated to provide opportunities for replication of subprojects in other Local Government Institutions (LGIs) within the identified city regions. The initial environmental examination (IEE) for the proposed Dhaka-Aricha Link Roads-Road and Drainage Subproject conforms to the requirements of the Environmental Assessment Review Framework (EARF) prepared under the Project Preparation Technical Assistance (PPTA), and complies with Government environmental rules and the Safeguard Policy Statement (2009) of the Asian Development Bank (ADB).

B. Purpose of the IEE

3. The purpose of the IEE is to describe the assessment of environmental impacts due to the Subproject and to specify measures to address impacts. This is an update of the Ashulia Industrial and Residential Clusters Sub-project IEE prepared during the PPTA. The IEE is based on information obtained during detailed design, a review of the previous IEE; subproject site plans; a field visit; and secondary data to characterize the environment and identify potential impacts. It contains the results of interviews and consultations with stakeholders. The IEE includes an environmental management plan (EMP) outlining mitigation measures and monitoring requirements, and environmental specifications to be appended to contract documents. The location of the subproject is shown in Figure 1.

4. The Subproject in package W-01 involves resurfacing and widening two roadway stretches that connect the Dhaka-Aricha and Ashulia Highways as they pass through Savar Upazilla. Drainage improvements are proposed to be implemented at the same time as roadways are rebuilt. There are two roads that will be rebuilt that are approximately parallel some 3 km apart, each approximately 5 km in length. The subproject in package W-02 involves rebuilding of eight internal roads of total length 18.547 km. All these roads are in Yearpur, Damsona and Ashulia union of Savar upazila and interconnect numerous industries, growth centers and residential areas. The work will take place in well-established right-of-way and no additional width will be needed. The proposed roads and drainage infrastructure will improve passage along the roadways, currently in poor repair, and provide better access to homes workplaces and

schools for a significant resident population in the area. Typical construction related impacts are associated with the type of civil works anticipated. Impacts are of limited intensity and short duration, and can be mitigated by appropriate measures including adoption of good construction practice. None of the subproject interventions are proposed within locations in or near sensitive and valuable ecosystems. The subproject has been categorized as 'B' in accordance with ADB's Safeguard Policy Statement (2009) and an IEE is carried out that provides mitigation measures for impacts and a monitoring and reporting protocol.

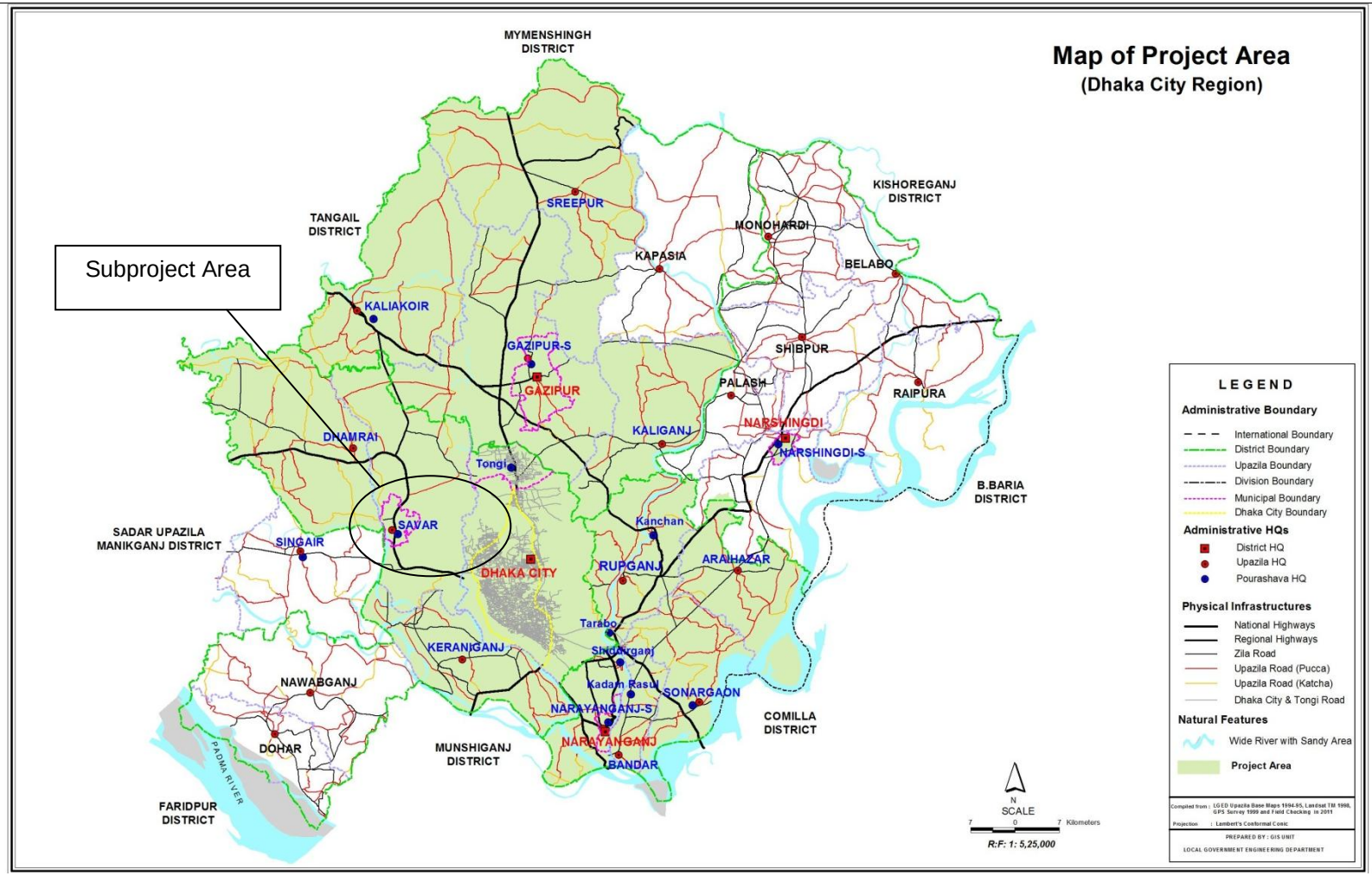
C. Environmental Regulatory Compliance

5. Government of Bangladesh. The provisions for environmental protection and pollution control in Bangladesh are contained in the Environmental Conservation Rules (ECR) 1997. This legislation also provides the principal mechanism for assessing and mitigating the environmental impacts of projects. Projects are classified as green, orange, or red. Roadway and drainage improvements under the Subproject are categorized as Orange B category projects, in accordance with Schedule 1 of the ECR. The Department of Environment (DOE) issued an Environmental Clearance Certificate for CRDP subprojects (up through Orange B), excluding water treatment plants and distribution pipe line laying/relaying/extensions, and sanitary landfills, bus and truck terminals by means of a letter No. DOE/ Clearance/5194/2013/180 dated 21/07/2013 shown in Appendix 1. Excluded subprojects are of the Red Category and invoke the environmental assessment process that may include preparation of an EIA.

6. Asian Development Bank. ADB categorizes projects as A, B or C depending on severity of impact and level of required environmental assessment, a process that is extended to subprojects. The Subproject has been categorized as B, necessitating preparation of an IEE with elements consistent with the ADB SPS: an EMP describing specific mitigation measures to be taken during construction and operation, monitoring and reporting requirements and procedures; requirements for information disclosure; the result of public consultations undertaken during subproject preparation; and a description of the grievance redress mechanism established under the Project.

7. The IEE report and summary for Category B projects are prepared by the Project Management and Coordination Unit (PMCU) for review by the ADB. Reporting on the findings of subproject IEEs will be made available by ADB via the depository library system and the ADB website.

Figure 1: Subproject Location



II. DESCRIPTION OF THE PROJECT

A. Subproject Scope and Components

8. The subproject consists of roadway and drainage components described in the following paragraphs. The subproject components were identified by the Savar Upazila as a priority investment, following its engagement with the project under the urban center small grants component. Figure 3 illustrates the major road and drainage components for the subproject.

9. Package W-01 provides improvements for two roadways in rapidly urbanizing areas, and drainage systems that are required accessories to the roadway improvements. Though sub grade and base materials are generally in place, the roadways are currently in very poor condition, with the road surfaces broken and cratered over most of their lengths. Improvements are needed to maintain acceptable traffic flow, and will enhance mobility within and between communities, commercial areas, schools and markets. Drainage components involve typically 900 mm dia. concrete pipe buried to a depth of 50 - 60 cm and joined at 10 m intervals with slotted drop inlets that are positioned along the flow line of the side drainage along the roadway. Drainage is intended to relieve temporary flooding conditions in urban areas and reduce maintenance on the road. In broad terms, drainage reduces inconvenience and damage to infrastructure and private property, exposure to disease associated with polluted water and diseases borne by insects that breed in water.

10. Package W-02 provides improvements of eight internal roads connecting numbers of industries, growth centers and residential areas. Physical conditions of the roads are poor damaged bituminous concrete (BC), damaged herringbone bond (HBB), damaged brick flat soling (BFS) and earthen track. Three of the roads are severely damaged due to improper drainage facilities along the roadway.

11. The existing roads are constructed on a right-of-way but the width is typically not fully developed and hence the driving surface is narrow and lacks shoulders. The surfaces of the roads are in very poor condition, which causes traffic to move slowly. Asphalt surfaces are generally degraded and often impassable in the wet season and during periods of heavy rainfall.

12. The subproject consists of removing and replacing broken pavement, building up base materials where necessary to obtain a smooth surface for replacing asphalt paving. The subproject will provide a full width crown of 8.5 m in two lanes and shoulders over the proposed lengths in package W-01. The proposed width of the roads in package W-02 varies from 5.50m to 3.70m. Widths may be constrained by trees and encroachments from roadside developments, so may vary.

13. Drainage improvements include lengthening of culverts where necessary to maintain cross drainage and development of longitudinal drainage along the roadway where needed to reduce flooding in built up areas and along poorly drained sections of the roadway in package W-01. Brief descriptions of the road and drainage schemes under this subproject are given in Table 1 and are illustrated in Figure 3.

14. A Rapid Environmental Assessment (REA) Checklist for this subproject is provided in Appendix 2. The Subproject is not located near any ecologically critical area (ECA) and will not have any significant impact. The Project is classified as Category B using ADB project classification, or as Orange – A and B using GOB criteria. This IEE is conducted to evaluate the potential for impact and to propose routine mitigation measures and monitoring

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Table 1: Roadway and Drainage Rehabilitation Components

PDP Sl. No	Name of the Scheme	Description of the Road/Drain	Present Condition	Improvement Proposal
Package No: CRDP/LGED/DHK/ICB/2012/W-01				
a) Roadway	Dhaka Aricha Highway Ashulia GC Road (Anwar Jung Road) (Ch. 0+000 to Ch. 7+100)	The road services the industrial area between Dhaka Aricha & Ashulia Highways. Traffic is congested due to narrow pavement width and passage of slow, heavy vehicles. Widening is not possible because of non availability of land. A portion of the road (Ch. 4+235m- Ch. 6+435m) will not be rehabilitated, as it is under the jurisdiction of the roads and Highways Department (RHD). This will remain as it is which may create trouble for uniform flow of traffic and resulting congestion. This road is a bituminous concrete (BC) surface but severely damaged in some areas. In some places, damaged areas has been repaired by HBB, say at Ch. 6+524m to 6+545=23.00m and there is HBB shoulder from Ch. 0+000 – 1+300m = 1300m. There are seven culverts in the alignment; some of which are not functioning. There is no road side drain and the road has been damaged due to water logging. The present pavement width is insufficient to cope up with the volume of vehicles arising from the industrial activity in the area. A 7.30m wide two lane pavement is proposed. In addition 600mm on both sides of the pavement is required for accommodating a hard shoulder, gutter etc. giving an overall 8.50m clear width. There will be no adverse environmental effect for this development of road.	Length : 4.90km Width : 5.00m Condition : BC road damaged top surface undulated Pot Holes at different chain age	Length: 4.90m Width: 7.30m <u>Road:</u> Cleaning the site Earth filling - 37.500 cum 150mm thick sand filling-widening, shoulder 150-220mm thick AS (1:1)-widening & damaged 130-250mm thick WBM-widening, junction part BFS & HBB single layer-Hard shoulder 75-125mm Brick on end edging 40mm thick DBC – Link Road 75mm thick DBC – Full length & junction Installation of Road Nameplate,Guidepost, Sign 80 nos. & 680m RCC pipes Brick work – 19.639 cum Relocation of Electric poles 66 nos. Tree plantation – 500 nos. Set up a field office & traffic protection etc.

b) Drainage	Dhaka Aricha Highway Ashulia GC Road Side Drain & Cross Culvert (Anwar Jung Road) (Ch. 0+000 to Ch. 4+235 & Ch.6+435 to Ch.7+100m)	This road services the industrial area between Dhaka Aricha & Ashulia Highways. There is no road side drainage and the road has been damaged due to water logging. To facilitate to drain out surface water of road, it is proposed sub surface concrete hume pipe in one side and gutter with X-pipe in other side of the road where water can't be discharge on surrounding areas. Where water can be disposed on surrounding areas either HBB or gutter without X-pipe can be accommodated.	Length : 4.90km Physically no drain is observed at both side of road	Length : 4.90 km Ring bundh – 2 nos. E/W excavation – 12430.599 cum Dewatering – Lump sum 150-750 mm thick sand filling BFS – Man hole 075-150 mm thick CC 200-300 mm thick RCC wall 900 mm dia RCC pipe – 3865.600 m Weep hole – 50 nos.
c) Roadway	Dhaka Aricha (RHD) at 20 Mile –Jirabo Bazar Yearpur UP road (Ch. 0+000 – 5+770)	This road also services the industrial area between Dhaka-Aricha & Tongi-Ashulia highways. Traffic is congested due to narrow pavement width and the movement of slow, heavy vehicles. Overall vertical alignment is satisfactory but horizontal alignment is deficient at some locations. The present condition of the road is BC but found severely damaged. There are nine cross-culverts and no road side drain, which has causes damage to the present road due to water logging. The present pavement width is insufficient to cope up with volume of vehicles and 7.30m wide two lanes of pavement has been proposed. In addition 600mm in both side of the pavement is required for accommodating hard Shoulder, Gutter etc giving 8.50m (approx) clear width. But it has been observed that in some stretches 8.50m is not available. It has been also observed some plants & trees along the shoulder on both side of the road. To minimize the tree cutting it is assumed the road should be centrally widened. There will be no adverse environmental effect for this development of road.	Length :5.750 km Width : 5.83m Condition : BC Severally damaged top surface HBB-Ch.2+473-Ch.2+493, Ch.2+527-Ch.2+536, Ch.4+463-Ch.4+488, Ch.4+844-Ch.5+170, Ch.5+360-Ch.5+366	Length :5.750 km Width : 8.50m Earth filling work – 45.00 cum 150mm thick sand filling-shoulder, junction 150-230mm thick AS (1:1)-raising & damaged 130-250mm thick WBM-new portion, junction BFS & HBB single layer-Hard shoulder 75-125mm Brick on end edging 40mm thick DBC – Link Road 75mm thick DBC – Full length & junction Installation of Road Nameplate,Guidepost,Sign 85 nos. & 680m RCC pipes Brick work – 19.639 cum Relocation of Electric poles 93 nos. Tree plantation – 500 nos. Set up a field office & traffic protection etc.

d) Drainage	Dhaka Aricha (RHD) at 20 Mile –Jirabo Bazar Yearpur UP road side drain and cross culvert (Ch. 0+000 – 5+770)	This is also a connecting road between Dhaka- Aricha & Tongi-Ashulia road which are nearly parallel. The area surrounding the proposed road to be rehabilitee is highly developing due to industrial growth. There are nine cross culvert in the road alignment, but most of them are inactive due to developed earth filling in the surrounding areas. There is no road side drain for which the present road has been damaged due to water logging. Some active cross culverts are short in length. These short culverts have been proposed to be extended up to required length for smooth cross drainage. To facilitate to drain out surface water of road, it is proposed sub surface concrete hume pipe in one side and gutter with X-pipe in other side of the road where water can't be discharge on surrounding areas. Where water can be disposed on surrounding areas either HBB or gutter without X-pipe can be accommodated.	Length : 5.77km Physically no drain is observed at both side of road	Length : 5.77 km Ring bundh – 2 nos. E/W excavation – 6817.562 cum Dewatering – Lump sum 150-750 mm thick sand filling BFS – Man hole 075-150 mm thick CC 200-300 mm thick RCC wall 900 mm dia RCC pipe – 2101.800 m Weep hole – 36 nos.
Package No: CRDP/LGED/DHK/NCB/2013/W-02				
(i)	Nabinagor-Kaliakor RHD at Sreepur-Kashimpur GC road. (Ch.0+00-1+500m);	This road starts from Nabinagar - Chandra highway to Sreepur Bazar. Existing conditions of the road surface is poor, damaged BC and WBM. Water logging is normal phenomena in rainy season. After improvement of this road smooth running of traffic will enhance economic, social and environmental development in this area.	Length :1.50 km Width : 4.0-5.2m Condition : BC & WBM Severally damaged top surface	Length :1.50 km : Width : 5.50m 150mm thick sand filling 150mm thick AS (1:1) 150-175mm WBM 125mm Brick on end Edging 50mm thick Dense BC RCC Pipe for drain Construction of semi pacca Field office
(ii)	Kuturia-Bogabari Bazar road. (Ch.0+00-4+570m);	This road starts from Kuturia Bazar at Bis Mile-Zirabo Bazar and ends at Bogabari Bazar. Existing conditions of the road surface is poor, damaged BC,WBM, Earthen, BFS & HBB. Water logging is normal phenomena in rainy season. After improvement of this road smooth running of traffic will enhance economic, social and environmental development in this area.	Length :4.552 km Width : 3.3 m Ch.0-2+950, 4+163-4+500 Condition : BC Severally damaged top surface and also Earthen, BFS, HBB: Ch.2+950-4+145, 4+500-4+570	Length :4.552 km Width : 3.7 m E/W: 2576.185 cum 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain

(iii)	Jamgora Bazar-Chitrachail-Kandail-Katgora Bazar road. (Ch.0+00-3+615m);	This road starts from Jamgora Bazar via Chitra chali and Kandal and ends at Katgora Bazar on Bis Mile –Zirabo Bazar road. Existing conditions of the road surface is poor, damaged BC, Earthen, BFS & HBB. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length:3.615 km Width : 3.0 m Condition : BC Severally damaged top surface and also Earthen, BFS, HBB.	Length:3.615 km Width : 3.7 m E/W: 3300.890 cum 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain
(iv)	Jamgora Chowrasta Bhadail via Bhadail Primary School road. (Ch.0+00-2+420m, link Ch.0+00-0+067m);	This road starts from Jamgora Chowrasta via Bhadail Primary School and ends at Bhadail Bazar. Existing condition of the road surface is poor, Damaged BC and Earthen. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length:2.487 km Width : 2.9 m Condition : BC Severally damaged top surface and also Earthen.	Length:2.487 km Width : 3.7 m 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain
(v)	Bhadail Chowrasta Madar Textile via Anobic Shakti Commission road. (Ch.0+00-1+280m);	This road starts from Bhadail Chowrasta via Atomic Energy Commission to Madar Textile Mill. Existing condition of the road is poor, damaged BFS and also Earthen. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length:1.280 km Width : 5.5-6.0 m Condition : BFS Severally damaged top surface and also Earthen.	Length:1.280 km Width : 3.7 m E/W: 2214.750 cum 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain
(vi)	Nabinagor-Kaliakoir RHD road-Tongi EPZ road via Birds Garments & Gajirchat Aliya Madrasha. (Ch.0+350-1+620m);	This road starts from Nabinagar-Kaliakoir RHD road via Birds Garments and Gajirchat Alia Madrasha and ends at Tongi EPZ road. Existing condition of the road is poor, damaged BC and Non Metal. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length:1.270 km Width : 4.5-6.0 m Condition : BC Severally damaged top surface and also Non Metal.	Length:1.270 km Width : 3.7 m 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain

(vii)	Kumkumary-Sadhupara road. (Ch.0+00-2+300m);	This road is partially parallel to Anwar Jong road. So many Bazar and industries are situated along the Anwar Jong road. Water logging is normal phenomena in rainy season. The purpose of improvement of this road is to minimize the traffic congestion during hat days and industrial worker's easy movement. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length:2.300 km Width : 3.0 m Condition : BFS and HBB Severally damaged top surface	Length:2.300 km Width : 3.7 m E/W: 10936.180 cum 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain
(viii)	Dhalpur - Katgora road. (Ch.0+00-1+525m)	This road is starts from Katgora road to Dhalpur Haque Market. Existing condition of the road is poor, damaged BC HBB and Earthen. After improvement of this road, road network connectivity in this area, smooth running of traffic will enhance economic, social and environmental development in this area.	Length : 1.525 km Width : 5.9 m Condition : BC Severally damaged top surface and also HBB and Earthen.	Length:1.525 km Width : 3.7 m 150mm thick sand filling 150mm thick AS (1:1) 150mm thick WBM 125mm Brick on end Edging 40mm thick Dense BC RCC Pipe for drain

HBB = Herring Bone Bond, AS = Aggregate Sand, WBM = Water Bond Macadam, BFS = Brick Flat Soling, DBC = Dense Bituminous Carpeting, E/W = Earth Work, CC = Cement Concrete, RCC = Reinforced Cement Concrete

Figure 2 : Savar Upazila Map

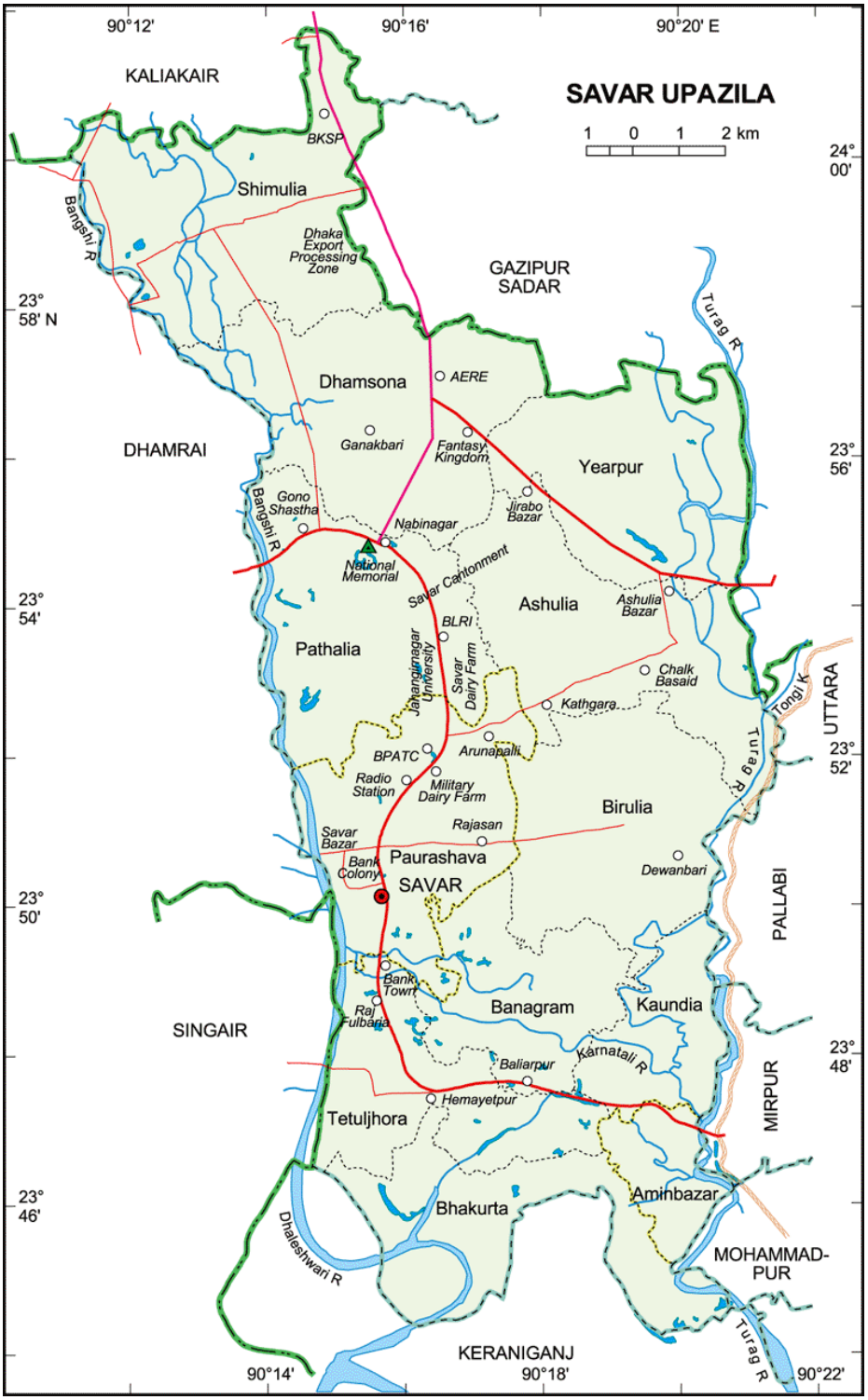
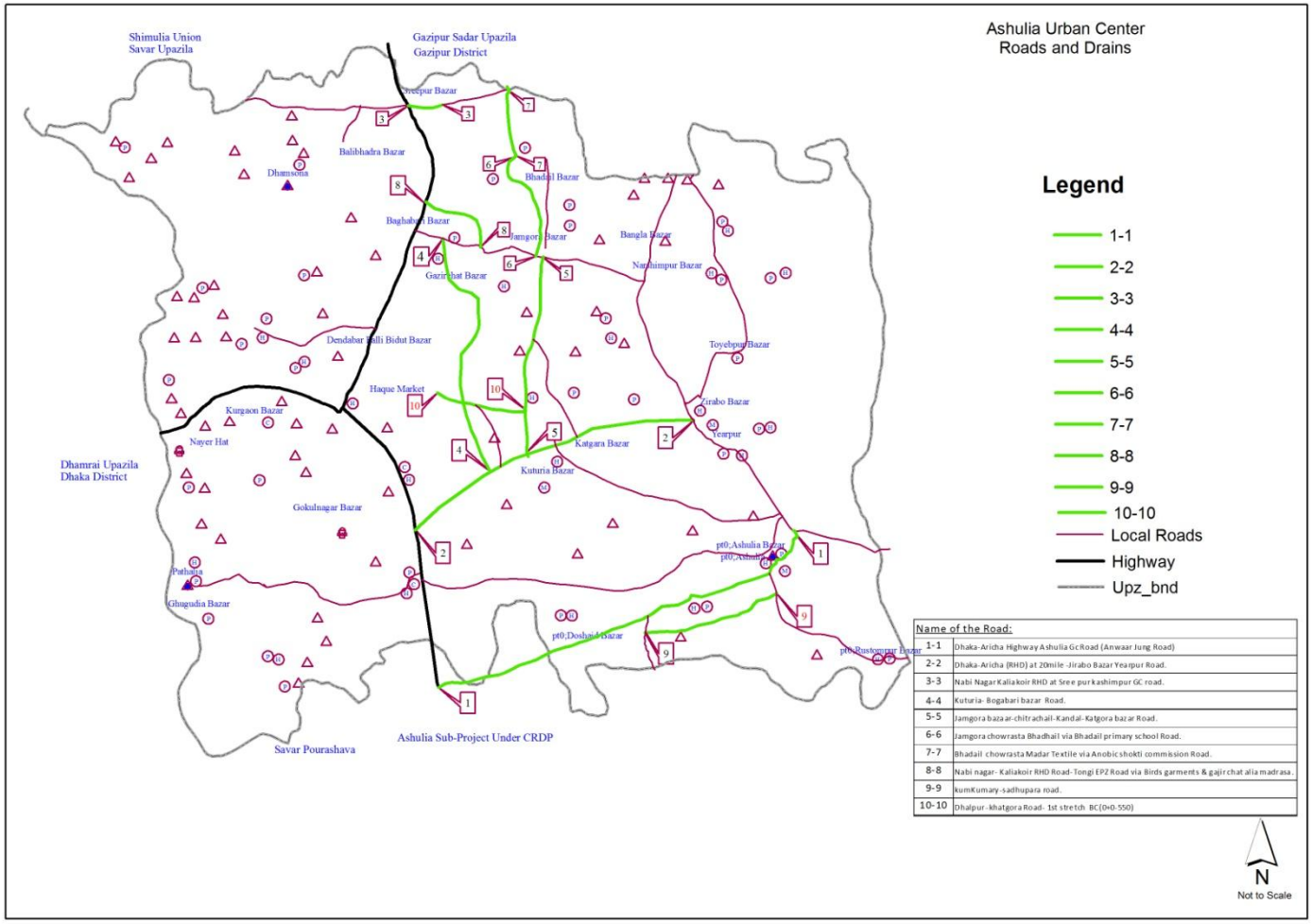


Figure 3:- Proposed Road and Drainage Subproject Components



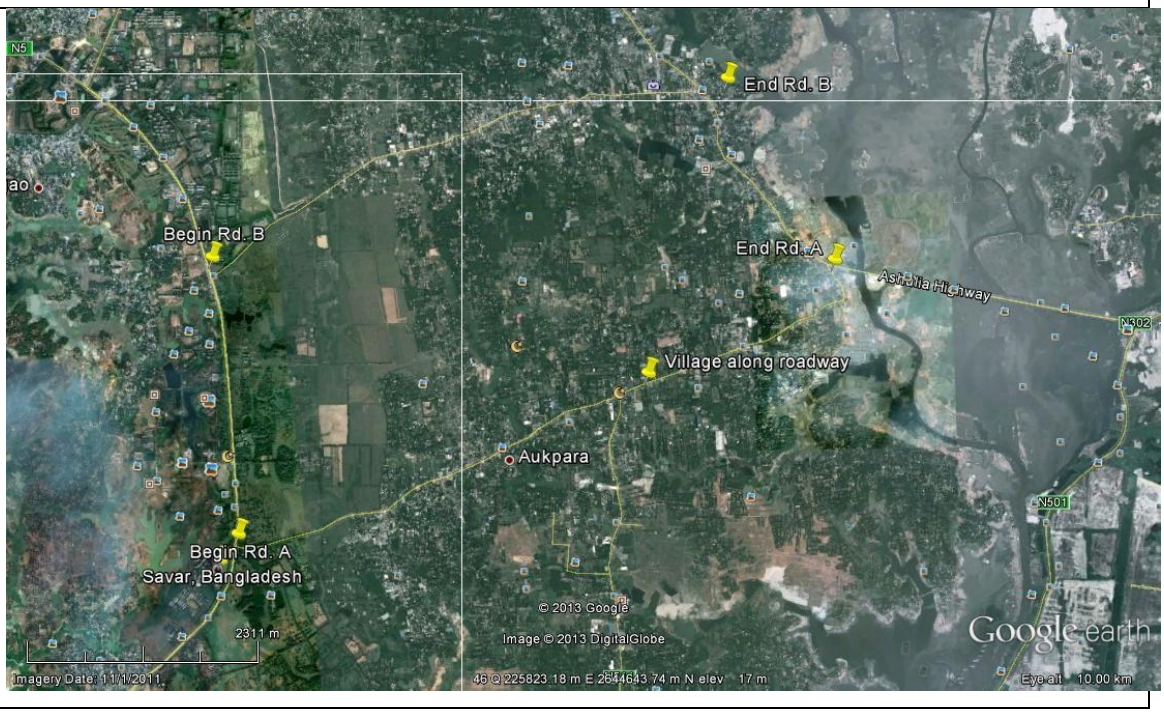
III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Location

15. Package W-01 is located in Savar Upazila at UTM coordinates 46 Q 222298 E 2642771 N and 227276 E 2647204 N. These are points marked “Begin Rd. A” and “End Rd. B” in the Google Earth image shown in Figure 4, and are separated by a distance of some 6.7 km. A rectangle enclosing the entire lengths of both roadways amounts to an area of some 22 sq km. It is located in the center portion of Savar Upazila.

Figure 4 – Subproject Area (Package W-01)



2. Topography, Soil and Geology

16. The area is generally flat and poorly drained. Soils are somewhat porous allowing for some seepage of surface water into the soil. Channelized drainage covers most of the land, in which slowly draining streams will transport surface runoff to the major rivers.

3. Climate

17. The temperature at Savar ranges from 32 to 12 degrees Celsius, and the monthly rainfall averages 430.75mm in monsoon and 10.50mm in winter. Cold temperatures are unusual in Savar, but when they occur they inflict hardship on the local community.

4. Air Quality

18. No information is available on local air quality. A Bangladesh Export Processing Zone is located in this upazila. Population density within the upazila is high and there are many motor vehicles operating on the local roads within the upazila. Direct observation is that air quality is generally deteriorated with dust from factories and vehicular emissions around bus stands and market areas.

5. Surface Water

19. There are two main river channels that drain the area: the Dhaleswari River flows from north to south along a channel that is located west of Savar Municipality, and the northern floodplains of the Buri Ganga bound the area in the east. The Turag also plays a role in area drainage by connecting these two rivers along a channel in the south of the Upazila. None of these rivers are close to the subproject area with one exception: the south-most road joins the Ashulia Highway near the bridge crossing of the Buri Ganga. Surface waters contain moderate levels of organic matter and pollution. The rivers are important for people's daily use, irrigation and for transport of raw materials to industries.

6. Groundwater

20. Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The water table at Savar Upazilla is shallow; however the main aquifer providing water supply is found at a depth of greater than 50 m. Arsenic contamination is generally not present in the project area.

B. Ecological Resources

21. The ecological setting is mostly settled countryside with typical homestead and roadside vegetation that has a positive effect on improvement of soil moisture through shading and mulching the soil. Trees growing at homesteads also provide easy access to fuel wood, fodder and other products. A large number of multipurpose trees (fruit, timber, fodder, medicine) are grown in the area. Main crops include paddy, jute, peanut, onion, garlic, chilli and other vegetables.

22. Birds, Wildlife and Wetland Habitats: Other than common birds like crows, sparrows, shaliks, cuckoos etc. and some domestic cattle, no wild animals inhabit the area. Aquatic habitats are common in the project area due to the numerous freshwater lowlands, ponds, wetlands and rivers coursing through the area. Fish diversity in rivers and streams is decreasing due to heavy pollution in the aquatic bodies from domestic and industrial effluent.

C. Economic Development

1. Land Use

23. Total cultivable land 16,700 hectares and fallow land is 10,500 hectares. The cultivable land under irrigation is 69%. Land distribution among the population is as follows Agriculture 24.34%, agricultural labourer 12.84%, wage labourer 4.44%, cattle breeding, forestry and fishing 1.90%, industry 1.37%, commerce 17.35%, service 20.68%, construction 1.66%, transport 3.96% and others 11.46%.

24. The market value of the land of the first grade is Tk 10,000 per 0.01 hectare. There are 14 hats (landings) and bazaars. Noted bazars are Savar, Nabinagar, Amin Bazar, Balibhadra and Bagbari Bazar; noted hats include Ashulia, Savar, Shimulia, Kathgara, Sadullapur and Vhakurar Hat.

2. Industry and Agriculture

25. There are many small, medium and large size industries in operation in the Upazila area such as cottage industries weaving shops, goldsmiths and others. Manufactories include three ceramic industries, beverage industries, press and print shops, and numerous large and small garment industries. Heavy industries in the Savar

Upazila area include ceramics, beverages, press and publication, garments industry, foot ware, jute mills, textile mills, printing and dying factory, transformer industry, automobile industry, biscuit and bread factory, pharmaceutical industry, soap factory, brick field, cold storage, welding, plant nursery, etc. Bangladesh Export Processing Zone is located in this upazila.

Infrastructure, Transport and Communications

26. Existing infrastructure in Savar upazila includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Itemized these include 273 km of pucca, 41 km of upazila road, 67 km of union road, 167 km of village road and 874 km of mud road made up of 11 km of upazila road, 55 km of union road and 808 km of village road. There are 50 km of highway in the upazila.

27. Traditional transports moving through upazila are Palanquin, bullock cart and horse carriage. These means of transport are either extinct or nearly extinct. Nowadays Savar upazila is well connected by road and water transport with Dhaka and other parts of the country, with the exceptions noted.

D. Social and Cultural Resources

1. Demography

28. The present Population is 1,385,910 of which males are 46.69% and female 53.31%. Religious affiliation is as follows: Muslim 88.59%, Hindu 10.41%, Buddhist 0.03%, Christian 0.93% and others 0.04%. Density of population is 4,948 per sq km. Literacy rate among the Upazila people is 68.00%.

2. Health and Educational Facilities

29. There are numerous health facilities and educational facilities within the upazila.

3. History, Culture and Tourism

30. Archaeological heritage and relics are generally of local interest only. None of these will be adversely affected by the proposed roadway improvements.

IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Planning, Location and Design

31. The subproject does not involve any special considerations regarding planning and location, since all of the components are reconstructions of existing roadways and occupy existing right-of-way that is generally clear, and for which no acquisition or easement for land is required. In case of package W-01 in some stretches it may be difficult to obtain the full 8.5 m road width, in which case the engineer will narrow the width based on available land in problematic areas, manage the problem locally with the landowner, or reduce the dimension of gutter or hard shoulder; but in any case there is no generalized solution to the problem and it will be dealt with on a case by case basis (see project technical report). In case of package W-02 existing width of all the roads are 4.0m to 10.0m, which is more than the proposed design width of 5.5m for one road and 3.7m for the remaining seven roads. There is a high degree of certainty that the improvements can be made without affecting permanent structures.

32. The drainage design for package W-01 follows standard procedures that are well established in Bangladesh. There are seven existing culverts along both roadways. Some remediation work is needed to extend some of these culverts beyond the width of the improved roadways. Otherwise, drainage is installed along the periphery of the roadways. Improvements involve 900 mm dia concrete pipe connected on 10 m centers with drop inlets placed in the flow line. Roadway drainage will be installed primarily where there are built up commercial areas, or where drains are needed to prevent flooding. Cross drainage pipe will be installed in package W-02 which will drain the water from one side to the other as necessary according to the direction of flow. Water drains freely into adjacent fields in some areas, hence drains are not required.

B. Construction

33. Construction presents the greatest potential for the subproject to exert a negative environmental impact. These are generally associated with interference with traffic movements, safety, convenience and local air quality impacts (dust). Impacts can be mitigated through environmental measures that are set out in the construction contract tender documents. These measures address the following key areas: worker provisions, use of land for construction purposes, sediment controls, community health and safety, site conditions, quarries and haul routes, and other factors. A set of these provisions for use in the subproject tender documents is found in Appendix 3.

34. Worker Provisions are meant to insure that the GOB and ADB policies are complied with regarding employment and worker health and safety. Employment criteria relate to minimum age, wage and living provisions, benefits, hours of work, overtime arrangements and overtime compensation, as set out by the GOB. ADB, and by reference the World Bank/IFC performance standards, sets out requirements for a safety and accident prevention program; and provision of safety equipment and training in use. Other aspects of worker provisions include availability of first aid equipment at the jobsite, and provisions for lodging, sanitary and potable water services and other facilities in the event workers are lodged at worker camps near the jobsite.

35. Use of land for construction purposes requires that local authorities be consulted on locations for worker camps and equipment yards, approval is obtained from landowners for temporary use and payments are made to legitimate owners, limits are placed on the types of activities permitted related to resource extraction (cutting firewood, and harvesting of plants or fish), disposal of wastes at the site is prohibited, and final cleanup of the site is required.

36. In order to reduce sediment losses to rivers and lakes, controls should be implemented that limit the size of areas where there is construction in progress and assure that open excavations and exposed earth will be protected to the extent possible from flowing water. Discharge of any sort of wastewater into natural water bodies is prohibited and construction work where there is a potential for sediment loss will be suspended during rains.

37. In order to protect community health and safety, a number of provisions need to be put into place related to transport of materials along roadways, accident prevention, dust and noise control and use of flagmen to control traffic flow in the construction zone, location of equipment yards and batch mixing plants, provision of temporary access to shops and homes, and accommodating pedestrian traffic especially in commercial areas and near schools. Special considerations by the contractor will be necessary to assure the flow of traffic through the construction zone.

38. In order to maintain safe and environmentally acceptable conditions, the Contractor will provide a Site Environmental Management Plan for development of the construction zone, traffic management, worker camps, equipment yards, haul roads and quarry areas that minimizes interference with ongoing activity, noise and air pollution, congestion and visual impact. Any borrow pits and quarries must be approved by local authorities, and be pre-existing sites already permitted for the intended use. Borrow pits along linear alignments will be interconnected; smoothly excavated; of uniform depth, width and slope; and graded to drain after use. The contractor is required to avoid damage to any locations or artifacts of historical and archeological significance encountered during the progress of work.

39. The above-described performance rules apply generally to projects for rehabilitation of road and drainage infrastructure in their original alignments, and are practical for use on the present project to mitigate impacts on the environment, the community and human health. These performance rules are described in more detail in Appendix 3, and the monitoring protocol set up for the implementation phase relies on observing contractor conformance with these rules. Mitigation and monitoring requirements are tabulated in the Environmental Management Plan (EMP) found in Sec. **Error! Reference source not found.** of this report. In addition to the general requirements, the following protocols should be observed by the contractor.

40. Given the high volume traffic loads on these two roadways, the contractor is urged to set out a plan for accommodating the flow of traffic (vehicular and, in places, pedestrian traffic) during construction, which will involve at the minimum:

- Perform work on one of the roads before beginning work on the second road: since the roads run parallel to one another, each can accept some of the traffic load for the other when the latter is under construction; at the very least the contractor must evaluate whether placing both roads under construction at the same time will increase traffic congestion.
- Consecutively perform construction on segments of roadway and drains of no longer than 300 m in length, and complete the construction of drains, and then road rebuilding, on each length before moving to the next length.
- Employ flagmen to control traffic flow through construction zones especially where road surfaces are being reworked.
- Remove construction debris as soon as possible after construction is completed in a given section of roadway, both for drainage and for roadway repair works; and do not leave piles of earth standing in the roadway from excavations for drainage works for periods of time longer than it takes to complete the drainage works underway in the immediate vicinity.

41. In regard to the installation of drainage, the PIU should insist that the Contractor close the newly installed drains as quickly as possible (e.g. install covers on the newly installed drop inlets) to limit the amount of dirt that enters the drain, which would only serve to clog the drain and require early cleaning. The contractor should be responsible for turning over to the LGU a newly installed drain free of any obstruction and significant amount of dirt or silt deposits.

42. The project includes planting some 500 trees within the right-of-way, which will provide a natural barrier to noise, dust and exhaust gases in package W-01.

C. Operations Phase

43. Once in operation the improved roadways may be responsible for an increase in noise and air emissions from increased vehicular traffic. Still, any future condition needs to be compared to present circumstances, or to future circumstances without any improvement in the roads (future without-project conditions). These circumstances are difficult to predict or estimate; however it is nearly certain that conditions once the roads are improved will be much better for local residents than would be the case without improvements, by removing severe traffic congestion that is a feature of the current condition, thereby reducing vehicle noise (honking of horns) and air pollution (idling vehicles). The conclusion is that the project provides improved roadway driving surfaces that enhance the flow of traffic and improve environmental conditions along the roadway.

44. Roadway safety will be enhanced by clearly delineated lane widths, improved signage and shoulders that provide room for pedestrians and slow moving vehicles. Still, there will be a tendency for increasing speed because of an improved driving surface. The LGU should install speed barriers wherever there is a potential for congestion, in particular around pedestrian areas such as schools, community shopping areas and factory gates. The LGU should post and enforce a speed limit along both roadways of 50 km per hr (or lower), since the roads are both congested and will remain so after the improvements. All the roads are of rather short length and high speeds are not needed to improve functionality of the roads.

45. The project will improve drainage in the area of the roadways, much of which is populated by rural and peri-urban communities. The LGU should regularly inspect and maintain the drains by removing residual dirt and repairing any breakage, including the covers of drop inlets, so that the drains do not become clogged and so that they continue to function as originally intended. The CRDP will provide O&M training to LGUs to instill a sense of responsibility for O&M that might not already be present. The LGU should:

- Establish a program of regular visual inspection to identify problems early, before they become critical (breakage, plugging, etc.)
- Ensure that all remedial action is implemented promptly, including clearing sediment and other material that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks.
- Prevent the discharge of waste oil, kitchen grease, offal, or other types of foreign materials that would plug the drain and contaminate land and water below the outfall.

46. The subproject will also provide some funds for maintenance. Any repairs to the drains should be small-scale, involving manual replacement of bricks and mortar. If these are conducted when necessary there should be no need for major repairs during the 30-year design life of the drains.

V. ENVIRONMENTAL MANAGEMENT PLAN

47. The IEE for this package has been prepared in accordance with ADB Safeguard Policy Statement's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject. The complete IEE can be downloaded from
< http://www.lged.gov.bd/ProjectLibrary.aspx?projectID=237>

48. The environmental management plan (EMP) describes the proposed mitigation measures in relation to potential impacts, and the means for assuring their implementation via monitoring. Institutional arrangements and costs related to mitigation and monitoring are described.

A. Summary of Environmental Impacts and Mitigation Measures

49. The potential adverse impacts of this road and drainage subproject as identified and discussed in Sections IV and the mitigations proposed to reduce impacts to acceptable levels are summarized in Table 2. The table also shows how the mitigation will be implemented, who will be responsible, and where mitigation activities take place.

B. Implementation Procedure

50. The screening and IEE has been prepared during detailed design by the MDS consultant. Cost of mitigation measures will be included in the contractor budget. Special testing is not required.

51. MDS Environmental Specialists will assist the PMCU and PIU to ensure that the subproject complies with environmental safeguards and the Environmental Monitoring Plan contained in the IEE. The Municipality will hire Construction Contractors (CC) to build the road and drainage improvements. Inspection of progress in construction will be undertaken locally by the PIU, supported by the PMCU and MDS.

52. During implementation the contractor will submit monthly progress reports to the PIU, which includes a section on EMP implementation. The PIU will submit reports to the PMCU for review. The PMCU will review progress reports to ensure that the all mitigation measures are properly implemented. The PMCU will consolidate monthly reports and submit quarterly reports to ADB for review.

C. Environmental Monitoring Plan

53. Mitigation activities fall into three stages: pre-construction (location, planning and design), construction and operations. Mitigation of pre-construction impacts are the responsibility of the PMCU and MDS Consultants working with the PIU to prepare the subproject according to good engineering practice. Mitigation of impacts during construction is the responsibility of the Construction Contractor, and will be included in the Contract bid documents.

54. Monitoring will ensure that all parties provide the required mitigations, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. This will be done by the PIU supported by the PMCU and the MDS Environmental Specialists. The PIU with support from the MDS Environmental specialist will be responsible for monitoring implementation of mitigation measures and reporting to the PMCU, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively. Post-construction monitoring will be conducted by the local government unit.

55. Most of the mitigation measures undertaken during construction are meant to minimize disturbance from the construction in urban areas by maintaining access, planning work to avoid sensitive times and reducing dust and noise pollution. Experienced Contractors should be familiar with the requirements. Monitoring by MDS Specialists may involve making observations in the course of site visits, review of records and surveys of residents.

D. Grievance Redress Mechanism

56. The Grievance Redress Mechanism, as described in Sec. VI, involves a three tiered process for registering and resolving complaints raised by project affected persons through intervention by the PIU (first level), the local Grievance Redress Committee (second level) of the LGU, or the PMCU (third level). The construction contractor has a role to deliberate along with the PIU and representatives of the PMCU (through the DSCM) solutions to complaints raised by individuals and groups, and to act promptly (within a period appropriate to the nature of the complaint) on executing agreed upon solutions to specific problems, then reporting back to both the PIU and the affected party on solutions undertaken by the contractor. The GRM serves dual functions to register complaints related to both environmental impacts and resettlement and compensation. The contractor will post notices announcing the grievance redress mechanism in local government offices (the Upazila Engineer office) and in strategic places of the subproject's area of influence.

Table 2: Potential Environmental Impacts and Mitigation Measures

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location
PLANNING, LOCATION & DESIGN					
Detailed design fails to incorporate good engineering design practice	S2	P	Analyze, survey and produce a technically and economically feasible designs	MDS, LGED	PMCU office
Spoils impact and mitigation measures	S2	T	Spoil management plan should be submit for approval from PIU for the disposal sites of excavated materials, spoils, construction debris and garbage prior to start of construction work.	MDS, LGED	PMCU office
CONSTRUCTION					
Awareness of surrounding people	S3	T	Inauguration meeting should be held at site headed by local representative	PIU	Project site
Traffic management plan for during construction period	S3	T	Submit a traffic management plan including but not limited to list of roads to be closed, number of flagmen to be designated along length of drainage per work day, type and number of signs/barricades to be used.	Contractor	Project site
Impact on air quality and noise levels due to construction activity	S2	T	Application of water to suppress dust where needed. Prompt removal of spoil materials	Contractor	All activities
Construction blocks access from failure to backfill trenches and removed materials and construction debris	S2	T	Provide means to bypass construction using detours, bridging trenches and providing pathways. Specific clauses in tender documents to complete construction promptly and remove excavated materials and debris.	Contractor	Project Site
Traffic congestion and blockage of paths of travel	S2	T	Provide signage, flagmen and detours around construction as appropriate; where pedestrian traffic is common, provide paths of travel through construction area.	Contractor	Project Site
Traffic and human movement may be disrupted by materials hauling	S3	T	Plan routes to avoid congested areas and narrow roads. Schedule transportation to avoid peak traffic	Contractor	Project Site
Quarters for workers in the proximity of worksites, and equipment/material yards	S3	T	Minimize need for workers quarters, equipment yard and onsite repair facility in work area; provide potable water supply and latrines for workers, and solid waste disposal	Contractor	All activities
Dirt, sediments and sludge causes an inconvenience by blocking pedestrian and vehicular access, nuisance to local residents, and impact on public health.	S2	T	Dispose of spoil material at a location agreed to by the PIU and the property owner. Use tarpaulins to cover dry materials during transport Provide walkways and metal sheets where required to maintain access across for people and vehicles Increase workforce in front of critical areas such as institutions, places of worship, business establishments, hospitals and schools Consult businesses and institutions regarding operating hours and factoring this in work schedules and ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage;	Contractor	Project Site

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location
			Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.		
			Materials excavated preceding construction of small drains to be removed from the site quickly.		
			Sediments and sludge excavated from drains, khals and rivers allowed to dewater and dry no longer than one week before removal.		
			Clear path of access for three-wheeled vehicles, rickshaws and pedestrians maintained along routes of usual travel.		
			Excavated materials sufficiently dry or loaded into sealed dump trucks that will not leak materials onto roadways		
Lack of planning during construction fails to properly sequence activities and minimize disturbance/cost.	S2	T	Plan construction to accommodate traffic flow; perform work on one road before beginning work on the second; complete construction on one segment before progressing to new location.	Contractor	Project Site
Drains are clogged at end of construction period.	S2	P	Close or cover newly installed drains to prevent entry of dirt; contractor to turn over to LGU installed drain free of dirt or foreign material.	Contractor	Drainage works
Schools, mosques, hospitals, temples may be disturbed by noise, dust and impeded access	S2	T	Increase work force to complete construction quickly in affected areas. Practice good housekeeping to minimize dust / avoid obstruction in the paths of travel of pedestrians and vehicles	Contractor	All activities
Potential for benefit from employment for local people	S2	T	Provide preferential employment for locals in labor force as specified in construction contract tender documents	Contractor	Project Site
Trees may be removed along drainage easements	S2	P	Avoid removing trees where possible	Contractor	Project Site
Potential for accident and injury of construction workers and public in zone of construction	S2	T	Implement a safety and health plan for workers and require personal protective gear suitable to the type of work being performed. Train in safe work procedures. Maintain a record of accidents that are reported to the supervising engineer. Bar the public from construction areas and barricade and mark excavations	Contractor	Project Site
OPERATION & MAINTENANCE					
Drainage channels are not maintained, solid waste builds up in drains, drains no longer function properly.	S2	P	Prevent deposit of foreign materials (oil, grease, solid waste, plastics) into drains, inspect, repair and clean drain periodically.	GCC	All drains
Appearance and environment will deteriorate if material from drain cleaning piled on adjacent land	S2	T	Dispose of material from blocked drain in location away from roadway and drain	GCC	All drains

Sig = Significance of Impact (S3 = Not Significant, negligible impacts; S2 = Moderate, reversible impacts which are site specific and simple to contain and mitigate; S1 = Significant, potentially irreversible impacts requiring complex mitigation); Dur = Duration of Impact (T = Temporary; P = Permanent)

57. A program of monitoring will be conducted to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. This will be conducted by the Environmental Officer within the PIU supported by the PMCU Environmental Coordinator and the Environmental Specialists on the MDSC Team. The Environmental Officer will be responsible for monitoring implementation of mitigation measures and reporting to the PMCU, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively. Post-construction monitoring will be conducted by the GCC.

58. Most of the mitigation measures undertaken during construction are meant to minimize disturbance from the construction in urban areas by maintaining access, planning work to avoid sensitive times, reducing dust and noise pollution and dealing effectively with excavated materials. Experienced Contractors should be familiar with the requirements. Monitoring of such measures normally involves making observations in the course of site visits, although some require review of records and surveys of residents.

59. Table 3 shows the proposed Environmental Monitoring Plan for these subprojects, which specifies the various monitoring activities to be conducted during all phases. The table describes: (i) mitigation measures, (ii) location, (iii) measurement method, (iv) frequency of monitoring and (v) responsibility (for both mitigation and monitoring). It does not show specific parameters to be measured because as indicated above, most measures will be checked by simple observation, by checking of records, or by interviews with residents or workers. Costs related to monitoring are included in the costs for loan project implementation.

60. LGED should conduct monitoring during the operational period to confirm the long-term benefits of the scheme. This will involve monitoring condition of drains in relation to breakage and removal of built up sediments, and limits on discharge of oil and grease to drains.

E. Environmental Management and Monitoring Costs

61. Mitigation costs are included in the overall cost for design and supervision consultants and/or the contract bid price for the construction work. Costs for monitoring are covered by the costs for environmental consultants, who will perform the monitoring. Costs associated with land acquisition and compensation are reported in the resettlement plan. No special costs other than the planting of trees is associated with the environmental mitigation and monitoring measures. Tree planting has been proposed along 2 roads in package W-01 which have been included in the bill of quantities of this package at a cost of Taka 3.00 lac.

Table 3- Environmental Monitoring Requirements

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PLANNING, LOCATION AND DESIGN					
Analyze, survey and produce a technically and economically feasible design	PMCU office	MDS, LGED	Critical evaluation of design outputs	Continuous	Team Leader & Project Director
Plan the sequence of construction to minimize disruptions	PMCU office	MDS, LGED	Critical evaluation of tender and construction pre-planning	Prior to tender award	Team Leader & Project Director
Incorporate good engineering practice into design	PMCU office	MDS, LGED	Review of design outputs	Before design approval	Team Leader & Project Director
Spoil management plan should be submitted for approval from PIU for the disposal sites of excavated materials, spoils, construction debris and garbage prior to start of construction work.	PMCU office	MDS, LGED	Include environmental clauses; critically evaluate environmental / safety aspect of implementation	Before approval of tender document	Team Leader & Project Director
Environment, Health and safety part of contract documents	PMCU office	MDS, LGED	Include environmental clauses; critically evaluate environmental / safety aspect of implementation	Before approval of tender document	Team Leader & Project Director
CONSTRUCTION					
Inauguration meeting should be held at site headed by local representative	Project site	PIU	CC records	Once before commencement	PIU
Traffic management plan including but not limited to list of roads to be closed, number of flagmen to be designated along length of drainage per work day, type and number of signs/barricades to be used.	Project site	Contractor	Site Visits; CC records	Weekly	MDS, PIU
Application of water to suppress dust where needed. Prompt removal of spoil materials	Construction zone	Contractor	Site Visits; CC records	Weekly	MDS, PIU
Provision of means to bypass construction where necessary using detours, bridging trenches and providing pathways.	Distribution	Contractor	Site visit; resident survey	Weekly	MDS, PIU
Provide flagmen and traffic detours when necessary	Distribution	Contractor	Site visits; CC records	Weekly	MDS, PIU
Plan truck routes to avoid congested areas, narrow roads and peak traffic	All sites	Contractor	Observations off site; CC record	Monthly	MDS, PIU
Dispose of spoil material at a location agreed to by	Construction	Contractor	Site Visits; CC records	Monthly	MDS, PIU

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
the PIU and the property owner. Use tarpaulins to cover dry materials during transport	zone				
Materials excavated preceding construction of small drains to be removed from the site quickly.	Construction zone	Contractor	Site visits	Weekly	MDS,PIU
Excavated materials sufficiently dry or loaded into sealed dump trucks that will not leak materials onto roadways	Haul routes	Contractor	Observations on and off site	Weekly	MDS,PIU
Cover or damp down fill material, soil and sand stockpiled on site	Construction zone	Contractor	Site visits	Weekly	MDS,PIU
Only bring construction material to site when needed.	Inhabited areas	Contractor	Site visits; CC records	Weekly	MDS,PIU
Sediments and sludge excavated from drains, khals and rivers allowed to dewater and dry no longer than one week before removal.	Construction zone	Contractor	Site visits; CC records	Weekly	MDS,PIU
Land acquisition / compensation in accord Resettlement Framework*	Where required	GCC	Landowner surveys; LGED record	As needed	MDS,PIU
Clear path of access for three-wheeled vehicles, rickshaws and pedestrians maintained along routes of usual travel.	Construction zone	Contractor	Site visits, CC records	Weekly	MDS,PIU
Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals and schools	Distribution	Contractor	Site visits; CC records	Monthly	MDS,PIU
Consult businesses and institutions regarding operating hours and factoring this in work schedules and ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage	Distribution	GCC	Resident surveys; CC records	Monthly	MDS,PIU
Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.	Distribution	MDS/GCC	Site visit; design reports	Monthly	MDS,PIU
Plan work with town authorities – work when traffic is light	Distribution	Contractor	Site visits; CC records	Monthly	MDS,PIU
Plan construction to accommodate traffic flow; perform work on one road before beginning work on the second; complete construction on one segment before progressing to new location.	Construction zone	Contractor	Site visits, CC records	Monthly	MDS,PIU

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Develop and apply archaeological protocol to protect chance finds	All sites	MDS and CC	MDS and CC records; Site visits	Weekly	MDS,PIU
Provide walkways and metal sheets where required to maintain access across for people and vehicles	Where needed	Contractor	Design reports; resident surveys	Monthly	MDS,PIU
Minimize need for workers quarters, equipment yard and onsite repair facility in work area; provide potable water supply and latrines for workers, and solid waste disposal	All sites	Contractor	Site visits; CC records	Monthly	MDS,PIU
Exclude public from the site with barricades; provide pedestrian path of travel through work area	All sites	Contractor	Site visits; CC records	Monthly	MDS,PIU
Ensure that workers wear Personal Protective Equipment	All sites	Contractor	Site visits; CC records	Monthly	MDS,PIU
Provide Health and Safety training for all personnel	All sites	Contractor	CC records; worker interviews	Monthly	MDS,PIU
Keep accident reports and records	All sites	Contractor	CC records	Monthly	MDS,PIU
Employ workforce from communities near sites	All sites	Contractor	CC records; worker interviews	Monthly	MDS,PIU
Close or cover newly installed drains to prevent entry of dirt; contractor to turn over to LGU installed drain free of dirt or foreign material.	Construction zone	Contractor	Site visits	Monthly	MDS,PIU
OPERATION AND MAINTENANCE					
Prevent deposit of foreign materials (oil, grease, solid waste, plastics) into drains, inspect, repair and clean drain periodically; dispose of materials removed from drains	GCC's Office	OM contractor	Site observations	Monthly	GCC Office
Dispose of material from blocked drain in location away from roadway and drain	GCC's Office	OM contractor	Site observations	Monthly	GCC Office

VI. PUBLIC CONSULTATION, DISCLOSURE AND GRIEVANCE REDRESS

A. Project Stakeholders

62. The CRDP Project approach for stakeholder involvement relies on the local government unit to be informed of the needs of the local community. Proposals for investment in public facilities are taken up based on recommendations from the LGU, which represent ward commissioners, businessmen, NGOs and citizen's associations, slum improvement committees and average citizens from the wealthy, middle-class and poor strata of the community.

B. Public Consultation

63. Consultation was carried out through meeting with the LGU representatives during project scoping, a group most familiar with the needs of the local communities. In addition, informal discussions were held during the site visit with local people along the roadways, who expressed that the main issue they face has been the poor condition of the roadway. The subproject gains the full support of communities, local businesses and transport operators in the area. It is up to the project implementing agency to insist that the contractor undertake the work in a manner that will cause the least inconvenience to the community.

64. The Project will provide training for staff working in CRDP, consultants and LGU staff on safeguard policies. Further consultation will be conducted during construction, to obtain views from the community on the best means for alleviating impacts.

C. Disclosure

65. Subproject disclosure will follow the following general guidelines:

- Public disclosure meetings during construction to inform the public of progress
- Formal disclosure of completed subproject reports by posting on the LGED website and by making copies available at locations in the towns, informing the public of their availability, and providing a mechanism through which comments can be made.

D. Grievance Redress Mechanism

66. A grievance redress mechanism (GRM) has been set up for the CRDP project to register grievances brought by people in the affected community regarding technical, social and environmental aspects, which is described in the EARF.

VII. FINDINGS, RECOMMENDATION AND CONCLUSION

A. Findings

67. The Dhaka-Aricha Link Roads-Road and Drainage Subproject and remaining eight roads are designed to improve the quality of life of residents by improving traffic flow along to heavily traveled peri-urban corridors in Savar Upazilla. Residents and businesses in the surrounding area will benefit from improved roads and drainage allowing better road transport access and reduced exposure to flooding. The local economy and businesses will benefit from enhanced productivity as a result of time savings from increased urban efficiency arising from improved roads and drainage.

68. During subproject design, community meetings were held with beneficiaries to discuss transport needs and environmental concerns. Socioeconomic surveys obtained information and individual views on the current situation and future preferences.

69. The IEE assesses environmental impacts of the proposed road and drainage improvements. Potential negative impacts stem primarily from construction. Mitigation measures have been proposed to reduce all negative impacts to acceptable levels. These and other mitigation and enhancement measures are summarized in Table 2, which also shows the location of the impact and the group responsible for mitigation.

70. The improved roads will provide more efficient and effective transport routes, which should improve the overall economy by reducing time spent idle in traffic by delivery vehicles, employees and customers. Drainage improvements will reduce the potential for flooding in the vicinity of homes and markets, thus enhancing economic value and social acceptability.

71. An environmental monitoring program will be conducted during construction to ensure that mitigation measures are carried out. This will include observations of construction practice, document checks, and interviews with workers and beneficiaries.

B. Recommendation

72. The recommendation is that environmental impacts of the subproject, stemming mainly from construction, can be successfully mitigated through the measures described in this report. To insure these measures are implemented, the LGU supported by the MDSC should follow the prescribed monitoring and reporting procedures.

C. Conclusion

73. Environmental impacts of the proposed road and drainage subproject has been assessed. The overall conclusion is that if the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. Major improvements in quality of life and public welfare will result once the scheme is in operation.

PHOTOGRAPHS OF EXISTING ROAD CONDITIONS

W-01:(i) Anwar Jung Road

W-01:(iii) Bismile Zirabo Bazar

W-02:(i) Nabinagar Kaliakoir RHD at Sreepur

W-02:(ii) Kuturia-Bogabari Bazar Road

W-02:(iii) Jamgora Bazar Chitrachail-Kandal-Katgora road

W-02:(iv) Jamgora Chowrasta Bhadhail

	
W-02:(v) Bhadhail Chowrasta Madar Textile	W-02:(vi) Nabinagar-Kaliakoir-Tongi EPZ
	
W-02:(vii) Kumkumari Shadhupara road	W-02:(viii) Dhalpur-Khatgora

Appendix 1: Environmental Clearance from Department of Environment

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, Paribesh Bhaban
E-16 Agargaon, Dhaka-1207
www.doe-bd.org

Memo No: DOE/Clearance/5194/2013/180 Date: 21/07/2013

Subject: Environmental Clearance for City Region Development Project.

Ref: Your application on 13/06/2013.

With reference to the above, the Department of Environment (DOE) hereby accords Environmental Clearance to above project excluding the construction of Water Treatment Plant, Water Distribution Pipeline Laying, Sanitary Landfill, Bus and Truck Terminal sub-components.

A copy of the said Environmental Clearance Certificate is attached herewith for your necessary action.

21.07.2013

(Syed Nazmul Ahsan)
Deputy Director (Environmental Clearance)
and
Member Secretary
Environmental Clearance Committee
Phone # 8181778

Mr. Md. Wahidur Rahman
Chief Engineer
Local Government Engineering Department
LGED Bhaban, Agargaon, Dhaka.

Copy Forwarded to :

1) PS to Secretary, Ministry of Environment and Forests, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Director, Department of Environment, Khulna Division, Khulna.
4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Appendix 2: Rapid Environmental Assessment (REA) Checklist: Roadway and Drainage

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
CITY REGION DEVELOPMENT PROJECT (ADB LOAN 2695-BAN)
Rapid Environmental Assessment (REA) Checklist for Screening of
ROADS AND DRAINAGE SUB - PROJECT

Name / Sector:	Ashulia Savar Urban Transport and Drainage
Name of the Scheme:	Dhalpur-Katgora road. (Ch.0+00-1+525m)

		SCREENING QUESTIONS	Yes	No	REMARKS
A.	**The Project**				
	●	Road length < 20 Km	√		Length 1.525 km
	●	Road length > 20 Km		√	
	●	Drainage included with roadway improvements	√		
	●	Drainage improvements outside roadway ROW		√	
	●	Waterway dredging in addition to drainage works		√	
	●	Widening of road formation	√		
	●	Repair /Improvement of road	√		Improvement
	●	Road Length within/abutting wetland (beel etc.) (m)		√	
	●	Road constructed along river or canal (km)		√	
	●	Road crossing any stream, canal, river		√	
	●	No. of cross-drainage structures per km		√	
	●	Frequency of flood on either side of the road		√	
	●	Plantation on ROW		√	
B	**Project Siting**				
Will the project area affect any of the following environmentally sensitive areas?					
	●	Cultural heritage site		√	
	●	Protected Area		√	
	●	Wetland		√	
	●	Mangrove		√	
	●	Estuarine		√	
	●	Buffer zone of protected area		√	
	●	Special area for protecting biodiversity		√	
	●	Bay		√	

C	**Construction**			
♦	Will construction affect critical waterbodies (rivers, irrigation canals, lakes or beels in use by the local community)?		√	
♦	Deterioration of surface water quality due to silt run-off, sanitary wastes from worker camps and chemicals used in construction?		√	
♦	Will air pollution from earth works, rock crushing, cutting and filling works, and chemicals from asphalt processing substantially affect the local community?	√		During Construction work only
♦	Are there community values affected by noise and vibration from blasting and other civil works?	√		During Construction work only, to be mitigated
♦	Will there be excess traffic disturbances due to construction?	√		During Construction work only
♦	Is there an increased risk of road accidents?	√		Safety sign will be installed during construction period
♦	Will there be blockage of access, or negative effect on commercial businesses or street vendors?	√		During Construction work only, to be mitigated
♦	Are there other concerns relating to community impact in the project areas?	√		Minor, Mitigated with standard means
♦	Will the project cause hazardous driving conditions due to interference with current traffic patterns?	√		To be mitigated
♦	Does the project require construction camps and equipment yards?	√		
♦	Will there be social conflicts between construction workers and the community?		√	Local labourer will be engaged
♦	Is there a chance for increasing the spread of HIV/ AIDS and STD?		√	
♦	Does the project require dislocation or involuntary resettlement of people?		√	
D	**Operations**		√	
♦	Does the drainage outfall cause pollution or impact on ecology of receiving water?		√	
♦	Does the drainage outfall discharge to irrigation canal?		√	
♦	Does the drainage outfall affect community water use in areas adjacent to outfall?		√	
♦	Will the project create breeding habitats for mosquitoes?		√	
♦	Will there be increased noise and air pollution resulting from traffic volume?	√		Unavoidable
♦	Is there increased risk of water pollution from vehicles using the road?		√	
♦	Will there be blockage of canals by sediments		√	
♦	Is there a chance for increased spread of water-borne diseases?		√	
	Signature of National Environmentalist		Signature of Pouroshava/Upazila Engineer's Office Representative	

Appendix 3: Environmental Specifications for Construction Contractor

General

1. The contractor shall review and comply with the environmental management plan (EMP) prepared for the subproject, and will note and implement any particular requirements therein, in addition to those found in this general specification. At the start of construction, the contractor will provide a Construction Environmental Management Plan for compliance with these specifications, including development of the construction zone, worker camps, equipment yards, haul roads and borrow/quarry areas. The contractor's implementation of mitigation measures will be monitored during the course of the work and reported to the ADB.

2. The contractor will post a public notice regarding the nature, extent and cost of the project at the start of the construction zone; and post notices announcing the grievance redress mechanism in local government offices and in strategic places of the subproject's area of influence. For projects with multiple sites, a single notice may be posted at the pourashava, upazilla or municipal office.

3. The Contractor's Project Manager or other technical staff shall serve as focal person for EMP implementation and for responsibilities under the Grievance Redress Mechanism (GRM). The Contractor's Project Manager or other technical staff is required to obtain construction environmental management training and orientation to be provided by an LGED specialist at the start of construction. Costs for implementing requirements set out herein are considered to be incorporated into the unit bid price for quantities unless indicated as paid for through provisional sums.

Worker Provisions

4. GOB criteria for minimum age, wage and living provisions, benefits, hours of work, overtime arrangements and overtime compensation, and leave for illness, maternity, vacation or holiday should be met for all workers. The Contractor will conform to national law in relation to hiring and employment; and will comply with the principle of equal opportunity, fair treatment, and nondiscrimination with respect to the employment relationship. Hiring of project-affected persons, women, residents of project-affected administrative units and disadvantaged groups is encouraged.

5. The contractor shall implement a safety and accident prevention program involving provision, training and use of safety equipment; minimum skills qualifications for operators and drivers; and record keeping related to accidents.

6. The Contractor will provide Personal Protective Equipment (PPE) to workers that offer adequate protection to the worker without incurring unnecessary inconvenience in its use[1]. Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out; and proper use of PPE should be part of training programs, as appropriate.

7. The contractor will maintain first aid kits onsite along with instructions for use, and personnel trained in basic first aid emergency response measures. In case of injury,

[1] Depending on the application PPE may include safety glasses with or without side-shields, and protective shades; plastic helmets with top and side impact protection; hearing protectors (ear plugs or ear muffs); safety shoes and boots for protection against moving & falling objects, liquids and chemicals; gloves made of rubber or synthetic materials; facemasks with appropriate filters for dust removal and air purification; single or multi-gas personal monitors; portable or supplied air; on-site rescue equipment, and insulating clothing, body suits and aprons of appropriate materials.

the contractor shall arrange treatment of the injured worker(s) and bear the cost of treatment.

8. Laborers and others resident at the site will be provided with lodging in a camp setting, potable water supply, food service facilities and adequate means for maintaining personal hygiene and solid/liquid waste disposal.

9. Safe drinking water will provided at the worksite with sufficient numbers of access points to assure availability for workers. Water will be periodically tested for and assured safe from bacteriological contamination.

10. HIV/AIDS awareness should be incorporated into the contractor's policy and outreach toward workers.

Gender Equity

11. The contractor shall provide equal wage payment for work of equal value for women, as required by the Government of Bangladesh. Separate sanitation and bathing facilities shall be provided for women at work camps and at the construction site.

12. The contractor is encouraged to engage women laborers, project affected women and destitute persons on works suitable for them, and shall follow ILO conventions and relevant protocols. The contractor shall consult with the Women's Ward Councilor and others on the availability of women workers including indigenous women workers in the area to engage them in work suitable to their skills.

Use of Land for Construction Purposes

13. The worksite and ancillary sites shall be surveyed and pegged prior to construction to ensure correct lines and grades for alignments, earth fill, side slopes, flow lines and trees to be removed or preserved in accordance with the design. Final verification of affected persons and assets shall be undertaken prior to the commencement of the works.

14. The contractor will obtain approval from landowners for temporary use of land for ancillary sites such as labor camps and construction yards. Local authorities will be consulted on locations, which will in no case be within 100 m of sensitive receptors such as hospitals, schools, residential communities or identified archaeological, religious or cultural sites. The contractor shall obtain approval and permits from the concerned District Collector for sand mining in rivers. An ancillary site shall be above flood level, at least 10m away from watercourses, and its size kept to a minimum to reduce vegetation clearance and ground disturbance.

15. The contractor will not encroach upon vacant land, or damage forests, wildlife or fisheries in the project area. The Contractor will execute a plan for preventing firewood gathering in the project area and prohibit among workers possession of instruments or poisonous substances for killing or capturing fish or wildlife.

16. Vegetation clearance shall be confined to the minimum area required for construction. Trees within the boundaries of ancillary sites shall be retained wherever possible.

17. Cutting trees is prohibited except inside the construction zone, on upper and lower slopes requiring stabilization, and in quarry areas. Trees to be removed must be specified in the Project plans and specifications. Pits resulting from removal of trees

and stumps shall be backfilled and compacted. The contractor shall dispose of removed vegetation at locations approved by the Engineer.

18. No fuel, oil, or parts cleaning fluids shall be spilled, wasted or disposed of at the project site. Secondary containment (earth or concrete berm with bottom and sides sealed with plastic sheeting) at least equal to the capacity of the fuel storage tank shall be provided at fueling stations. Hazardous materials shall be stored above flood level and at least 20m away from any water course.

19. After completion of occupancy, all affected areas within the general project boundary shall be graded to their original elevation or to a continuous sloping grade that allows positive drainage. Machinery, equipment, structures, contaminated earth, plant matter and waste or unused materials shall be removed and disposed of at locations approved by the Engineer.

Sediment Controls and Spoil Materials

20. Areas to be cleared and excavated are limited to areas where construction will take place. The areas will be protected from flowing water including sheet runoff. The contractor will limit sediment loss from exposed surfaces. Existing drainage patterns should be maintained during construction to the extent possible.

21. Discharge of wastewater into water bodies is prohibited as is the discharge of wash water from concrete trucks to waterways. . Land clearing activity will be suspended during rains to limit sediment loss.

22. Topsoil shall be removed from areas of fill or sub-surface excavation and stockpiled at designated locations for reuse in covering embankment slopes, berms, and other disturbed areas.

23. Unsuitable and spoil materials shall be disposed promptly and properly from the site at locations approved by the Engineer.

Community Values

24. Vehicles transporting dirt, sand and construction materials capable of producing dust will be covered when traveling through community areas or along roadways in use by the public. Vehicles will operate within the legal speed limits in populated areas. The operation of moving equipment in locations accessible to the public will be done in a manner so as to prevent the occurrence of incidents and accidents.

25. The Contractor should use available means to prevent accidents by emphasizing safety aspects among drivers; assuring sufficient driving skills and requiring licensing of drivers; adopting limits for trip duration and arranging driver rosters to avoid overtiredness; specifying and obtaining approval from the PIU in advance, and adhering to, haul routes between borrow areas and the project site; avoiding dangerous routes and times of day to reduce the risk of accidents; use of speed control devices (governors) on trucks, and remote monitoring of driver actions.

26. The contractor is responsible for regular spraying of roadway surfaces in use as haul routes and of sites under construction as well as temporary detours where these locations are accessed by the public. The contractor will remove excess debris during construction and after completion of the item of work.

27. The contractor will locate aggregate crushing and batch mix plants at sufficient distance (at least one km) from populated areas, houses, schools and hospitals so as

to reduce air pollution and noise. The contractor shall protect, conserve and maintain access to social and cultural properties in the project area including schools, mosques, hospitals, temples, shrines, graveyards, tourism sites and other public places. The contractor may increase the workforce to minimize the duration of construction in such areas.

28. The Contractor will post flagmen at intersections of transit paths for construction vehicles and local traffic, and along traffic lanes where work is in progress. Traffic detours will be clearly marked.

29. The contractor will provide a path for transit of pedestrians and vehicular traffic through or around the construction area; and barricade open excavations to prevent injury to the public.

30. The contractor shall ensure that working hours do not extend beyond 7.00 a.m. to 7.00 p.m. to avoid undue disturbance of the local people.

31. The contractor shall avoid trenching near to buildings, walls and existing buried pipelines. If unavoidable, the contractor shall provide adequate protective measures to prevent damage.

32. The contractor will avoid blocking access to land, homes and businesses; where unavoidable, the contractor will provide temporary access to affected properties and reinstate permanent access on completion of work; minimize the area under construction at any one time and the duration of works at any one location; and minimize impacts on infrastructure, access and services. Backfill and sealing of construction trenches shall be done promptly.

33. The contractor will install signs and lighting, where there is nighttime traffic, in the vicinity of works on public roads, and restrict access to the construction site by the public.

34. All construction machinery and vehicles to be used in works shall be of proven efficiency and shall conform to GOB standards for emissions and noise levels. The contractor shall regularly maintain the construction machinery and vehicles so that emissions, vibrations and noise levels conform to GOB's relevant standards. The Contractor shall prohibit the use of air horns in settlement areas.

35. The contractor shall promptly reinstate any services and reinstall any physical facilities that are cut, disconnected or damaged during construction activities, and shall maintain or provide temporary services that are interrupted by construction. The Engineer shall inspect and certify the adequacy of all reinstated services and facilities.

<u>Site Conditions, Quarries and Haul Routes</u>

36. At the start of construction, the contractor will provide a Site Environmental Management Plan for development of the construction zone, worker camps, equipment yards, haul roads and quarry areas.

37. Haul routes will minimize interference with ongoing activity in the area. Routes shall be approved by the PIU. Haul roads and transport/equipment routes shall be kept within the construction zone, unless authorized by the PIU.

38. Selection of borrow pits, quarry sites and haul routes shall minimize noise and air pollution in the site vicinity, visual impacts in inhabited areas, impacts on land use, air and noise emissions along haul routes, and congestion in populated areas.

39. Quarry and borrow pit locations will be permitted for use by the local authority, and shall be pre-existing sites, e.g. already in use prior to the start of the construction. Newly opened quarry locations require approval of the PIU.

40. The contractor shall select borrow pits that are free from organic materials. The use of dredged materials from rivers is permitted if the materials are sandy and free from organic matter. Topsoil from farmland should not be used as fill.

41. The contractor shall stockpile construction materials in such a way as to prevent any loss of materials to watercourses. Stockpiling of backfill shall be done outside the right of way and not on the side slopes of roads.

42. Borrow pits shall be restricted to areas within the construction zone as defined by right-of-ways for roads, embankments and irrigation canals. Borrow pits along linear alignments will be interconnected; smoothly excavated; of uniform depth, width and slope; and graded to drain after use.

Archeological and Cultural Relics

43. The Contractor will stop construction on discovery of objects of archeological origin; and notify the PIU, who will contact the Department of Archaeology, Ministry of Cultural Affairs to investigate and, if desirable, undertake recovery. Work must remain halted at the specific location until investigation is complete.