

# Environmental Due Diligence Report

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May 2017

BAN: South Asia Subregional Economic Cooperation  
Dhaka–Northwest Corridor Road Project, Phase 2

Prepared by the Roads and Highways Department for the People's Republic of Bangladesh and the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 14 March 2017)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.012573
\$1.00	=	Tk 79.5350

## **ABBREVIATIONS**

ADB	–	Asian Development Bank
BLPA	–	Bangladesh Land Port Authority
CSC	–	Construction Supervision Consultants
EA	–	Executing Agency
EARF	–	Environmental Assessment and Review Framework
EMP	–	Environmental Management Plan
EMoP	–	Environmental Monitoring Plan
GoB	–	Government of Bangladesh
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IEE	–	Initial Environmental Examination
MFF	–	multitranches financing facility
OCR	–	ordinary capital resources
PIU	–	Project Implementation Unit
REA	–	Rapid Environmental Assessment
RHD	–	Roads and Highways Department
RoW	–	right of way
SASEC	–	South Asia Subregional Economic Cooperation
SPS	–	Safeguard Policy Statement

## **WEIGHTS AND MEASURES**

km	–	kilometer
m	–	meter

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## I. INTRODUCTION

### A. Report Purpose and Rationale

1. This environmental due diligence is prepared for the processing of Subregional Economic Cooperation Dhaka-Northwest Corridor Road Project, Phase 2. The investment is a Multi-tranche financing facility (MFF) with three outputs: (i) upgrading of Dhaka–Northwest international trade corridor (Phase 2: Elenga–Hatikamrul–Rangpur), (ii) enhancement of institutional capacity of Roads and Highways Department (RHD) in road operation and management, and (iii) additional financing of cost overrun of Dhaka–Northwest International Trade Corridor (Phase 1: Joydebpur–Chandra–Tangail–Elenga (JCTE)) project.<sup>12</sup>

2. It is estimated that the investment program will cost \$1,600 million, including \$1,420 million for the improvement of Elenga–Hatikamural–Rangpur section (190 km), \$30 million for institutional enhancement of RHD, and \$150 million to finance the cost overrun of SASEC Road Connectivity Project. The cost overrun resulted from higher bid estimates compared to engineer's estimates, price escalation and design adjustments to address premature deterioration on existing pavement and congested junctions.

3. The additional financing of the cost overrun of Dhaka-Northwest International Trade Corridor (Phase 1: Joydebpur – Chandra – Tangail – Elenga) Project should conform to ADB policies, including safeguards<sup>3</sup>. Para 56 of Safeguards Policy Statement 2009 states that for projects proposed for financing, ADB will conduct safeguard reviews, including the borrower's safeguard documents. Due diligence and review will also comprise field visits as well as desk reviews.

4. This Environmental Due Diligence (EDD) is one of the requirements for the processing of the project's Additional Financing of the Dhaka–Northwest International Trade Corridor (Phase 1: Joydebpur–Chandra–Tangail–Elenga) project. By conducting an EDD, ADB helps borrowers manage environmental impacts and risks and promotes long-term sustainability of investments.<sup>4</sup>

5. This EDD report assesses the environmental safeguards compliance of Dhaka–Northwest International Trade Corridor (Phase 1: Joydebpur–Chandra–Tangail–Elenga) Project vis-a-vis requirements of Safeguards Policy Statement 2009, the Initial Environmental Examinations (IEEs) and Environmental Management Plans (EMPs) of the four subprojects, and the Government of Bangladesh's environmental policies, laws and regulations. The three subprojects include: (i) Roads and Highways Department Headquarter Building; (ii) Benapole and Burimari Land Ports; and (iii) JCTE Road.

### B. The Dhaka–Northwest International Trade Corridor (Phase 1: Joydebpur–Chandra–Tangail–Elenga) Project

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<sup>1</sup> ADB. 2012. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan and Technical Assistance Grant to the People's Republic of Bangladesh for South Asia Subregional Economic Cooperation Road Connectivity Project*. Manila (Loan 2949-BAN).

<sup>2</sup> The original name of the project is SASEC Road Connectivity Project. The project's title was changed to reflect its location and nature. No project preparatory technical assistance and/or project design advance is required.

<sup>3</sup> ADB. 2010. *Additional Financing: Enhancing Development Effectiveness*. Para 69. Manila

<sup>4</sup> Operations Manual Section F1 / Bank Policies. October 2013.

6. The Loan Agreement between the Government of Bangladesh and ADB for the Dhaka-Northwest International Trade Corridor (Phase 1: Joydebpur-Chandra-Tangail-Elenga) Project was signed on 14 November 2013 with a loan of \$198 million from ADB's Ordinary Capital Resources (OCR). The project is also co-financed by the OPEC Fund for International Development and Abu Dhabi Fund for Development with a loan of \$30 million each. ADB has also provided a \$1.5 million technical assistance grant to support RHD's institutional development initiatives.

7. The Government is financing about \$86.7 million equivalent or about 25% of the total project cost, including taxes and duties, land acquisition and resettlement and other miscellaneous costs.

8. An additional financing of \$150 million to finance the cost overrun of SASEC Road Connectivity Project is being requested arising from higher bid estimates compared to engineer's estimates, price escalation and design adjustments to address premature deterioration on existing pavement and congested junctions.

### C. Project Scope and Location

9. The Dhaka-Northwest International Trade Corridor (Phase 1: Joydebpur-Chandra-Tangail-Elenga) Project (formerly SASEC Road Connectivity Project) consists of the following subprojects:

- (i) **Subproject 1** - Upgrading of 70 km of Joydebpur-Chandra-Tangail-Elenga Road, which is part of Asian Highway No. 2 and SHC Nos. 4 and 8, to a four-lane highway with safety features including separate lane for slow moving traffic and construction of flyovers at the busiest junctions;
- (ii) **Subproject 2** - Modernization of RHD headquarters and provision of equipment and consulting services in line with RHD's institutional development action plan<sup>5</sup>;
- (iii) **Subproject 3** - Improvement of 2 land ports in Benapole and Burimari.

10. The JCTE road is located north of Dhaka City, with chainage starting at at Vogra Bazaar (N 23° 58' 39" and E 90° 22' 51") at an intersection 2.7 km south of Joydebpur roundabout where the N3 Dhaka – Mymensingh road meets the N105 Dhaka Eastern Bypass, joining the N4 Joydebpur – Chandra – Tangail - Elenga road at project Chainage 2.900 at a point 2.38 km west of Joydebpur (N 23° 59' 22" and E 90° 21' 30"). The route then follows the N4, including the Kaliakor, Mirzapur and Tangail bypasses (south end: N 24° 14' 33" and E 89° 56' 27", north end: N 24° 16' 03" and E 89° 56' 15") to Elenga (N 24° 20' 22" and E 89° 55' 28"). The total length is 69 km. Figure 1 shows the alignment of the JCTE Road.

11. The proposed new RHD headquarters will be built inside a 6.88-ha RHD owned compound located in Teigoan, Dhaka City. The current head office, located in Raman Thana beside the Bangladesh Supreme Court Building has to be vacated since RHD does not own the land.

12. Benapole Land Port is located in Benapole, Sharsha, Jessore District. It is in the southwest region of Bangladesh within Bara Achra, Benapole, Choto Achra and Bhabarber mouzas of Benapole Union under the Sharsha Upazilla of Jessore District (Figure 2). Burimari Land Port, on the other hand, is located at Burimari near the Bangladesh border on Road N509 and adjacent to the India border near Changrabandha on State Highway-12A (National Highway 27).

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<sup>5</sup> Technical assistance for institutional development in RHD is being provided in parallel with the loan to support the implementation of the action plan.



Figure 1: JCTE Road Location Map

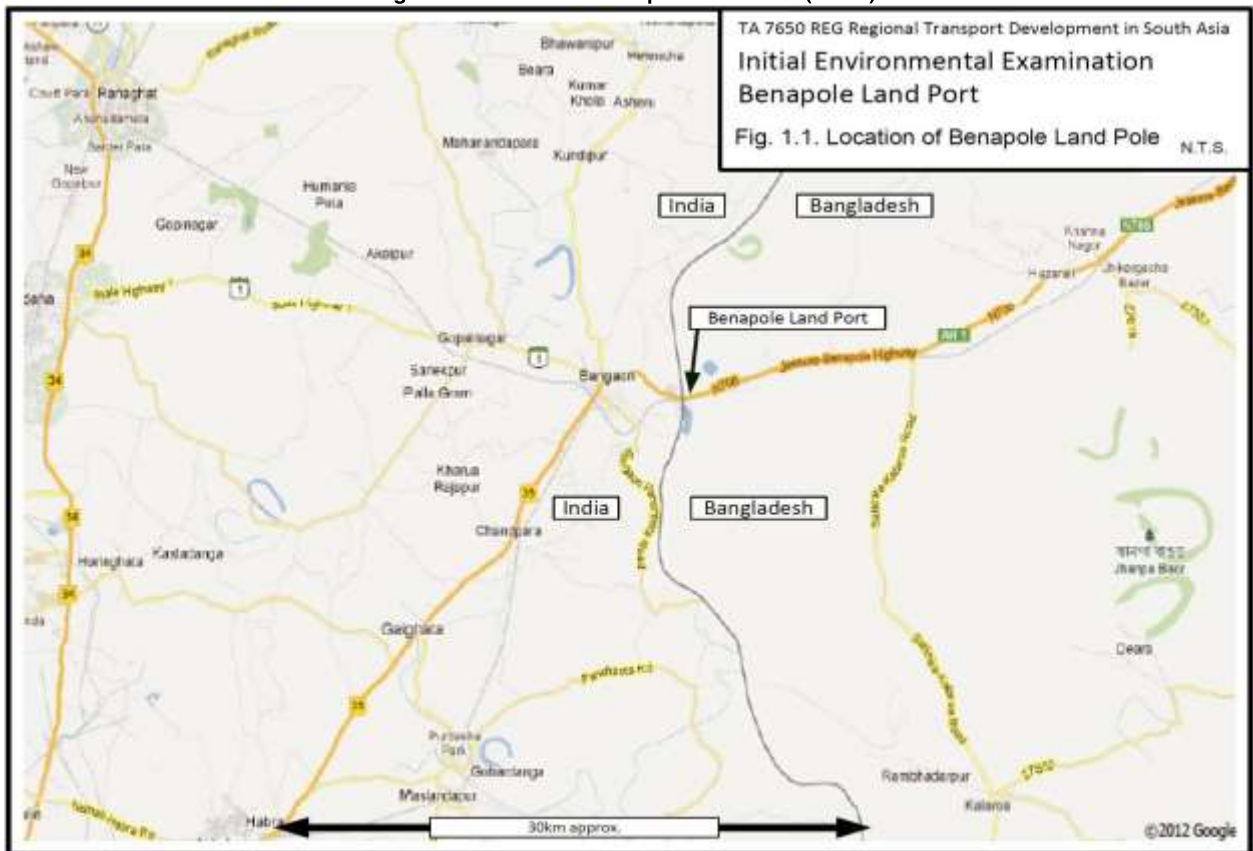


Figure 2: Benapole Land Port



Figure 3: Burimari Land Port

**D. Implementation Progress as of March 2017**

**a. Dhaka-Northwest International Trade Corridor (Phase 1: Joydebpur – Chandra – Tangail – Elenga) Project**

13. There are 4 civil works contract packages for the JCTE road. The scope of works and names of contractors for each contract package are provided in table 1 below.

**Table 1: Contract Packages for JCTE road**

Pkg. No.	Scope of Works	Chainage (km)	Contractor
WP 01	Part 1: Improvement of Road from Vogra bazaar intersection to Kaliakoir bypass intersection (18.9 km) from two-lane to four lane including structures Part 2: Performance based Maintenance works on improved 4 lane road	0+000 to 18+900 (Includes flyover at Konabari and Chandra)	Kyeryong-Spectra Joint Venture
WP02	Part 1: Improvement of Road from kaliakoir bypass to Dullamari road (18.00 km) from 2 lane to four lane including structures. Provision of Support to Project for third party maintenance quality check.	18+900 to 36+900 (Includes rail overpass at Kaliakoir bypass and at Sohagpur)	AML-HCM Joint venture



<b>Pkg. No.</b>	<b>Scope of Works</b>	<b>Chainage (km)</b>	<b>Contractor</b>
	Part 2: Performance based Maintenance works on improved 4 lane road		
WP03	Part 1: Improvement of Road from Dullamari road to Tangail (22.40 km) from two-lane to four lane including structures Part 2: Performance based Maintenance works on improved 4 lane road	36+900 to 59+300	SAMWHAN-MIR AKHTER Joint Venture
WP04	Part 1: Improvement of Road from Tangail to Elenga (10.0 km) from two-lane to four lane including structures Part 2: Performance based Maintenance works on improved 4 lane road	59+300 to 69+300 (Includes a road overpass at Tangail Bypass)	GDCL-DIENCO

14. Civil works commenced in January 2016 and physical and financial progress of each contract package as of March 2017 is provided in table 2 below.

**Table 2: Status of civil works for JCTE road as of March 2017**

<b>Pkg. No.</b>	<b>Contractor</b>	<b>Physical Progress</b>	<b>Financial Progress</b>
WP 01	Kyeryong-Spectra Joint Venture	21%	22.049%
WP02	AML-HCM Joint venture	29.7%	33.78%
WP03	SAMWHAN-MIR AKHTER Joint Venture	23.9%	28.71%
WP04	GDCL-DIENCO	29.4%	30.72%

15. Land acquisition and resettlement activities are ongoing. The utility lines are also in the process of being shifted. Trees in corridor of impact are also being removed based on work progress.

16. All the contractors have submitted their Quarterly Compliance Monitoring Report for November 2016 after their engagement of Environment Management Officer (EMO) / Environmental Specialist (ES) having duties connected with Environmental Management on the Site. All four contractors have sub-contracted the environmental quality monitoring services to Environmental Quality Management Services (EQMS) Consulting Ltd.

**b. Modernization of RHD headquarters and provision of equipment and consulting services in line with RHD's institutional development action plan**

17. The works for constructing the RHD building was awarded to PRATIBHA-NAVANA JV on 11 June 2015. The headquarter area comprises 31,245 square meters including internal roads and car parking. The scope of works include construction of a 13 storey office building with a semi basement for an auditorium including all works for sub-structure, super structure, water supply and sanitary works, water lifting pump, electrical works, sub-station equipment, diesel generator, lifts, fire detection and alarm, fire hydrant, air-conditioning, installation of deep tube well, gas connection and site development including necessary demolition and dismantling old structures. As of March 2017 the physical progress of works is 30.5%. Details of the status of works is given in table 3 below.

**Table 3: Status of Works of RHD building construction**

No.	Activity	Status
1.	General and Site	<ul style="list-style-type: none"> <li>• Site office, site laboratory, vehicle is functioning and maintenance of those continuing.</li> </ul>
2.	Civil Works	<p><b>Building Part-2</b></p> <p>a) Fifth floor slab casting completed. Sixth floor slab shuttering is in progress. Brick and plastering works are in progress.</p> <p><b>Part-3</b></p> <p>a) Fourth floor slab casting completed. Fifth floor slab rebar binding is nearing completion. Brick and plastering works are in progress.</p> <p><b>Part-4</b></p> <p>a) All columns casting up to first floor slab is completed .Roof slab shuttering and 3Nos stair works are in progress.</p> <p><b>Auditorium: Part-1</b></p> <p>a) Fifth floor slab casting completed. Sixth floor shuttering work is in progress.( Main bldg. part). Brick and plastering works are in progress.</p> <p>b) 30% of Auditorium roof slab casting completed. Shuttering work of 2<sup>nd</sup> segment is in progress. Fair faced wall casting is in progress.</p> <p><b>Open stair (south side)</b> 80% of open stair casting completed.</p>

**c. Improvement of 2 land ports in Benapole and Burimari.**

**18. Burimari Landport.** Construction of the land port started in November 2015. With a 15 month construction period the port construction activities were completed in February 2017. Accordingly the physical progress of works for Burimari landport is 97.5% as of March 2017. Details of the progress are:

- All the works of Trans shipment shed 1&2 have been completed except enamel painting of steel truss and rainwater pipe. Up to date progress is 100%.
- Concrete paving of shed TS-1 and TS-2 is 100% completed.
- All culvert works have been 100% completed.
- Manufacturing & laying of 300 mm diameter RCC pipe is 100%completed.
- Surface drainage improvement works have been 100% completed
- Filling works are 100% completed.

**19. Benapole Landport.** The notice of Award for Benapole port was issued on 27 June 2016 and construction works began in August 2016. The planned construction period is 24 months. As of March 2017 the physical progress of works for Benapole landport is 19.8%. Details of the progress are provided below.

**20. General and site facilities:** The contractor has provided site office temporarily on rent basis, field laboratory and one vehicle.

21. **Ware House no.1 (Retaining Wall).** The proposed design of retaining wall along with ramp submitted by contractor was checked and approved by architect and designer. 95% retaining wall has been completed. The sand filling inside is nearing completion. Macadam and RCC pavement work of same area is in progress. Adjacent road side ISG, sub-base, macadam and RCC rigid pavement work is under progress with 18% completed so far. A total of 50 blocks of rigid pavement (300mm thickness of panel 10.0 x 3.0 m) has been completed so far. A decision has been made to use the tie beam design of Mezzanine floor. This was not included in the initial drawing of the ware house column.

22. **Ware House no.2 (Retaining Wall).** The proposed design of retaining wall along with ramp submitted by contractor was approved by architect and designer. 95% of the retaining wall has been completed. The sand filling inside is nearing completion. For transshipment shed no. 1,2 and 4 scarifying of existing bed is under progress (after picking up HBB and double flat soling) with a total 10300.00 sq meter being completed so far. A total of 23100 m<sup>3</sup> of macadam with 0.225m thickness has been completed so far. A total of 310 concrete class-25 rigid pavement blocks (10.0 X 3.0 m each) has been completed so far.

23. **Paving area of Truck Terminal.** A total of 11,315.00 sq. meter of scarifying and re-compaction over existing sub-base has been completed so far. 2650.00 m<sup>3</sup> of 225 mm macadam has been completed and a total of 320 (10.0 X 3.0 m) rigid pavement panels have been completed so far. Mix Design for concrete class-25 has been approved with the contractor being recommended to use a minimum proportion of 1:1.5:3.0. All materials, field density test and concrete cylinder testing is under progress at the site laboratory.

24. **RCC Drain.** RCC drain improvement works in TTI, Ware House W1 & W2 and Hazard area is under progress.

#### **E. Environmental Categorization, Assessment and Reporting**

25. All subprojects were categorized as B for environment safeguards based on Safeguards Policy Statement (SPS) 2009. Four Initial Environmental Examinations were approved in July 2012 for the JCTE Road, RHD headquarters, Benapole land port and Burimari land port and disclosed on the ADB website.

26. A total of three semi-annual (November 2015, June 2016, December 2016) environment monitoring reports have been prepared for the project and disclosed on the ADB website in compliance with the loan agreement. However there a need for improvement in quality and content of the reports. While monthly and quarterly progress and monitoring reports were being prepared for the land ports and RHD building and submitted to the EA, the information was not included in the semi-annual monitoring reports.

#### **F. Institutional Setup and Responsibilities**

27. The Project Implementation Consultants (PIC) is primarily responsible for supervision and monitoring of EMP implementation. They also support RHD to advise and assist in quality and capacity enhancement and independent quality monitoring. The contractor is responsible for implementation of EMP including periodic monitoring of environmental quality during construction.

## II. COMPLIANCE WITH ENVIRONMENTAL SAFEGUARDS REQUIREMENTS AND IMPLEMENTATION

### A. Compliance with National Environmental Laws

28. The environmental legislation of GOB emphasizes reducing the negative impacts of infrastructure development projects and enhancement of the positive impacts. This conforms to the National Environmental Policy 1992 that was enacted based on the Agenda 21 of Rio Conference and subsequent enactments of the Bangladesh Environmental Conservation Act (BECA) 1995 and Bangladesh Environmental Conservation Rules (BECR) 1997. Since the project is a national road, which is in the Red List of Environmental Conservation Rules (1997), RHD is required to secure an Environmental Clearance (valid for 1 year) from the Department of Environment.

**Table 4: Compliance with National Laws**

Environment Policy/Rule	Compliance Requirement	Subproject	Status
Bangladesh Environmental Conservation Act (BECA) 1995 and Bangladesh Environmental Conservation Rules (BECR) 1997	Requires all construction / reconstruction / expansion of road projects (regional, national and international) to submit an EIA with EMP to obtain an Environmental Clearance (EC)	JCTE Road	The environmental clearance (valid for 1 year) for the project was obtained from the Department of Environment in July 2015. Subsequent renewal of the environmental clearance certificate is obtained annually.
		RHD Building Subproject	Environmental Clearance was obtained on 27 January 2015 with a validity period of one year. Subsequent renewal of the environmental clearance certificate is obtained annually.
		Benapole and Burimari Landports	Environmental Clearance was not required for this subproject

### B. Compliance with the ADB Safeguard Policy Statement 2009 and Environmental Management Plan

29. The SASEC Road Connectivity Project which consists of 4 subprojects – RHD headquarters construction, Benapole and Burimari land ports improvement and upgrading of the JCTE Road, were all categorized as B for the environment. All subprojects are found to be in compliance with the ADB Safeguard Policy Statement Policy 2009 in terms of categorization; preparation, submission and disclosure of safeguard requirements; implementation of EMP and EMoP; and submission and disclosure of safeguard reports with ADB. There is no need to prepare another IEE for the Additional Financing of the JCTE road subproject since this will only entail funding of cost overrun of this project.

30. Separate EMPs were prepared for the four subprojects under the SASEC Road Connectivity Project (Phase 1: Joydebpur – Chandra – Tangail – Elenga) Project. The links to EMPs of the four subprojects are detailed in Table 5.

**Table 5. Detailed Environmental Management Plans of Subprojects under SASEC Phase 1**

Subproject	Detailed Environmental Management Plan	Page Nos.
Roads and Highways Department Building	<a href="https://www.adb.org/sites/default/files/project-document/73520/40540-014-ban-iee-04.pdf">https://www.adb.org/sites/default/files/project-document/73520/40540-014-ban-iee-04.pdf</a>	Pages 58-68
Benapole Land Port	<a href="https://www.adb.org/sites/default/files/project-document/73518/40540-014-ban-iee-02.pdf">https://www.adb.org/sites/default/files/project-document/73518/40540-014-ban-iee-02.pdf</a>	Pages 52-60
Burimari Land Port	<a href="https://www.adb.org/sites/default/files/project-document/73519/40540-014-ban-iee-03.pdf">https://www.adb.org/sites/default/files/project-document/73519/40540-014-ban-iee-03.pdf</a>	Pages 44-51
JCTE Road	<a href="https://www.adb.org/sites/default/files/project-document/73520/40540-014-ban-iee-04.pdf">https://www.adb.org/sites/default/files/project-document/73520/40540-014-ban-iee-04.pdf</a>	Appendix 8, pages 142 - 153

### C. Compliance with Loan Agreement

31. Schedule 5 of the Loan Agreement specifies environmental conditions that the Borrower must comply. The project's compliance with the environmental safeguards provisions are indicated in Table 6.

**Table 6: JCTE Road Project Compliance**

Para. No	Loan Condition	Project Compliance
4	The Borrower shall (a) ensure, and shall cause the Project Executing Agencies to ensure, that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (i) all applicable laws and regulations of the Borrower relating to environment, health, and safety; (ii) the Environmental Safeguards; and (iii) all measures and requirements set forth in the IEEs and EMPs; and (iv) any corrective or preventative actions set forth in a Safeguards Monitoring Report; and (b) ensure, or cause the Project Executing Agencies to ensure, that Works do not commence until and unless environmental clearance, satisfactory in form and content to ADB, in respect of the relevant site has been received from the Department of Environment.	<b>Being complied.</b> Environmental safeguards requirements, as stipulated in SPS 2009, is being complied. Four IEEs were prepared and approved by ADB in July 2012. Requirements of the IEE, the EMP and corrective actions are being taken where necessary.
8	The Borrower shall make available, or cause the Project Executing Agencies to make available, necessary budgetary and human resources to fully implement the EMPs.	<b>Being complied.</b> Adequate budgetary and human resources are provided to fully implement the EMPs. Contractor is responsible for implementation of EMP and the PIC is responsible for supervision of monitoring of the implementation of the

Para. No	Loan Condition	Project Compliance
		EMP and supporting RHD to advise and assist in quality and capacity enhancement and independent quality monitoring.
9	<p>The Borrower shall ensure, or cause the Project Executing Agencies to ensure, that all bidding documents and contracts for Works contain provisions that require contractors to:</p> <p>(a) comply with the measures and requirements relevant to the contractor set forth in the IEE and the EMP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set out in a Safeguards Monitoring Report;</p> <p>(b) make available a budget for all environmental measures;</p> <p>(c) provide the Borrower with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the IEE, the EMP;</p> <p>(d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and</p> <p>(e) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-Project condition upon the completion of construction.</p>	<p>(a) <b>Being complied.</b> Contractors under all subprojects are complying with the measures and requirements set in the respective IEE and EMP.</p> <p>(b) <b>Being complied.</b> Budget is being provided for environmental measures.</p> <p>(c) <b>Being complied.</b> Unanticipated environmental impacts faced under JCTE road was discussed with RHD and corrective actions taken and planned.</p> <p>(d) <b>Being complied.</b> Recorded.</p> <p>(e) <b>Not yet applicable.</b></p>
10	<p>The Borrower shall cause the Project Executing Agencies to do the following:</p> <p>(a) submit annual environmental monitoring reports in accordance with the requirements of the SPS for category B projects, and semiannual Safeguards Monitoring Reports in respect of the social impacts of the Project, to ADB and disclose relevant information from such reports to affected persons promptly upon submission;</p> <p>(b) if any unanticipated environmental and/or social risks and impacts arise during constructions, implementation or operation of the Project that were not considered in the IEEs and the EMPs, promptly inform ADB of the occurrence of such risks or impacts, with a detailed description of the event and proposed corrective action plan; and</p> <p>(c) report any actual or potential breach of compliance with the measures and requirements</p>	<p>(a) <b>Being complied.</b> Semi-annual Social and Environmental Monitoring Reports were submitted and disclosed in ADB website.</p> <p>(b) <b>Being complied.</b> Unanticipated environmental impacts experienced under the JCTE road subproject were discussed with ADB and necessary corrective actions taken and proposed.</p>

Para. No	Loan Condition	Project Compliance
	set forth in the EMPs promptly after becoming aware of the breach.	<b>(c) Being complied.</b> Results of EMoP are reported to ADB.
13	The Borrower shall ensure, or cause the Project Executing Agencies to ensure, that no proceeds of the Loan are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS.	<b>Being complied.</b>

### III. STATUS OF EMP IMPLEMENTATION AND MONITORING

#### A. Environmental Management Plan

32. Based on the assessment of EMP compliance status of JCTE Road, most of the environmental concerns that need to be addressed by the contractors include: (i) immediate pavement of sites where oil, fuel and other hazardous materials are stored to prevent groundwater contamination; (ii) improvement in the management of wastewater since this is being disposed in city corporation's dumping area; (iii) improvement in solid waste management in labour camps and construction sites; (iv) adequate water spraying of unpaved areas to minimize the level of dusts; (v) increase in usage of PPEs such as masks and earplugs, as well as provision for firefighting equipment in fuel areas and first aid kit in construction site; (vi) improvement in the level of sanitation in labour camps; and (vii) improvement in living conditions for workers inside labour camps. Details of compliance status of each mitigation action under the EMP for JCTE Road as of March 2017 is provided in Appendix 1.

33. Overall compliance of the Burimari and Benapole land port Road to the EMP is partly satisfactory. There is a need to improve the conditions of occupational health and safety for the construction workers and waste management in the construction camp site. Details of the compliance status of each mitigation activity as of March 2017 are provided in Appendix 2. Physical construction works for the Burimari land port have been completed. Therefore, the mitigation actions recommended for further improvement are only applicable to the Benapole land port.

34. Compliance of the RHD building construction to the EMP is satisfactory. Improvements are required mainly in waste management and occupational health and safety. Details of the compliance with each mitigation action of the EMP as of March 2017 is provided in appendix 3

#### B. Environmental Monitoring Plan

35. The Environmental Monitoring Plan (EMoP) compliance is summarized in Table 4. Environmental test results showed that parameters for ground water, surface water, and air quality were all within Bangladesh national standards. Understandably, results for noise exceeded the national standard.

**Table 7. Summary of Compliance of JCTE Contractors with the Environmental Monitoring Plan**

Contract Package	Contractor	Compliance with National Standards			
		Ground water	Surface water	Air Quality	Noise
WP - 01	Kyeryong Spectra JV	Passed	Passed	Passed	Failed

Contract Package	Contractor	Compliance with National Standards			
		Ground water	Surface water	Air Quality	Noise
WP – 02	AML-HCM JV	Passed	Passed	Passed	Failed
WP – 03	Samwhan – Mir Aktaer JV	Passed	Passed	Passed	Failed
WP-04	GDCL-DIENCO JV	Passed	Passed	Passed	Failed

36. Monthly and quarterly environmental monitoring reports are being prepared by EQMS a local firm hired for environmental monitoring by the four contract packages under the JCTE road. The monitoring reports are informative including information on the data collection results on ground and surface water quality, air quality and noise levels. It also includes information on findings of visual inspection conducted in the construction site.

37. The PIC prepares semi-annual environmental monitoring reports and submits it to RHD and further to ADB for disclosure on the ADB website. It was found that these semi-annual monitoring reports so far have only covered the JCTE road subproject and not the land ports and RHD building construction. Therefore, it is recommended that the semi-annual environmental monitoring reports cover all three subprojects. There is also a need for improvement in the quality and content of the reports, particularly analysis of findings on air, water, noise monitoring and recommendation of actions for improvement.

#### C. Site Inspections and monitoring activities

38. Project Implementation Consultant (PIC) is regularly conducting site inspections to ensure that the implementation of EMP is being followed by the contractors.

#### D. Complaints and grievances

39. While numerous complaints have been received mainly under the JCTE road subproject, they were all minor complaints involving dust, waste, etc. that could be immediately addressed at the project site level. None of them had to be elevated to the local Grievance Redress Committee level.

#### E. Non-compliance Notices

40. No Non-Compliance Notices have been issued to the contractor so far under the three subprojects

### IV. UNANTICIPATED ENVIRONMENTAL IMPACTS

41. **Large Quantity of Municipal Garbage.** Substantial quantities of municipal garbage have been dumped by the Gazipur City Corporation, Kaliakoir Pouroshova and many other local bodies, industries and markets along the road and in some of the junction islands under WP-01 and parts of WP-02 of the JCTE road. This practice of disposing waste started only after the project was approved and did not exist before. Hence it was not included in the IEE report for the JCTE road nor added as a civil work item. Therefore, this issue of poor disposal of solid waste is an unanticipated impact.

42. The huge quantities of waste disposed by the municipality and local bodies, industries, markets etc. has created a highly unhygienic environment for pedestrians and traffic users along the road with foul smell, countless flies, vermin and leachate.



43. This PIU and PIC discussed this issue in the periodic progress meetings in October 2016. A committee headed by the Additional Project Director (SE, RHD, SASEC), was formed. Other members of the committee were Deputy Team Leader, Environmental Specialist and Quantity Surveyor of the PIC, Deputy Project Manager (SDE, RHD) of Lot No. WP-01 (SASEC) and Contractor's Project Manager. Based on instructions from RHD and the PIC immediate action taken by the contractor was to remove about 30% of the waste and dump it in barren land located near the construction site.

44. Considering that the quantity of waste is substantial it was agreed that the long term solution is to issue a contract variation to the contractor to remove the waste sludge and dispose it properly in site approved by the local authorities. The budget for this additional work is included as one of the items under the Additional Financing for the SASEC Road Connectivity Project. RHD and PIC have met with the Gazipur City Corporation officials to discuss the identification of a suitable site for disposing the waste.

45. It is recommended that the PIU continue discussions with the Gazipur City Corporation and other local government officials to jointly prepare a proper waste management plan. The plan needs to include i) identification of a suitable locally approved site for disposing the waste and ii) construction of a proper lined disposal facility that will manage the leachate.

46. Gas pipes. Another issue which was not evident during project preparation was the existence of many gas pipes along the JCTE road. During excavation works for all 4 contract packages gas pipes were discovered to be buried along the road. In some cases this also led to accidental punctures of the buried gas pipes.

47. To address the problem RHD immediately organized the conduction of a Ground Penetrating Radar (GPR) survey to map the location of the buried gas pipelines. Inter-ministerial meetings have been held to discuss this issue. In addition, RHD has held many meeting with the gas company Titas Gas Distribution and Transmission Company. Based on the findings of the GPR survey and agreements made during the inter-ministerial/agency meeting the following measures have been and will be taken:

- a. The method of excavation and piling works for WP-01 and WP-04 have been modified in a manner not to impact gas pipes.
- b. The gas company will shift the gas pit for WP-02 and WP03.
- c. The gas company will install new pipelines alongside the widened road for some sections
- d. For some sections the road level will be raised to accommodate the gas pipelines
- e. For the phase 2 section of the road from Elenga – Hatikamrul – Rangpur the old gas pipelines (most of which are empty) will be kept buried and the road embankment height will be increased. For others, the gas company will establish a new gas pipeline will be installed alongside the newly widened road

## V. FINDINGS AND RECOMMENDATIONS

48. **Compliance to Environmental Safeguard Requirements.** The borrower has fully complied with the environmental regulations of Bangladesh - the Bangladesh Environmental Conservation Act of 1995 and Bangladesh Environmental Conservation Rules of 1997. Environmental clearances require for the JCTE subproject and RHD Building subproject have been secured before start of construction works and are renewable annually. All environmental safeguards provisions in the Loan Agreement are being complied with.

**49. Compliance to Environmental Management Plan.** Compliance with the EMP is partly satisfactory for JCTE road and the Land Ports. For the RHD building compliance most mitigation activities are being complied with a few activities that need improvement. However, overall the level of compliance of the mitigation measures has been improving over time since the start of civil works for the JCTE road and the Land Ports. In particular the contractor in all three<sup>6</sup> subprojects needs to improve in the following:

- (i) proper storage of oil, fuel and other hazardous materials;
- (ii) management of solid and liquid being generated from construction sites and camps;
- (iii) spraying of water to minimize dust;
- (iv) use of PPEs, as well as provision for firefighting equipment in fuel areas and first aid kit in construction site; and
- (v) sanitation and living conditions in labour camps

**50.** Under the additional financing for the JCTE road project, a number of design modifications and additional works mostly within the existing right of way have been proposed. The EMP's for the respective contract package need to be updated to include the design modifications. The list of design modifications and additional works are provided in appendix 4.

**51.** From the list in appendix 4 item number 9 is on disposal of the municipal garbage in WP-01 and WP-02. It is recommended that the PIU urgently hold further discussions with the Gazipur City Corporation and other local government officials. Based on the agreements made during the discussion the contractor must be required prepare a waste management plan for review and approval by the Waste Management Committee. The plan needs to include i) identification of a suitable locally approved site for disposing the waste and ii) construction of a proper lined disposal facility that will manage the leachate.

**52. Compliance to Environmental Monitoring Plan.** Periodic monitoring of environmental quality parameters for groundwater, surface water, and air, is a requirement only for the JCTE road subproject were all within Bangladesh national standards. However, the contractors for the JCTE road need to conduct more consultations with stakeholders as the noise levels during construction are not being met. Contractors also need to find a way to minimize disturbance to nearby community.

**53.** As stated earlier there is a need to improve the quality and coverage of the semi-annual environmental monitoring reports that are submitted to ADB for disclosure on the ADB website. So far the reports have only covered the JCTE road subproject and not the land ports and RHD building construction. Henceforth it is recommended that it cover all three subprojects. There is also a need for improvement in the quality and content of the reports, particularly analysis of findings on air, water, noise monitoring and recommendation of actions for improvement.

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<sup>6</sup> Except for the subproject on Burimari Landport, since the physical construction works have been completed.

### APPENDIX 1: ENVIRONMENTAL MANAGEMENT PLAN (EMP) COMPLIANCE STATUS OF CONTRACTORS<sup>7</sup>

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
<b>Design Stage</b>						
1. Extraction of river sands	1. Permits/NOC from relevant authority such as BIWTA	Y	Y	Y	Y	Complied. Environmental Clearance was issued July 2015
2. Transportation of construction materials	2. Construction materials should be covered properly.	N	N	N	N	Proper covering is not done
	3. Overload should be avoided	Y	Y	Y	Y	
3. Climate change	4. Consider climate change study output for design of alignment and bridge height.	Y	Y	Y	Y	Complied. This is an ADB requirement.
<b>Construction Stage</b>						
1. Land use						
Land use change and Loss of productive/top soil	1. All efforts shall be made in finalization of alignment to reduce productive land requirement	Y	Y	Y	Y	River dredged material is being used for filling road embankment. Hence no agricultural areas are being used as borrow areas
	2. Agricultural areas not to be used as borrow areas.	NA	NA	NA	NA	
Land use change due to borrowing of earth	3. Land acquisition for borrow areas to be minimized. River sand shall be used for embankment. Soil should be used for top layer.	Y	Y	Y	Y	No agricultural areas are being used as borrow areas
	4. Preference shall be given to borrow earth from RoW itself wherever feasible.	NA	NA	NA	NA	
	5. Borrow pits shall be rehabilitated/ used for fishing and other community preferred activity.	NA	NA	NA	NA	
	6. Non-productive lands, barren lands, raised lands; wastelands shall be used for borrowing earth with the necessary permissions/consents	NA	NA	NA	NA	
	7. If new borrow areas are to be selected, all environmental considerations to be ensured.	NA	NA	NA	NA	
	8. The depths in borrow pits to be regulated so that the sides will not be steeper.	NA	NA	NA	NA	
	9. Topsoil to be stockpiled and protected for use at the rehabilitation stage.	Y	Y	Y	N	
	10. Unpaved surfaces used for the haulage of borrow materials to be maintained.	NA	NA	NA	NA	

<sup>7</sup> Contractor numbers correspond to the following: 1 - Kyeryong Spectra JV; 2 - AML-HCM JV; 3 - Samwhan – Mir Aktaer JV; 4 - GDCL-DIENCO JV. Y – Yes; N - No; NA – Not Applicable; ND – No Data; NI – Needs Improvement

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
	11. Transportation of earth materials through covered vehicles.	N	N	N	N	
<b>2. Soil</b>						
Soil erosion due to construction activities, earthwork/cut & fill and Erath stock piles	12. Adopt Good Engineering & construction practices.	Y	Y	Y	Y	Replantation activities are not yet due for implementation
	13. Undertake re-plantation of Native variety of trees and shrubs	NA	NA	NA	NA	
	14. Construction schedule for bridges/beels during non-monsoon season	Y	Y	Y	Y	
	15. Bio-turfing of embankments to protect slopes.	NA	NA	NA	NA	Turfing activities are not yet due for implementation
	16. The earth stockpiles to be provided with gentle slopes to prevent soil erosion	Y	Y	Y	Y	
Compaction of soil due to movement of vehicles and equipment	17. Construction vehicles, machinery, and equipment to be stationed in the designated ROW to avoid compaction. .	Y	Y	N	N	
	18. Approach roads/haulage roads shall be designed along the fallow and consolidated soil area to reduce the compaction	Y	Y	Y	N	
Contamination of soil due to leakage/spillage of oil, bituminous and non-bituminous debris	19. Provision of cemented surface with dyke around fuel storage and filling.	NI	NI	NI	NI	Needs improvement. Oil and fuel should be stored in paved area. Ground should be cemented.
	20. Oil interceptors shall be provided with at the wash fuelling	Y	NI	Y	NI	
	21. Demolition waste to be reused to the extent feasible.	Y	Y	Y	Y	
	22. Oil and grease soaked materials shall be sold off to authorized recyclers.	NA	NA	NA	NA	
<b>1. Water</b>						
Loss of surface water bodies and impact on fishes	23. Design modifications shall be made to prevent any water bodies from filling.	NA	NA	NA	NA	The rivers are dry most of the year and have water flowing in them only for a few months during the monsoon season. Hence there are no issues of impacts on fishes or fishing activities
	24. If filling is unavoidable, no bituminous or hazardous materials shall be used for filling.	NA	NA	NA	NA	
	25. Institutional measures to be made to enhance fish productivity in these water bodies.	NA	NA	NA	NA	
Siltation in water bodies	26. Bridge construction to be limited to the maximum extent in dry season.	Y	Y	Y	Y	Information on this not available
	27. Embankment slopes to be modified suitably to restrict the soil debris entering water bodies.	Y	Y	Y	Y	
		N	N	N	N	

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
	28. Provision of silt fencing shall be made at water bodies. 29. Silt/sediment should be collected and stockpiled for possible reuse. 30. Earthworks to be prevented from impeding natural flow of rivers, streams and water canals or existing drainage system.	N	N	N	N	Information on this not available
		Y	Y	Y	Y	
Deterioration in surface water quality due to uncontrolled dumping of waste, sewage, dredge materials and accidental spillage of fuels	31. No sewage shall be discharged into the ponds and wetlands.	NI	NI	NI	NI	Needs improvement.
	32. Adequate provision for collection and disposal of solid and liquid wastes at construction camps shall be made.	NI	NI	NI	NI	Waste has been deposited to the surrounding site.
	33. Septic tanks shall be provided at construction camps and rehabilitation sites for treatment and disposal of sewage. 34. Concrete platforms with bunding and shade are to be provided for storage of fuels and chemicals. Oil traps may be provided at construction sites, especially the fuelling areas.	Y	Y	Y	Y	Concrete platforms are not being adequately provided for fuelling and fuel storage areas.
Alternation of aquifer regime and further contamination of already arsenic polluted aquifers	35. Maximize available surface water resources in the project area.	Y	Y	Y	Y	There is no issue of arsenic pollution in the project area
	36. No abstraction from all already arsenic polluted aquifers.	NA	NA	NA	NA	
Health hazard to workers in case of unsafe drinking water supply	37. Workers shall be provided arsenic free and safe drinking water.	Y	Y	Y	Y	There is no problem of arsenic pollution in the project area. Deep tube wells have been created for sourcing water for domestic use
<b>2. Drainage and Flood</b>						
Drainage congestion due to waste/sediment disposal and construction of road embankment	38. The road elevation level in both the subprojects area is to be designed considering the flood threat levels.	Y	Y	Y	Y	
	39. Construction shall be so planned that there is no drainage congestion. Wastes should not be disposed on any water body.	Y	Y	Y	Y	
	40. Adequate cross drainage structure shall be provided to easy draining of water	Y	Y	Y	Y	
	41. Regular cleaning up of all channels to avoid its choking.	Y	Y	Y	Y	
<b>3. Hydrology</b>						

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
Impacts due to constructions of bridges	42. Consider flood threat mapping and drainage profiling for consideration of bridge heights.	Y	Y	Y	Y	Complied. This is an ADB requirement.
Increase in sedimentation and dispersion of pollutant of dredged material	43. The dredged material from the river bank shall be tested for presence of heavy metals and other pollutants before its reuse	NA	NA	NA	NA	Testing for heavy metals were found to not be necessary as the materials are only being used for road embankment fill will no risk of causing health hazards to people or animals
<b>4. Air Quality</b>						
Dust Generation due construction activities and transport of construction materials.	44. Transport of loose and fine materials through covered vehicles.	N	N	Y	N	Most of the mitigating measures are being complied except for (i) the need to improve the water spraying on earthworks (except for contractor 3), (ii) unpaved haulage roads, other dust prone areas and construction yard; (iii) Except for contractor no. 3 with adequate PPEs, other contractors have no masks for workers; (iv) no firefighting equipment in fuel area. First aid kit and medical personnel are available except for contractor 4 (no first aid kit in construction site).
	45. Loading and unloading of construction materials in covered area.	N	N	N	N	
	46. Approach roads shall be paved and widened.	NA	NA	NA	NA	
	47. Storage areas to be located downwind of the habitation area.	Y	Y	Y	Y	
	48. Water spraying on earthworks, unpaved haulage roads, other dust prone areas and construction yard.	NI	NI	Y	NI	
49. Provision of PPEs to workers.	NI	NI	Y	NI		
Emission from vehicle, equipment and machinery	50. Regular maintenance of machinery and equipment.	Y	Y	Y	Y	Ambient air quality monitoring parameters are within standards. Mixing plant not being used yet
	51. Mixing plants and asphalt to be sited at least 1 km in the downwind direction from the nearest settlement.	NA	NA	NA	NA	
	52. Ambient air quality monitoring.	Y	Y	Y	Y	
	53. DG sets to be fitted with stacks of adequate height and low sulphur diesel to be used in DG sets as well as machineries.	Y	Y	Y	Y	
	54. Monitoring of air quality as per EMoP.	Y	Y	Y	Y	
<b>5. Noise</b>						
Noise from construction vehicle, equipment and machinery.	55. All equipment to be timely serviced and properly maintained to minimize its operational noise.	Y	Y	Y	Y	Vulnerable labourers or those exposed to high level of noise, are not using ear plugs. The construction camps and equipment operation sites are not located near settlements or sensitive receptors
	56. Construction equipment and machinery to be fitted with silencers and maintained properly.	NA	NA	NA	NA	
		Y	Y	Y	Y	

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
	57. Construction timings to be regulated near inhabited and sensitive locations. 58. Protection devices (ear plugs or ear muffs) will be provided to the workers operating in the vicinity of high noise generating machines. 59. Noise monitoring.	Y Y	Y Y	Y Y	Y Y	
Workers health in construction camp	60. Adequate sanitation facilities to be provided at construction camps by means of septic tanks soak pits, etc. 61. Proper drainage to be maintained around the sites to avoid water logging leading to disease. 62. Preventive medical care to be provided to workers. 63. Disposal of solid waste on regular basis at identified locations. 64. Provision of day crèche for children	NI NI NI NA	NI NI NI NA	NI NI NI NA	NI NI NI NA	While toilets, soak pits or septic tanks have been provided in the labour camps, liquid and solid waste is not disposed and managed properly. First aid kits are not adequately well-stocked with medicines and in some cases not available on site.
6. Topography and landscape						
Land degradation due to careless excavation from borrow area	65. All requisite borrow pits shall be opened preferably within the RoW and not on agriculture land 66. Top soil shall be preserved. Borrow pits shall be rehabilitated. 67. If any borrow pits are required to be opened on private land, it shall be either closed or converted to ponds as per the discretion of the landowner. 68. Constructional wastes shall be optimally used for construction activities.	NA NA NA Y	NA NA NA Y	NA NA NA Y	NA NA NA Y	All fill material is being sourced from river bed material suppliers. Hence, no borrow pits are required to be opened.
7. Flora and fauna						
Vegetation loss due to site preparation and construction activities	69. Minimize the tree cutting by selecting road widening option based on technical and tree laws consideration. 70. Afforestation shall be done at the ration of 1:3 71. For social forestry afforestation ratio shall be as per the consultation with tree owner.	Y NA NA	Y NA NA	Y NA NA	Y NA NA	Tree cutting activities are only just beginning. Afforestation activities have not yet started.

Project Activity	Mitigating Measures	Contractor's Compliance				Remarks
		1	2	3	4	
Disturbance to aquatic life including migration of fish due to bridge construction	72. Construction of Bridges during non-rainy season.	NA	NA	NA	NA	The rivers in the project area are mostly dry for most of the year. Hence the issue of fish migration is not applicable
	73. Deep water channel shall be always maintained during bridge construction.	NA	NA	NA	NA	
Impact on fishing activity (production, spawning and breeding grounds)	74. Adequate cross drainage structure shall be provided in all these areas.	NA	NA	NA	NA	The rivers in the project area are mostly dry for most of the year. Hence there are no fishing activities in the project area
	75. Institutional support shall be provided including promoting fish culture which can enhance the pond fish productivity	NA	NA	NA	NA	
	76. No construction shall be undertaken during the spawning and breeding period between	NA	NA	NA	NA	
	77. June, July, August and September at this activity aquatic sensitive location.	NA	NA	NA	NA	
8. Social						
Impact due to setting up of construction camp	78. Adequate sanitation facilities to be provided at construction camps by means of septic tanks soak pits, etc.	NI	NI	NI	NI	Medical facilities and hygiene including waste management in the labour camps need to be improved
	79. Proper drainage shall be maintained around the sites to avoid water logging leading to disease.	NI	NI	NI	NI	
	80. Preventive medical care shall be provided to workers.	NI	NI	NI	NI	
	81 Disposal of solid waste on regular basis at identified locations.	NI	NI	NI	NI	



## APPENDIX 2: STATUS OF EMP COMPLIANCE FOR BURIMAR AND BENAPOLE LAND PORTS

(C = Complied, N = Not Complied, NI = Needs Improvement, NA = Not Applicable, ND = No Data)

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
<b>A. Design and Pre-construction stage</b>				
<b>1. Project preparation project design and disclosure</b> Incorporate design measures in the project design to minimize environmental impacts. Compliance with BAN statutory environmental assessment process. Establishment of Grievance Redress Mechanism (GRM)	1. Project management Unit (PMU) to update designs to address design requirements.	C	C	Update site specific EMPs were prepared and approved by the PIC
	2. Update IEE and EMP based on detailed design and submit to ADB for review and approval.	C	C	
	3. Ensure EMPs are included in bidding and contract documents	C	C	
	4. Implement plan for Grievance Redress Mechanism as described in the IEE and inform local authorities	C	C	
<b>2. Environmental capacity development</b> Develop environmental management capacity of and PMU/ESC to ensure proper EMP implementation and promote environmental awareness among workers.	1. PMU/ESC to commit and retain dedicated staff (ESO) for project duration to oversee EMP implementation	C	C	PIC needs to visit the project site regularly to provide on-the-job training and technical guidance to the contractor
	2. PMU/ESC to train PMU/ESC/ESOs to build their capacity on EMP implementation, monitoring and reporting using workshops and on-the-job training techniques and case studies.	C	NI	
	3. Conduct workers' orientation on EMP provisions. Such orientation shall be periodically conducted by the PMU/ESC as every new contractor is engaged.	N	N	
<b>3 Prepare draft method statements/site-specific EMPs (SEMPs)</b>	1 Based on the Project EMP (included in the IEE), prepare draft method statements/site-specific EMPs (SEMPs) for implementation by BELP and contractor: Workers and Public Safety Plan. Waste Management Plan, Drainage Management Plan, Traffic Management Plan, These SEMPs will demonstrate the manner (location, responsibilities, schedule/ timeframe, budget, etc.) Further details that should be included in the above SEMPs are provided in the subsequent sections of this table and in Chapter V of the IEE.	NI	NI	While an updated EMP was prepared separate sub-plans such as Waste Management Plan, Traffic Management Plan etc. were not prepared.
<b>4 Enhancements</b> Provide environmental enhancement of the project	Contractor to reconfirm and implement enhancements (e.g., landscaping, tree replanting) identified at the detailed design stage.	ND	NA	Not yet due for Benapole LP
<b>B. Construction Stage</b>				

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
<b>1. Activate management plans and obtain permits / licenses.</b> Avoid impacts from unplanned activities.	1. Update and activate management plans/SEMPs for waste and Spoil disposal, materials management, drainage, runoff control, tree-cutting and replanting, traffic, utilities and irrigation provisioning, noise and dust control and workers and public safety. The SEMPs shall not be in conflict with any provisions of the EMP. 2. Contractor(s) and their suppliers comply with all statutory requirements for permits from DOE with regard to use of mechanical equipment, establishment and operation of construction plants such as concrete batching plant, rock crusher, Spoils disposal, etc.	NI	NI	Detailed sub-plans were not prepared and submitted to the PIC  Given the small scale of civil works there was no need for use of batching plants and rock crushing plants
		NA	NA	
<b>2. Safety Precautions for the Workers</b> Ensure worker safety.	1. Contractor to update draft Worker and Public Safety Plan (WPSP) prepared by PMU/ESC and instruct workers in health and safety matters. Updated plan to be approved in writing by PMU/ESS one month prior to starting works. Contractor to implement WPSP provisions. 2. Establish safety measures as required by law and by good engineering practice and provide first aid facilities that are readily accessible by workers. 3. Scheduling of regular (e.g., weekly tool box talks) to orient the workers on health and safety issues related to their activities as well as on proper use of PPE. 4. Fencing on all excavation, borrow pits and sides of temporary bridges 5. Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee. 6. Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from traffic vehicles. Another measure is to install channeling devices (e.g., traffic cones and barrels) to delineate the work zone. 7. Workers shall be provided with reliable supply of potable water. 8. Construction camps shall be provided with adequate drainage to avoid accumulation of stagnant water.	NI	NI	Occupational health and safety measures such as provision of face masks, gloves, are being taken in some instances. However, improvement is required in terms of regularly wearing the PPE and conducting awareness talks and training on health and safety measures on the construction site.  Construction camps need to have better waste management as currently waste is being disposed on an ad hoc basis all over the camp site.
		NI	NI	
		NI	NI	
		NA	NA	
		NI	NI	
		C	C	
		C	NI	
		NI	NI	
C	C			

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	<p>9. Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained to allow effective operation.</p> <p>10. Ensure reversing signals are installed on all construction vehicles.</p>			
<p><b>3. Public safety</b> Prevent accident with public in local community</p>	<p>1. Include in WSPS for barriers (e.g., temporary fence), shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points.</p> <p>2. The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and such sites have a watchman to keep public out.</p> <p>3. Speed restrictions shall be imposed on Project vehicles and equipment when traveling within 50m of sensitive receptors (e.g. residential, schools, temples, etc.).</p> <p>4. Upon completion of construction works, borrow areas will be backfilled (if suitable materials are available, e.g., excavation Spoils) or fenced.</p>	<p>C</p> <p>C</p> <p>NA</p> <p>NA</p>	<p>NA</p> <p>C</p> <p>NA</p> <p>NA</p>	<p>Construction activities for the Benapole LP is taking place inside the premises of the LP area, hence there is no issue of pedestrian access to the roadway.</p> <p>There are no sensitive receptors near the Benapole LP No borrow areas have been opened for construction of the 2 LPs</p>
<p><b>4a. General Construction Waste Disposal</b> Reduce, reuse and recycle waste and contamination due to poor waste disposal practices.</p>	<p>1. Update the Waste Management section of the draft WASTE MANAGEMENT and SPOIL DISPOSAL PLAN prepared by the PMU/ESS, one month before construction to cover all aspects of waste storage, disposal and accidental spills to be approved in writing by PMU/ESS one month prior to starting works. Contractor to implement WMSDP provisions.</p> <p>2. Areas for disposal to be agreed with land owner and DOE checked; and recorded and monitored by the PMU/ESS/BLPA/ESO.</p> <p>3. Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked.</p> <p>4. Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses can be given to local farmers for fodder and fuel. Organic (biodegradable) shall be</p>	<p>N</p> <p>NA</p> <p>N</p> <p>N</p> <p>C</p> <p>NA</p> <p>NI</p> <p>C</p> <p>C</p> <p>C</p>	<p>N</p> <p>NA</p> <p>N</p> <p>N</p> <p>NI</p> <p>C</p> <p>NI</p> <p>C</p> <p>NI</p> <p>NI</p>	<p>The waste management and spoil disposal plan has not been updated</p> <p>No waste is being disposed in private land areas. This is not being done</p> <p>This is not being done</p> <p>There is an overall need for improvement in the management of solid waste</p>

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	<p>collected and disposed of on site by composting (no burning on site).</p> <p>4. Recyclables shall be recovered and sold to recyclers.</p> <p>5. Residual and hazardous wastes shall be disposed of in disposal sites approved by local authorities.</p> <p>6. Construction/workers' camps shall be provided with garbage bins.</p> <p>7. Burning of construction and domestic wastes shall be prohibited.</p> <p>8. Disposal of solid wastes into canals, rivers, other watercourses, agricultural field and public areas shall be prohibited.</p> <p>9. There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local waste disposal sites.</p> <p>10. Solid waste generated during construction and at campsites to be treated and safely disposed only in demarcated off-site waste disposal sites identified and agreed with PMU/ESS/PMU/ESS, local community and local authorities.</p>	C	NI	<p>generated in the construction camps</p> <p>Proper and systematic disposal of construction waste (though minimal) in coordination with the local authorities is required</p>
<p><b>4b. Use of hazardous substances and hazardous waste disposal</b></p> <p>Minimize contamination due to use and storage of hazardous substances</p>	<p>1. Update Hazardous Waste section of WASTE MANAGEMENT and SPOIL DISPOSAL PLAN prepared by the PMU/ESS, one month before construction. Updated plan to be approved in writing by PMU/ESS one month prior to starting works. Contractor to implement WMSDP provisions.</p> <p>2. Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by BLPA/ESO/PMU/ESS and have necessary approval/permit from DOE and local authorities.</p> <p>3. Hydrocarbon, toxic material and explosives will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination.</p> <p>4. Equipment/vehicle maintenance and refueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water</p>	<p>NA</p> <p>NA</p> <p>NA</p> <p>NA</p> <p>NA</p> <p>NA</p>	<p>C</p> <p>C</p> <p>NI</p> <p>NI</p> <p>NI</p> <p>C</p> <p>C</p>	<p>This requirement on hazardous waste was only in the EMP for the Benapole LP</p> <p>Not all refuelling activities are carried out in contained areas.</p> <p>This is being done partially. However the situation is expected to improve after completion of the improvement works of the Benapole LP</p>

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	separator that will be regularly skimmed of oil and maintained to ensure efficiency.	NA	NI	
	5. Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant.	NA	C	
	6. Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations.	NA	NI	
	7. Ensure all storage containers are in good condition with proper labeling.	NA	NI	
	8. Regularly check containers for leakage and undertake necessary repair or replacement.	NA	NI	
	9. Store hazardous materials above flood level.	NA	NI	
	10. Discharge of oil contaminated water shall be prohibited.	NA	NI	
	11. Used oil and other toxic and hazardous materials shall be disposed of in an authorized facility off-site.	NA	NI	
	12. Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of channel beds.	NA	NI	
	13. Ensure availability of spill clean up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored.	NA	NI	
	14. Spillage, if any, will be immediately cleared with utmost caution to leave no traces.	NA	NI	
	15. Spillage waste will be disposed at disposal sites approved by local authorities and approved by PMU/ESS.	NA	NI	
	16. All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation.	NA	NI	
	17. The Contractor shall identify named personnel in the management plan/SEMP in-charge of these sites and ensure they are properly trained to control access to	NA	NI	

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	these areas and entry will be allowed only under authorization.			
<b>5. Drainage and Hydrological Impacts</b> To minimize hydrological impacts flooding and runoff of river banks.	1. Review detailed designs for cross-drainage and side-drainage structures assess and agree with PMU/ESS/PMU/ESS if redesign is required or if new structures would be constructed or existing ones would be repaired. 2. Before start of site works prepare to implement DRAINAGE MANAGEMENT PLAN (DMP) prepared by PMU/ESC during detailed design phase. Updated plan to be approved in writing by PMU/ESC one month prior to starting works. Contractor to implement provisions of DMP. 3. Implement agreed designs for bridges and culverts sufficient to control flooding as designed and to dissipate energy of flow to reduce runoff. 4. Protect lead off streams that may become silted by construction runoff, workshops or equipment washing-yards. 5. Minimize alterations in the project corridor's surface drainage patterns as much as possible: 6. Drains to be constructed so that the outfalls of the surface run-off from the carriageway are diverted away from the SRs. 7. Ensure that storm drains and highway drainage systems are periodically cleared to maintain storm water flow during construction.	C  C  NA NA  C C  C	C  C  NA NA  C C  NI	
<b>6. Traffic Management</b> Minimize disturbance of traffic and traffic congestion	1. Prior to start of site works, update and implement draft Temporary (temporary means during construction period) Traffic Management Plan (TTMP) prepared by PMU/ESS during detailed design phase. Updated plan to be approved in writing by PMU/ESS one month prior to starting works. Contractor to implement TTMP provisions. 2. Communicate to the public through local officials regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restrictions.	C  C C  C  C	NI  NI NI  NI  NI	There is a problem of severe traffic congestion in Benapole due to rapid increase in trucks bringing in goods from India and limited space in the Land Port. To address a new component on constructing roads on either side of the railway track is proposed (outside the scope of the current SASEC Road Connectivity Project).

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	<p>3. In coordination with local traffic authorities, implement appropriate traffic diversion schemes to avoid inconvenience due to project operations to road users, ensure smooth traffic flow and avoid or minimize accidents, traffic hold ups and congestion</p> <p>4. In coordination with local traffic officials, schedule transport of materials to avoid congestion, set up clear traffic signal boards and traffic advisory signs at the roads going in and out the road and bridge construction sites to minimize traffic build-up.</p> <p>5. Provide safe vehicle and pedestrian access around construction areas.</p> <p>6. Install bold diversion signs that would be clearly visible even at night and provide flag persons to warn of dangerous conditions (24 hours, as necessary)</p> <p>7. Provide sufficient lighting at night within and in the vicinity of construction sites..</p> <p>8. Designate traffic officers in construction sites.</p>	C C C	C C C	
<p><b>7. Sanitation and Diseases</b></p> <p>Control of infectious diseases.</p>	<p>1. Standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside to prevent proliferation of mosquitoes.</p> <p>2. Temporary and permanent drainage facilities will be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.</p> <p>3. Malaria controls ((e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, etc.) and HIV-AIDS education will be implemented in line with social plans for the project.</p> <p>4. HIV/AIDS awareness and prevention program shall be implemented in line with social plans under the Project</p>	C C NI N	C NI NI NI	
<p><b>8. Asphalt plant rock crushers, bitumen usage and soil contamination</b></p> <p>Avoid air pollution, nuisances, traffic obstacles and contamination</p>	<p>1. Use local suppliers for asphalt plant, rock and bitumen supply</p>	C	C	

Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
<b>9. Noise and dust nuisances</b>  To minimize air impacts effectively and avoid complaints due to the airborne dust.	1. Before construction starts, update the draft NOISE and DUST CONTROL PLAN (NDCP) prepared by the PMU/ESS. Include requirements for controlling noise and dusty materials at source. Updated plan to be approved in writing by PMU/ESS one month prior to starting works. Contractor to implement NDCP provisions. 2. Restrict works to daylight hours within 500m of residential settlements and hospitals. 3. Powered mechanical equipment and vehicle emissions to meet national TCVN standards. All construction equipment and vehicles shall have valid certifications indicating compliance to vehicle emission standards. 4. Construction equipment and vehicles will be maintained to a good standard and shall be provided with muffler silencers. Machinery causing excessive pollution will be banned from construction sites. 5. Monitor and investigate complaints; propose alternative mitigation measures. 6. Keep stockpiles moist 7. Tightly cover trucks transporting construction materials (sand, soil, cement, gravel, etc.) to avoid or minimize spills and dust emission. 8. On rainless day undertake watering, at least twice per day, on dusty and exposed areas at construction yards, materials stockpile, construction sites, access roads, quarry areas, borrow sites and other project areas where residential sites and other sensitive receptors such as schools, hospital, etc. are located nearby. If works are within 15m of any sensitive receivers, the contractor shall install dust barrier between the works at the road edge and the sensitive receivers (e.g. 2.5 m high temporary walls, etc.) 9. Mixing and crushing plants operations will be equipped with dust suppression devices such as water sprays. 10. Clean up road surfaces after work.	N	NI	
		C	C	
		C	C	
		C	C	
		NA	NA	
		NI	NI	
		NI	NI	
		NA	NA	
		C	NA	
		NA	NA	
NA	NA			
C	C			
NA	NA			
C	C			



Environmental Concern	Mitigation Measure	Compliance Status		Remarks
		Burimari LP	Benapole LP	
	<p>11. Temporary noise barriers shall be used, as necessary, in sites where sensitive receptors are present, such as residential areas, schools, hospitals, temples, etc.</p> <p>12. To protect buildings and structures from vibration, non-vibrating roller shall be used in construction sites near buildings and structures.</p> <p>13. Structures which are damaged due to vibration caused by the Project shall be repaired immediately as directed by PMU/ESS.</p> <p>14. Machinery is turned off when not in use.</p> <p>15. Pile driving during to be schedule for day time if construction site is near sensitive receptors or approved by DOE, local authority and PMU/ESS.</p> <p>16. Impose speed limits on construction vehicles to minimize dust emission along areas where sensitive receptors are located (houses, schools, hospitals, etc.).</p>			

### APPENDIX 3: STATUS OF COMPLIANCE OF THE RHD BUILDING

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
<b>A. PRE-CONSTRUCTION STAGE:</b>			
Improper design	<ul style="list-style-type: none"> <li>▪ All project facilities are to be designed in accordance with the planning and design norms of BNBC.</li> <li>▪ Earthquake hazard should be considered in the structural design of the RHD head quarter building.</li> </ul>	C C	
Lack of environmental specifications	<ul style="list-style-type: none"> <li>i. Prepare relevant environmental sections in the tender documents for bidders</li> <li>ii. Prepare a bid evaluations section for environment, according to ADB bid evaluation format</li> <li>iii. Prepare environmental contract clauses for contractors (refer to IEE)</li> </ul>	C C C	
Removal of Existing RHD structures/equipment/vehicles	All concrete structures/vehicles/equipment in the proposed RHD HQC area to be dismantled & sold before construction starts.	C	
Land acquisition (1064 sq.m land) and loss of properties	Adequate compensation to PAPs to be paid in time, as mentioned in RAP.	C	
Removal of utilities such as electricity line, gas connection, telephone connection, water supply and sewerage pipelines	Necessary planning and coordination with concerned authorities. Prior to start construction, all utilities should be shifted with the consultation of relevant authorities. Proper health and safety measures for the workers should be taken during shifting of the utilities to avoid any accidents.	C	
Tree cutting (217 nos.)	To compensate the loss caused due to felling of 284 trees. RHD will replant trees (1,027nos.) as per the prescription of forest department (FD) e.g min. two tree seedlings to be planted during monsoon period of operation stage.for each tree felled. Cutting, carry out and selling these trees should be as per GOB procedure to avoid any accident.	C	Included in Tree Plantation Plan
<b>B. CONSTRUCTION STAGE:</b>			
Drainage Congestion	<ul style="list-style-type: none"> <li>▪ Temporary drainage congestion (TDC) in the foundation trench due to rainwater to be removed by pumping. Avoid monsoon period for foundation works.</li> <li>▪ TDC in construction yard &amp; camp of the proposed HQC area to be removed by temporary earth or RCC drains.</li> <li>▪ All rainwater, storm water waste water etc. should be drain out via sewerage pipelines of DWASA.</li> </ul>	C C C	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
Air Pollution	<ul style="list-style-type: none"> <li>▪ Fit construction vehicles with appropriate exhaust systems and emission control devices.</li> </ul>	NA	Water spraying is being carried out by the contractor to control dust. However it needs to be done for the entire construction site including stockpile areas and frequency needs to be increased.
	<ul style="list-style-type: none"> <li>▪ Maintain construction vehicles and equipment in good working condition including regular servicing.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Operate the construction vehicles in a fuel efficient manner.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Cover hauls vehicles carrying dusty materials moving outside the construction site.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Impose speed limits (maximum 10 km/hr) on all vehicle movement at the worksite and through access roads to reduce dust emissions.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Control the movement of construction vehicles in the access road ( during night from 22:00 to 6:00).</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Water spray to the construction materials or cover (especially sand &amp; boulders/brick chips) prior to loading and transport.</li> </ul>	NI	
	<ul style="list-style-type: none"> <li>▪ Focus special attention on containing the emissions from generators.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Equipment/vehicles causing excess pollution (e.g. visible smoke) should be banned from construction sites or fixed immediately prior to further usage.</li> </ul>	N	
	<ul style="list-style-type: none"> <li>▪ Provide filtering systems, dust collectors or humidification or other techniques (as applicable) to the concrete mixing plant to control the particle emissions at all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations.</li> </ul>		
	<ul style="list-style-type: none"> <li>▪ Water spray to the material stockpiles as and when required to minimize the potential environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds and dry periods). Stored materials such as boulders and sand should be covered and confined to avoid them being wind-drifted.</li> </ul>	NI	
	<ul style="list-style-type: none"> <li>▪ Erect dust barriers along the boundary of the complex area specially at university site to reduce dust movement to the surrounding areas.</li> </ul>	C	
	<ul style="list-style-type: none"> <li>▪ Reschedule earthwork activities when practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site.</li> </ul>	NA	
	<ul style="list-style-type: none"> <li>▪ Restore disturbed areas as soon as possible by vegetation/grass-turfing.</li> </ul>	C	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
	<ul style="list-style-type: none"> <li>▪ Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations.</li> </ul>		
Noise Pollution	<ul style="list-style-type: none"> <li>▪ Maintain all vehicles in order to keep them in good working order in accordance with manufacturers maintenance procedures.</li> <li>▪ Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. (20 km/hr during night time).</li> <li>▪ Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.</li> <li>▪ Appropriately site all noise generating activities to avoid noise pollution to local residents.</li> <li>▪ Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines, silencers).</li> <li>▪ Maintain all equipment in order to keep it in good working conditions in accordance with manufacturers' maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment.</li> <li>▪ Install acoustic enclosures around generators to reduce noise levels.</li> <li>▪ Fit high efficiency mufflers to appropriate construction equipment.</li> <li>▪ Avoid the unnecessary use of alarms, horns and sirens.</li> <li>▪ Notify adjacent landholders prior any typical noise events outside of daylight hours.</li> <li>▪ Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions.</li> <li>▪ Employ best available work practices on-site to minimize occupational noise levels.</li> <li>▪ Install temporary noise control barriers (wooden or jute or plastic screen), specially at university site.</li> <li>▪ Plan activities on site and deliveries to and from site to minimize impact.</li> <li>▪ Monitor and analyze noise and vibration results and adjust construction practices as required.</li> <li>▪ Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.</li> </ul>	<p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">N</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">N</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">N</p> <p style="text-align: center;">C</p>	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
Sewage Pollution/ Sanitation Hazard	<ul style="list-style-type: none"> <li>▪ Provide hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females workers with total isolation by wall or by location. The minimum number of toilet facilities required is one toilet for every ten persons.</li> <li>▪ Ensure the sanitary facilities are kept clean and without any odor.</li> <li>▪ Educate the workers of using the facilities.</li> </ul>	<p style="text-align: center;">NI</p> <p style="text-align: center;">NI C</p>	<p>Toilets have been provided in the construction site. However the level of cleanliness needs to be better</p>
Solid Waste Pollution	<ul style="list-style-type: none"> <li>▪ Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less offsite environmental impacts. The disposal site should be approved by RHD prior to usage and should be rehabilitated after usage to ensure the land is not exposed to soil erosion, wind and water stagnation.</li> <li>▪ Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach.</li> <li>▪ Segregate and reuse or recycle all the wastes, wherever practical.</li> <li>▪ Prohibit burning of solid waste.</li> <li>▪ Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process.</li> <li>▪ Provide refuse containers at each worksite and worker camps.</li> <li>▪ Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal by Dhaka City Corporation (DCC).</li> <li>▪ Ensure proper collection and disposal of all wastes within the construction camps from where DCC will take by their truck and dispose at their dumping area at Matuial.</li> <li>▪ Insist on waste separation and store by source; organic wastes, inorganic wastes and recyclables in separate containers.</li> <li>▪ Clear wastes on daily basis to waste collectors. Establish waste collection, transportation and disposal at the dumping site in adequate sizes of concrete chambers/boxes.</li> </ul>	<p style="text-align: center;">NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">N</p>	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
	<ul style="list-style-type: none"> <li>▪ Dispose organic wastes in a designated safe place and should be kept covered so that flies, mosquitoes, dogs, cats, rats, etc. are not attracted. Encourage composting of organic waste that can be used for tree planting purposes.</li> <li>▪ Locate the garbage pit/waste disposal site away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children from entering and playing.</li> <li>▪ Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approved waste disposal sites.</li> </ul>	<p style="text-align: center;">C</p> <p style="text-align: center;">C</p>	
Liquid waste	<ul style="list-style-type: none"> <li>▪ Train the relevant construction personnel in handling of fuels and spill control procedures.</li> <li>▪ Refueling shall occur only within enclosed areas.</li> <li>▪ Provide PPE such as protective clothing, safety shoes, helmets, masks and hand gloves to the construction personnel, to handle construction materials.</li> <li>▪ Make sure all containers and drums that are used for storage are in good condition and are labeled with expiry date. Any container, drum that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur.</li> <li>▪ Put containers and drums in permanent storage areas on an impermeable floor and dumping at Matuail CWDS, Dhaka..</li> <li>▪ Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution.</li> <li>▪ Ensure basic firefighting equipment is in place outside these storage areas in case of a fire.</li> </ul>	<p style="text-align: center;">N</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C</p>	
Landscape	<ul style="list-style-type: none"> <li>▪ Parking of construction vehicles and stockpiling of construction materials should be done in systematic way to avoid any drainage blockages, to enhance the aesthetics of the site.</li> <li>▪ Duration of stockpiling should be minimized as much as possible.</li> </ul>	<p style="text-align: center;">C</p> <p style="text-align: center;">C</p>	
Road/Traffics	<ul style="list-style-type: none"> <li>▪ Prepare and submit a traffic management plan to the PIU for approval at least 30 days before commencing work on</li> </ul>	<p style="text-align: center;">NI</p>	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
	<p>project component involving traffic diversion and management.</p> <ul style="list-style-type: none"> <li>▪ Include measures in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, access roads, necessary barricades, warning signs / lights, road signs, etc.</li> <li>▪ Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Bangladesh Road Traffic Regulations of BRTA.</li> <li>▪ Restrict truck deliveries to day time working hours (as common practice in Dhaka) to avoid road accidents and to reduce inconveniences to the road users.</li> <li>▪ Restrict the transport of oversize loads.</li> <li>▪ Operate construction vehicles to non-peak periods (night) to minimize traffic disruptions.</li> <li>▪ Enforce on-site and access road speed limits.</li> </ul>	<p>NI</p> <p>C</p> <p>C</p> <p>C</p> <p>C</p> <p>C</p>	
Occupational H&S	<ul style="list-style-type: none"> <li>▪ Implement suitable safety standards for all workers and site visitors which shall not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the Government of Bangladesh (e.g. 'The Bangladesh Labor Code, 2006').</li> <li>▪ Provide the workers a safe and healthy work environment, taking into account inherent risks of this particular construction activity and specific classes of hazards in the work areas,</li> <li>▪ Provide personal protection equipment (PPE) for workers, such as safety shoes, helmets, masks, gloves, protective clothing, goggles, safety belt for working at height and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones.</li> <li>▪ Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job.</li> </ul>	<p>C</p> <p>C</p> <p>C</p> <p>C</p> <p>NI</p> <p>C</p>	

Environmental Impact	Mitigation Measures	Compliance Status	Remarks
	<ul style="list-style-type: none"> <li>▪ Appoint an environment, health and safety manager to look after the health and safety of the workers.</li> <li>▪ Not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the Bangladesh Labor Code, 2006</li> <li>▪ Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work</li> <li>▪ Document and report occupational accidents, diseases, and incidents and actions taken.</li> <li>▪ Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards in a manner consistent with good international industry practice.</li> <li>▪ Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.</li> <li>▪ Provide HIV awareness program, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis.</li> <li>▪ Provide awareness to the construction drivers to strictly follow the driving rules.</li> <li>▪ Provide adequate lighting in the construction area and along the roads.</li> <li>▪ Adequate ventilation in all facilities.</li> <li>▪ Provide plastic net and others appropriate H&amp;S measures surrounding the buildings to avoid accidents.</li> <li>▪ Safe and reliable water supply. Water supply from DWASA that meets the national standards.</li> <li>▪ Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage.</li> <li>▪ Carry out regular mosquito repellent spraying during monsoon periods.</li> <li>▪ Recreational and social facilities.</li> <li>▪ Safe storage facilities for petroleum and other chemicals.</li> <li>▪ Solid waste collection and disposal system.</li> <li>▪ Provide ambulance facility for the laborers to be transported to nearest hospitals during an emergency.</li> </ul>	<p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">N</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p> <p style="text-align: center;">C</p> <p style="text-align: center;">NI</p>	



Environmental Impact	Mitigation Measures	Compliance Status	Remarks
	<ul style="list-style-type: none"> <li>▪ Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work.</li> <li>▪ Establish a code of conduct for the contractor staff.</li> <li>▪ Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form.</li> <li>▪ Provide appropriate security personnel (home guard/private security guards) and enclosures to prevent unauthorized entry into the camp area.</li> </ul>		
Community H&S	<ul style="list-style-type: none"> <li>▪ All construction activities except movement of trucks should be during day time (6:00 to 21:00)</li> <li>▪ Construction trucks should be moved during night time to avoid accident.</li> </ul>	C  C	

**APPENDIX 4: PROPOSED DESIGN CHANGES AND ADDITIONAL WORKS UNDER THE  
ADDITIONAL FINANCING FOR JCTE ROAD SUBPROJECT**

- 1) Provision of separate SMVT bridges for Kodda- 1, Kodda- 2 and Bymail under WP-01.
- 2) Inclusion of Flyover near ICT Park at Kaliakoir (L=400 m including ramp) at Ch 18+800 in WP-02
- 3) Inclusion of a 400 m Fly Over (including ramp) at Naojuri at Ch. 3+000 km under WP -01
- 4) Construction of footpath and drain on both sides in Contract WP-01
- 5) Inclusion of additional loops (Tangail- Chandra- Nabinagar) in Chandra Flyover at Ch. 16+000 km.
- 6) Integration of the existing road with proposed new 2 Lane roads along with SMVT Lane (s).
- 7) Inclusion of Underpass along JCTE road
- 8) Maintenance during Construction
- 9) Removal of Garbage/ Unsuitable soil in WP-01 and WP- 02
- 10) Adjustment of Quantities of lane changing underpasses and culverts