Environmental Monitoring Report

Project No. 40540-017, 40540-018
Semi-annual Report (January-June 2022)
July 2022

Bangladesh: South Asia Subregional Economic Cooperation Dhaka Northwest Corridor Road Project, Phase 2 - Tranche 1 and 2

Prepared by Roads and Highways Department (RHD), Government of Bangladesh for the Asian Development Bank.

Government of the People's Republic of Bangladesh

Ministry of Road Transport and Bridges
Road Transport and Highways Division
Roads and Highways Department

SASEC ROAD CONNECTIVITY PROJECT-2

SASEC Dhaka-Northwest Corridor Road Project, Phase 2

ADB Loan: 3592/3593/3883-BAN

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT

JANUARY- JUNE 2022

PROJECT IMPLEMENTATION CONSULTANTS are

Korea Consultants International Co., Ltd. (South Korea) ***in joint venture with*** Chodai Co., Ltd. (Japan), H.P. Gauff Ingenieure GmbH & Co. KG-JBG (Germany), Lea Associates South Asia Private Limited (India), Soosung Engineering Co. Ltd. (South Korea), ***And in association with*** BCL Associates Limited (Bangladesh), BETS Consulting Services Ltd. (Bangladesh), Development Technical Consultants Pvt. Ltd. (Bangladesh), Philkoei International, Inc. (Philippines)

EXECUTIVE SUMMARY

1. All civil works including CEMP implementation as per specification and as per terms of conditions of the Contract of SASEC Dhaka-Northwest Corridor Road Project, Phase-2 (SASEC Road Connectivity Project-II: Improvement of Elenga-Hatikamrul-Rangpur Road to a 4-lane Highway), ADB Loan 3592/3593/3883-BAN are being executed by the Contractors

2. The project is deemed as Category B in ADB safeguard policy 2009, while in Bangladesh Environmental Conservation Rule 1997 categorized the project as Red. Second time renewal of Environmental Clearance Certificate (ECC) from Department of Environment (DoE) had been obtained. Its validity will remain for one year that is up to 13 February 2022. So, for the third time renewal application will be processed with submission of necessary renewal fee and compliance report in the first week of February 2022 accordingly.

Infrastructures and Physical Progress during January-June 2022

3. The contracted work is being undertaken via "design checking and construction" arrangement with the Contractors of the Eight PACKAGEs and being supervised by the Project Implementation Consultant (PIC) or Engineer, Korea Consultants International Co., Ltd. (South Korea) with joint venture and in association partners. The scope of works includes detailed design, earthworks, pavement construction, construction of new Bridges and rehabilitation of old Bridges, drainage, structures, link/roadside improvements and installation of road furniture such as signs and safety barriers. A total of 26 Bridges and 161 culverts will be rehabilitated and/or reconstructed. In addition, construction of three flyovers, 39 underpass, 68 bus bays, 11 pedestrian overpasses etc. will be constructed. During January-June 2022 the physical progress of WP-05 is 0.02%, WP-06 is 54.17%, WP-07 is 35.625%, WP-08 is 36.117%, WP-09 is 53.77%, WP-10 is 64.52%, WP-11 is 75.03%, WP-12 is 68.51% and WP-14 is 1.47%.

4. Contractors are monitoring environmental quality parameter test quarterly. The environmental mitigation measures like dust control /dust suppression measure, noise attenuation measures, measures taken in watercourse impacts mitigation in wetlands/ponds/rivers, measures taken to minimize borrow and dredging site impacts, measures taken for disposal of construction debris and other waste materials, mitigation measures taken for servicing and operating equipment impact, measures taken for controlling of petroleum products are being taken effectively and accordingly in all of the WPs.

5. The environmental specialists of the PIC have been monitoring the environmental aspects using Environmental Monitoring Checklist of all project activities. Environmental field sampling and analysis have been done in compliance with specific scope of works as defined in the respective Contract Packages and prevailing field condition.

6. After the project's resumes several guidelines regarding COVID-19 from Director General of Health-Bangladesh and from World Health Organization have been adopted and followed as directed by ADB. Workers and Engineers are supplied with set of PPEs, hand sanitizer, masks, goggles etc. which are adequate and of good qualities. Disinfectant spray arrangements provided at some work places and in the vehicles and also disinfectant tunnel has been installed at the important camp`s entry. Hand washing system with no touch also have been facilitated. Arrangement of quarantine room also has been ensured before resuming the project works. Awareness guidelines have been circulated to all.

The program was scheduled as physical training at site. A short training programme was held physicaly on 03, 04, 05 April 2021 at individual WPs' and each WPs' 9/10 persons joined the program included by Residential Engineers (RE), Project Manager (PM-Contractor), Environmental Management officer (EMO), Safety personals, Paramedics, Nurse and others.

Environmental Compliance Monitoring

7. Monitoring works focus on inspection of contractor's work areas, their waste disposal sites, their rehabilitation/re-vegetation, proper landscaping, re-establishment of local access, debris clearance from construction sites, culverts as well as the Engineers Office, etc. RHD is being conducted the air, water and noise quality monitoring program during construction period to implement proper noise and air quality attenuation measures.

Water Quality Monitoring

8. Surface water quality monitoring had been performed during reporting period. There is a possibility to pollute the surface water during the construction period from housekeeping garbage, construction debris discharged by the workers, spillage of fuel and other chemicals from construction equipment. The quality of surface water tested and analyzed, and result of the parameters found within acceptable limit.

9. Groundwater contamination occurs when gasoline, oil, lubricants, petroleum products and chemicals get into the groundwater and cause it to become unsafe and unfit for human use. The quality of groundwater is being tested and analyzed in the project area quarterly basis by Contractors JV. The result of the parameters of ground water found within the standard limit.

Air Quality Monitoring

10. Ambient air samples were collected from the different PACKAGE areas of the project road between Elenga and Rangpur. The ambient status of major air pollutants viz. Particulate Matter (PM10 and PM2.5), Sulfur Dioxide (SO2), Oxides of Nitrogen (NOx), and Carbon Monoxide (CO) have been assessed by monitoring air quality. Most of the parameters of air quality are found within the acceptable limits specified by the DoE, and take proper initiative like regular water spray, cover the air pollutants construction materials ect; to maintain air quality within the standard level of DoE.

Noise Level Monitoring

11. Ambient noise levels have been monitored from PACKAGEs of the SASEC-2 project. Project related key noise sources are bus traffic, generators, vehicles, construction equipment and people. Sometimes noise level found little bit more than EMP and DoE standard. Noise attenuation measure is suggested for mitigation.

Results of Environmental Monitoring and Compliance Measures

12. The monitoring results revealed that there are a number of working sites where some mitigation action needs to be taken by the contractor to meet up full compliance with the EMP. In respect to location, work type and status of compliance contractor should mention the environmental issues and mention their mitigation measures taken in upcoming reports.

Conclusions

13. Elenga-Hatikamrul-Rangpur Highway project generate a number of environmental impacts, such as those associated with the embankment construction, the river crossings or workers poor campsite housekeeping by the contractor. The EMP provides the specific guidelines which RHD has put in place to prevent or mitigate these effects. RHD is committed to implement these measures have fully endorsed into the EIA which is the basis for the EMP. RHD will ensure that the work is carried out in an environmentally acceptable manner and the monitoring and reporting are completed in a compliant and timely fashion, acceptable to DoE and ADB

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BDT	Bangladesh Taka
BOQ	Bill of Quantities
DOE	Department of Environment
DPP	Development Project Proforma /Proposal
EA	Executing Agency
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificate
ECR	Environmental Conservation Rules
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
GOB	Government of Bangladesh
GRC	Grievances Redress Committee
IECs	Important Environmental Components
IEE	Initial Environmental Examination
INGO	Implementation Non-Government Organization
IPC	Interim Payment Certificate
PIU	Project Implementation Unit
PIC	Project Implementation Consultants
PVD	Prefabricated Vertical Drain
RHD	Roads and Highways Department
RoW	Right-of-Way
ROU	Road Operation Unit
RRTC	Road Research and Training Centre
SASEC	South Asian Sub-regional Economic Cooperation
SASEC-2	Elenga- Rangpur Double Line Project

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CHAPTER 1: INTRODUCTION

1. INTRODUCTION

1.1. Background

14. The Project is divided into eight work packages (WP5 to WP12), one Hatikamrul Intersection package (WP13), One Road Research Training Center (RRTC), Package WP14 and one Road Operation Unit (ROU), Package (WP15).

15. The Project Implementation Consultants (PIC) under the Korea Consultants International Co., Ltd., Korea as consortium is undertaking construction and environmental supervision and monitoring works. Environmental compliance of the Contractor's civil works is being monitored by the Environmental Specialists with field coordination with Resident Engineers and Road safety Engineers of the PIC. Improvement of 190.4 Kilometers of Elenga-Hatikamrul-Rangpur Project Road under the South Asian Sub-Regional Economic Cooperation (SASEC) Road Connectivity Project-2 is being financed by the Asian Development Bank, ADB Loan 3592/3593/3883-BAN. The improvement of this project road to a 4 Lane Highway has been designed under the framework of Regional Cooperation and Integration Project (RCIP) to develop Trans- Asian Highway (TAH) connectivity with South Asian and many Asian countries. This project was approved by the ECNEC on September 6, 2016 and the implementation period was determined from September 2016 – August 2021 and extension up to June 2024.

16. Within the period of Contract, each Contractor is obligated to perform the necessary measures to mitigate environmental issues as part of his CEMP implementation activities. The contractors have been executing all civil works including EMP as per specification and as per terms of conditions of the Contract of SASEC Road Connectivity Project-II:

17. Contractors have been executing the Environmental Monitoring Plan of the Technical Specification in the Tender Document Volume 3 of 5. The periodic measurements of water quality, noise and air quality are being carried out at all Work Packages. The results and analysis of these tests have been submitted regularly to the Engineer in accordance with agreed schedule.

18. Contract was signed with Project Implementation Consultants (PIC), Korea Consultants International Co., Ltd. (South Korea), in joint venture with Chodai Co. Ltd. (Japan), H.P. Gauff Ingenieure GmbH & Co. KG-JBG (Germany), Lea Associates South Asia Private Limited (India), SOOSUNG ENGINEERING CO. LTD. (South Korea), in association with BCL Associates Limited (Bangladesh), BETS Consulting Services Ltd. (Bangladesh), Development Technical Consultants Pvt Ltd. (Bangladesh), Philkoei International, Inc. (Philippines) on 25 October 2018. The PIC had mobilized in January 2019. The project comprises eight road improvement packages and one interchange construction package.

19. Construction works of SASEC-2 Road Connectivity Project is under implementation since the commencement of all Contractor's field activities under Eight Work Packages (WPs) have been started. So, the environmental monitoring activities have been started with full swing.

The Road Master Plan (RMP) of Bangladesh Government has identified many feasible and priority projects. One of priority roads identified is the Elenga-Hatikamrul-Rangpur (HER) Highway. This road is a vital link in the national highway network and forms a part of the Asian Highway Network complementing the government plans to increase trade with neighboring countries.

20. Under the project, a team of consultants has mobilized on 27 January 2019 and started working as Project Implementation Consultants (PIC) to provide professional and expert support in design review of project roads, construction supervision, and design of Hatikamrul Interchange, establishment of Road Operation Unit (ROU) and Road Research and Training Centre (RRTC).

21. The outbreak of coronavirus disease-2019 (COVID-19) first emerged at the end of December 2019 and declared as an international public health emergency in a couple of weeks by the World Health Organization (WHO, 2020a). Although the intermediate source of origin and transfer to humans is not clearly known, the rapid human to human transmission capability of this virus has been established.

22. Older people along with other underlying medical conditions are at a high risk of mortality. Till date, there has not been any significant breakthrough in the development of an effective medicine or a vaccine for this disease. National and international authorities and experts suggest the use of non-pharmaceutical measures like wearing face masks and hand gloves, washing hands with soap, frequent use of antiseptic solution and maintaining social distance. All the public transport services (e.g., bus, truck, train, aero planes etc.) were suspended, with exceptions of the transportation of essential goods and emergency services Overall, the pandemic has caused huge socio-economic disruption, which directly or indirectly affected the environment like improvement of air and water quality, reduction of noise and restoration of ecology.

23. Moreover, the increased use of personal protective equipment (PPE) (e.g., face mask, hand gloves, gowns, goggles, face shield etc.), and their haphazard disposal creates environmental burden. In these circumstances, this study intended to explore the positive and negative environmental consequences of the COVID-19 pandemic and propose possible strategies as future guideline for environmental sustainability.

1.2 Project Objectives

24. The Elenga-Hatikamrul-Rangpur Highway is an important part of SASEC Corridor, Asian Highway, BIMSTEC Corridor & SAARC Highway Figure 1. The existing 2-lane highway is inadequate for carrying passengers and goods between Dhaka and 16 northern districts of Bangladesh. Increasing the capacity of this highway is crucial for sustainable development of the country. The road is two lanes with no shoulders and no provision for slow moving vehicular traffic (SMVT) or non-motorized traffic (NMT). There are capacity constraints caused by congested junctions, markets, and community areas. Presence of several unsafe sharp bends and movement of slow- moving traffic (like rickshaw, rickshaw-van, ‘Koriman’, ‘Nosiman’, etc.) on the same lanes with heavy vehicles make the existing undivided 2-lane highway prone to risk of frequent road.

1.3 Purpose of the Report and Rationale

25. The Environmental Monitoring Report covers the period from January to June 2022, in compliance with the environmental scope of the construction supervision. The upgrading of the project road has its associated environmental impacts that require due consideration in project design for its mitigation and management, based on detailed Environmental Impact Assessment (EIA) which was carried out for the Elenga-Hatikamrul and Hatikamrul- Rangpur Road section to determine the likely significant environmental changes due to the project’s associated activities and formulated mitigation measures in the Environmental Management Plan (EMP) to avoid, minimize, or compensate the identified adverse impacts during implementation phases of the project.

26. The main purpose of this environmental monitoring is to ensure the implementation of environmental mitigation measures of the EMP during the construction and maintenance phases according to the Technical Specifications of the Bidding Documents of all Work Packages. Also, to comply the full requirement of the Environmental Clearance Certificate (ECC) approved by the Department of Environment and ADB’s Safeguard Policy Statement, 2009 for timely completion of the project as environmentally sound and sustainable.

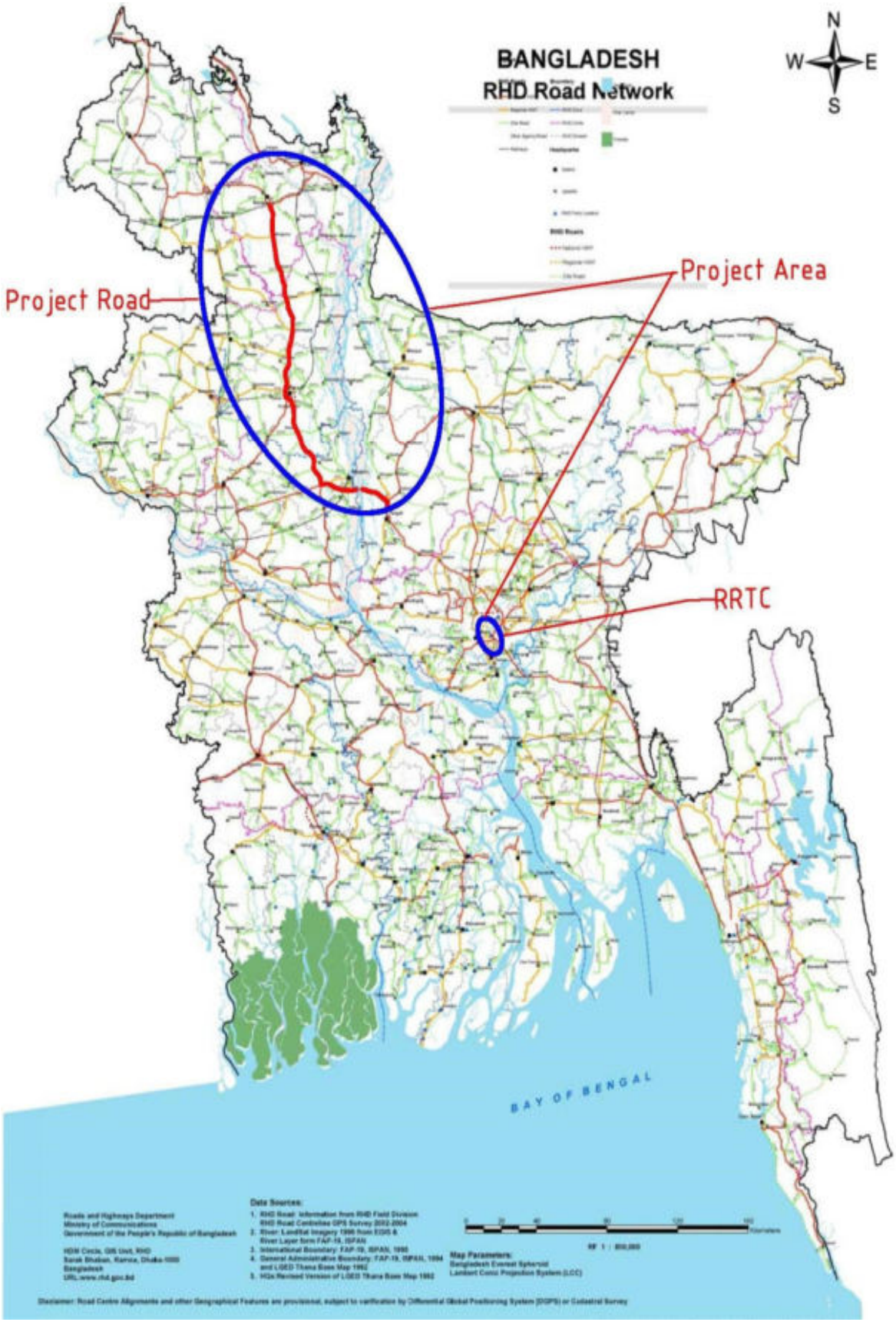

Figure 1.1: Elenga- Hatikamrul-Rangpur Project Road.

1.4 Environmental Category as per ADB Safeguard Policy Statement, 2009 and DOE

28. This project was classified as environment Category B according to the ADB Safeguard Policy Statement (SPS) 2009 as there are no environmentally sensitive sites within the project area and the project includes improvement of road from 2- lanes to 4- lanes alongside an already existing road with limited impact to the existing environment. Hence an Initial Environmental Examination (IEE) has been prepared.

29. In accordance with the requirements of the Department of Environment (DoE), Ministry of Environment and Forests, Government of Bangladesh the project is classified as red category and requires a full EIA. The 69 types of projects listed a red category in the Environmental Conservation Rules 1997 includes engineering works where the capital investment is more than 1 million BDT and construction of Bridges longer than 100 m. The project investment is more than 1 million taka and includes Bridges longer than 100 m, and hence is red category project. So, the EIA study has been conducted.

30. As part of the requirements as per the GOB guidelines, the EIA document was produced for the project, which served as the guidelines for the environmental management and monitoring during construction period. Technically, the EIA provides guidance to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project implementation, as well as provides a detailed description of the direct and indirect environmental effects during conducting of the construction.

31. Due to existing road with settlement, the area near the project road has limited flora and much of the trees and vegetation on slopes and ROW has been depleted as the trees were cut down and used as fuel. The fauna along the project road is rather low, aside from the commonly existing species in the country and no important, rare, endangered, or protected bird species or habitats are found within the Project Corridor and according to EIA.

1.5 ECC Renewal Status from DOE for this year 2022

33. RHD applied for second time renewal of Environmental Clearance Certificate (ECC) to DOE for the year 2022-2023 with necessary document, renewal fee and compliance monitoring report accordingly and had obtained the renewal. Its validity will remain for one year that is up to 13 February 2023. As per the rules of Bangladesh, the clearance certificate needs to be renewed for every year. Accordingly for further renewal of ECC for remaining project periods will be processed with submission of necessary renewal fee and compliance report in the first week of February of every year.

34. During the monitoring period, the team observed some construction activities are in progress such as embankment, road and culvert construction etc. Pilling activities of bridges and culverts have been initiated. The embankment alignment of road is also on pursuits that involve soil and sand filling (second layer) along the designated road length.

CHAPTER 2: SUMMARY OF PROJECT DESCRIPTION

2.1 Locations of the SASESC-2 Project Road

35. The EHR road passes through Tangail, Sirajganj, Bogura, Gaibandha and Rangpur Districts. The Elenga-Hatikamrul road located north of Tangail District and starts at Elenga Junction (N 24°20'22" and E 89°55'28") near the intersection of N4 and N405 and ends at 200m apart from Modern More of Rangpur city. The beginning of this road joins the N4 and then follows the N405 at end of SASEC-I. At Chainage 83+081 the Bangabandhu Bridge started and at west side of this Bridge Chainage is 90+700 of the project roads. The road passes Hatikamrul (24°25'8.97"N and 89°33'6.97"E) of Sirajganj district and then passes up to Rangpur district and Figure 2 and Figure 3 shows the project location. The road is a standard two-lane highway (two 3.65m lanes, paved shoulders each 1.5m and verges each 1.0m). The road condition is varying in different section. Pavement crack is one the main problem for this road. There are several sub-standard horizontal curves. Road passes through Bogura town and several Upzila towns, market and developed areas like: Elenga, Koddar moor, Hatikamrul, Sherpur, Mokamtola, Gobindoganj, Polashbari, Pirgonj, Mithapukur, etc. The Length of the road is 190.4km and the average width of the carriageway is 7.3m.

Figure 2.1 Project Road from Elenga to Hatikamrul

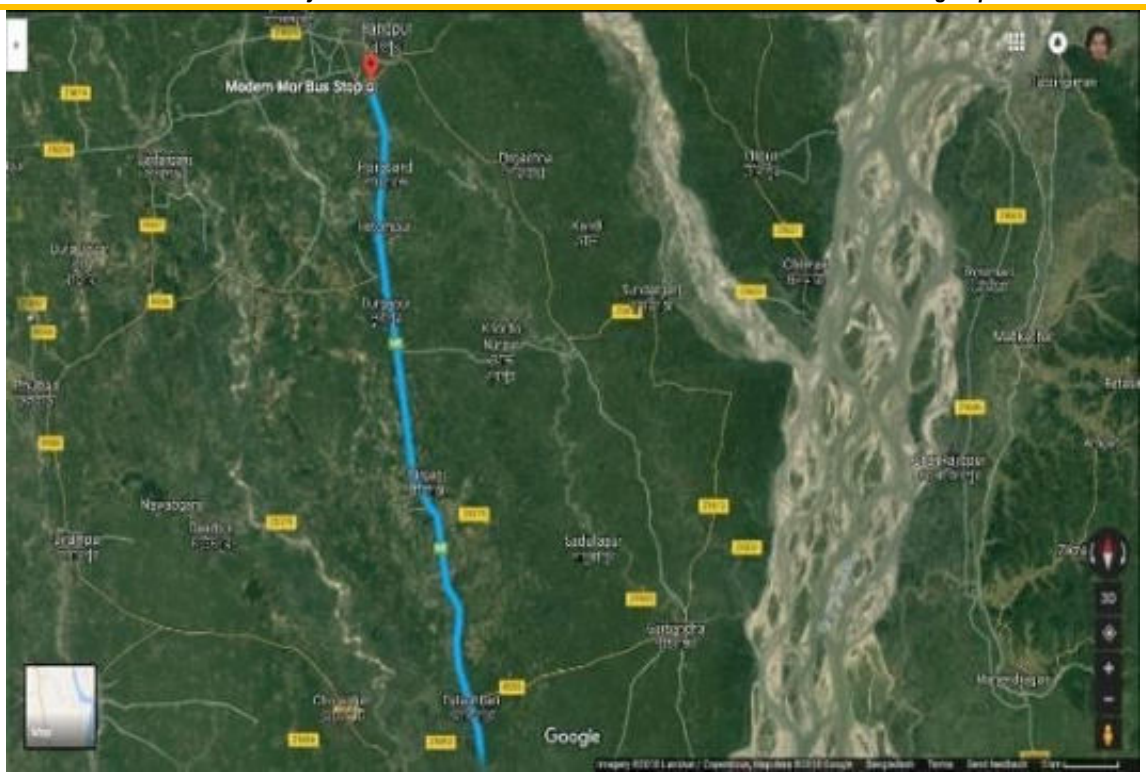

Figure 2.2 Project Road ends at Modern Bus Stop in Rangpur District

2.2 The Overall Project Particulars with Location and Length

The SASEC road connectivity project-2 has divided into 9 PACKAGEs which are expressed in the following Table 2.1.

Table 2.1: List of Work Packages of Project

Work Packages	Road Sections (Location)	Length (km)
WP-05	Elenga to East Side of Bangabandhu Bridge	13.6
WP-06:	West Side of Bangabandhu Bridge to Hatikamrul	19.8
WP-07:	Hatikamrul to Mirzapur	28.3
WP-08:	Mirzapur to Banani (Bogura)	22.5
WP-09:	Banani (Bogura) to Mokamtala	25.3
WP-10:	Mokamtala to Polashbari	29.9
WP-11:	Polashbari to Borodargah Bus Stand	27.2
WP-12:	Borodargah Bus Stand to Rangpur	23.8
WP-13:	Hatikamrul Interchange (1500 m) including ROU	1.50

1.2 Overall Project Components and Design

36. Project comprises eight road improvement packages and one interchange construction package. The scope of works includes detailed design, earthworks, pavement construction, construction of new Bridges and rehabilitation of old Bridges, drainage, structures, link/roadside improvements, and installation of road furniture such as signs and safety barriers. A total of 26 Bridges and 161 culverts will be rehabilitated and/or reconstructed. In addition, construction of three flyovers, 39 underpass, 68 bus bays, pedestrian overpass etc. will be constructed under eight PACKAGE and Hatikamrul Intersection. The components of the project and design of the project are presented in **Table 2.2.**

Table 2.2 Project Components and Description of Design Plan of Project Road

Project	Description of Design
Main Carriageway	190.4 kilometres of existing 2-lane undivided road will be upgraded to
SMVT	Separate lanes will be provided on both sides for Slow Moving
Interchange	One (1500 meters) at Hatikamrul
Flyovers	Three (3) flyovers, total 2635 meters • Elenga: 1538.61 meters • Kodda Moor: 395.64 meters • Gobindoganj: 700.75 meters
Railway Overpass:	1 No, 411 meters
Bridge:	26 nos. total 1461.39 meters
Culvert:	161 nos. total 1102 meters
Underpass:	39 nos.
Foot Over Bridge:	11 nos. total 397 meters
Land Acquisition	198.94 hectares
ROU	Road Operation Unit (ROU) for axle load control, road incident response and other road operational activities on the corridor.
RRTC	A Road Research and Training Center (RRTC) for Roads and Highways Department.

Table 2.3 Description of subprojects (package-wise) and status of implementation

Package Number	Components / List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/ Completed/O&M)	Contract Status (specify if under bidding or contract awarded)	Status of Environmental Approval (provide specific response from list below)	SEMP prepared and Approved by PD (Y/N)	If On-going Construction	
						% Physical Progress (January-June.) 2022	Expected Completion Date
WP-5	Bridge-8 Culvert-10 SMVT-2 Fly Over-1	a	Awarded	a, d & e (on 16 January, 2021)	a, d & e (on 19 December, 2021)	0.02	2024
WP-6	Bridge-7 Culvert-17 Under pass-1 SMVT-2 Fly Over-2	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	54.17	2024
WP-7	Bridge-7 Culvert-32 Under pass-1 SMVT-7	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	35.625	2024
WP-8	Bridge-1 Culvert-8 Under pass-2 SMVT-5	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	36.117	2024
WP-9	Bridge-2 Culvert-20 Under pass-3 SMVT-6 Fly Over-2	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	53.77	2024
WP-10	Bridge-5 Culvert-27 Under pass-1	Detailed Design and Constructions are on-going simultaneously	Awarded	a, b, c, d, e	Yes	64.52	2024

Package Number	Components / List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/ Completed/O&M)	Contract Status (specify if under bidding or contract awarded)	Status of Environmental Approval (provide specific response from list below)	SEMP prepared and Approved by PD (Y/N)	If On-going Construction	
						% Physical Progress (January-June.) 2022	Expected Completion Date
	SMVT-7 Fly Over-1						
WP-11	Culvert-30 Under pass-2 SMVT-5 Fly Over-1	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	75.03	2024
WP-12	Bridge-2 Culvert-17 Under pass-1 SMVT-5	Detailed Design and Constructions are on-going simultaneously	Awarded	a, d & e (on 16 January, 2021)	Yes	68.51	2024
WP-13	Interchange	a	Awarded	a, d & e (on 16 January, 2021)	No	Not started	2024
WP-14	Buildings	a	Awarded	A (on 31 August, 2021)	Yes	1.47	2024

a. Not yet due (detailed design not yet completed)
b. IEE/EIA report prepared and shared with ADB for comments.
c. IEE submitted to DOE for clearance.
d. Environmental clearance renewal had been obtained on 12 October 2020 and valid 13 February 2021
e. Submitted to ADB (Provide Date of Submission) (Submitted with the SEMR Jan-June. 2022)

CHAPTER 3: Project's Environmental Safeguards

3.1 Institutional Arrangement

37. The Environmental Management Plan (EMP) implementation requires an organization support structure in the form of organizational requirements, training needs and plan, and information management system. However, an organizational structure shall be developed at the corporate, regional and site level to aid effective implementation of the EMP document. Various departments will be involved during implementation of the project. Contractor is responsible for implementation of EMP during works and Construction Supervision Consultant (CSC) is primarily responsible for supervision of monitoring of the implementation of the EMP. RHD will be supported by a Management Consultant (MC) to advise and assist RHD in quality and capacity enhancement and independent quality monitoring. Contractor will be responsible for implementation of EMP during work activities stage. Relevant departments responsible for implementation and supervision of proposed mitigation and monitoring measures are given in the EMP.

3.2 Project Safeguard Team

- The engineer has addressed all safeguard issues and recognizing the technical capacity of the contractor through preparing and delivering workshop on EMP implementation, field monitoring and reporting, including templates of all required tables and reports.
- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as appendix all supporting documents including signed monthly environmental site inspection reports prepared by consultants and/or contractors.
- Substantiate compliance and non-compliance statements with relevant photographs.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

Table 3.1 Project Safeguards Team Composition under Roads and Highways Department

Name	Designation/Office	Email Address	Contact Number
PIU	RHD		
Dr. Md. Waliur Rahman	Project Director	waliur.rahman.rhd@gmail.com	01891973956
Joy Prakash Chowdhury	Deputy Project Director	dpd.sasec2.rhd@gmail.com	01799985248
Md. Mahbubur Rahman	Project Manager-3	mmr_buet@yahoo.com	01716279922
PIC			
SEOL Jeong Ho	Team Leader	jhseol92@gmail.com	01882528311
Md. Gias Uddin	Deputy Team Leader	dtl.sasec2.pic@gmail.com	01715032707
Syed Nazmul Husain	Environment Specialist	nazmulhusain6@gmail.com	01711131242
Md. Sirajul Karim Talukder	Road Safety Engineer-1	sirajulktalukdewr@gmail.com	01715331418
Md. Mustafizur Rahman	Road Safety Engineer-2	mustafizbakul@yahoo.com	01717478580
Contractor			
Engr. Md. Nazrul Islam Khan	Project Manager/ **WP5**	nazrul1957@gmail.com	01730066948
	Environment Officer		On process
	Safety Officer		On process
Akhlas Uddin	Project Manager/ **WP6**	mahl.saseccwp06@gmail.com	01917063532
Md. Khalid Hossain	Environment Officer	mkhs46@gmail.com	01716248100
Mozaffar Rahman	Safety Officer	mozaffarrahman1983@gmail.com	01708642272
Engr. SM Nazmul	Project Manager/ **WP7**	smnazmul99@yahoo.com	01711325619
Md. Abdur Rahman	Environment Officer	abdur.rahman@eqms.com.bd	01764692447
Gias Uddin Khandakar	Safety Officer	N/A	N/A
Engr. Shamsuzzoha	Project Manager/ **WP8**	engr.szoha@gmail.com	01712021752
Ashis Dhar	Environment Officer		01726965036
Shafiul Shajahan	Safety Officer	shafiulsaju1988@gmail.com	01721882084
Dewan Emran Ahmed	Project Manager/ **WP9**	deahmed@yahoo.com	01787697586
Shihabuddin Ahmed	Environment Officer	shihabuddin.ahmed@eqms.com.bd	01717014387
Hannan Khan	Safety Officer	hannan.123khan123@gmail.com	01715895643

Name	Designation/Office	Email Address	Contact Number
Mr. Zhang Zhong Wei	Project Manager/ **WP10**	wp10pm.sasec2.cscec7@gmail.com	01838360071
Md. Faisal Bin Mahmud	Environment Officer	aecl.lab1@gmail.com	01733376603
Md. Shahidul Islam	Safety Officer	N/A	01319915516
Zhang Youinjin	Project Manager/ **WP11**	cscecwp11@gmail.com	01306767168
Atiar Rahman (HSE)	Environment Officer	atiar500@gmail.com	01744518098
Atiar Rahman (HSE)	Safety Officer	atiar500@gmail.com	01744518098
Mr. Dong Yanliang	Project Manager/ **WP12**	sesec2wp12@163.com	01824727778
Mr. Peng Zelin	Environment Officer	N/A	N/A
Shakhawat Hossain	Safety Officer	shakhawathossain527@gmail.com	01736485020
Mr. Dong	Project Manager/ **WP13**	cscec7wp12@gmail.com	01824727778
	Environment Officer		On process
	Safety Officer		On process
Md. Sanwar Hossain	Project Manager/ **WP14**	sanwar@ndebd.com.bd	01709658870
	Environment Officer		On process
	Safety Officer		On process

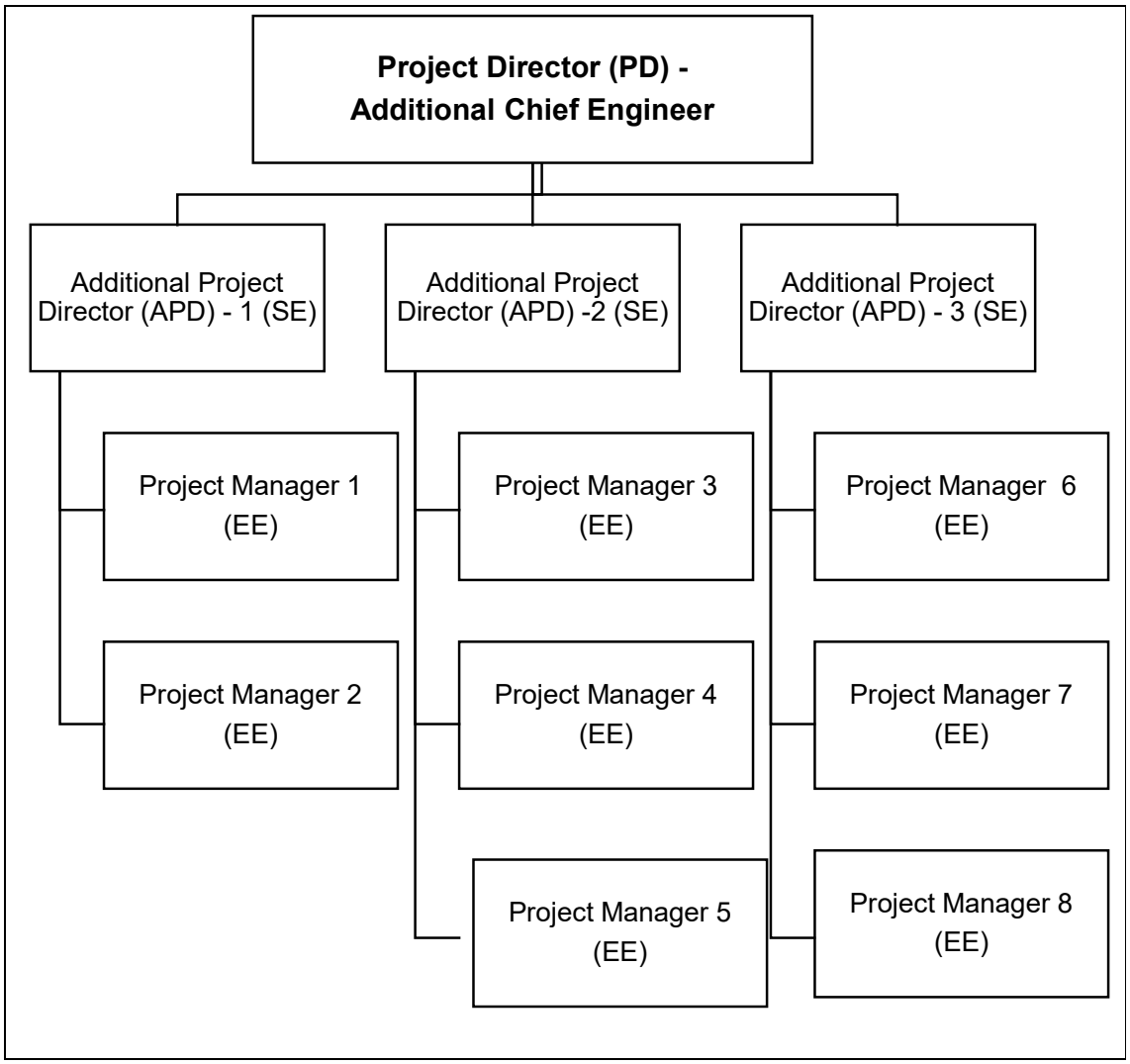

Figure 3.1 Organizational Chart of Project Implementation Unit of SASEC-2

CHAPTER 4: Environmental Compliance Requirements

4.1 Compliance with National Environmental Laws

Progress achieved during January-June 2021 is presented in the tabular form **(Table 4.1)** below:

Table 4.0-1 Compliance Status with National/ Statutory Environmental Requirements

Package No.	Statutory Environmental Requirements	Status of Compliance	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish
All Packages	Yearly Renewal of ECC	Compliant, obtained and submitted	13 February 2022	Action required in first week of February for the next renewal	Forest Clearance/ Tree-cutting permit taken provided that, 3 trees should be planted for every tree cut.

Table 4.0-2 Cumulative Physical Activities Progress for each Package up to June 2022.

WPs	WP-05	WP-06	WP-07	WP-08	WP-09	WP-10	WP-11	WP-12	WP-15
Targeted (%)	3.03	56.90	100	100	100	100	100	100	2.62
Achieved (%)	0.02	54.17	35.625	36.117	53.77	64.52	75.03	68.51	1.47
Ach.-Tar. (%)	-3.01	-2.73	-64.375	-63.883	-46.22	-35.48	-24.97	-31.49	-1.15

4.2 Compliance with Loan Covenants

The following table shows the project specific covenants as displayed in loan agreements.

Table 4.0-3 Compliance Status with Environmental Loan Covenants

No. (List schedule and paragraph number of Loan Agreement)	Loan Covenant Items	Status of Compliance	Action Required
ADB Loan Project Loan; Project No.: 3592/3593/3883-BAN). The loan had been effected from 3 January 2018, L-3592/3593/3883-BAN.	1. Project screening and categorization 2. Environmental assessment 3. Alternative examination 4. Environmental management plan 5. Consultation and grievance redress mechanism 6. Information disclosure 7. Monitoring and reporting 8. Biodiversity protection and natural resources management 9. Pollution prevention and abatement 10. Occupational and community health and safety 11. Physical cultural resources	1. Compliant 2. Compliant 3. Compliant 4. Partially compliant 5. Compliant 6. Compliant 7. Compliant 8. Compliant 9. Compliant 10. Compliant 11. Compliant	CEMP has been approved.

Table 4.0-4 Compliance Status with Environmental Loan Covenants in WP

No. (List schedule and paragraph number of Loan Agreement)	**Loan Covenant Items**	**Status of Compliance for all WP**	**Action Required** WP-06	**Action Required** WP-07	**Action Required** WP-08	**Action Required** WP-09	**Action Required** WP-10	**Action Required** WP-11	**Action Required** WP-12
ADB Loan Project Loan; Project No.: 3592/3593/3883-BAN). The loan had been effected from 3 January 2018, L-3592/3593/3883-BAN.	1. Project screening and categorization 2. Environmental assessment 3. Alternative examination 4. Environmental management plan 5. Consultation and grievance redress mechanism 6. Information disclosure 7. Monitoring and reporting 8. Biodiversity protection and natural resources management 9. Pollution prevention and abatement 10. Occupational and community health and safety 11. Physical cultural resources	1. Compliant 2. Compliant 3. Compliant 4.Partially compliant 5. Compliant 6. Compliant 7. Compliant 8. Compliant 9. Compliant 10. Compliant 11. Compliant	CEMP has been approved.	CEMP has been approved	CEMP has been approved	CEMP has been approved	CEMP has been approved	CEMP has been approved	CEMP has been approved

4.3 Compliance with ADB SPS 2009

38. For loan implementation work, the ADB's active participation is noticed and periodic discussion with RHD about the need for the Contractor to comply (based on the Engineer's input) is performed as the EMP actions need to be effective. This action reinforced the seriousness of safeguard implementation with both the Contractor and RHD, while underscoring the value of the Engineer's oversight.

4.4 Compliance with Terms and Reference of the ECC

39. For the Overall Environmental Safeguards Compliance with the ECC has been given below:

1) Contractor

The environmental awareness creation, particularly regarding the direct construction impacts and especially for health, pollution and safety issues are compliant.

2) Roads and Highway

RHD had recognized the need and have improved its safeguards technical capacity and so to that end in planning established an Environmental and Social Safeguards Unit within the agency.

3) Project Implementation Consultants (Engineer)

The engineer has addressed all safeguard issues and recognizing the technical capacity of the contractor through preparing and delivering workshop on EMP implementation, field monitoring and reporting, including templates of all required tables and reports.

5) Engineer's Environmental Specialist on the Job while the Contractor was mobilizing.

Having the Engineer's (PIC) designated environmental specialist on the job when the Contractor mobilized was found satisfactory to set the tone and significance of environmental safeguards

6) Presentation on safeguard by contractor for all of the ADB missions and involvement of PIC

CHAPTER 5: Status of Implementation of EMP

5.1 Air Pollution and Dust Control

40. Air pollution is usually observed near batching point or mixing plants. However, air quality report suggests that the air pollution is within DOE standards. During the dry season, dust around the project site is being produced due to on-going construction work. To control the dust nuisance during dry weather, the Contractors are spraying water three to four times in a day as per necessity. Dust Suppression is carried out by truck mounted water spray system. Workers involved in dust control have to put on proper PPE during water spray.

5.2 Noise Attenuation Measures

41. Prior to the selection and design of control measures, noise sources were identified and the noise produced was carefully evaluated. The Contractors have employed machineries and heavy earth moving equipment which is mostly latest. New equipment tends to be quieter than the old ones. Earplugs as an integral part of PPE along with other accessories have been provided to the labors and workers accordingly. The use of earplugs is made mandatory during heavy construction activities and its proper use is a part of orientation training also.

5.3 Protection of Topsoil and Soil Erosion

42. Topsoil consists of loam, sandy loam; silt loam, silty clay loam or clay loam is incomparable when it comes to road construction. It is essential to consider how the topsoil is being stored, so it can effectively serve its purpose.

43. During dry season, flow of rivers along the project alignment is relatively low. As a result, running water is not a major cause of any soil erosion along the river banks. However, in the Bridge construction site visible soil erosion is observed due to heavy equipment use and construction works which is not that significant. Sandbags have been deployed near bridge and culvert construction area as a preventive measure.

5.4 Drainage Congestion

44. Highway drainage removes or control surface water and subsurface water away from the road surface and the subgrade supporting it. The continuous presence of water on the road surface weakens the pavement causing pot holes and ruts; similarly, the presence of water in the subgrade reduces its bearing power and load dispersion capacity. As the project is still in its initial phase, drainage system has not been constructed yet. As in additional, in the base camp area temporary drainage system has been made to ensure the wellbeing of the labors and the environment.

5.5 Borrow and Dredging Site Impacts

45. Borrow pits are selected on a basis that it shall be adjacent to the functional area i.e. selection under embankment process. Borrow pits used in construction are approved but outside of ROW. After the subsequent embankment is completed, respected pits are leveled using road rollers.

5.6 Protection of Wetlands/Ponds/Rivers/Canals

46. The project adjacent to river and the pond nearby are under environmental study on a quarterly basis. Water sample is collected and analyzed in the laboratory for the given parameters which are- P^H, DO, EC, BOD, PO_4 and TSS. No anomalies and threat have been found so far. Mitigation measures shall be deployed if such event comes up.

5.7 Liquid Waste

47. Oily water and chemical discharge have been collected and treated separately to an approved quality before discharge. All drains and other liquids discharged from the project site should meet the quality standards specified in GOB Environment Conservation Rule (1997).

5.8 Control of Petroleum Products

48. Petroleum products used in the site are stored in the respected tanker in the base camp. While fueling a vehicle or transferring to different medium, polybags are used to prevent spillage of oily substance on the ground. However, if somehow spillage occurs, shovels are used to separate that soil amount and transfer to the designated waste disposal area in the base camp for further disposal in the dumping yard. Air pollution has not been reported yet according to air quality tests so far.

5.9 Disposal of Construction Debris & Other Waste Materials

49. Construction wastes are generated from construction works and workers activities (kitchen waste, paper waste) at the project site. Contractor is erecting all kinds of relevant signs regarding waste minimization in respective places of the project. Generated solid and domestic waste are being disposed in specific locations. At construction camps, adequate solid waste bins and baskets are placed at proper places. All the wastes are then collected and carried to designated disposal site by waste delivery trucks. All the domestic wastes are further disposed in the waste disposal yard.

5.10: EMP Implementation Monitoring

Table 5.1: Summary of EMP Implementation Monitoring

WP No.	Summary of Environmental Issues Monitored	Environmental Issues Noted for Corrective Actions	Suggested Measures	Timeline to implement CAP	Responsibility(Name & Designation)
WP 6	Air quality, Noise level, Surface water quality's' parameters are within the DOE Standard Analysis of Ground water quality's Fe value found 0.90 and 1.40 mg/l at GW-S1 and GW-S2 respectively are higher than DOE value (0.3-1.0 mg/l).	Surface soil pollution by bituminous Ground water quality	The bituminous drum should be removed from the open space and prevent leaking the drum Take necessary action to minimize the Fe value of water	7950 drums have been removed out of 8250 drums and 300 drums are pending for removal. Take necessary action by September 2022.	WP-06 contractor Contractor's EMO supported by PM WP-06 contractor
WP 7	Noise level, Ground water quality, Surface water quality's' parameters are within the DOE Standard	Lux labyrinth	During construction works at night construction flash light should be installed properly so that high beams do not hampers visibility of road drivers to prevent accidents	During the night time works as and when required Take action measure as early as possible.	Contractor's EMO supported by PM WP-07 contractor
WP 8	Noise level, Ground water quality, Surface water quality's' parameters are within the DOE Standard Surface water quality's' Oil and Grease is more (2.7)	Surface water quality	Control Surface water quality through the maintaining cleaning drainages and proper filtering before discourage the Oil and Grease contaminated water	Take action measure as early as possible.	Contractor's EMO supported by PM WP-08 contractor
WP 9	Analysis of air quality PM2.5 and PM10 was more (65.38.3 and 115.42µg/m3) than DOE (65 and 150 µg/m3).	Air quality	Control air pollution through dust suppression measure	Take action measure as early as possible.	Contractor's EMO supported by PM WP-09 contractor

WP 10	Air quality, Noise level, Ground water quality, Surface water quality's' parameters are within the DOE Standard	Lux labyrinth	During construction works at night construction flash light should be installed properly so that high beams do not hampers visibility of road drivers to prevent accidents	During the nighttime works as and when required.	Contractor's EMO supported by PM
WP 11	Air quality, Noise level, Ground water quality, Surface water quality's' parameters are within the DOE Standard	Lux labyrinth	During construction works at night construction flash light should be installed properly so that high beams do not hampers visibility of road drivers to prevent accidents	During the nighttime works as and when required.	Contractor's EMO supported by PM
WP 12	Air quality, Noise level, Surface water quality's' parameters are within the DOE Standard Analysis of Ground water qualities- Fe value found 1.8 mg/l and 0.8 mg/l which respectively are higher than DOE value (0.3-1.0 mg/l).	Ground water quality	Take necessary action to minimize the Fe value of water and advise the school authority to avoid using the water	Take action measure as early as possible	Contractor's EMO supported by PM WP-12 contractor

CHAPTER 6: Environmental Quality Monitoring

6.1 Approach and Methodology for Environmental Monitoring of the Project

50. Brief description on the means for environmental monitoring of the Project: The environmental components with parameters are analyzed in the lab but some parameters were detected at site through digital instrument such as pH, Temperature, TDS, and DO etc.

- **Frequency of Monitoring**

51. The environmental components with parameters are being monitored quarterly. Environmental management implementation is being performed monthly.

- **Location of monitoring**

52. Locations of monitoring are construction base camp, Asphalt mixing plant, pavement construction sites, labour camp, bridge and culvert construction sites.

➢ Objectives of the Monitoring

1) To characterize and monitor the environmental and health safety quality at project site

2) To obtain an environmental database which can be used to identify any short- and long-term environmental impacts of the project

3) To monitor the performance and effectiveness of proposed environmental management plan and practiced mitigation measures

4) To identify environmental compliance of the project with regulatory requirements, Government and international standards and policies

5) To provide suggestion and additional measures to achieve proposed Construction Environmental Management Plan (CEMP).

6.1.1 Air Quality Monitoring

53. Air pollution is the change in the natural composition of the air we breathe, beyond some defined limits. This change is induced by releasing harmful substances into the atmosphere and it causes damage to our health and environment. Natural sources of air pollution include forest fire, and dust storms. Anthropogenic sources include motor vehicles, industrial production processes, and power generation.

Table 6-0-1: Methodology for monitoring of ambient air quality and equipment used

Parameters	Methods	Also, Equipment used
$PM_{2.5}$	Gravimetric Method	AAS 127 Sampler, Digital Air Sampler
PM_{10}	Gravimetric Method	APM 460 sampler, Digital Air Sampler
SO_2	West Geake Method	APM 460 BL, Digital Gas analyzer
NO_2	Jacobs-Hochheiser Method	APM 460 BL, Digital Gas analyzer
CO	Jacobs-Hochheiser Method	APM 460 BL, Digital Gas analyzer

Figure 6 1: AAS 127 Sampler, Digital Air Sampler machine

6.1.2 Monitoring of Noise Level

54. Noise is an important environmental pollutant. A survey by the U S. Federal Council of Science and Technology has revealed that noise is a technology generated problem and that the overall loudness of environmental noise doubles every ten years in pace with our social and industrial progress. This geometric progression wise growth of noise could be mind-boggling in view of the ever-increasing pace of technological growth. The noise quality of the pre mentioned locations has been measured during working phase. Wind direction was from south to north. According to the Department of Environment (ECR'1997),

the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within allowable limits.

55. Smart Sensor **AR824 Sound Level Meter** testing machine has been used to monitor of ambient noise levels at different locations. Noise level was measured for 1 hour at every location.

Figure: 6 2: Smart Sensor AR824 Sound Level Meter testing machine

6.1.3 Monitoring of Surface Water

56. The surface water quality has been analyzed and found that the project is not posing any detrimental effect to surrounding environment by surface water pollution. From the above analysis result it is found that, all the parameters are within allowable limit.

Table 6-0-2: Methodology for monitoring of surface water quality and equipment used

Sl. No.	Parameter tested	Analysis Procedure/ Tools
01.	Temperature	EC Meter
02.	Electrical Conductivity (EC)	EC Meter
03.	pH	pH Meter
04.	Total Suspended Solid (TSS)	Gravimetric Method
05.	Biochemical Oxygen Demand (BOD)	Winkler's Method
06.	Dissolved Oxygen (DO)	Multimeter
07.	Nitrate	Titration Method
08.	Phosphate	Digestion

6.1.4 Monitoring of Ground Water

57. The Ground Water samples collected from different points as described has been analyzed. Iron content in some location doesn't conform to the given standards. Seasonal variations that affect hydrological/hydrogeological conditions are a critical factor which may affect Fe concentrations. However subsequent studies shall be continued yearlong to clearly understand the reasons behind it.

Table 6-0-3 Methodology for ground water quality test and equipment used

Sl. No.	Parameter	Analysis Procedure/ Tools
01.	Total Coliform (TC)	Membrane Filtration
02.	Iron (Fe)	Spectrophotometer
03.	Arsenic (As)	Spectrophotometer
04.	Manganese (Mn)	Spectrophotometer
05.	Chloride (Cl-)	Titration Method
06.	Hardness ($CaCO_3$)	Titration Method

Monitoring Results Analyzed in Relation to Baseline Data and DoE Requirements

The results are presented as per the tables below.

Table 6.0-4: Results and Analysis of Environmental Quality Monitoring

Contract WP-06: HEGO-Mir Akhter JV. **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water 1							
Arsenic (As)	106+800	Nalka Bridge	24.59°59N89.83°E		0.001	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	106+800	Nalka Bridge	24.59°59N89.83°E	-	54	150-600	Water Quality parameter are below from National Standard level
Electrical Conductivity (EC)	106+800	Nalka Bridge	24.59°59N89.83°E		240	-	Water Quality parameter are below from National Standard level
pH	106+800	Nalka Bridge	24.59°59N89.83°E		7.3	6.5-8.5	Water Quality parameter are within National Standard level
Fecal Coli form (FC)	106+800	Nalka Bridge	24.59°59N89.83°E	-	0	0	Water Quality parameter within the National Standard level
Total Coli form (TC)	106+800	Nalka Bridge	24.59°59N89.83°E	-	0	0	Water Quality parameter within the National Standard level
Iron (Fe)	106+800	Nalka Bridge	24.59°59N89.83°E	-	0.95	0.3-10	Water Quality parameter are below from National Standard level
Manganese	106+800	Nalka Bridge	24.59°59N89.83°E	-	0.02	0.10	Water Quality parameter are above from National Standard level
Surface Water 1							
Temperature	106+800	Nalka Bridge	24.42°59N89.58°E		29	25 -30	Water Quality parameter are above from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
Biochemical Oxygen Demand (BOD)	106+800	Nalka Bridge	24.42°59N89.58°E	-	5.8	6 or less	Water Quality parameter are within the National Standard level
Dissolved Oxygen (DO)	106+800	Nalka Bridge	24.42°59N89.58°E	-	5.5	6	Water Quality parameter are within the National Standard level
Electrical Conductivity (EC)	106+800	Nalka Bridge	24.42°59N89.58°E	-	398	2000	Water Quality parameter are below from National Standard level
pH	106+800	Nalka Bridge	24.42°59N89.58°E	-	7.2	6.5-8.5	Water Quality parameter are within the National Standard level
Nitrate	106+800	Nalka Bridge	24.42°59N89.58°E	-	2.1	10	Water Quality parameter are within the National Standard level
Phosphate	106+800	Nalka Bridge	24.42°59N89.58°E	-	1.4	0	Water Quality parameter are above the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water 2							
Arsenic (As)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	0.002	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	45	150-600	Water Quality parameter are below from National Standard level
Electrical Conductivity (EC)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E		240	-	Water Quality parameter are below from National Standard level
pH	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	7.7	6.5-8.5	Water Quality parameter are within National Standard level
Fecal Coli form (FC)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	0	0	Water Quality parameter within the National Standard level
Total Coli form (TC)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	0	0	Water Quality parameter within the National Standard level
Iron (Fe)	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	0.45	0.3-10	Water Quality parameter are below from National Standard level
Manganese	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	-	0.05	0.10	Water Quality parameter are above from National Standard level
Surface Water 2							
Temperature	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E		28	25 – 30	Water Quality parameter are below from National Standard level
Biochemical Oxygen Demand (BOD)	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	4.5	6 or less	Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
Dissolved Oxygen (DO)	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	6.2	6	Water Quality parameter are within the National Standard level
Electrical Conductivity (EC)	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	436	2000	Water Quality parameter are below from National Standard level
pH	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	6.8	6.5-8.5	Water Quality parameter are within the National Standard level
Nitrate	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	1.5	10	Water Quality parameter are within from National Standard level
Phosphate	106+800	Nalka Bridge (Downstream)	24.59˚N 89.83˚E	-	2.5	0	Water Quality parameter are above the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	24	45.29	65	Ambient air quality is below the National Standard Level
PM10	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	24	104.1	150	Ambient air quality is below the National Standard Level
SPM	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	8	91.2	200	Ambient air quality is below the National Standard Level
SOX	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	24	59.62	365	Ambient air quality is below the National Standard Level
NOX	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	24	35.59	100	Ambient air quality is below the National Standard Level
CO	95+553	Kodda Intersection	24.83˚ N 89.93˚ E	8	<0.56ppm	9 ppm	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	106+800	Nalka Bridge East	24.59˚N 89.83˚E	24	38.11	65	Ambient air quality is below the National Standard Level
PM10	106+800	Nalka Bridge East	24.59˚N 89.83˚E	24	88.87	150	Ambient air quality is below the National Standard Level
SPM	106+800	Nalka Bridge East	24.59˚N 89.83˚E	8	172.2	200	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
SOX	106+800	Nalka Bridge East	24.59˚N 89.83˚E	24	67.66	365	Ambient air quality is below the National Standard Level
NOX	106+800	Nalka Bridge East	24.59˚N 89.83˚E	24	17.07	100	Ambient air quality is below the National Standard Level
CO	106+800	Nalka Bridge East	24.59˚N 89.83˚E	8	<0.67 ppm	9 ppm	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	95+553	Kodda Intersection	24.83˚N 89.93˚E	Don't exit	67.0	Silent Area-50 & Working Zone 75dB	High
Average Noise Level (Day Time)	106+800	Nalka Bridge East	24.59˚N 89.83˚E	Don't exit	54.97	Silent Area-50 & Working Zone 75dB	Noise Level is below the National Standard Level

Contract WP-07: Abdul Monem Ltd. **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water 1							
Arsenic (As)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0.0	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0.04	0.2	Water Quality parameter are below from National Standard level
pH	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	7.4	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0	0	Water Quality parameter within the National Standard level
Total Coliform (TC)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0	0	Water Quality parameter within the National Standard level
Manganese (Mn)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	23+570	Site Office of Construction Camp	24°35'18.84"N 89°27'16.39"E	-	0.01	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water 1							
Temp	21+320	Ghoga River Near Garoy Bazar	24°34'23.21"N 89°28'0.14"E	-	33	-	Water Quality parameter are below from National Standard level
BOD	21+320	Ghoga River Near Garoy Bazar	24°34'23.21"N 89°28'0.14"E	-	2.0	6 or less	Water Quality parameter are below from National Standard level
DO	21+320	Ghoga River Near Garoy Bazar	24°34'23.21"N 89°28'0.14"E	-	6.3	6 or above	Water Quality parameter are within the National Standard level
EC	21+320	Ghoga River Near Garoy Bazar	24°34'23.21"N 89°28'0.14"E	-	117	-	Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
pH	21+320	Ghoga River Near Garoy Bazar	24°34'23.21"N 89°28'0.14"E	-	7.4	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	20+200	Bongshal River	24°34'23.21"N 89°28'0.14"E	-	120	-	Water Quality parameter are below from National Standard level
Ground Water 2							
Arsenic (As)	23+820	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0.0	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	23+820	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0.04	0.2	Water Quality parameter are below from National Standard level
pH	23+820	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	7.2	6.5-8.5	Water Quality parameter within the National Standard level
Fecal Coliform (FC)	23+820	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0	0	Water Quality parameter within the National Standard level
Total Coliform (TC)	23+000	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0	0	Water Quality parameter within the National Standard level
Manganese (Mn)	23+000	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0.01	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	23+000	Staff Residence of Construction Camp	24°35'25.50"N 89°27'12.52"E	-	0.01	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water 2							
Temp	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	34	-	Water Quality parameter are below from National Standard level
BOD	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	2.3	6 or less	Water Quality parameter are below from National Standard level
DO	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	6.4	6 or above	Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result	National Standard	Remarks
EC	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	132	-	Water Quality parameter are below from National Standard level
pH	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	7.2	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	10+970	Bangali River Near Bhuiyagati Bazar	24°30'9.42"N 89°30'30.25"E	-	153	-	Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
$PM_{2.5}$	23+580	Batching Plant of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.86"N 89°27'15.40"E	8	38.1	65	Ambient air quality is below the National Standard Level
PM_{10}	23+580	Batching Plant of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.86"N 89°27'15.40"E	8	95.8	150	Ambient air quality is below the National Standard Level
SO_2	23+580	Batching Plant of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.86"N 89°27'15.40"E	8	39.5	365	Ambient air quality is below the National Standard Level
NO_X	23+580	Batching Plant of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.86"N 89°27'15.40"E	8	43.6	100	Ambient air quality is below the National Standard Level
CO	23+580	Batching Plant of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.86"N 89°27'15.40"E	8	<0.03 ppm	9 ppm	Ambient air quality is below the National Standard Level
Air Quality2							

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
PM2.5	1+091	In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj	24°25'43.78"N 89°32'50.95"E	24	41.4	65	Ambient air quality is below the National Standard Level
PM10	1+091	In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj	24°25'43.78"N 89°32'50.95"E	24	98.5	150	Ambient air quality is below the National Standard Level
SO_2	1+091	In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj	24°25'43.78"N 89°32'50.95"E	24	39.5	365	Ambient air quality is below the National Standard Level
NO_X	1+091	In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj	24°25'43.78"N 89°32'50.95"E	24	43.6	100	Ambient air quality is below the National Standard Level
CO	1+091	In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj	24°25'43.78"N 89°32'50.95"E	8	<0.02 ppm	9 ppm	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	23+560	Mosque of Construction Camp, Chonka, Sherpur, Bogra	24°35'18.35"N 89°27'15.53"E	12 hr	57.2	75	Noise Level is within the National Standard Level
Average Noise Level (Day Time)	19+240	In front of Shohor Ali's House, Betgari, Dhonkundi, Sirajganj	24°34'2.73"N 89°29'9.38"E	12 hr	64.6	75	Noise Level is within the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Average Noise Level (Day Time)	10+050	Bhuiyagati Bus Stand Shahi Jame Mosque, Bhuiyagati, Sirajganj	24°29'40.28"N 89°30'27.94"E	12 hr	64.8	75	Noise Level is within the National Standard Level
Average Noise Level (Day Time)	5+530	Gurkha Adarsha High School, Gurkha, Sirajganj	24°27'47.52"N 89°32'1.06"E	12 hr	64.1	75	Noise Level is within the National Standard Level
Average Noise Level (Day Time)	1+080	Hatikumrul Bazar Mosque, Hatikumrul, Sirajganj	24°25'43.39"N 89°32'51.07"E	12 hr	71.1	75	Noise Level is within the National Standard Level

Contract WP-08: CPC-Tantia JV **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -1							
Arsenic (As)	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0.001	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0.0	150-600	Water Quality parameter are below from National Standard level
Electrical Conductivity (EC)	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	540	-	Water Quality parameter are below from National Standard level
pH	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	6.6	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	35+610	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0	0	Water Quality parameter are below from National Standard level
Surface Water-1							
TOC	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	3.36	-	Water Quality parameter are below from National Standard level
BOD	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	3.4	6 or less	Water Quality parameter are below from National Standard level
DO	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	4.1	6 or above	Water Quality parameter are below from National Standard level
EC	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	118	-	Water Quality parameter are below from National Standard level
pH	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	8.3	6.5-8.5	High
TDS	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	216	-	Water Quality parameter are below from National Standard level
TSS	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	12		Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Total Phosphate (PO_4^{3-})	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	0.4		Water Quality parameter are below from National Standard level
Oil and Grease	48+110	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	2.7		High
Ground Water -2							
Arsenic (As)	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0.01	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0	150-600	Water Quality parameter are below from National Standard level
Electrical Conductivity (EC)	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	540	-	Water Quality parameter are below from National Standard level
pH	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	7.1	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	47+800	Construction Camp	24°06´58.9"N 90°03´57.4"E	-	0	0	Water Quality parameter are below from National Standard level
Surface Water-2							
TSS	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	10	-	Water Quality parameter are below from National Standard level
BOD	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	2.3	6 or less	Water Quality parameter are below from National Standard level
DO	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	5.1	6 or above	Water Quality parameter are below from National Standard level
EC	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	125	-	Water Quality parameter are below from National Standard level
pH	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	7.5	6.5-8.5	Water Quality parameter are below from National Standard level
TDS	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	148	-	Water Quality parameter are below from National Standard level

Total Organic Content (TOC)	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E		3.2	Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	1.1	Water Quality parameter are below from National Standard level
Oil and Grease	39+480	Besides Sherpur-Bogra Highway, Sherpur, Bogra	24°43'39.71"N 89°23'57.54"E	-	<2.7	High

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	35+500	Base camp, Sherpur, Bogra	24°41'9.30"N 89°24'29.35"E	8	38.21	65	Ambient air quality is below the National Standard Level
PM10	35+500	Base camp, Sherpur, Bogra	24°41'9.30"N 89°24'29.35"E	8	96.34	150	Ambient air quality is below the National Standard Level
SO_2	35+500	Base camp, Sherpur, Bogra	24°41'9.30"N 89°24'29.35"E	8	34.42	365	Ambient air quality is below the National Standard Level
NO_X	35+500	Base camp, Sherpur, Bogra	24°41'9.30"N 89°24'29.35"E	8	32.12	100	Ambient air quality is below the National Standard Level
CO	35+500	Base camp, Sherpur, Bogra	24°41'9.30"N 89°24'29.35"E	8	0.12ppm	9 ppm	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	37+380	Besides the Mirzapur to Bogra Highway, Sherpur, Bogra	24°41'31.81"N 89°24'21.74"E	8	39.25	65	Ambient air quality is below the National Standard Level
PM10	37+380	Besides the Mirzapur to Bogra Highway, Sherpur, Bogra	24°41'31.81"N 89°24'21.74"E	8	104.23	150	Ambient air quality is below the National Standard Level
SO_2	37+380	Besides the Mirzapur to Bogra Highway, Sherpur, Bogra	24°41'31.81"N 89°24'21.74"E	8	35.51	365	Ambient air quality is below the National Standard Level
NO_X	37+380	Besides the Mirzapur to Bogra Highway, Sherpur, Bogra	24°41'31.81"N 89°24'21.74"E	8	33.41	100	Ambient air quality is below the National Standard Level
CO	37+380	Besides the Mirzapur to Bogra Highway, Sherpur, Bogra	24°41'31.81"N 89°24'21.74"E	8	0.13 ppm	9 ppm	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	35+500	Base Camp	24°41'8.84"N 89°24'29.34"E	1 hr	55.41	60	Low
Average Noise Level (Day Time)	48+500	Near Fotki Bridge	24°47'45.29"N 89°23'10.37"E	1 hr	65.34	50	High
Average Noise Level (Day Time)	47+606	Sajapur Fotullah Ahmadia Fazil Degree Madrasah	24°47'38.43"N 89°23'11.30"E	1 hr	56.41	50	High
Average Noise Level (Day Time)	42+512	Union Health and Family welfare Centre, Aria, Shajahanpur, Bogra	24°44'33.12"N 89°23'51.60"E	1 hr	64.21	55	High
Average Noise Level (Day Time)	38+401	Garidoho Govt Primary School, Bogra	24°42'5.42"N 89°24'0.90"E	1 hr	54.34	60	Low
Average Noise Level (Day Time)	49+210	Base Camp -2	24°48'26.70"N 89°23'19.90"E	1 hr	53.71	60	Low

Contract WP-09: KMC-MONICO JV **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -1							
Arsenic (As)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	<0.030	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	1.23	150-600	Water Quality parameter are below from National Standard level
pH	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	7.60	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	0.02	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	72+350	Staff Residence of Construction Camp	24°58'59.58"N 89°22'26.26"E	-	0.17	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-1							
TOC	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	3.61	-	Water Quality parameter are below from National Standard level
BOD	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	4.7	6 or less	Water Quality parameter are below from National Standard level
DO	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	6.42	6 or above	Water Quality parameter are below from National Standard level
EC	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	157	-	Water Quality parameter are below from National Standard level
pH	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	6.71	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	43	-	Water Quality parameter are below from National Standard level
TSS	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	5		Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Total Phosphate (PO_4^{3-})	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	0.43		Water Quality parameter are below from National Standard level
Oil and Grease	72+350	Camp side pond, Bogra	24°59'01.36"N 89°22'25.72"E	-	<1.0		High
Ground Water -2							
Arsenic (As)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	<0.010	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	1.37	150-600	Water Quality parameter are below from National Standard level
pH	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	6.25	6.5-8.5	Water Quality parameter are within the National Standard level
Fecal Coliform (FC)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	0.03	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	72+500	Local Village of Project area	24°58'59.58"N 89°22'26.26"E	-	0.05	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-2							
TOC	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	3.36	-	Water Quality parameter are below from National Standard level
BOD	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	3.24	6 or less	Water Quality parameter are below from National Standard level
DO	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	5.76	6 or above	Water Quality parameter are below from National Standard level
EC	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	161	-	Water Quality parameter are below from National Standard level
pH	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	7.42	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	44	-	Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
TSS	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	7		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	0.41		Water Quality parameter are below from National Standard level
Oil and Grease	68+000	Canal of Korotoa River, Near Fotki Bridge	24°47'45.3"N 89°23'10.40"E	-	<1.0		Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	72+350	Construction area, Chandihara, Bogra	24°58'50.92"N 89°22'11.61"E	24	65.38	65	Ambient air quality is the Higher from the National Standard Level
PM10	72+350	Construction area, Chandihara, Bogra	24°58'50.92"N 89°22'11.61"E	24	115.42	150	Ambient air quality is below the National Standard Level
SO_2	72+350	Construction area, Chandihara, Bogra	24°58'50.92"N 89°22'11.61"E	8	4.62	365	Ambient air quality is below the National Standard Level
NO_X	72+350	Construction area, Chandihara, Bogra	24°58'50.92"N 89°22'11.61"E	24	57.95	100	Ambient air quality is below the National Standard Level
CO	72+350	Construction area, Chandihara, Bogra	24°58'50.92"N 89°22'11.61"E	24	0.12 ppm	9 ppm	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	63+850	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'50.88"N 89°21'6.84"E	24	128.53	65	Ambient air quality is the Higher from the National Standard Level
PM10	63+850	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'50.88"N 89°21'6.84"E	24	171.17	150	Ambient air quality is the Higher from the National Standard Level
SO_2	63+850	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'50.88"N	8	4.82	365	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
			89°21'6.84"E				
NO_X	63+850	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'50.88"N 89°21'6.84"E	24	89.58	100	Ambient air quality is below the National Standard Level
CO	63+850	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'50.88"N 89°21'6.84"E	24	0.28 ppm	9 ppm	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	71+300	Chandihara Bazar Jame Mosjid, Chandihara, Bogra	24°58'23.73"N 89°22'2.72"E	1 hr	65.3/62.5	50/40 (Silent)	High
Average Noise Level (Day Time)	72+350	Construction Camp area, Chandihara, Bogra	24°59'1.35"N 89°22'27.21"E	1 hr	57.6/51.3	75/70 (Industrial)	Low
Average Noise Level (Day Time)	63+300	Student Hostel Pundro University, Bogra	24°54'34.73"N 89°21'11.21"E	1 hr	62.1/57.3	55/45 (Residential)	High
Average Noise Level (Day Time)	63+900	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	24°54'53.52"N 89°21'6.62"E	1 hr	66.7/63.4	60/50 (Mixed)	High
Average Noise Level (Day Time)	75+700	Mokamtola Bazar Area, Mokamtola, Bogra	25° 0'48.17"N 89°22'7.35"E	1 hr	65.2/62.1	70/60 (Commercial)	Low
Average Noise Level (Day Time)	63+100	Rofatullah Community Hospital, TMSS, Bogra	24°54'26.75"N 89°21'14.23"E	1 hr	62.7/56.9	60/50 (Mixed)	High

Contract WP-10: China Construction Seventh Engineering Division Corp. Ltd **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -1							
Arsenic (As)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	0.002	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	54.4	150-600	Water Quality parameter are below from National Standard level
pH	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	6.7	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	0.03	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	96+300	Base Camp 1	25°11'38.3552"N 89°23'15.072"E	-	0.14	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-1							
BOD	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	0.19	6 or less	Water Quality parameter are below from National Standard level
DO	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	4.9	6 or above	Water Quality parameter are below from National Standard level
EC	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	166	-	Water Quality parameter are below from National Standard level
pH	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	7.6	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	352	-	Water Quality parameter are below from National Standard level
TSS	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	1.24		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	0.04		Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Oil and Grease	93+800	Nundoho Bridge	25°.192281"N 89°.38928"E	-	2.5		High
Ground Water -2							
Arsenic (As)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	0.002	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	32.7	150-600	Water Quality parameter are below from National Standard level
pH	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	7.2	6.5-8.5	Water Quality parameter are within the National Standard level
Fecal Coliform (FC)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	0.2	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	105+200	Katakhali Bridge	25°173765"N 89°.38834"E	-	0.26	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-2							
BOD	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	2.6	6 or less	Water Quality parameter are below from National Standard level
DO	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	5.1	6 or above	Water Quality parameter are below from National Standard level
EC	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	170	-	Water Quality parameter are below from National Standard level
pH	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	7.1	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	412	-	Water Quality parameter are below from National Standard level
TSS	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	3.83		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	-	0.07		Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Oil and Grease	93+800	Bangali River	25°10'268212.3"N 89°23'22.3440"E	-	1.3		High

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	33.14	65	Ambient air quality is below the National Standard Level
PM10	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	70.25	150	Ambient air quality is below the National Standard Level
SO_2	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	24.13	365	Ambient air quality is below the National Standard Level
NO_X	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	17.25	100	Ambient air quality is below the National Standard Level
CO	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	3.04 ppm	9 ppm	Ambient air quality is below the National Standard Level
SPM	96+300	Base Camp 1	25°11'37.3488"N 89°23'19.2084"E	8	115.22	200	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	31.81	65	Ambient air quality is below the National Standard Level
PM10	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	77.38	150	Ambient air quality is below the National Standard Level
SO_2	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	24.62	365	Ambient air quality is below the National Standard Level
NO_X	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	18.54	100	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
CO	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	2.13 ppm	9 ppm	Ambient air quality is below the National Standard Level
SPM	93+800	Katakhali Bridge	25°173538"N 89°.388645"E	8	114.52	200	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	93+800	Basecamp 1 (Gate)	25°193823"N 89°388678"E	1 hr	64.35	65	Low
Average Noise Level (Day Time)	105+200	Basecamp 1	25°19428"N 89°38835"E	1 hr	62.39	65	Low
Average Noise Level (Day Time)	96+300	Workshop Site	25°194052"N 89°387649"E	1 hr	69.11	65	Low
Average Noise Level (Day T ime)	89+700	Nundoho Bridge	25°192296"N 89°388768"E	1 hr	61.55	65	Low
Average Noise Level (Day Time)	103+750	Katakhali Bridge	25°174003"N 89°388894"E	1 hr	70.83	65	High
Average Noise Level (Day Time)	90+750	Taltola Bridge	25°185428"N 89°388623"E	1 hr	65.11	65	High

Contract WP-11: China Construction Seventh Engineering Division Corp. Ltd **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -1							
Arsenic (As)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	0.016	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	24.2	150-600	Water Quality parameter are below from National Standard level
pH	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	6.5	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	3	0	Water Quality parameter are Higher from National Standard level
Total Coliform (TC)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	2	0	Water Quality parameter are Higher from National Standard level
Manganese (Mn)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	0.03	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	106+000	Base Camp 1	89°.310755"E 25°.425101"N	-	0.04	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-1							
BOD	106+100	Idilpur	89°.33996"E 25°.325514"N	-	0.13	6 or less	Water Quality parameter are below from National Standard level
DO	106+100	Idilpur	89°.33996"E 25°.325514"N	-	6.0	6 or above	Water Quality parameter are below from National Standard level
EC	106+100	Idilpur	89°.33996"E 25°.325514"N	-	118	-	Water Quality parameter are below from National Standard level
pH	106+100	Idilpur	89°.33996"E 25°.325514"N	-	7.3	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	106+100	Idilpur	89°.33996"E 25°.325514"N	-	60	-	Water Quality parameter are below from National Standard level
TSS	106+100	Idilpur	89°.33996"E 25°.325514"N	-	29		Water Quality parameter are below from National Standard level
Manganese (Mn)	106+100	Idilpur	89°.33996"E 25°.325514"N	-	<0.1		Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -2							
Arsenic (As)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	<0.004	0.05	Water Quality parameter are below from National Standard level
Chloride (Cl)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	<60	150-600	Water Quality parameter are below from National Standard level
pH	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	7.16	6.5-8.5	Water Quality parameter are within the National Standard level
Fecal Coliform (FC)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	0.1	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	133+200	Base Camp 2	89°.329816"E 25°.372551"N	-	0.28	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-2							
BOD	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	0.1	6 or less	Water Quality parameter are below from National Standard level
DO	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	6.1	6 or above	Water Quality parameter are below from National Standard level
EC	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	143	-	Water Quality parameter are below from National Standard level
pH	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	7.4	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	91	-	Water Quality parameter are below from National Standard level
TSS	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	6.7		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	2.4		Water Quality parameter are below from National Standard level
Oil and Grease	123+200	Angar Bridge	89°19'38.10E 25°22'52.39"N	-	3.0		Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	58.6	65	Ambient air quality is below the National Standard Level
PM10	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	87	150	Ambient air quality is below the National Standard Level
SO_2	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	26.84	365	Ambient air quality is below the National Standard Level
NO_X	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	38.17	100	Ambient air quality is below the National Standard Level
CO	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	0.3 ppm	9 ppm	Ambient air quality is below the National Standard Level
SPM	106+200	Base Camp 3	89°.334499"E 25°.356756" N	8	163.3	200	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	123+100	Dhaper Hat	89°.342287"E 25°345475"N	24	37.2	65	Ambient air quality is below the National Standard Level
PM10	123+100	Dhaper Hat	89°.342287"E 25°345475"N	24	112	150	Ambient air quality is below the National Standard Level
SO_2	123+100	Dhaper Hat	89°.342287"E 25°345475"N	8	34.15	365	Ambient air quality is below the National Standard Level
NO_X	123+100	Dhaper Hat	89°.342287"E 25°345475"N	8	57.1	100	Ambient air quality is below the National Standard Level
CO	123+100	Dhaper Hat	89°.342287"E 25°345475"N	8	4.4	9 ppm	Ambient air quality is below the National Standard Level
SPM	123+100	Dhaper Hat	89°.342287"E 25°345475"N	8	168.3	200	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	106+000	Base Camp-01	25°24'7.50"N 89°19'39.75"E	1 hr	64.94	60	High
Average Noise Level (Day Time)	110+200	Champa Ganj	25°16'53.81"N 89°21'5.76"E	1 hr	62.12	60	High
Average Noise Level (Day Time)	111+220	Base Camp-02	25°25'09.5"N8 9°18'33.2"E	1 hr	62.60	60	High
Average Noise Level (Day Time)	115+170	Base Camp-03	25°30'18.37"N 89°17'21.01"E	1 hr	51.80	60	Low
Average Noise Level (Day Time)	120+000	Dhaper Hat	89°.342287"E 25°345475"N	1 hr	66.77	60	High
Average Noise Level (Day Time)	132+200	Laldighi Underpass	25°41'42.99"N 89°16'2.58"E	1 hr	60.10	60	High

Contract WP-12: China Construction Seventh Engineering Division Corp. Ltd **Submitted in June 2022**

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
Ground Water -1							
Arsenic (As)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	0.015	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	24.1	150-600	Water Quality parameter are below from National Standard level
pH	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	6.7	6.5-8.5	Water Quality parameter are below from National Standard level
Fecal Coliform (FC)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	0.03	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	133+200	Base Camp1	25” 37' 44.324"N 89”16' 10.99"E	-	0.15	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-1							
BOD	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	0.15	6 or less	Water Quality parameter are below from National Standard level
DO	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	4.7	6 or above	Water Quality parameter are below from National Standard level
EC	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	459	-	Water Quality parameter are below from National Standard level
pH	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	7.0	6.5-8.5	Water Quality parameter are within the National Standard level
TDS	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	394	-	Water Quality parameter are below from National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
TSS	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	8.81		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	0.06		Water Quality parameter are below from National Standard level
Oil and Grease	156+00	Modern More Bridge	25' 42' 29.95"N 89”15’ 43.86"E	-	1.21		High
Ground Water -2							
Arsenic (As)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	0.003	0.05	Water Quality parameter are below from National Standard level
Chlorine (Cl)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	60	150-600	Water Quality parameter are below from National Standard level
pH	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	7.6	6.5-8.5	Water Quality parameter are within the National Standard level
Fecal Coliform (FC)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	0	0	Water Quality parameter are below from National Standard level
Total Coliform (TC)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	0	0	Water Quality parameter are below from National Standard level
Manganese (Mn)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	0.1	0.1	Water Quality parameter are below from National Standard level
Iron (Fe)	157+000	Base Camp 2	25".628631"N 89"26’ 97.55"E	-	0.6	0.3-1.0	Water Quality parameter are below from National Standard level
Surface Water-2							
BOD	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	0.1	6 or less	Water Quality parameter are below from National Standard level
DO	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	4.8	6 or above	Water Quality parameter are below from National Standard level
EC	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	281	-	Water Quality parameter are below from National Standard level
pH	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	7.0	6.5-8.5	Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result	National Standard	Remarks
TDS	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	378	-	Water Quality parameter are below from National Standard level
TSS	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	10.38		Water Quality parameter are below from National Standard level
Total Phosphate (PO_4^{3-})	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	0.08		Water Quality parameter are below from National Standard level
Oil and Grease	133+00	Domdoma Bridge	89°27'40.34E 25°67'98.33"N	-	1.32		Water Quality parameter are within the National Standard level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
Air Quality 1							
PM2.5	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	24	45.14	65	Ambient air quality is below the National Standard Level
PM10	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	24	91.52	150	Ambient air quality is below the National Standard Level
SO_2	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	8	19.60	365	Ambient air quality is below the National Standard Level
NO_X	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	24	23.38	100	Ambient air quality is below the National Standard Level
CO	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	24	4.74 ppm	9 ppm	Ambient air quality is below the National Standard Level
SPM	133+00	Barodargah Bazar	25“42’ 29.25"N 89“15’ 42.77"E	24	139.23	200	Ambient air quality is below the National Standard Level
Air Quality 2							
PM2.5	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	24	15.05	65	Ambient air quality is below the National Standard Level
PM10	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	24	83.3	150	Ambient air quality is below the National Standard Level
SO_2	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	8	8.78	365	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency Of Monitoring	Monitoring Result (µg/m3)	National Standard	Remarks
NO_X	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	24	11.82	100	Ambient air quality is below the National Standard Level
CO	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	24	6 ppm	9 ppm	Ambient air quality is below the National Standard Level
SPM	37+380	Base Camp 1	25“37' 41.06"N 89“16'11.66"E	24	92.89	200	Ambient air quality is below the National Standard Level

Monitoring Parameter	Chainage (Km+m)	Location	GPS Coordinate	Frequency of Monitoring (Day/Night)	Monitoring Result (Noise in dB)	National Standard (Zone)	Remarks
Noise Level							
Average Noise Level (Day Time)	61+921	Barodargah Bazar	25"42' 2799"N89”15' 43.03"E	1 hr	62.91	65	Low
Average Noise Level (Day Time)	67+500	Base amp 1	25"42’ 29.21"N 89'15' 42.29"E	1 hr	63.64	65	Low
Average Noise Level (Day Time)	69+250	Domdoma Bridge	25" 37’ 41.06N" 89”16' 11.67"E	1 hr	67.69	65	High
Average Noise Level (Day Time)	65+750	Modern More Bridge	25"34’13.66"N 89"16’ 30.37"E	1 hr	64.83	65	Low
Average Noise Level (Day Time)	65+750	Outside o Base Camp2	25"37’ 41.06"N 89"16' 11.66"E	1 hr	60.31	65	Low
Average Noise Level (Day Time)	65+750	Base Camp2	25“30’ 39.08"N 89”16’ 56.07"E	1 hr	66.38	65	High

Table 6-5: Safeguard Monitoring Observation Submitted for June 2022

Contract WP-06: HEGO-Mir Akhter JV. **Submitted in June 2022**

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
1.	• Ambient Air Quality	• According to EMP, ambient air quality needs to be checked quarterly • Air quality has been done in June 12, 2022	• Next ambient air quality Monitoring will be held on September 2022.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
2.	• Dust	• During the construction work and materials loading and unloading time mandatory musk usages wasn't followed by the workers. • Dust control activity was observed.	• All relevant areas are suggested to use sprinkler properly following DoE standard to mitigate dust problem. • Musk should be used by the labours during work at construction area.	
3.	Pollution caused by domestic sewage and solid waste	• Kitchen waste was deposited in dustbin. • Waste was seen deposited in dustbins. • Dustbins were not closed during field visit.	• Install sufficient numbers of dustbin. • Dustbin should be closed. • Kitchen waste should be managed properly. • Need to make an MOU with Pauroshava to collect kitchen and other solid waste regularly.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
		• Toilet having Soak pit in sub constructor labour campsite. • Regular cleaning and sufficient numbers of toilets were observed during monitoring.	• Regular cleaning of toilets is suggested.	
4.	Possible development of camp into permanent settlement	• There are limited numbers of temporary tents for workers.	• Should increase the living facilities of subcontractor labours following ADB standards and take proper steps for accommodation. • Increase indoor environmental quality.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
5.	Possibilities of underground water contamination by fuel and oil, grease, in yards	• There is a less possibility of underground water contamination by the oil/ mobile storage on the open soil area. • Concrete floor was observed	• Oil/ fuel/ mobile should be stored in concrete surface.	
6.	First aid box	• First aid box present in the construction camp. • Regular accident record is updated periodically.	• It is strongly recommended that all labour camp sites should have first aid kits. • Trained staff/ medical officer should employ for serving first aid. • Adequate numbers of first aid kits should be stocked as facilities can get 24/7. • Should manage and provide others medical facilities.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
7.	Firefighting facilities	• Fire extinguisher in the construction camp was observed. • Fire buckets were not observed in construction camp. • Labor camps were not considered to install fire extinguisher.	• Need to provide fire extinguisher in labour camp. • Rearrange the fire extinguisher location, so that it can take easy.	
8.	Wearing of protective clothing, safety vest and safety shoes	• Workers are using safety equipment during work but some workers didn't follow the instruction. • All engineers are well equipped with helmet, reflective clothing, cone for warning traffic and flagman to give sign to road users.	• Need to develop HSE policy and Plan according to ADB standard and proper implementation is required.	

Contract WP-07: Abdul Monem Ltd. **Submitted in June 2022**

No.	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
1.	Ambient Air Quality	• According to EMP, ambient air quality needs to be checked quarterly. • Air quality has been done in 13th June, 2022.	• Next ambient air quality monitoring will be held on September 2022.	
2.	Dust	• Water spraying was observed • Wet construction materials transport in the camp area • No musk was used during the Construction Materials loading and unloading time.	• To mitigate dust problem during constructions period, all relevant areas are suggested to spray water regularly following DoE standard. • Musk should be used by the labours during work at construction area.	

No.	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
3.	Pollution caused by domestic sewage and solid waste	• Flash toilet is used with septic tank. • Waste has been deposited to the surrounding site • Waste water is disposed in adjacent pond.	• Need proper awareness • Regular cleaning of soak pit • Increase the number of dustbins • Closed dustbin should be used properly	
		• Toilets having Soak pit in labor camp site. • Subcontractor labour camp toilet is not clean properly.	• Increase the number of dustbin • Regular cleaning of soak pit • Need proper awareness. • Need to make an MOU with Pauroshava to collect kitchen waste regularly.	

No.	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
4.	Possible development of camp into permanent settlement	• Room accommodation is available for Engineer, Foreman, Supervisor, Driver, Operator, Helper and Mechanics. • Sub-contractor labor room tent ceiling's height is not enough.	• Residential facilities should be Bangladesh Labour Act standard • Should increase living facility and take proper steps for settlement. • Increase indoor environment. • Need to increase toilet number.	
5.	Possible underground water contamination by fuel and oil, grease, in yards	• Less possibility of underground water contamination by the oil/ mobile storage on the open soil area. • Concrete surface was observed	• Oil/ fuel/ mobile should be stored in concrete surface.	

No.	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
6.	Traffic and pedestrian safety	• Contractor using traffic control activities for road safety.	• Need to make a traffic management plan. • Must follow the traffic rules	
7.	Firefighting facilities	• Fire extinguisher is available in the construction camp. • Fire extinguisher found on fuel storage area. • Fire extinguisher found on field laboratory area.	• Increase the number of fire extinguisher. • Required to check in regular basis • Fire drill training required for all staff and worker in the camp site.	

No.	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
8.	First aid box	• First aid box is available in construction site; • First aid box present in the engineer's construction camp. • There is a para-medical doctor sited in engineer's construction camp. • Regular incident accident record has been updated.	• It is strongly recommended that all labour campsite shall have first aid kits • Should cheek up every labour in a week • Increase first aid kits number	

Contract WP-08: CPC-Tantia JV **Submitted in June 2022**

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Comments/Suggestions	Picture
1.	Ambient Air Quality	• According to EMP, ambient air quality needs to be checked quarterly. • Air quality has been done in 15th June, 2022.	• Next ambient air quality monitoring will be held on September 2022.	
2.	Dust	• During the construction work and materials loading and unloading time mandatory musk usages but most of the workers wasn't followed the safety officer instruction. • Water spray activity was observed, • Water spray was done properly camp construction site.	• All relevant areas are suggested to use sprinkler were not sufficient following DoE standard to mitigate dust problem. • Water is spraying every day but dry weather condition; it's difficult to control the dust problem. • Musk should be used by the labours/workers during work at construction area.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Comments/Suggestions	Picture
		• Some labor sheds, kitchen waste was deposited inside the dustbin carefully, • Solid waste and Kitchen waste bin was observed in the engineer shed and labor shed.	• Kitchen waste should be managed properly. • They have sufficient numbers of dustbin • Dustbin should be used correctly in labor shade. • Need to make an MOU with Pauroshava to collect kitchen and other solid waste regularly.	
3.	Pollution caused by domestic sewage and solid waste	• Regular cleaning was observed. • Sufficient flash toilets were installed with septic tank (in engineer and staff sheds). All were observed cleaned. • Toilet having Soak pit in some sub constructor and own labour campsite.	• Some labour shed regular cleaning of soak pit and toilets is suggested.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Comments/Suggestions	Picture
4.	Possible development of camp into permanent settlement	• There are limited numbers of temporary tents for workers. • The room is clean enough. • Room space is not perfect	• Residential facilities should be ADB standard. • Should increase the living facilities of subcontractor labours following ADB standards and take proper steps for accommodation. • Increase indoor environmental quality.	
5.	Possible underground water contamination by fuel and oil, grease, in yards	• There is a less possibility of underground water contamination by the oil/ mobile storage on the open soil area. • Concrete surface was observed oil storage area.	• Oil/ fuel/ mobile should be stored in concrete surface.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Comments/Suggestions	Picture
6.	First aid box	• First aid box present in the construction camp. • Regular accident record is being updated periodically.	• It is strongly recommended that all labour camp sites shall have first aid kits. • Trained staff/ medical officer should employ for serving first aid. • Should manage and provide others medical facilities.	
7.	Firefighting facilities	• There is fire extinguisher in the construction camp. • Fire buckets were also observed in construction camp area. • Fire extinguisher has not seen in the labor sheds.	• Check the fire extinguisher status. • Provide fire extinguisher in all sensitive area like (Office floor, construction camp area and labor shed area)	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Comments/Suggestions	Picture
8.	Wearing of protective clothing and safety shoes	• All engineers are well equipped with helmet, reflective clothing, cone for warning traffic and flagman to give sign to road users.	• Need to keep the present HSE policy and Plan according to ADB standard and proper implementation.	

Contract WP-09: KMC-MONICO JV **Submitted in June 2022**

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
1.	Ambient Air Quality	• According to EMP, ambient air quality needs to be checked quarterly • Air quality has been done in 15th to 20th Dec, 2021.	• Next ambient air quality monitoring will be held on September 2022.	
2.	Dust	• Water spray activity was observed. • During the construction work and materials loading and unloading time mandatory musk usages wasn't followed by the workers.	• All relevant areas are suggested to use sprinkler properly following DoE standard to mitigate dust problem. • Musk should be used by the labours during work at construction area.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
		• Solid waste has been deposited to the dustbins but a few numbers of dustbins are installed. • Dustbins are open as a result stink may be incurred.	• Increase the numbers of dustbin • Covered Dustbin should be installed and make sure proper use. • Kitchen waste should be managed properly. • Need to make an MOU with Pauroshava to collect kitchen and other solid waste regularly.	
3.	Pollution caused by domestic sewage and solid waste	• Regular cleaning and sufficient numbers of toilets were observed during monitoring. • Sufficient flash toilets were installed with septic tank (in engineer and staff sheds). All were observed cleaned.	• Regular cleaning of soak pit and toilets is suggested. • Numbers of toilets for subcontract labors are required to be increased.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
4.	Possible development of camp into permanent settlement	• Room space is not perfect and healthy aspect of engineers' shed. • There are limited numbers of temporary sheds for workers.	• Residential facilities should be ADB standard • Should increase the living facilities of subcontractor labours following ADB standards and take proper steps for accommodation. • Increase indoor environmental quality.	
5.	Possible underground water contamination by fuel and oil, grease, in yards	• There is a less possibility of underground water contamination by the oil/ mobile storage on the open soil area. • Concrete surface has been observed	• Oil/ fuel/ mobile should be stored in concrete surface.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
6.	First aid box	• First aid box present in the construction camp. • Regular accident record is not being updated periodically.	• It is strongly recommended that all labour camp sites shall have first aid kits. • Trained staff/ medical officer should employ for serving first aid. • Adequate numbers of first aid kits should be stocked as facilities can get 24/7. • Should manage and provide others medical facilities.	
7.	Firefighting facilities	• There is fire extinguisher in the construction camp. • Labor camps were not deemed to install fire extinguisher.	• Need to provide fire extinguisher in labour camp.	

No	Safeguard related issue	Safeguard Monitoring Activity (Observation)	Suggestion/Comment	Picture
8.	Wearing of protective clothing and safety shoes	• All engineers are well equipped with helmet, reflective clothing, cone for warning traffic and flagman to give sign to road users. • Workers are using safety equipment during work but some labors are not using any PPE.	• Need to develop HSE policy and Plan according to ADB standard and proper implementation is required.	

CHAPTER 7: Occupational Health and Safety

7.1 Site Security and Fire Safety

58. The Contractors have already constructed site boundary fencing to isolate the base camp. Proper sign boards and pictorial sign have been used mentioning caution for the area of petroleum, spirit & highly flammable materials & general awareness prohibiting smoking inside the base camp. At camp site there are adequate fire extinguisher systems. It is suggested to ensure pavement surface of refueling station in base camps and secondary containments of lubricant chemicals. Fire safety signage, precautionary symbols and labeling are used at refueling station and base camp.

I. Fire Extinguisher Infront of Site Laboratory II. Fire Extinguisher Infront of Engineer's Office

Figure 7.1: Site security through fire safety extinguisher system

7.2 Accident/Incident Record and Reporting

59. Contractor has developed recording and reporting system with proper format to monitor any incident, accident, near misses etc. If any incidental issue arises, immediately it has to be reported & recorded properly in the prescribed format. Remedial measures are being determined by contractor for any kind of incident and accident at project site. Accident / incident record is presented in the table below:

Table 7. 1 Accident/Incident Record Register of WP- 06

Sl.	Description	From January-June 2022	Till June 2022
1	Fatal Accidents	0	0
2	Lost Time Injury (LTI)	0	0
3	Medical Treatment (MT)	4	10
4	First Aid Cases (FAC)	22	32
5	Health Incidents	1	2
6	Fire/Explosion	0	0
7	Security Incident	0	0
8	Near Miss	3	8
9	Environment (EN)	0	0
10	Toolbox Talks	180	821

Table 7. 2: Accident/Incident Record Register of WP- 07

Sl	Description	From January-June 2022	Till June 2022
1	Fatal Accidents	1 Nos	1 Nos
2	Lost Time Injury (LTI)	Nil	Nil
3	Medical Treatment (MT)	5	11
4	First Aid Cases (FAC)	40	52
5	Health Incidents	Nil	6
6	Fire/Explosion	Nil	Nil
7	Security Incident	Nil	Nil
8	Near Miss	4	8
9	Environment (EN)	Nil	Nil
10	Toolbox Talks	85	292

Table 7.1 3: Accident/Incident Record Register of WP- 08

Sl	Description	From January-June 2022	Till June 2022
1	Fatal Accidents	1	4
2	Lost Time Injury (LTI)	Nil	Nil
3	Medical Treatment (MT)	2	3
4	First Aid Cases (FAC)	15	35
5	Health Incidents	Nil	Nil
6	Fire/Explosion	Nil	Nil
7	Security Incident	Nil	Nil
8	Near Miss	1	3
9	Environment (EN)	Nil	Nil
10	Toolbox Talks	90	260

Table 7. 4: Accident/Incident Record Register of WP- 09

Sl	Description	From January-June 2022	Till June 2022
01	Fatal Accidents	1	4
02	Lost Time Injury (LTI)	1	5
03	Medical Treatment (MT)	4	10
04	First Aid Cases (FAC)	82	105
05	Health Incidents	0	1
06	Fire/Explosion	0	0
07	Security Incident	0	0
08	Near Miss	0	1
09	Environment (EN)	0	0
10	Toolbox Talks	90	305

Table 7. 5: Accident/Incident Record Register of WP- 10

Sl	Description	From January-June 2022	Till June 2022
1	Fatal Accidents	Nil	Nil
2	Lost Time Injury (LTI)	Nil	Nil
3	Medical Treatment (MT)	24	52
4	First Aid Cases (FAC)	6	24
5	Health Incidents	Nil	Nil
6	Fire/Explosion	Nil	Nil
7	Security Incident	18	72
8	Near Miss	Nil	Nil
9	Environment (EN)	Nil	Nil
10	Toolbox Talks	24	96

Table 7. 6: Accident/Incident Record Register of WP- 11

Sl	Description	From January-June 2022	Till June 2022
1	Fatal Accidents	4	5
2	Lost Time Injury (LTI)	0	0
3	Medical Treatment (MT)	0	0
4	First Aid Cases (FAC)	34	74
5	Health Incidents	8	22
6	Fire/Explosion	0	0
7	Security Incident	0	0
8	Near Miss	0	0
9	Environment (EN)	0	0
10	Toolbox Talks	176	431

Table 7. 7: Accident/Incident Record Register of WP- 12

Sl	Description	From January-June 2022	Till June 2022
	Fatal Accidents	NIL	Nil
	Lost Time Injury (LTI)	00	00
	Medical Treatment (MT)	02	08
	First Aid Cases (FAC)	06	23
	Health Incidents	10	37
	Fire/Explosion	00	00
	Security Incident	03	09
	Near Miss	02	10
	Environment (EN)	00	00
	Toolbox Talks	130	527

7.3 Personal Protective Equipment

60. The working personnel involved in the construction activities have put on PPE properly. The workers were found with proper PPE, such as Safety Jacket, Safety Shoes, Helmet and Hand Gloves, Eye face protection etc. Due to COVID-19 outbreak all the workers, labors and other personnel involved in this project has been provided with respiratory masks to protect themselves while working. Social distance

has been seen to be maintained by everyone as much as possible. General knowledge regarding self-protection against novel Corona Virus has been infused with orientation program and training properly.

Table 7. 8: List of personal protective equipment used in project site

Sl No.	Type of work	Personal Protective Equipment used in site
1	Excavation	Safety Jacket, Safety Shoes, Helmet, Respiratory protection and Hand Gloves.
2	Construction	Safety Jacket, Safety Shoes, Helmet, Respiratory protection and Hand Gloves.
3	Welding	Helmet, Safety shoes, Eye face protection, protective clothing, Hand Gloves, Ear defense, Respiratory protection etc.
4	Scaffolding	Safety vests, Headwear, Safety footwear, Eye face protection, Slush Boots, Safety belt, Rain Suits, Hand protection.

7.4 Worker's Health

61. The Contractor has provided all kinds of treatment facilities and pay compensation according to Bangladesh Labor Law 2006. It is suggested that worker's health have to be checked properly twice in a year. The Contractor has established health monitoring system by appointing nurse for the workers. In addition, necessary steps are being taken for arrangement of ambulance service in the project area to support any emergency medical aid and shifting to the hospital/medical Centre. It is suggested to keep records of all accidents, medical support and emergency issues arise. Any case involving Corona disease has been given a top priority and shall be handled immediately.

7.5 Sanitation & Drinking Water Facility to Workers

62. Safe drinking water is being supplied through the arrangement of piping network in the base camp and water is available for the workers for the washing and toilet facilities. Adequate toilets for male and female workers have been constructed. It is recommended that washrooms & toilets have to be cleaned twice a day otherwise it will be unhygienic. Contractor also maintain a checklist for cleaning the washrooms & toilets.

7.6 Safety Orientation & Training of Workers

63. Training is essential to maintain the employee's health and safety. Both theoretical and practical training is conducted for the employees on the hazards, precautions, and procedures involving the safe storage, handling, and use of all potentially harmful materials. Safety orientation & training are being provided to all working personnel during the fresh enrollment / employment. Routine safety training on regular basis is maintained. It is suggested that, the Contractors will arrange routine safety training at definite time interval for the workers throughout the construction phase of the project. Toolbox meeting, Fire safety & COVID19 awareness training are arranged, and training is conducted for fresh enrolment employee.

Figure 7.1 Construction and Safety Training

CHAPTER 8: COVID 19 Pandemic Management

8.1 Awareness on following COVID 19 Guidelines

64. ADB provided health & safety guideline on COVID-19 had been sent to the sites of all WPs with Annex-A, Annex-B and Annex-E form for field assessment on COVID-19. All of the field workers are instructed to follow the guideline for awareness building to protect from pandemic COVID-19 affect.

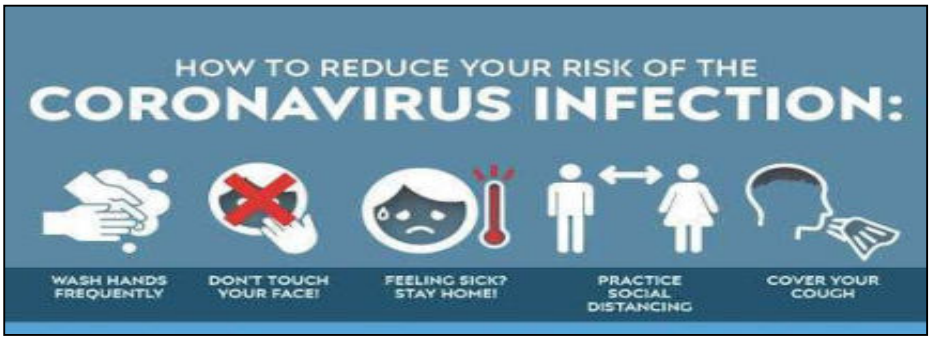

Figure 8.1.How to reduce risk of the Corona Virus infection

8.2 Management of COVID 19 infected patients

65. In the project's several guidelines regarding COVID-19 from Director General of Health-Bangladesh and from World Health Organization have been adopted and followed as directed by ADB. Workers and Engineers are supplied with set of PPEs, hand sanitizer, masks, goggles etc. which are adequate and of good qualities. Disinfectant spray arrangements provided at some work places and in the vehicles and also disinfectant tunnel has been installed at the important camp`s entry. Hand washing system with no touch also have been facilitated. Arrangement of quarantine room also has been ensured before resuming the project works. Awareness guidelines have been circulated to all.

66. The program was scheduled as physical training at site. The disruption caused by the COVID-19 has brought about several effects on the environment and climate. Due to movement restriction of social and economic activities, air quality has improved in many towns and city with a reduction in water pollution in different parts of the country. Besides, increased use of PPE (e.g., face mask, hand gloves etc.), their haphazard disposal, and generation of a huge amount of hospital waste has negative impacts on the environment. Both positive and negative environmental impacts of COVID-19 .

CHAPTER 9: Grievance Redress Mechanism

9.1 Adopted GRM mechanism

67. To deal with Grievance Redress Mechanism disputes and to make the project accountable to the affected households and community, one complaint and redress mechanism will be in operation under the project. The mechanism will be an officially recognized system for resolving disputes arising out of various matters related to compensation and resettlement benefits, environmental safety and other social concerns. The fundamental objective of this mechanism is to resolve the resettlement related grievances locally in consultation with the aggrieved party for facilitating smooth implementation of the social and environmental action plans. Another important objective is to democratize the development process at the local level and to establish accountability to the displaced people. Based on consensus, the procedure will help resolving issues/conflicts amicably and quickly and thus saving the aggrieved persons resorting to expensive and time-consuming legal actions. This will be ensured through minimization of land acquisition, and resettlement design and implementation by ensuring full participation and consultation with the PAHs and by establishing extensive communication and coordination between the affected communities and EA (SASEC-II, RHD).

9.2 Complaint Registered and Resolution Status

68. The INGO shall maintain all GRC documents in their Field Office(s) which will act as the Secretariat of GRCs. Accordingly; all the records will be updated regularly and easily accessible on-site. GRC meetings will be held as agreed by the Committee, in the respective Field Office of SASEC-II or other location(s). If required, GRC members may take field visits to verify and review the issues at dispute, including titles/shares, the reasons for any delay in payments or other relevant matters. The GRC meetings will be entirely financed by the project. The Project Managers of field offices of SASEC-II will keep records of all the grievances and their redress in monthly cumulative formats, which will be provided by the INGO and to be signed by the convener of the Grievance Redress committee. The format will contain information on the number of grievances received with nature, resolved, and the number of unresolved grievances.

CHAPTER 10: Training and Capacity Building

68. Environmental Training/Capacity Building Workshop Performed During Reporting Period. Training and capacity building programs conducted during the reporting period and the cumulative number of the training conducted till date is given in the table below:

Table 10. 1: Training and Capacity Building Activities

Date	Name of the Training (i.e., EMP, H&S etc.)		Trainers Details	No. of Participants	
	Jan-June 2022	Till June 22		Jan-June 2022	Till June 22
03/04/22 to 07/04/22	Environmental Projection Procedures (i. Hazardous waste management, ii. Top ten dust control techniques and iii. How to handle, storage, and dispose of oil & fuel safely)	**1.** Training on Environmental and Social Safeguards for Project Implementers **2.** Training on Environmental Safeguard (i. *Construction Activities and Effects of SASEC-2 Project* & ii. *CEMP Implementation and Operation*) **3.** Environmental Projection Procedures (i. Hazardous waste management, ii. Top ten dust control techniques and iii. How to handle, storage, and dispose of oil & fuel safely) **4.** Project activities on Environmental Safeguard Issues (Particular Specification VOL. 3 of 5)	PIC Environment Specialist	52 (24/2/2021=23 & 7/3/2012= 20)	89 (6/12/2020=22 & Before December 2020=15 + Jan-Jun=52)
15/05/2022 to 17/05/2022	Project activities on Environmental Safeguard Issues (Particular Specification VOL. 3 of 5)				

69. Necessary training on EMP, H&S and necessary environmental safeguards measure to the EMOs, H&S officers, contractor personnel, workers etc. are being provided to the Stakeholders regular basis. But due to Covid19 the training programs are not taking place in due manner. But online discussions and virtual training are taking place among the contractors and PIC.

Table 10. 2: List of Environmental Training under SASEC-2 Project

SL No.	Training Topics	Duration	Participants	Trainer/ Speaker
1	Environmental Awareness Training	2 Hours	All Contractors' Project Managers	RHD Environmental Focal Point
		2 Hours	Contractors' Site Engineers and EMOs	PIC Environmental Specialist
2	How to Handle, Store, and Dispose of Oil & Fuel safely	2 Hours	Workers involved in these activities and EMOs	PIC Environmental Specialist
3	Waste Handling and Disposal Procedure	1.50 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
4	Solid Waste Management	2 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
5	Liquid Waste Management	1.50 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
6	Hazardous Waste Management	2 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
7	Air Pollution and Dust Control	1.50 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
8	Environmental Noise Pollution Management	2 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
9	Soil Erosion and Dredged Material Management	2 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
10	Surface and Ground Water Pollution Prevention	1.50 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Environmental Specialist
11	HSE Emergency/ Rescue Procedure	2 Hours	Contractors' Site Engineers, Safety Officers and EMOs	PIC Road Safety Engineers

70. PIC had performed environmental safeguard trainings during January-June 2022 among the Contractors' Environmental Management Officers, Safety officers and PIC's Road Safety Engineers and RHD PD and other officials. The training attendances are attached as appendix.

CHAPTER 11: Conclusion

11.1 Overall Conclusions of Semi-Annual Environmental Monitoring Report

11.1.1 Overall Progress with Implementation of Environmental Safeguard Measures

71. The Project is now at the primary to middle stage and various development activities are in progress. The land development activity of the project area is ongoing. There are some environmental compliance measures in environmental management plan that should be at place during this construction stage. From the first quarter environmental monitoring of assessment, some recommendations have been made and it is important to consider these measures to properly implement the approved Environmental Management Plan (EMP). Contractors are implementing the Environmental Management Plan (EMP) accordingly but sometimes fluctuates and deviates which PIC observes and give instruction to comply the issues.

72.. According to the monitoring and supervision by the Engineer of the environmental activities on the SASEC-2 it is found that the contractors are now credibly undertaking most of the environmental mitigate measures specified in the EMP although there are areas where further action and improvement need to be made.

73. The Contractor's compliance with contract clauses and EMP tasks have increased since the mobilization of contractors' Environmental Management Officer (EMO), which is a very positive sign.

74. The potential adverse impact of the ongoing works on the major watercourses and overall drainage of the area is being minimized by ensuring the design and construction of the new embankment and structures generally match the embankment and structures of the existing track alignment. The potential adverse impact of dust from the transport of large quantities of embankment materials is being minimized by spraying water to the worksites.

75. The monitoring of water quality, air quality, and noise levels has generally been fully compliant during reporting period January-June 2021. The implementation of the occupational health and safety issues has been greatly improving with the Contractor and Engineer holding regular briefing related to the various campsites and work sites.

76. Contractor is making presentations on the work being undertaken with the knowledge and oversight of the Engineer. The Contractor took this to mean that the Engineer and environmental safeguards are items not to be ignored, with few if any consequences.

77. ADB needs to insist that the Engineer be involved in all matters that require regular the Engineer oversight. This is especially true for safeguard matters. It is found that both GoB and ADB HQ are involved on large and long duration projects and to make sure that the Engineer is kept in the information loop as much as possible.

78. All contractors are executing all civil works including EMP as per specification and terms & conditions of the Contract.

78. If any grievance receive will be recorded, resolved and the outcomes will be displayed/ disclosed in the PIU offices, as applicable and will be reported in the next semi-annual environmental monitoring report of the SASEC Road Connectivity Project-2.

79. The Environmental specialists of the PIC have been monitoring the environmental aspects through Environmental Monitoring Checklist of all project activities. Based on the field visits, analysis is being done on compliance in lieu with specific scope of on works as defined in the respective Contract Packages and prevailing field condition.

Appendix A:

Summary of Environmental Monitoring Activities (January-June 2022)

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Construction Phase						
1. Change in Hydrologic Regime (The use of dredged material may have its impact in terms of localized sedimentation level increase and dispersion of pollutants present in the dredged material in the river water.)	• Small bridges will be constructed on canals and drains; • Box culverts to control flood damages and provision of safety of embankments; • Sufficient sizes of drains to take design flows; • Wastes should not be disposed near any water body.	Dredged materials and other waste materials	Visual inspection and through environmental parameter test in field and in the laboratory	Bridges and culverts over the rivers and waterbodies	In the month of February 2022	PIC Environment Specialist Contractors' Environment Officer
2. Drainage Congestion & Flood (Run off from storage of construction material near water bodies cause temporary drainage congestion near small bridges, culverts, service areas, and construction sites. Stockpiling of fill materials dredged from the riverbeds for construction of the embankment may result erosion and subsequent deposition in the adjacent crop fields.)	▪ Careful planning for construction to minimize drainage congestion. ▪ Wastes should not be disposed near any water body. ▪ All waste should be disposed in a controlled manner. ▪ Adequate cross drainage structure shall be provided to easily drain off water to canals and other lowland areas. ▪ The road elevation level in the project area should be designed considering the flood threat levels.	Waste materials & water logging	Visual inspection and through environmental parameter test in field and in the laboratory	Bridges and culverts over the rivers and waterbodies	In the month of February 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	▪ Provision of 1m free board is proposed.					
3. <u>Soil Erosion and Siltation</u> (Some trees, shrubs, and grasses will be cleared and existing road pavement will be removed which cause localized soil erosion problems during the rains. The potential risk of river or water bodies' erosion will increase after implementation of the project road if the bridge crossings are provided with waterway width less than the regime width of the water bodies.)	➢ The road embankments and road cuttings shall be vegetated with a fast-growing crop and a native seed mix immediately after fill placement to prevent scour and to encourage stabilization. ➢ Use of stone pitching or riprap shall be made at appropriate places especially around overpasses, bridges, culverts. ➢ Provide adequate bank protection and structures. ➢ Adequate drain and slope protection measures shall be applied at such locations. ➢ Use of geo-grids on a layer-by-layer basis for better bonding in the pavement structure must be carried out to resist erosion. ➢ The portion of the highway that is in contact with river, channel and canal will be provided with slope protection measures.	Embankment erosion of river and water bodies	Visual inspection and through environmental test in field and in laboratory	Bridges and culverts over the rivers and waterbodies	In the month of March 2022	Contractors' Environment Officer
<u>4. Soil compaction and contamination</u> (The Soil contamination may take place around borrow pits, road cuttings, embankments, construction	▪ The impacts of soil contamination would be temporary and moderate negative. ▪ The movement of construction vehicles,	Soil pollution in construction sites	Visual inspection and through environmental parameter test in field and in the laboratory	Bridges and culverts over the rivers and waterbodies and earth work sites	In the month of February 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
camps, workshop areas, equipment washing yards, asphalt plants, batching plants, fuel and chemical storage areas, etc. Soil contamination may affect the road stability in worst cases may reduce the economic productivity of land and biodiversity in the project area. During transportation of machine and materials, the cultivable lands beyond the proposed ROW may get compacted due to movement of vehicle and construction equipment. Soil in the project area may also get contaminated particularly from the bituminous wastes, spillage of oil and grease, mixing with construction materials.)	machinery and equipment will be restricted to the corridor or identified route. ▪ The unusable, non-saleable, non-hazardous construction waste shall be disposed of in the properly delineated places. ▪ The compacted land will be restored for agricultural use. ▪ The construction vehicle shall be fueled or repaired/serviced at the designated place with proper arrangement of waste collection and disposal. ▪ The arrangement shall include, cemented floor with dyke around for fuel storage and filling as well as repairing of construction equipment. ▪ Soil contamination by bitumen, fuel and chemical storages shall be minimized by siting them on an impervious base within an embanked area and secured by fencing. ▪ The base and walls of the embankment shall be impermeable and of sufficient capacity to contain of the total volume of stored fuels and chemicals.					

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	▪ The disposal of waste asphalt shall be made in approved locations such as borrow pits or natural depressions and shall not be within the RoW.					
5. Top Soil (Removal of top soil for construction from outside the RoW. Compaction of top soil. Loss of top soil by wind and water erosion. Covering of top soil by project works.)	▪ The stockpiles will be done in slopes of 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil. - Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. - Construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil. - Spread the topsoil to maintain the physico-chemical and biological activity of the soil. - The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites. - Limit equipment and vehicular movements to within the approved construction zone. - Remove unwanted materials from top soil like grass, roots of trees and similar others	Loss of topsoil by wind and water erosion outside construction areas.	Visual inspection and through environmental parameter test in field and in the laboratory	Bridges and culverts over the rivers and waterbodies and earth work sites	In the month of February 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
6. Air Quality (Certain amount of dust and gaseous emissions will be generated during the construction phase from road construction machineries. emissions are also anticipated from hot mix plants and batching plants.).	• The stockpiles of construction material shall be sprinkled with water. • Water should be sprayed at asphalt mixing site and temporary service and access roads. • After compacting, water should be sprayed on the earthwork regularly to prevent dust. • Construction equipment will be maintained to a good standard and idling of engines will be discouraged. • Machinery causing excessive pollution (e.g., visible clouds of smoke) will be banned from construction sites; • The Contractor(s) will submit a dust suppression program to RHD prior to construction. The plan will detail action to be taken to minimize dust generation (e.g., spraying of roads with water), and will identify equipment to be used. • Road pavement design should be such that tyre friction due to vehicle movement will be reduced. • Vehicles delivering loose and fine materials like sand and fine aggregates shall be	Air quality parameters	Visual inspection and through environmental parameter test in field and in the laboratory	Earth work sites	In the month of March 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	covered to reduce dust pollution on existing road. • Regular maintenance of machinery and equipment shall be carried out. • Dust mask will be provided to the workers. • Air pollution monitoring shall be carried out as per monitoring plan and corrective action shall be taken in case of deviation.					
7. Noise & Vibration (Noise is likely to be generated form site clearing, excavation, concrete mixing, crushers, and piling during bridge construction. Vibrations caused by movements of heavy construction equipment, pile driving operations, operation of crushing, ballasting and aggregating plants will disturb the local residents unless operation times are fixed by discussing with local representatives.)	➢ Selection of latest equipment and plant with reduced noise level ➢ All powered mechanical equipment and machinery shall be fitted with noise abating gear such as mufflers ➢ Vehicles and equipment should be fitted with silencer and maintained well. ➢ Mufflers should be used during pile driving hydraulic mechanism to ensure noise level is below 85 dBA. ➢ The noisiest operations should be performed during daytime. ➢ Temporary noise barrier shall be made near sensitive locations like schools, religious places and hospitals.	Noise level and vibration monitoring	Noise and vibration measurement	Construction working sites	In the month of April 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	➢ The workers should be provided with personal protection devices as earplugs and earmuffs. ➢ where there are structures likely to be affected by vibrations because of the construction activities, precaution will be taken to minimize the vibration ➢ Noise and vibration monitoring shall be carried out as per the suggested monitoring plan.					
8. Surface Water (Dredging and piling activities increase in total suspended particulates (TSS) level in surface water. Get contaminated due to the disposal of construction waste. Uncontrolled dumping of wastes, sewage, dredge materials, and accidental spillage of fuels and chemicals will pollute water bodies. Disposal of sewage and wastes from the construction camps to surface water bodies without treatment will deteriorate the water quality. The seasonal canals and ponds are unlikely to be affected from construction activities.)	▪ Proper care will be taken above or near the water channels so that no damage could be made during construction activities. ▪ To maintain the surface water flow/drainage, proper mitigation measures will be taken along the road, like drainage structures in urban areas. ▪ Proper training of operators and other workers should be ensured to avoid pollution of water bodies by the operation of construction machinery and equipment. ▪ Temporary construction facilities including structures and material stockpiles shall	Surface water quality parameters	Visual inspection and through environmental parameter test in field and in the laboratory	Bridge and culvert work sites	In the month of April 2022	Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	be located at least 50 m away from water bodies. ▪ Avoid disposal of wash water, solid waste as discarded packing etc., waste from concrete agitator cleaning operations and excavated material on water bodies adjacent to or within the vicinity of the project. ▪ Construction of bridges and culverts should be done during dry season as much as possible. ▪ Cast-in-place concrete pile should be used in bridge and culvert construction. ▪ During the boring in the river cofferdams will be installed to prevent silt from mixing with river water. ▪ When large amounts of boring slag are produced, this slag will be hauled to spoiled disposal areas.					
9. Groundwater (Consumption of arsenic contaminated groundwater may have adverse health effect on workers. Uncontrolled extraction of water may also affect availability of water to locals. In addition to that, construction waste, if left unattended	❖ Arrangement for safe drinking water is made prior to start of work. ❖ Water shall be supplied for consumption only after adequate analysis and requisite treatment. ❖ The workers may also be trained on the need for	Ground water quality parameters	Visual inspection and through environmental parameter test in field and in the laboratory	Construction and equipment maintenance sites	In the month of May 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
will result in forming leachate which will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it.	judicious use of freshwater resources. ❖ The contractors must be advised to use water judiciously. ❖ The water reserves will be adequately protected from any source of contamination such as the construction and oily waste that will degrade its potable quality.					
10. Construction Waste Oil, grease etc. from construction machinery; Solid waste from waste construction material and food; Wastewater from washing and sprinkling; and Sanitary waste from staff toilets.	➢ Wastewater would be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams; ➢ Waste will be disposed at designated sites and no waste will be disposed in the productive agricultural field; ➢ The hazardous waste will be transported to nearby incineration facility; ➢ Solid waste generated during construction will be safely disposed in approved and demarcated waste disposal sites and the contractor will not dispose waste into productive agricultural lands and will also provide a proper waste management plan;	Water bodies and soil sample	Visual inspection and through environmental parameter test in field and in the laboratory	Construction sites	In the month of May 2022	PIC Environment Specialist Contractors' Environment Officer

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
	➢ Sanitary wastes generating from staff and labour camps must be disposed of in environment friendly manner, i.e., provision of septic tank etc. for toilet wastes; and ➢ Aggregate waste material of existing road will be reused in road improvement.					

Appendix B

Environmental Quality Parameter Test Results of WP-06

GEO ENVIRONMENTAL MEASUREMENTS

Fifth Floor, Nakshi Homes, 6/1/A Topkhana Road, Segunbagicha, Dhaka - 1000

Memo No: GEO/AQ/0343/06-22 Date: 20.06.2022

Test Results of Ambient Air Quality Analysis

Project Name	:	SASEC II, WP-06
Description of Sample	:	Sample was collected from the project area
Sampling Location	:	**AQ-1:** Kodda Flyover **AQ-2:** Nalka Bridge Site
GPS Coordinator		**AQ-1:** 24.39°N, 89.69°E **AQ-2:** 24.42°N, 89.59°E
Sample Collection Date	:	11-12th June 2022
Reporting Date	:	20th June 2022
Environmental Condition	:	Temperature: 34.7°C; Relative Humidity: 67%; Weather Condition: Sunny

Description of Analysis :

Project Site	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	NO_2 (µg/m³)	SO_2 (µg/m³)	CO (ppm)	TVOC (mg/m³)	O_3 (µg/m³)
AQ-1: Kodda Flyover	45.29	104.1	35.59	59.62	0.56	0.17	12.75
AQ-2: Nalka Bridge Site	38.11	88.87	17.07	67.66	0.67	0.12	10.33
Bangladesh Standards as per ECR, 1997 amended on 2005 (Schedule-2)*	**65** (24 hour)	**150** (24 hour)	**100** (Annual)	**365** (24 hour)	**9** (8 hour)	-	**157** (8 hour)
WB Standard**	**75** (24 hour)	**150** (24 hour)	**200** (1 Hour)	**125** (24 hour)	**9** (8 hour)	-	**100** (8 hour)

Note: *Regular checkup and calibration of the equipment's to avoid any error.*
**ECR, 1997 = Environmental Conservation Rules, 1997*
*** WB = World Bank, IFC = International Finance Cooperation*
Legend: $PM_{2.5}$- Particulate Matter of a diameter of 2.5 micron or less, PM_{10}- Particulate Matter of a diameter of 10 micron or less, NO_2- Nitrogen Di-Oxide, SO_2- Sulphur Di-Oxide, CO- Carbon Monoxide, TVOC- Total Volatile Organic Compounds, O_3- Ozone.

Analysed by:

Mostafa Al Imran
Junior Environmental Specialist
GEO Environmental Measurements

GEO Environmental Measurements DHAKA

Checked by:

Md. Rashidul Islam
Environmental Specialist
GEO Environmental Measurements

SURVEY SUB-SOIL INVESTIGATION PILE INTEGRITY TEST SONIC LOGGING TEST PILE DYNAMIC TEST ENVIRONMENTAL MONITORING

GEO ENVIRONMENTAL MEASUREMENTS

Fifth Floor, Nakshi Homes, 6/1/A Topkhana Road, Segunbagicha, Dhaka - 1000

Memo No: GEO/NL/0344/06-22 Date: 20.06.2022

Test Results of Noise level

Project Name : SASEC II, WP-06

Description of Sample : Sample was collected from the project area

Sample Collection Date : 11 & 12th June 2022

Reporting Date : 20th June 2022

Sampling Location:

Serial No.	Sampling Location	Sample ID
1	Kodda Flyover N: 24.39°, E: 89.69°	NL-1
2	Nalka Bridge site N: 24.42°, E: 89.59°	NL-2

Test Results:

Location	Concentration Present (dB)						Category	Remarks
	Day			Night				
	Leq	L_{max}	L_{min}	Leq	L_{max}	L_{min}		
Kodda Flyover	67.06	74.9	51.7	55.68	64.4	40.4	Mixed Area	High because of heavy traffic movement and construction work
Nalka Bridge site	54.97	61.9	44.2	43.53	48.8	37.8	Silent Area	High because of construction work and heavy traffic movement

Bangladesh Standards	Day Time	Night Time
Industrial Area	75	70
Commercial Area	70	60
Mixed Area	60	50
Residential Area	55	45
Silent Area	50	40
World Bank/IFC Standards	**Day Time**	**Night Time**
Industrial Area	70	70
Residential; Institutional; Educational	55	45

Sample Collection Date: 11 & 12th June 2022

**Environmental Conservation Rules, 1997 (Schedule 4) (subsequent amendment in 2006).*

Analysed by:

Mostafa Al Imran
Junior Environmental Specialist
GEO Environmental Measurements

GEO Environmental Measurements DHAKA

Checked by:

Md. Rashidul Islam
Environmental Specialist
GEO Environmental Measurements

SURVEY SUB-SOIL INVESTIGATION PILE INTEGRITY TEST SONIC LOGGING TEST PILE DYNAMIC TEST ENVIRONMENTAL MONITORING

EnviroCare International Ltd.
A house of Inspection, Testing, Assessment &Consultancy

Ref: ECIL/2022/102-06/SW

Test Results of Surface Water Analysis

Description of sample : Sample was collected from project area.

Sample Collector : Collected by Mostafa Al Imran, Environmental Specialist, GEO Environmental Measurements.

Sample Collection Date : 12 June, 2022

Date of Analysis : 13 June 2022 – 20 June, 2022

Reporting Date : 20 June, 2022

Sampling Location:

Sl. No	Sample Locations	Sampling ID
1	Kodda Flyover N : 24.39, E : 89.69	SW01

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration Present	Unit	Analysis Method
			SW01		
1	BOD	6 or less	4.5	mg/l	5 days Incubation
2	DO	5 or more	6.2	mg/l	Multimeter
3	EC	NYS	436	µS/cm	Multimeter
4	Nitrate	NYS	1.5	mg/l	UV-VIS
5	pH	6.5-8.5	6.8	-	pH Meter
6	Phosphorus	NYS	2.5	mg/l	Digestion
7	Suspended Solid	NYS	8.7	mg/l	Filtration and Drying
8	Temperature	20-30	28	°C	Thermometer

Note: NYS- Not yet set

Envirocare International Ltd. Dhaka

Prepared By
Md. Golam Saclayen
B.Sc. in Environmental Science and Resource Management (MBSTU)
Environmental Analyst

Reviewed By
Sanjoy Kumar Mondol
B.Sc. in ESRM (MBSTU)
MS in Environmental Science (MBSTU)
Technical Manager

Approved By:
Shorov Roy
B.Sc. in ESRM (MBSTU)
MS in Environmental Science (BAU)
Quality Manager

Address: House #9 (3rd Flr), Road # 6, Sector # 12, Uttara, Dhaka-1230, Bangladesh. Cell: 01925687029,

EnviroCare International Ltd.
A house of Inspection, Testing, Assessment &Consultancy

Ref: ECIL/2022/103-06/SW

Test Results of Surface Water Analysis

Description of sample : Sample was collected from project area.

Sample Collector : Collected by Mostafa Al Imran, Environmental Specialist, GEO Environmental Measurements.

Sample Collection Date : 12 June, 2022

Date of Analysis : 13 June 2022 – 20 June, 2022

Reporting Date : 20 June, 2022

Sampling Location:

SL No	Sample Locations	Sampling ID
1	Nalka Bridge Site N : 24.42, E : 89.58	SW02

LABORATORY TEST RESULTS:

SL#	Water quality parameters	Bangladesh Standard	Concentration Present	Unit	Analysis Method
			SW02		
1	BOD	6 or less	5.8	mg/l	5 days Incubation
2	DO	6 or more	5.5	mg/l	Multimeter
3	EC	NYS	398	µS/cm	Multimeter
4	Nitrate	NYS	2.1	mg/l	UV-VIS
5	pH	6.5-8.5	7.2	-	pH Meter
6	Phosphorus	NYS	1.4	mg/l	Digestion
7	Suspended Solid	NYS	9.5	mg/l	Filtration and Drying
8	Temperature	20-30	29	°C	Thermometer

Note: NYS- Not yet set

Envirocare International Ltd. Dhaka

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MS in Environmental Science (BAU)
Quality Manager

Address: House #9 (3rd Flr), Road # 6, Sector # 12, Uttara, Dhaka-1230, Bangladesh. Cell: 01925687029,

EnviroCare International Ltd.
A house of Inspection, Testing, Assessment &Consultancy

Ref: ECIL/2022/186-06/GW

Test Results of Ground Water Analysis

Description of sample : Sample was collected from project area.

Sample Collector : Collected by Mostafa Al Imran, Environmental Specialist, GEO Environmental Measurements

Sample Collection Date : 12 June, 2022

Date of Analysis : 13 June 2022 – 20 June, 2022

Reporting Date : 20 June, 2022

Sampling Location:

Sl. No	Sample Locations	Sampling ID
1	Kodda Flyover N : 24.39, E : 89.69	GW01

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration Present GW01	Unit	Analysis Method
1	Arsenic (As)	0.05	0.002	mg/l	AAS
2	Chloride	150-600	45	mg/l	Titrimetric
3	Fecal Coliform	0	0	N/100ml	MFM
4	Hardness	200-500	68	mg/l	Titrimetric
5	Iron (Fe)	0.3-1	0.45	mg/l	AAS
6	Manganese (Mn)	0.1	0.05	mg/l	UV-VIS
7	pH	6.5-8.5	7.7	-	pH Meter

Note: AAS- Atomic Absorption Spectrophotometer, .MFM- Membrane Filter Method.

Envirocare International Ltd. Dhaka

Prepared By	*Reviewed By*	*Approved By:*
Md. Golam Saclayen	Sanjoy Kumar Mondol	Shorov Roy
B.Sc. in Environmental Science and Resource Management (MBSTU)	B.Sc. in ESRM (MBSTU) MS in Environmental Science (MBSTU)	B.Sc. in ESRM (MBSTU) MS in Environmental Science (BAU)
Environmental Analyst	Technical Manager	Quality Manager

Address: House #9 (3rd Flr), Road # 6, Sector # 12, Uttara, Dhaka-1230, Bangladesh. Cell: 01925687029,

EnviroCare International Ltd.
A house of Inspection, Testing, Assessment & Consultancy

Ref: ECIL/2022/187-06/GW

Test Results of Ground Water Analysis

Description of sample : Sample was collected from project area.

Sample Collector : Collected by Mostafa Al Imran, Environmental Specialist, GEO Environmental Measurements

Sample Collection Date : 12 June, 2022

Date of Analysis : 13 June 2022 – 20 June, 2022

Reporting Date : 20 June, 2022

Sampling Location:

Sl. No	Sample Locations	Sampling ID
1	Nalka Bridge Site N : 24.42, E : 89.58	GW02

LABORATORY TEST RESULTS:

SL#	Water quality parameters	Bangladesh Standard	Concentration Present	Unit	Analysis Method
			GW02		
1	Arsenic (As)	0.05	0.001	mg/l	AAS
2	Chloride	150-600	54	mg/l	Titrimetric
3	Fecal Coliform	0	0	N/100ml	MFM
4	Hardness	200-500	72	mg/l	Titrimetric
5	Iron (Fe)	0.3-1	0.95	mg/l	AAS
6	Manganese (Mn)	0.1	0.02	mg/l	UV-VIS
7	pH	6.5-8.5	7.3	-	pH Meter

Note: AAS- Atomic Absorption Spectrophotometer, MFM- Membrane Filter Method.

Envirocare International Ltd. Dhaka

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Md. Golam Saclayen
B.Sc. in Environmental Science and Resource Management (MBSTU)
Environmental Analyst

Reviewed By
Sanjoy Kumar Mondol
B.Sc. in ESRM (MBSTU)
MS in Environmental Science (MBSTU)
Technical Manager

Approved By:
Shorov Roy
B.Sc. in ESRM (MBSTU)
MS in Environmental Science (BAU)
Quality Manager

Address: House #9 (3rd Flr), Road # 6, Sector # 12, Uttara, Dhaka-1230, Bangladesh. Cell: 01925687029,

OCEANUS

Henan Oceanus Import & Export Co., Ltd.

Calibrate report

Product	Air Quality Monitoring Station	**Model**	AQM-09
Quantity	1pc	**Cali date**	November 5, 2021
Product no.	Oc20211105198822		
Appearance	☑Clean ☑Non corrosive ☑No damage		
Gas type	CO:ppm SO_2:ppb NO_2:ppb O_3: ppb CO_2:ppm Tvoc:ppm PM2.5:ug/m³ PM10:ug/m³ TSP:ug/m³ Wind speed: m/s Wind direct:° Atmospheric:hpa Noise:dB Rainfall:mm/min		
Accuracy	±3%F.S		
resolution	0.1ppm, 1ppb, 1ug/m3		
Response time	≤30S		
Survey range	CO:0-200ppm SO2:0-2000ppb NO2:0-2000ppb O3: 0-2000ppb CO2:0-5000ppm TVOC:0-50ppm PM2.5:0-1000 ug/m3, PM10:0-1000 ug/m3, TSP:0-1000 ug/m3 Wind speed:0-60m/s Wind direct:0-360° Atmospheric:600-1100hpa Temp:-20-50℃ Hum:0%-100%RH Noise:30-130dB Rainfall:0-4mm/min		
Signal output mode	4G LTE		
Power supply voltage	AC 220V/50Hz		
Power dissipation	≤ 30W		
Working temperature and humidity range	-20℃-50℃ / 10%RH-95%RH		
Testing condition	Temperature：25℃ Humidity：60%RH		
Calibration gas	CO2, SO2, O3, CO, NO2, TCOV		
Cali gas test	1. CO: Cali gas concentration: 100PPM Inspect concentration: 98.7PPM 2. CO2: Cali gas concentration: 4000PPM Inspect concentration:3978PPM 3. SO2: Cali gas concentration: 1000PPB Inspect concentration: 998PPB 4. O3: Cali gas concentration: 1000PPB Inspect concentration: 997PPB 5. NO2: Cali gas concentration: 1000PPB Inspect concentration: 996PPB 6. TVOC: Cali gas concentration: 50PPM Inspect concentration:49.7PPM 7. PM2.5: Measured value: 22 ug/m3 PM10: Measured value: 26 ug/m3 TSP: Measured value: 31ug/m3 Atmospheric: Measured value: 1002hpa Noise: measured value: 63dB Rainfall: Measured value: 0.2mm/min 8. Wind veloci: Measured value: 1.5m/s Wind direct: Measured value: 217° 9. Temperature: Measured Value:26.1℃ Humidity: Measured value:55%RH		
Test result	Qualified		

QC PASS 01

Check: _____ **Approval:** _____ **Tester:** _____

Company: Henan Oceanus Import & Export Co., Ltd.

Validity period: November 5, 2021--November 4, 2022

https://www.ocgasdetector.com Telephone: +86 371 60998169 Email: info@china-oceanus.com
Add:No. 923,Unit 2, No. 78, Shangding Road, Zhengzhou Area, Henan Pilot Free Trade Zone, China

NOISE LEVEL MONITORING FIELD DATA

NOISE LEVEL MONITORING FIELD DATA

Sl. No.	Date & Time	Value	Unit	Sl. No.	Date & Time	Value	Unit
1	6/11/2022 10:00	65.6	dB	1	6/11/2022 19:00	54.5	dB
2	6/11/2022 10:01	66.7	dB	2	6/11/2022 19:01	51.4	dB
3	6/11/2022 10:02	72.5	dB	3	6/11/2022 19:02	54.7	dB
4	6/11/2022 10:03	70.4	dB	4	6/11/2022 19:03	58.8	dB
5	6/11/2022 10:04	65.7	dB	5	6/11/2022 19:04	49.3	dB
6	6/11/2022 10:05	67.3	dB	6	6/11/2022 19:05	46.8	dB
7	6/11/2022 10:06	66.9	dB	7	6/11/2022 19:06	53.9	dB
8	6/11/2022 10:07	73.3	dB	8	6/11/2022 19:07	52.4	dB
9	6/11/2022 10:08	66.3	dB	9	6/11/2022 19:08	43.2	dB
10	6/11/2022 10:09	67.1	dB	10	6/11/2022 19:09	52.6	dB
11	6/11/2022 10:10	73.3	dB	11	6/11/2022 19:10	54.2	dB
12	6/11/2022 10:11	58.9	dB	12	6/11/2022 19:11	57.4	dB
13	6/11/2022 10:12	67.2	dB	13	6/11/2022 19:12	56.3	dB
14	6/11/2022 10:13	66.3	dB	14	6/11/2022 19:13	59.4	dB
15	6/11/2022 10:14	57.7	dB	15	6/11/2022 19:14	57.8	dB
16	6/11/2022 10:15	65.8	dB	16	6/11/2022 19:15	42.3	dB
17	6/11/2022 10:16	63.2	dB	17	6/11/2022 19:16	52.9	dB
18	6/11/2022 10:17	68.6	dB	18	6/11/2022 19:17	54.5	dB
19	6/11/2022 10:18	66.4	dB	19	6/11/2022 19:18	58.7	dB
20	6/11/2022 10:19	58.7	dB	20	6/11/2022 19:19	53.4	dB
21	6/11/2022 10:20	54.4	dB	21	6/11/2022 19:20	47.7	dB
22	6/11/2022 10:21	66.4	dB	22	6/11/2022 19:21	44.3	dB
23	6/11/2022 10:22	64.9	dB	23	6/11/2022 19:22	52.6	dB
24	6/11/2022 10:23	65.5	dB	24	6/11/2022 19:23	54.5	dB
25	6/11/2022 10:24	64.7	dB	25	6/11/2022 19:24	51.1	dB
26	6/11/2022 10:25	70.6	dB	26	6/11/2022 19:25	40.4	dB
27	6/11/2022 10:26	64.8	dB	27	6/11/2022 19:26	55.3	dB
28	6/11/2022 10:27	60.3	dB	28	6/11/2022 19:27	41.2	dB
29	6/11/2022 10:28	52.3	dB	29	6/11/2022 19:28	48.5	dB
30	6/11/2022 10:29	68.4	dB	30	6/11/2022 19:29	49.4	dB
31	6/11/2022 10:30	74.9	dB	31	6/11/2022 19:30	52.3	dB
32	6/11/2022 10:31	58.3	dB	32	6/11/2022 19:31	53.8	dB
33	6/11/2022 10:32	71.3	dB	33	6/11/2022 19:32	54.4	dB
34	6/11/2022 10:33	64.7	dB	34	6/11/2022 19:33	56.6	dB

35	6/11/2022 10:34	63.6	dB	35	6/11/2022 19:34	53.1	dB
36	6/11/2022 10:35	66.5	dB	36	6/11/2022 19:35	50.2	dB
37	6/11/2022 10:36	60.6	dB	37	6/11/2022 19:36	51.4	dB
38	6/11/2022 10:37	68.4	dB	38	6/11/2022 19:37	56.7	dB
39	6/11/2022 10:38	66.7	dB	39	6/11/2022 19:38	64.4	dB
40	6/11/2022 10:39	67.3	dB	40	6/11/2022 19:39	58.6	dB
41	6/11/2022 10:40	71.4	dB	41	6/11/2022 19:40	52.9	dB
42	6/11/2022 10:41	66.3	dB	42	6/11/2022 19:41	54.9	dB
43	6/11/2022 10:42	60.1	dB	43	6/11/2022 19:42	56.6	dB
44	6/11/2022 10:43	51.7	dB	44	6/11/2022 19:43	58.3	dB
45	6/11/2022 10:44	55.6	dB	45	6/11/2022 19:44	55.8	dB
46	6/11/2022 10:45	62.6	dB	46	6/11/2022 19:45	52.4	dB
47	6/11/2022 10:46	61.7	dB	47	6/11/2022 19:46	57.6	dB
48	6/11/2022 10:47	70.5	dB	48	6/11/2022 19:47	55.4	dB
49	6/11/2022 10:48	65.7	dB	49	6/11/2022 19:48	54.9	dB
50	6/11/2022 10:49	61.5	dB	50	6/11/2022 19:49	57.8	dB
51	6/11/2022 10:50	58.4	dB	51	6/11/2022 19:50	63.1	dB
52	6/11/2022 10:51	56.2	dB	52	6/11/2022 19:51	56.7	dB
53	6/11/2022 10:52	64.5	dB	53	6/11/2022 19:52	57.3	dB
54	6/11/2022 10:53	62.4	dB	54	6/11/2022 19:53	52.5	dB
55	6/11/2022 10:54	66.3	dB	55	6/11/2022 19:54	44.4	dB
56	6/11/2022 10:55	59.5	dB	56	6/11/2022 19:55	50.6	dB
57	6/11/2022 10:56	67.9	dB	57	6/11/2022 19:56	57.2	dB
58	6/11/2022 10:57	56.7	dB	58	6/11/2022 19:57	48.3	dB
59	6/11/2022 10:58	66.3	dB	59	6/11/2022 19:58	55.5	dB
60	6/11/2022 10:59	62.6	dB	60	6/11/2022 19:59	58.7	dB
NL-1: Kodda Flyover, Day Time				**NL-1: Kodda Flyover, Night Time**			

Sl. No.	Date & Time	Value	Unit	Sl. No.	Date & Time	Value	Unit
1	6/12/2022 11:01	58.3	dB	1	6/12/2022 20:25	44.6	dB
2	6/12/2022 11:02	53.9	dB	2	6/12/2022 20:26	38.5	dB
3	6/12/2022 11:03	56.4	dB	3	6/12/2022 20:27	40.7	dB
4	6/12/2022 11:04	55.7	dB	4	6/12/2022 20:28	45.8	dB
5	6/12/2022 11:05	50.9	dB	5	6/12/2022 20:29	37.8	dB
6	6/12/2022 11:06	49.6	dB	6	6/12/2022 20:30	44.7	dB
7	6/12/2022 11:07	54.4	dB	7	6/12/2022 20:31	48.8	dB
8	6/12/2022 11:08	57.5	dB	8	6/12/2022 20:32	41.6	dB
9	6/12/2022 11:09	60	dB	9	6/12/2022 20:33	43.9	dB
10	6/12/2022 11:10	60.6	dB	10	6/12/2022 20:34	48.7	dB
11	6/12/2022 11:11	57.5	dB	11	6/12/2022 20:35	43.5	dB
12	6/12/2022 11:12	48.8	dB	12	6/12/2022 20:36	45.3	dB
13	6/12/2022 11:13	47.9	dB	13	6/12/2022 20:37	40.6	dB
14	6/12/2022 11:14	57.1	dB	14	6/12/2022 20:38	39.8	dB
15	6/12/2022 11:15	48.8	dB	15	6/12/2022 20:39	39.3	dB
16	6/12/2022 11:16	50.9	dB	16	6/12/2022 20:40	43.9	dB
17	6/12/2022 11:17	48.8	dB	17	6/12/2022 20:41	45.1	dB
18	6/12/2022 11:18	46.6	dB	18	6/12/2022 20:42	46.7	dB
19	6/12/2022 11:19	52.3	dB	19	6/12/2022 20:43	48.2	dB
20	6/12/2022 11:20	56.1	dB	20	6/12/2022 20:44	44.7	dB
21	6/12/2022 11:21	51.7	dB	21	6/12/2022 20:45	42.8	dB
22	6/12/2022 11:22	59.7	dB	22	6/12/2022 20:46	39.7	dB
23	6/12/2022 11:23	51.7	dB	23	6/12/2022 20:47	43.8	dB
24	6/12/2022 11:24	56.4	dB	24	6/12/2022 20:48	47.2	dB
25	6/12/2022 11:25	49.6	dB	25	6/12/2022 20:49	42.2	dB
26	6/12/2022 11:26	52.3	dB	26	6/12/2022 20:50	43.4	dB
27	6/12/2022 11:27	55.2	dB	27	6/12/2022 20:51	44.8	dB
28	6/12/2022 11:28	60	dB	28	6/12/2022 20:52	43.3	dB
29	6/12/2022 11:29	51.7	dB	29	6/12/2022 20:53	40.7	dB
30	6/12/2022 11:30	50.3	dB	30	6/12/2022 20:54	39.8	dB
31	6/12/2022 11:31	52.3	dB	31	6/12/2022 20:55	43.4	dB
32	6/12/2022 11:32	58.1	dB	32	6/12/2022 20:56	41	dB
33	6/12/2022 11:33	47.9	dB	33	6/12/2022 20:57	43.9	dB
34	6/12/2022 11:34	50.9	dB	34	6/12/2022 20:58	46.7	dB
35	6/12/2022 11:35	47.9	dB	35	6/12/2022 20:59	46.5	dB

36	6/12/2022 11:36	46.6	dB	36	6/12/2022 21:00	46.7	dB
37	6/12/2022 11:37	60.4	dB	37	6/12/2022 21:01	43.8	dB
38	6/12/2022 11:38	45.5	dB	38	6/12/2022 21:02	41.1	dB
39	6/12/2022 11:39	50.9	dB	39	6/12/2022 21:03	43.7	dB
40	6/12/2022 11:40	52.3	dB	40	6/12/2022 21:04	44.6	dB
41	6/12/2022 11:41	53.9	dB	41	6/12/2022 21:05	41.5	dB
42	6/12/2022 11:42	44.2	dB	42	6/12/2022 21:06	46.5	dB
43	6/12/2022 11:43	51.7	dB	43	6/12/2022 21:07	41.8	dB
44	6/12/2022 11:44	53.9	dB	44	6/12/2022 21:08	40.7	dB
45	6/12/2022 11:45	52.8	dB	45	6/12/2022 21:09	40.3	dB
46	6/12/2022 11:46	61.1	dB	46	6/12/2022 21:10	39.9	dB
47	6/12/2022 11:47	53.3	dB	47	6/12/2022 21:11	40.3	dB
48	6/12/2022 11:48	56.1	dB	48	6/12/2022 21:12	39.2	dB
49	6/12/2022 11:49	50.3	dB	49	6/12/2022 21:13	38.9	dB
50	6/12/2022 11:50	48.8	dB	50	6/12/2022 21:14	38.3	dB
51	6/12/2022 11:51	46.6	dB	51	6/12/2022 21:15	39.7	dB
52	6/12/2022 11:52	50.3	dB	52	6/12/2022 21:16	39.6	dB
53	6/12/2022 11:53	53.3	dB	53	6/12/2022 21:17	38.9	dB
54	6/12/2022 11:54	44.2	dB	54	6/12/2022 21:18	38.7	dB
55	6/12/2022 11:55	52.3	dB	55	6/12/2022 21:19	40.5	dB
56	6/12/2022 11:56	61.9	dB	56	6/12/2022 21:20	39.5	dB
57	6/12/2022 11:57	47.9	dB	57	6/12/2022 21:21	43.5	dB
58	6/12/2022 11:58	55.7	dB	58	6/12/2022 21:22	39.3	dB
59	6/12/2022 11:59	52.8	dB	59	6/12/2022 21:23	42.4	dB
60	6/12/2022 12:00	49.6	dB	60	6/12/2022 21:24	41.5	dB
NL-2: Nalka bridge site, Day time				**NL-2: Nalka bridge site, Night time**			

Appendix C:

Environmental Quality Parameter Test Results of WP-07

SL No: 6260

Ref: EQMS/Air Quality/20220101774

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Ambient Air Quality

Project Name	:	Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures, WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II
Monitoring Activity	:	Ambient Air Quality
Monitoring Personnel	:	Md. Abdur Rab, Assistant Consultant, EQMS Consulting Limited
Monitoring Location	:	AQ1- Batching Plant of Construction Camp, Chonka, Bogra (Ch 23+580 km) AQ2- In Front of Kurban's House, Talpara, Hatikumrul, Sirajganj (Ch 1+091 km)
GPS Coordinate	:	24°35'18.86"N 89°27'15.40"E and 24°25'43.78"N 89°32'50.95"E
Monitoring Date	:	12-13.06.2022
Analysis Date	:	15.06.2022

Description of Analysis:

Location	Sampling Date	Ambient Air Pollutants' Concentration in µg/m³						TVOC mg/m³	CO ppm
		PM_{10}	$PM_{2.5}$	SO_2	NO_2	NO	O_3		
AQ1	12.06.2022	95.8	38.1	39.5	43.6	24.5	4.8	0.07	0.03
AQ2	13.06.2022	98.5	41.4	59.4	51.3	34.1	6.4	0.08	0.02
ECR, 1997 and amendment in 2005 Standard (Schedule-2)		150	65	365	100 Annual	-	157	-	9
WB Standard**		50	25	20	200 1 hour	-	100	-	9
Method of Analysis Instrument Use: Haz-Scanner™ HIM 6000		Light Scattering Nephelometer	Light Scattering Nephelometer	High Sensitivity Electrochemical	High Sensitivity Electrochemical	High Sensitivity Electrochemical	Mixed Metal Oxide	High Sensitivity Electrochemical	High Sensitivity Electrochemical

Note:
**ECR, 1997 = Environmental Conservation Rules, 1997.*
***WB=World Bank, IFC=International Finance Cooperation*
Legend:
PM_{10} -Particulate Matter of a diameter of 10 microns or less. $PM_{2.5}$ -Particulate Matter of a diameter of 2.5 microns or less, SO_2 –Sulphur Dioxide; NO_2 –Nitrogen Dioxide; NO –Nitric Oxide; O_3 –Ozone, TVOC –Total Volatile Organic Compounds; CO –Carbon Monoxide

EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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EQMS

Weather Condition:

Code	Coordinate	Temperature (°C)	Wind Speed (km/h)	Wind Direction	Relative Humidity (%)	Remarks/ Comments
AQ1	24°35'18.86"N 89°27'15.40"E	33	14	SW	74	Partly Sunny Day
AQ2	24°25'40.80"N 89°32'52.20"E	34	15	SW	75	Partly Sunny Day

Received By:

Muzahid Rahman
Assistant Consultant
EQMS Consulting Limited

Analyzed By:

Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:

Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6171

Ref: EQMS/Noise Level/20220101635

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Noise Level

Project Name : Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures; WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II

Monitoring Activity : Noise Level

Monitoring Personnel : Abdur Rab, Assistant Consultant, EQMS Consulting Limited

Monitoring Locations : NL1 (Ch 23+560 km); NL2 (Ch 19+240 km); NL4 (Ch 10+050 km); NL5 (Ch 5+530 km); NL6 (Ch 1+080 km)

Monitoring Date : 18.04.2022

Analysis Date : 26.04.2022

Description of Analysis:

Code	Locations	Noise Level (dBA)				*Standard (dBA)	
		L_{eqday}	$L_{eqnight}$	L_{max}	L_{min}	Day	Night
NL1	Mosque of Construction Camp, Chonka, Bogra	58.4	47.3	68.3	39.6	60	50
NL2	In front of Shohor Ali House, Betgari, Sirajganj	67.7	48.2	79.3	41.4	55	45
NL4	Bhuiyagati Bus Stand Shahi Jame Mosque, Sirajganj	65.6	48.5	77.8	52.5	60	50
NL5	Gurkha Adarsha High School, Gurkha, Sirajganj	62.4	44.6	74.4	45.6	50	40
NL6	Hatikumrul Bazar Mosque, Hatikumrul, Sirajganj	71.1	53.7	85.7	43.4	70	60
Instrument Use	**Teckoplus Sound Level Meter; Model: SLM25K**						
***Standard (ECR'1997) & Noise Pollution (Control) Rules, 2006**							
Silent area						50	40
Residential area						55	45
Mixed area						60	50
Commercial Area						70	60
Industrial area						75	70

Received By:

Shihabuddin Ahmed
Consultant
EQMS Consulting Limited

Analyzed By:

Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:

Md. Jahidul Islam
Quality Manger
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontaria, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6151

Ref: EQMS/Noise Level/20220101642

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Noise Level

Project Name : Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures, WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II

Monitoring Activity : Noise Level

Monitoring Personnel : Abdur Rab, Assistant Consultant, EQMS Consulting Limited

Monitoring Locations : NL1 (Ch 23+560 km); NL2 (Ch 19+240 km); NL4 (Ch 10+050 km); NL5 (Ch 5+530 km); NL6 (Ch 1+080 km)

Monitoring Date : 24.05.2022

Analysis Date : 26.05.2022

Description of Analysis:

Code	Locations	Noise Level (dBA)				*Standard (dBA)	
		$L_{eq_{day}}$	$L_{eq_{night}}$	L_{max}	L_{min}	Day	Night
NL1	Mosque of Construction Camp, Chonka, Bogra	59.4	46.6	67.2	42.5	60	50
NL2	In front of Shohor Ali House, Betgari, Sirajganj	65.3	47.2	76.3	40.3	55	45
NL4	Bhuiyagati Bus Stand Shahi Jame Mosque, Sirajganj	66.1	48.5	73.6	51.6	60	50
NL5	Gurkha Adarsha High School, Gurkha, Sirajganj	63.2	46.7	71.7	42.3	50	40
NL6	Hatikumrul Bazar Mosque, Hatikumrul, Sirajganj	70.2	50.7	79.4	42.9	70	60
Instrument Use	**Teckoplus Sound Level Meter; Model: SLM25K**						
***Standard (ECR'1997) & Noise Pollution (Control) Rules, 2006**							
Silent area						50	40
Residential area						55	45
Mixed area						60	50
Commercial Area						70	60
Industrial area						75	70

Received By: Shihabuddin Ahmed, Consultant, EQMS Consulting Limited

Analyzed By: Md. Shahparan, Technical Manager, EQMS Consulting Limited

Checked By: Md. Jahidul Islam, Quality Manger, EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6265

Ref: EQMS/Noise Level/20220101775

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Noise Level

Project Name : Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures, WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II

Monitoring Activity : Noise Level

Monitoring Personnel : MD. Abdur Rab, Assistant Consultant, EQMS Consulting Limited

Monitoring Locations : NL1 (Ch 23+560 km); NL2 (Ch 19+240 km); NL4 (Ch 10+050 km); NL5 (Ch 5+530 km); NL6 (Ch 1+080 km)

Monitoring Date : 12-13.06.2022

Analysis Date : 14.06.2022

Description of Analysis:

Code	Locations	Noise Level (dBA)				*Standard (dBA)	
		L_{eqday}	$L_{eqnight}$	L_{max}	L_{min}	Day	Night
NL1	Mosque of Construction Camp, Chonka, Bogra	57.2	46.1	68.6	44.5	60	50
NL2	In front of Shohor Ali House, Betgari, Sirajganj	64.6	46.4	73.5	41.7	55	45
NL4	Bhuiyagati Bus Stand Shahi Jame Mosque, Sirajganj	64.8	47.2	72.5	49.8	60	50
NL5	Gurkha Adarsha High School, Gurkha, Sirajganj	64.1	47.3	70.6	43.7	50	40
NL6	Hatikumrul Bazar Mosque, Hatikumrul, Sirajganj	71.1	51.3	80.4	40.1	70	60
Instrument Use	**Teckoplus Sound Level Meter; Model: SLM25K**						
***Standard (ECR'1997) & Noise Pollution (Control) Rules, 2006**							
Silent area						50	40
Residential area						55	45
Mixed area						60	50
Commercial Area						70	60
Industrial area						75	70

Received By: Muzahid Rahman, Assistant Consultant, EQMS Consulting Limited

Analyzed By: Md. Shahparan, Technical Manager, EQMS Consulting Limited

Checked By: Md. Jahidul Islam, Quality Manger, EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Bashlakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Annex 0-1: Surface Water Quality Analyis Report

Sl No: 6262

Ref: EQMS/Water Quality/20220101776

EQMS WET LABORATORY

Test Results of Surface Water Quality

Project Name	:	Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures, WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II
Description of Sample	:	Surface Water
Sample Collector	:	Md. Abdur Rab, Asst. Consultant, EQMS Consulting Limited
Sampling Location	:	SW1-Ghoga River Near Garoy Bazar (Ch 21+320 km) SW2-Bangali River Near Bhuiyagati Bazar (Ch 10+970 km)
GPS Coordinate	:	24°34'23.21"N 89°28'0.14"E and 24°30'9.42"N 89°30'30.25"E
Sampling Date	:	13.06.2022
Reporting Date	:	14.06.2022

Description of Analysis :

Parameter	Unit	Analysis Method	SW1	SW2	Bangladesh Standards*
Electrical Conductivity (EC)	µS/cm	Hanna Combo Meter	117	132	--
pH	--	Hanna Combo Meter	7.4	7.2	6.5 - 8.5
Total Suspended Solid (TSS)	mg/l	Gravimetric Method	5	7	--
Total Dissolved Solid (TDS)	mg/l	Hanna Combo Meter	120	153	--
Biological Oxygen Demand (BOD)	mg/l	5 days Incubation	2.0	2.3	6 or less
Dissolved Oxygen (DO)	mg/l	Hanna Combo Meter	6.3	6.4	5 or more
Total Organic Content (TOC)	mg/l	APHA Method 5310B	1.3	1.5	--
Total Phosphate (PO_4^{3-})	mg/l	Amino Acid	0.2	0.5	--
Oil and Grease	mg/l	APHA Method 5520B	<2.0	<2.0	--

* *The Environment Conservation Rules, 1997* [Schedule 3 (A)].

Received By:
Muzahid Rahman
Assistant Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 58, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Annex 0-2: Ground Water Quality Analyis Report

SL No: 6263

Ref: EQMS/Water Quality/20220101777

EQMS WET LABORATORY

Test Results of Ground Water Quality

Project Name	:	Improvement of Road from Hatikamrul - Mirzapur to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures, WP-07 under The South Asian Subregional Economic Cooperation (SASEC) Road Connectivity Project -II
Description of Sample	:	Ground Water
Sample Collector	:	Md. Abdur Rab, Assistant Consultant, EQMS Consulting Limited
Sampling Location	:	GW1- Site Office of Construction Camp (Ch 23+570 km) GW2- Staff Residence of Construction Camp (Ch 23+820 km)
GPS Coordinate	:	24°35'18.84"N 89°27'16.39"E and 24°35'25.50"N 89°27'12.52"E
Sampling Date	:	12.06.2022
Reporting Date	:	14.06.2022

Description of Analysis :

Parameter	Unit	Analysis Method	GW1	GW2	Bangladesh Standards*
pH	--	Hanna Combo Meter	7.4	7.2	6.5-8.5
Manganese (Mn)	mg/l	Periodate Oxidation/AAS	0.0	0.01	0.1
Arsenic (As)	mg/l	Modified Gutzeit Method	0.0	0.0	0.05
Iron (Fe)	mg/l	Phenanthroline Method	0.01	0.01	0.3-1.0
Chlorine (Cl^-)	mg/l	Titrimetric Method	0.04	0.04	0.2
Total Hardness	mg/l	Colorimetric Method	28	27	200-500
Total Coliform (TC)	N/100ml	Membrane Filtration Method	0	0	0
Fecal Coliform (FC)	N/100ml	Membrane Filtration Method	0	0	0

* *The Environment Conservation Rules, 1997* [Schedule 3 (B)].

Received By:
Muzahid Rahman
Assistant Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Appendix D:

Environmental Quality Parameter Test Results of WP-08

SL No: 7074

Ref: EQMS/Air Quality/20220101404

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Ambient Air Quality

Project Name	:	Improvement of Road from Mirzapur to Banani (Bogra) to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)
Monitoring Activity	:	Ambient Air Quality
Monitoring Personnel	:	EQMS Personnel (Mr. Syed Galib Shah)
Monitoring Date	:	24.03.2022 – 25.03.2022
Analysis Date	:	30.03.2022

Description of Analysis:

Location	Sampling Date	Ambient Air Pollutants' Concentration in µg/m³						TVOC mg/m³	CO ppm
		PM_{10}	$PM_{2.5}$	SO_2	NO_2	NO	O_3		
AQ1	24.03.2022	124.34	41.23	35.67	34.56	25.12	0.78	0.17	0.14
AQ2	25.03.2022	141.23	50.48	32.42	37.21	29.45	4.34	0.16	0.09
ECR, 1997 and amendment in 2005 Standard (Schedule-2)		150	65	365	100 Annual	-	157	-	9
WB Standard**		50	25	20	200 1 hour	-	100	-	9
Method of Analysis Instrument Use: Haz-Scanner™ HIM 6000		*Light Scattering Nephelometer*	*Light Scattering Nephelometer*	*High Sensitivity Electrochemical*	*High Sensitivity Electrochemical*	*High Sensitivity Electrochemical*	*Mixed Metal Oxide*	*High Sensitivity Electrochemical*	*High Sensitivity Electrochemical*

Note:
**ECR, 1997 = Environmental Conservation Rules, 1997.*
***WB=World Bank, IFC=International Finance Cooperation*
Legend:
PM_{10}-Particulate Matter of a diameter of 10 microns or less, $PM_{2.5}$-Particulate Matter of a diameter of 2.5 microns or less, SO_2 – Sulphur Dioxide; NO_2 –Nitrogen Dioxide; NO –Nitric Oxide; O_3 –Ozone, TVOC –Total Volatile Organic Compounds; CO – Carbon Monoxide

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 7075

EQMS

Ref: EQMS/Air Quality/20220101404

Weather Condition:

Code	Coordinate	Temperature (°C)	Wind Speed (km/h)	Wind Direction	Relative Humidity (%)	Remarks/ Comments
AQ1	24°41'9.30"N 89°24'29.35"E	29	11	SSW	43	Sunny Day
AQ2	24°41'31.81"N 89°24'21.74"E	30	9	SSW	55	Sunny Day

Received By:

Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:

Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:

Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 7076

EQMS

Ref: EQMS/Noise Level/20220101405

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Noise Level Measurement

Project Name : SASEC II Road Connectivity Project (WP-08)
Monitoring Activity : Noise Level
Monitoring Personnel : EQMS Personnel
Monitoring Date : 24.03.2022 – 26.03.2022
Analysis Date : 29.03.2022
Description of Analysis:

Code and area	$L_{Aeq\ day}$	Standard dBA
Base Camp	56.12	60
Near Fotki Bridge	68.31	60
Sajapur Fotullah Ahmadia Fazil Degree Madrasah	53.10	50
Union Health and Family welfare Centre, Aria, Shajahanpur, Bogra	65.34	55
Garidoho Govt Primary School, Bogra	55.71	60
Base Camp -2	55.23	60
Instrument Use	Techoplus Sound Level Meter; Model: SLM25K	
Standard (ECR 1997) & Noise Pollution (Control) Rules, 2006		
Silent area		50
Residential area		55
Mixed area		60
Commercial Area		70
Industrial area		75
World Bank / IFC Standard		
Residential; Institutional; Educational		55
Industrial		70

Received By:
Md Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manger
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Sl. No: 7077

EQMS

Ref: EQMS/Water Quality/20220101406

EQMS WET LABORATORY

Test Results of Surface Water Quality

Project Name : Improvement of Road from Mirzapur to Banani (Bogra) to a Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)

Description of Sample : Surface Water
Sample Collector : EQMS Personnel (Mr. Syed Galib Shah)
Sampling Date : 26.03.2022
Reporting Date : 30.03.2022

Description of Analysis :

Parameter	Unit	Analysis Method	SW1	SW2	Bangladesh Standards*
Electrical Conductivity (EC)	µS/cm	Hanna Combo Meter	119	121	--
pH	--	Hanna Combo Meter	8.7	7.2	6.5 - 8.5
Total Suspended Solid (TSS)	mg/l	Gravimetric Method	14	12	--
Total Dissolved Solid (TDS)	mg/l	Hanna Combo Meter	231	155	--
Biological Oxygen Demand (BOD)	mg/l	5 days Incubation	3.8	2.5	6 or less
Dissolved Oxygen (DO)	mg/l	Hanna Combo Meter	4.4	5.8	5 or more
Total Organic Content (TOC)	mg/l	APHA Method 5310B	3.12	3.8	--
Total Phosphate (PO_4^{3-})	mg/l	Amino Acid	0.3	1.6	--
Oil and Grease	mg/l	APHA Method 5520B	2.5	<2.0	--

* *The Environment Conservation Rules, 1997* [Schedule 3 (A)]

Received By:
Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Sl. No: 7078

Ref: EQMS/Water Quality/20220101407

EQMS WET LABORATORY

Test Results of Ground Water Quality

Project Name : Improvement of Road from Mirzapur to Banani (Bogra) to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)
Description of Sample : Ground Water
Sample Collector : EQMS Personnel (Mr. Syed Galib Shah)
Sampling Date : 26.03.2022
Reporting Date : 30.03.2022

Description of Analysis :

Parameter	Unit	Analysis Method	GW1	GW2	Bangladesh Standards*
pH	--	Hanna Combo Meter	6.8	6.9	6.5-8.5
Manganese (Mn)	mg/l	Periodate Oxidation/ AAS	0.01	0.01	0.1
Arsenic (As)	mg/l	Modified Gutzeit Method	<0.01	<0.01	0.05
Iron (Fe)	mg/l	Phenanthroline Method	0.07	0.07	0.3-1.0
Chlorine (Cl^-)	mg/l	Titrimetric Method	0.4	0.4	0.2
Total Hardness	mg/l	Colorimetric Method	83	82	200-500
Total Coliform (TC)	N/100ml	MFM	0	0	0
Fecal Coliform (FC)	N/100ml	MFM	0	0	0

* *The Environment Conservation Rules, 1997* [Schedule 3 (8)], MFM- Membrane Filtration Method

Received By:
Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Sl. No: 6238

Ref: EQMS/Air Quality/20220101762

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Ambient Air Quality

Project Name : Improvement of Road from Mirzapur to Banani (Bogra) to a Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)

Monitoring Activity : Ambient Air Quality

Monitoring Personnel : EQMS Personnel (Mr. Abdur Rab)

Monitoring Date : 14.06.2022 – 15.06.2022

Analysis Date : 19.06.2022

Description of Analysis:

Location	Sampling Date	Ambient Air Pollutants' Concentration in µg/m³						TVOC mg/m³	CO ppm
		PM_{10}	$PM_{2.5}$	SO_2	NO_2	NO	O_3		
AQ1	14.05.2022	96.34	38.21	34.42	32.12	25.15	0.68	0.15	0.12
AQ2	15.05.2022	104.23	39.25	35.51	33.41	26.14	0.71	0.16	0.14
ECR, 1997 and amendment in 2005 Standard (Schedule-2)		150	65	365	100 Annual	-	157	-	9
WB Standard**		50	25	20	200 1 hour	-	100	-	9
Method of Analysis Instrument Use: Haz-Scanner™ HIM 6000		Light Scattering Nephelometer	Light Scattering Nephelometer	High Sensitivity Electrochemical	High Sensitivity Electrochemical	High Sensitivity Electrochemical	Mixed Metal Oxide	High Sensitivity Electrochemical	High Sensitivity Electrochemical

Note:
*ECR, 1997 = Environmental Conservation Rules, 1997.
**WB=World Bank, IFC=International Finance Cooperation
Legend:
PM_{10} -Particulate Matter of a diameter of 10 microns or less. $PM_{2.5}$ -Particulate Matter of a diameter of 2.5 microns or less. SO_2 –Sulphur Dioxide; NO_2 –Nitrogen Dioxide; NO –Nitric Oxide; O_3 –Ozone, TVOC –Total Volatile Organic Compounds; CO –Carbon Monoxide

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Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6239

EQMS

Ref: EQMS/Air Quality/20220101762

Weather Condition:

Code	Coordinate	Temperature (°C)	Wind Speed (km/h)	Wind Direction	Relative Humidity (%)	Remarks/ Comments
AQ1	24°41'9.30"N 89°24'29.35"E	31	10	SSW	45	Sunny Day
AQ2	24°41'31.81"N 89°24'21.74"E	30	8	SSW	52	Sunny Day

Received By:

Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:

Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:

Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6240

Ref: EQMS/Noise Level/20220101763

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Noise Level Measurement

Project Name : SASEC II Road Connectivity Project (WP-08)
Monitoring Activity : Noise Level
Monitoring Personnel : EQMS Personnel
Monitoring Date : 14.06.2022 – 17.06.2022
Analysis Date : 19.06.2022
Description of Analysis:

Name of the location	$L_{Aeq\ day}$	Standard dBA
Base Camp	57.23	60
Near Fotki Bridge	65.43	60
Sajapur Fotullah Ahmadia Fazil Degree Madrasah	54.21	50
Union Health and Family welfare Centre, Aria, Shajahanpur, Bogra	64.67	55
Garidoho Govt Primary School, Bogra	56.23	60
Base Camp -2	56.15	60
Instrument Use	Techoplus Sound Level Meter; Model: SLM25K	
Standard (ECR 1997) & Noise Pollution (Control) Rules, 2006		
Silent area		50
Residential area		55
Mixed area		60
Commercial Area		70
Industrial area		75
World Bank / IFC Standard		
Residential; Institutional; Educational		55
Industrial		70

Received By:
Md Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manger
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6241

Ref: EQMS/Water Quality/20220101764

EQMS WET LABORATORY

Test Results of Surface Water Quality

Project Name : Improvement of Road from Mirzapur to Banani (Bogra) to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)
Description of Sample : Surface Water
Sample Collector : EQMS Personnel (Mr. Abdur Rab)
Sampling Date : 14.05.2022
Reporting Date : 30.05.2022

Description of Analysis :

Parameter	Unit	Analysis Method	SW1	SW2	Bangladesh Standards*
Electrical Conductivity (EC)	µS/cm	Hanna Combo Meter	118	125	--
pH	--	Hanna Combo Meter	8.3	7.5	6.5 - 8.5
Total Suspended Solid (TSS)	mg/l	Gravimetric Method	12	10	--
Total Dissolved Solid (TDS)	mg/l	Hanna Combo Meter	216	148	--
Biological Oxygen Demand (BOD)	mg/l	5 days Incubation	3.4	2.3	6 or less
Dissolved Oxygen (DO)	mg/l	Hanna Combo Meter	4.1	5.1	5 or more
Total Organic Content (TOC)	mg/l	APHA Method 53108	3.36	3.2	--
Total Phosphate (PO_4^{3-})	mg/l	Amino Acid	0.4	1.1	--
Oil and Grease	mg/l	APHA Method 55208	2.7	<2.0	--

** The Environment Conservation Rules, 1997 [Schedule 3 (A)]*

Received By:
Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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SL No: 6242

Ref: EQMS/Water Quality/20220101765

EQMS WET LABORATORY

Test Results of Ground Water Quality

Project Name : Improvement of Road from Mirzapur to Banani (Bogra) to a 4 Lane Highway along with SMVT Lane on Both Sides and Structures under the South Asian Sub Regional Economic Cooperation (SASEC) II Road Connectivity Project (WP-08)
Description of Sample : Ground Water
Sample Collector : EQMS Personnel (Mr. Abdur Rab)
Sampling Date : 14.05.2022
Reporting Date : 30.05.2022

Description of Analysis :

Parameter	Unit	Analysis Method	GW1	GW2	Bangladesh Standards*
pH	--	Hanna Combo Meter	6.6	7.1	6.5-8.5
Manganese (Mn)	mg/l	Periodate Oxidation/AAS	0.01	0.01	0.1
Arsenic (As)	mg/l	Modified Gutzeit Method	<0.01	<0.01	0.05
Iron (Fe)	mg/l	Phenanthroline Method	0.07	0.06	0.3-1.0
Chlorine (Cl-)	mg/l	Photometric Method	BDL	BDL	0.2
Total Hardness	mg/l	Colorimetric Method	84	81	200-500
Total Coliform (TC)	N/100ml	MFM	0	0	0
Fecal Coliform (FC)	N/100ml	MFM	0	0	0

* The Environment Conservation Rules, 1997 [Schedule 3 (B)]. MFM - Membrane Filtration Method, BDL – Below Detection Limit

Received By:
Md. Shafiqul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Ahmed Jubayer
Chemist
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani, Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Appendix E:

Environmental Quality Parameter Test Results of WP-09

SL No: 6258

Ref: EQMS/Noise Level/20220101771

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level Measurement

Project Name : South Asian Sub-regional Economic Cooperation (SASEC) II, WP-09
Description of Sample : Noise Level Measurement
Sample Collector : Collected by EQMS Personnel
Sampling Date : 16.06.2022
Date of Analysis : 19.06.2022

Description of Analysis:

Code	Location	Leq day	Leq Night	Standard dBA Day	Standard dBA Night
NL 1	Chandihara Bazar Jame Mosjid, Chandihara, Bogra	65.3	62.5	**50**	**40**
NL 2	Construction Camp area, Chandihara, Bogra	57.6	51.3	**75**	**70**
NL 3	Residential area, TMSS, Bogra	62.1	57.3	**55**	**45**
NL 4	Baghopara Sahid Danesh Uddin School and College, Gokul, Bogra	66.7	63.4	**60**	**50**
NL 5	Mokamtola Bus Stand, Mokamtola, Bogra	65.2	62.1	**70**	**60**
NL 6	Rofatullah Community Hospital, TMSS, Bogra	62.7	56.9	**60**	**50**
Standard (ECR'1997) & Noise Pollution (Control) Rules 2006					
Silent area				50	40
Residential area				55	45
Mixed area				60	50
Commercial Area				70	60
Industrial area				75	70
World Bank/IFC Standard					
Residential; Institutional; Educational				55	
Industrial				70	

Note: Regular Checkup and calibration of equipment are done by the manufacturers and EQMS personnel to avoid any error.

Received By:
Shihabuddin Ahmed
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Checked By:
Md. Jahidul Islam
Quality Manager
EQMS Consulting Limited

Corporate Office : 2nd & 3rd Floor, House # 53, Road # 4, Block # C, Banani Dhaka-1213, Bangladesh.
Toronto Office : 7 Arnot Street, Scarborough, Ontario, M1K4B5, Canada.
Laboratory : Flat # F1, House # Ta-134/A, Baishakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Appendix F:

Environmental Quality Parameter Test Results of WP-10

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-10

Analysis Report of WP-10 (June)

Project Name : SASEC Road Connectivity Project-II (WP-10)
Sampling Title : Ambient Air Quality sampling
Sampling Date : 01.06.2022
Date of Testing : 01.06.2022
Analytical Result : Air Quality Analysis Result and Sampling Locations

Table 1: Ambient Air Quality Sampling Locations at WP-10

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	AQ1	Base Camp 1(gate)	25.193792° N	89.388688° E
02.	AQ2	Taltola Bridge	25.185449° N	89.388623° E
03.	AQ3	Katakhali Bridge	25.174013° N	89.3889° E

Table 2: Ambient Air Quality Parameters Analysis Data of WP-10

Parameter	Method	AQ1 mg/m³	Baseline1 mg/m³	AQ2 mg/m³	Baseline2 mg/m³	AQ3 mg/m³	Baseline3 mg/m³	DOE Standard
PM2.5	Gravimetric	33.14	33.84	30.19	56.65	31.81	27.23	65
PM10	Gravimetric	70.25	67.98	97.5	107.72	77.38	91.41	150
SPM	Gravimetric	115.22	123.29	131.38	190.44	114.52	130.33	200
SO2	West-Geake	24.13	32.47	21.94	19.51	24.62	22.48	365
NOx	Jacob and Hochheiser	17.25	19.78	14.35	12.92	18.54	9.56	NF*
CO	Jacob and Hochheiser	3.04	2	1.83	2	2.13	2	35

Mehrab

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

Resourcesafe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-10

Analysis Report of WP-10 (June)

Project Name : SASEC Road Connectivity Project-II (WP-10)

Sampling Title : Ambient Noise Level Measurement

Sampling Date : 01.06.2022

Date of Testing : 01.06.2022

Analytical Result : Noise Level Analysis Result and Sampling Locations

Table 1: Ambient Noise Level Measurement Locations at WP-10

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	NL1	Base Camp 1(gate)	25.193823° N	89.388678° E
02.	NL2	Base Camp 1	25.19428° N	89.38835° E
03.	NL3	Work Shop Site	25.194052° N	89.387649° E
04.	NL4	Nundoho Bridge	25.192296° N	89.388768° E
05.	NL5	Katakhali Bridge	25.174003° N	89.388894° E
06.	NL6	Taltola Bridge	25.185428° N	89.388623° E

Table 2: Ambient Noise Level Analysis Data of WP-10

Site Location ID	Site Condition	Concentration present (LAeq) dBA.	Baseline Value	DOE Standard
NL-01	Construction Stage	64.35	62.3	60
NL-02	Construction Stage	62.39	52.2	
NL-03	Construction Stage	69.11	55.9	
NL-04	Construction Stage	61.55	59.9	
NL-05	Construction Stage	70.83	56.6	
NL-06	Construction Stage	65.11	52.3	

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka,Bangladesh

Resourceable Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-10

Analysis Report of WP-10 (June)

Project Name : SASEC Road Connectivity Project-II (WP-10)

Sampling Title : Surface Water Sampling

Sampling Date : 01.06.2022

Date of Testing : 01.06.2022-10.06.2022

Analytical Result : Surface Water Analysis Result and Sampling Locations

Table 1: Surface Water Sampling Locations at WP-10

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	SW1	Nundoho Bridge	25.192281° N	89.38928° E
02.	SW2	Katakhali Bridge	25.173538° N	89.388645° E
03.	SW3	Taltola Bridge	25.185252° N	89.389577° E

Table 2: Surface Water Quality Parameter Analysis Data of WP-10

Parameter	SW1	Baseline1	SW2	Baseline2	SW3	Baseline3	DOE	Unit	Method
pH	7.6	6.7	7.3	7.1	7.6	6.9	6.5-8.5	-	APHA Method
Dissolved Oxygen (DO)	4.9	4.6	4.6	5.1	4.7	4.5	6.0	mg/l	APHA Method
BOD_5	0.19	2.1	0.2	2.6	0.17	2.1	0.2	mg/l	5-day BOD test
EC	166	310	172	170	269	170	-	µS/cm	Open Reflux
TDS	352	340	386	412	375	430	1000	mg/l	AAS
TSS	1.24	1.33	2.71	3.83	12.16	19.66	150	mg/l	AAS
PO4	0.04	0.1	0.8	0.07	0.7	0.07	6	mg/l	AAS
Oil & Grease	2.5	3.0	3.4	1.3	2.1	2.7	10	mg/l	APHA 5520.B

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka,Bangladesh

RCL

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-10

Analysis Report of WP-10 (June)

Project Name : SASEC Road Connectivity Project-II (WP-10)

Sampling Title : Ground Water Sampling

Sampling Date : 01.06.2022

Date of Testing : 01.06.2022-10.06.2022

Analytical Result : Ground Water Analysis Result and Sampling Locations

Table 1: Ground Water Sampling Locations at WP-10

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	GW1	Base Camp 1	25.193784° N	89.38873° E
02.	GW2	Katakhali Bridge	25.173765° N	89.38834° E
03.	GW3	Taltola Bridge	25.185822° N	89.388535° E

Table 2: Ground Water Quality Parameters Analysis Data of WP-10

Parameter	GW1	Baselie 1	GW2	Baseline 2	GW3	Baseline 3	DOE	Unit	Method
pH	6.7	7.07	7.2	7.17	7.0	6.97	6.5 – 8.5	-	APHA Method
Hardness	113	140	85	132	138	550	200-500	mg/l	Titrimetric
Chloride	54.4	<60	32.7	<60	44.7	60	150-600	mg/l	Photometric
As	0.002	0.01	0.002	0.01	0.003	0.008	0.05	mg/l	Atomic Absorption Spectrophotometer
Fe	0.14	9.93	0.26	0.16	0.19	0.21	0.3-1.0	mg/l	Spectrophotometry Technique
Mn	0.03	<0.01	0.02	<0.1	0.03	0.2	0.1	mg/l	AAS
Total Coliform	2	2	1	0	2	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	1	0	1	0	0	0	0	n/100 ml	Membrane Filter Technique

Mehrab

Mehrab Hossain

BSc in Civil and Environmental Engineering

Lab Incharge

RCL Laboratory Services

Dhaka, Bangladesh

RCL Resourceable Consultants LTD Dhaka

Md Milon Hossain

MSc in Environmental Science

Lab Technician

RCL Laboratory Services

Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

Appendix G:

Environmental Quality Parameter Test Results of WP-11

RCL Environmental Test & Analysis Services

Test result and Analysis of WP-11

Analysis Report of WP-11 (June)

Project Name : SASEC Road Connectivity Project-II (WP-11)
Sampling Title : Ambient Air Quality Sampling
Sampling Date : 02.06.2022
Date of Testing : 02.06.2022
Analytical Result : Air Quality Analysis Result and Sampling Locations

Table 1: Ambient Air Quality Sampling Locations at WP-11

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	AQ1	Base Camp3	25.356756° N	89.334499° E
02.	AQ2	Dhaper Hat	25.345475° N	89.342287° E
03.	AQ3	Base Camp 2	25.372869° N	89.330468° E

Table 2: Ambient air quality analysis data of WP-11

Parameter	Method	AQ1 mg/m³	Baseline1 mg/m³	AQ2 mg/m³	Baseline2 mg/m³	AQ3 mg/m³	Baseline3 mg/m³	DOE Standard
$PM_{2.5}$	Gravimetric	58.6	44.0	37.2	19.0	50.1	32.1	65
PM_{10}	Gravimetric	87	96.0	112	128.3	97	78.0	150
SPM	Gravimetric	163.3	157.1	168.3	158.5	128.6	123.1	200
SO2	West-Geake	26.84	19.92	34.15	29.08	24.02	12.33	365
NOx	Jacob and Hochheiser	38.17	40.66	57.1	46.29	28.62	14.37	NF*
CO	Jacob and Hochheiser	3	0	4.4	2	3.1	0	35

Mehrab
Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

RCL Resourcesafe Consultants Ltd. Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test result and Analysis of WP-11

Analysis Report of WP-11 (June)

Project Name : SASEC Road Connectivity Project-II (WP-11)

Sampling Title : Ambient Noise Level Measurement

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022

Analytical Result : Noise Level Analysis Result and Sampling Locations

Table 1: Ambient Noise Level Measurement Locations at WP-11

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	NL1	Base Camp1	25.425163° N	89.310827° E
02.	NL2	Champa Ganj	25.30812° N	89.342109° E
03.	NL3	Base Camp 2	25.372808° N	89.33052° E
04.	NL4	Base Camp 3	25.356753° N	89.334495° E
05.	NL5	Dhaper Hat	25.345459° N	89.342319° E
06.	NL6	Laldighi Underpass	25.440342° N	89.300912° E

Table 2: Ambient Noise Level Analysis Data of WP-11

Site Location ID	Site Condition	Concentration present (LAeq) dBA.	Baseline Value	DOE Standard
NL-01	Construction Stage	62.94	54.6	60
NL-02	Construction Stage	62.12	56.3	
NL-03	Construction Stage	62.60	60.3	
NL-04	Construction Stage	51.80	61.0	
NL-05	Construction Stage	66.77	63.2	
NL-06	Construction Stage	60.10	63.0	

Mehrab

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka,Bangladesh

Resourceable Consultants RCL Dhaka Ltd.

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test result and Analysis of WP-11

Analysis Report of WP-11 (June)

Project Name : SASEC Road Connectivity Project-II (WP-11)

Sampling Title : Surface Water Sampling

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022-10.06.2022

Analytical Result : Surface Water Analysis Result and Sampling Locations

Table 1: Surface Water Sampling Locations at WP-11

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	SW1	Idilpur	25.325514° N	89.33996° E
02.	SW2	Ongar Bridge	25.411288° N	89.322496° E
03.	SW3	Bolla's Canal	25.468508° N	89.29525° E

Table 2: Surface Water Quality Parameter Analysis Data of WP-11

Parameter	SW1	Baseline1	SW2	Baseline2	SW3	Baseline3	DOE	unit	method
pH	7.3	6.6	7.4	7.2	7.2	7.0	6.5-8.5	-	APHA Method
Dissolved Oxygen (DO)	5.8	5.4	6.1	6.5	5.9	5.1	6.0	mg/l	APHA Method
BOD_5	0.13	1.4	0.1	1.5	0.14	1.1	0.2	mg/l	5-day BOD test
EC	118	170	143	120	87	10	-	µS/cm	Open Reflux
TDS	60	127	91	285	44	410	1000	mg/l	AAS
TSS	29	33	6.7	4.0	9.8	7.5	150	mg/l	AAS
PO4	1.8	0.08	2.4	0.07	2.4	0.07	6	mg/l	AAS
Oil & Grease	2.0	1.9	3.0	2.1	3.4	1.7	10	mg/l	APHA 5520. B

Mehrab

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

Resourceeafe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test result and Analysis of WP-11

Analysis Report of WP-11 (June)

Project Name : SASEC Road Connectivity Project-II (WP-11)

Sampling Title : Ground Water Sampling

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022-10.06.2022

Analytical Result : Ground Water Analysis Result and Sampling Locations

Table 1: Ground Water Sampling Locations at WP-11

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	GW1	Base Camp 1	25.425101° N	89.310755° E
02.	GW2	Base Camp 2	25.372551° N	89.329816° E
03.	GW3	Base Camp 3	25.356389° N	89.33458° E

Table 2: Ground Water Quality Parameters Analysis Data of WP-11

Parameter	GW1	Baseline1	GW2	Baseline2	GW3	Baseline3	DOE	Unit	Method
pH	6.5	7.37	6.8	7.16	7.0	7.24	6.5 – 8.5	-	APHA Method
Hardness	152	93	148	45	85	33	200-500	mg/l	Titrimetric
Chloride	24.2	<60	24.8	<60	56.3	<60	150-600	mg/l	Photometric
As	0.016	<0.01	0.013	<0.004	0.028	<0.003	0.05	mg/l	AAS
Fe	0.04	0.16	0.03	0.28	0.22	0.51	0.3-1.0	mg/l	Atomic Absorption Spectrophotometer
Mn	0.03	<0.1	0.02	0.1	0.04	<0.1	0.1	mg/l	AAS
Total Coliform	3	0	2	0	3	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	2	0	2	0	4	0	0	n/100 ml	Membrane Filter Technique

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

Resourcesafe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

Appendix H:

Environmental Quality Parameter Test Results of WP-12

RCL Environmental Test & Analysis Services

Test result and Analysis of WP-12

Analysis Report of WP-12 (June)

Project Name : SASEC Road Connectivity Project-II (WP-12)

Sampling Title : Ambient Air Quality Sampling

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022

Analytical Result : Air Quality Analysis Result and Sampling Locations

Table 1: Ambient Air Quality Sampling Locations at WP-12

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	AQ1	Barodargah Bazar	25.507899° N	89.288933° E
02.	AQ2	Base Camp 1	25.532727° N	89.284374° E
03.	AQ3	Base Camp 2	25.628347° N	89.270034° E

Table 2: Ambient Air Quality Parameters Analysis Data of WP-12

Parameter	Method	AQ1 mg/m³	Baseline1 mg/m³	AQ2 mg/m³	Baseline2 mg/m³	AQ3 mg/m³	Baseline3 mg/m³	DOE Standard
$PM_{2.5}$	Gravimetric	49.14	15.05	55.61	27.27	54.32	31.36	65
PM_{10}	Gravimetric	91.52	83.03	98.18	29.84	106.49	87.15	150
SPM	Gravimetric	139.23	92.89	126.94	63.74	132.04	131.56	200
SO_2	West-Geake	19.60	8.78	49.88	14.41	29.02	40.70	365
NOx	Jacob and Hochheiser	23.38	11.82	33.67	19.34	26.28	8.72	NF*
CO	CO/O3 Meter	4.74	6	4.98	4	4.17	0	35

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka,Bangladesh

Resourcesafe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL

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Test Result and Analysis of WP-12

Analysis Report of WP-12 (June)

Project Name : SASEC Road Connectivity Project-II (WP-12)

Sampling Title : Ambient Noise Level Measurement

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022

Analytical Result : Noise Level Analysis Result and Sampling Locations

Table 1: Ambient Noise Level Measurement Locations at WP-12

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	NL1	Barodargah Bazar	25.50834° N	89.288923° E
02.	NL2	Base Camp 1	25.532723° N	89.283925° E
03.	NL3	Domdoma Bridge	25.679935° N	89.27358° E
04.	NL4	Modern More Bridge	25.707603° N	89.261653° E
05.	NL5	Outside of Base Camp 2	25.628647° N	89.269424° E
06.	NL6	Base Camp 2	25.628367° N	89.26999° E

Table 2: Ambient Noise Level Analysis Data of WP-12

Site Location ID	Site Condition	Concentration present (LAeq) dBA.	Baseline Value	DOE Standard
NL-01	Construction Stage	62.91	62.3	60
NL-02	Construction Stage	63.64	52.2	
NL-03	Construction Stage	67.69	55.9	
NL-04	Construction Stage	64.83	59.9	
NL-05	Construction Stage	60.31	56.6	
NL-06	Construction Stage	66.38	52.3	

Mehrab

Mehrab Hossain

BSc in Civil and Environmental Engineering

Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

RCL Resourcesafe Consultants Ltd. Dhaka

Md Milon Hossain

MSc in Environmental Science

Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-12

Analysis Report of WP-12 (June)

Project Name : SASEC Road Connectivity Project-II (WP-12)

Sampling Title : Surface Water Sampling

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022-11.06.2022

Analytical Result : Surface Water Analysis Result and Sampling Locations

Table 1: Surface Water Sampling Locations at WP-12

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	SW1	Barodargah Bazar	25.507881° N	89.289578° E
02.	SW2	Modern More Bridge	25.707196° N	89.261409° E
03.	SW3	Domdoma Bridge	25.679833° N	89.274034° E

Table 2: Surface Water Quality Parameter Analysis Data of WP-12

Parameter	SW1	Baseline1	SW2	Baseline2	SW3	Baseline3	DOE	Unit	Method
pH	6.9	7.1	7.0	6.6	7.0	7.2	6.5-8.5	-	APHA Method
Dissolved Oxygen (DO)	5.1	6.8	4.7	6.9	4.8	6.3	4.5-8	mg/l	APHA Method
BOD_5	0.09	1.9	0.15	2.8	0.1	1.9	0.2	mg/l	5-day BOD test
EC	403	220	459	210	281	210	-	µS/cm	Open Reflux
TDS	377	310	394	222	378	411	1000	mg/l	AAS
TSS	4.85	4.16	8.81	11.5	10.38	12.6	150	mg/l	AAS
PO4	0.06	0.07	0.06	0.07	0.08	0.07	6	mg/l	AAS
Oil & Grease	1.19	1.7	1.21	1.0	1.32	1.8	10	mg/l	APHA 5520.B

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

Resource Safe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

RCL Environmental Test & Analysis Services

Test Result and Analysis of WP-12

Analysis Report of WP-12 (June)

Project Name : SASEC Road Connectivity Project-II (WP-12)

Sampling Title : Ground Water Sampling

Sampling Date : 02.06.2022

Date of Testing : 02.06.2022-11.06.2022

Analytical Result : Ground Water Analysis Result and Sampling Locations

Table 1: Ground Water Sampling Locations at WP-12

Sl. No.	Sampling Code	Name of the Point	Geographic Coordinate	
01.	GW1	Barodargah Bazar	25.508018° N	89.289104° E
02.	GW2	Base Camp 1	25.532761° N	89.284205° E
03.	GW3	Base Camp 2	25.628631° N	89.269755° E

Table 2: Ground Water Quality Parameters Analysis Data of WP-12

Parameter	GW1	Baseline1	GW2	Baseline2	GW3	Baseline3	DOE	Unit	Method
pH	6.9	6.8	6.7	6.8	6.9	7.6	6.5 – 8.5	-	APHA Method
Hardness	272	367	109	55	203	55	200-500	mg/l	Titrimetric
Chloride	34.6	<60	24.1	<60	54.5	<60	150-600	mg/l	Photometric
As	0.003	<0.003	0.015	<0.003	0.004	0.003	0.05	mg/l	Atomic Absorption Spectrophotometer
Fe	0.47	6.05	0.15	0.31	0.36	0.6	0.3-1.0	mg/l	Atomic Absorption Spectrophotometer
Mn	0.04	0.1	0.03	0.1	0.04	0.1	0.1	mg/l	AAS
Total Coliform	1	1	2	0	0	0	0	n/100 ml	Membrane Filter Technique
Fecal Coliform	0	0	1	0	0	0	0	n/100 ml	Membrane Filter Technique

Mehrab Hossain
BSc in Civil and Environmental Engineering
Lab Incharge
RCL Laboratory Services
Dhaka, Bangladesh

Resourcesafe Consultants Ltd. RCL Dhaka

Md Milon Hossain
MSc in Environmental Science
Lab Technician
RCL Laboratory Services
Dhaka, Bangladesh

Address: Plot No. 8, Block-B, Kalwalapara Main Road, 1 No. Super Market, Chowdhury Mansion, Mirpur-1, Dhaka-1216
Mobile: +8801715974701; Email: resourcesafec@gmail.com, rcl.kabil.2016 @gmail.com, drmkh.du@gmail.com, Web. www.rclkabil.com

Appendix I:

Environmental Checklist:

Name of the Project: SASEC Road Connectivity Project-II, WP: 06

Name of EMO: For Md Mozaffor Rahman. Mobile # 01916276917

Date of Visit: 09, 10, 15. 18, June 2022 Time: 08 am to 05 pm. Chainage # 90+780km.
at 95+553km.
at 97+632km.
at 99+448km.
at 106+381km

1. Please check the construction items you visited:

☐Site clearing/grabbing activity	☐ Asphalt batching plant
☐Earth works and compaction√	☐ Concrete batching plant√
☐Borrow pits	☐ Stone crushing plant√
☐Piling works	☐ Asphalt/bituminous work
☐ Bridge construction work √	☐ Brick crushing plant√
☐Flyover construction work√	☐Oil dispensing system
☐Building construction work	☐ Lubricants/chemical materials storage√
☐ Overpass construction work	☐ Please mention any other……

2. Please tick the status of environmental and health safety level you observed during your visit:

	Worst ←			→ Best
Environmental issues				
☐Noise/Sound	☐ High	☐ Medium √	☐ Low	☐ Zero
☐ Water pollution	☐ High	☐ Medium	☐ Low	☐ Zero√
☐ Solid waste/construction debris√ Zero		☐ High	☐ Medium	☐ Low √
☐ Hazardous Waste	☐ High	☐ Medium	☐ Low √	☐ Zero
☐ Sewage leakage	☐ High	☐ Medium	☐ Low	☐ Zero√
☐ Spills / Site contamination	☐ High	☐ Medium	☐ Low √	☐ Zero
Health & Safety Issues				
☐ Housekeeping	☐ Poor	☐ Moderate		☐ Good√
☐ PPE use	☐ Poor	☐ Moderate √		☐ Good
☐ Safety signage/fence/barricade	☐ Poor	☐ Moderate		☐ Good √
☐ First aid and medical support	☐ Poor	☐ Moderate		☐ Good √

Note: *Please provide detail information for the environmental issues marked 'High' and 'Medium', and Health-Safety Issues with 'Moderate' and 'Poor' in relevant sections as follows.*

3.Emission

a. Please mention, which location is observed with air emission.	Chainage # 92+780km. at 95+553km. at 97+632km. at 99+448km ✓
b. Is there any sensitive receptors exposed to air pollution? If so, please give detail. (Distance from the source of pollution, type of receptor, number of exposed person etc.)	☐ Yes ☐ No
c. What measures are taken at site to control air quality. Please discuss with evidence i.e., data, pictures etc.	Regular maintenance of equipment and Water spray, while construction materials transported caver with tarpaulin.
d. Specify, what mitigation measures need to be implemented further to control air quality level within the DOE standards.	Provided proper PPE (Dust musk), Covered the stock pile materials, Water Spray, proper maintenance tuning of Engine, Engine Oil & fuel check and changed from time to time. The Area air quality is under the DOE standards (Ref: Air Quality test report Month of June,2022).
e. Who is responsible?	site Engineers, supervisor. HSE officer.

3. Noise/Sound Pollution

a. Please mention, which locations are observed with noise pollution.	Chainage # 92+780km. at 95+553km. at 97+632km. at99+448km
b. What are the sources of noise/sound?	☑ Generator, ☐ Metal Cutting Machine, ☐ Grinding machine, ☐ Vibrator, ☐ Crushing Machine, ☐ Hauling trucks, ☐ Existing Highway Traffic ☐ Others_____
c. Is there any sensitive receptors exposed to noise? If yes, please give detail. (Distance from the source of noise, type of receptor, number of exposed person etc.)	☐ Yes ☐ No Working with radial distance of less than 50-70 meters from the sound source.
d. What measures are taken at site to control noise? Please discuss with evidence i.e., data, pictures etc.	Provide proper PPE (Ear plug or earmuff) for the Construction worker. Aquatic enclosure; Barricade around the construction area. and Entry restricted for local people to avoid noise pollution exposure.
e. Specify, what mitigation measures need to be implemented further to control noise level within the DOE standards.	Ensure Enclosure to the Surrounding of the work area Were use high Noise Equipment. Heavy Equipment will be Equipped with built-in noise Control Devices.
f. Who is responsible?	site Engineers, supervisor. HSE officer.

4. Waste Management

a. What kinds of waste do you observed during site visit? Please mention by when waste will be disposed of properly:	☐Spoil, ☑Construction debris, ☐ Mud, etc. ☐ Any other, please mention ___Reusables materials_____ Volume of wastes (M^3): _____ approx. Location: Chainage # 97+632km, Number of days dumped here: 07 days _____
b. Are there any wastes creating unhygienic and filthy environment at the camp site?	☐ Yes ☑No If so, please explain _____
c. Are solid/hazardous wastes stored for reuse, recycle or disposal labeled properly for identification?	☑Yes ☐ No Please mention in detail __
d. Is there any drainage congestion due to waste/sediment disposal to drains or in runoff channel that cause localized inundation or stagnation?	☐ Yes ☐ No If yes, location: Problem caused in detail:
e. By when waste will be removed?	Designated area Dumped, Reusable when needed
f. Who is responsible?	site Engineer, Supervisor, HSE Officer.

5. Land degradation

a. Please check in the right column, if there is any land degradation due to careless excavation from borrow area: - Excavated borrow pits degraded agricultural lands by top soil loss.	☐ Yes ☐ No Location where land degradation happened:
b. Borrow pits opened on private land in consultation with the land owners and soil borrowed as the written direction of the land owners.	☐ Yes ☐ No Location of private borrow pit:
c. Please check whether borrow pit filling or excavation causes major ecosystem or biodiversity loss.	☐ Yes ☐ No

What measures is proposed for restoration: By when to be restored: Who is Responsible:	If yes, location: site Engineer, Supervisor

6. Storage of Chemicals/Oil/Hazardous Materials

a. Check the types of chemicals/ hazardous materials stored with approx quantity.	☐ Oil approx 2500 Ltrs ☐ Lubricants 1230 Ltrs ☐ Bitumens 5000 Ltrs ☐ Chemical admixture 500 Ltrs ☐ Paints 110 Ltrs ☐ Others ……
b. Check whether all primary containers are enclosed in secondary containments to prevent release of the chemicals/hazardous materials to environment?	√ ☐ Yes ☐ No If no, please mention in detail_
c. Is there contamination of soil/water due to leakage/spillage of oil, bitumen and other chemicals?	√ ☐ Yes ☐ No If yes, please mention –
d. Please mark whether chemical & hazardous materials are - Labeled properly in Bangla for identification. - Stored with safety instructions properly on the storage container for handling. - Managed by trained staff.	√ ☐ Yes ☐ No √ ☐ Yes ☐ No √ ☐ Yes ☐ No

	If no, please mention
e. Are emergency response procedures (fire extinguishers, PPE, solvents, etc.) in place to address any accident?	☐ Yes ☐ No If no, please mention by when to be addressed

7. Spills / Site Contamination

a. What materials did spill out or released?	☐ Oil, ☐ Chemicals, ☐ Lubricants, ☐ Hazardous materials, ☐ Sewage sludge Location: N/A When did spill?
b. What environmental media was contaminated by the spill or release of chemical or hazardous materials?	☐ Soil, ☐ Surface water, ☐ Ground water ☐ Air, ☐ Other Partially Contamination. Location incident happened: N/A
c. What measures did contractor take to clean-up or remediate the site?	Please mention: _ If no, please get the plan of site remediation. _____ _____

8. Occupational Health and Safety

a. Is there health risk due to unsafe working conditions (e.g. improper PPEs, unprotected construction site, dust pollution, high noise, etc.)?	☐ Yes ☐ No If so, what poses health risk: Improper PPEs Location: When working at height. By when to be addressed: As soon as possible

	Who is responsible: √
b. Is there proper safety barrier to control trespassing and traffic management at construction site?	☐ Yes ☐ No If no, please mention location: By when safety barrier will be erected: Who is responsible: safety engineers, site Engineer
c. Are the instructions given in the Traffic Management Plan followed for proper traffic flow	☐ Yes ☐ No If no, please mention which location What specific traffic management problem was observed? What measure is needed: By when to be done: Who is responsible: √
d. Is safety officer working due diligently to ensure safety of workers, employees and local community? ○ If yes, please specify does Safety Officer provide toolbox talk everyday (provide with photo and record evidence)? ○ How frequently safety trainings are conducted (provide photo and record evidences). ○ If any of above answer is no, by when to be implemented.	☐ Yes ☐ No If no, please mention reason: : Every morning conduct toolbox talk meeting at Base camp.

	: weekly : Workers are trained through toolbox talk meetings
e. Are there adequate safety signs and symbols to aware and educate pedestrians and existing traffic about construction activities and their safety precautions?	☐ Yes ☐ No If no, please mention the location √ By when necessary safety signboards and signage will be placed: Who is responsible: HSE officer, site Engineer √
f. Are construction sites provided with first aid and medical support services?	☐ Yes ☐ No If yes, please specify to what level: If no, please mention by when first aid and emergency medical support service will be developed: Who is responsible: HSE officer
g. Please provide number of incidences/accidents that took medical supports or first aids with necessary evidences. - Please mention briefly about the incidents	: This month no of incidences/accidents :

9. Personal Protective Equipment

a. Does contractor provide adequate PPEs of proper quality?	☑ Yes ☐ No If no, mention reason:
b. Do you maintain a PPE register: - If yes, please mention present stocktaking, last issue date, change request, etc.	☑ Yes ☐ No Store keeper maintained a PPE Register. PPE present stock at store: (1) Safety Vast = 370 ps. (2) Safety Helmet = 110 ps. (3) Safety Goggles=70 (4) Safety Shoe = 25 Pair.

	(5) Ear Plug = 70 ps. (6) Gumboot = 20 Pair. (7) Safety Hand Gloves = 1000 pair.
c. Do workers and employees use PPE properly.	☑ Yes ☐ No If no, write workers' name and designation not using PPEs.
d. Discuss with the workers and employees about their opinion.	Write why they are reluctant to use PPE:
e. Corrective Action. Take specific date by when proper PPE will be used properly.	25 June, 2022 will be more improve about this matter

10. Health and Sanitation

a. User vs. Toilet ratio (number of person per toilet):	One toilet for 10 Person ✓
b. Are toilets and bath rooms of workers observed with adequate neatness and supplied with soap and detergents?	☐ Yes ☐ No If no, write in detail whether soaps and detergent are supplied: How frequently toilets are cleaned: Is there full time cleaner: yes Name of the cleaner: Raj horibajon
c. Is there potable water supply facility for workers?	☑ Yes ☐ No What is the arrangement for water supply: Tube-wells and potable water supply tank

12.COVID 19 Issues

a. Status with respect to following COVID 19 guidelines in the workers' shed, base camp and construction sites? o Use of mask o Frequent hand wash o Social distancing o Monitoring body temperature o Rescheduling of work schedule to avoid influx of workers at the same time	✓ ☐ Yes ☐ No ✓ ☐ Yes ☐ No ✓ ☐ Yes ☐ No ✓ ☐ Yes ☐ No ✓ ☐ Yes ☐ No If no, write in detail: By when guidelines will be followed properly:
b. Are there COVID quarantine rooms for workers' and employees? If no, please mention by when at least 2 rooms will be ready with attached bathroom facility for quarantine.	☑ Yes ☐ No

11. General Housekeeping

a. Check whether construction materials (stones, bricks, bitumen, rods, etc) are stocked/piled in the designated area with proper labeling?	☑ Yes ☐ No Mention by when housekeeping will be improved: Who is responsible: site Engineer, Supervisor, HSE Officer.
b. Are base camp and workers' shed premises clean?	☐ Yes ☐ No

	Is there a dedicated person to clean premises? : yes How frequently cleaned: Everyday ✓
c. Are there separate waste collection bins for disposal of different types of wastes (kitchen, paper, plastic waste, construction debris, etc.)?	□ Yes □ No If no, please mention by when bins will be placed:

Note: *To substantiate your observations relevant pictures and documents are to be attached as evidence.*

22-06-2022

Signature of the Enumerator Date

Environmental Monitoring Form
SASEC II – Elenga Hatikumrul-Rangpur Road Connectivity Project
Roads and Highways Department.

Name of the Project: SASEC Road Connectivity Project-2 Under RHD WP: 07

Name of EMO: Muzahid Rahman, Mobile # 01714819234

Date of Visit: 17th April to 18th April 2022 Time: 09:00 AM-06:00 PM Chainage # 0+000-28+300

1. Please check the construction items you visited:

✓Site clearing/grabbing activity	☐ Asphalt batching plant
✓Earthworks and compaction	**✓Concrete batching plant**
☐Borrow pits	**✓Stone crushing plant**
☐Piling works	☐ Asphalt/bituminous work
✓Bridge construction work	**✓ Brick crushing plant**
☐Flyover construction work	☐Oil dispensing system
☐Building construction work	**✓Lubricants/chemical materials storage**
✓Overpass construction work	☐ Please mention any other.....

2. Please tick the status of environmental and health safety level you observed during your visit:

	Worst ←			→ Best
Environmental issues				
☐ Dust / Air pollution	☐ High	☐ Medium	**✓Low**	☐ Zero
☐ Noise/Sound	☐ High	**✓ Medium**	☐ Low	☐ Zero
☐ Water pollution	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Solid waste/construction debris	☐ High	☐ Medium	**✓ Low**	☐ Zero
☐ Hazardous Waste	☐ High	☐ Medium	**✓ Low**	☐ Zero
☐ Sewage leakage	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Spills / Site contamination	☐ High	☐ Medium	**✓ Low**	☐ Zero
Health & Safety Issues				
☐ Housekeeping	☐ Poor	**✓ Moderate**		☐ Good
☐ PPE use	☐ Poor	**✓ Moderate**		☐ Good
☐ Safety signage/fence/barricade	☐ Poor	☐ Moderate		**✓ Good**
☐ First aid and medical support	☐ Poor	☐ Moderate		**✓Good**

Note: *Please provide detailed information for the environmental issues marked 'High' and 'Medium', and Health-Safety Issues with 'Moderate' and 'Poor' in relevant sections as follows.*

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3. Air Emission

a. Please mention, which location is observed with air emission.	Whole Project Area; Ch 0+000 to 28+300 km
b. Are there any sensitive receptors exposed to air pollution? If so, please give detail. (Distance from the source of pollution, type of receptor, number of the exposed person, etc.)	☐ Yes ✓ **No**
c. What measures are taken at the site to control air quality? Please discuss with evidence i.e., data, pictures, etc.	Water spraying with tanker engagement and manual sprinkling; Sand transportation truck covered with polyethylene
d. Specify, what mitigation measures need to be implemented further to control air quality levels within the DOE standards.	The air quality is under the DoE standard according to the quarterly monitoring (ref: 8th quarterly env. monitoring report). Recommended using face mask while working.
e. Who is responsible?	HSE Manager, Abdul Monem Limited, SASEC II, WP07

4. Noise/Sound Pollution

a. Please mention, which locations are observed with noise pollution.	Whole Project Area; Ch 0+000 to 28+300 km
b. What are the sources of noise/sound?	✓**Generator**, ✓ **Metal Cutting Machine**, ☐ Grinding machine, ☐ Vibrator, ☐ Crushing Machine, ☐ Hauling trucks, ✓**Existing Highway Traffic** ☐ Others_____
c. Are there any sensitive receptors exposed to noise? If yes, please give detail. (Distance from the source of noise, type of receptor, number of the exposed person, etc.)	☐ Yes ✓ **No**
d. What measures are taken at the site to control noise? Please discuss with evidence i.e., data, pictures, etc.	Barricade around the construction area; Aquatic enclosure; Silencer installment; and Entry restricted for local people to avoid noise pollution exposure.
e. Specify, what mitigation measures need to be implemented further to control noise levels within the DOE standards.	The speed limit for the existing highway traffic; earplugs for workers; pre-announcement of noisy work to the local community; and awareness training.
f. Who is responsible?	HSE Manager, Abdul Monem Limited, SASEC II, WP07

5. Waste Management

a. What kinds of waste do you observe during site visits? Please mention by when waste will be disposed of properly:	☐Spoil, ✓ **Construction debris**, ✓ **Mud**, etc. ☐ Any other, please mention _____ Volume of wastes (M^3): _____ approx. Location: Camp Area and Construction Area Number of days dumped here: 2 days _____
b. Are there any wastes creating an unhygienic and filthy environment at the campsite?	☐ Yes ✓ **No** If so, please explain _____
c. Are solid/hazardous wastes stored for reuse, recycle or disposal labeled properly for identification?	☐ Yes ✓ **No** Please mention in detail _____ _____
d. Is there any drainage congestion due to waste/sediment disposal to drains or in runoff channels that cause localized inundation or stagnation?	☐ Yes ✓ **No** If yes, location: A problem caused in detail:
e. By when waste will be removed?	Designated Dumping site in the construction camp of the project as well as to the government designated dumping yard
f. Who is responsible?	HSE Manager, Abdul Monem Limited, SASEC II, WP07

6. Land degradation

a. Please check in the right column, if there is any land degradation due to careless excavation from the borrow area: - Excavated borrow pits degraded agricultural lands by topsoil loss.	☐ Yes ✓ **No** The location where land degradation happened:
b. Borrow pits opened on private land in consultation with the landowners and soil	☐ Yes ☐ No ✓ **Not Applicable** Location of private borrow pit:

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borrowed as the written direction of the landowners.	
c. Please check whether borrow pit filling or excavation causes major ecosystem or biodiversity loss. What measures is proposed for restoration: By when to be restored:	☐ Yes ✓ **No** If yes, location:
Who is Responsible?	HSE Manager, Abdul Monem Limited, SASEC II, WP07

7. Storage of Chemicals/Oil/Hazardous Materials

a. Check the types of chemicals/ hazardous materials stored with approx. quantity.	☐ Oil 8000 Ltrs ☐ Lubricants 900 Ltrs ☐ Bitumen **N/A** ☐ Chemical admixture 620 Ltrs ☐ Paints **N/A** ☐ Others **N/A**
b. Check whether all primary containers are enclosed in secondary containments to prevent the release of chemicals/hazardous materials to the environment?	✓ **Yes** ☐ No If no, please mention in detail_____ _____ _____
c. Is there contamination of soil/water due to leakage/spillage of oil, bitumen, and other chemicals?	☐ Yes ✓ **No** If yes, please mention _____ _____ _____
d. Please mark whether chemical & hazardous materials are - Labeled properly in Bangla for identification. - Stored with safety instructions properly on the storage container for handling.	 ✓ **Yes** ☐ No ✓ **Yes** ☐ No

- Managed by trained staff.	✓ **Yes** ☐ No If no, please mention _____
e. Are emergency response procedures (fire extinguishers, PPE, solvents, etc.) in place to address any accident?	✓ **Yes** ☐ No If no, please mention by when to be addressed Who is responsible?

8. Spills / Site Contamination

a. What materials did spill out or release?	☐ Oil, ☐ Chemicals, ☐ Lubricants, ☐ Hazardous materials, ☐ Sewage sludge Location: **N/A** When did spill?
b. What environmental media was contaminated by the spill or release of chemical or hazardous materials?	☐ Soil, ☐ Surface water, ☐ Groundwater ☐ Air, ☐ Other _____ **N/A** Location incident happened: _____
c. What measures did the contractor take to clean up or remediate the site?	Please mention: _____ **N/A** If not, please get the plan of site remediation.

9. Occupational Health and Safety

a. Is there health risk due to unsafe working conditions (e.g., improper PPEs, unprotected construction site, dust pollution, high noise, etc.)?	☐ Yes ✓ **No** If so, what poses health risks: Location: By when to be addressed:

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	Who is responsible:
b. Is there a proper safety barrier to control trespassing and traffic management at the construction site?	✓ **Yes** ☐ No If no, please mention location: By when safety barrier will be erected: Who is responsible:
c. Are the instructions given in the Traffic Management Plan followed for proper traffic flow	✓ **Yes** ☐ No If not, please mention which location What specific traffic management problem was observed? What measure is needed: By when to be done: Who is responsible:
d. Is the safety officer working due diligently to ensure the safety of workers, employees, and the local community? o If yes, please specify does Safety Officer provides toolbox talk every day (provide with photo and record evidence)? o How frequently safety training is conducted (provide a photo and record evidence). o If any of the above answers is no, by when to be implemented.	✓ **Yes** ☐ No If no, please mention the reason: : Toolbox meetings conducted on daily basis before starting work. : Weekly per Month :
e. Are there adequate safety signs and symbols to aware	✓ **Yes** ☐ No

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and educate pedestrians and existing traffic about construction activities and their safety precautions?	If no, please mention the location: By, when necessary, safety signboards and signage will be placed: Who is responsible?
f. Are construction sites provided with first aid and medical support services?	✓ **Yes** ☐ No If yes, please specify to what level: If no, please mention by when first aid and emergency medical support service will be developed: Who is responsible?
g. Please provide the number of incidences/accidents that took medical supports or first aids with necessary evidence. - Please briefly mention the incidents	: There has no accident occurred during the monitoring period and according to the HSE manager, the construction site is zero accidental zone. :

10. Personal Protective Equipment

a. Does the contractor provide adequate PPEs of proper quality?	✓ **Yes** ☐ No If no, mention reason:
b. Do you maintain a PPE register? - If yes, please mention present stocktaking, last issue date, change request, etc.	✓ **Yes** ☐ No HSE manager is responsible for maintaining the PPE register.
c. Do workers and employees use PPE properly?	✓ **Yes** ☐ No If no, write workers' names and designation not using PPEs.
d. Discuss with the workers and employees their opinion.	Write why they are reluctant to use PPE: **No, they used PPE with willingness.**
e. Corrective Action. Take a specific date by when proper PPE will be used properly.	Date: 03.12.2021

11. Health and Sanitation

a. User vs. Toilet ratio (number of persons per toilet):	Eight (8)
b. Are toilets and bathrooms of workers observed with adequate neatness and supplied with soap and detergents?	✓ **Yes** ☐ No If no, write in detail whether soaps and detergent are supplied: How frequently toilets are cleaned: Is there a full-time cleaner? Name of the cleaner:
c. Is there a potable water supply facility for workers?	✓ **Yes** ☐ No What is the arrangement for water supply?

12. COVID 19 Issues

a. Status to following COVID 19 guidelines in the workers' shed, base camp, and construction sites? ○ Use of mask ○ Frequent hand wash ○ Social distancing ○ Monitoring body temperature ○ Rescheduling of work schedule to avoid an influx of workers at the same time	✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No If no, write in detail: By when guidelines will be followed properly: GoB and WHO guidelines
b. Are there COVID quarantine rooms for workers and employees? If not, please mention by when at least 2 rooms will be ready with attached bathroom facility for quarantine.	✓ **Yes** ☐ No

13. General Housekeeping

a. Check whether construction materials (stones, bricks, bitumen, rods, etc.) are stocked/piled in the designated area with proper labeling?	✓ **Yes** ☐ No Mention by when housekeeping will be improved: Who is responsible?
b. Are base camp and workers' shed premises clean?	✓ **Yes** ☐ No Is there a dedicated person to clean premises? How frequently cleaned: Daily
c. Are there separate waste collection bins for the disposal of different types of wastes (kitchen, paper, plastic waste, construction debris, etc.)?	✓ **Yes** ☐ No If no, please mention by when bins will be placed:

Note: *To substantiate your observations relevant pictures and documents are to be attached as evidence.*

Signature of the Enumerator

Date: 20.04.2022

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Environmental Monitoring Form
SASEC II – Elenga Hatikumrul-Rangpur Road Connectivity Project
Roads and Highways Department.

Name of the Project: SASEC Road Connectivity Project-2 Under RHD WP: 08

Name of EMO: Md. Shafiqul Islam Mobile # 01715156143

Date of Visit: 23-28 March 22 Time: 09:00 AM-06:00 PM Chainage # 35+800

1. **Please check the construction items you visited:**

✓Site clearing/grabbing activity	☐ Asphalt batching plant
✓Earthworks and compaction	**✓Concrete batching plant**
☐Borrow pits	**✓Stone crushing plant**
☐Piling works	☐ Asphalt/bituminous work
☐Bridge construction work	☐ Brick crushing plant
☐Flyover construction work	☐Oil dispensing system
☐Building construction work	**✓Lubricants/chemical materials storage**
✓Overpass construction work	☐ Please mention any other.....

2. **Please tick the status of environmental and health safety level you observed during your visit:**

Environmental issues	Worst ←			→ Best
☐ Dust / Air pollution	☐ High	☐ Medium	**✓Low**	☐ Zero
☐ Noise/Sound	☐ High	**✓ Medium**	☐ Low	☐ Zero
☐ Water pollution	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Solid waste/construction debris	☐ High	☐ Medium	**✓ Low**	☐ Zero
☐ Hazardous Waste	☐ High	☐ Medium	✓ Low	**✓ Zero**
☐ Sewage leakage	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Spills / Site contamination	☐ High	☐ Medium	**✓ Low**	☐ Zero
Health & Safety Issues				
☐ Housekeeping	☐ Poor	✓ Moderate		**✓ Good**
☐ PPE use	☐ Poor	**✓ Moderate**		☐ Good
☐ Safety signage/fence/barricade	☐ Poor	☐ Moderate		**✓ Good**
☐ First aid and medical support	☐ Poor	☐ Moderate		**✓Good**

Note: *Please provide detailed information for the environmental issues marked 'High' and 'Medium', and Health-Safety Issues with 'Moderate' and 'Poor' in relevant sections as follows.*

3. **Air Emission**

a. Please mention, which location is observed with air emission.	Whole Project Area; 35+800 km
b. Are there any sensitive receptors exposed to air pollution? If so, please give detail. (Distance from the source of pollution, type of receptor, number of the exposed person, etc.)	☐ Yes **✓ No**

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c. What measures are taken at the site to control air quality? Please discuss with evidence i.e., data, pictures, etc.	Regular maintenance of equipment and water. Water spraying has been conducted regularly (3 to 4 times a day). Applied to the Approach Roads, Construction Yard, and Base Camp Pavements.
d. Specify, what mitigation measures need to be implemented further to control air quality levels within the DOE standards.	The air quality is under the Department of Environment (DoE) of Bangladesh standard according to the quarterly monitoring (ref: 8th quarterly env. Monitoring report).
e. Who is responsible?	HSE Officer, CPCL, SASEC II, WP08

4. Noise/Sound Pollution

a. Please mention, which locations are observed with noise pollution.	Whole Project Area; 35+800 km
b. What are the sources of noise/sound?	✓**Generator**, ☐ Metal Cutting Machine, ☐ Grinding machine, ☐ Vibrator, ☐ Crushing Machine, ☐ Hauling trucks, ✓**Existing Highway Traffic** ☐ Others_____
c. Are there any sensitive receptors exposed to noise? If yes, please give detail. (Distance from the source of noise, type of receptor, number of the exposed person, etc.)	☐ Yes ✓ **No**
d. What measures are taken at the site to control noise? Please discuss with evidence i.e., data, pictures, etc.	Aquatic enclosure; Barricade around the construction area; Silencer installment; and Entry restricted for local people to avoid noise pollution exposure.
e. Specify, what mitigation measures need to be implemented further to control noise levels within the DOE standards.	The speed limit for the existing highway traffic; earplugs for workers; pre-announcement of noisy work to the local community; and awareness training.
f. Who is responsible?	HSE Officer, CPCL, SASEC II, WP08

5. Waste Management

a. What kinds of waste do you observe during site visits? Please mention by when waste will be disposed of properly:	☐Spoil, ✓ **Construction debris**, ✓ **Mud**, etc. ☐ Any other, please mention _____ Volume of wastes (M^3): _____ approx. Location: Camp Area and Construction Area Number of days dumped here: 2 days _____
b. Are there any wastes creating an unhygienic and filthy environment at the campsite?	☐ Yes ✓ **No** If so, please explain _____
c. Are solid/hazardous wastes stored for reuse, recycle or disposal labeled properly for identification?	☐ Yes ✓ **No** Please mention in detail _____ _____
d. Is there any drainage congestion due to waste/sediment disposal to drains or in runoff channels that cause localized inundation or stagnation?	☐ Yes ✓ **No** If yes, location: A problem caused in detail:
e. By when waste will be removed?	Designated Dumping site in the construction camp of the project as well as to the government designated dumping yard
f. Who is responsible?	HSE Officer, CPCL, SASEC II, WP08

6. Land degradation

a. Please check in the right column, if there is any land degradation due to careless excavation from the borrow area: - Excavated borrow pits degraded agricultural lands by topsoil loss.	☐ Yes ✓ **No** The location where land degradation happened:
b. Borrow pits opened on private land in consultation with the landowners and soil borrowed as the written direction of the landowners.	☐ Yes ☐ No ✓ **Not Applicable** Location of private borrow pit:

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c. Please check whether borrow pit filling or excavation causes major ecosystem or biodiversity loss. What measures is proposed for restoration: By when to be restored:	☐ Yes ✓ **No** If yes, location:
Who is Responsible?	HSE Officer, CPCL, SASEC II, WP08

7. Storage of Chemicals/Oil/Hazardous Materials

a. Check the types of chemicals/ hazardous materials stored with approx. quantity.	☐ Oil 5000 Ltrs ☐ Lubricants 500 Ltrs ☐ Bitumen **N/A** ☐ Chemical admixture 350 Ltrs ☐ Paints **N/A** ☐ Others **N/A**
b. Check whether all primary containers are enclosed in secondary containments to prevent the release of chemicals/hazardous materials to the environment?	✓ **Yes** ☐ No If no, please mention in detail_____ _____ _____
c. Is there contamination of soil/water due to leakage/spillage of oil, bitumen, and other chemicals?	☐ Yes ✓ **No** If yes, please mention _____ _____ _____
d. Please mark whether chemical & hazardous materials are - Labeled properly in Bangla for identification. - Stored with safety instructions properly on the storage container for handling. - Managed by trained staff.	✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No If no, please mention _____ _____

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e. Are emergency response procedures (fire extinguishers, PPE, solvents, etc.) in place to address any accident?	✓ **Yes** ☐ No If no, please mention by when to be addressed Who is responsible?

8. Spills / Site Contamination

a. What materials did spill out or release?	☐ Oil, ☐ Chemicals, ☐ Lubricants, ☐ Hazardous materials, ☐ Sewage sludge Location: **N/A** When did spill?
b. What environmental media was contaminated by the spill or release of chemical or hazardous materials?	☐ Soil, ☐ Surface water, ☐ Groundwater ☐ Air, ☐ Other _____ **N/A** Location incident happened: _____
c. What measures did the contractor take to clean up or remediate the site?	Please mention: _____ **N/A** If not, please get the plan of site remediation.

9. Occupational Health and Safety

a. Is there health risk due to unsafe working conditions (e.g., improper PPEs, unprotected construction site, dust pollution, high noise, etc.)?	☐ Yes ✓ **No** If so, what poses health risks: Location: By when to be addressed: Who is responsible:
b. Is there a proper safety barrier to control trespassing and traffic management at the construction site?	✓ **Yes** ☐ No If no, please mention location: By when safety barrier will be erected: Who is responsible:
c. Are the instructions given in the Traffic Management Plan followed for proper traffic flow	✓ **Yes** ☐ No If not, please mention which location

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	What specific traffic management problem was observed? What measure is needed: By when to be done: Who is responsible:
d. Is the safety officer working due diligently to ensure the safety of workers, employees, and the local community? o If yes, please specify does Safety Officer provides toolbox talk every day (provide with photo and record evidence)? o How frequently safety training is conducted (provide a photo and record evidence). o If any of the above answers is no, by when to be implemented.	✓ **Yes** ☐ No If no, please mention the reason: : Toolbox meetings conducted on daily basis before starting work. : Weekly per Month :
e. Are there adequate safety signs and symbols to aware and educate pedestrians and existing traffic about construction activities and their safety precautions?	✓ **Yes** ☐ No If no, please mention the location: By, when necessary, safety signboards and signage will be placed: Who is responsible?
f. Are construction sites provided with first aid and medical support services?	✓ **Yes** ☐ No If yes, please specify to what level: If no, please mention by when first aid and emergency medical support service will be developed: Who is responsible?
g. Please provide the number of incidences/accidents that took medical supports or first aids with necessary evidence. - Please mention briefly the incidents	: There has no accident occurred during the monitoring period and according to the HSE manager, the construction site is zero accidental zone. :

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10. Personal Protective Equipment

a. Does the contractor provide adequate PPEs of proper quality?	✓ **Yes** ☐ No If no, mention reason:
b. Do you maintain a PPE register? - If yes, please mention present stocktaking, last issue date, change request, etc.	✓ **Yes** ☐ No HSE manager is responsible for maintaining the PPE register.
c. Do workers and employees use PPE properly?	✓ **Yes** ☐ No If no, write workers' names and designation not using PPEs.
d. Discuss with the workers and employees their opinion.	Write why they are reluctant to use PPE: **No, they used PPE with willingness.**
e. Corrective Action. Take a specific date by when proper PPE will be used properly.	Date: 16.03.2022

11. Health and Sanitation

a. User vs. Toilet ratio (number of persons per toilet):	Eight (8)
b. Are toilets and bathrooms of workers observed with adequate neatness and supplied with soap and detergents?	✓ **Yes** ☐ No If no, write in detail whether soaps and detergent are supplied: How frequently toilets are cleaned: Is there a full-time cleaner? Name of the cleaner:
c. Is there a potable water supply facility for workers?	✓ **Yes** ☐ No What is the arrangement for water supply?

12. COVID 19 Issues

a. Status to following COVID 19 guidelines in the workers' shed, base camp, and construction sites? o Use of mask o Frequent hand wash o Social distancing	 ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No

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○ Monitoring body temperature ○ Rescheduling of work schedule to avoid an influx of workers at the same time	✓ **Yes** ☐ No ✓ **Yes** ☐ No If no, write in detail: By when guidelines will be followed properly: GoB and WHO guidelines
b. Are there COVID quarantine rooms for workers and employees? If not, please mention by when at least 2 rooms will be ready with attached bathroom facility for quarantine.	✓ **Yes** ☐ No

13. General Housekeeping

a. Check whether construction materials (stones, bricks, bitumen, rods, etc.) are stocked/piled in the designated area with proper labeling?	✓ **Yes** ☐ No Mention by when housekeeping will be improved: Who is responsible?
b. Are base camp and workers' shed premises clean?	✓ **Yes** ☐ No Is there a dedicated person to clean premises? How frequently cleaned: Daily
c. Are there separate waste collection bins for the disposal of different types of wastes (kitchen, paper, plastic waste, construction debris, etc.)?	✓ **Yes** ☐ No If no, please mention by when bins will be placed:

Note: *To substantiate your observations relevant pictures and documents are to be attached as evidence.*

Signature of the Enumerator

Date: 28.03.2022

Environmental Monitoring Form
SASEC II – Elenga Hatikumrul-Rangpur Road Connectivity Project
Roads and Highways Department.

Name of the Project: SASEC Road Connectivity Project-2 Under RHD WP: 09

Name of EMO: Shihabuddin Ahmed Imran, Mobile # 01717014387

Date of Visit: 16th June 2022 Time: 09:00 AM-06:00 PM Chainage # 50+800-76+100

1. Please check the construction items you visited:

☐Site clearing/grabbing activity	☐ Asphalt batching plant
✓Earthworks and compaction	**✓ Concrete batching plant**
☐Borrow pits	**✓ Stone crushing plant**
☐Piling works	**✓ Asphalt/bituminous work**
☐Bridge construction work	**✓ Brick crushing plant**
☐Flyover construction work	☐ Oil dispensing system
☐Building construction work	**✓ Lubricants/chemical materials storage**
✓Overpass construction work	✓ Please mention any other **Bricks Stackyard**

2. Please tick the status of environmental and health safety level you observed during your visit:

	Worst ← → Best			
Environmental issues				
☐ Dust / Air pollution	☐ High	☐ Medium	**✓Low**	☐ Zero
☐ Noise/Sound	☐ High	**✓ Medium**	☐ Low	☐ Zero
☐ Water pollution	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Solid waste/construction debris	☐ High	☐ Medium	**✓ Low**	☐ Zero
☐ Hazardous Waste	☐ High	☐ Medium	**✓ Low**	☐ Zero
☐ Sewage leakage	☐ High	☐ Medium	☐ Low	**✓ Zero**
☐ Spills / Site contamination	☐ High	☐ Medium	**✓ Low**	☐ Zero
Health & Safety Issues				
☐ Housekeeping	☐ Poor	**✓ Moderate**		☐ Good
☐ PPE use	☐ Poor	**✓ Moderate**		☐ Good
☐ Safety signage/fence/barricade	☐ Poor	☐ Moderate		**✓ Good**
☐ First aid and medical support	☐ Poor	☐ Moderate		**✓Good**

Note: *Please provide detailed information for the environmental issues marked 'High' and 'Medium', and Health-Safety Issues with 'Moderate' and 'Poor' in relevant sections as follows.*

3. Air Emission

a. Please mention, which location is observed with air emission.	Whole Project (50+800-76+100)

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b. Are there any sensitive receptors exposed to air pollution? If so, please give detail. (Distance from the source of pollution, type of receptor, number of the exposed person, etc.)	☐ Yes ✓ **No**
c. What measures are taken at the site to control air quality? Please discuss with evidence i.e., data, pictures, etc.	Water spraying with tanker engagement and manual sprinkling;
d. Specify, what mitigation measures need to be implemented further to control air quality levels within the DOE standards.	The air quality is under the DoE standard according to the quarterly monitoring. Recommended using facemask while working.
e. Who is responsible?	HSE Manager, KMC-Monico JV, SASEC II, WP09

4. Noise/Sound Pollution

a. Please mention, which locations are observed with noise pollution.	Six locations: 71+300 km, 72+350 km, 63+300 km, 63+900 km, 75+700 km and 63+100 km.
b. What are the sources of noise/sound?	✓**Generator**, ☐ Metal Cutting Machine, ☐ Grinding machine, ☐ Vibrator, ✓**Crushing Machine**, ☐ Hauling trucks, ✓**Existing Highway Traffic** ☐ Others_____
c. Are there any sensitive receptors exposed to noise? If yes, please give detail. (Distance from the source of noise, type of receptor, number of the exposed person, etc.)	☐ Yes ✓ **No**
d. What measures are taken at the site to control noise? Please discuss with evidence i.e., data, pictures, etc.	Barricade around the construction area; and Entry restricted for local people to avoid noise pollution exposure.
e. Specify, what mitigation measures need to be implemented further to control noise levels within the DOE standards.	The speed limit for the existing highway traffic; earplugs for workers; pre-announcement of noisy work to the local community; and awareness training.
f. Who is responsible?	HSE Manager, KMC-Monico JV, SASEC II, WP09

5. Waste Management

a. What kinds of waste do you observe during site visits? Please mention by when waste will be disposed of properly:	☐Spoil, ✓ **Construction debris**, ✓ **Mud**, etc. ☐ Any other, please mention _____ Volume of wastes (M^3): _____ approx. Location: Camp Area and Construction Area Number of days dumped here: 2 days _____
b. Are there any wastes creating an unhygienic and filthy environment at the campsite?	☐ Yes ✓ **No** If so, please explain _____
c. Are solid/hazardous wastes stored for reuse, recycle or disposal labeled properly for identification?	☐ Yes ✓ **No** Please mention in detail _____ _____
d. Is there any drainage congestion due to waste/sediment disposal to drains or in runoff channels that cause localized inundation or stagnation?	☐ Yes ✓ **No** If yes, location: A problem caused in detail:
e. By when waste will be removed?	Designated Dumping site in the construction camp of the project as well as to the government designated dumping yard
f. Who is responsible?	HSE Manager, KMC-Monico JV, SASEC II, WP09

6. Land degradation

a. Please check in the right column, if there is any land degradation due to careless excavation from the borrow area: - Excavated borrow pits degraded agricultural lands by topsoil loss.	☐ Yes ✓ **No** The location where land degradation happened:
b. Borrow pits opened on private land in consultation with the landowners and soil borrowed as the written direction of the landowners.	☐ Yes ☐ No ✓ **Not Applicable** Location of private borrow pit:

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c. Please check whether borrow pit filling or excavation causes major ecosystem or biodiversity loss. What measures is proposed for restoration: By when to be restored:	☐ Yes ✓ **No** If yes, location:
Who is Responsible?	HSE Manager, KMC-Monico JV, SASEC II, WP09

7. Storage of Chemicals/Oil/Hazardous Materials

a. Check the types of chemicals/ hazardous materials stored with approx. quantity.	☐ Oil 5000 Ltrs ☐ Lubricants 600 Ltrs ☐ Bitumen **N/A** ☐ Chemical admixture 480 Ltrs ☐ Paints **N/A** ☐ Others **N/A**
b. Check whether all primary containers are enclosed in secondary containments to prevent the release of chemicals/hazardous materials to the environment?	✓ **Yes** ☐ No If no, please mention in detail_____ _____ _____
c. Is there contamination of soil/water due to leakage/spillage of oil, bitumen, and other chemicals?	☐ Yes ✓ **No** If yes, please mention _____ _____ _____
d. Please mark whether chemical & hazardous materials are - Labeled properly in Bangla for identification. - Stored with safety instructions properly on the storage container for handling. - Managed by trained staff.	 ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No If no, please mention _____

	_____
e. Are emergency response procedures (fire extinguishers, PPE, solvents, etc.) in place to address any accident?	✓ **Yes** ☐ No If no, please mention by when to be addressed Who is responsible? HSE Manager, KMC-Monico JV, SASEC II, WP09

8. Spills / Site Contamination

a. What materials did spill out or release?	☐ Oil, ☐ Chemicals, ☐ Lubricants, ☐ Hazardous materials, ☐ Sewage sludge Location: **N/A** When did spill?
b. What environmental media was contaminated by the spill or release of chemical or hazardous materials?	☐ Soil, ☐ Surface water, ☐ Groundwater ☐ Air, ☐ Other _____ **N/A** Location incident happened: _____ _____
c. What measures did the contractor take to clean up or remediate the site?	Please mention: _____ _____ **N/A** If not, please get the plan of site remediation. _____ _____

9. Occupational Health and Safety

a. Is there health risk due to unsafe working conditions (e.g., improper PPEs, unprotected construction site, dust pollution, high noise, etc.)?	☐ Yes ✓ **No** If so, what poses health risks: Location: By when to be addressed: Who is responsible:
b. Is there a proper safety barrier to control trespassing and traffic management at the construction site?	✓ **Yes** ☐ No If no, please mention location: By when safety barrier will be erected: Who is responsible:

c. Are the instructions given in the Traffic Management Plan followed for proper traffic flow	✓ **Yes** ☐ No If not, please mention which location What specific traffic management problem was observed? What measure is needed: By when to be done: Who is responsible:
d. Is the safety officer working due diligently to ensure the safety of workers, employees, and the local community? o If yes, please specify does Safety Officer provides toolbox talk every day (provide with photo and record evidence)? o How frequently safety training is conducted (provide a photo and record evidence). o If any of the above answers is no, by when to be implemented.	✓ **Yes** ☐ No If no, please mention the reason: : Toolbox meetings conducted on daily basis before starting work. : Weekly per Month :
e. Are there adequate safety signs and symbols to aware and educate pedestrians and existing traffic about construction activities and their safety precautions?	✓ **Yes** ☐ No If no, please mention the location: By, when necessary, safety signboards and signage will be placed: Who is responsible?
f. Are construction sites provided with first aid and medical support services?	✓ **Yes** ☐ No If yes, please specify to what level: If no, please mention by when first aid and emergency medical support service will be developed: Who is responsible?

g. Please provide the number of incidences/accidents that took medical supports or first aids with necessary evidence. - Please mention briefly the incidents	: There has no accident occurred during the monitoring period and according to the HSE manager. :

10. Personal Protective Equipment

a. Does the contractor provide adequate PPEs of proper quality?	✓ **Yes** ☐ No If no, mention reason:
b. Do you maintain a PPE register? - If yes, please mention present stocktaking, last issue date, change request, etc.	✓ **Yes** ☐ No HSE manager is responsible for maintaining the PPE register.
c. Do workers and employees use PPE properly?	✓ **Yes** ☐ No If no, write workers' names and designation not using PPEs.
d. Discuss with the workers and employees their opinion.	Write why they are reluctant to use PPE: **No, they used PPE with willingness.**
e. Corrective Action. Take a specific date by when proper PPE will be used properly.	Date: 01.07.2022

11. Health and Sanitation

a. User vs. Toilet ratio (number of persons per toilet):	Ten (10)
b. Are toilets and bathrooms of workers observed with adequate neatness and supplied with soap and detergents?	✓ **Yes** ☐ No If no, write in detail whether soaps and detergent are supplied: How frequently toilets are cleaned: Is there a full-time cleaner? Name of the cleaner:
c. Is there a potable water supply facility for workers?	✓ **Yes** ☐ No What is the arrangement for water supply?

12. COVID 19 Issues

a. Status to following COVID 19 guidelines in the workers' shed, base camp, and construction sites? o Use of mask o Frequent hand wash o Social distancing o Monitoring body temperature o Rescheduling of work schedule to avoid an influx of workers at the same time	✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No ✓ **Yes** ☐ No If no, write in detail: By when guidelines will be followed properly: GoB and WHO guidelines
b. Are there COVID quarantine rooms for workers and employees? If not, please mention by when at least 2 rooms will be ready with attached bathroom facility for quarantine.	✓ **Yes** ☐ No

13. General Housekeeping

a. Check whether construction materials (stones, bricks, bitumen, rods, etc.) are stocked/piled in the designated area with proper labeling?	✓ **Yes** ☐ No Mention by when housekeeping will be improved: Who is responsible?
b. Are base camp and workers' shed premises clean?	✓ **Yes** ☐ No Is there a dedicated person to clean premises? How frequently cleaned: Daily
c. Are there separate waste collection bins for the disposal of different types of wastes (kitchen, paper, plastic waste, construction debris, etc.)?	✓ **Yes** ☐ No If no, please mention by when bins will be placed:

Note: *To substantiate your observations relevant pictures and documents are to be attached as evidence.*

Signature of the Enumerator

Date: 16.06.2022

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