Ref. No.: JV-ALDLP-BR-22-168 Date: 25 July 2022

Mr. Md. Shahidul Islam
Project Director
Bangladesh Railway, Rail Bhaban (7th Floor)
16 Abdul Ghani Road, Dhaka 1000, Bangladesh

Project: **Contract No.: PD/ALDLP/ADB-EIB/2015: Construction of Dual Gauge Double Line and Conversion of Existing Railway into Dual Gauge between Akhaura-Laksam**

Subject: **Draft Revised Semi-Annual (January – June 2022) Environment Monitoring Report Second revision**

Dear Sir,

In response to the recent comments of ADB on the draft Semi-Annual (January-June 2022) Environmental Monitoring Report, we have updated the report containing most of the appropriate modifications. These improvements include: i) removal of tables in the Executive Summary; ii) change of text font from Ariel to Times New Roman; iii) inclusion of relevant photographs in the text; and iv) addition of 3 more columns in the Corrective Action Plan (CAP) to contain the names of the responsible persons, their respective contact numbers and action timelines.

The last item was the recurring comment of ADB for the Project to use the prescribed noise monitoring methodology contained in the Department of Environment (DOE) law. CSC consulted the Director of the DOE Dhaka Laboratory Office; as well as the Deputy Director of the DOE Chittagong District Office on the matter. Both officials said that there is no prescribed methodology. They commented that noise monitoring is done on a case to case basis. Our third-party environmental monitors EQMS had adopted the methodology used by the Consultants that prepared the Project's Environmental Impact Assessment Report (EIA). The EIA was done during the Project Feasibility Study Phase.

Should you find the revised report acceptable, may we request that it be forwarded to ADB for their information and approval for posting at their website.

Sincerely yours,

Mr. Raymond George Sawyer
Team Leader
CSC of ALDLP
E-mail: rayjul1965@gmail.com

Attachment: Revised Semi-Annual (January – June 2022) Environment Monitoring Report Second revision.

DRAFT RESPONSE TO ADB COMMENTS

ADB COMMENTS	RESPONSE	REFERENCE
General Issues		
1. Some relevant photographs can be given in main text of discussion.	Relevant photographs have been provided.	Plate 1 (p3); Plate 2 (p5); Plate 3 (p17); Plate 4 (p34); Plate 5 (p39); Plate 6 (p40); Plate 7
2. Environmental sampling and testing must follow DOE prescribed methodology.	CSC consulted DOE Dhaka Laboratory Office and DOE Chittagong District Office regarding their prescribed noise monitoring methodology. Officials of both DOE Offices said that there is no official noise monitoring methodology. According to them, noise monitoring is done on a case to case basis.	
Specific Issues on the ALDTP EMR: 1. **Executive Summary:** Environmental monitoring results: Please do not use Table here, rather use data in the text. For example, air quality analysis is well presented in Executive Summary. Similar presentation for water quality should be sufficient, keeping the Table in the main body of the report.	Tables in the Executive Summary had been removed.	Pages I - iv
2. **Table of Contents:** Font used "Times New Roman". Please replace with Arial as used in entire report.	All fonts in the texts have been converted to Times New Roman	Whole main report.
3. **Para 54: Noise Monitoring:** As stated in the EMR, *Noise level measurement was done continuously for 1 hours per monitoring site and the power formula adopted in the Project's EIA was used to compute for the average noise level.* Also referred methodology adopted for conducting EIA. Please comply with DOE given methodology only for testing environmental quality.	CSC consulted DOE Dhaka Laboratory Office and DOE Chittagong District Office regarding their prescribed noise monitoring methodology. Officials of both DOE Offices said that there is no official noise monitoring methodology. According to them, noise monitoring is done on a case to case basis.	

ADB COMMENTS	RESPONSE	REFERENCE
4. Table 5.1: CAP should include a column on timeline to implement corrective action, and name of the person responsible with mobile number and email id. This comment is repeated since last SEMR. Please correct as suggested	Additional columns had been provided in the CAP containing the names of responsible persons, contact numbers and timelines.	Page 36
5. Annex 6 C: Methodology stated has not mentioned requirement of duration of noise data collection to obtain a representative Leq for the location noise measured. Please provide methodology as DOE law.	CSC consulted DOE Dhaka Laboratory Office and DOE Chittagong District Office regarding their prescribed noise monitoring methodology. Officials of both DOE Offices said that there is no official noise monitoring methodology. According to them, noise monitoring is done on a case to case basis.	

BANGLADESH RAILWAY

CONSULTING SERVICES CONTRACT
FOR CONSTRUCTION SUPERVISION OF
AKHAURA-LAKSAM DOUBLE TRACT PROJECT

ADB Loan No.:3170-BAN(SF)

Contract No.: PD/ALDLP/CSC/02/2016

Document Title:

SEMI-ANNUAL ENVIRONMENT MONITORING REPORT

JANUARY – JUNE 2022

Document Number		
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02	24/07/2022	Second Draft

Prepared by	**DOHWA Engineering Co. Ltd., Korea** ***In Joint Venture with*** **Korea Rail Network Authority, Korea;** **Oriental Consultants Global Co. Ltd., Japan;** **Balaji Railroad Systems Limited, India; and** **Development Design Consultants Ltd., Bangladesh**

Semi-Annual Environmental Monitoring Report (January – June 2022)

July 2022

BAN 3170: SASEC Railway Connectivity: Akhaura-Laksam Double Track Project

Prepared by the ALDLP Construction Supervision Consultant for the Bangladesh Railway

Government of the People's Republic of Bangladesh

MINISTRY OF RAILWAYS

BANGLADESH RAILWAY

SOUTH ASIA REGIONAL ECONOMIC COOPERATION RAILWAY CONNECTIVITY: AKHAURA-LAKSAM DOUBLE TRACK PROJECT

Semi Annual Environmental Monitoring Report
January – June 2022

CONSULTING SERVICES CONTRACT FOR CONSTRUCTION SUPERVISION OF AKHAURA-LAKSAM DOUBLE TRACK PROJECT

ADB Loan No.: 3170-BAN (SF)

Submitted To : ADB BRM, Dhaka

Submitted By : Project Director, ALDLP, Bangladesh Railway

Prepared By : Construction Supervision Consultant, ALDLP, Bangladesh Railway

EXECUTIVE SUMMARY

The Akhaura-Laksam Double Line Project, is part of Dhaka-Chittagong Railway corridor, that is a component of the Trans-Asian Railway Network, SASEC, SAARC & BIMSTEC corridors in Bangladesh. The project entails the double tracking of a 72 km rail line, upgrading of 2 major and 11 minor stations; and a few hundred meters of access roads in eastern Bangladesh.

The land use in the project area is mainly agricultural with no significant environmental features or protected areas. The Project is basically an expansion of an existing single track to double railway line, thereby increasing its current capacity to convey passengers and cargo not only along the Akhaura to Laksam track segment, but the whole Dhaka to Chittagong network. In view of this site condition and nature of the Project, it has been categorized as ADB Environment Category B, where the environmental impacts are known, limited in scope to within the Project area and its adjacent environ, short-term, reversible, and can be mitigated with proper implementation of the prescribed Environmental Management Plan (EMP) contained in the Initial Environmental Examination (IEE) that was prepared for the Project During the Detailed Design Phase.

Other reportorial requirements complied by the Project was the Environmental Impact Assessment (EIA) report that was prepared in compliance to the European Investment Bank (EIB) Environmental and Social Handbook (2013), as well as the EIA report in fulfillment of the requirements of the Department of Environment (DoE), Ministry of Environment and Forests, Government of Bangladesh for red category projects.

Protection of the Environment is one of the most important policy that ADB, EIB and the Bangladesh government subscribed to. ADB and EIB is seriously concerned about this issue and strictly ensure that any development project financed by them will not significantly affect the natural and social environment of the Project site and its adjacent environs. The Project Loan Agreement prescribes that ADB's Safeguard Policy Statement (SPS-2009) through the EMP be complied with by the Executing Agency throughout the Project implementation.

The Project has also instituted measures consistent with the guidelines prescribed by the World Health Organization (WHO) and Bangladesh Government Directorate, in order to help control the spread of Covid-19 virus. These prevention measures that include discouraging personnel from unnecessary movement within and outside of the Project site, inclusion of Covid-19 prevention lectures in the regular tool-kit meetings and at the HIV/AIDS STD prevention seminars that are attended by construction workers; distribution of face masks to construction workers, and installation of wash areas in the workplace, as well as disinfecting booths in Project offices. The body temperature of persons are taken as well as observing any Covid-19 symptoms, for persons entering offices to avoid possible virus contamination. An ambulance is on stand-by at the Project site 24/7 to ferry sick or injured persons to nearby medical facilities when necessary. While there were no case of the pandemic infection in the Project during the reporting period, however, should any staff experience Covid-19 like symptoms, they will be promptly isolated, tested in government accredited laboratories and if found positive for the virus, are quarantined until they get a negative test result. Offices of these infected staff are also quickly sanitized.

Project Status

As of 31 May 2022, the Project has achieved 82.3% cumulative progress (against total work sections), had an overall financial cumulative progress of 80.57% (against total work sections) as well as a 71.89% overall cumulative financial progress (against total contract sum). Embankment works is 128.17 km (89.01%) complete with 69.37 km (96.25%) and 58.8 km (81.67%) upline and downline respectively built. Bridge work is 99.66% (12 units) and 79.30% (7 units) complete for upline and downline respectively. Culverts are 95.56% (42 units) and 72.05% (31 units) completed for upline and downline respectively. Station buildings (13 units) are 73.79% completed with physical progress ranging from 33.25% in Saldanadi Station to 100% in Alishahar, Lalmai, Mainamati and Cumilla Stations. The overall track linking is 63.16% complete with 116.307 km of new tracks laid, where 70.728 km and 41.758 km for upline and downline respectively. Signaling works is about 69.60% complete.

The Contractor's Work Program (WP-H) had been endorsed by BR PIU to ADB. Once the WP-H is issued a "No Objection Letter" by ADB, the completion dates for Sections 1, 2 and 3 will become 27 November 2021, 25 June 2023 and 27 December 2023 respectively.

Environmental Monitoring

All anticipated negative environmental impacts, appropriate mitigation measures and monitoring requirements have been defined in Environment Management Plan (EMP). There are two types of Environmental Monitoring works being conducted in the Project, the first of which is the Compliance monitoring of EMP implementation and the second is the Environmental Quality Monitoring. A third party had been hired through the Contractor, to perform both monitoring works. The Sub-Contractor EQMS conducts periodic site inspection, focusing on the contractor's work areas, construction waste disposal sites, vegetative rehabilitation of embankments and opened areas, restoration of local access used as haul roads, clean-up of completed works such as station buildings, site offices, bridges, culverts and others. During the reporting period, the new MS Excel-based reporting system that had been developed during the first quarter of the year 2021, is in continued use in the monitoring of the Contractor's compliance to the EMP. The system provided a mechanism by which non-compliant activities are tracked up to the time these are resolved.

Similarly, the Environmental Quality Monitoring is done by conducting sampling in preselected sites within the Project area. Every month, EQMS conducts air quality and noise level monitoring and ground water sampling in 2 of 13 major and minor stations; as well as surface water sampling in 2 preselected nearby waterways that intersect the construction site. Monitoring will be shifted to 2 other stations and 2 nearby surface water bodies in the following month and so on. While Section 1 had already been handed over by CTM JV to BR, there are defects in the completed works that required rectification. Similarly, in view of the completion of works in Section 1, the Project had stopped monitoring in that Section and added more sampling stations in Sections 2 and 3 that had not been covered previously.

During the reporting period that covers both dry season (January) and rainy month (June), on-site measurement of air quality and noise level were done using portable analyzers; while surface and ground water quality from preselected water bodies/sources is performed by securing grab water samples, and transporting them in suitable containers, and analyzed in government registered laboratories using standard methods for specific analytical parameters set by the Government environment agency. The results of the analysis were compared to the government set standards to determine compliance. A brief description is provided to explain the test results and provide recommendation when necessary. The EQM is conducted every month.

Water Quality Monitoring

Surface water quality monitoring had been performed at natural waterways along the Project alignment on a monthly basis during reporting period that is between the months of January to May 2022. This sampling period was within the dry season. All samples taken with the exception of those from the Goniajuri River and an irrigation canal crossing Culvert 252, had exhibited parameter concentrations that are within the DOE standards. The Goiajuri River is the main natural drainage of Comilla City Corporation and its adjacent areas. Sewage, commercial and industrial wastewater discharges find their way into the river water that flows Southward through the Project track alignment by crossing 2 completed bridges (Bridge 232 and 234) and 1 completed culvert (culvert 235) before merging with the Gakatia River and eventually to the Padma River. The third-party monitors detect the pollutants in terms of low Dissolved Oxygen (DO) and high Biological Oxygen Demand (BOD_5) in the river water from Comilla City Corporation and not from the Project which has already been completed and handed over to BR PIU last year. Likewise, samples from an intermittent irrigation canal taken 200m upstream of culvert, had yielded slightly higher pollutant concentration from DOE standards. Since the canal was dry from most parts except the point of the canal where a pool of water is found, then the detected contaminants are from the adjacent agricultural areas and not from the Project. Similarly, groundwater samples taken from various sites indicate that the test results for all samples were compliant to government set standards.

Air Quality Monitoring

A total of 10 ambient air samples were collected from the Railway Station areas of the project Rail corridor between Akhaura and Laksam. The ambient status of major air pollutants viz. Particulate Matter (SPM, PM**10** and PM**2.5**), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NO_x), and Carbon Monoxide (CO) have been assessed by monitoring air quality. All parameters of air quality are found within the acceptable limits specified by the DoE. $PM_{2.5}$ values are between 7.48 – 17.06 ug/m^3; PM_{10} have results between 14.26 to 31.49 ug/m^3; SPM was measured between 29.72 to 63.78 ug/m^3; SO_2 is between 1.01 – 8.89 ug/m^3; NO_x figures is between 3.71 to 25.45 ug/m^3; while CO levels are between 0.01 – 0.3 ppm. All of the test results are found compliant with the DOE standard for the said contaminants.

Noise Level Monitoring

Ambient noise levels have been monitored from Railway Stations of the ALDLP project and adjacent "quiet areas" such as Mosques and schools. Potential noise intensity vary and dependent on the distance from the source, site land use, topography, presence of obstructions and meteorological factors. From the noise level measured from twenty sampling locations, done over the period of 5 months, five had slightly exceed the government prescribed threshold for institutional area of 50 dB(A) for rail station mosques. These mosques are located along the access road of the stations that are affected by the noise emanating from the movement of vehicles, commuters and pedestrians rather than the construction work. In view of the work stoppages in Section 2 and slow down in Section 3 construction works, noise generating from the site were mostly from the surrounding environment. Noise attenuation measure is suggested for mitigation.

Tree Plantation

To mitigate the estimated 55,000 trees logged as a result of ALDLP implementation, the Project entails to replace these trees through a "Compensation Tree Plantation and Rehabilitation Program". Under the program, three times the number of trees felled will be planted along the completed track embankments, around train stations and environmental sensitive areas. Tree planting has commenced last year and continued this year. For the 2022 tree planting season, a total of 6,500 saplings of various tree species had been planted along the track embankment areas which is 6% of its annual 75,800 target. The tree plantation work had just commenced in the second week of June and so survival assessment is still at 100%. Plantation maintenance and protection for the newly planted trees have also commence. Overall, a total of 148,929 trees have been planted, however about 54,732 saplings have died and so the estimated live trees of 93,597 would yield a survival rate of 62.85%. A 100% tree inventory will be conducted by the first week of July 2022 to determine the actual number of live trees per species at the site. The results of the inventory will also be the basis for the preparation of the updated "Compensation Tree Plantation Establishment and Rehabilitation Program". This program is to cover all the tree plantation requirements of the Project such as track embankment stabilization, train station landscaping and noise attenuation for noise sensitive areas. Maintenance and protection works for the 2021 tree plantation will continue.

Results of Environmental Monitoring and Compliance Measures

The EMP compliance monitoring results reveal, that most of the mitigation measures identified in the EMP are complied with by the Contractor. Corrective actions have been prescribed by the third party monitor EQMS for the appropriate action of the Contractor, while good practices are also encouraged to be continued. There are however, a few prescribe measures that have not been adequately complied with by the contractor and as such, their immediate attention were called to address these short comings at the soonest possible time. Among the non-compliance is the habitual non-wearing of issued Personal Protective Equipment (PPE) by construction subcontracted laborers; inadequate dust control, and proper temporary storage and disposal of petroleum and other construction waste.

Health & Safety

During the reporting period, there were no reports of serious accidents within the workplace that result in stoppage of the construction activities. Overall, for the average 1,847 personnel mobilized by CTM only no case of fatal nor major injury had been recorded during the reporting period with the exception of 9 minor cases that only require first-aide. A total of 2,745,480 uninterrupted working hours have been recorded as a result of the almost accident-free working condition. The Contractor continues to implement their Health & Safety Program, that includes activities such as tool-box meetings, distribution of appropriate PPE to workers, holding of HIV/AIDS and Covid-19 Prevention Seminars, provision of drinking water and sanitation facilities at site; and assignment of an ambulance 24/7 at the site to transport sick or injured personnel to the appropriate health facility. While attention will be made on implementing possible disciplinary action against worker's non-wearing of provided PPEs, the project will continue its information drive to increase in awareness training for workers, and installation of more appropriate Health & Safety posters at the workplace. When appropriate, sharing of accident/incident report with workers will be encouraged. A total of 18 trainings were conducted by the Contractor that was participated in by about 216 directly hired personnel, and resource persons were mostly CTM JV senior Environment, Health & Safety Officers.

Conclusions

Akhaura-Laksam Double Track project had generated a number of environmental impacts, such as those associated with the embankment construction, bridge/culvert installation or worker's campsite and housekeeping by the contractor. The EMP provides the specific guidelines which BR has put in place to prevent or mitigate these undesirable effects. The assessment of the Contractor's performance indicate compliance to the EMP with a few individual site slippages that need rectification as prescribed in the Corrective Action Plan.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADF	Asian Development Fund
ALDLP	Akhaura- Laksam Double Line Project
BDT	Bangladesh Taka
BOQ	Bill of Quantities
BR	Bangladesh Railway
BG	Broad Gauge
CROW	Construction Right of Way
CSC	Construction Supervision Consultancy
DB	Dispute Board
DG	Dual Gauge
DOHWA JV	DOHWA Engineering Co.Ltd. Korea In Joint Venture
DPP	Development Project Pro-forma/Proposal
EIA	Environment Impact Assessment
EIB	European Investment Bank
GIBR	Government Inspector of Bangladesh Railway
GOB	Government of Bangladesh
IEE	Initial Environmental Examination
INGO	Implementation Non-Government Organization
IPC	Interim Payment Certificate
ITC	Instruction to Commence
LA	Land Acquisition
LC	Level Crossing
MG	Meter Gauge
MoF	Ministry of Finance
MoR	Ministry of Railways
MPR	Monthly Progress Report
OCR	Ordinary Capital Resource
PAM	Project Administrative Manual
PVD	Prefabricated Vertical Drain
RoB	Rail Over bridge
RoW	Right-of-Way
RP	Resettlement Plan
SAARC	South Asian Association for Regional Co-operation
SASEC	South Asia Sub-regional Economic Cooperation
SRP	Supplemental Resettlement Plan
TL	Team Leader of DOHWA Joint Venture
TOR	Terms of Reference

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I. INTRODUCTION

I.1 Project Background

1. The Akhaura-Laksam Double Line Project seeks to convert the existing 72 km track from Laksam Station to Akhaura Station to double track, as well as upgrade the existing 2 major and 11 minor stations along this route; install state of the art signaling and communications facilities within these stations; and upgrade existing level crossings and provide new ones in other critical road intersections. New train terminals of international standards, complete with offices, passenger waiting areas, prayer rooms, separate male and female sanitary toilets, ramps and railings for disabled persons and other appurtenances that are Elderly-Women-Child-Disabled friendly; had been and are in the process of being constructed. Likewise, residential buildings are being provided to most of these stations for use as accommodations of BR personnel that are assigned to these areas.

2. The upgraded rail facilities will complete the double tracking of the route from Dhaka to Chittagong, thereby providing an environment friendly alternative to other modes such as road based transport. The Initial Environmental Examination (IEE) prepared for the Project had identified 3 main benefits which includes traffic diversion and fuel savings. Once the 44 train sets are in operations, it estimated that about 64.4 million liters of fuel would be saved annually, a reduction of the country's carbon footprint by 145,000 tons/year, and installation of upgraded rail buildings following international design.

3. The implementation of the Project is expected to yield adverse environmental impacts during construction and operation phase. The IEE identified these adverse impact as: a) deterioration of existing local roads by construction hauling trucks; b) blockage of waterways by construction materials spillage or erosion of embankments; c) air and noise pollution affecting sensitive receptors; and d) poor housekeeping of construction camps and workplaces leading to water pollution of nearby surface water bodies.

4. An environmental management plan (EMP) had been developed and approved for execution in order to mitigate the negative effects of Project implementation. To ensure that the Project implementation is compliant to the approved EMP, monthly environmental monitoring is being conducted by a third party Subcontractor, under the supervision of the Consultant and the Employer BR PIU. This Semi-Annual report covers the progress of the EMP implementation during the period of January-June 2022. This report also provides information on corrective actions done for non-compliant works, as well as the progress of the tree planting program that seeks to replace the trees that had been removed as a result of Project implementation, as well as replace the dead trees from last year's plantation program.

1.2 Rationale

5. The Preparation and Submission of the Semi-Annual Report on EMP Implementation Status is among the Project Loan Agreement conditions [Schedule 5, Number 12, item (a)] that was entered into by and between the Government of Bangladesh and the Asian Development Bank (ADB). The report is also a means ADB, EIB and GoB can help ensure that another Loan Agreement condition [Schedule 5, paragraph 6] is met where "*the Borrower and BR shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment, health and safety; (b) the Environment Safeguards; and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventive actions set forth in a Safeguards Monitoring Report."*[1]

1.3 Environmental Monitoring

6. The Project is engaged in two types of monitoring, the first is the Environmental Management Plan (EMP) compliance monitoring to record and assess the performance of the Contractor CTM JV in the implementation of the EMP which is part of its Scope of Work; and secondly the Environmental Quality Monitoring of key environments such as air, land and water using government prescribed analytical parameters in order to determine if the approved EMP is effective in mitigating the identified

[1] ADB Loan Number 3170 – BAN, Schedule 5 (Execution of Project: Financial Matters), paragraph 6 (Environment).

negative impacts that the Project implementation will create. The conduct of the environmental monitoring is through a third party that had been selected through the Contractor CTM JV. The environmental monitor called EQMS performs both EMP compliance monitoring as well as the Environmental Quality Monitoring works. The Contract Supervision Consultant (CSC) Environmental team supervises the work of EQMS; while the overall supervision work is performed by the Executing Agency BR that has a Project Implementing Unit (PIU) who has designated one of its Deputy Directors as the environment Focal Person. The contents of this Semi-Annual (January-June 2022) EMP Implementation Status Report contains the progress attained by the Project in complying with the EMP and verification of its effectivity in mitigating the negative impacts to the environment during the 6 months monitoring period. Lessons learned and recommendations are likewise provided for consideration of BR decision makers and planners for future projects.

1.4 Brief Project Description

7. The ALDLP has 3 outputs under the Design and Monitoring Framework, namely a) upgraded railway infrastructure; b) improved capacity of BR in Project Management and Implementation; and c) Improved Project Implementation unit in BR.

8. Under Output 1 (upgraded railway infrastructure), the following are the major Project components:

i. Construction of a second track in dual gauge;
ii. Reconstruction of the present track to dual gauge;
iii. Lengthening passing loops;
iv. Construction of new bridges;
v. Reconstruction of existing bridges and culverts;
vi. Modernization of signaling and telecommunication system; and
vii. Construction of 11 new stations and upgrading of 2 major stations.

9. Likewise, a modern computer-based interlocking signaling system will be installed; where this will be integrated with the Centralized Traffic Control system. **Table 1.1** below provides details of the Project components.

Table 1.1. Project Major Components

Project Component	Quantity
Major Bridges	12 bridges
Minor Bridges (culverts)	45 culverts
New Station	11 minor stations
Upgraded Station	2 major stations
Route km	72 km
Track	184.15 km
Level crossing	30

10. The project will support the Government of Bangladesh to upgrade about 72 km Akhaura-Laksam section of Dhaka Chittagong railway corridor to a double track railway line with modern signaling and telecommunication equipment. The section is part of a major sub-regional corridor and the Trans-Asia Railway network.

11. Output 3 on the other hand, entails the establishment and strengthening of a Project Implementation Unit (PIU) within the Executing Agency BR, that will oversee the ALDLP implementation. Currently, a BR PIU had been established for the implementation of the Project, which is manned by senior permanent officers of BR headed by a career Project Director, and supported by a Chief Engineer, an Additional Chief Engineer, and 4 Deputy Directors for Headquarters, Resettlement, Works and Ways, and Signal & Telecommunications. Two Additional Directors have likewise been assigned to the PIU to provide on-site support to the PIU's activities. The Deputy Director for

Headquarters has been designated as the Environment Focal Person on a concurrent capacity. The Deputy Director (Resettlement) had been designated as the Focal Person for Gender concerns.

12. Output 2 involves the holding of capacity-building activities for BR officials and staff to enable them to more effectively carryout their respective tasks in the Project and in other BR operating units. Several BR officials and staff had attended various trainings abroad covering various topics which includes among others project management and procurement.

1.5 Project Location

13. The Project is located within the Division of Chottogram found east of the capital city of Dhaka. Two Districts exercise jurisdiction over the Project site namely Cumilla and Brahmanbaria. Similarly, under the Cumilla District, there are 3 Upuzillas that are traversed by the Project which includes Bhramanpara, Burichang, Cumulla Saar, Daksmin and Laksam; while the Upazilla that cover the Project site in the Brahmanbaria Districts include Akhaura and Quasba. **Figure 1.1** contains the location map of the Project, while **Table 1.2** contains details of the administrative subdivision that exercise jurisdiction over the Project site.

Table 1.2. Location of the Akhaura-Laksam Double Line Project

Division	District	Upazilla
Chottogram	Brahmanbaria	Akhaura, Quasba
	Cumilla	Bhramanpara, Burichang, Cumilla Sadar, Cumilla Sadar Daksmin, Laksam.

1.6 Progress in Project Implementation

14. As of 31 May 2022, the Project has achieved 82.3% cumulative progress (against total work sections), had an overall financial cumulative progress of 80.57% (against total work sections) as well as a 71.89% overall cumulative financial progress (against total contract sum).. Embankment works is at 128.17 km (89.01%) complete with 69.37 km (96.25%) and 58.8 km (81.67%) upline and downline respectively built. About 107.8% Sub-Grade and 78.39% Sub-Ballast layers already laid, and 271.52% of unsuitable materials removed and properly disposed. Bridge work is 99.66% (12 units) and 79.30% (7 units) complete for upline and downline respectively. Whereas culverts construction are 95.56% (42 units) and 72.05% (31 units) completed for upline and downline respectively. Station buildings are 73.79% completed with physical progress ranging from 33.25% in Saldanadi Station to 100% in Alishahar Station. The 4 stations in Section 1 (i.e. Alishahar, Lalmai, Mainamoti and Comilla) are completed and had been handed over to BR. The overall track linking is 63.16% complete with 116.307 km of new tracks laid, where 70.728 km and 41.758 km are for upline and downline respectively. Signaling works is about 69.60% complete.

Plate 1. Substantially Completed Comilla Railway Station

15. The Contractor's Work Program (WP-H) had been endorsed by BR PIU to ADB. Once the WP-H is issued a "No Objection Letter" by ADB, the completion dates for Sections 1, 2 and 3 will become 27 November 2021, 25 June 2023 and 27 December 2023 respectively.

Figure 1.1. Akhaura-Laksam Double Line Project Location Plan

1.7 Environmental Classification of the project

16. 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. The project only entails the construction of tracks alongside an already existing railway line. Hence an Initial Environmental Examination (IEE) was required to comply with ADB safeguard reportorial requirements.

17. The European Investment Bank (EIB), a co-financier for this project on the other hand, requires the preparation of an Environmental Impact Assessment (EIA) in accordance with the requirements of EIB Environmental and Social Handbook, 2013-Version 9.0.

18. Moreover, 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. This is due to the Project's estimated total cost of more than BDT 1 million and its component bridges having spans longer than 100 m, which puts the ALDLP under the red category following the Environmental Conservation Rules 1997.

1.8 Environmental Clearances

19. According to the Environmental Conservation Rules, 1997, the project falls under Red category and thus under the provisions of the Bangladesh Environment Conservation Act (1995), Bangladesh Railway (BR) need to obtain an Environmental Clearance Certificate (ECC) from the Department of Environment, Government of Bangladesh; before commencement of the construction works.

20. So on the 2nd of May 2016, an Environmental Clearance Certificate (ECC) was secured by BR from the Department of Environment (DOE) for the project that is valid for one year, by virtue of their memo no. DOE/Clearance/ 5209/2013/188, dated 02 May 2016. Subsequently yearly renewals of the ECC has been obtained by BR by lodging renewal applications of the environmental clearance to the environment agency. For the reporting period, the ECC renewal application filed at the DOE branch in Chittagong District during the middle of June 2022 is still under process. **Annex 7** contains the BR-PIU endorsement letter for the ECC renewal.

1.9 Institutional Arrangements

Bangladesh Railway

21. The Executing Agency is the Bangladesh Railway that is the overall responsible to the Bangladesh Government, ADB and EIB for the smooth implementation of the Project. A Project Implementing Unit (BR-PIU) has been established and assigned senior permanent BR officers and staff to manage the Project. The PIU is headed by a career Project Director, who is assisted by a Chief Engineer (CE), Additional Chief Engineer (ACE), 4 Deputy Directors for Headquarters, Resettlement, Works and Ways, and Signal & Telecommunications. Two Additional Directors have likewise been assigned to the PIU to provide on-site support to the PIU's activities. The Deputy Director for Headquarters has been designated as the Environment Focal Person, while the Deputy Director for Resettlement was given the Gender Focal Person role.

Plate 2. ALDLP Project Deputy Director Islam (2nd left) hands over the check compensation to an elderly NEPs (4th right)

Environment and Social Safeguards Unit (ESSU)

22. Within the BR-PIU, an Environment and Social Safeguards Unit (ESSU) will be created that is tasked of overseeing the implementation of various Safeguard program such as the Environmental management Plan (EMP), the Resettlement Plan (RP) and the Gender Action Plan (GAP). The

establishment of the ESSU within the BR-PIU is the first step towards its full institutionalization after the completion of the Project.

23. The objective of an ESSU is to build enough technical capacity within BR to permit it to oversee environmental and social safeguard matters arising from donor projects and to respond with technical knowledge to specific safeguard issues triggered by Project activities, or community complaints. Secondly, the ESSU should be able to manage the Consultants and oversee the Consultant's deliverables. Thirdly it will need to be able to fully address EIA requirements of the Project when the Engineer is no longer on the job. The ESSU will have to be able to assess environmental data, analyze it and define actions required to address non-compliant findings in a credible and timely manner. Finally, the ESSU should be able to provide training as needed to both contractors and BR staff in all aspects of environmental and social safeguards management.

24. The Environment and Social Safeguards Unit (ESSU) however has not yet been established at the moment due to shortages of qualified permanent staff in the agency. A number of senior staff have retired, and their replacements are still forthcoming. At the moment BR PIU senior officers are designated safeguards supervision position on a concurrent capacity such as the Deputy Director (HQ) who is the focal person for Environment. The creation of the ESSU can still be pursued in the near future when the qualified staff are available.

Construction Supervision Consultant (CSC)

25. There are other operating entities under the Project which includes the Construction Supervision Consultant (CSC) or "Consultant" task to supervising the day-to-day activities of the Construction Contractor CTM JV, which includes the implementation of the approved EMP, Health and Safety Program among others. The CSC has mobilized an international Resident Engineer for Environment, a Senior and 2 Junior Environment Specialist to oversee the Contractor's EMP implementation. The CSC prepares the Semi-Annual Environmental Monitoring Report covering the progress of the contractor in complying with the EMP as well as the Environmental Quality Report that is intended to confirm the effectiveness of the EMP in mitigating adverse environmental impacts.

26. During the reporting period, it was unfortunate that the CSC Sr. Environmental Specialist had been diagnosed to be suffering from stage 3 lung cancer and had been undergoing chemotherapy. In view of this situation, the Resident Social, Resettlement and Gender Specialist had again been tasked to serve as the acting RE Environment on a concurrent capacity. He is supported by the 2 Jr. Environmental Specialist that are based in the CSC Quasba and Akhaura Offices.

CTM JV

27. The Contractor CTM JV is the main implementor of the EMP. At the start of their contract period, CTM JV was required to submit their own EMP, that was duly approved by the Engineer, and was the basis for their environmental implementation activities and served as the performance indicator for the monitoring work. The EMP is part of the Contractor's scope of works, and payment is obtained by CTM JV for the fulfillment of their environmental protection and monitoring works following set BOQ items.

EQMS

28. The environmental monitoring is done by the third party EQMS. Their services is availed of the Project as a subcontract of CTM JV. EQMS performs both EMP Compliance Monitoring as well as Environmental Quality Monitoring. Every month, a team from EQMS visits the Project site to perform their EMP compliance monitoring using a checklist intended to guide the evaluation of the Contractor's environmental performance. A report is submitted by EQMS to CSC, covering the result of their monthly activity. Similarly, EQMS also conducts on-site air quality and noise level monitoring in preselected stations using portable air quality and noise level measuring instruments; as well as collect surface and ground grab water samples for analysis in their laboratory for parameters prescribed by the government environment agency. The results of the environmental quality sampling is compared to prescribe government environmental quality thresholds to determine compliance to set standards. Exceedance to government standards is provided with explanation and recommendations for action when necessary.

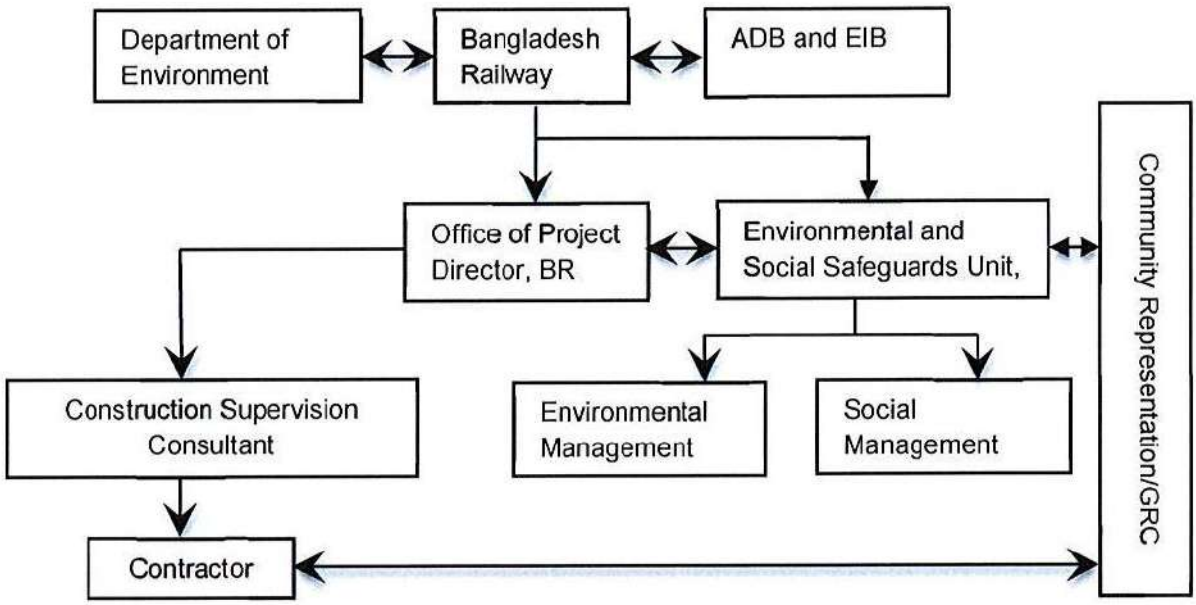
Compensation Tree Plantation Sub-Contractor

29. A last but not the least implementor is the Compensation Tree Plantation subcontractor named the Gomti Nursery. This organization is responsible for replacing the removed trees within the Project site, as a result of the construction works. Their scope of works include the production or procurement of quality planting materials such as tree saplings (i.e. timber, fruit-bearing, medicinal and fuel wood), site preparation, transport and out planting of saplings, replacement of dead saplings, plantation protection and maintenance. Out planting is only done during the rainy months to help ensure adequate availability of moisture to the saplings and less intense heat that can dry up the young plants. Dead out-planted saplings are promptly replaced by good quality ones also during the rainy months.

30. In view of the poor performance of the Gumti Nursery, a local plant nursery operator had been hired by CTM JV to supplement the tree plantation program. Discussions are on-going between CTM JV and the two tree plantation Subcontractors to agree on their respective scope of works and areas of operation in order to avoid overlapping and misunderstanding at the plantation sites. The CSC is responsible for monitoring the performance of the compensation tree planning due to the inability of EQMS to carry out this task.

31. The Asian Development Bank and the European Investment Bank, being the development partner of GoB, conducts periodic monitoring of the performance by the Executing Agency in implementing the Project as well as compliance to the approved Safeguard measures which includes the EMP. Bank technical staff review reports submitted by the Executing Agency and conducts field verification Missions to validate the information contained in the progress reports, which includes the EMP compliance reports and the Environmental Quality monitoring reports. Bank technical consultants review the progress of the Project's environmental work, site issues that require rectification, and recommends corrective measures to resolve identified issues for rectification. **Figure 1.2** contains the Safeguards Implementation and Report Work Flow diagram.

Figure 1.2. Safeguards Implementation and Reporting Work Flow



1.10 Environmental Management Plan

32. For this project the EIA report included (Table 38, Table 39, Table 40 and Table 41 of the EIA report**)** the Environmental Management Plan (EMP)**.** The EMP defines a set of mitigation and monitoring actions to be taken, in response to potential impacts predicted to take place during the pre-construction, construction and operating period of the Project. The sources of the impacts and the impacts were identified during the EIA study. The EMP is presented as two tables, defining not only impacts and mitigative and monitoring actions to be implemented, but also, where, when and who will be responsible for implementing them. The EMP describes well known and best practice mitigative action to be taken to prevent negative impacts from taking place and if that is not possible to mitigate them to an acceptable level. In addition, this EMP will:

- define measures to off-set or compensate irreversible negative impacts;
- specify the institutional arrangement for the implementation of the EMP; and
- identify means to enhance and maximize positive impacts.

33. The EMP (Table 38 and Table 39 of the EIA report) will be the main tool with which BR will manage environment impacts by applying both mitigative and monitoring measures in a technically credible and timely manner. The mitigation measures are considered successful when the impacts have either been eliminated or the residual effect complies with the environmental quality standards, policies, and legal requirement set by DoE. Mitigation measures are tracked via the monitoring program, which is described in the second of two EMP tables, and focuses on construction and operating period impacts.

34. As agreed with DoE, the construction of any large bridge (>100 m spans) which under DoE regulations would normally require their own EIA, and which DoE has exempted BR from doing, will be presented in more detail and with its own mitigative and monitoring requirements. These details for the Gomti River Bridge are provided in Chapter VI and Chapter IX in the EIA report.

35. The Contractor shall be responsible for preparing detailed documentation related to implementing this EMP. This should include information regarding scheduling, personnel, reporting and auditing requirements, training and detailed procedures for implementing the EMP. The Contractor's EMP and associated documentation shall be approved by BR prior to construction commences.

1.10.1 The Environmental Management Plan Implementation in different Phases of the Project

Preconstruction Phase

36. During the pre-construction period, several environment-related activities had been performed for the Project. These includes: a) the preparation of the Initial Environmental Examination (IEE) for approval of ADB; b) preparation of an Environmental Impact Assessment (EIA) report for the review and approval of the Department of Environment; and c) securing of environmental clearance for the Project from the DoE in compliance to government environmental laws. The IEE and EIAR had been prepared, reviewed and approved by ADB and DOE respectively; and the corresponding environmental clearance had been issued by the DOE for the Project. Moreover, this environmental clearance is renewed on an annual basis by the Project from the DOE designated district office of Chittagong. So, ever since the start of the ALDLP, the environmental clearance had been renewed 4 times by the CSC Environmental team in behalf of BR PIU for the Project. Currently, the application for the ECC renewal is awaiting DOE Chittagong approval. **Annex 8** contains the received BR PIU endorsement letter for the ECC renewal.

37. Once the Project had been approved and made effective; the BR-PIU was established, and procurement process for several contract packages commenced. For the construction contract package, the EMP had been integrated into the scope of works and corresponding budget also provided in the package, to help ensure that the environmental mitigation measures are implemented by the winning bidder. Upon the selection of the most responsive bid, the winning contractor CTM JV was required to submit their detailed EMP that was subject to the approval of the Engineer, who was also selected by the Employer following ADB procurement guidelines.

Construction Phase

38. The implementation of the EMP rests with the Contractor CTM-JV. To supervise the EMP works internally within CTM JV, the Contractor had deployed qualified senior staff, one for the MAX side of the Project; while the other for the TCCL part. They report directly to the respective Construction Manager of CTM MAX and TCCL. These personnel likewise coordinate their activities with the concerned temporary CSC Resident Environmental Specialist (Resident Social, Resettlement and Gender Specialist) who does the supervision work in behalf of the Employer. These Environmental Officers of CTM JV, also cover the Health and Safety concerns, which is under the supervision of the CSC Resident Health & Safety Engineer. However, since the Resident H & E Engineer had already demobilize, the supervision of the H & E is being done by the CSC mid-level Health and Safety Specialist.

39. Likewise, the Contractor CTM JV also shared some of its EMP scope to their Subcontractor. These works include the 3rd party environment monitoring to the company EQMS whose scope covers the EMP compliance monitoring, environmental quality monitoring and monthly report preparation. The other shared EMP task is the Compensation Tree Plantation and Rehabilitation Program which is being implemented by the Gomti Nursery. Details of the EQMS scope of work is found in the subsequent paragraphs.

40. Since the issuance of the "Notice to Proceed" given by the Employer to CTM JV that marked the start of the construction phase, followed by the approval of the Contractor's detailed EMP by the Engineer (CSC), the mitigation measures prescribed in the EMP had been implemented by the Contractor, monitored by EQMS, and supervised by the CSC Environmental team. Regular monthly reports have been submitted by EQMS that were subject to the review and validation of CSC. These reports as well as the field inspection reports; form the basis for the Semi-Annual Reports prepared by the CSC Resident Social, Resettlement and Gender Specialist (who also serve as the acting Environmental Engineer), for submission to the Employer and subsequently forwarded to ADB for information and uploading to the ADB website in line with the Bank's transparency policy.

41. Since the start of the Project, a total of 86 reports have been prepared, which includes: 61 monthly environmental reports; 15 Quarterly Environmental Reports; 9 Semi-Annual Environmental Monitoring Reports; and 3 Annual Environmental Reports. The monthly and quarterly environmental monitoring reports are prepared by the CTM Subcontractor EQMS, while the Semi-Annual and Annual Environmental Reports are done by CSC Environment team.

II. Environmental Quality Monitoring

2.1 Water Quality Monitoring

2.1.1 Surface and Ground Water Quality

42. Surface water sampling was based on the identification of major surface water bodies which has crossed the Construction site. Groundwater sampling locations were selected to obtain a representative water sample from various zones within the study area. The samples were collected from existing tube wells of the railway stations, stored in a suitable plastic container, and transported to a government accredited laboratory for analysis following standard methods.

43. The results of the surface water sample analysis were compared to the standards prescribed by government for Inland Surface Water, Environment Conservation Rules (ECR) and 1997-Schedule 3. Similarly, the groundwater test results were on the other hand, compared to the Drinking Water Standard ECR Schedule-3, 1997. The standards have been presented along with the monitoring test results of surface and groundwater samples for comparison. Considering that the beneficial use for humans of the waterways sampled, is mostly for fisheries, then the water quality standards set for this beneficial use was made the basis for the analysis of water quality compliance to standards.

Results of Sampling and Laboratory Analysis

44. The surface water sampling was done for 5 sites (Haora River, Goniajuri River, Bijna River, Shaindara River and the drainage canal traversed by Bridge #252) during the dry season from January to May 2022. Environmental monitoring during the month of June 2022 was done at the last week of the month and so its results had not been incorporated into this report. It can be noted that the surface water monitoring at the Goniajuri river is a follow-up study to determine the cause of the high organic pollution of the waterway that is traversed by the Project's track alignment with 3 bridges/culverts. A discussion on this contaminated surface waterway is found later in this chapter.

45. It can be noted that all water samples collected from the other 4 waterways (except Goniajuri River) most stations yielded laboratory test results compliant to Bangladesh surface water standard (Beneficial use for fisheries) for pH, dissolved oxygen (DO) and 5-day Biological Oxygen Demand (BOD_5). For these surface water where the samples were taken, it appears that there is no significant contamination level found, and as such mitigation measures implemented in as far as surface water pollution is concerned is working.

46. However, water samples taken from the drainage canal traversed by the track alignment at Culvert #252 (chainage km 164+557) failed in the parameters of DO and BOD_5. Since the structure has already been completed, it is unlikely that the source of the organic pollution in the canal water originated from the Project construction works and its workers. Dissolved oxygen (DO) is essential for the survival of aquatic life for respiration. Surface water with DO level below 5 mg/l is not suitable for many fish and aquatic life. Similarly, samples from the same river has a BOD_5 level that is higher than the DOE allowable threshold value of 6 mg/l (Beneficial use for fisheries). BOD_5 is a measure of pollution in terms of the amount of DO needed in 5 days to stabilize organic pollutants in the water. A low DO and high BOD_5 is a clear indication of a polluted river or surface waterway.

47. The drainage canal crossed by culvert #252 traverses a typical agricultural area that is planted with paddy rice during the rainy season and is dry during the rainy season. At the time of the monitoring work, there was no water in the intermittent canal under the culvert 252. Samples were taken at a point in the canal with stagnant water that is about 200m away from the culvert. The contaminants detected may have come from the adjacent agricultural lands and patches of rural residential areas and not from the Project construction site.

Table 2.1. Surface Water Quality in the Study Area during January to May 2022

S/N	Sampling Code	Location	pH	Temperature (^{0}C)	Electric Conductivity, EC (mS)	Total Dissolved Solids, TDS (mg/L)	Dissolve Oxygen, DO (mg/L)	Biochemical Oxygen Demand, BOD_5 (mg/L)	Chemical Oxygen Demand, COD (mg/L)	Total Suspended Solid, TSS (mg/L)
January 2022										
1	SWQ-1	Haora River Water (Upstream)	6.90	22.0	0.18	90	6.3	0.7	21	37
2	SWQ-2	Haora River Water (Downstream)	6.88	21.6	0.18	90	6.0	0.8	23	41
February 2022										
1	SWQ-1	Goniajuri River Water (Upstream)	7.22	22.7	0.86	440	1.4	15	87	238
2	SWQ-2	Goniajuri River Water (Downstream)	7.21	22.4	0.86	440	1.1	12.5	90	236
March 2022										
1	SWQ-1	Bijna River Water (Upstream)	7.54	24.2	0.14	70	8.5	1.7	27.6	182
2	SWQ-2	Bijna River Water (Downstream)	7.44	24.3	0.14	70	8.0	1.8	30	180
April 2022										
1	SWQ-1	Shaindara River Water (Upstream)	7	31	0.57	290	7.4	1.2	11.7	19.2
2	SWQ-2	Shaindara River Water (Downstream)	7.10	31.5	0.58	300	7.1	1.8	13.2	19.8
May 2022										
1	SWQ-1	Canal (C #252) Water (Upstream)	6.71	30.2	0.10	50	4.3	6.4	31	94
2	SWQ-2	Canal (C #252) Water (Downstream)	6.67	29.3	0.10	50	4.0	6.2	38	93
Bangladesh Standard										
		Source of drinking water supply only after disinfecting	6.5-8.5	-			6 or above	2 or less		
		Water usable for recreational activity	6.5-8.5	-			5 of more	3 or less		
		Source of drinking water supply after conventional treatment	6.5-8.5	-			6 or above	6 of less		
		Water usable by fisheries	6.5-8.5	-			5 of more	6 of less		
		Water usable by various process and cooling industries	6.5-8.5	-			5 of more	10 or less		
		Water usable for irrigation	6.5-8.5	-			5 of more	10 or less		

*Note: BDL = Below Detection Limit; NR= Not Reported; Source: EQMS Field Survey and DPHE Central Laboratory LA= Lab analysis * Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water).*

Organic Pollution Recorded at the Goniajuri River

48. The Goniajuri River is the main waterways that drains Comilla City, which serve as its headwaters. Its streams emanates from Alekharchor Mouza (near Comilla Cantonment) on its western-most branch, to the Comilla Export Processing Zone (Ashrafpur, Dhulipara & Unaishar Mouzas) in the middle and the Birahmpur Shal Forest (Rajeshpur Mouza, Jorkanan Union) on its Eastern-most branch. The natural surface waterway meanders through a mixed used area having the land-use of paddy rice fields/fish ponds; residential areas, commercial centers, institutional institutions and industrial areas. The Goniajuri River carries with its surface water flow pollutants (sewage, factory waste, agricultural chemicals) towards the Gakatia River (tributary of Padma River). Asides from the Goniajuri River, another natural waterway called the Gumti River also drains the northern portion of Comilla City as it flows from India on a westerly direction towards Meghna River. **Figure 2.1** contains the location map of the Goniajuri River, while **Figure 2.2** shows the headwaters of the Goiajuri river as its tributaries traverses parts of Comilla City on a Southern eastern, southern and south western direction until it merges near Bridge # 232 at Shayedpur Mouza (km141+627). The river also intersects the Project at 2 other water crossing points namely: Bridge 234 (km144+769) and culvert 235 (km 145+557).

49. Water samples were taken from the Goiajuri river twice, first in October 2021 which is still during the rainy season, and the other during the month of February 2022 which is already halfway in the dry season. The samples were all brought to the EQMS analytical laboratory for analysis. In both cases, Dissolved oxygen (DO) levels were way below the DOE standard (beneficial use for fisheries) at 2.8 mg/l and 2.7 mg/l upstream and downstream of the bridge respectively in October 2021; as well as 1.4 mg/l and 1.1 mg/l for also upstream and downstream of the bridge respectively in February 2022. It can be noted that the dry season samples have about half DO concentration as those in the rainy season. For the five day Biological Oxygen demand (BOD_5), the October 2021 sample concentration are at 12.5 mg/l and 13.1 mg/l for upstream and downstream of the bridge respectively; while for the February 2022 samples, these have a relatively higher BOD5 concentration at 15 mg/l and 12.5 mg/l for upstream and downstream of the bridge respectively. Opposite to the DO test results, the BOD5 concentration are more during the dry season as compared to the rainy season. **Table 2.2** contains details of the laboratory analysis of the Goiajuri River.

Table 2.2. Surface Water Quality Laboratory Test Results for Goiajuri River Samples

Sampling Month	Location	Dissolved Oxygen (mg/l)	Biological Oxygen Demand (mg/l)
October 2021	Upstream of bridge	2.8	12.5
	Downstream of bridge	2.7	13.1
February 2022	Upstream of bridge	1.4	15
	Downstream of bridge	1.1	12.5
Bangladesh Standard (fresh water for fisheries)		5 or more	6 or less

Source: ALDLP Environmental Quality Monitoring Report for October 2021 and February 2022

50. It can be noted that the poor water quality of samples taken from the Boniajuri river can be attributed to the untreated or raw sewage coming from the built-up areas upstream of the Project surface water monitoring stations, as well as agricultural chemicals applied to paddy rice fields located along the path of the river until it intersects the Project bridge and culvert. It is estimated that in 2011, about 16.18% and 1.62% of the urban population of Comilla City has access to unsanitary toilets or none at all respectively; while for its rural population about 20.97% and 3.33% have only unsanitary toiles or none at all respectively. Should this trend continue, then a 2022 estimated population of about 630,000 can yield a significant number of persons discharging untreated sewage into the waterways which in this case is the Goniajuri River. It is unlikely that the construction works had contributed to the pollution since the 3 bridges had already been completed before the water quality monitoring was conducted.

51. It can be noted that the concentration of BOD_5 are more in the dry season primarily due to the limited or no rainfall hitting the area thus increasing the dilution of the contaminants. Similarly, there are lesser DO during the dry season than those in the rainy season primarily since BOD_5 is responsible for the depletion of DO. The DO oxidizes the organic waste into a more stable form, so the higher is the BOD_5 concentration, the lesser is the residual DO obtained.

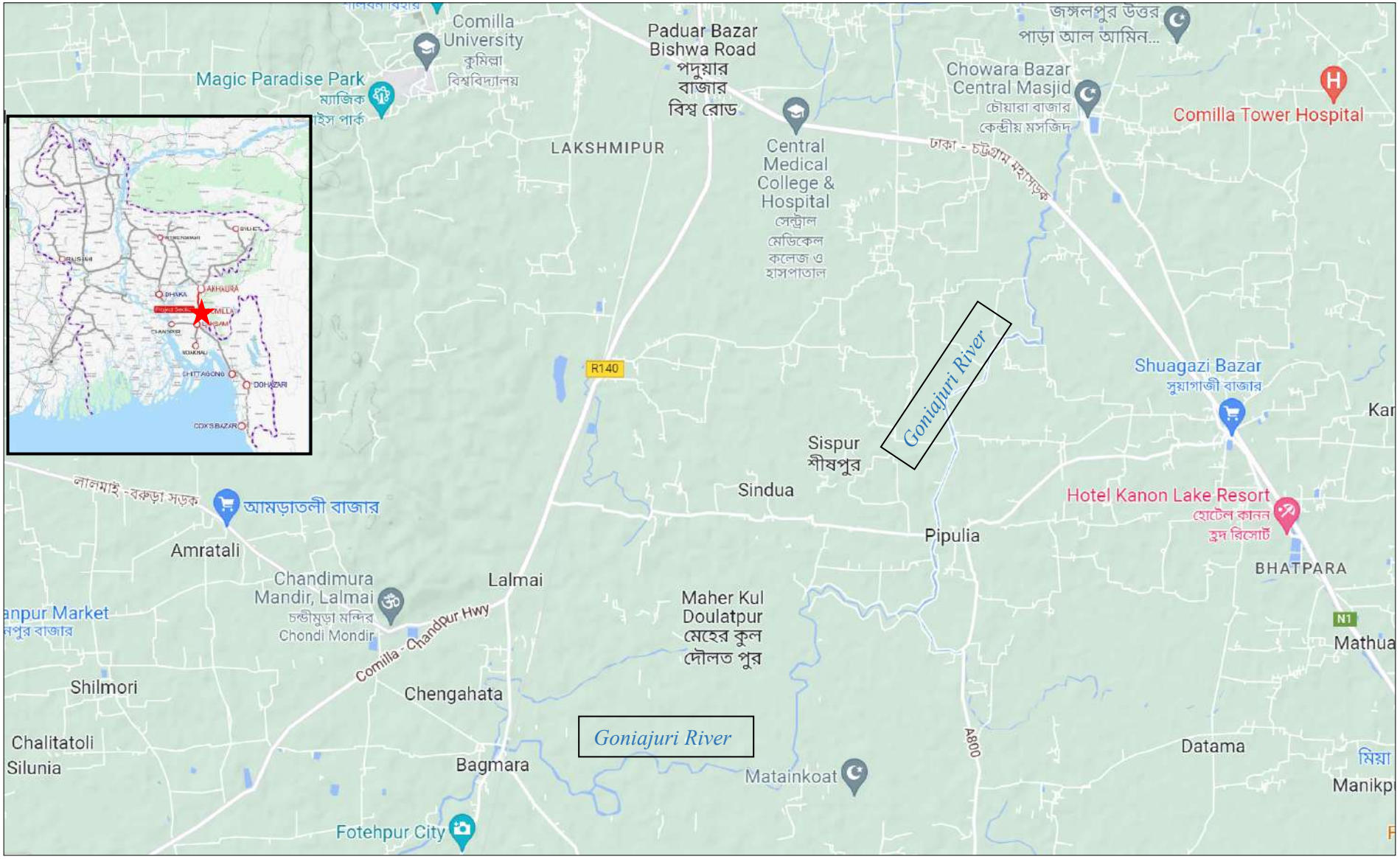


Figure 2.1. Location Map of the Goniajuri River

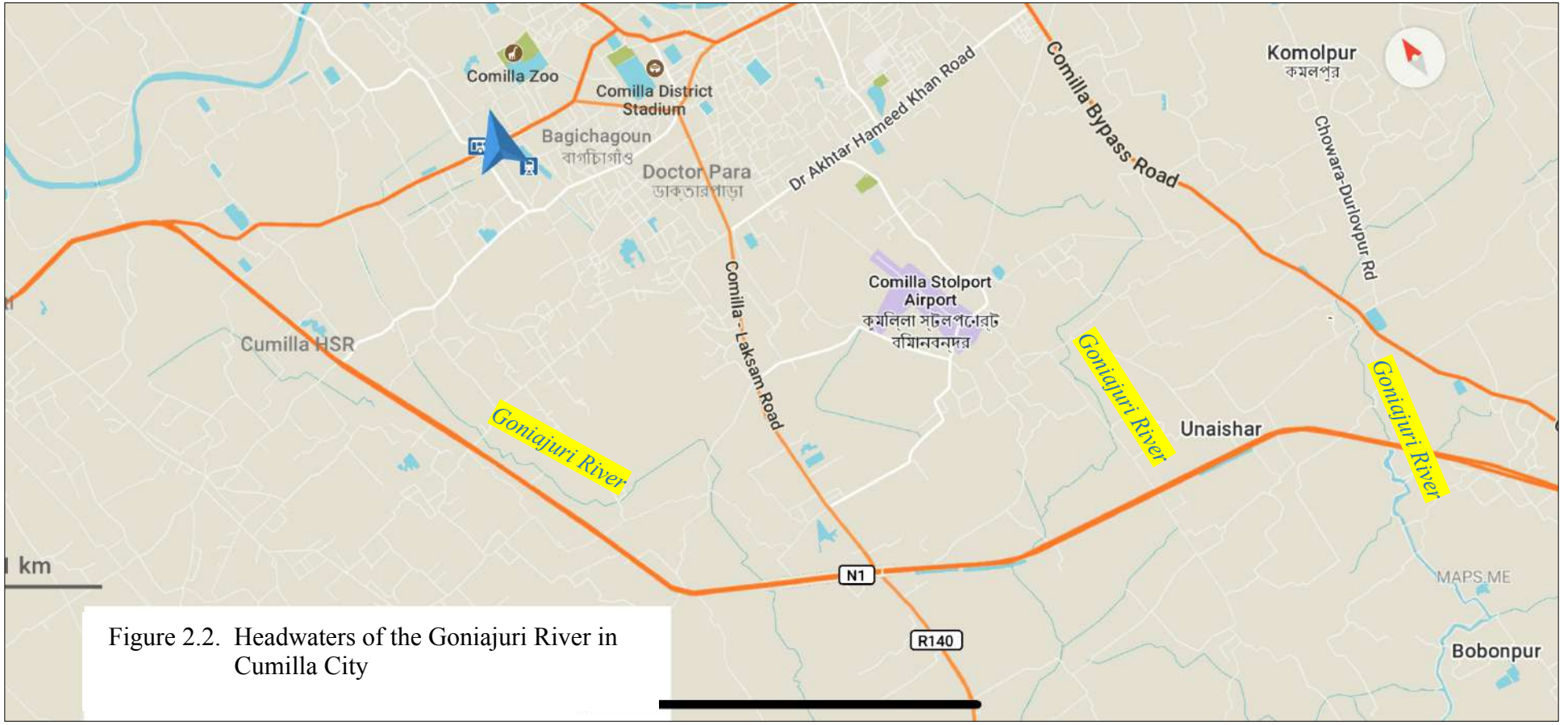


Figure 2.2. Headwaters of the Goniajuri River in Cumilla City

2.1.2 Ground Water Quality

52. The analysis of groundwater samples taken from the selected 10 stations had indicate that all comply with Bangladesh Drinking water Standards. These stations where ground water sampling were conducted include: Rajapur (January 2022), Gangasagar (January 2022), Imambari (February 2022), Bridge #243/Batch Plant & Labor Camp (February 2022), Sadar Rasulpur (March 2022), Kasba (March 2022), Akhaura (April 2022), Shashidal (April 2022), Black Cotton Zone (May 2022), and Mandabag (May 2022). The test results for samples taken during the month of June 2022 were not received during to the time of this report writing. This test result values indicate that there is no contamination of the ground water by Project construction related activities at the sampling stations from where the water samples were taken. The quality of groundwater tested and analyzed in the project area is provided in the following **Table 2.3.**

Table 2.3. Ground Water Quality in the Study Area during January – May 2022

S/N	Sampling Code	Location	pH	Temperature (^{0}C)	Phosphate (mg/L)	Manganese, Mn (mg/L)	Arsenic, As (mg/L)	Iron, Fe (mg/L)	Fecal Coliform, FC (N/100mL)
January 2022									
1	GWQ-1	Rajapur Railway Station	6.54	26.1	0.02	0.01	<0.01	0.02	0
2	GWQ-2	Gangasagar Railway Station	6.60	27.7	0.03	0.02	<0.01	0.04	0
February 2022									
1	GWQ-1	Imambari Railway Station	6.58	27	0.80	0.01	<0.01	0.66	0
2	GWQ-2	Bridge #243/Batch Plant and Labor Camp	6.80	27.4	0.60	0.01	<0.01	.01	0
March 2022									
1	GWQ-1	Sadar Rasulpur Railway Station	6.79	27.8	0.7	0.01	<0.01	0.06	0
2	GWQ-2	Kasba Railway Station	7.21	27.5	0.1	0.06	<0.01	0.29	0
April 2022									
1	GWQ-1	Akhaura Railway Station	6.62	28.9	0.60	0.01	<0.01	0.07	0
2	GWQ-2	Shashidal Railway Station	6.85	27.5	0.15	0.03	<0.01	0.27	0
May 2022									
1	GWQ-1	Black Cotton Zone	6.63	29.4	0.8	0.02	<0.01	0.09	0
2	GWQ-2	Mandabag Railway Station	6.54	27.6	0.6	0.04	<0.01	0.9	0
		Bangladesh StandardError! Bookmark not defined.	**6.5-8.5**	**–**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

Note: BDL = Below Detection Limit; LA: Lab Analysis Still Going On; Source: EQMS Field Survey and DPHE Central Laboratory.

2.2 Air Quality Monitoring

53. A total of 10 sets of ambient air samples were collected from selected railway station areas of the Project rail corridor between Akhaura and Laksam. All ten (10) sets of samples were taken during the dry months of January to May 2022. The ambient status of major air pollutants such as Particulate Matter (SPM, PM10 and PM2.5), Sulfur Dioxide (SO2), Oxides of Nitrogen (NOx), and Carbon Monoxide (CO) have been covered in the monitoring work. Sampling time varies depending on the parameter, where PM2.5, PM10, SO_2, NOx were monitored for a period of 24 hours, while the parameters SPM and CO were measured for 8 hours. The air quality measurements were done using portable analyzers that were installed at the selected stations. The test results when compared to the Bangladesh air quality standards indicate that all of them are compliant at a level far below the set threshold. The test results would indicate that the EMP measures being implemented by the Contractor at the time of the air quality monitoring work, to minimize air pollution and dust control is working. During the upcoming rainy season and autumn, the Contract will still need to implement their dust control measures most especially at the Block Cotton Zone area. **Table 2.4** below contains the ambient air quality monitoring test results from selected stations for the period January – May 2022. The results of the ambient air quality monitoring for the month of June 2022 did not make it to the time of this report writing.

Table 2.4. Air Quality monitoring during January – May 2022

Sampling Code	Sampling Location	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO_2 ppm
January 2022							
AAQ-1	Rajapur Railway Station	13.66	26.97	54.76	3.84	13.15	0.04
Baseline Status	Rajapur Railway Station	12.47	26.81	63.21	2.91	10.43	<2
AAQ-2	Gangasagar Railway Station	15.82	31.29	63.78	1.01	13.10	0.31
Baseline Status	Gangasagar Railway Station	22.73	49.97	98.46	2.95	12.39	<2
February 2022							
AAQ-1	Imambari Railway Station	8.63	16.19	33.81	3.41	10.04	0.07
Baseline Status	Imambari Railway Station						
AAQ-2	Bride #243/Batch Plant and Labor Camp	7.48	14.26	29.72	2.09	25.43	0.21
Baseline Status	Bride #243/Batch Plant and Labor Camp						
March 2022							
AAQ-1	Sadar Rasulpur Railway Station	17.06	21.12	51.62	8.89	13.61	0.05
Baseline Status	Sadar Rasulpur Railway Station	11.32	27.76	48.57	2.41	12.57	<2
AAQ-2	Kasba Railway Station	14.86	19.47	46.51	8.23	12.27	0.02
Baseline Status	Kasba Railway Station	10.95	25.56	49.52	3.73	11.46	<2
April 2022							

Sampling Code	Sampling Location	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_x µg/m³	CO_2 ppm
AAQ-1	Akhaura Railway Station	9.69	18.29	37.94	7.51	11.67	0.03
Baseline Status	Akhaura Railway Station	26.85	61.53	105.72	5.27	17.45	<2
AAQ-2	Shashidal Railway Station	9.41	20.48	40.57	4.89	10.05	0.01
Baseline Status	Shashidal Railway Station	9.59	22.12	39.34	2.37	10.37	<2
May 2022							
AAQ-1	Black Cotton Zone	8.96	16.41	34.05	5.67	3.71	0.06
Baseline Status	Black Cotton Zone						
AAQ-2	Mandabag Railway Station	10.29	18.78	39.62	6.33	8.82	0.03
Baseline Status	Mandabag Railway Station	14.43	33.93	59.18	3.11	12.83	<2
Bangladesh Standard**Error! Bookmark not defined.**		**65**	**150**	**200**	**365**	**100Error! Bookmark not defined.**	**9**
Duration (Hours)		**24**	**24**	**8**	**24**	**24**	**8**

[1] Carbon Monoxide (CO) concentrations and standards are 8-hourly only.

[2] The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

[3] The Bangladesh Standard for Oxides of Nitrogen (NO_X) is considered for annual measurement.

Note:
** CO concentrations and standards are 8-hourly only.*
*** The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.*
All parameters shown in ***Table 4*** are within the acceptable limits specified by the DoE.

2.3 Noise Level Monitoring

54. Ambient noise levels have been monitored from 8 railway stations of the ALDLP project and 4 other noise sensitive areas during this reporting period. Noise meter with data logger (Digital Noise Meter: Model no. GM 1357) was used to record the ambient noise levels. Twenty (20) noise level sampling locations had been selected which are located near sensitive receptors of the stations. The Detail list of sampling location is shown in **Table 2.5.** Noise level measurement was done continuously for 1 hours per monitoring site and the power formula adopted in the Project's EIA was used to compute for the average noise level. The average Leq was recorded and compared to the prescribed ambient noise threshold for the specific zone on which the monitoring site is located; to determine compliance to government noise level standards. **Annex 5C** contains the methodology for the ambient noise monitoring.

55. Potential noise intensity reaching a receptor vary and dependent on the distance from the source, site land-use, topography, presence of obstacles and meteorological factors. In this project key noise source are operating trains, back-up electric generators, moving vehicles, operating construction equipment and people (i.e. construction workers, commuters, pedestrians, vendors). The average noise levels measured at the monitoring sites are mostly compliant to the government noise threshold for the relevant zone category with the exception of 5 (20%) out of 20 sites.

Plate 3. Noise level monitoring at the Mandabag Railway Station Jame Mosque.

All (5) of these sites are BR station mosques (Rajapur, Gangasagar, Imambari, Sadar Rasulpur, Akhaura, Mandabag) that are located mostly beside the access road to the respective stations, where local transport vehicles pass through. The Gangasagar mosque is about 650 m away from the new railway station under construction, while the Rajapur and Sadar Rasulpur mosques are found on the opposite side of the track from the new station buildings, and along the existing access roads where small variety shops are located. Here the noise is mainly generated by the movement of vehicles entering, idling and leaving the station, as well as the commuters and vendors/shop owners selling their merchandise. It can be noted that at the time of the noise level monitoring, there were very minimal construction activities being done at the 5 stations as well as the track embankments adjacent to the said buildings, and yet the noise level still exceeded the DOE standard for institutional areas (50 dB(A)). One possible attenuation measure is to plant trees between the construction area and the mosque. Regulating the vehicular traffic in order to minimize the noise is not within the mandate of BR. The concerned local government would have to step in to control the vehicle movement during hours of prayer.

56. The methodology employed by EQMS is consistent with the approach done during the conduct of the EIA for the Project Feasibility Study. A one-hour measurement was done in the morning, and its average result was fed into a power formula that yield the average ambient noise level for the morning period. The power formula was derived as part of the EIA study. No night measurements were made since there were no night-time construction work done during the reporting period. The results of noise level monitoring is given in **Table 2.5**. Details of the noise monitoring methodology is found in Annex 6c.

Table 2.5. Results of noise level monitoring during January – May 2022

Month		Sampling Code	Location	Leq dB(A)[3]	Baseline Status	Zone[4]	Bangladesh Standard at day Time dB (A)	Remarks
Jan 2022	1	ANL-1	Rajapur Railway Station	57.41	66.84	Mixed	60	Low
	2	ANL-2	Rajapur Railway Station Jame Mosque	52.17	60.98	Silent	50	High
	3	ANL-3	Gangasagar Railway Station	53.44	55.06	Mixed	60	Low
	4	ANL-4	Gangasagar Railway Station Jame Mosque	48.63	55.51	Silent	50	Low
Feb 2022	1	ANL-1	Imambari Railway Station	56.49		Mixed	60	Low
	2	ANL-2	Imambari Railway Station Jame Mosque	53.17		Silent	50	High
	3	ANL-3	Bride #243/Batch Plant and Labor Camp	62.04		Industrial	75	Low
	4	ANL-4	Araiura, Uttar Durgapur, Adarsha Sadar,	53.76		Residential	55	Low

Month		Sampling Code	Location	Leq dB(A)[3]	Baseline Status	Zone[4]	Bangladesh Standard at day Time dB (A)	Remarks
			Cumilla					
March 2022	1		Sadar Rasulpur Railway Station	58.22	63.51	Mixed	60	Low
	2	ANL-2	Sadar Rasulpur Railway Station Jame Mosque	52.37	52.25	Silent	50	High
	3	ANL-3	Kasba Railway Station	55.41	54.65	Mixed	60	Low
	4	ANL-4	Kasba Railway Station Jame Mosque	48.13	NR	Silent	50	Low
April 2022	1	ANL-1	Akhaura Railway Station	59.73	66.23	Mixed	60	Low
	2	ANL-2	Akhaura Railway Station Jame Mosque	55.04	55.80	Silent	50	High
	3	ANL-3	Shashidal Railway Station	58.11	62.22	Mixed	60	Low
	4	ANL-4	Shashidal Samata Shishu Niketon	48.29	NR	Silent	50	Low
May 2022	1	ANL-1	Black Cotton Zone	53.73		Mixed	60	Low
	2	ANL-2	Pitambar, Burichang, Cumilla	55.98		Mixed	60	Low
	3	ANL-3	Mandabag Railway Station	57.24	54.64	Mixed	60	Low
	4	ANL-4	Mandabag Railway Station Jame Mosque	53.17	54.74	Silent	50	High

[1] A-weighted decibel, abbreviated dB(A), is an expression of the relative loudness of sounds in air as perceived by the human ear. In the A-weighted system, the decibel values of sounds at low frequencies are reduced, as the ear is less sensitive to low audio frequencies, especially below 1000 Hz, than to high audio frequencies.
[2] Noise Pollution (Control) Rules, 2006.

*Source: EQMS Survey Team; EMP: Environmental Management Plan; NR: Not Reported; *Environmental Conservation Rules, 1997 (Schedule 4) (subsequent amendment in 2006)*

III. Environmental Management Plan Compliance

3.1 Progress of EMP Compliance during Construction Period

57. The implementation of the approved EMP is one of the conditions for the effectivity of the Project Loan Agreement. To ensure the contractor's compliance to the EMP, the Loan Agreement prescribe that these measures be incorporated into the bid documents as among the scope of work by the contractor.

58. During the actual EMP implementation by the Contractor, the monitoring of its compliance had been awarded to a third party that serves as an independent monitor. The third party monitor called EQMS is also tasked to conduct the Environmental Quality Monitoring to check if the EMP is effective in mitigating the projected negative environmental impacts. The CSC Environment team on the other hand, supervises the work of the third party monitor EQMS, and confirms their findings and recommendations for corrective action to be performed by the Contractor to remedy non-compliances of the EMP.

59. In response to the comments of ADB on the January – June 2020 Semi-Annual report on the quality of the EMP compliance monitoring, the CSC Social Safeguards team developed a new monitoring system that provides for a quantitative methodology to evaluate compliance by the Contractor to approved EMP, and contains a routine that allows for the identification and monitoring of non-compliant activities. Using MS Excel apps, the implementation of all major project components is evaluated for compliance to the EMP by an evaluator by giving a numerical score between 1 to 5 to each relevant mitigation measures as applied to each project component, where 1 is non-compliant and 5 is fully compliant. The MS Excel apps will consolidate all scores and generate a single number that can define if the Contractor is fully, partially or non-complaint to the EMP. The system was introduced to representative of CTM JV, CSC, and third party monitor EQMS in a 2 day workshop held in 23-24 March 2021. Due to fine tuning of the system, it was only applied during the May 2021 monitoring period.

60. Under the new system, the Project was divided into 83 components made up of 13 stations, 12 bridges, 43 culverts, 14 5 km segment of railway track & embankment, and 1 plant nursery. Each of these Sections are individually evaluated for compliance to EMP. Section 1 has 26 components (4 stations, 3 bridges, 14 culverts, 5 5 km long track/embankment); Section 2 has 25 components (4 stations; 5 bridges, 11 culverts, 4 5 km track/embankment, and 1 plant nursery) while Section 3 has 32 components (5 stations, 4 bridges, 18 culverts, 5 5 km long track/embankment). More details on the new Environmental monitoring system will be discussed in later chapters of this report.

3.2 EMP Progress Status During the Period January – May 2022

3.2.1 Overall EMP Compliance Status

61. For the reporting period (January-May 2022), the Project is evaluated as compliant to the approved EMP with an overall average rating of 4.7 points. Under the new reporting system, a score greater than or equal to 4 points ($\geq$ 4 points) is considered compliant to EMP. A score that is less than 4 points but equal to or greater than 3 ($>\underline{3}$ and <4) is considered as partially compliant. However, a score less than 3 points (< 3) is non-complaint. For the month of May 2022 that is evaluated in this report, it is in the aspect of dust control that an overall average points of 3.5-3.7 for Sections 2 & 3 was garnered, meaning partially compliant was recorded. Efforts still need to be exerted by the Contractor to address the issue. Section 1 on the other hand, is already completed and handed over to BR PIU. **Table 3.1** contains the overall summary of EMP compliance during the reporting period (Jan-May 2022), while **Table 3.2** contains the summary evaluation for all mitigation measures as of May 2022. **Table 3.3** on the other hand contains details of the May 2022 status, while **Annex 1** contains the full evaluation table covering all of the 83 Project components, per EMP mitigation measure as of the month of May 2022 where much of the corrective measures were done.

Table 3.1. SUMMARY EVALUATION OF COMPLIANCE TO THE ENVIRONMENTAL MANAGEMENT PLAN (JANUARY – MAY 2022)

	MONTH	SECTION 1		SECTION 2		SECTION 3		OVERALL	
		RATING	REMARKS	RATING	REMARKS	RATING	REMARKS	RATING	REMARKS
1	January, 2022	5.0	Compliant	4.6	Compliant	4.6	Compliant	4.7	Compliant
2	February, 2022	5.0	Compliant	4.6	Compliant	4.6	Compliant	4.7	Compliant
3	March, 2022	5.0	Compliant	4.6	Compliant	4.6	Compliant	4.7	Compliant
4	April, 2022	5.0	Compliant	4.7	Compliant	4.4	Compliant	4.7	Compliant
5	May, 2022	5.0	Compliant	4.7	Compliant	4.4	Compliant	4.7	Compliant
Average		5.0	Compliant	4.64	Compliant	4.52	Compliant	4.7	Compliant

Table 3.2 SUMMMARY EVALUATION OF COMPLIANCE TO ENVIRONMENTALMANAGEMENT PLAN PER SECTION AS OF 31 MAY 2022

S.I.	GENERAL MITIGATION	SECTION 1		SECTION 2		SECTION 3		OVERALL	
		RATING	REMARKS	RATING	REMARKS	RATING	REMARKS	RATING	REMARKS
1	Noise and Attenuation Measures	5.0	Compliant	4.6	Compliant	5.0	Compliant	4.9	Compliant
2	Dust Control	5.0	Compliant	3.7	Partially compliant	3.5	Partially compliant	4.1	Compliant
3	Watercourse Impacts in Wetlands/Ponds/Rivers	5.0	Compliant	4.7	Compliant	5.0	Compliant	4.9	Compliant
4	Borrow and Dredging Site Impacts	5.0	Compliant	5.0	Compliant	4.9	Compliant	5.0	Compliant
5	Disposal of Construction Debris and other Waste Materials	5.0	Compliant	4.0	Compliant	4.8	Compliant	4.6	Compliant
6	Servicing and Operating Equipment	4.9	Compliant	5.0	Compliant	4.9	Compliant	5.0	Compliant
7	Control of Petroleum Products	4.8	Compliant	4.7	Compliant	4.8	Compliant	4.8	Compliant
8	Protection of Topsoil and Soil Erosion	5.0	Compliant	5.0	Compliant	4.9	Compliant	5.0	Compliant
9	Occupational Health and Safety	5.0	Compliant	4.7	Compliant	4.4	Compliant	4.7	Compliant
	AVERAGE RATING	5.0	Compliant	4.6	Compliant	4.7	Compliant	4.8	Compliant

Table 3.3. SUMMARY OF COMPLIANCE TO EMP PER SECTION AS OF MAY 2022

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
1	**Noise and Attenuation Measures**							
	1	Use of modern plant and equi pment.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	2	All powered mechanical e quipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control in compliance with DoE regulat ions.	5.0	**Compliant**	3.2	**Partially compliant**	5.0	**Compliant**
	3	Locate rock crushing, concret e mixing and material shipment yards away from residential areas, schools, colleges and hospitals.	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	4	Install temporary noise barriers near sensitive locations such as schools, reli gious places and hospitals	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	5	Providing the construction workers with suitable hearing protection like ear cap, or earmuffs etc.	5.0	**Compliant**	4.7	**Compliant**	5.0	**Compliant**
	6	Noise quality monitoring to be carried out as per the schedule in the enviro nmental monitoring plan.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	4.3	**Compliant**	4.6	**Compliant**	5.0	**Compliant**
2	**Dust Control**							
	1	Vehicles transporting construction material to be covered	5.0	**Compliant**	1.2	**Non compliant**	1.0	**Non compliant**
	2	Construction equipment to be maintained to a good standard and idling of engines discouraged.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	3	Machinery emitting visible smoke to be banned from construction sites.	5.0	**Compliant**	3.2	**Partially compliant**	4.8	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	4	Contractor to prepare a dust suppression program detailing action to be taken to minimize dust generation (e.g . spraying of roads with water), and the equipment to be used.	5.0	**Compliant**	3.1	**Partially compliant**	3.0	**Partially compliant**
	5	Dust masks to be provided to workers where dust hazards exist.	5.0	**Compliant**	2.5	**Non compliant**	2.3	**Non compliant**
	6	Air quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	5.0	**Compliant**	5.0	**Compliant**	4.8	**Compliant**
	7	All roads, permanent or temp orary, pukka or katcha, that become dusty an d all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures by watering, sweeping or other measures approved or directe d by the Engineer	5.0	**Compliant**	3.1	**Partially compliant**	3.0	**Partially compliant**
	8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accide ntal spillage of petroleum products, contact of such materials with soil or water course through discharge run-off, and or seepage	4.9	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
	9	Contractor shall take all reaso nable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions require dust suppression. If the Engineer considers that the dust suppression measures adopted by Contractor ineffective. Contractor shall in that case take further measure to minimize dust blowing at construction site as per his direction	5.0	**Compliant**	5.0	**Compliant**	3.0	**Partially compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
		Average Rating	5.0	**Compliant**	3.5	**Partially compliant**	3.5	**Partially compliant**
3	**Watercourse Impacts in Wetlands/Ponds/Rivers**							
	1	Adequate mitigation measure shall be undertaken to limit the impac t on all water bodies within the Project area	5.0	**Compliant**	4.9	**Compliant**	5.0	**Compliant**
	2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contaminat ion from fuel and lubricants.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	3	Proper disposal of bricks, cement, and steel reinforcement which will be removed as part of the reconstruction of bridg es/ culverts shall be ensured not to block strea m flow.	5.0	**Compliant**	3.7	**Partially compliant**	4.9	**Compliant**
	4	Temporary erosion and sedim entation control measures during rehabilitation of cross-drainage structures shall be undertaken to ensure that sediment laden run off does not enter the adjoining watercourses.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	5	Construction materials and waste shall not be discharged in watercourse during construction of bridges/culver ts by implementing appropriate mitigation measure.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	5.0	**Compliant**	4.7	**Compliant**	5.0	**Compliant**
4	**Borrow and Dredging Site Impacts**							
	1	Proper management of borrow pits and dredging sites so that water pollution and water logging may not be happened.	5.0	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
		Average Rating	5.0	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
5	**Disposal of Construction Debris and other Waste Materials**							
	1	No burning shall be allowed.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	2	No cleared debris shall be left lying on the surface of the ground or buried in any agricultural land.	5.0	**Compliant**	3.1	**Partially compliant**	5.0	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	3	Man-made construction debris shall be disposed of in disposal areas the location and nature of such disposal shall be subject to the approval of the Engineer.	4.8	**Compliant**	3.1	**Partially compliant**	4.7	**Compliant**
	4	All disposal areas shall be finally graded to a uniform and level condition and left such that they create a minimum impac t on the surrounding area.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	5.0	**Compliant**	4.0	**Compliant**	4.8	**Compliant**
6	**Servicing and Operating Equipment**							
	1	Servicing of machines or equipment near rivers, streams or other bodies of water shall be carried out in such a manner as to avoid pollution with gasoline, diesel fuel, oil, grease, or surplus or disposable materials	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	2	Without limiting the generality of the foregoing, the Contractor shall ensure that all hydraulic systems, fuel systems and lubricating systems are in good condition to avoid leakage of petroleum products.	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	3	Fuel spills will not be condoned and care shall be taken to avoid overfilling machines.	4.8	**Compliant**	5.0	**Compliant**	4.8	**Compliant**
	4	The Contractor shall have the proper equipment to transport fuel so that spillage will not occur. Automatic shut-off nozzles shall be installed on all fuel dispensing units.	4.9	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	5	The Contractor shall have oil spill abatement equipment on the Site at all times.	4.8	**Compliant**	4.7	**Compliant**	4.7	**Compliant**
	6	The type of equipment shall be subject to the approval of the Engineer, and the equipment shall be maintained in good working condition.	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	4.8	**Compliant**	4.7	**Compliant**	4.9	**Compliant**
		Average Rating	4.9	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
7	**Control of Petroleum Products**							
	1	All petroleum products shall be stored in a designated storage location where any spillage can be safely maintained without contamination of the surrounding area. Storage of petroleum products shall not be permitted in the vicinity of streams rivers or to avoid groundwater contamination. be placed on subsurface of the storage room other bodies of water. Impermeable liner shall	4.8	**Compliant**	4.7	**Compliant**	4.8	**Compliant**
		Average Rating	4.8	**Compliant**	4.7	**Compliant**	4.8	**Compliant**
8	**Protection of Topsoil and Soil Erosion**							
	1	Topsoil storage areas must be protected during the dry season from wind erosion by covering.	4.9	**Compliant**	5.0	**Compliant**	4.6	**Compliant**
	2	Rapid re-vegetation and use of hydro-seeding and jute erosion protection mats will be applied in areas where erosion is noted during the regular monthly inspections.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	3	Embankment site to be planted with trees to promote natural vegetation; as well as fast growing grasses.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
	4	The stockpiling and/or disposal of material as aforesaid shall be such that the material is not placed in any area where natural drainage or storm water could pond and become stagnant, or where could erode the material and cause silting of the adjacent area or of any natural or man-made water course.	5.0	**Compliant**	5.0	**Compliant**	5.0	**Compliant**
		Average Rating	5.0	**Compliant**	5.0	**Compliant**	4.9	**Compliant**
9	**Occupational Health and Safety**							

MITIGATTION MEASURES			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	1	Supply of appropriate person al protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles and ear protection among the workers and enforce its use.	5.0	**Compliant**	1.2	**Non compliant**	1.0	**Non compliant**
	2	Follow the specification on construction safety as defined in civil works	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	3	Construction workers will be required to train in general health and safety matters and on specific hazards of their work	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	4	Must not hire child labor, age below 14	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	5	Hire, use of benefit from child Labor-Child labor (as defined by ILO Conventions 138 and 182) means that no work ers under the age of 14 may be hired as general labors, and no workers under the age of 17 are to be hired for hazardous jobs.	5.0	**Compliant**	5.2	**Compliant**	5.0	**Compliant**
	6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	5.0	**Compliant**	4.9	**Compliant**	4.4	**Compliant**
		Average Rating	4.5	**Compliant**	4.2	**Compliant**	4.2	**Partially compliant**

3.2.2 Noise Attenuation Measures

62. To help insure compliance to Clause 3.5 of the EMP that prescribes the implementation of noise attenuation measures, site monitoring work was performed by the third party monitor EQMS. The monitor had indicated that most of the 6 prescribed measures had generally been complied with under the prescribed EMP measures. These complied measures include a) use of modern plant and equipment that are properly maintained; installation of noise abatement gear on all powered equipment; location of rock crushers and other noisy equipment and activities away from noise sensitive areas.

63. While it can be noted that ear protection had not been provided to workers that may be exposed to extreme noisy environment, these safety gear however are not necessary during reporting period. It can be noted that minimal work had been observed in Sections 2 and 3; while Section 1 had been completed and handed over to BR PIU. The work slow down is partially due to the demand by the Indian Border Guards to cease all construction activity on Section 2 bridges and stations, until the Bangladesh government can secure a diplomatic clearance from their government. Whereas in Section 3, construction work is very limited due to the internal financial problems of the Contractor. In addition, Likewise, work at Akhaura station yard is hampered by unresolved involuntary resettlement work involving Project affected structures (i.e. food godown, privately owned and squatter residential and commercial structures, and BR operating units) located along the path of the tracks that requires relocation. In view of these events, construction-related noise created is very minimal to nil, and therefore ear protection against noise is not needed by the workers at the construction site.

3.2.3 Dust Control

64. The third party monitor EQMS had noted, that most of 9 measures prescribed had been fully complied (5 or 55.5%) and partially complied (3 or 33.3%) with by the Contractor. The non-compliant measures include: a) the provision of dust mask to construction workers and b) covering of trucks transporting construction materials that had not been complied with. The fully compliant measures include: a) proper maintenance of construction equipment; b) conduct of monthly air quality monitoring; and c) avoiding the use of spent petroleum products as dust suppressant. Likewise the partially compliant measures include: a) watering of all roads, temporary or permanent; as well as b) watering of construction materials/waste stockpiles to prevent dust suspension by wind.

65. It can be seen in Annex 1 that the Contractor has failed to cover their trucks hauling construction materials, waste and others; as well as provision of dust mask to construction workers in the 83 project components, be it stations, bridges, culverts, or track/embankment works. The rest of the mitigation measures under the dust control sector, are fully and partially compliant. The green color of the cells indicates full compliant, while yellow cells symbolize partially compliant measures.

66. The reporting period covered 5 months within the dry season. To avoid dust resuspension, the contractor normally wet the materials before being transported by the trucks. However, there are instances that inadequate water is sprinkled on the materials or no water at all in some cases. Similarly, stockpiles of materials at the construction yard were also watered, to also prevent dust suspension. Similar to the transported materials, there may be instances when inadequate watering is done which resulted in a dusty environment that affects not only the local residents but the construction workers as well. The attention of the Contractor had been done to remind them to cover the transport trucks and moisten the stockpiles as prescribed in the EMP. Meetings had been called by CSC that was attended by the concerned CTM JV responsible officers, to discuss the progress of the EMP implementation that includes dust control measures. **Table 3.3** contains details of the dust mitigation measures, site observations made by the third party monitor and recommended action to ensure full compliance of the EMP prescribed measure. **Table 3.2** contains the summary compliance to EMP per major mitigation measure, per Section.

3.2.4 Watercourse Impacts in Wetlands/Ponds/Rivers/Canals

67. During the reporting period, it was observed that most of the (4 out of 5) watercourse impact preventive measures had been fully complied with. These fully achieved measures during the reporting period include: a) All waterways where Construction activities are conducted, are maintained open at all times, else temporary diversion works adequate to convey surface water flow are installed; b) Earth moving in the vicinity of watercourses are kept to a minimum ; c) temporary erosion and sedimentation control measures are installed during rehabilitation of drainage structures; and d)

construction materials and waste are not dumped into water courses and are deposited into designated disposal areas. Only the proper and prompt disposal of construction wastes is partially compliant. The Contractor should continue to ensure that these pollution preventive measures be followed in all sites, and the monitor will need to follow-up on this matter.

68. The Contractor had some difficulty in promptly disposing properly of construction waste this may be due to the construction slow down. In Section 2, the Contractor had demobilized many of their equipment and personnel due to the work stoppage demanded by the Indian Boarder Guards; as well as internal financial problems of one of the Contractor partners. As a result of this condition, the construction waste are temporarily stockpiled within the construction area, both along the unfinished track embankments, stations and completed bridges/culverts. There are efforts observed to transport the waste to the authorized disposal areas, however, these are inadequate to fully clear the temporary storage areas. It is hoped that the Contractor can secure additional funding for its construction activities so that uncollected waste materials can be properly and fully hauled to the approved disposal sites.

69. One of the authorized disposal site is the Comilla City solid waste facility which the Project had used to deposit its inert wastes. Local people also are allowed to collect some of the unsuitable materials for their own use; while solid waste materials with value are auctioned-off by the Contractor for their profit.

3.2.5 Borrow and Dredging Site Impacts

70. During the reporting period, there were no borrowing nor dredging activity performed by the Contractor. It is for this reason that this activity had not been covered in the monitoring work performed by EQMS.

3.2.6 Disposal of Construction Debris and other Waste Materials

71. Most of the mitigation measures related to proper storage and disposal of construction waste has been complied during the reporting period. These measures include: a) no burning was allowed; b) No construction debris left lying on the surface of the ground, pond or buried in agricultural areas; c) discarded waste were properly covered with earth before abandoned in a manner that blends with the surrounding environment; d) disposal areas are graded to a uniform level. Similar to the mitigation measure on clearing waterways of construction debris, it can be noted one mitigation specifically: proper disposal of man-made construction related debris in disposal areas is only partially complied with. As mentioned in paragraph 67 above, the slowdown in construction activities leading to the demobilization of many personnel and equipment had affected also the timely and adequate disposal of solid waste. Wastes such as non-suitable materials are normally stockpiled at the construction site, and awaits transport to disposal sites when the transport trucks and personnel are available. Similarly, some unsuitable materials are left for local people to collect, while those having value are sold to interested private parties.

72. The partially complied with measures are found at Section 2 stations, bridge and culvert construction sites. Section 1 had already been completed and handed over to BR by the Contractor, and so no significant volume of solid waste are left for disposal.

3.2.7 Servicing and Operating Equipment

73. All of the mitigation measures prescribed under Servicing of Construction Equipment had been complied with. These measures include: a) avoidance of servicing equipment near water course; b) ensuring equipment hydraulic, fuel and lubricating systems are properly operating to avoid oil spillage; c) non-condoning of spillages; d) provision of proper equipment for transporting and/or filling fuel and other petroleum products; e) and securing first the approval of the Engineer prior to the deployment of equipment at the site; and f) disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP. Construction equipment are important element that facilitates the construction work effectively and on a timely manner. Moreover, their proper use and maintenance will ensure the machines longer service life, minimizes costly down time due to equipment brake down, and government imposed penalties due to pollution of adjacent environs.

74. However, the 5th and 7th (last) mitigation measure under the servicing and operating equipment (provision of proper oil spill abatement equipment and proper disposal of used oil, lubricants, tires,

etc.), were partially complied in most stations. It can be noted that construction equipment assigned to these were previously being maintained in these sites, rather than at the Construction yard to minimize fuel and maintenance cost, and unnecessary generation of greenhouse gases. However, in view of the slow down of construction activities resulting in the reduction in personnel and equipment, only the construction yards in the Lalmai and Quasba Stations operate garage facilities to service the construction equipment (i.e. change engine oil, change radiator coolant, replacement of broken parts, etc.). Refilling of petroleum are done at site using fuel tankers manned by Contractor's personnel. Fuel depots are maintained at the Gumti and Quasba construction yards from where tankers secure the petrol to fill the construction equipment and vehicles at the site. The fuel depot can also directly fill the construction vehicles/equipment when required.

75. Waste oil and other petroleum products are collected by the Contractor, and temporarily stored in the used oil storage facilities at the above mentioned stations, to await their collection for proper treatment/disposal by a licensed contractor. The spent oil/lubricants at the Lalmai construction yard are kept in tightly sealed steel drums, and stored in sheds having waterproof concrete floor with roofing. There were instances observed that spillages occur in the storage area maybe due to mishandling of the drums. The contractor claims they promptly clean-up the spillage. The Contractor spread sand over the concrete floored storage area, which they intend to absorb spilled waste oil. The contaminated sand will be collected and properly disposed of at the authorized local government disposal site. It has been observed that empty drums are exposed to the elements, with no concrete flooring and only protected with polyethylene cover from rain. To these sites, the attention of the Contractor had been called to transfer the drums to a covered area to minimize rusting which may cause future structural failures in the drums.

76. However, the Quasba used oil is stored in sealed steel drums exposed or a concrete waterproof sump with concrete walls, a single door and galvanized iron roofing. The steel drums are placed on concrete slab floor adjacent to the concrete oil sump. There were instances observed that spillages occur in the uncovered steel drum storage area maybe due to mishandling of the drums. The contractor claims they promptly clean-up the spillage, however traces of oil can still be seen on the concrete floor. Extra effort is needed to clean-up the waste oil from the floor, as well as install at least a galvanized sheet roofing for the used oil drums that are awaiting disposal. There are also other open drums filled with water beside the oil drums possibly used for fire fighting. These should be covered to prevent mosquitoes from breeding in them. Proper informative/warning markings also need to be painted on the oil storage drums and oil sump to inform the public of fire hazards, and fire fighting drums should also be well marked and painted in red or similar colors to distinguish them from the rest of the waste oil drums.

77. For other hazardous waste such as broken equipment parts, rusting small pieces of reinforcement bars and other metallic construction waste materials, these are normally collected by the Contractor, temporarily stored at selected areas within the Construction area, and then sold to buyers who use them as scrap materials. Those scraps not sold, as well other wastes such as broken glass, broken bulbs, are brought to the authorize local government garbage disposal area for deposit.

3.2.8 Control of Petroleum Products

78. The storage of petroleum products in suitable places with proper impermeable bottom, located at a distance away from water bodies is an essential measure to help insure the prevention of any accidental spillage that may contaminate the soil and eventually ground water of which majority of rural people in the country are dependent on for their domestic water needs. During the reporting period, it has been observed that most of the construction sites and yards where petroleum products are stored, comply with the measure. As had been mentioned earlier only a few areas had been retained as storage facilities for fuel and other petroleum products, which are Lalmai, Gumti and Quasba construction yards. The temporary storage for waste oils and related products is in Lalmai and Quasba construction yards. As mentioned earlier in paragraph 75, the Quasba storage for waste oil in sealed drums would need to be sheltered in at least a galvanized iron roof shed as protection from the rain.

79. Servicing/maintenance work for vehicles and equipment are done in Lalmai, Quasba and Shashidal construction yards. Disposable items from maintenance work such as spent oil filters, broken fan belts, soiled rags, and others should be separated from the used oil and other spent petroleum products, temporary stored in dry place while awaiting disposal in the approved deposit site. Reusable or recyclable items (i.e. drums, boxes, etc.) can be separated from rest and donated to interested schools, madrasas, private individuals.

80. Similarly, the Contractor needs to ensure that those abandoned facilities be properly cleaned and restored to at least their pre-Project conditions. Since waste petroleum are hazardous substances, appropriate modification of the existing storage facilities will need to be made such as installing of walls to ensure that possible spillages due to improper handling or storage will not flow to the adjacent areas most especially drainage or water bodies thereby polluting these areas.

3.2.9 Occupational Health and Safety

81. The other major activity where deficiencies were observed are in the Occupational Health and Safety Program. While this program got a compliant average score, there are activities that are non-compliant that require attention. These non-compliant activities include: a) the supply and proper utilization of Personal Protective Equipment (PPE); provision of adequate sanitary toilet and clean water supply at the construction sites.

82. While CTM JV provides the PPEs, however, its proper utilization by the contract unskilled labor, has much to be desired. Workers are observed not wearing the PPE since they find it inconvenient to use. Only when CSC engineers visit the site will the workers wear them. All Project Sections has garnered a non-compliant rating for PPE use. Since Section 1 had during the reporting period been handed over by the contractor to BR, then only Section 2 and 3 can be considered as delinquent in this mitigation measure. The Contractor had been issued formal notices about these deficiencies. What is lacking is the implementation of the prescribed measures such as construction supervisors to prevent the local contracted workers with no properly worn PPE from working. Habitual violators of the PPE wearing rule to be suspended from work. **Annex 1** would show that the Contractor has not complied with workers properly wearing PPE requirement in Sections 2 and 3.

83. The contractor needs to pay more attention to the provision of PPEs to its workers or subcontractors; and strict enforcement of their use in the workplace. Disincentives may need to be imposed by the CSC on the Contractor for the habitual disregard of health and safety measures. Likewise, increase in awareness trainings/orientations for workers will be pursued along with the installation of more Health & Safety posters. Sharing of accident/incident report outcomes with the workers are encouraged. Details on the occupational health and safety measures are found in **Table 3.7.**

84. For the provision of inadequate sanitary toilets and clean water supply at the construction site, only the construction site at Culvert # 1 and #2 at the Akhaura Station yard remains delinquent. While work in the Akhaura Station yard had continue to be sluggish, it is no excuse for not providing the sanitation facility. While there are public toilets in the nearby neighborhood, these are not sanitary and are considered as obstructions to the construction work. These are subject to demolition since these are obstructing the station loop line construction work. The owners of these structures are entitled to financial compensation and other benefits as provided for in the approved Project Resettlement Plan.

3.2.10 Protection of Topsoil and Soil Erosion

85. All 5 measures were fully complied with by the Contractor under the protection of topsoil and soil erosion mitigation measures. These compliant activities include: a) protection of topsoil storage areas from wind and rain; b) prompt protection of open embankments using appropriate methods that includes hydroseeding among others; c) planting of selected embankments with appropriate tree saplings and maintenance and protection of the established plantations; d) proper selection of stockpiling and disposal areas; and e) proper siting of disposable materials in areas located away from water bodies, flood prone and erodible slopes. The Contract should ensure that soil erosion be prevented most especially on unprotected embankment slopes which can be the source of weakness in the upgraded double track and may be the cause of future train accidents.

3.3 Compensatory Tree Plantation and Replacement Program

3.3.1 Objective of tree plantation

86. The objective of the tree plantation and replacement program is to compensate for the loss of trees due to the implementation of the Akhaura-Laksam double line railway Project. Other major objectives of the program are:

- To protect the affected cultural/sensitive areas located within 50 m from the Row boundary;

- To enhance the health of the existing ecosystem;
- To reduce the impacts of air pollution and dust as trees are known to be natural sink for air pollutants; and
- To arrest soil erosion at the embankment slopes.

3.3.2 Scope of tree plantation

87. About 31,749 timber trees, 13,546 fruit trees, 188 medicinal trees, 4,166 banana clumps, and 5,693 bamboo poles of different sizes had been cut due to the implementation of Project at pre-construction and construction periods. Approximately, 55,000 trees had been removed from the study area, but are under the process of being replaced under the Project. The Compensation Tree Plantation Establishment and Rehabilitation Program intends to plant at least three times the number of fallen trees and other forest products. These trees and other important forest products are being planted on both sides of the widened embankments, station building areas, and new station access road alignments and along affected cultural/sensitive areas within 50m from the ROW boundaries. Therefore, a total of 165,000 trees and other forest products are in the process of being planted and maintained by the completion of this project.

3.3.3 Status of tree plantation

88. For this year 2022, compensation tree plantation establishment and rehabilitation had commenced in the second week of June 2022. Contractor has targeted to plant 75,800 saplings during the rainy months of June to October 2022. It was reported that about 6,500 saplings have been planted, of which 1,200 saplings are from Section 1 and 2, while 5,300 saplings are from Section 3. A new local Subcontractor Bismillah Nursery had just commenced the tree planting works and so the accomplishments in terms of area prepared and tree saplings planted is limited but is expected to accelerate in the following days. This new Subcontractor will supplement the works of the existing Subcontractor Gumti Nursery. Since the saplings had also been planted, these have so far survived the stress associated with their transport from a different area, temporary storage in a satellite nursery located near the plantation site, and actual out-planting. Section 3 has a relatively number of saplings planted at 5,300 as compared to those installed at Sections 1&2 at 1,200 saplings.

89. Plantation maintenance and protection for the newly planted tree species have also commenced with Section 3leading the way with 5,300 saplings covered, while Sections 1 and 2 had only its newly planted 1,200 saplings to be covered. No replacement planting had so far been conducted this early in the planting season. Based on the weighted average of the tree plantation activities, it is estimated that the works done so far is equivalent to 6% of the annual target as compared to the 46.7% activities that should have been targeted to be completed by the end of the reporting period of June 2022. Table 3.3 contains the status of the 2022 tree plantation establishment and rehabilitation program.

Table 3.4. Status of 2022 Tree Plantation Establishment and Rehabilitation Program

	CATEGORY	Annual Target	Unit	2022 Target			2022 Accomplishments			Annual %		Weights	Weighted Average	
				Section 1 & 2	Section 3	Total	Section 1 & 2	Section 3	Total	as of 25 June 2022	% 2022 Annual Progress		Target	Actual
1	Sapling Production/ Procurement & Maintenance	75,800	sapling	36,300	39,500	75,800	1,200	5,300	6,500	54.8%	8.6%	30.0%	16.4%	2.6%
2	Plantation Establishment													
	a. Site Preparation	75,800	sapling	36,300	39,500	75,800	1,600	5,500	7,100	12.9%	9.4%	11.0%	1.4%	1.0%
	b. New Plantation Established	75,800	sapling	36,300	39,500	75,800	1,200	5,300	6,500	12.9%	8.6%	13.0%	1.7%	1.1%
	c. Replacement of Dead trees from 2022 plantation	7,900	sapling	0	7,900	7,900	0	0	0	0.0%	0.0%	13.0%	0.0%	0.0%
	d. Replacement of Dead trees from 2020 & 2021 plantation	0	sapling	0	0	0	0	0	0	0.0%	0.0%	13.0%	0.0%	0.0%
3	Plantation Maintenance & Protection													
	a. Fencing	28.96	km	0.00	28.96	28.96	0.00	0	0	0.0%	0.0%	7.0%	0.0%	0.0%

	CATEGORY	Annual Target	Unit	2022 Target			2022 Accomplishments			Annual %		Weights	Weighted Average	
				Section 1 & 2	Section 3	Total	Section 1 & 2	Section 3	Total	as of 25 June 2022	% 2022 Annual Progress		Target	Actual
	b. Ring weeding & fertilization	75,800	sapling	36,300	39,500	75,800	1,200	0	1,200	12.9%	1.6%	7.0%	14.6%	0.2%
	c. Protection & Patrolling	75,800	sapling	36,300	39,500	75,800	1,200	5,300	6,500	12.9%	8.6%	6.0%	12.5%	1.1%
ANNUAL PERFORMANCE												100.0%	**46.7%**	**6.0%**

90. It can be noted that the targeted number of saplings set by the contractor is 2,200 trees less than the required number to attain an overall 165,000 trees planted at 100% survival. It can be noted that the Contractor had been given a conditional approval of their 2022 compensation tree plantation establishment and rehabilitation program. This program will be updated once the results of the 100% tree inventory will have been made available by a tri-partite inventory team composed of representatives from BR-PIU, CSC and CTM-JV. The inventory seeks to verify the actual number of live trees, their species, and general condition (i.e. height, health, stand, etc.).

91. Overall, of the 165,000 tree saplings targeted to be planted, a total of 148,929 saplings have already been installed by the Project corresponding to 90.3% of total target. From this total, 111,247 saplings were in Sections 1 & 2; while 37,682 are in Section 3. However, overall sapling mortality was also high, totaling to 54,732 saplings or 36.8% of total planted. Tree saplings planted in 2022 were newly installed during the 2nd & 3rd week of June 2022 and so are still alive as of the reporting time. As has been reported in the July-December 2021 Semi-Annual Environmental Monitoring Report, Sections 1&2 was reported to have the higher mortality at 42,700 dead saplings or 38.8% of planted plants; while Section 3 has a mortality of 12,032 dead saplings or 37.2% of those planted. It is estimated that there are about 93,597 live saplings of assorted species at the Project site. **Table 3.5** contains the overall status of the ALDLP Tree Plantation Establishment and Rehabilitation Program.

Table 3.5. Overall Status the Tree Plantation Establishment and Rehabilitation Program

	2020 & 2021			2022			Total	
	Section 1 & 2	Section 3	Subtotal	Section 1 & 2	Section 3	Subtotal	Overall Target	2020+2021+ 2022
Annual Tree Plantation Establishment target	57,000	30,000	87,000	36,300	39,500	75,800	165,000	162,800
Total Tree Saplings Planted	110,047	32,382	142,429	1,200	5,300	6,500	165,000	148,929
Dead tree saplings	42,700	12,032	54,732	0	0	0	-	54,732
Total Surviving Trees	66,747	20,350	87,097	1,200	5,300	6,500	165,000	93,597
% Survival	60.65%	62.84%	61.15%	100.00%	100.00%	100.00%	100.00%	62.85%

92. However, the reported live saplings will be subject to change as soon as the tri-partite 100% tree inventory team had completed their task. The team will be composed of representatives from BR PIU, CSC and CTM JV. The objective of the inventory is to verify the actual number of live planted saplings at the Project site, their species and general condition. The inventory work had initially been scheduled early in June 2022 prior to the start of the tree plantation work. However, there was a mis-understanding between the 2 Subcontractors for the program. ADB and BR PIU initially were not satisfied with the performance of the original local Subcontractor Gumti Nursery and recommended its replacement. A new local Subcontractor Bismillah Nursery was recruited by the main contractor CTM JV to carryon the tree plantation establishment and rehabilitation work. The new Subcontractor has accepted the challenge and already commenced his work that included the following: a) procuring 42,100 tree saplings, b) establishing of 2 satellite nurseries and expanding his main nursery to accommodate the procured tree saplings c) preparing the plantation sites good for 10,000 saplings; and actual out planting of 6,500 saplings. However, the original Subcontractor appears to have not been

informed of the new hiring and confronted the new comer. Gumti Nursery appears to have much influence in the Project site and so it advised that the issue be resolved prior to any further tree plantation works. To defuse the tension at the Project site, CTM JV requested for the postponement of the tree inventory and tree plantation works pending the resolution of the misunderstanding. It is hoped that the issue would be resolved before the end of June 2022 and that tree inventory and tree plantation establishment work can proceed by the first week of July 2022.

93. To avoid confusion, the Contractor and Subcontractors were instructed to place temporary markers on the ground to indicate the location of tree plantation blocks to be inventoried and those for tree planting. Should an agreement be already forged between CTM JV and the two subcontractors, then the markers for tree planting should also indicate which subcontractor will work in the said plantation block.

94. There were no sapling production done in the respective nurseries of the Subcontractors for use in the Project. A total of 6,500 tree saplings had been procured by the new Subcontractor Bismillah Nursery which they have used up in their tree plantation work. Gumti Nursery has no accomplishments yet. CTM JV plans to have about 75,800 tree saplings of assorted species procured for use in this year's plantation works. As mentioned earlier, this figure may change depending on the results of the upcoming tree inventory.

95. Most of the reporting period was spent on plantation maintenance and protection. These maintenance activities include: a) deployment of watch guards tasked to protect the plantation from physical damage cause by grazing domestic animals or fire; and b) weeding and supplemental fertilization of the planted saplings. As has been reported during last year's Semi Annual Report (January-June and July-December 2021), internal financial problems had affected the performance of the Subcontractor specifically in the plantation maintenance work. Watchguards are less motivated to maintain the tree plantation due to delays in their wages. This results in delays in the weeding of the established plantation, where newly planted saplings get covered by weeds before being cleared. Surviving trees of last year's (2020) plantation on the other hand are big and stable enough that weeds no longer pose as a problem.

Plate 4. Tree plantation workers install bamboo sticks as support to the newly planted tree saplings at Section 3 track embankment slopes.

96. For fencing works, the pigeon pea fencing intended to provide a vegetative barrier for the plantation against domestic animals was stopped due to the poor germination rate of the seeds procured. Domestic animals find the pigeon pea leaves distasteful and avoid eating them, thus are repelled by a wall of these plants. Meanwhile, the long plastic mesh fencing was replaced by the bamboo fences installed around each planted sapling. Based on site inspection, it seems the bamboo fencing is more effective that the plastic that is prone to being toppled over by cattle.

97. In conformity with the Contract specifications, a draft Site-Specific Tree Plantation Establishment and Rehabilitation Plan 2022 had been prepared by the Contractor. However, the details of this plan may change as soon as the 100% tree inventory results from the tri-partite team will be released. In view of this, the CSC has only granted a conditional approval of the Contractor's "Site Specific Tree Plantation Establishment and Rehabilitation Plan" for 2022. The final Plan will be provided to BR-PIU and ADB as soon as it has been prepared following the completion of the 100% tree inventory.

IV. Compliance to Environment Related Project Covenants

4.1 Compliance with National Environmental Laws

98. The environmental legislation of GoB emphasizes reducing the negative impacts of infrastructure development projects and enhancement of the positive effects. This conforms to the National Environmental Policy 1992 that was enacted by the government, based on the Agenda 21 of Rio de Jenero Conference, and subsequent enactments of the Bangladesh Environmental Conservation Act (ECA) 1995 and Bangladesh Environmental Conservation Rules (ECR) 1997. The DOE guidelines however do not specifically provide measures for railway tracks, station buildings and bridges.

4.2 Compliance with ADB SPS 2009 Guidelines

99. According to the ADB Social Policy Safeguards (SPS 2009), the project falls under Environment Category B and hence an IEE was sufficient to meet the Bank's environmental requirements. An IEE report was prepared by the Consultant engaged by ADB during appraisal in 2014. In addition, an updated Environmental Management Plan (EMP) was prepared during the detailed design stage in 2016. In view of these, the project had conformed with the ADB Safeguard Policy Statement (SPS 2009).

4.3 Contractor Compliance

Compliance with EMP

100. Overall, the contractor is able to comply with the mitigation measures as prescribed in the Project Environmental Management Plan (EMP) which is also part and parcel of their Contract TOR. As mentioned in earlier chapters of this report, there are however site specific non-compliance that require to be resolved by the contractor. A corrective action plan was provided to help remedy the situation. CTM JV has mobilized 2 focal persons for Section 1 & 2, and the other for Section 3 to coordinate the implementation of the EMP and respond to instructions by CSC for any environment related concerns.

Environmental Monitoring Reports

101. The contractor began submitting monthly environmental monitoring reports based on the approved template and Table of Contents from November 2016. Based on the environmental reports of January – May 2022 prepared by the Subcontractor EQMS, this Semi-Annual EMP Implementation Report was prepared by CSC. While the Environmental Monitoring Report format used is still the same, however the "Construction Period Environmental Mitigation Measures Report" format had been appropriately revised to cater to the information requirement of the Bank. The report contains among others, the tables of all monitoring results from the monthly reports for the period January – May 2022.

Landscaping and Site Restoration

102. It was observed that borrow areas that had been returned to their respective owners, have turned them into fishponds. The reuse of the land into a productive enterprise is in itself a landscaping restoration by its original owners. During the reporting period, no significant activity was observed related to landscaping and site restoration due to the work slowdown. The Compensation Tree plantation establishment and rehabilitation program" had been limited to the protection and maintenance of its established plantation. The dry season is not a favorable time to install tree sapling in view of the high ambient temperatures, and low to no rainfall for plant watering, which may result in high plant mortality.

V. Corrective Action Plan

103. Despite the compliant implementation of the EMP by the Contractor, a number of site specific deficiencies had been identified and corresponding corrective action is necessary to address these issues. **Table 5.1** below contains the mitigation measures that had not been fully complied with, the location of these infringements, the nature of the non-compliance, the prescribed corrective action, the responsible persons and the time line for action.

Table 5.1. Corrective Action Plan

S.I.	Mitigation Measure		Location of Non-Compliance	Nature of Non-Compliance	Corrective Action Prescribed	Person Responsible	Contact Number	Timeline
	General	**Specific**						
1	Dust Control	Vehicles transporting construction and waste material to be covered	Sections 2 & 3	No cover of vehicles during transporting construction and waste material	Vehicle should be covered properly during transporting construction and waste material	• Md Hanif (CTM-MAX H&E) • Md. Mirza Habib (CTM-TOMA Envi Engr)	01717158668 01628690283	31 August 2022
2	Dust Control	Dust masks to be provided to workers where dust hazards exist.	All locations	Non-wearing of dust masks by construction workers	The wearing of dust mask to be strictly enforced.	• Md Hanif (CTM-MAX H&E) • Md. Mirza Habib (CTM-TOMA Envi Engr)	01717158668 01628690283	30 June 2022
3	Control of Petroleum Products	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	Quasba,	Improper storage of all petroleum products and waste	Proper storage of petroleum products and waste need to be implemented following prescribed methods mentioned in the EMP. Contracted collector to regularly retrieve waste oil from site for treatment/ disposal.	• Md. Mirza Habib (CTM-TOMA Envi Engr)	01628690283	31 August 2022
4	Occupational Health and Safety	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses, harness, safety goggles and ear protection, and others; and enforce its proper use.	Sections 2 & 3	Workers working without proper PPE	Strict enforcement of PPE use in the workplace. Consider imposition of penalties for habitual violators.	• Md Hanif (CTM-MAX H&E) • Md. Mirza Habib (CTM-TOMA Envi Engr)	01717158668 01628690283	31 July 2022

VI. Other Issues

6.1 Time Allocation for CSC Environmental Specialists

104. The original consultants time allocated for this work is for 4 years for international specialist and for national counterpart. This level of effort only allowed for the preparation of two semi-annual monitoring reports every year up to 2019, but did not provide enough time for the essential workshops and training at the start of the Contract and the time requirement for the international environmental specialist to be on site when the Contractor mobilized. Likewise, the budget provided should be related to the size of the project, since larger projects take longer time to inspect and longer to report on.

105. The Resident Environmental Specialist demobilized in September 2018, while the Sr. Environmental Specialist resigned on September 2020. The task of the Resident Environmental Engineer was assigned to the Resident Social, Resettlement and Gender Specialist without additional compensation. While a Senior Environmental Specialist was mobilized in December 2021, his inputs had been minimal for the first 2 months (December 2021 and January 2022) due to his involvement with another project; then after committing to a fulltime engagement in the ALDLP, his health is in need of much medical attention and thus his inputs to the Project has again been minimized. The task of handling all Safeguards matter for the Project had been a challenge, since there are instances where priority activities for environment, resettlement, and gender, and deliverables coincide.

106. The CSC Variation Order 3 that had been proposed by the Engineer to the Employer for consideration was finally approved by the Cabinet Coordinating Committee for Government Procurement by the 3rd week of June 2022, after 1.5 years it was submitted. This proposal provides for additional time and cost for CSC engineers to continue their services up to the end of June 2022 in view of the time extension granted to the Contractor up to the same period. While time and cost were allocated for the Senior and Junior Environmental Specialist among other CSC engineers, that will allow their full time engagement up to the end of requested time extension. However, the multi-tasking Resident Social, Resettlement and Gender Specialist will be deployed only on a part-time basis covering half of the extended time period. No time has been proposed for the Resident international Environmental Specialist. So by the time the formal notice of approval on VO3 is sent to CSC, the contract revision would have already expired. Another VO4 may need to be prepared and submitted to BR PIU to cover the additional time, cost and profit, that will allow the CSC to again continue its supervision work up to the end of the new proposed Project completion date of 31 December 2023.

6.2 Establishment of the Environment and Social Safeguards Unit

107. Bangladesh Railways has recognized the gap in their technical capacity and engaged Environment Consultant (CSC) to address safeguard issues and to supervise the implementation of EMPs. BR is committed to establishing an Environmental and Social Safeguards Unit (ESSU) to manage safeguards across the agency. The persons intended to be assigned to this unit will require capacity-building sessions to enable them to carry-out their assigned tasks. However this ESSU has not yet been consummated at the time of this report due to the shortage of qualified permanent BR personnel. It is expected that once there are available qualified career personnel, then an ESSU can be institutionalized and these available personnel will be assigned to it.

6.3 Grievance Redress Mechanism

108. The Project loan agreement has prescribed the establishment of a Grievance Redress Mechanism (Schedule 5, paragraph 5) in the project that can address possible complaints emanating from stakeholders. The Project Administrative Manual (Chapter VII, Item C, paragraph 47) further defines the scope of the GRM. The PAM mentions that issues be first referred to the Executing Agency (EA) level (i.e. project site, BR-PIU, BR) and only when it is not resolved, will the case be forwarded to the Grievance Redress Committee for action. The Project Initial Environmental Examination Report (Chapter VII) provided the rationale, composition of the GRC, its function, process followed in resolving cases brought to it, publication of resolutions.

109. At present, no Environment GRC has yet been created for the Project. This condition had been so since complaints related to the environment if any, had been resolved at the Project level. The CSC Environment and Social Safeguards team also function as the informal grievance redress team at the project site. Complaints related to safeguards are first referred to CSC by either the local people or the Contractor for resolution. The GRC established for the Project's resettlement related issues is currently inactive since the INGO SAMAHAR serving as its Secretariat had not been paid by BR PIU for the last 3 years, and so most of its personnel had already demobilized.

110. The CSC Jr. Environment and/or Resettlement specialists (depending on the case), hear the details of the complaint and report the details to the CSC Resident Social, Resettlement and Gender Specialist (RSRGS). Upon learning on the facts of the case, the CSC RSRGS will arrange for a meeting with the aggrieved party with representative of the Contractor and do an actual site inspection to better appreciate the situation. If the case can be resolved at the RSRGS level, then an amicable solution will be reached, documented and appropriate report will be sent to the Employer for their record. However, if the case will require CSC and/or BR PIU opinion/decision, a report will be prepared and sent to CSC headquarters and/or BR for their action. It is only when the case cannot be resolved at the BR level will a GRC will be needed.

111. During the reporting period, there was no environment/health & safety related community complaint that was referred to CSC. Only cases related to involuntary resettlement specifically delayed payment of compensation and other resettlement benefits for Project affected titled, commercial renters and informal setters were received. Some of these cases were referred to an ADB External Monitor who visited the Project site in March 2022 and conducted several focus group discussions that was participated in by representatives of the BR-PIU, CSC, SAMAHAR, the Project affected persons and local leaders. Commitments have been made by BR PIU to facilitate the compensation payments as soon as funds are made available to them.

6.4 Covid-19 Prevention Program

112. In response to the rapidly degrading Covid-19 pandemic situation within the ALDLP track alignment and stations, the Project has pursued a pro-active approach to the prevention and control of the virus. As would be describe in detail in health and safety Chapter VI (Section 6.22) , the Project has pursued a preventive approach. Construction supervisors and workers are provided a short orientation on the nature of the virus and how to prevent its spread as part of the monthly HIV/AIDS prevention seminars; face masks and hand sanitizers have been distributed to all members of the construction team; wash stations had been installed in many work sites; and disinfection booths were also placed at major construction yards.

113. In the event personnel do get infected by Covid-19 virus and its new variants, instruction was given to office managers/construction supervisors to first isolate the possible infected person, arrange for RT PCR Swab test to confirm if indeed the illness is Covid-19 related, disinfect the work area/accommodations, and report the case to higher authorities for information or further action. An ambulance is on a 24/7 hour standby at the Comilla Station Office, ready to convey any sick person for isolation, testing, treatment, or retrieval from the health facility.

114. As a result of the measures undertaken by the Project, no Covid-19 related cases at the site had been reported during the reporting period (January to June 2022). **Annex 3** contains photographs of the Covid-19 prevention measures in place at the Project site.

6.5 Training/Capacity Building Status

115. The contractor CTM JV held 18 trainings (7 CTM-JV-MAX and 11 CTM-JV-TOMA) during the reporting period. The 7 capacity building activities conducted by the Contractor CTM-JV-MAX include: a) Workplace safety, and HSE Awareness Program for Safety personnel of ALDLP (18 January 2022); b) Awareness Meeting for Covid-19 (29 January 2022); c) Awareness Meeting for Covid-19 (10 February 2022) and d) Safe Driving and Road Safety training for Driver and Operators (18 March 2022); e) Workplace safety, and HSE Awareness Program for Safety personnel of ALDLP (18 January 2022). A total of 105 personnel directly hired by CTM JV attended the trainings. The resource person of the CTM JV MAX trainings was the CTM-JV In-charge of Health, Safety & Environment Mr. Abu Hanif.

116. The 11 capacity-building activities of CTM-JV-TOMA include the following:

Plate 5. CTM Health & Safety Officer Hanif orients truck drivers on safe driving and road safety.

The 11 capacity-building activities of CTM-JV-TOMA include the following: a) Tool Box Meeting For Site Safety Rules (Track Work) (12 January 2022); b) Safety Meeting With Level Crossing Gatemen For Safely Pass Vehicle (1 February 2022); c) Training For Safe Rail Passing With Points Man (2 February 2022); d) Awareness Training For Hazard & Welding, (9 February 2022); e) Awareness For Track Work. (24 February 2022); f) Tool Box Meeting Before Bridge Work Start. (9 February 2022); g) Safety Induction For Work In Height With Steel Fixing Worker (4 March 2022); h) 2 Awareness Meeting For Covid-19 (29 March 2022); i) Toolbox Meeting Before Work In Height (2 May 2022); j) Safe Driving and Road Safety training for Driver and Operators. (15 June 2022). The main resource persons for the capacity-building activities include the Health & Safety Officer of CTM-JV-TOMA Mr. Mozibur Rahman, and their Environmental Engineer Habibur Rahman. Other resource persons include: Mr. Md Abdul Rahim and Md. Shamshul Alam. A total of 111 personnel directly hired by CTM-JV-TOMA attended the trainings. **Table 6.1** below contains details of the conducted trainings.

Table 6.1. Training and Capacity Building Activities (January – June 2022)

Date	Name of Training	Trainers Details	No. of Partici-pants
1. ***CSC Initiated Trainings/Workshops***			
	None		0
2. ***Contractor Initiated Trainings (CTM-JV-MAX)***			
18 January.	Workplace safety, and HSE Awareness Program for Safety personnel of ALDLP	Md. Abu Hanif	10
29 January	Awareness Meeting For Covid-19	Md. Abu Hanif	20
10 February	Awareness Meeting For Covid-19	Md. Abu Hanif	17
18 March	Safe Driving and Road Safety training for Driver and Operators.	Md. Abu Hanif	9
18 January.	Workplace safety, and HSE Awareness Program for Safety personnel of ALDLP	Md. Abu Hanif	10
01 April	Safety Meeting With Level Crossing Gatemen For Safely Pass Vehicle.	Md. Abu Hanif	18
16 May	Initial Fire Response and Workplace Health and Safety training for Max and CTM-JV employees, at Labiba Tower, Comilla.	Md. Abu Hanif	21
		Subtotal	105
3. ***Contractor Initiated Trainings (CTM-JV-TOMA)***			
12 January	Tool Box Meeting For Site Safety Rules (Track Work)	Md. Abdur Rahim	20
01 February	Safety Meeting With Level Crossing Gatemen For Safely Pass Vehicle.	Md. Shamsul Alam.	08.
09February	Awareness Training For Hazard & Welding,	Md. Shamshul Alam.	6
02 February	Training For Safe Rail Passing With Points Man.	Mozibur Rahman	6
24February	Awareness For Track Work.	Habibur Rahman	20
09 February	Tool Box Meeting Before Bridge Work Start.	Mahfuzur Rahman	03
04 March	Safety Induction For Work In Height With Steel Fixing Worker.	Ahmed Islam	04
29 March	Awareness Meeting For Covid-19	Mozibur Rahman	10
29 March	Awareness Meeting For Covid-19	Mozibur Rahman	12
2 May	Toolbox Meeting Before Work In Height.	Md. Habibur Rahman.	05
15 June .	Safe Driving and Road Safety training for Driver and Operators.	Mozibur Rahman	17
		Subtotal	111
		Total	216

VII. Occupational Health and Safety

7.1 Safety measures during construction period

117. On behalf of the contractor a safety officer is supervising the safety arrangement at the site of work. From starting to completion of the embankment, bridge/culvert and track construction work, many safety measures are being taken by contractor. They are providing safety barricade for protect the public. CTM has installed safety caution signboards. They have installed heavy barricade by galvanizing sheets in bridge work site. They also have installed barricade for protect their sensitive works.

118. During the reporting period January-June 2022, the Project has shown good performance in terms of prevention of accidents in the workplace. No fatal accidents had occurred, no lost time injuries (LTI) was recorded, no worker was in need of major medical treatment with the exception 09 cases that only require first-aid treatment for minor cuts and bruises. No field personnel were recorded to have been diagnosed with the Corona virus during the reporting period. Moreover, there were a total of 576 tool box meetings conducted by the contractor and their workers prior to the start of the work to help insure they (workers) are reminded of the health and safety protocols that are in effect in the Project. **Table 7.1** below contains a summary of accidents/incidents that had been recorded during the reporting period of January - June 2022.

Table 7.1. Summary of Accidents/Incidents (January – June 2022)

No.	Description of Report Items	CTM-JV-TOMA		CTM-JV-MAX		Overall	
		Jan-Jun	Cumulative	Jan-Jun	Cumulative	Jan-Jun	Cumulative
1	Total manpower (engaged daily average)	4,438	721	1,197	1,126	5,635	1,847
2	Total man-hours worked	1,039,400		1,706,080	18,345,776	2,745,480	18,345,776
3	Cumulative Man-hours worked since start		10,470,507		18,345,776	0	28,816,283
4	Total man-hours worked without Loss Time Accidents (LTA)	1,039,400		1,706,080	18,345,920	2,745,480	18,345,920
5	Total Man-days lost due to Loss-Time Accidents (LTA)	0	0.5	0	144	0	145
6	Number of Reported LTA	0	0.2	0	5	0	5.2
7	Number of minor injury/first-aid cases	0	0	9	17	9	17
8	Number of Reportable Accident/Incident	0	1	0	3	0	4
9	Number of near miss incidents	0	0	0	0	0	0
10	Number of Major Injury	0	0	0	0	0	0
11	Number of Fatal Accident	0	0	0	0	0	0
12	Number of Dangerous Occurrence	0	0	0	0	0	0
13	Frequency Rate = (Number of Reportable LTA x 1000000)/Man-hours Worked	0.00	0.30	0.00	0.54	0.00	0.84
14	Severity rate = (Man-days Lost due to Reportable LTA x 1000000)/Man-hours Worked	0.00	1.40	0.00	0.99	0.00	2.39
15	Incidence rate = (Number of Reportable LTA x 1000)/Average number of persons employed	0.00	0.30	0.00	8.28	0.00	8.58
16	Cumulative AIR (Accident Incident Rate), AIR = (Number of Reportable Accident, Incident X 1000)/Average Daily Manpower	0.00	2.45	0.00	13.50	0.00	15.95

7.2 Status of implementation of the safety execution plan

119. CTM organize safety promotional event based on the safety execution plan and carry out other promotional activities. They are giving various training and visual presentation on safety for their employee by this event. The safety promotional events content elements such as –awareness training, firefighting training, emergency procedure training, first aid training and safety related heart touching video presentations. They have also installed many type of safety promotional poster in their workplace. In order to minimize incidence of non-wearing of PPEs issued to the construction workers, more awareness trainings will be conducted and additional Health and Safety posters will be installed on strategic locations. When adequate, it is encouraged accident reports/incident reports can be shared with the workers. They are also trying to ensure use of personal protective equipment for workers' safety.

7.3 Orientation session on HIV/AIDS and STI Awareness Activities

- Managing, monitoring of HIV/AIDS prevention program
- Presentation of awareness orientation session on HIV/AIDS prevention program
- Provision of medical and counseling services.
- Condom and IEC materials distribution.
- Posters provided for all railway stations and work sites.

Description

120. Many Project personnel are deployed in the ALDLP site, where large number of local community members are also residing and working. The workers and the community people are not aware of the dangers of HIV/AIDS based on the result of an awareness survey conducted by the contracted NGO UDOY. Orientation session on HIV/AIDS and STI Awareness/Prevention under ALDLP has been conducted in the construction sites, that was attended in by Project construction workers and members of the local communities. The NGO UDOY had been subcontracted to hold the HIV/AIDS Awareness and Prevention seminars. During the reporting period, a total of 18 seminars where held, that was attended by 184 workers and 130 community members. Of these total number, about 122 participants are females (38.9%). **Table 7.2** contains the summary of the orientation sessions on HIV/AIDS STD awareness/prevention that were conducted during the reporting period.

Table 7.2. Orientation Seminars on HIV/AIDS and STI Awareness/Prevention

SI No	Location	Date	Participants				
			Workers	Community Members	Total	Females	%
01	Razapur Station	January	26	16	42	14	33.3%
02	Sadar Rasulpur Station	February	20	17	37	15	40.5%
03	Razapur & Akhaura Stations	March 2022	44	25	69	25	36.2%
04	Sadar Rasulpur & Mandabag Stations	April 2022	24	34	58	24	41.4%
05	Razapur & Akhaura	May 2022	41	28	69	26	37.7%
06	Sadar Rasulpur Station	June 2022	19	20	39	18	46.2%
	Total		184	130	314	122	38.9%

7.4 COVID -19 Strategy

121. The coronavirus disease 2019 (COVID-19) pandemic is exacting a huge toll on individuals, families, communities, and societies across the world. Daily lives have been profoundly changed, economies have fallen into recession, and many of the traditional social, economic, and public health safety nets that many people rely on in times of hardship have been put under unprecedented strain.

122. Speed, scale, and equity must be our guiding principles. Speed, because the explosive nature of the virus means every day lost in implementing effective response capacities and behaviors costs lives; scale, because everyone in society has a part to play in building the capacities required to control this pandemic; and equity, because everyone is at risk until the virus is controlled everywhere in the world: collective resources must be directed to where there is greatest risk. COVID-19 is a truly global crisis: the only way to overcome it is together, in global solidarity.

7.5 Action taken against the spreading of Covid-19

123. Several numbers of COVID-19 awareness program executed following WHO guideline. Distribution of masks and gloves, spraying of disinfectant at potential entry points, Installation of hand washing facilities and Disinfectant tunnels at several key points within project sites have been performed by the Contractor with direct supervision from CSC.

- Regular and thorough hand washing with soap and water or hand;
- Hand hygiene stations, such as hand washing and hand rub dispensers are provided;
- Face masks and paper tissues are provided;
- Measures to keep a distance of at least 1 meter between people and avoid direct physical contact has been introduced;
- Awareness program held on Covid-19 among workers and engineer several time;
- Regular environmental cleaning and disinfection introduced;
- WHO developed symptoms consistent with COVID-19 were kept self-isolated, and contacted a medical professional or the local COVID-19 information line for advice on testing and referral;
- Enhance cleaning and disinfection of objects and surfaces that are touched regularly, including all shared rooms, surfaces, floors, bathrooms, and changing rooms;
- Provide PPE and training on its proper use—e.g., masks, disposable gowns, and disposable gloves or heavy-duty gloves that can be disinfected. Provide face or eye protection (medical mask) during cleaning procedures that generate splashes (e.g., washing surfaces);
- Enhance hand hygiene—regular hand washing with soap and water or use of alcohol-based hand rub— before entering and after leaving enclosed machinery, vehicles, confined spaces, and before putting on and after taking off PPE;
- Provide posters, videos, and electronic message boards to increase awareness of COVID-19 among workers, and promote safe individual practices at the workplace and engage workers in providing feedback on the preventive measures and their effectiveness;
- Provide regular information about the risk of COVID-19 using official sources such as government agencies and the World Health Organization, and emphasize the effectiveness of adopting protective measures and counteracting rumors and misinformation; and
- Body temperature checked by Thermal body temperature machine at potential entry points.

VIII. Conclusion

124. On the basis of the environmental monitoring reports submitted by the third-party monitor EQMS that had been duly verified by the CSC Environment team, it can be concluded that the Contractor has generally complied with the mitigation measures provided in the Environmental Management Plan (EMP).

125. There are however, site specific deficiencies of the contractor that needs to be addressed which include: a) dust control; b) proper storage of petroleum products and disposal of waste oil; and c) wearing of PPE at the workplace.

126. The results of environmental monitoring of surface and ground water quality, air quality, and noise levels are generally compliant to the standards set by the Department of Environment. Only 5 monitoring sites located in 5 railway station mosques had exceeded the acceptable noise level threshold for quiet and mixed zone areas. Possible noise attenuation would be the planting of trees between the quiet zone and the noise generators.

127. The Compensation Tree Plantation Establishment and Rehabilitation Program had mostly been engaged in the protection and maintenance of last year 2021 tree plantation during the reporting period. Starting the 2nd week of June 2022, the Contractor had commenced its 2022 tree planting program with a total of 6,500 trees planted at various locations along the track embankments. Protection and maintenance work of the existing and new plantations are on-going.

128. A corrective action plan (Table 5.1) was proposed for action that aims to resolve the site specific non-compliant or partially compliant mitigation measures. The CAP implementation status show that only 3 major issues is still in the process of being resolved. Dust control specifically on

covering of hauling trucks and watering of unpaved roads and stock piles had not been fully done. Storage and disposal of waste oil will need to be improved at the Quasba station yard specifically temporary storage of oil-filled drums in covered sheds with concrete waterproof flooring, promptly collect and proper disposal of spent vehicle/equipment maintenance materials. While personnel directly hired by the Contractor comply with the "no PPE, no work" regulation; however, subcontracted labor are delinquent in this respect. Workers regularly exposed to resuspended dust need to use dust masks provided by the Contractor. Provided surgical mask to be used for Covid-19 transmission prevention.

129. This Semi-Annual Report (January-June 2022) is the second report that used the new Environmental Monitoring system for the Contractor's compliance to the EMP implementation as main reference material. Further refinement of the system and its application in the preparation of semi-annual reports is forthcoming based on the comments of report users such as ADB, EIB, DOE and BR-PIU.

130. Grievance redress had been kept at the Project site level with CSC Environment team doing the resolution of cases with environmental concerns. During the reporting period, no complaint related to environmental matters were received by the CSC. Grievances that did reach the consultants were related to the delays in payments by BR PIU of compensation and other resettlement benefits due to displaced Project affected persons. An ADB External Monitoring Agent visited the site and conducted several consultation meetings that was attended in by representatives of BR PIU, CSC, SAMAHAR , the affected displaced persons and their local leaders. A meeting between ADB and BR PIU followed the Bank representative visit to the site to discuss the Mission's findings and actions to be taken.

131. The Project has put in place Covid-19 preventive measures. This includes implementation of government prescribed health protocols at the workplace, conduct of awareness seminars for construction workers on prevention measures against the virus, distribution of face mask and hand sanitizers, posting of informative materials on Covid-19 prevention, installation of hand washing stations and provision of clean water at the construction sites; disinfection booths at the field offices, available ambulance on stand-by 24/7 ready to convey sick personnel to nearby health facilities, arrangements for RT-PR Swab test for possible infected persons and assigned isolation rooms at site for confirmed cases.

ANNEXES

ANNEX 1. DETAILED EMP COMPLIANCE STATUS

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2022

	Mitigation Measures	SECTION 1																													
		STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
		Laksam Station	Akhaihar Station	Lalmai Station	Mainamati Station	Comilla Station	Bridge 231	Bridge 232	Bridge 234	Culvert 226	Culvert 227	Culvert 228	Culvert 229	Culvert 230	Culvert 233	Culvert 235	Culvert 236	Culvert 237	culvert 238	Culvert 239	Culvert 240	Culvert 241	Culvert 242	km 130+675 TO 135+675	km 135+675 to 140+675	km 140+675 to 145+675	km 145+675 to 150+675	km 150+675 to 155+675	AVERAGE
1	**Noise and Attenuation Measures**																														
1	Use of appropriate modern plant and/or equipment, that are properly maintained following the manufacturer's specifications and original manual, specifically on the control of noise and smoke emissions.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	All powered mechanical equipment and machinery to be fitted with noise abating gear	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	environment, to be provided with suitable noise protection equipment like ear muffs, etc.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2	**Dust Control**																														
1	Vehicles transporting construction and waste material to be covered	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Machinery emitting visible smoke to be banned from construction sites.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Dust masks to be provided to workers where dust hazards exist.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	Air quality monitoring to be carried out as per	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
7	All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off,	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
9	Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5.0	4.8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3	**Watercourse Impats in Wetlands/Ponds/Rivers**																														
1	All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored,	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Construction materials and waste shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	**Borrow and Dredging Site Impacts**																														
1	Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2022

SECTION 1

	Mitigation Measures		STATION BUILDINGS				BRIDGES			CULVERTS															TRACK WORK					AVERAGE RATING
			Laksam Station	Akhaihar Station	Lalmai Station	Mainamati Station	Comilla Station	Bridge 231	Bridge 232	Bridge 234	Culvert 226	Culvert 227	Culvert 228	Culvert 229	Culvert 230	Culvert 233	Culvert 235	Culvert 236	Culvert 237	culvert 238	Culvert 239	Culvert 240	Culvert 241	Culvert 242	km 130+675 TO 135+675	km 135+675 to 140+675	km 140+675 to 145+675	km 145+675 to 150+675	km 150+675 to 155+675	
5	**Disposal of Construction Debris and other Waste Materials**																													
	1	No burning shall be allowed.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	4	Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating		5	4.5	5	4.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	**Servicing and Operating Equipment**																													
	1	Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Fuel spills will not be tolerated and care shall		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	4	The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all		5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	5	The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	6	All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, and shall be maintained in g ood working condition following the manufacturer's standards.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
		Average Rating		5	3.85714	5	4.14286	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
7	**Control of Petroleum Producrts**																													
	1	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
		Average Rating		5	3	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
8	**Protection of Topsoil and Soil Erosion**																													
	1	Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion		5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	4	In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5	Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating		5	5	5	4.6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
9	**Occupational Health and Safety**																													
	1	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	Prepare, submit and implement a Health and Safety Program acceptable to		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	4	Must not hire Child labor, or persons with ages 14 and below.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5	No persons with age between 17 and 15, are to be hired for hazardous duties.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	8	Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.0
		Overall all Ratimg		4.50	4.11	4.50	4.12	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.5

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE ST

SECTION 2

		Mitigation Measures	GE RATING	STATION BUILDINGS				BRIDGES					CULVERTS												Track Work				Gumti Nursery	AVERAGE
				Sadar Rasulpur Station	Rajapur Station	Shashtal Station	Salda Nadi Station	Bride 243	Bridge 246	Bridge 249	Bridge 259	Bridge 261	Culvert 244	Culvert 245	Culvert 247	Culvert 248	Culvertt 250	Culvert 251	Culvert 252	Culvert 253	Culvert 254	Culvert 255	Culvert 241 A	km 155+200 to 160+200	km 160+200 to 165+200	km 165+200 to 170+200	170+200 to 175+200	Gumti Nursery	AVERAGE
		manual, specifically on the control of noise and smoke emissions.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	All powered mechanical equipment and machinery to be fitted with noise abating gear		3	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.2
	3	facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.		5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	4	Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by		5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
	5	environment, to be provided with suitable noise protection equipment like ear muffs, etc.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3		4.7
	6	Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating		4.7	5.0	4.7	4.7	4.0	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.3	4.3	4.3	4.3	5.0	4.6
2		**Dust Control**																											
	1	Vehicles transporting construction and waste material to be covered		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1.2
	2	Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Machinery emitting visible smoke to be banned from construction sites.		5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.2
	4	Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation (e.g. spraying of roads with water), and the equipment to be		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.1
	5	Dust masks to be provided to workers where dust hazards exist.		1	1	1	1	3	3	3	3	3	5	5	3	3	1	1	1	5	5	5	1	1	1	1	5	2.5
	6	Air quality monitoring to be carried out as per		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	7	All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.1
	8	Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	9	Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5.0
		Average Rating		3.4	3.2	3.2	3.2	3.4	3.4	3.4	3.4	3.4	3.7	3.7	3.4	3.4	3.2	3.2	3.2	3.7	3.7	3.7	3.2	3.2	3.2	3.2	5.0	3.7
3		**Watercourse Impats in Wetlands/Ponds/Rivers**																											
	1	All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	3	Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These		5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	3.7
	4	Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	5	Construction materials and waste shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
		Average Rating		5	5	5	5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	5	5	5	5	5	4.7
4		**Borrow and Dredging Site Impacts**																											
	1	Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	5.0
		Average Rating		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	5.0

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE ST

SECTION 2

Mitigation Measures	STATION BUILDINGS				BRIDGES					CULVERTS											Track Work				Gumti Nursery	AVERAGE
	GE RATING	Sadar Rasulpur Station	Rajapur Station	Sheshdal Station	Sakla Nadi Station	Bride 243	Bridge 246	Bridge 249	Bridge 259	Bridge 261	Culvert 244	Culvert 245	Culvert 247	Culvert 248	Culvert 250	Culvert 251	Culvert 252	Culvert 253	Culvert 254	Culvert 255	Culvert 241 A	km 155+200 to 160+200	km 160+200 to 165+200	km 165+200 to 170+200	170+200 to 175+200	Gumti Nursery	AVERAGE
5 Disposal of Construction Debris and other Waste Materials																										
1 No burning shall be allowed.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2 No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.1
3 Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3.1
4 Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
Average Rating		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	4.0
6 Servicing and Operating Equipment																										
1 Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
2 The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
3 Fuel spills will not be tolerated and care shall		3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4 The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
5 The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate		3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.7
6 All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, and shall be maintained in g ood working condition following the manufacturer's standards.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
7 Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.		3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.7
Average Rating		4.1	4.1	5.0	5.0	5.0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.4	4.4	4.4	4.4	5	5.0
7 Control of Petroleum Producrts																										
1 All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater		3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.7
Average Rating		3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.7
8 Protection of Topsoil and Soil Erosion																										
1 Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion		3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.5
2 Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
3 Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
4 In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
5 Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
Average Rating		4.6	4.6	4.6	4.6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6	4.6	4.6	4.6	5	5.0
9 Occupational Health and Safety																										
1 Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses,		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1.2
2 Prepare, submit and implement a Health and Safety Program acceptable to		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
3 All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
4 Must not hire Child labor, or persons with ages 14 and below.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
5 No persons with age between 17 and 15, are to be hired for hazardous duties.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
6 Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	5	4.9
7 Prepare and implement an HIV/AIDS STD prevention Program, acceptable		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
8 Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
Average Rating		4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.25	4.25	4.25	4.25	5.00	4.7
Overall all Ratimg		3.84	3.85	4.10	4.10	4.05	4.12	4.12	4.12	4.12	4.14	4.14	4.12	4.12	4.10	4.10	4.10	4.14	4.14	4.14	4.10	3.58	3.58	3.58	3.58	4.50	4.2

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE ST

Mitigation Measures	SECTION 3																																					AVERAGE
	STATION BUIDINGS					BRIDGES				CULVERTS																													
	E RATING	Mandabag Station	Quaaba Station	Imamton Station	Gangasagar Station	Akhaura Station	Bridge 262	Bridge 263	Bridge 272	Brige 276	Culvert 256	Culvert 260	Culvert 264	Culvert 265	Culvert 266	Culvert 267	Culvert 268	Culvert 269	Culvert 270	Culvert 271	Culvert 273	Culvert 274	Culvert 275	Culvert 277	Culvert 261	Culvert 262	Culvert 1	Culvert 2	km 175+200 to 180+200	km 180+200 to 185+200	km 185+200 to 190+200	km 190+200 to 195+200	km 195+200 to 202+650							
1 Noise and Attenuation Measures																																						
1 Use of appropriate modern plant and/or equipment, that are properly maintained following the manufacturer's specifications and original manual, specifically on the control of noise and smoke emissions.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2 All powered mechanical equipment and machinery to be fitted with noise abating gear	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3 facilities, construction yards away from noise sensitive areas such as residential sites, schools, colleges and hospitals; to a distance that attenuates the disturbance to a level conforming with DOE standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4 Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5 environment, to be provided with suitable noise protection equipment like ear muffs, etc.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6 Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
Average Rating	5.0	5.0	5.0	5.0	4.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2 Dust Control																																						
1 Vehicles transporting construction and waste material to be covered	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
2 Construction equipment and vehicles to be properly maintained in good working condition following manufacturer's standards, and idling of engines discouraged.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3 Machinery emitting visible smoke to be banned from construction sites.	5	5	5	5	3	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5	5	5	5	5	5	4.8
4 Contractor to prepare and implement upon the approval of the Engineer, a dust suppression program detailing action to be taken to minimize dust generation [e.g. spraying of roads with water], and the equipment to be	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
5 Dust masks to be provided to workers where dust hazards exist.	1	1	1	1	1	3	3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	2.3
6 Air quality monitoring to be carried out as per	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
7 All roads, permanent or temporary, pukka or katcha, that become dusty and all areas where construction related activities are carried out, shall be subject to necessary dust suppression measures such as watering, sweeping, prevention of speeding vehicles on unpaved roads or other measures	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
8 Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage of petroleum products, contamination of such materials with soil or surface/ground water, through discharge run-off,	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
9 Contractor shall take all reasonable measures to minimize dust-blowing from areas under his control by spraying water on stockpile, bare soil, haul road, un-surfaced traffic route and any other source of dust when conditions	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.0
Average Rating	3.4	3.4	3.2	3.2	3.2	3.7	3.7	3.4	3.4	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.4	3.2	3.4	3.4	3.4	3.4	3.4	3.5						
3 Watercourse Impats in Wetlands/Ponds/Rivers																																						
1 All waterways where Construction activities are conducted, shall be maintained open at all times, else a temporary diversion works adequate to convey surface water flow will be installed. The wetland is to be restored.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2 Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3 Proper and prompt disposal of construction wastes such as soil, broken bricks, concrete, and steel reinforcement which are dismantled from structures, in connection to the reconstruction of bridges/ culverts. These	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5	5	5	5	4.9
4 Temporary erosion and sedimentation control measures (i.e. sedimentation pond, etc.) during rehabilitation of drainage structures, shall be undertaken to ensure that sediment laden run-off does not enter the adjoining	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5 Construction materials and waste shall not be dumped into watercourse during construction of bridges/culverts, and instead deposited in	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
Average Rating	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6	4.6	5	5	5	5	5	5							
4 Borrow and Dredging Site Impacts																																						
1 Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
Average Rating	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE ST

SECTION 3

	Mitigation Measures	STATION BUIDINGS					BRIDGES				CULVERTS																								AVERAGE
	E RATING	Mandabag Station	Quessa Station	Imambari Station	Gangasagar Station	Akhaura Station	Bridge 262	Bridge 263	Bridge 272	Bridge 276	Culvert 256	Culvert 260	Culvert 264	Culvert 265	Culvert 266	Culvert 267	Culvert 268	Culvert 269	Culvert 270	Culvert 271	Culvert 273	Culvert 274	Culvert 275	Culvert 277	Culvert 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+200	km 180+200 to 185+200	km 185+200 to 190+200	km 190+200 to 195+200	km 195+200 to 202+850	
5	**Disposal of Construction Debris and other Waste Materials**																																		
1	No burning shall be allowed.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.7
3	Man-made construction-related debris shall be deposited in disposal areas, the location and nature of such site, shall be subject to the approval of the	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.7
4	Before abandoning disposal areas, these shall be covered with earth and leveled in a manner that these blend with the surrounding environment.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
6	**Servicing and Operating Equipment**																																		
1	Whenever possible, avoid servicing machines or equipment near rivers, streams or other bodies of water. If unavoidable, servicing shall be carried out in such a manner, as to avoid pollution of the water body with gasoline, diesel fuel, oil, grease, and/or other related waste materials (i.e. oil filter,	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Fuel spills will not be tolerated and care shall	5	3	5	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
4	The Contractor shall have the appropriate equipment to transport fuel so that spillage will be avoided. Automatic shut-off nozzles shall be installed on all	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	The Contractor shall have oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.7
6	All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, and shall be maintained in g ood working condition following the manufacturer's standards.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	5	1	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	Average Rating	4.7	3.9	4.7	4.4	4.1	5	5	5.0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
7	**Control of Petroleum Producrts**																																		
1	All petroleum products shall be stored in a suitable facility where any spillage can be safely controlled to avoid contamination of the surrounding areas. Storage of petroleum products shall not be permitted in the vicinity of streams, rivers or other bodies of water. To avoid groundwater	5	1	5	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
	Average Rating	5	1	5	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8
8	**Protection of Topsoil and Soil Erosion**																																		
1	Topsoil of storage areas must be covered by suitable material especially during the dry season, to prevent wind erosion	5	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	4.6
2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	Open embankment slopes are to be planted with suitable vegetation such as grasses, cover crop or fast-growing tree species. In some cases concrete	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	In the selection of sites for the use of stockpiling and disposal of construction materials, natural drainage, storm drain or ponds should be	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	Topsoil and/or any organic materials excavated from the construction site, is to be stockpiled in a suitable area as defined in item 8.4 above, for use in the Project's compensatory tree plantation program; or when in excess amounts, these soil can be donated/sold to interested parties or deposited in approved	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	5	4.6	4.6	4.6	4.6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6	4.6	5	5	5	5	5	4.9
9	**Occupational Health and Safety**																																		
1	Provide personal protection equipment appropriate to the construction workers' job; which may include among others, safety vest, safety shoes, helmets, gloves, welding protective eye glasses,	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
2	Prepare, submit and implement a Health and Safety Program acceptable to	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
3	All Construction Workers are to be trained in general health and safety guidelines, especially on how to manage hazards specific to their respective work. Tool-box health & Safety sessions are to be conducted by the	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
4	Must not hire Child labor, or persons with ages 14 and below.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
5	No persons with age between 17 and 15, are to be hired for hazardous duties.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	1	5	5	5	5	5	5	4.4
7	Prepare and implement an HIWAIDS STD prevention Program, acceptable	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
8	Hiring of personnel, job assignment and pay scale, shall be done irrespective of gender, race, creed, political affiliation, and social status.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
	Average Rating	4.25	4.25	4.25	4.25	4.25	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.00	4.00	4.50	4.50	4.50	4.50	4.50	4.4
	Overall all Ratimg	4.14	3.62	4.08	3.85	3.59	4.32	4.32	4.29	4.29	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.16	4.14	4.29	4.29	4.29	4.29	4.29	4.2

ANNEX 2
WEEKLY TREE PLANTATION ESTABLISHMENT PROGRESS

CTM JV MAX

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE FOR THE MONTH OF JUNE , 2022

		ACTIVITIES		Unit	June 22				Total	Remarks
					W1	W2	W3	W4		
1		**Nursery Operation**								
	1	Sapling Production								
		a. Timber Trees	Target	Saplings					0	
			Actual	Saplings					0	
		b. Fruit Trees	Target	Saplings					0	
			Actual	Saplings					0	
		c. Medicinal Trees	Target	Saplings					0	
			Actual	Saplings					0	
		d. Fuel Wood	Target	Saplings					0	Total nurtury production=44650 Sapling
			Actual	Saplings					0	
		Total	Target	Saplings	44,650	44,650	44,650	44,650	44,650	
			Actual	Saplings					0	
	2	**Sapling Procurement**								
		a. Timber Trees	Target	Saplings		1,500	1,500	1,500	4,500	
			Actual	Saplings		300	300	0	600	
		b. Fruit Trees	Target	Saplings		900	900	900	2,700	
			Actual	Saplings		180	180	0	360	
		c. Medicinal Trees	Target	Saplings		150	150	150	450	
			Actual	Saplings		60	60	0	120	
		d. Fuel Wood	Target	Saplings		150	150	150	450	
			Actual	Saplings		60	60	0	120	
		Total	Target	Saplings		2,700	2,700	2,700	8,100	Total Procurement=36,300 Sapling
			Actual	Saplings	35,100	600	600	0	36,300	
	3	Sapling Maintenance		Saplings	35,100	35,700	36,300	36,300	36,300	
2		**Plantation Establishment**								
	1	Site preparation (Staking/hole digging/fertilization)	Target	hectares/holes		1,500	1,500	1,500	4,500	
			Actual	hectares/holes		800	800	0	1,600	
		Location		chainage		DN. Line- 169+400 to 170+00				
	2a	Outplanting to replace 2021 plantation mortality	Target	hectares/ holes					0	
			Actual	hectares/ holes					0	
		Location		chainage						
	2b	Outplanting New 2022	Target	hectares/holes		1,500	1,500	1,500	4,500	
			Actual	hectares/holes		600	600	0	1,200	Total Outplanting replaced =1,200 trees on 2022
		Location		chainage	DN. Line- Ch: 168+620 to 171+320,					
3	1	Ring weeding/fertilization/	Target	Saplings	0	1500	1500	1500	4,500	
			Actual	Saplings		600	600	0	1,200	
		Location		chainage	DN. Line- Ch: 168+620 to 171+320,					
	2	Protection/Patrolling	Target	hectares/ holes		55847	57347	58847	58847	
			Actual	hectares/ holes	54347	55847	57347	58847	58847	
		Location		chainage	DN. Line- Ch: 168+620 to 171+320,					

CTM JV TOMA

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE FOR THE MONTH OF JUNE-2022

		ACTIVITIES		Unit	Month of June 21				Remarks
					W1	W2	W3	W4	
			Actual	Saplings	0	0	0	0	
		c. Medicinal Trees	Target	Saplings	175	175	175	175	
			Actual	Saplings	0	0	0	0	
		d. Fuel Wood	Target	Saplings	175	175	175	175	
			Actual	Saplings	0	0	0	0	
		Total	Target	Saplings	1,750	1,750	1,750	1,750	
			Actual	Saplings	0	0	0	0	**Total-00**
	2	**Sapling Procurement**							
		a. Timber Trees	Target	Saplings	875	875	875	875	
			Actual	Saplings	700	1,000	1,200	0	
		b. Fruit Trees	Target	Saplings	525	525	525	525	
			Actual	Saplings	0	200	200	0	
		c. Medicinal Trees	Target	Saplings	175	175	175	175	
			Actual	Saplings	300	500	500	0	
		d. Fuel Wood	Target	Saplings	175	175	175	175	
			Actual	Saplings	200	500	500	0	
		Total	Target	Saplings	1,750	1,750	1,750	1,750	**Total Procurement=5,800 Sapling**
			Actual	Saplings	1,200	2,200	2,400	0	
	3	**Sapling Maintenance**		Saplings	1,200	3,400	5,800		
2		**Plantation Establishment**							
	1	Site preparation (Staking/hole digging/fertilization)	Target	hectares/ holes	1,750	1,750	1,750	1,750	
			Actual	hectares/ holes	0	0	5,500	0	
		Location		chainage	0	0	184+300 to 180+00	0	
	2a	Outplanting to Replace 2022 mortality	Target	hectares/ holes	0	0	0	0	
			Actual	hectares/ holes	0	0	0	0	
		Location		chainage	0	0	0	0	
		Outplanting New 2022	Target	hectares/ holes	1,750	1,750	1,750	1,750	
			Actual	hectares/ holes	0	0	5,300	0	Total Outplanting of new plantation =5,300 trees
		Location		chainage			184+300 to 180+00		
	2b	Outplanting Replace of Replace on 2021 & 2020	Target	hectares/ holes	0	0	0	0	Dead Trees 0
			Actual	hectares/ holes	0	0	0	0	
		Location		chainage					
3		**Plantation Maintenance & Protection**							
	1	Fencing	Target	km	1.5	1.5	1.5	1.5	
			Actual	km	0	0	0	0	Total=0 km
		Location		chainage					
	2	Ring weeding/fertilization/	Target	Saplings	1,750	1,750	1,750	1,750	Total weeding/ fertilization = 0
			Actual	Saplings	0	0	0	0	
		Location		chainage	0	0	0	0	
	3	Protection/Patrolling	Target	hectares/ holes	1,750	1,750	1,750	1,750	
			Actual	hectares/ holes	0	0	5,300	0	Total plantation =5,300; Dead trees = 0; Number of live trees = 5,300
		Location		chainage			184+300 to 180+00		

ANNEX 3. PHOTOGRAPHS

ANNEX 3A. ENVIRONMENTAL MONITORING

Plate 1. Ambient air quality monitoring at Akhaura Station. Picture taken on 17 April 2022.

Plate 2. Ambient noise level monitoring at Pitambar, Burichang. Picture taken on 18 May 2022.

Plate 3. Surface water sample taken from Shaindara River. Picture taken on 18 May 2022.

ANNEX 3 B. DUST CONTROL

Plate 4. Photograph of watering of unpaved grounds of the Akhaura station yard. Picture taken on 4 June 2022.

Plate 5. Photograph of watering of unpaved road crossing at Comilla Station yard. Picture taken on 3 February 2022.

Plate 6. Photograph of watering of unpaved track embankment near the Gumti bridge area.. Picture taken on 27 April 2022.

ANNEX 3C. WATERCOURSE IMPACT MITIGATION IN WETLANDS/PONDS/CANALS

Plate 7. Photograph of clearing waterway. Temporary cover for newly established embankment to avoid soil erosion. Sodding will be done later. Picture taken on 18 June 2022.

Plate 8. Newly constructed 2 cell box culvert cleared of debris to allow free flow of flood waters. Picture taken on 19 June 2022..

Plate 9. Photograph of newly constructed box culvert with sodded approach to help prevent soil erosion that may block the waterway. Picture taken on 25 June 2022.

ANNEX 3D. DISPOSAL OF CONSTRUCTION DEBRIS AND OTHER WASTE MATERIALS

Plate 10. Photograph of front loader operator stacking unsuitable materials at the CTM MAX construction yard. Picture taken on 26 June 2022.

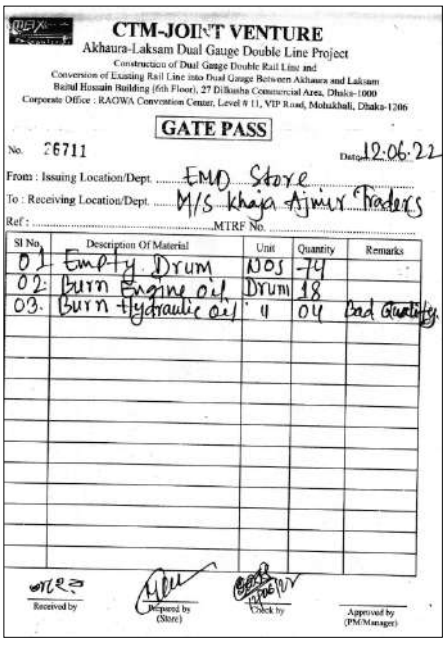
Plate 11. Photograph of a small rock crusher reducing broken concrete and other solid waste into smaller and uniform sized materials for use as concrete aggregates . Picture taken on 29 June 2022.

Plate 12. Photograph of crushed broken concrete from construction site, that had been stockpiled for use in repairing nearby damaged rural roads. Picture taken on 26 June 2022.

ANNEX 3E. CONTROL OF PETROLEUM PRODUCTS

Plate 13. Photograph of the fuel filling station at the Quasba Construction yard. Picture taken on 25 June 2022.

Plate 14. Photograph of the Quasba Office electric power generator with fuel tank and tin roofing. Picture taken on 9 February 2022.



CTM-JOINT VENTURE
Akhaura-Laksam Dual Gauge Double Line Project
Construction of Dual Gauge Double Rail Line and
Conversion of Existing Rail Line into Dual Gauge Between Akhaura and Laksam
Baitul Hossain Building (6th Floor), 27 Dilkusha Commercial Area, Dhaka-1000
Corporate Office : RAOWA Convention Center, Level # 11, VIP Road, Mohakhali, Dhaka-1206

GATE PASS

No. 26711 Date 12.06.22

From : Issuing Location/Dept. EMD Store

To : Receiving Location/Dept. M/S khaja Ajmir Traders

Ref : MTRF No.

Sl No.	Description Of Material	Unit	Quantity	Remarks
01	Empty Drum	NOS	74	
02	Burn Engine oil	Drum	18	
03	Burn Hydraulic oil	"	04	Bad Quality

Received by | Prepared by (Store) | Check by | Approved by (PM/Manager)

Plate 15. Photocopy of the gate pass for the buyer of waste engine oil, spent lubricating oil and empty drums. The Picture taken on 23 December 2021.

ANNEX 3F. OCCUPATIUONAL HEALTH AND SAFETY

Plate 16. Training on Safe Driving and Road Safety for Contractor's Drivers and equipment operators Picture taken on 23 June 2022.

Plate 17. Tool Box meetings held prior to starting the work. Picture taken on 5 June 2022.

Plate 18. Informative signs and yellow table placed at construction site to warn workers, commuters and pedestrians of possible dangers that may occur at the Gangasagar train station construction site. Picture taken on 9 June 2022.

Plate 19. Maintenance of cleanliness at the worker's camps. Picture taken on 26 June 2022.

Plate 20. Hygienic Toilets installed at the Akhaura Food Godown construction site. Picture taken on 25 June 2022.

Plate 21. Hand washing station installed at the construction site. Picture taken on 27 June 2022.

ANNEX 3G. COMPENSATORY TREE PLANTATION AND REHABILITATION PROGRAM

Plate 22. Out planting of new trees saplings at chainage km169+900. Photograph taken on 16 June 2022.

Plate 23. Ring weeding and installation of bamboo sticks to support the newly planted tree sapling in chainage km148+800. Photograph taken on 26 June 2022.

Plate 24. 2021 Tree plantation at chainage km157+100 that are undergoing maintenance work. Photograph taken on 26 June 2022

Plate 25. New plantation establishment at km183+700.Photograph taken on 25 June 2022.

Plate 26. Worker installing a bamboo stick as support to the newly planted tree sapling. Photograph taken on 25 June 2022.

Plate 27. Surviving trees from the 2021 planting season near bridge #263. A black bird is already perching on one tree (yellow circle). Photograph taken on 26 June 2022.

ANNEX 3H. HIV/AIDS STD AWARENESS AND PREVENTION SEMINARS

Plate28. HIV/AIDS Awareness & Preventive Seminar held at Sadar Rasulpur Station. Photograph taken on 25 April 2022.

Plate29. HIV/AIDS Awareness & Preventive Seminar held near Sadar Rasulpur station for members of local Community. Photograph taken on 25 April 2022.

Plate 30. Mobile clinic benefiting construction and community members .Photograph taken on 29 May 2022.

ANNEX 4. LABORATORY TEST RESULTS

All Test Results | January 2022

SL No: 9952

Ref: EQMS/Air Quality/20220101266

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Date : 16 January 2022 to 18 January 2022
Reporting Date : 27 January 2022
Monitoring Location : Rajapur and Gangasagar Railway Station

Result of Ambient Air Quality Test

Sampling Code	Sampling Location	GPS Coordinate	$PM_{2.5}$ µg/m³	PM_{10} µg/m³	SPM µg/m³	SO_2 µg/m³	NO_X µg/m³	CO ppm
AAQ-1	Rajapur Railway Station	23°34'50.0"N 91°09'05.0"E	13.66	26.97	54.76	3.84	13.15	0.04
AAQ-2	Gangasagar Railway Station	23°49'32.7"N 91°11'37.2"E	15.82	31.29	63.78	1.01	13.10	0.31
Bangladesh Standard**			65	150	200	365	100*	9
Duration (Hours)			24	24	8	24	24	8

* The Bangladesh Standards for Oxides of Nitrogen (NO_X) is annually.

** The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

Received by:
Sk. Salahuddin Ahammad
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, Balshakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

Environmental and Engineering Analytical laboratory is Accredited by AB-CAB International Accreditation Board

SL No: 9953

Ref: EQMS/Noise Level/20220101267

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Date : 16 January 2022 to 18 January 2022
Reporting Date : 24 January 2022
Monitoring Location : Rajapur and Gangasagar Railway Station, and sensitive receptor

Result of Noise (dB)

S/N	Sampling Code	Sampling Location	GPS Coordinate	Leq dB(A)	Zone*	Bangladesh Standard at day Time dB(A)	Remarks
1	ANL-1	Rajapur Railway Station	23°34'49.8"N 91°09'08.2"E	57.41	Mixed	60	Low
2	ANL-2	Rajapur Railway Station Jame Mosque	23°34'51.5"N 91°09'10.7"E	52.17	Silent	50	Low
3	ANL-3	Gangasagar Railway Station	23°49'33.8"N 91°11'36.0"E	53.44	Mixed	60	Low
4	ANL-4	Gangasagar Railway Station Jame Mosque	23°49'49.1"N 91°11'44.7"E	48.63	Silent	50	High

Bangladesh Standard*	
Silent area	50
Residential area	55
Mixed area	60
Commercial area	70
Industrial area	75

*Noise Pollution (Control) Rules, 2006

Received by:
Sk. Salahuddin Ahammad
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, Balshakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Sl No: 9954

Ref: EQMS/Water Quality/20220101268

EQMS WET LABORATORY

Test Results of Surface Water Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Date : 16 January 2022
Reporting Date : 27 January 2022
Monitoring Location : Haora River

Result of Surface Water Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	EC (mS)	TDS (mg/L)	DO (mg/L)	BOD (mg/L)	COD (mg/L)	TSS (mg/L)
SWQ-1	Haora River (Upstream)	23°50'01.3"N 91°11'54.1"E	6.90	22.0	0.18	90	6.3	0.7	21	37
SWQ-2	Haora River (Downstream)	23°50'03.3"N 91°11'51.8"E	6.88	21.6	0.18	90	6.0	0.8	23	41
Bangladesh Standard*										
Source of drinking water for supply only after disinfecting			6.5-8.5	–	–	–	6 or above	–	–	–
Water usable for recreational activity			6.5-8.5	–	–	–	5 of more	–	–	–
Source of drinking water for supply after conventional treatment			6.5-8.5	–	–	–	6 or above	–	–	–
Water usable by fisheries			6.5-8.5	–	–	–	5 or more	–	–	–
Water usable by various process and cooling industries			6.5-8.5	–	–	–	5 or more	–	–	–
Water usable for irrigation			6.5-8.5	–	–	–	5 or more	–	–	–

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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Sl No: 9955

Ref: EQMS/Water Quality/20220101269

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 16 January 2022 to 18 January 2022
Reporting Date : 27 January 2022
Monitoring Location : Rajapur and Gangasagar Railway Station

Result of Groundwater Quality

Sampling Code	Sampling Location	GPS Coordinate	pH	Temp (°C)	Phosphate (mg/L)	Manganese (mg/L)	Arsenic (mg/L)	Iron (mg/L)	Fecal Coliform, FC (N/100mL)
GWQ-1	Rajapur Railway Station	23°34'49.7"N 91°09'07.5"E	6.54	26.1	0.02	0.01	<0.01	0.02	0
GWQ-2	Gangasagar Railway Station	23°49'30.8"N 91°11'36.2"E	6.60	27.7	0.03	0.02	<0.01	0.04	0
Bangladesh Standard*			**6.5-8.5**	**20-30**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka- 1212, Bangladesh.

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All Test Results | February 2022

SL No: 7025

Ref: EQMS/Noise Level/20220101353

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Location : Imambari Railway Station, Bride #243/Batch Plant and Labor Camp, and sensitive receptors
Sampling Date : 20 February 2022 to 22 February 2022
Reporting Date : 7 March 2022

Result of Noise (dB)

Sampling Locations	Location Settings	Leq in dB(A)	Bangladesh Standard at day-time dB(A)*	Remarks
ANL-1	Mixed	56.49	60	Low
ANL-2	Silent	53.17	50	High
ANL-3	Industrial	62.04	75	Low
ANL-4	Residential	53.76	55	Low

* Noise Pollution (Control) Rules, 2006.

Received by:
Sk. Salahuddin Ahammad
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.

ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

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SL No: 7024

Ref: EQMS/Air Quality/20220101352

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Location : Imambari Railway Station and Bride #243/Batch Plant and Labor Camp
Sampling Date : 20 February 2022 to 22 February 2022
Reporting Date : 7 March 2022

Result of Ambient Air Quality Test

Sampling Locations	$PM_{2.5}$	PM_{10}	SPM	SO_2	NO_X	CO
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ppm
AAQ-1	8.63	16.19	33.81	3.41	10.04	0.07
AAQ-2	7.48	14.26	29.72	2.09	25.43	0.21
Bangladesh Standard*	65	150	200	365	100**	9
Duration (Hours)	24	24	8	24	24	8

* The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.
** The Bangladesh Standards for oxides of nitrogen (NO_X) is annually.

Received by:
Sk. Salahuddin Ahammad
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: 7025

Ref: EQMS/Noise Level/20220101353

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Location : Imambari Railway Station, Bride #243/Batch Plant and Labor Camp, and sensitive receptors
Sampling Date : 20 February 2022 to 22 February 2022
Reporting Date : 7 March 2022

Result of Noise (dB)

Sampling Locations	Location Settings	Leq in dB(A)	Bangladesh Standard at day-time dB(A)*	Remarks
ANL-1	Mixed	56.49	60	Low
ANL-2	Silent	53.17	50	High
ANL-3	Industrial	62.04	75	Low
ANL-4	Residential	53.76	55	Low

* Noise Pollution (Control) Rules, 2006.

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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.

ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

Environmental and Engineering Analytical laboratory is Accredited by AB-CAB International Accreditation Board

SL No: 7027

Ref: EQMS/Water Quality/20220101355

EQMS WET LABORATORY

Test Results of Groundwater Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Location : Imambari Railway Station and Bride #243/Batch Plant and Labor Camp
Sampling Date : 20 February 2022 to 22 February 2022
Reporting Date : 7 March 2022

Result of Groundwater Quality

Sampling Locations	pH	Temp	Phosphate	Manganese	Arsenic	Iron	Fecal Coliform, FC
		°C	mg/L	mg/L	mg/L	mg/L	N/100mL
GWQ-1	6.58	27.0	0.80	0.01	<0.01	0.66	0
GWQ-2	6.80	27.4	0.60	0.01	<0.01	0.01	0
Bangladesh Standard*	6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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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All Test Results | March 2022

SL No: 7230

Ref: EQMS/Air Quality/20220101536

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Test Results of Ambient Air Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Location : Sadar Rasulpur Railway Station and Kasba Railway Station
Sampling Date : 20 March 2022 to 22 March 2022
Reporting Date : 12 April 2022

Result of Ambient Air Quality Test

Sampling Locations	$PM_{2.5}$	PM_{10}	SPM	SO_2	NO_X	CO
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ppm
AAQ-1	17.06	21.12	51.62	8.89	13.61	0.05
AAQ-2	14.86	19.47	46.51	8.23	12.27	0.02
Bangladesh Standard*	65	150	200	365	100**	9
Duration (Hours)	24	24	8	24	24	8

* The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.
** The Bangladesh Standards for oxides of nitrogen (NO_x) is annually.

Received by:
Sk. Salahuddin Ahammad
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: 7231

Ref: EQMS/Noise Level/20220101537

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Location : Sadar Rasulpur Railway Station, Kasba Railway Station, and sensitive receptors
Sampling Date : 20 March 2022 to 22 March 2022
Reporting Date : 12 April 2022

Result of Noise (dB)

Sampling Locations	Location Settings	Leq in dB(A)	Bangladesh Standard at day-time dB(A)*	Remarks
ANL-1	Mixed	58.22	60	Low
ANL-2	Silent	52.37	50	High
ANL-3	Mixed	55.41	60	Low
ANL-4	Silent	48.13	50	Low

* Noise Pollution (Control) Rules, 2006.

Received by:
Sk. Salahuddin Ahammad
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: 7232

Ref: EQMS/Water Quality/20220101538

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Test Results of Surface Water Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Location : Bijna River
Sampling Date : 22 March 2022
Reporting Date : 12 April 2022

Result of Surface Water Quality

Sampling Locations	pH	Temp	EC	TDS	DO	BOD_5	COD	TSS
		°C	mS	mg/L	mg/L	mg/L	mg/L	mg/L
SWQ-1	7.54	24.2	0.14	70	8.5	1.7	27.6	182
SWQ-2	7.44	24.3	0.14	70	8.0	1.8	30	180
Bangladesh Standard*								
Source of drinking water for supply only after disinfecting	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity	6.5-8.5	-	-	-	5 or more	-	-	-
Source of drinking water for supply after conv. treatment	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation	6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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: 7233

Ref: EQMS/Water Quality/20220101539

EQMS WET LABORATORY

Test Results of Groundwater Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Location : Sadar Rasulpur Railway Station and Kasba Railway Station
Sampling Date : 20 March 2022 to 22 March 2022
Reporting Date : 12 April 2022

Result of Groundwater Quality

Sampling Locations	pH	Temp	Phosphate	Manganese	Arsenic	Iron	Fecal Coliform, FC
		°C	mg/L	mg/L	mg/L	mg/L	N/100mL
GWQ-1	6.79	27.8	0.7	0.01	<0.01	0.06	0
GWQ-2	7.21	27.5	0.1	0.06	<0.01	0.29	0
Bangladesh Standard*	6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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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All Test Results | April2022

Sl. No: 6141

Ref: EQMS/Air Quality/20220101667

EQMS

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Location : Akhaura and Shashidal Railway Station
Sampling Date : 17 April 2022 to 19 April 2022
Reporting Date : 10 May 2022

Result of Ambient Air Quality Test

Sampling Locations	PM_{10}	$PM_{2.5}$	SPM	SO_2	NOx	CO
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	ppm
AAQ-1	9.69	18.29	37.94	7.51	11.67	0.03
AAQ-2	9.41	20.48	40.57	4.69	10.05	0.01
Bangladesh Standard*	65	150	200	365	100**	9
Duration (Hours)	24	24	8	24	24	8

* The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.
** The Bangladesh Standards for oxides of nitrogen (NO_2) is annually.

Received by:
Sk. Salahuddin Ahammad
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: 6142

Ref: EQMS/Noise Level/20220101668

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Test Results of Noise Level

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Location : Akhaura, Shashidal Railway Station, and sensitive receptors
Sampling Date : 17 April 2022 to 19 April 2022
Reporting Date : 10 May 2022

Result of Noise (dB)

Sampling Locations	Location Settings	Leq in dB(A)	Bangladesh Standard at day-time dB(A)*	Remarks
ANL-1	Mixed	59.73	60	Low
ANL-2	Silent	55.04	50	High
ANL-3	Mixed	58.11	60	Low
ANL-4	Silent	48.28	50	Low

* Noise Pollution (Control) Rules, 2006.

Received by:
Sk. Salahuddin Ahammad
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: 6143

Ref: EQMS/Water Quality/20220101669

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EQMS WET LABORATORY

Test Results of Surface Water Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Location : Shalmdara River
Sampling Date : 17 April 2022
Reporting Date : 10 May 2022

Result of Surface Water Quality

Sampling Locations	pH	Temp	EC	TDS	DO	BOD_5	COD	TSS
		°C	mS	mg/L	mg/L	mg/L	mg/L	mg/L
SWQ-1	7.0	31.0	0.57	280	7.4	1.2	11.7	19.2
SWQ-2	7.1	31.5	0.58	300	7.1	1.8	13.2	10.8
Bangladesh Standard*								
Source of drinking water for supply only after disinfecting	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity	6.5-8.5	-	-	-	5 or more	-	-	-
Source of drinking water for supply after conv. treatment	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation	6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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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EQMS WET LABORATORY

Test Results of Groundwater Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Location : Akhaura and Shashidal Railway Station
Sampling Date : 17 April 2022 to 19 April 2022
Reporting Date : 10 May 2022

Result of Groundwater Quality

Sampling Locations	pH	Temp	Phosphate	Mangenese	Arsenic	Iron	Fecal Coliform, FC
		°C	mg/L	mg/L	mg/L	mg/L	N/100mL
GWQ-1	6.62	25.9	0.60	0.01	<0.01	0.07	0
GWQ-2	6.80	27.5	0.15	0.03	<0.01	0.27	0
Bangladesh Standard*	6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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: 6076

Ref: EQMS/Air Quality/20220101723

EQMS ENVIRONMENTAL LABORATORY

Test Results of Ambient Air Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Air Quality
Sampling Location : Black Cotton Zone and Mandabag Railway Station
Sampling Date : 16 May 2022 to 18 May 2022
Reporting Date : 6 June 2022

Result of Ambient Air Quality Test

Sampling Locations	$PM_{2.5}$	PM_{10}	SPM	SO_2	NO_X	CO
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	ppm
AAQ-1	8.96	16.41	34.05	5.67	3.71	0.06
AAQ-2	10.29	18.78	39.62	6.33	8.82	0.03
Bangladesh Standard*	65	150	200	365	100**	9
Duration (Hours)	24	24	8	24	24	8

* The Bangladesh National Ambient Air Quality Standards have been taken from the Environment Conservation Rules, 1997 which was amended on 19 July 2005 vide S.R.O. No. 220-Law/2005.

** The Bangladesh Standards for oxides of nitrogen (NO_x) is annually.

Received by:
Sk. Salahuddin Ahammad
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: 6078

Ref: EQMS/Noise Level/20220101724

EQMS ENVIRONMENTAL LABORATORY

Test Results of Noise Level

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Ambient Noise Level
Sampling Location : Black Cotton Zone, Mandabag Railway Station, and sensitive receptors
Sampling Date : 16 May 2022 to 18 May 2022
Reporting Date : 6 June 2022

Result of Noise (dB)

Sampling Locations	Location Settings	Leq in dB(A)	Bangladesh Standard at day-time dB(A)*	Remarks
ANL-1	Mixed	53.73	60	Low
ANL-2	Mixed	55.98	60	Low
ANL-3	Mixed	57.24	60	Low
ANL-4	Silent	53.17	50	High

* Noise Pollution (Control) Rules, 2006.

Received by:
Sk. Salahuddin Ahammad
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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EQMS WET LABORATORY

Test Results of Surface Water Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Surface Water Quality
Sampling Location : Canal (C #252)
Sampling Date : 16 May 2022
Reporting Date : 6 June 2022

Result of Surface Water Quality

Sampling Locations	pH	Temp	EC	TDS	DO	BOD_5	COD	TSS
		°C	mS	mg/L	mg/L	mg/L	mg/L	mg/L
SWQ-1	6.71	30.2	0.10	50	4.3	6.4	31	94
SWQ-2	6.67	29.3	0.10	50	4.0	6.2	38	93
Bangladesh Standard*								
Source of drinking water for supply only after disinfecting	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable for recreational activity	6.5-8.5	-	-	-	5 or more	-	-	-
Source of drinking water for supply after conv. treatment	6.5-8.5	-	-	-	6 or above	-	-	-
Water usable by fisheries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable by various process and cooling industries	6.5-8.5	-	-	-	5 or more	-	-	-
Water usable for irrigation	6.5-8.5	-	-	-	5 or more	-	-	-

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Inland Surface Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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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Ref: EQMS/Water Quality/20220101726

EQMS WET LABORATORY

Test Results of Groundwater Quality

Project Name : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Location : Black Cotton Zone and Mandabag Railway Station
Sampling Date : 16 May 2022 to 18 May 2022
Reporting Date : 6 June 2022

Result of Groundwater Quality

Sampling Locations	pH	Temp	Phosphate	Manganese	Arsenic	Iron	Fecal Coliform, FC
		°C	mg/L	mg/L	mg/L	mg/L	N/100mL
GWQ-1	6.63	29.4	0.8	0.02	<0.01	0.09	0
GWQ-2	6.54	27.6	0.6	0.04	<0.01	0.9	0
Bangladesh Standard*	6.5-8.5	20-30	6.0	0.1	0.05	0.3-1	0

* Bangladesh Environment Conservation Rules, 1997 - Schedule 3 (Standards for Drinking Water)

Received by:
Md. Shahparan
Technical Manager
EQMS Consulting Limited

Analyzed by:
Md. Jubaer Ahmed
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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ANNEX 5 SAMPLING METHODOLOGY

ANNEX 5A. WATER QUALITY MONITORING METHODOLOGY

EQMS WET LABORATORY WATER TESTING METHOD

SN	Parameters	Analysis Method
1	Arsenic, As	Modified Gutzeit method
2	Biochemical Oxygen Demand, BOD_5	5 Days Incubation
3	Chemical Oxygen Demand, COD	USEPA 410.4
4	Dissolve Oxygen, DO	DO Meter
5	Electric Conductivity, EC	Hanna Combo Meter
6	Fecal Coliform	Membrane Filtration
7	Iron, Fe	Phhenantroline Method
8	Manganese, Mn	Periodate Oxidation
9	pH	Hanna Combo Meter
10	Phosphate	Amino Acid Method
11	Temperature	Hanna Combo Meter
12	Total Dissolved Solids, TDS	Hanna Combo Meter
13	Total Suspended Solid, TSS	Dry and Filtration

ANNEX 5B

AMBIENT AIR QUALITY MONITORING METHODOLOGY

A total of 2 (two) ambient air samples were collected from the railway station areas of the project rail corridor between Akhaura and Laksam. The ambient status of major air pollutants viz. Particulate Matter (SPM, PM_{10}, and $PM_{2.5}$), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NO_x), and Carbon Monoxide (CO) have been assessed by monitoring air quality at two railway stations of the project.

The portable wireless HAZ-SCANNER ™ HIM-6000 Hazardous Incident Monitor was used to scan, measure, and document critical pollutants including nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulates. Sampling and analysis of ambient air quality was conducted by referring to the recommendation of the United States Environmental Protection Agency (USEPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air monitoring data. Sampling rate or air quality data was measured automatically every one to five minutes and directly recorded onsite for measured parameters (SO_2, NO_2, CO, PM_{10}, $PM_{2.5}$ and SPM) as shown in Table 1-1. Different analysis methods are integrated in the instrument, such as Particulates 90 Infrared Light Scattering for particulate matters (PM_{10}, $PM_{2.5}$ and SPM), filter for lead analysis and electrochemical sensors for toxic gases (CO, NO_2, and SO_2).

Table 1-1. Methods of Air Quality Sampling and Analysis

Parameter	Machine Name	Methods of Testing	Analysis Method
$PM_{2.5}$	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
PM_{10}	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
SPM	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
NO_x	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
SO_2	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer
CO	Hazz Scanner HIM 6000	On site recording	Light Scanner Nephotometer

As per the national standard, CO and SPM were monitored for 8 hours to compare with the national standard. For PM_{10}, $PM_{2.5}$, and SO_2, the standard duration is 24-hour data whereas the standard duration for NOx is annual. So, standard duration varies from parameter to parameter. So the Hazz Scanner HIM 6000 was operated for 8 hours in peak traffic time (mostly from 10:00am to 6:00pm) and a conversion equation (given below) was used to convey the data from specific time period to expected time period. The equation has been used in many approved EIA report and is as follows:

$$C_{long} = C_{short} (t_{short}/t_{long})^p$$

Where, C_{long} = Expected output in specific time
C_{short} = Outcome during Monitoring Period
T_{short} = Specific time period during monitoring (in minutes)
T_{long} = Expected time period (in minutes)
P = Exponential factor where the value is 0.30

ANNEX 5C

AMBIENT NOISE LEVEL MONITORING METHODOLOGY

In all cases, the sound level meter (SLM) was mounted on a tripod at 1.5 m above ground level and at least 3.5 m away from any sound reflecting surfaces. The SLM was oriented towards the facility of interest for each measurement taken. The measurements were made using a Noise data logger (Digital Noise Meter: Model no. SLM25TK). The SLM was calibrated before the noise monitoring survey was carried out. The sound level is recorded in form of A-weighted equivalent continuous sound pressure level (Leq) values with the use of A-weighing filters in the noise measuring instrument.

Then noise level data will be analyzed to Leq. Noise level data are also compared with the DoE standard ECR 1997.

ANNEX 6. CALIBRATION CERTIFICATE

GLOBAL ACCEPTANCE

BAB

BANGLADESH ACCREDITATION BOARD

ACCREDITATION CERTIFICATE

Issued under the authority of Bangladesh Accreditation Act, 2006
by Bangladesh Accreditation Board (BAB), Ministry of Industries to

EQMS Consulting Limited

Flat F-1, House: Ta-134/A, Boishakhi Sarani

Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

This is to certify that this
Inspection Body(Type-A)

is accredited in accordance with the international standard
ISO/IEC 17020:2012

in respect of the associated scope, subject to the terms and conditions governing the relevant conformity assessment body (CAB) accreditation.

Certificate Number	:	05.013.21
Accreditation Date	:	26 August 2021
Date of Issuance	:	26 August 2021
Date of Expiration	:	25 August 2024

CERT. NO. 05.013.21
BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17020:2012

GLOBAL
BAB ACCREDITED
ACCEPTANCE

Md. Monwarul Islam
Director General

This certificate must be returned on request; reproduction must follow BAB guidelines. For the specific scopes to which this accreditation applies, please refer to the Directory of CABs at BAB website.

GLOBAL ACCEPTANCE

BAB

BANGLADESH ACCREDITATION BOARD

ACCREDITATION CERTIFICATE

Issued under the authority of Bangladesh Accreditation Act, 2006
by Bangladesh Accreditation Board (BAB), Ministry of Industries to

EQMS Consulting Limited (Testing Laboratory)

Flat#F1, House#Ta–134/A, Boishakhi Sarani

Gulshan–Badda Link Road, Dhaka, Bangladesh. Post Code- 1212

This is to certify that this

Testing Laboratory

is accredited in accordance with the international standard

ISO/IEC 17025:2017

in respect of the associated scope, subject to the terms and conditions governing the relevant conformity assessment body (CAB) accreditation.

CERT. NO. 01.062.21
BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17025:2017

Certificate Number	:	01.062.21
Accreditation Date	:	26 August 2021
Date of Issuance	:	26 August 2021
Date of Expiration	:	25 August 2024

GLOBAL BAB ACCREDITED ACCEPTANCE

Md. Monwarul Islam
Director General

This certificate must be returned on request; reproduction must follow BAB guidelines. For the specific scopes to which this accreditation applies, please refer to the Directory of CABs at BAB website.

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02203017801
Issue Date 04/01/2022

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Haz Scanner
Manufacturer	Environmental Devices Corporation
Model/Type	HIM 6000
Serial Number	918157
ID No.	**EQMS # 437**
Range/working Range	Ref on Obs
Least Count	Ref on Obs
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	03/01/2022
Suggested Due Date	02/01/2023
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/119 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Portable Flue Gas Analyzer	LOOBO	SCS/PFGA/01	QSI/0283/21/02	17/02/2022	QSI-INDIA
02	Stop Watch	CASIO	SCS/SW/01	QSI/0474/21/02	04/02/2022	QSI-INDIA
03	Digital Thermo Hygrometer	CEM	SCS/DL/05	QSI/0527/21/10	11/10/2022	QSI-INDIA

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

Sulfur Dioxide SO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.00	N/S	D	±0.03% of rdg
02	1.0	1.01	-0.01	N/S	D	
03	3.0	3.02	-0.02	N/S	D	
04	5.0	5.02	-0.02	N/S	D	

Nitrogen Dioxide NO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.00	N/S	D	±0.03% of rdg
02	1.0	1.01	-0.01	N/S	D	
03	3.0	3.02	-0.02	N/S	D	
04	5.0	5.03	-0.03	N/S	D	

Nitrogen Monoxide NO : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.00	N/S	D	±0.03% of rdg
02	1.0	1.01	-0.01	N/S	D	
03	5.0	5.02	-0.02	N/S	D	
04	10.0	10.04	-0.04	N/S	D	
04	20.0	20.06	-0.06	N/S	D	

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Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Time: (verified against calibrated master equipment)

Sl. No.	STD. Value (h:mm:ss.sss)	U.U.C. Value (h:mm:ss.sss)	Tolerance (%)	Status	Uncertainty(Sec.)
01	00:00:00.000	00:00:00.000	N/S	D	±0.15
02	00:00:30.013	00:00:30.000	N/S	D	
03	00:01:00.039	00:01:00.000	N/S	D	±0.25
04	00:10:00.055	00:10:00.000	N/S	D	
05	00:30:00.089	00:30:00:000	N/S	D	
06	01:00:00.129	01:00:00:000	N/S	D	
07	02:00:00.171	02:00:00:000	N/S	D	
08	03:00:00.247	03:00:00:000	N/S	D	±3.5
09	04:00:00.315	04:00:00:000	N/S	D	
10	05:00:00.598	05:00:00:000	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Abdullah Al Mamun
(Calibration Engineer)

Issued By
Md. Arman Ahmed Rizu
(Technical Manager)

End of Calibration Certificate

ISO/IEC : 17025
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STANDARD CALIBRATION SERVICE PRIVATE LIMITED

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Corporate Office
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Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02114094301
Issue Date 18/09/2021

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Hazz Scanner
Manufacturer	Environmental Devices Corporation
Model/Type	HIM 6000
Serial Number	918158
ID No.	**EQMS # 438**
Range/working Range	Ref on Obs
Least Count	Ref on Obs
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	14/09/2021
Suggested Due Date	13/09/2022
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/119 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

ISO/IEC : 17025
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Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Portable Flue Gas Analyzer	LOOBO	SCS/PFGA/01	QSI/0283/21/02	17/02/2022	QSI-INDIA
02	Stop Watch	Any Time	SCS/SW/02	QSI/0257/21/02	17/02/2022	QSI-INDIA
03	Digital Thermo Hygrometer	HTC	SCS/DL/01	QSI/0441/20/10	14/10/2021	QSI-INDIA

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

Sulfur Dioxide SO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.0	N/S	D	±0.03% of rdg
02	1.0	1.01	0.0	N/S	D	
03	3.0	3.01	0.0	N/S	D	
04	5.0	5.02	0.0	N/S	D	

Nitrogen Dioxide NO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.0	N/S	D	±0.03% of rdg
02	1.0	1.01	0.0	N/S	D	
03	3.0	3.02	0.0	N/S	D	
04	5.0	5.02	0.0	N/S	D	

Nitrogen Monoxide NO : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.0	0.00	0.00	N/S	D	±0.03% of rdg
02	1.0	1.01	-0.01	N/S	D	
03	5.0	5.02	-0.02	N/S	D	
04	10.0	10.03	-0.03	N/S	D	
04	20.0	20.05	-0.05	N/S	D	

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Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Time: (verified against calibrated master equipment)

Sl. No.	STD. Value (h:mm:ss.sss)	U.U.C. Value (h:mm:ss.sss)	Tolerance (%)	Status	Uncertainty(Sec.)
01	00:00:00.000	00:00:00.000	N/S	D	±0.15
02	00:00:30.015	00:00:30.000	N/S	D	
03	00:01:00.038	00:01:00.000	N/S	D	±0.25
04	00:10:00.057	00:10:00.000	N/S	D	
05	00:30:00.089	00:30:00:000	N/S	D	
06	01:00:00.129	01:00:00:000	N/S	D	
07	02:00:00.172	02:00:00:000	N/S	D	
08	03:00:00.249	03:00:00:000	N/S	D	±3.5
09	04:00:00.316	04:00:00:000	N/S	D	
10	05:00:00.597	05:00:00:000	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Md. Milon Ali
(Calibration Engineer)

Issued By:

Md. Arman Ahmed Razu
(Asst.Technical Manager)

End of Calibration Certificate

ISO/IEC : 17025
Accredited Laboratory

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Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02212027801
Issue Date 13/02/2022

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Haz Scanner
Manufacturer	Environmental Devices Corporation
Model/Type	HIM 6000
Serial Number	919218
ID No.	**EQMS # 439**
Range/working Range	Ref on Obs
Least Count	Ref on Obs
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	12/02/2022
Suggested Due Date	11/02/2023
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/119 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Portable Flue Gas Analyzer	LOOBO	SCS/PFGA/01	QSI/0283/21/02	17/02/2022	QSI-INDIA
02	Stop Watch	CASIO	SCS/SW/01	QSI/0454/22/02	03/02/2023	QSI-INDIA
03	Digital Thermo Hygrometer	CEM	SCS/DL/05	QSI/0527/21/10	11/10/2022	QSI-INDIA

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

Sulfur Dioxide SO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppb)	U.U.C Value (ppb)	Error (ppb)	Tolerance	Status	Uncertainty
01	0.0	0.0	0.00	N/S	D	±0.03% of rdg
02	1.01	1.0	0.00	N/S	D	
03	3.02	3.0	0.02	N/S	D	
04	5.04	5.0	0.04	N/S	D	

Nitrogen Dioxide NO_2 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.00	0.0	0.00	N/S	D	±0.03% of rdg
02	0.99	1.0	-0.01	N/S	D	
03	2.97	3.0	-0.03	N/S	D	
04	4.93	5.0	-0.07	N/S	D	

Carbon Monoxide CO : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.00	0.00	0.00	N/S	D	±0.03% of rdg
02	1.01	1.00	0.01	N/S	D	
03	5.03	5.00	0.03	N/S	D	
04	10.06	10.00	0.06	N/S	D	
05	20.08	20.00	0.08	N/S	D	

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Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
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CERTIFICATE of CALIBRATION

Ammonia NH3 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm)	Error (ppm)	Tolerance	Status	Uncertainty
01	0.00	0.0	0.00	N/S	D	±0.03% of rdg
02	0.98	1.0	-0.02	N/S	D	
03	2.96	3.0	-0.04	N/S	D	
04	4.92	5.0	-0.08	N/S	D	

Nitrogen Oxide NOx : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppb)	U.U.C Value (ppb)	Error (ppb)	Tolerance	Status	Uncertainty
01	0.00	0.0	0.00	N/S	D	±0.03% of rdg
02	0.97	1.0	-0.03	N/S	D	
03	2.96	3.0	-0.04	N/S	D	
04	4.91	5.0	-0.09	N/S	D	

Sulfur Oxide SOx : (verified against calibrated master equipment)

Sl. No.	STD. Value (ug/m3)	U.U.C Value (ug/m3)	Error (ug/m3)	Tolerance	Status	Uncertainty
01	0.00	0.0	0.00	N/S	D	±0.03% of rdg
02	0.99	1.0	-0.01	N/S	D	
03	2.97	3.0	-0.03	N/S	D	
04	4.94	5.0	-0.06	N/S	D	

Hydrocarbon CH4 : (verified against calibrated master equipment)

Sl. No.	STD. Value (ppm)	U.U.C Value (ppm))	Error (ppm)	Tolerance	Status	Uncertainty
01	0.00	0.0	0.00	N/S	D	±0.03% of rdg
02	0.99	1.0	-0.01	N/S	D	
03	2.97	3.0	-0.03	N/S	D	
04	4.94	5.0	-0.06	N/S	D	

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www.scsbd-ltd.com

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Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Time: (verified against calibrated master equipment)

Sl. No.	STD. Value (h:mm:ss.sss)	U.U.C. Value (h:mm:ss.sss)	Tolerance (%)	Status	Uncertainty(Sec.)
01	00:00:00.000	00:00:00.000	N/S	D	±0.15
02	00:00:30.017	00:00:30.000	N/S	D	
03	00:01:00.038	00:01:00.000	N/S	D	±0.25
04	00:10:00.054	00:10:00.000	N/S	D	
05	00:30:00.089	00:30:00:000	N/S	D	
06	01:00:00.126	01:00:00:000	N/S	D	
07	02:00:00.172	02:00:00:000	N/S	D	
08	03:00:00.245	03:00:00:000	N/S	D	±11
09	04:00:00.317	04:00:00:000	N/S	D	
10	05:00:00.596	05:00:00:000	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Abdullah Al Mamun
(Calibration Engineer)

Issued By:

Md. Armin Ahmed Razu
(Asst. Technical Manager)

End of Calibration Certificate

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02109094525
Issue Date 18/09/2021

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Combo Meter
Manufacturer	HANNA
Model/Type	HI98130
Serial Number	N/P
ID No.	**EQMS#97**
Range/working Range	Ref. On Obs.
Least Count	Ref. On Obs.
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	09/09/2021
Suggested Due Date	08/09/2022
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/111 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	pH 4, pH 7, pH 10 Solution	Agilent	SCS/PH/4,7,10	9186-3625	21/11/2021	Agilent
02	Digital Thermo Hygrometer	HTC	SCS/DL/01	QSI/0441/20/10	14/10/2021	QSI-INDIA
03	TDS Solutions	Traceable Standard Solution				
04	EC Solutions	Traceable Standard Solution				

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

Before Calibration:

Sl. No.	Solution (pH)	U.U.C Value (pH)	Error (pH)	Tolerance	Status	Uncertainty
01	4.00	4.03	-0.03	N/S	D	±0.2% of rdg
02	7.00	7.05	-0.05	N/S	D	
03	10.00	10.11	-0.11	N/S	D	

After Calibration:

Sl. No.	Solution (pH)	U.U.C Value (pH)	Error (pH)	Tolerance	Status	Uncertainty
01	4.00	4.00	0.00	N/S	D	±0.2% of rdg
02	7.00	7.00	0.00	N/S	D	
03	10.00	10.01	-0.01	N/S	D	

TDS OBSERVATION:

Obs. No.	Solution (ppt)	U.U.C Value (ppt)	Error (ppt)	Tolerance	Status	Uncertainty
01	3.0	3.00	0.00	N/S	D	±0.03% of rdg
02	5.0	5.00	0.00			
03	8.0	8.01	-0.01			
04	10.0	10.01	-0.01			

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

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Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

EC OBSERVATION:

Obs. No.	Solution (mS/cm)	U.U.C Value (mS/cm)	Error (mS/cm)	Tolerance	Status	Uncertainty
01	5.0	5.00	0.00	N/S	D	±0.03% of rdg
02	10.0	10.01	-0.01			
03	15.0	15.02	-0.02			
04	20.0	20.02	-0.02			

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Md. Milon Ali
(Calibration Engineer)

Issued By:

Md. Armaan Ahmad Razu
(Asst. Technical Manager)

End of Calibration Certificate

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02109094526
Issue Date 18/09/2021

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Dissolved Oxygen Meter
Manufacturer	Lutron
Model/Type	DO-5509
Serial Number	R.027879
ID No.	**EQMS # 99**
Range (mg/L)	0 to 20
Least Count (mg/L)	0.1
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	09/09/2021
Suggested Due Date	08/09/2022
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/226. (Procedure based on Comparison Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than ±0.3°C per Hour and ±5.0% per 4 Hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Digital Thermo Hygrometer	HTC	SCS/DL/01	QSI/0441/20/10	14/10/2021	QSI-INDIA
02	DO Solution	Traceable Standard Solution				

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Before Calibration:

Sl. No.	Standard Value (mg/L)	U.U.C Value (mg/L)	Error (mg/L)	Tolerance (mg/L)	Status	Uncertainty
01	10.0	10.1	-0.1	N/S	D	±0.1 % of rdg.
02	20.0	20.2	-0.2	N/S	D	

After Calibration:

Sl. No.	Standard Value (mg/L)	U.U.C Value (mg/L)	Error (mg/L)	Tolerance (mg/L)	Status	Uncertainty
01	10.0	10.0	0.0	N/S	D	±0.1 % of rdg.
02	20.0	20.0	0.0	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked,"N/A" means Not Applicable,"N/P" means Not Provided,"N/R" means Not Readable,"N/S" means Not Specified.

Calibrated By:

Md. Milon Ali
(Calibration Engineer)

Issued By:

Md. Arman Ahmed Razu
(Asst. Technical Manager)

End of Calibration Certificate

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02109094528
Issue Date 18/09/2021

Customer Details:

Name	**EQMS Consulting Limited**
Address	Flat # F1, House # Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1742 556466
E-mail	jubaer.ahmed@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Sound Level Calibrator
Manufacturer	REED
Model/Type	R8090
Serial Number	160324209
ID No.	**EQMS # 134**
Range/working Range (dB)	Ref. On Obs.
Least Count (dB)	Ref. On Obs.
Accuracy	As per instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	07/08/2021
Suggested Due Date	06/08/2022
Calibration Procedure	The calibration had been performed in accordance with calibration procedure SCS.WI-09M (Procedure based on comparision method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	20±2
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

ISO/IEC : 17025
Accredited Laboratory

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh

Laboratory Location
House # 427, Road # 6/2
Shahinbag, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Sound Level Meter	CEM/DT-8820	SCS/SLM/01	QSI/0670/20/02	17/02/2022	QSI-INDIA
02	Digital Thermo Hygrometer	HTC	SCS/DL/01	QSI/0441/20/10	14/10/2021	QSI-INDIA

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

Output Sound Pressure : (verified against calibrated master equipment)

Obs. No.	Standard Value (dB)	U.U.C. Value (dB)	Error (dB)	Tolerance (dB)	Status	Uncertainty (dB)
01	93.8	94.0	0.2	N/S	D	±1.2
02	113.5	114.0	0.5	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. Adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Md. Milon Ali
(Calibration Engineer)

Issued By

Md. Armanul Abuied Razu
(Asst.Technical Manager)

End of Calibration Certificate

INSTRUMENTATION ENGINEERING SERVICES LTD.

Liaison Office: Building # 296/A (Unit: D1, D2 & E1), Building # 297 (Ground Floor), Road # 19/B, New DOHS, Mohakhali, Dhaka-1206, Bangladesh. Registered Office: CHAA-71/1, North Badda, Dhaka, Bangladesh.
Cell No. : +8801755 569956, +8801993 339042, +8801993 339073
Email: service@ieslbd.com, alim@ieslbd.com, Website: www.ieslbd.com

CERTIFICATE OF CALIBRATION

CERTIFICATE No.

SNLSO/00035/21

Customer	:	EQMS Consulting Limited., Flat#F1, H#Ta–134/A, Boishakhi Sarani, Gulshan–Badda Link Road, Dhaka-1213, Bangladesh
Instrument	:	Tekcoplus Sound Level Meter
Manufacturer	:	N/A
Serial No.	:	202001477
Tag No.	:	EQMS#418
Model No.	:	SLM25TK
Range	:	30~130 dB
Resolution	:	0.1 dB
As Received Physical Condition	:	Good
As Return Physical Condition	:	Good
Date of Issue	:	11-09-2021
Date Calibrated	:	09-09-2021
Recommended Due Date	:	09-09-2022

This instrument has been Calibrated at IESL Laboratory.
The Calibration was performed at an ambient temperature of 21.5 °C, and a relative humidity of 56.0%RH

Calibration Method

Procedure number : IESL CP-28-03, Procedure name : IESL CP-28: Calibration Procedure for Sound Level Meter, International standard used :IS 15575:2005 (part-2), JCGM-100:2008., EA-04/, Operations Manual of Lutron SC-942

Reference Equipments Used

	Equipment Name	Serial No	Traceability	Certificate No	Due On
1	Sound Level Meter	H.331313	NPL/NABL Accredited Laboratory	BCL/SLM/231956	01-12-2021

Calibration Results / Remarks (if any)

1 Please refer to the attached Calibration certificate

2 The user should decide on the usability of this document for its intended use

Calibrated By
Md. Shahin Uz Zaman
Emp ID : ASC 010
Date : 11-09-2021

Reviewed By
Kazi Sourov Alim
Emp ID : ASC 002
Date : 11-09-2021

Approved Signatory
Kazi Sourov Alim
Emp ID : ASC 002
Date : 11-09-2021

ISO/IEC: 17025:2017
Accredited Laboratory

INSTRUMENTATION ENGINEERING SERVICES LTD.

Liaison Office: Building # 296/A (Unit: D1, D2 & E1), Building # 297 (Ground Floor), Road # 19/B, New DOHS, Mohakhali, Dhaka-1206, Bangladesh. Registered Office: CHAA-71/1, North Badda, Dhaka, Bangladesh.
Cell No. : +8801755 569956, +8801993 339042, +8801993 339073
Email: service@ieslbd.com, alim@ieslbd.com, Website: www.ieslbd.com

CERTIFICATE OF CALIBRATION

CERTIFICATE No.

SNLSO/00035/21

Calibration Results(As Found)

Table : Calibration of Sound

Sl.	Nominal Sound (dB)	Average Standard Sound (dB)	Average Sound on UUC (dB)	Error	Expanded Uncertainty (±)
1	94.0	94.0	92.9	-1.2	0.67
2	114.0	114.0	112.7	-1.3	0.69

The result has an expanded uncertainty of approximately 95% confidence level with a coverage factor k=2.00

Calibrated By
Md. Shahin Uz Zaman
Emp ID : ASC 010
Date : 11-09-2021

Reviewed By
Kazi Sourov Alim
Emp ID : ASC 002
Date : 11-09-2021

Approved Signatory
Kazi Sourov Alim
Emp ID : ASC 002
Date : 11-09-2021

ANNEX 7. ENDORSEMENT LETTER FOR ECC RENEWAL

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
প্রকল্প পরিচালক এর কার্যালয়
"আখাউড়া থেকে লাকসাম পর্যন্ত ডুয়েলগেজ ডাবল রেললাইন নির্মাণ এবং
বিদ্যমান রেললাইনকে ডুয়েলগেজে রূপান্তর" শীর্ষক প্রকল্প
বাংলাদেশ রেলওয়ে, রেলভবন, ঢাকা।

নং- পিডি/এএলডিএলপি/পরিবেশ/০৩/২০২১-৩৫৬

তারিখঃ ১৪/০৬/২০২২

প্রাপকঃ পরিচালক
চট্টগ্রাম বিভাগীয় কার্যালয়
পরিবেশ অধিদপ্তর
জাকির হোসেন রোড, খুলশী,
চট্টগ্রাম-৪২০২।

বিষয়ঃ "আখাউড়া থেকে লাকসাম পর্যন্ত ডুয়েলগেজ ডাবল রেললাইন নির্মাণ এবং বিদ্যমান রেললাইনকে ডুয়েলগেজে রূপান্তর" শীর্ষক প্রকল্পের অনুকূলে ইস্যুকৃত পরিবেশ অধিদপ্তরের ছাড়পত্র ২০২২-২০২৩ সালের জন্য নবায়ন প্রসঙ্গে।

উপর্যুক্ত বিষয়ে জানানো যাচ্ছে যে, "আখাউড়া থেকে লাকসাম পর্যন্ত ডুয়েলগেজ ডাবল রেললাইন নির্মাণ এবং বিদ্যমান রেললাইনকে ডুয়েলগেজে রূপান্তর" শীর্ষক প্রকল্পের সূত্রস্থ পত্রের মাধ্যমে গত ২০২১-২০২২ সালের জন্য পরিবেশগত ছাড়পত্র নবায়ন করা হয় যার মেয়াদ ০১/০৫/২০২২ তারিখে উত্তীর্ণ হয়েছে। পরিবেশ অধিদপ্তরের নিয়মানুযায়ী উক্ত প্রকল্পের ২০২২-২৩ সালের পরিবেশগত ছাড়পত্র নবায়ন ফি বাবাদ ১,২৫,০০০/= (এক লক্ষ পঁচিশ হাজার) টাকা সোনালী ব্যাংকের চালান নং- ৭০ তারিখ ২৮/০৪/২০২২ (কোড নং- ১-৪৫৪১-০০০০-২৬৮১) এর মূল কপি এবং ১৫% ভ্যাট বাবদ টাকা ১৮,৭৫০.০০ (আঠার হাজার সাতশত পঁঞ্চাশ) টাকা এফএন্ডসিএও/প্রকল্প দপ্তর কর্তৃক জাতীয় রাজস্ব বোর্ডে প্রদান করা হয়েছে টোকেন নং-০০০৭৩৯৯১ তারিখঃ ২০.০৪.২০২২ খ্রিঃ। উক্ত ভ্যাট চালানের প্রত্যয়ন পত্র এতদসঙ্গে সংযুক্ত করা হলো।

এমতাবস্থায়, বর্ণিত প্রকল্পের অনুকূলে ২০২২-২০২৩ সালের পরিবেশগত ছাড়পত্র নবায়নের প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য অনুরোধ করা হলো।

সংযুক্তি ঃ (১) নবায়ন ফি পরিশোধের চালান কপি।
(২) ভ্যাট চালানের প্রত্যয়ন পত্র।
(৩) অনলাইন দরখাস্তের হার্ড কপি-১ সেট।
(৪) Environmental Monitoring report 3 copies.

(মোঃ শহীদুল ইসলাম)
প্রকল্প পরিচালক

অনুলিপিঃ সদয় অবগতির জন্য প্রেরণ করা হলোঃ

১) মহাপরিচালক মহোদয়ের একান্ত সচিব, বাংলাদেশ রেলওয়ে, ঢাকা।
২) মহাপরিচালক, পরিবেশ অধিদপ্তর, পরিবেশ ভবন, ই-১৬, আগারগাঁও, ঢাকা-১২০৭।
৩) ডিএফএ/প্রকল্প, বাংলাদেশ রেলওয়ে, কমলাপুর, ঢাকা।