Ref. No.: JV-ALDLP-BR-21-**210** Date: 17 July 2021

Mr. Md. Shahidul Islam
General Manager/Project Director
Bangladesh Railway, Rail Bhaban (17th 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: **Semi-Annual (January – June 2021) Environment Monitoring Report Third Revision.**

Dear Sir,

In response to the comments of ADB, we are submitting the revised version of the draft Semi-Annual (January – June 2021) Environment Monitoring Report for your final review. To facilitate the review, we have provided one draft report containing yellow highlights on the modifications made, as well as a matrix indicating the comments of the Bank, and the corresponding draft response and the location in the report where the modifications have been made.

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

Sincerely yours,

Raymond George Sawyer
Team Leader
CSC of ALDLP
E-mail: raysey9@gmail.com

Attachment: 1. Semi-Annual (January – June 2021) Environment Monitoring Report Third Revision

Response to the Comments of ADB Consultant to the Draft Semi-Annual Report (January to June 2021)

<table>
<tr><th>COMMENTS</th><th>REMARKS</th><th>PAGE REFERENCE</th></tr>
<tr><td>The Semiannual EMR has been submitted by the ALDTP authority duly. Monitoring and reporting of implementation status of EMP and EMOPs were conducted monthly basis across the project corridor and compiled into SEMR - this has been reviewed with reasonably satisfactory quality. The submitted EMR for January to June 2021 provided necessary contents including executive summary, compliance status of EMP, loan covenants, recommendations as corrective measures and photographs as evidences. This EMR has also reported on grievances and provided successful resolution related information. Implementation of rating based compliance assessment of environmental issues is also considered effective in the EMP compliance evaluation. Although, this EMR is much improved than any time before for the ALDTP, following issues should be addressed before finalization and disclosure of the EMR in ADB website:</td><td></td><td></td></tr>
<tr><td>1. Training/Capacity Building status: Please tabulate the details of training and capacity building programs conducted during reporting period according to following format. Also provide the cumulative number of the training conducted till date.
Table: Training and Capacity Building Activities
<table>
<tr><th>Date</th><th>Name of the Training (i.e., EMP, H&S etc.)</th><th>Trainers Details</th><th>No. of Participants</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table></td><td>Done</td><td></td></tr>
<tr><td>2. Summary of Key Issues and Remedial Actions: Pictorial evidence for prior and after rectification of the registered non-compliances should have been added in Table as per following guidelines.
<table>
<tr><th>Sl.</th><th>Name of activities</th><th>Type of non-compliances recorded</th><th>Date of corrective action request (CAR)</th><th>Compliance Status</th><th>Photo before Rectification</th><th>Photo after Rectification</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td><td>The implementation of the new Environmental monitoring system in the ALDLP that contains these required information had just recently adopted by the Project (May 2021). In view of this, the relevant information (date of CAR request, compliance status) and “before and after Photographs are not yet available at this time. The next Semi-Annual Report will definitely have this table complete with the photographs. The incorporation of “before &</td><td></td></tr>
</table>

<table>
<tr><td></td><td>after" photographs is an added feature that shall be included in the new monitoring syste,</td><td></td></tr>
<tr><td>3. Summary of accident/incident should be recorded as per following format:

Table: Accident/Incident Register
<table><tr><th>Sl</th><th>Description</th><th>From January-June 2021</th><th>Till June 2021</th></tr><tr><td></td><td>Fatal Accidents</td><td></td><td></td></tr><tr><td></td><td>Lost Time Injury (LTI)</td><td></td><td></td></tr><tr><td></td><td>Medical Treatment (MT)</td><td></td><td></td></tr><tr><td></td><td>First Aid Cases (FAC)</td><td></td><td></td></tr><tr><td></td><td>Health Incidents</td><td></td><td></td></tr><tr><td></td><td>Fire/Explosion</td><td></td><td></td></tr><tr><td></td><td>Security Incident</td><td></td><td></td></tr><tr><td></td><td>Near Miss</td><td></td><td></td></tr><tr><td></td><td>Environment (EN)</td><td></td><td></td></tr><tr><td></td><td>Tool Box Talks</td><td></td><td></td></tr></table></td><td>Done</td><td>• Paragraph 125
• Table 5.1</td></tr>
<tr><td>4. Grievance Register:

Complaints Registered Sample
<table><tr><th>Complaint Number</th><th>Date</th><th>Complaint through (phone/letter/site)</th><th>Name of Complainer</th><th>Complaint Details</th><th>Action Taken by Contractor/PMU/CSC</th><th>Date- case resolved (days required)</th><th>Remark further ac if any</th></tr><tr><td colspan="8">Subproject/corridor Name:</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>Done</td><td>Table 6.1</td></tr>
<tr><td>5. Health and Safety Status: From the review of EMR it was found that, H&S aspects focuses only on the use of PPEs. We recommend focusing in increasing awareness training for the workers, increasing number of H&S posters, sharing accident/incident report outcome with the workers rather than penalizing only.</td><td>Done</td><td>• Executive Summary paragraph 3, page 5
• Paragraph 75
• Paragraph 130</td></tr>
</table>

6. **Hazardous Materials Management:** We did not find anything related to hazardous materials management status which was discussed during last meeting held with presence of Project Director, PMU team, consultant team and ADB.	Done	• Paragraph 69 & 70
Specific Issues on the ALDTP EMR: **1. Executive Summary:** a. Air quality monitoring: What is the result of air quality monitoring during the reporting period? Please mention here in summary form.	Done	• Executive Summary paragraph 1, page iv; • Table A3, pp iv.
b. Water Quality Monitoring: How concentrations of heavy metals and manganese, that were higher than standards in last July-Dec 2020 reporting period, came into normal range in this reporting period? Is there any explanations? *Need attention during reporting*, main part of report does not have reference/mentioning about high heavy metal concentration in ground water (2.1.2) above standards during the previous or this reporting period. So avoid this statement from Executive Summary. here briefly.	**Done**	• Executive Summary paragraph 2 pp ii; • Table A2 • Paragraph 45
c. Health and Safety: Regarding accidents occurred at the construction sites, did CTMs prepare investigative reports instantly after each accident happened, particularly those were fatal? If so, submit to CSC and BR? What remedial actions were recommended to reduce accidental cases by the CTMs in the project sites? Please mention	There were no fatal accidents that occurred during the reporting period. Consequently, no report nor any action was necessary.	• Paragraph 125; • Table 5.1
2. Air Quality Monitoring (2.2): Please mention methodology adopted for monitoring of air quality of construction sites.	Done	Annex 6B
3. Noise Monitoring (2.3): As stated, *'Noise level measurement was done continuously for only 4 hours per monitoring site instead of the DOE prescribed 24 hours period'*. This is violation of national law and totally unacceptable. CSC must call EQMS how this violation is committed desperately despite repeated advice given to contractors to abide by the laws of the DOE for environmental sample collection and testing procedure.	The Contractor had been instructed to observe the official DOE noise monitoring duration starting next month August 2021.	
4. Scope of tree plantation (3.3.2): Revise the para to give sense to readers, that 55000 trees were logged out and compensatory tree plantation is already started to fulfill target given in the scope.	Done	• Executive Summary Paragraph 3, page iv; • Paragraph 78
5. Adequacy of Institutional Arrangements for EMP Implementation (6.3): CSC raise the issue of conducting a workshop on EMP implementation and an annual performance review with participation of ADB, while no specific plan was	Done	• Paragraph 92

proposed. Please state it clearly when CSC would prefer to conduct this workshop.		
6. Para 100, COVID 19 Prevention Program (6.6): Please report with specific information, how many workers or staff were infected and how they were treated, and state about contractors' responses when they found COVID positive cases.	A total of 14 staff and no workers were infected. All but 1 have recovered.	• Paragraph 101 • Table 6.2
7. Annex 3E Photo plate 16: Oil drum stored in containment is devoid of spill retaining wall. Although shed roof is covered and floor is impermeable, there has full possibility of spillage and contamination of surrounding environments. This containment should be improved with retaining wall and proper precaution label.	Comment is duly noted. Instructions have been issued to Contractor to improve containment structure of waste petroleum products.	
8. Annex 3H Photo plate 30: Workers' shed and hand wash areas are untidy and no label is posted on the hand wash facility. Housekeeping of these premises should be tidy and improved. Please change this photo with a proper one.	Done	Annex 3H
9. Annex 4: Lab reports must mention methodology/equipment adopted for conducting the test in the lab. Calibration certificates of Air Quality and Noise monitoring equipment must be submitted.	Done	Annex 7
10. Please share the validation certificate of 3rd party consulting services who were doing the environmental quality monitoring for ALDTP. Appreciate receiving the organization validation certificate, equipment's calibration certificate, calibrator's certificates etc. Appreciate if ALDTP can confirm that these all are within in compliance with proper documentation.	Done	Annex 7

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 2021

Document Number		
Rev. No.	Date	Revision Description
03	17/07/2021	Third 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 2021)

July 2021

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 2021

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 avid 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. In the few cases where Project staff experience Covid-19 like symptoms, they are 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 30 June 2021, the Project has achieved 77.25% cumulative progress (against total work sections), had an overall financial cumulative progress of 75.1% (against total work sections) as well as a 68.06% overall cumulative financial progress (against total contract sum).. Embankment works is 111.1 km (77.15%) complete with 68.1 km (94.58%) and 43 km (59.72%) upline and downline respectively built. Bridge work is 99% (12 units) and 59.42% (5 units) complete for upline and downline respectively. Culverts are 93% (41 units) and 45.86% (20 units) completed for upline and downline respectively. Station buildings (13 units) are 67.31% completed with physical progress ranging from 32% in Saldanadi Station to 99% in Alishahar Station. The overall track linking is 46.08% complete with 82.86 km of new tracks laid, where 59.01Km and 23.85 km for upline and downline respectively. Signaling works is about 55.3% complete.

The 8th version of the Contractor's Work Program (WP-H) is still under refinement. The current 7th version of the Contractor's Work program (WP-G), had been approved by BR and concurred by

the Bank, which resulted in the time extension of the Contractor's handing over of Section 1 from 1 September 2020 to 16 June 2021 which is equivalent to 264 days. Correspondingly, the handing over of the other Sections had been adjusted accordingly. Section 2 had been given a 412 day extension ending in 12 November 2022, while Section 3 had a 400 days extension ending in December 2022.

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, Engineer's accommodations, site offices, bridges, culverts and others. During the reporting period, a new MS Excel-based reporting system had been developed for use in the monitoring of the Contractor's compliance to the EMP. The system also provides a mechanism by which non-compliant activities are tracked up to the time these are resolved. Representatives from BR-PIU, CSC, CTM and EQMS attended a training/workshop on how to use the new system.

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.

During the reporting period that covers both dry season (January to April) and rainy months (May and 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, preserved in ice 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 June 2021. This sampling period is found in both dry and rainy seasons. All samples taken had exhibited parameter concentrations that are within the DOE standards. Table A.1 contains the summary of surface water quality test results.

Table A.1. Summary of Surface Water Quality Test Results

Month	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	Haora River Water (Upstream)	7.11	22.5	0.16	80	8.2	0.3	21	53
	Haora River Water (Downstream)	7.07	23.2	0.16	80	8.3	0.3	26	84
February	Gomti River Water (Upstream)	7.79	23.6	0.13	60	6.2	0.8	27	82
	Gomti River Water (Downstream)	7.87	23.6	0.13	70	6.5	.08	21	108
March	Sindai River Water (Upstream)	6.52	29.7	0.12	60	6.6	3.1	31	164

Month	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)
	Sindai River Water (Downstream)	6.57	29.6	0.13	60	5.6	1.2	43	116
April	Goniajuri River Water (Upstream)	7.12	28.5	0.36	180	6.2	1	31	94
	Goniajuri River Water (Downstream)	7.12	28.4	0.35	170	6.5	1.2	34	93
May	Salda River Water (Upstream)	6.63	29.3	0.08	40	8.4	1.4	16	65
	Salda River Water (Downstream)	6.52	29.2	0.07	40	7.5	1.5	14	68
Bangladesh Standard									
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		

Groundwater samples taken from various sites indicate that the test results for all samples were compliant to government set standards. Heavy metals manganese and iron which had shown higher concentration levels in previous reporting period (July-December 2020) have reduced to acceptable levels following DOE standards. It can be noted that the previous Semi-Annual Report covered mostly the rainy season where much water infiltration into the underlying aquifers may have caused the suspension of more heavy metals such that the recorded concentration had exceeded DOE standards for drinking water. As such it is possible that heavy metals recorded in previous report were much less during this reporting period where very minimal rain has fallen. Table A.2 contains the summary of ground water quality test results of samples taken from selected railway stations during the reporting period.

Table A2. Summary of Ground Water Quality of Selected Railway Stations

Month	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	Rajapur Station	6.60	26.2	1.2	0.04	<0.01	0.01	0
	Akhaura Station	6.53	27.3	1.4	0.03	<0.01	0.14	0
February	Sadar Rasulpur Railway Station	6.90	26.9	0.1	0.02	<0.01	0.09	0
	Gangasagar Station	6.62	27.6	0.2	0.1	<0.01	0.08	0
March	Cumilla Station	6.71	32.5	0.8	0.05	<0.01	0.13	0
	Kasba Station	6.59	27.3	1.1	0.03	<0.01	0.97	0
April	Mainamati Station	6.90	29.0	1.5	0.02	<0.01	0.02	0
	Mandabag Station	6.80	28.5	0.8	0.05	<0.01	0.75	0
May	Lalmai Station	6.76	31.1	0.2	0.01	<0.01	0.42	0
	Saldanodi Station	6.60	26.8	0.3	0.01	<0.01	0.26	0
Bangladesh Standard Error! Bookmark not defined.		**6.5-8.5**	**–**	**6.0**	**0.1**	**0.05**	**0.3-1**	**0**

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 (SO2), Oxides of Nitrogen (NOx), 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 9.03 – 42.56 ug/m^3; PM_{10} have results between 15.54 to 69.30 ug/m^3; SPM was measured between 33.73 to 139.88 ug/m3; SO_2 is between 2.04-23.48 ug/m^3; NO_2 figures is between 6.12 to 32.94 ug/m^3; **Table A.3** contains the summary of the air quality levels monitored during the last 6 months (June to July 2021) and CO levels are between 0,01 – 0,11 ppm; which are all found compliant with the DOE standard for the said contaminants.. Previously air sample was collected for 2 hours but at present they are taking the sample for about 8 hours.

Table A3. Summary of Air Quality Monitoring Results during the period January-June 2021

Sampling Period	Sampling Location	$PM_{2.5}$ µg/m^3	PM_{10} µg/m^3	SPM µg/m^3	SO_2 µg/m^3	NO_x µg/m^3	CO_1 ppm
January	Rajapur Railway Station	31.18	43.56	101.64	2.86	14.23	0.03
	Akhaura Railway Station	42.92	69.30	139.88	3.39	32.94	0.03
February	Gangasagar Railway Station	18.44	39.71	66.12	23.48	20.31	0.11
	Sadar Rasulpur Railway Station	24.15	51.73	74.11	9.06	6.38	0.12
March	Cumilla Railway Station	42.56	68.27	121.35	9.74	6.12	0.07
	Kasba Railway Station	25.76	27.73	72.86	6.13	16.79	0.03
April	Mainamati Railway Station	14.96	15.54	41.45	2.41	21.03	0.08
	Mandabag Railway Station	12.95	22.93	36.17	2.04	4.40	0.01
May	Saldanodi Railway Station	9.03	15.87	33.73	2.56	11.27	0.05
	Lalmai Railway Station	16.21	24.34	45.16	3.01	12.31	0.03
Bangladesh Standard**Error! Bookmark not defined.**		**65**	**150**	**200**	**365**	**100**Error! Bookmark not defined.	**9**

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 and railway station of 60 dB(A). These mosques are located at the parking lot of the stations are affected by the noise emanating from the movement of vehicles, commuters and pedestrians rather than the construction work. In the Mainamati station that is almost completed save for final finishing works, the noise recorded emanates mostly from the adjacent busy bus terminal rather than the manual construction works. 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 will be continued this year. However, of the 45,882 saplings that have been planted in 2020, about 13,900 have survived that is composed of 900 saplings in the CTM TOMA side and 13,000 saplings in the CTM MAX side which yield an overall plantation survival rate of 30.3%. The low survival rate can be attributed to the inadequate protection and maintenance of the established plantation by the Sub-Contractor. To help remedy the problem, CSC, CTM and Gomti Nursery jointly prepared a Site Specific Tree Plantation Establishment and

Rehabilitation Program that seeks to establish new tree plantations with 57,500 saplings meeting 90% survival rate, and at the same time, rehabilitate the poorly performing previous year's plantations with replacement of 32,500 dead saplings. Plantation protection and maintenance will be enhanced with the deployment of watch guards that will double as maintenance person at a ratio of 1 guard per 2 km of established plantation.

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 workers; inadequate orientation for workers most especially those doing hazardous tasks, inadequate dust control, proper temporary storage and disposal of petroleum and other construction waste; and attenuation of ambient noise exceeding government prescribed thresholds in some "quiet areas" within the Project alignment and stations.

Health & Safety

Despite the above short comings of the Health & Safety Program as mentioned above, 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 total 568 personnel mobilized by CTM TOMA only 1 injury case had been recorded that resulted in 4 hours work stoppage. This figure is negligible as compared to the total 7,746,310 uninterrupted working hours. CTM MAX on the other hand, has a total 1,101 personnel that had worked for 14,533,136 hours. However, there were 16 accidents reported resulting in a lost time accident (LTA) total of 144 hrs. (18 days) of work stoppage. Two (2) of these accidents were fatal. 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; 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 disciplinary action against worker's non-wearing of provided PPEs, the project will also pursue an 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 4 trainings were conducted by the Contractor that was participated in by about 51 personnel and resource persons were 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 poor campsite 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 crossings. Residential buildings are likewise to be 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, 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 work places leading to water pollution of nearby 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 Contractor, 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 2021. 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.*"[2]

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 negative impacts that the Project implementation will

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

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 2021) 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	46 bridges
New Station	11 minor stations
Upgraded Station	2 major station
Route km	72 km
Track	180.29 km
Level crossing	33

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. However, no Focal Person had yet been designated 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. During this reporting period, DD HQ (Environment Focal Person) and the DD Signal & Telecommunications participated in the "face to face" training/workshop on Environmental Monitoring using the new reporting system, that was conducted by the CSC Environment Team. Other concerned personnel of CSC, CTM JV and third party monitor EQMS also attended the activity.

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

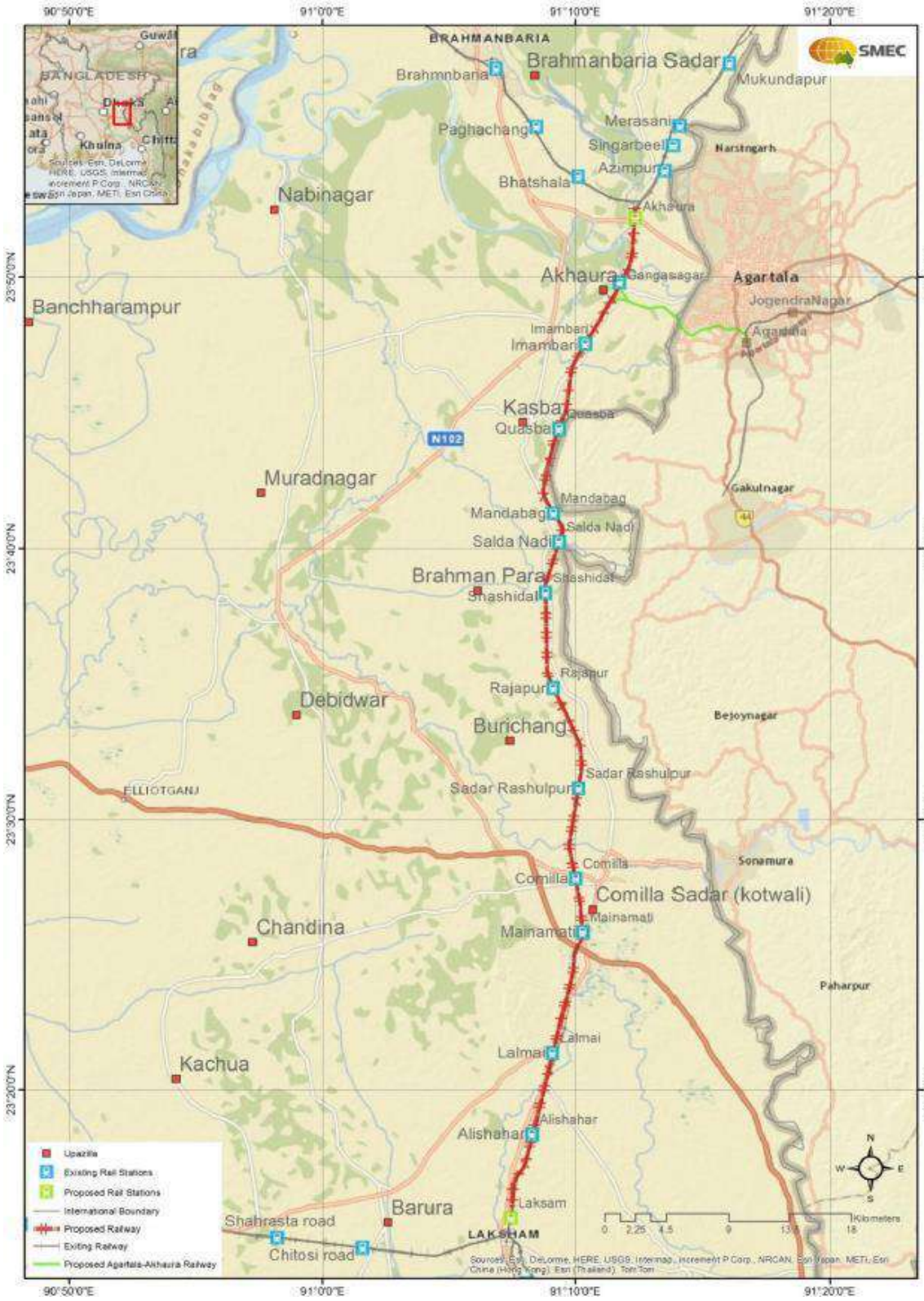
Division	District	Upazilla
Chottogram	Brahmanbaria	Akhaura, Quasba
	Cumilla	Bhramanpara, Burichang, Cumilla Sadar, Cumilla Sadar Daksmin, Laksam.

1.6 Progress in Project Implementation

14. As of 30 June 2021, the Project has achieved 73% cumulative progress and utilized 63.57% of its contracts budget amounting to BDT 18.9 Billion. Embankment works is at 88.054 km (79%) complete with 63.7km and 24.64 km upline and downline respectively built. About 77.38% Sub-Grade and 54.6% Sub-Ballast layers already laid, and 271.39% of unsuitable materials removed and properly disposed. Bridge work is 98.58% (12 units) and 49.5% (4 units) complete for upline and downline respectively. Whereas culverts construction are 93% (41 units) and 27.25% (11 units) completed for upline and downline respectively. Station buildings are 61% completed with physical progress ranging from 25% in Saldanadi Station to 94% in Alishahar Station. It is expected that Alishahar station will be completed by the early part of January 2021. The overall track linking is 36.76% complete with 67.3 km of new tracks laid, where 49.29Km and 17.43km are for upline and downline respectively. Signaling works is about 20.23% complete.

15. The 7th version of the Contractor's Work program (WP-G), had been endorsed by CSC, and subsequently approved by BR which resulted in the awarding of a time extension to the Contractor's handing over of Section 1 from 1 September 2020 to 16 June 2021 which is equivalent to 264 days. Correspondingly, the handing over of the other Sections is adjusted accordingly. Section 2 had been given a 412 days extension ending in 12 November 2022, while Section 3 have a 400 days extension that will end in December 2022.

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 1 million taka 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 Cumilla District during the middle of June 2021 is still under process.

1.9 Institutional Arrangements

Bangladesh Railway

21. The Executing Agency is the Bangladesh Railway that is the overall responsible to the Bangladesh Government and to 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.

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 Consultant 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, analyses 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) Tania Mostafa 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. However, in July 2019 the Resident Environmental Specialist had exhausted his assigned person months (24 pm) demobilized. During the reporting period (July-December 2020), the Sr. Environmental Specialist had been relieved of his duty by the Employer. BR-PIU was not satisfied over the performance of the Sr. Environmental Specialists and so they (BR) required his replacement. Only 2 Jr. Environmental Specialist are left to carry out the task of overseeing the EMP implementation. The CSC Resident Social, Resettlement and Gender Specialist had been temporarily assigned by CSC to support the 2 Jr. Environmental Specialist while awaiting the mobilization of Dr. Kabile Hossain's (Sr. Environmental Specialist) replacement. The CSC Resident Social, Resettlement and Gender Specialist is also a practicing international Environmental Specialist providing services to ADB, World Bank and JICA projects. There has been unofficial report that the Sr. Environmental Specialist nominated by CSC to BR for consideration has been approved by the MoR Secretary, as well as other CSC nominees. The Project will await the issuance of the formal approval letter by MoR on the proposed Sr. Environmental Specialist.

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 work.

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

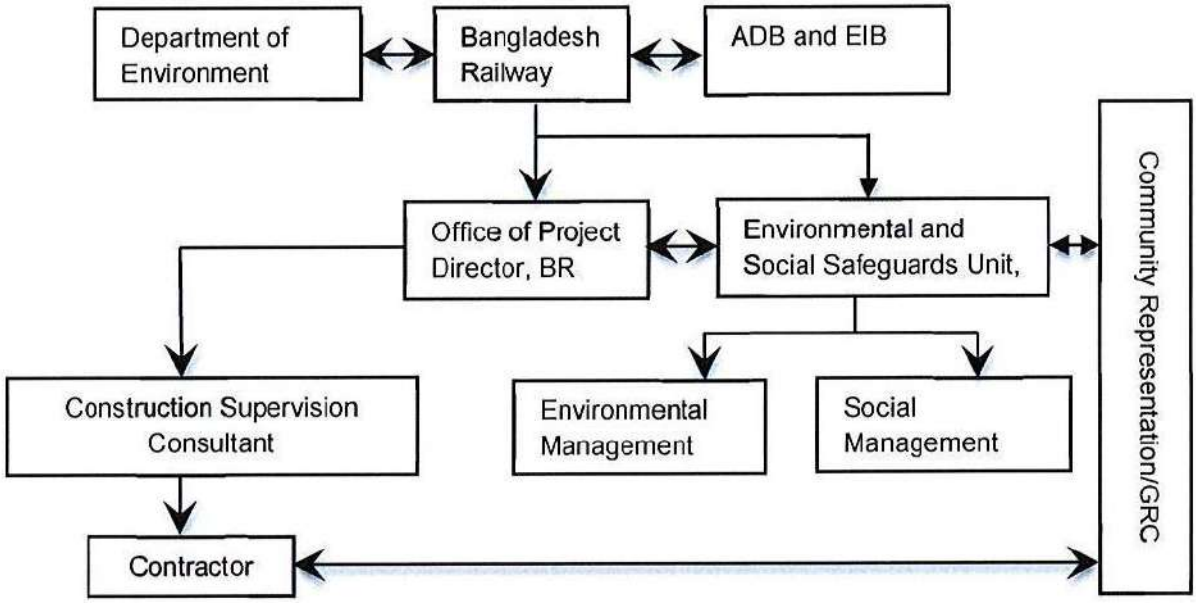
environment agency. The results of the environmental quality sampling is compared to prescribe government environmental quality thresholds to determine compliance to set standards. Exceedance to government standards is provided with explanation and recommendations for action when necessary.

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 seedlings and less intense heat that can dry up the young plants. Dead out planted seedlings are promptly replaced by good quality ones also during the rainy months. The CSC is responsible for monitoring the performance of the compensation tree planning due to the inability of EQMS to carry out this task.

30. 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

31. 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.

32. 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 mitigative measured 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. Mitigative 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.

33. 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.

34. 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

35. 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 Cumilla. 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.

36. 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

37. 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.

38. 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 Planting which is being implemented by the Gomti Nursery. Details of the EQMS scope of work is found in the subsequent paragraphs.

39. Since the issuance of the "Notice to Proceed" issued 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 temporary Environmental Engineer), for submission to the Employer and subsequently forwarded to ADB for information and uploading to the ADB website in line with its transparency policy.

40. Since the start of the Project, a total of 81 reports have been prepared, which includes: 56 monthly environmental reports; 15 Quarterly Environmental Reports; 8 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

41. 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, preserved using ice, and transported to the government accredited laboratory for analysis following standard methods.

42. 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

43. The surface water sampling for 4 sites (Haora River, Gomti River, Sindai River, and Goniajuri River) were done during in dry months from January to April 2021; while the last surface water site (Salda River) was sampled during the rainy month of May 2021. Since the rainy season was just starting, the water samples taken during the month of May did not show any significant increase in total suspended solids (TDS) load as compared to those samples taken during the 4 dry months. The limited rainfall was not plentiful enough to produce surface water run-off that can carried with it sediments from upstream agricultural lands with relatively lose soil, as well possibly the excavated materials from Project construction sites.

44. It can be noted that the dissolved oxygen (DO) level on which local fisheries are dependent for their respiration, are compliant to the minimum threshold concentration of 5 mg/l. Domestic waste water from upstream residences and agricultural waste from adjacent farm that had been possibly discharged into the water ways may have been minimized as indicated by the relatively low BOD_5 between 3.1 to 0.3 mg/l. TDS level of the Goniajuri river still remains relatively high at 180 mg/li upstream and 170m mg/li downstream which is consistent with last Semi-Annual report figures and has values doubled the TDS level of the next River with high TDS. With regards to the parameter of pH, it can be observed that the test results would indicate compliance to the set pH levels. The quality of surface water tested and analyzed in the project area is provided in the following **Table 2.1.**

Table 2.1. Surface Water Quality in the Study Area during January – June 2021

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 2021										
1	SWQ-1	Haora River Water (Upstream)	7.11	22.5	0.16	80	8.2	0.3	21	53
2	SWQ-2	Haora River Water (Downstream)	7.07	23.2	0.16	80	8.3	0.3	26	84
February 2021										
1	SWQ-1	Gomti River Water (Upstream)	7.79	23.6	0.13	60	6.2	0.8	27	82
2	SWQ-2	Gomti River Water (Downstream)	7.87	23.6	0.13	70	6.5	.08	21	108
March 2021										
1	SWQ-1	Sindai River Water (Upstream)	6.52	29.7	0.12	60	6.6	3.1	31	164
2	SWQ-2	Sindai River Water (Downstream)	6.57	29.6	0.13	60	5.6	1.2	43	116
April 2021										
1	SWQ-1	Goniajuri River Water (Upstream)	7.12	28.5	0.36	180	6.2	1	31	94
2	SWQ-2	Goniajuri River Water (Downstream)	7.12	28.4	0.35	170	6.5	1.2	34	93
May 2021										
1	SWQ-1	Salda River Water (Upstream)	6.63	29.3	0.08	40	8.4	1.4	16	65
2	SWQ-2	Salda River Water (Downstream)	6.52	29.2	0.07	40	7.5	1.5	14	68

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).*

2.1.2 Ground Water Quality

45. The analysis of groundwater samples taken from the selected stations had indicate that all comply with Bangladesh Standards. It can be noted that the test results values for the parameter manganese and iron which in the previous Semi-Annual report was none compliant, this reporting time the test results yield compliant figures. It can be noted that the previous Semi-Annual report covered mostly rainy months, which caused an increase rain water infiltration of the underlying aquifer. This event may have caused a resuspension of more heavy metals into the groundwater. As has been discussed in the previous Semi-Annual Report (July-December 2020) it is unlikely that any of the contamination to the ground water can be attributed to the Project due to the following: a) no deep excavations are performed in the Project with the exception of driving a few concrete piles (16-25m long) into the ground of some stations to strengthen their foundation; b) existing tube wells used to draw ground water is about 750 ft (228m) deep; c) Manganese and iron are typical contaminants in "hard water" which can be found throughout the country; d) the absence of fecal coliform in the samples indicate that any seepage from surface excavations such as septic tanks are not able to reach the deep aquifer, in which the tube wells from where the samples are taken. A study published by IEB found that 78.9% sources of ground water in Chittagong division has higher Manganese concentration than Bangladesh standard. The quality of groundwater tested and analyzed in the project area is provided in the following **Table 2.2.**

Table 2.2. Ground Water Quality in the Study Area during January – June 2021

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 2021									
1	GWQ-1	Rajapur Railway Station	6.60	26.2	1.2	0.04	<0.01	0.01	0
2	GWQ-2	Akhaura Railway Station	6.53	27.3	1.4	0.03	<0.01	0.14	0
February 2021									
1	GWQ-1	Sadar Rasulpur Railway Station	6.90	26.9	0.1	0.02	<0.01	0.09	0
2	GWQ-2	Gangasagar Railway Station	6.62	27.6	0.2	0.1	<0.01	0.08	0
March 2021									
1	GWQ-1	Cumilla Railway Station	6.71	32.5	0.8	0.05	<0.01	0.13	0
2	GWQ-2	Kasba Railway Station	6.59	27.3	1.1	0.03	<0.01	0.97	0
April 2021									
1	GWQ-1	Mainamati Railway Station	6.90	29.0	1.5	0.02	<0.01	0.02	0
2	GWQ-2	Mandabag Railway Station	6.80	28.5	0.8	0.05	<0.01	0.75	0
May 2021									
1	GWQ-1	Lalmai Railway Station	6.76	31.1	0.2	0.01	<0.01	0.42	0
2	GWQ-2	Saldanodi Railway Station	6.60	26.8	0.3	0.01	<0.01	0.26	0
		Bangladesh Standard Error! 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

46. 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. Eight (8) sets of samples were taken during the dry months of January to April; while two (2) sets of samples were taken during the start of the rainy months of May. The ambient status of major air pollutants such as Particulate Matter (SPM, PM_{10} and $PM_{2.5}$), Sulfur Dioxide (SO_2), Oxides of Nitrogen (NOx), and Carbon Monoxide (CO) have been covered in the monitoring work. Sampling time varies depending on the parameter, where $PM_{2.5,}$ PM_{10}, SO_2, NO_x 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. Nevertheless, the contractor still needs to carry out the anti-pollution and dust control measures most especially at the start of the dry months (November) on which much dust are normally generated at the Project site especially at the Block Cotton Zone area. **Table 2.3** below contains the ambient air quality monitoring test results from selected stations for the period January – June 2021.

Table 2.3. Air Quality monitoring during January – June 2021

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_3 ppm
January 2021							
AAQ-1	Rajapur Railway Station	31.18	43.56	101.64	2.86	14.23	0.03
Baseline Status	Rajapur Railway Station	12.47	26.81	63.21	2.91	10.43	<2
AAQ-2	Akhaura Railway Station	42.92	69.30	139.88	3.39	32.94	0.03
Baseline Status	Akhaura Railway Station	26.85	61.53	105.72	5.27	17.45	<2
February 2021							
AAQ-2	Gangasagar Railway Station	18.44	39.71	66.12	23.48	20.31	0.11
Baseline Status	Gangasagar Railway Station	22.73	49.97	98.46	2.95	12.39	<2
AAQ-1	Sadar Rasulpur Railway Station	24.15	51.73	74.11	9.06	6.38	0.12
Baseline Status	Sadar Rasulpur Railway Station	11.32	27.76	48.57	2.41	12.57	<2
March 2021							
AAQ-1	Cumilla Railway Station	42.56	68.27	121.35	9.74	6.12	0.07
Baseline Status	Cumilla Railway Station	24.87	56.98	96.79	4.95	14.86	<2
AAQ-2	Kasba Railway Station	25.76	27.73	72.86	6.13	16.79	0.03
Baseline Status	Kasba Railway Station	10.95	25.56	49.52	3.73	11.46	<2
April 2021							
AAQ-1	Mainamati Railway Station	14.96	15.54	41.45	2.41	21.03	0.08

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_3 ppm
Baseline Status	Mainamati Railway Station	18.75	42.45	78.48	3.63	14.78	<2
AAQ-2	Mandabag Railway Station	12.95	22.93	36.17	2.04	4.40	0.01
Baseline Status	Mandabag Railway Station	14.43	33.93	59.18	3.11	12.83	<2
May 2021							
AAQ-2	Saldanodi Railway Station	9.03	15.87	33.73	2.56	11.27	0.05
Baseline Status	Saldanodi Railway Station	7.91	19.79	34.69	2.76	9.58	<2
AAQ-1	Lalmai Railway Station	16.21	24.34	45.16	3.01	12.31	0.03
Baseline Status	Lalmai Railway Station	13.45	29.87	53.98	3.79	11.23	<2
Bangladesh Standard**Error! Bookmark not defined.**		**65**	**150**	**200**	**365**	**100**Error! 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

47. Ambient noise levels have been monitored from 11 railway stations of the ALDLP project 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 2.4.** Noise level measurement was done continuously for only 4 hours per monitoring site instead of the DOE prescribed 24 hours period. 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.

48. 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. Two of these sites are BR station mosques (Akhaura and Cumella) that are located in the parking lot of the respective stations. 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. The next train station and adjacent Rail Mosque where the noise level slightly exceeded the threshold for mixed use area is the old Mainamati train station. It can be noted that at the time of the noise level monitoring, there was an on-going earthwork adjacent to the sampling site about 5 m from the monitoring instrument. The noise meter would have picked up these construction noise. Once the old station would have been demolished to give way to the parking lot, the small old mosque will be expose to the noise from the railway track. One possible attenuation measure is the planting of trees between the Mosque and the track to

help reduce the noise level. The last affected rail mosque is located near the Lalmai Station and the construction yard of CTM JV. The excessive noise would have come from the construction yard where equipment are being maintained or repaired, as well as a batching plant is located. One possible attenuation measure is to plant trees between the construction yard and the mosque. The space beside the yard's perimeter wall can be a good site to plant the trees.

49. The methodology employed by EQMS does not comply with existing DOE prescribed methods specifically the duration of the continuous noise measurement. The correct duration should be 24 hours continuous and not the 4 hours as performed by the third-party monitor. Subsequent noise monitoring should comply with the prescribed regulation else they would not be compensated for their noise monitoring efforts. The results of noise level monitoring is given in **Table 2.4**.

Table 2.4. Results of noise level monitoring during January – June 2021

Month		Sampling Code	Location	Leq dB(A)[4]	Baseline Status	Zone[5]	Bangladesh Standard at day Time dB (A)	Remarks
Jan 21	1	ANL-1	Rajapur Railway Station	53.64	66.84	Mixed	60	compliant
	2	ANL-2	Rajapur Railway Station Jame Mosque	48.83	60.98	Silent	50	compliant
	3	ANL-3	Akhaura Railway Station	59.18	66.23	Mixed	60	compliant
	4	ANL-4	Akhaura Railway Station Jame Mosque	57.41	55.80	Silent	50	Not compliant
Feb 21		ANL-1	Sadar Rasulpur Railway Station	59.29	63.51	Mixed	60	compliant
		ANL-2	Sadar Rasulpur Railway Station Jame Mosque	47.18	52.25	Silent	50	compliant
		ANL-3	Gangasagar Railway Station	57.64	55.06	Mixed	60	compliant
		ANL-4	Gangasagar Railway Station Jame Mosque	48.13	55.51	Silent	50	compliant
March 21		ANL-1	Cumilla Railway Station	56.07	72.68	Mixed	60	compliant

Month		Sampling Code	Location	Leq dB(A)[4]	Baseline Status	Zone[5]	Bangladesh Standard at day Time dB (A)	Remarks
		ANL-2	Cumilla Railway Station Jame Mosque	54.18	66.10	Silent	50	Not compliant
		ANL-3	Kasba Railway Station	56.41	54.65	Mixed	60	compliant
		ANL-4	Kasba Railway Station Jame Mosque	49.73	NR	Silent	50	compliant
April 21		ANL-1	Mainamati Railway Station	64.73	74.99	Mixed	60	Not compliant
		ANL-2	Mainamati Railway Station Jame Mosque	58.39	65.20	Silent	50	Not compliant
		ANL-3	Mandabag Railway Station	54.28	54.64	Mixed	60	compliant
		ANL-4	Mandabag Railway Station Jame Mosque	49.21	54.74	Silent	50	compliant
May 21		ANL-1	Lalmai Railway Station	59.77	64.13	Mixed	60	compliant
		ANL-2	Lalmai Railway Station Jame Mosque	53.64	59.12	Silent	50	Not compliant
		ANL-3	Saldanodi Railway Station	57.26	62.49	Mixed	60	compliant
		ANL-4	Ganganagar Jame Mosque	49.04	55.82	Silent	50	compliant

[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

50. 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 this measures be incorporated into the bid documents as among the scope of work by the contractor.

51. 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 monitoring. The third party monitor called EQMS is also be 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 to the EMP.

52. In response to the comments of ADB on last year's 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 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 are 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.

53. 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 (stations – 4, bridges – 3, culvert – 14, 5 km track/embankment – 5); Section 2 has 25 components (stations – 4; bridges – 5, culverts – 11, 5 km track/embankment – 4, and 1 plant nursery) while Section 3 has 32 components (stations – 5, bridges – 4, culverts – 18, 5 km track/embankment – 5). More details on the new Environmental monitoring system will be discussed in later chapters of this report.

3.2 EMP Progress Status During January – June 2021

3.2.1 Overall EMP Compliance Status

54. Overall, the Project is evaluated as compliant to the approved EMP with an overall average rating of 4.8 points. Under the new reporting system, a score greater than or equal to 4 points (> 4 points) is considered compliant to EMP. A score that is less than 4 points but greater than 3 (>3 and <4) is considered as partially compliant. However a score less than 3 points (< 3) is non-complaint. It is only in the aspect of dust control that an overall average points of 3.5 meaning partially compliant was recorded. Such rating is similar to all Project Sections. Table 2.5 contains the overall summary of EMP compliance.

55. The evaluation of the Contractor's performance in complying with the EMP covered the whole Project site and its 83 components. Table 2.6 contains the summary of the Contractor's compliance to the EMP per section, while Annex 1 contains the full evaluation table covering all of the 83 Project components, per EMP mitigation measure.

Table 2.5. SUMMMARY EVALUATION OF COMPLIANCE TO
ENVIRONMENTAL MANAGEMENT PLAN AS OF MAY 2021

S.I.	GENERAL MITIGATION	SECTION 1		SECTION 2		SECTION 3		OVERALL	
		RATING	REMARKS	RATING	REMARKS	RATING	REMARKS	RATING	REMARKS
1	Noise and Attenuation Measures	4.9	Compliant	4.9	Compliant	4.9	Compliant	4.9	Compliant
2	Dust Control	3.4	Partially compliant	3.7	Partially compliant	3.4	Partially compliant	3.5	Partially compliant
3	Watercourse Impacts in Wetlands/Ponds/Rivers	5.0	Compliant	5.0	Compliant	5.0	Compliant	5.0	Compliant
4	Borrow and Dredging Site Impacts	5.0	Compliant	5.0	Compliant	5.0	Compliant	5.0	Compliant
5	Disposal of Construction Debris and other Waste Materials	4.9	Compliant	4.9	Compliant	5.0	Compliant	4.9	Compliant
6	Servicing and Operating Equipment	5.0	Compliant	5.1	Compliant	5.0	Compliant	5.0	Compliant
7	Control of Petroleum Products	4.8	Compliant	5.0	Compliant	4.9	Compliant	4.9	Compliant
8	Protection of Topsoil and Soil Erosion	5.0	Compliant	5.2	Compliant	5.0	Compliant	5.1	Compliant
9	Occupational Health and Safety	4.4	Compliant	4.5	Compliant	4.3	Compliant	4.4	Compliant
	AVERAGE RATING	4.7	Compliant	4.8	Compliant	4.7	Compliant	4.8	Compliant

Table 2.6. SUMMARY OF COMPLIANCE TO EMP PER SECTION

MITIGATTION MEASURES			EMP COMPLIANCE STATUS					
			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
1	**Noise and Attenuation Measures**							
	1	Use of modern plant and equipment.	5.0	Compliant	5.0	Compliant	5.0	Compliant
	2	All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	4.7	Compliant	4.6	Compliant	4.7	Compliant
	3	Locate rock crushing, concrete 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, religious 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.	4.9	Compliant	4.9	Compliant	5.0	Compliant
	6	Noise quality monitoring to be carried out as per the schedule in the environmental monitoring plan.	4.9	Compliant	5.0	Compliant	5.0	Compliant
		Average Rating	4.9	Compliant	4.9	Compliant	4.9	Compliant
2	**Dust Control**							
	1	Vehicles transporting construction material to be covered	1.0	Non Compliant	1.0	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	5.0	Compliant	5.0	Compliant
	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.	3.0	Partially Compliant	3.0	Partially Compliant	3.0	Partially Compliant
	5	Dust masks to be provided to workers where dust hazards exist.	1.0	Non Compliant	1.0	Non Compliant	1.0	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	5.0	Compliant
	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 by watering, sweeping or other measures approved or directed by the Engineer	3.0	Partially Compliant	3.0	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 accidental spillage of petroleum products, contact of such materials with soil or water course through discharge run-off, and or seepage	4.8	Compliant	5.0	Compliant	5.0	Compliant

MITIGATTION MEASURES			EMP COMPLIANCE STATUS					
			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	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 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	3.0	Partially Compliant	5.0	Compliant	3.0	Compliant
		Average Rating	3.4	Partially Compliant	3.7	Partially Compliant	3.4	Partially Compliant
3	**Watercourse Impacts in Wetlands/Ponds/Rivers**							
	1	Adequate mitigation measure shall be undertaken to limit the impact on all water bodies within the Project area	5.0	Compliant	5.0	Compliant	5.0	Compliant
	2	Earth moving in the vicinity of watercourses shall be kept to a minimum to avoid sedimentation and contamination 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 bridges/ culverts shall be ensured not to block stream flow.	5.0	Compliant	5.0	Compliant	5.0	Compliant
	4	Temporary erosion and sedimentation 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/culverts by implementing appropriate mitigation measure.	5.0	Compliant	5.0	Compliant	5.0	Compliant
		Average Rating	5.0	Compliant	5.0	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	5.0	Compliant
		Average Rating	5.0	Compliant	5.0	Compliant	5.0	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.	4.8	Compliant	4.5	Compliant	5.0	Compliant
	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.	5.0	Compliant	5.0	Compliant	5.0	Compliant

MITIGATTION MEASURES			EMP COMPLIANCE STATUS					
			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	4	All disposal areas shall be finally graded to a uniform and level condition and left such that they create a minimum impact on the surrounding area.	5.0	Compliant	5.0	Compliant	5.0	Compliant
		Average Rating	4.9	Compliant	4.9	Compliant	5.0	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	5.0	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	5.0	Compliant	5.0	Compliant
	3	Fuel spills will not be condoned and care shall be taken to avoid overfilling machines.	5.0	Compliant	5.0	Compliant	5.0	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.	5.0	Compliant	5.0	Compliant	5.0	Compliant
	5	The Contractor shall have oil spill abatement equipment on the Site at all times.	5.0	Compliant	5.0	Compliant	5.0	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	5.0	Compliant	5.0	Compliant
	7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	4.7	Compliant	4.8	Compliant	4.7	Compliant
		Average Rating	5.0	Compliant	5.0	Compliant	5.0	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	5.0	Compliant	4.9	Compliant
		Average Rating	4.8	Compliant	5.0	Compliant	4.9	Compliant
8	**Protection of Topsoil and Soil Erosion**							
	1	Topsoil storage areas must be protected during the dry season from wind erosion by covering.	5.0	Compliant	5.0	Compliant	5.0	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

MITIGATTION MEASURES			EMP COMPLIANCE STATUS					
			Section 1		Section 2		Section 3	
			Rating	Remarks	Rating	Remarks	Rating	Remarks
	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	5.0	Compliant
9	**Occupational Health and Safety**							
	1	Supply of appropriate personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles and ear protection among the workers and enforce its use.	3.0	Partially Compliant	3.1	Partially Compliant	2.4	Non-Compliant
	2	Follow the specification on construction safety as defined in civil works	5.0	Compliant	5.0	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.	3.0	Partially Compliant	2.7	Non-Compliant	2.6	Non-Compliant
	4	Must not hire child labor, age below 14	5.0	Compliant	5.0	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 workers 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	5.0	Compliant	5.0	Compliant
	6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	4.5	Compliant	4.6	Compliant	4.4	Compliant
		Average Rating	4.4	Compliant	4.5	Compliant	4.3	Compliant
		Overall all Rating	4.3	Compliant	4.3	Compliant	4.3	Compliant

3.2.2 Noise Attenuation Measures

56. 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 EQMS. The third-party monitor had indicated that all of the 6 prescribed measures had generally complied with 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; and provision of ear protection to workers exposed to extreme noisy environment.

57. There are however, some areas however were individually have partial compliance observed and these are in the provision of noise abating measures to mechanical equipment used in the construction site which includes 14 out of 83 components found in Section 1 (Lalmai Station, Mainamati station, Comilla Station and Bridge 231), Section 2 (Sadar Rasulpur, Rajapur, Shashidal and Saldanadi Stations; and Bridge 243) and in all of Section 3 stations (Mandabag, Quasba, Imambari, Gangasagar and Akhaura Station).

58. Lalmai station and Bridge 243 (Section 2) have also been observed to have partial compliance to a number of noise attenuation measures. These partial compliance for Lalmai Station include: inadequate installation of noise abating gear for plant and equipment,

provision of ear protection in noisy working environment and the conduct of regular noise monitoring. In Bridge 243 however, the contractor has also the same noise attenuation deficiency as in the Lalmai Station, as well as the non-relocation of rock crushing, concrete mixing and aggregate storage facilities away from residential areas.

3.2.3 Dust Control

59. EQMS had noted that only 1 (11%) of 9 measures prescribed had been fully complied, while the rest (8 or 89%) had only partially complied with by the Contractor. It is only the monthly air quality monitoring that had been fulfilled for selected stations. The other measures such as covering of materials being transported, proper maintenance of construction equipment, regular watering of material stock piles and/or open areas; and avoiding the use of spent petroleum products as dust suppressant had only partially complied with. For this coming dry season, it is essential that dust suppression measures be properly applied, most especially with the anticipated full blast construction work due to the favorable working condition. **Table 3.2** 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.

60. In determining the fulfillment of Clause 3.3 of the EMP which is dust suppression, a review of the Contractor's average performance per mitigation measure was performed. The review reveal that the deficiency in the Contractor's implementation of their dust control measure can be traced to their: a) failure to cover trucks hauling excavated/waste materials; and b) non-supply of face mask to workers exposed to dust resuspended by moving vehicles. Partially complied measures are in the form of: a) non-submission of a dust suppression program; b) inadequate dust suppression measures implemented at site such as watering of dusty haul roads, proper storage of excavated materials, prompt hauling of unsuitable materials to permanent disposal sites, etc., and c) the contractor to exhaust all means to minimize generation of dust in the workplace and to the adjacent residential/institutional areas. Table 2.6 contains the summary compliance to EMP per major mitigation measure, per Section.

61. Further 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 provide appropriate dust mask for affected construction workers in all the 83 project components, be it stations, bridges, culverts, or track/embankment works. The reporting period is mostly dry months and unnecessary exposure to dust and the heat of the sun can be hazardous for the construction workers.

62. The other mitigation measures under Dust Control had been judge as compliant to the EMP. These compliant activities include: a) construction equipment are properly maintained in good working conditions; b) machineries emitting visible smoke are banned from the construction site; c) air quality monitoring are carried out following the environmental monitoring plan.

3.2.4 Watercourse Impacts in Wetlands/Ponds/Rivers/Canals

63. During the reporting period, it was observed that all of the 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) proper and prompt disposal of construction wastes; d) temporary erosion and sedimentation control measures are installed during rehabilitation of drainage structures; and e) construction materials and waste are not dumped into water courses and are deposited into designated disposal areas. 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.

64. The issue of water course contamination by construction activities is expected to increase during the next 4 months since these will be conducted mostly during the rainy season. Nevertheless, construction sites adjacent to permanent waterbodies such as rivers or ponds; should still experience pollution preventive measures from the Contractor during this period (January-June 2021).

3.2.5 Borrow and Dredging Site Impacts

65. 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

66. All of the 4 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) man-made construction related debris were properly deposited in disposal areas, d) discarded waste were properly covered with earth before abandoned in a manner that blends with the surrounding environment. However, there were still individual partial compliances in 9 components. These involve debris that were sometimes left lying on the surface of the ground, pond or buried in agricultural areas. The areas where this partial compliance was observed was at the 3 Section 1 stations (Lalmai, Mainamati and Comilla), and 4 Section 2 stations (Sadar Rasulpur, Rajapur, Shashidal, and Salda Nadi stations) and 2 bridge sites (Bridge 243 & 246), Proper implementation construction waste management is an important measure that needs to be fully complied with by the contractor. It is for this reason that close monitoring not only by EQMS but also CSC need to be done, and corrective measures need to be acted upon by the Contractor.

3.2.7 Servicing and Operating Equipment

67. 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.

68. However, the last mitigation measure under the servicing and operating equipment (proper disposal of used oil, lubricants, tires, etc), were not complied in 2 stations (Lalmai and Quasba) and partially complied in the other 10 stations with the exception of Comilla Station. Lalmai and Quasba stations are the location of CTM JV's 2 main construction yards that among others have a garage to maintain construction equipment and vehicles. Waste oil and other petroleum products are collected and temporarily stored in these facilities to await their collection for proper treatment/disposal by a licensed contractor. The spent oil/lubricants are kept in steel drums, and stored in concrete floor with roofing. There were instances observed that spillages occur in the storage area maybe due to mishandling of the drums, and clean-up takes time to be completed. The contractor needs to promptly respond to waste oil spillages and ensure regular collection and proper disposal waste oil, tires and the like.

69. For other hazardous waste such as broken equipment parts, rusting reinforcement bars and other metallic construction waste materials, these are normally 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

70. 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 (78 or 94%) of the construction sites and yards where petroleum products are stored, comply with the measure. There are however, still some areas that need to have adequate storage facility for their petroleum products these include Lalmai and Quasba stations. The Contractor needs to ensure that this measure is strictly followed at site, else arrangements will have to be made for sites with no adequate petroleum storage facility to store their fuel/lubricants/other petroleum products in other nearby sites with compliant storage facilities and carefully retrieve them when needed. 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

71. 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 are in the supply and proper utilization of Personal Protective Equipment (PPE). While CTM JV provides the PPEs, however, its proper utilization 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. Section 3 has garnered a non-compliant rating for PPE use. 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 workers with no properly worn PPE from working. Habitual violators of the PPE wearing rule to be suspended from work.

72. Also observed is the lack of orientation in general health and safety matters especially on specific occupational hazards. This is especially true for new recruits to the construction work. Workers engaged in hazardous work such as welding, working in high places such as building roofing fabrication, installation of elevated concrete water tanks, painting multi-story buildings, etc. need to be properly oriented on their assigned tasks, the risk their job entails, as well as the safety measures in place to managed these risks. It has been observed that welders and their assistants perform their work without eye protection nor safety gloves and shoes. Steel fabricators and painters can be seen working on elevated areas with barely no harness to prevent them from falling.

73. Annex 1 would show that the Contractor has not complied with workers properly wearing PPE requirement in Section 3 specifically in all of its 5 stations (Mandabag, Quasba, Imambari, Gangasagar, and Akhaura), 3 bridges (bridge 262, 263 and 272) and 3 culvert sites (culvert 256, 264 and 266). The rest of Section 1 and 2 have rated the Contractor to only partial compliance.

74. With respect to the inadequate orientation of workers on the hazards of their work, this deficiency have been observed in Section 2 specifically 2 stations (Shashidal and Salda Nadi) and 5 bridge sites (bridge 243, 246, 249, 259 and 261) and in Section 3 specifically in 5 stations (mandabag, Quasba, Imambari, Gangasagar, and Akhaura), and 3 bridge sites (Bridge 262, 263, and 272). All the rest of the 83 component sites have a partial compliance rating.

75. 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.

3.2.10 Protection of Topsoil and Soil Erosion

76. 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

77. 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

78. 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 proposed Tree Plantation and Replacement Program (TPRP) 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 50mm 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

79. Under ALDLP, tree plantation establishment had commenced in the middle of the month of June 2020. Contractor has targeted to plant 108,000 saplings during the rainy months of June- to August 2020. Gomuti Nursery had been contacted by CTM JV to implement the program. Plantation site preparation (i.e. site clearing, hole digging, etc.) was supposed to commence before June 2020 starting from zero point at Laksam (Chainage 130+700). But due to COVID-19 pandemic lockdown, site preparation activities could not start on time. As a result, the set target could not be achieved.

80. It was unfortunate that due to internal financial problem within the Contractor CTM, maintenance and protection works could not be adequately supported, which resulted in a low survival rate in the established plantations. Activities were affected include: a) deployment of watch guards tasked to protect the plantation from physical damage cause by grazing domestic animals or fire; b) maintenance work which entails weeding and supplemental fertilization of the planted saplings that were also not possible which resulted in the poor growth and sickly tree saplings; and c) poorly installed plastic net fences having thin bamboo stick support. Partly responsible for the low plantation survival rate was the shallow pit dug on

which the saplings were planted, rendering relatively limited amount of organic fertilizer to be applied to the plantation.

81. From the total of 45,882 saplings planted, only about 13,900 are alive which yield a low survival rate of 30.3%. Section 1 & 2 has a higher number of planted and surviving tree saplings at 37,500 and 13,000 respectively, which yielded a survival rate of 34.67%. Section 3 on the other hand had a relatively smaller number of trees saplings planted and surviving at 8,382 and 900 respectively, which yielded a survival rate of 10.74%. Contract specification requires about 80% survival and so the existing plantation is not acceptable and will require extensive rehabilitation. Table 3.9 contains the current status of last year 2020 established plantation, as well as the planned targets for the 2021 plantation.

82. In conformity with the Contract specifications, a draft Site-Specific Tree Plantation Establishment and Rehabilitation Plan was prepared by the Contractor in cooperation with the CSC Environment team. The plan calls for the planting of 87,500 tree saplings, of which 57,000 saplings are for the new tree plantation, while 32,500 are for the replacement planting of dead tree saplings. The Contractor is aiming for at least 90% survival as per recommendations of ADB. To help insure that the planned targets are met, the Contractor intends to hire additional personnel to serve as plantation watch guard and maintenance person tasked to do the ring weeding and fertilization of the planted saplings until the plantation is handed over to the Employer. **Annex 2** contains the Site Specific Tree Plantation Establishment and Rehabilitation Program.

Table 3.1 Status of Current Tree Plantation and Planned 2021 Plantation Program

S.I.	Major Activity/Details	Unit	Section 1 & 2			Section 3			TOTAL
			2020 (actual)	Jan-Jun 2021 (planned)	Total	2020 (actual)	Jan-Jun 2021 (planned)	Total	
I.	PLANTATION ESTABLISHMENT								
1	Site clearing, staking, hole digging	Holes	38,400	57,000	95,400	11,300	30,000	41,300	136,700
2	New Tree Planting	Saplings	37,500	27,500	65,000	8,382	30,000	38,382	103,382
3	Live trees	Saplings	13,000	27,500	40,500	900	30,000	30,900	71,400
4	Survival rate	%	34.67%	100.0%		10.74%	100.0%		
II	PLANTATION MAINTENANCE & PROTECTION								
1	Replacement Tree Planting	Saplings	5,100	29,500	34,600	1,000	3000	4,000	38,600
2	Fencing	km	40	33.75	73.75	9	24,675	24,684	24,758

IV. Compliance to Environment Related Project Covenants

4.1 Compliance with National Environmental Laws

83. 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

84. 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

85. 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

86. 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 – June 2021 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 – June 2021.

Landscaping and Site Restoration

87. During site inspection it was found that, aside from the borrow areas which have been turned over to local operators for use as fishponds, landscaping had been partly executed. Earthworks for embankment and bridges still are not yet completed, as well completion of works in the stations involving the station buildings, platforms and platform sheds, pedestrian foot over bridges and the signaling system. As such, cleaning up of surplus materials along the embankment and track, and its tidy storage at approved temporary storage sites is required as well as the cleaning up of all the station yard areas and approaches of construction debris. Some clearing of channels and removal of construction debris is also required at some of the bridge sites, but this can only be done after the monsoon season when the river water levels have dropped. Once these sites are cleared of debris, then the compensation tree plantation program can come in and install appropriate tree saplings that will improve the aesthetics of the place.

V. Corrective Action Plan

88. 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	Responsible Party	Time Line (Deadline)
	General	Specific					
I. SECTION 1, 2 and 3							
1.1	Noise and Attenuation Measures	All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	Lalmai, Mainamati, Cumilla Railway Station, Saldanodi, Shoshidol, Quasba, Gangasagar Station/ construction area	Lack of noise abating gear	Installation of noise abating gear on power equipment required. Planting of trees as noise barrier for "quiet areas" affected by Project generated noise.	CTM-JV	30-Jul-21
1.2	Dust Control	Vehicles transporting construction and waste material to be covered	All locations	No cover of vehicles during transporting construction and waste material	Vehicle should be covered properly during transporting construction and waste material	CTM-JV	15-Jul-21
1.3	Dust Control	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 used.	All locations	Lack of dust suppression program to minimize dust generation	The frequency of water spraying need to be revised according to the need assessment in sensitive working site where people have excessive access	CTM-JV	15-Jul-21
1.4	Dust Control	Dust masks to be provided to workers where dust hazards exist.	All locations	Lack of dust masks	Dust mask to be provided to the workers as need basis	CTM-JV	15-Jul-21
1.5	Disposal of Construction Debris and other Waste Materials	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	Lalmai, Mainamati, Cumilla Railway Station, Saldanodi, shoshidol, Quasba, Gangasagar Station/ construction area	Improper management of construction debris	Construction debris should be promptly collected, stored in appropriate sites, and deposited in authorized location.	CTM-JV	15-Jul-21
1.6	Servicing and Operating Equipment	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	Lalmai, Quasba,	Improper disposal of used oil, lubricants and tires	Proper disposal of used oil, lubricants, tires require to be implemented. Contracted collector to regularly retrieved waste oils from site for proper treatment/disposal.	CTM-JV	15-Jul-21

S.I.	Mitigation Measure		Location of Non-Compliance	Nature of Non-Compliance	Corrective Action Prescribed	Responsible Party	Time Line (Deadline)
	General	Specific					
1.7	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.	Lalmai, 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.	CTM-JV	15-Jul-21
1.8	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.	All locations	Workers working with lack of proper PPE	Strict enforcement of PPE use in the workplace. Consider imposition of penalties for habitual violators.	CTM-JV	Immediate

VI. Other Issues

6.1 Time Allocation for CSC Environmental Specialists

89. 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.

90. At present, the task of the Resident Environmental Engineer was assigned to the Resident Social, Resettlement and Gender Specialist without additional compensation. The resignation of the Sr. Environmental Specialist in September 2020 had made the supervision of the Project's environmental concern a challenge, since the Resident Social, Resettlement and Gender Specialist also has other priority tasks to complete. A recent CSC Variation Order 3 had been proposed to the Employer for consideration which provides for additional time and cost for CSC engineers to continue their services up to the middle of 2022 in view of the time extension granted to the Contractor up to the same period. The time and cost allocated for the Jr. Environmental Specialist will allow their full time engagement, however, the multi-tasking Resident Social, Resettlement and Gender Specialist will be deployed on a part-time basis covering half of the extended time period. No time has been proposed for the Resident international Environmental Specialist. In this respect, it is essential that the replacement Sr. Environmental Specialist and the incoming Sr. Resettlement and Gender Specialist should be able to carry-on their respective tasks so that dependence on the Resident Social, Resettlement and Gender Specialist may be significantly reduced.

6.2 Establishment of the Environment and Social Safeguards Unit

91. 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 Adequacy of Institutional Arrangements for EMP Implementation

92. An annual workshop on EMP implementation cum performance review is proposed to be held in which ADB should be invited to participate. This activity may be held by the 2nd or 3rd week of December 2021. To operate effectively, the Engineer should have the direct authority to stop work and fine the contractor for not complying fully with the environmental contract clauses and EMP. The contractor should not be asked to provide presentations on project progress to the lender or BR without the involvement of the Engineer. It only stands to reason the self-reporting will not be impartial and likely miss many important issues. This situation may lead to future problems.

6.4 Monitoring Plan for Tree Plantation & Replacement Program

93. Items listed below are required to be monitored according to the approved Tree Plantation and Replacement Plan. CSC`s environment specialists will monitor closely whether these items are in practice and implemented properly.

Monitoring before Plantation

a. Monitoring of Species Selection - Species selection is very crucial. Species selection is according to approved TPRP or not to be monitored.
b. Monitoring of Source of tree planting stocks - Sapling source that is selected nursery should be monitored. Availability of saplings, their size, nursery management status, and nursery workers experience, number of workers both male and female should be monitored.
c. Monitoring of Sapling Types - Sapling types, sapling health, and mentioned ratio need to be monitored.
d. Monitoring of Sapling Size - Preferable sapling size would be 4 to 6 feet height to adapt new environment and survive against threats.
e. Monitoring of Plantation Area **-** Trees must be planted in both sides of the embankment slopes, Back side of station yards and culturally affected and sensitive areas.

Monitoring during Plantation

a. Monitoring of Size of Pits - Size of excavated pit should be 1ft x 1ft x1ft
b. Monitoring of Gap between Pits - Gap between each pit must be 2 meter.
c. Monitoring of Soil Preparation - Soil preparation with compost or decomposed cow dung and mix properly. Debris and weeds need to be removed during soil preparation.
d. Monitoring of Support Stack - Support stack is essential for trees for survive. Support stack must be removed after the firm establishment of trees.

Monitoring during Post Plantation

a. Monitoring of Watering and weeding - Saplings must be watered daily until they are strongly rooted. Regular weeding and clearing the surface surrounding the planted saplings must be maintained.

b. **Monitoring of Fencing -** Proper fencing must be ensured to protect the saplings from goat and cattle.

c. **Monitoring of Watch Guard -** Deploy watch guard throughout the plantation area, divide their watching area and time. Provide adequate number of watch guard according to plantation area.

d. **Capacity Building training -** At least 3 trainings need to be arranged for watch guard and workers. One training has been performed.

e. **Status of Planted trees -** Condition of planted tress must be inspected. A rating system will be followed while counting. According to the condition of planted trees five scale rating will clearly describe the status of trees. The scale includes –Very Good, Good, Fair, Weak and Dead.

f. **Monitoring of Tree Replacement -** Dead trees will be detected and ensure new sapling plantation for each dead tree as replacement.

g. **Monitoring of Counting of Trees -** The physical count enabled estimation of the actual number of surviving trees out of many planted sites. Through this count, each tree (s) reported to have been planted at any site by each respondent was physically checked in order to ascertain that the said trees were really planted and thereby being able to record the reliable survival rate of trees on that site. Physical count also helps identify the real species of the planted trees since some respondents were not aware of tree species that were planted. Per each site, only five transects will randomly be selected for physical count, and per each selected transect, both the number of empty holes and the number of surviving trees were recorded. These records help in calculating the survival rate of trees per that site given that the total number of planted trees was known. Below figure is a sketch of how physical count will be carried out in the field. The Statistical Package for Social Sciences (SPSS) and Microsoft Excel will be used to process the data.

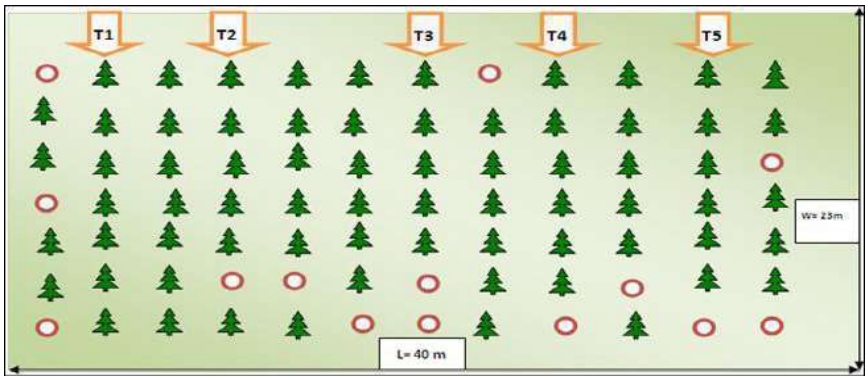


Figure 6.1 Graphical illustration of how physical count is carried out in the field

k. **Monitoring of post planting care conduction on newly planted trees -** Post-planting care to trees is important. One of the most important works are carrying out weeding, as weeding activity for tender trees is known to be the most important post-planting care for successful establishment of newly planted trees. The care taker should be instructed on proper tending techniques of young tree plantations. This is a great challenge that should really be addressed if higher survival rate and performance are to be achieved. Other important activities are watering, fencing/sheltering, low pruning, mulching, beating up etc.

6.5 Grievance Redress Mechanism

94. 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.

95. At present, no GRC has yet been created for the Project. This condition had been so since complaints related to the environment had been resolved at the Project level. The CSC Environment and Social Safeguards team also function as the grievance redress team at the project site level. Complaints related to safeguards are first referred to CSC by either the local people or the Contractor for resolution. 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.

96. During the reporting period, there were 2 community complaint that were resolved before these were elevated to the BR-PIU level. These entail the complaint of the local community at Sasangacha (chainage km154+175 to 155+125) and Datapur mouzas (chainage km 152+000), of possible water logging in their area due to the covering by the Project earthworks of their existing drainage canal. The leaders of the two local communities wrote letters to BR PIU expressing their grievance and even threatened to barricade the track in their area if their demands are not met.

97. The CSC Social Safeguards and Earthworks team went to the site with the Contractor, analyzed the situation and agreed to an engineering solution to the problem. Then the CSC Social Safeguards team met the concerned local community leaders, discussed the problem and presented the engineering solution. For the Datapur mouza cases, it was proposed that the earthworks can be adjusted such that about a meter wide drainage canal can still be constructed at the site parallel to the Project earthworks, thereby eliminating the waterlogging problem. For the Sasangacha issue, the proposal was for the Contractor to revise their construction drawing to include an earth drainage canal to be installed parallel to the track alignment but all within the BR ROW. However, for the case of Sasangacha, it is possible that there will be limited resettlement impact that may result in the construction of the drainage canal. The community members committed to resolve these issues by themselves and not demand compensation from BR. These resettlement impact involve the shifting of some tin boundary walls and tin sheds found along the canal alignment. Since there are enough space for where these light materials can be manually transferred, these issue was not significant to the local community to resolve. Both proposals by CSC was accepted by the local community, and all parted ways satisfied with the outcome. Attached as Annex 5 is the Minutes of the Meeting with the local community of Sasangacha mouza along with the quit claim that was signed by all EPs.

98. There was also the case during the reporting period where the Contractor's personnel were complaining on the operation of a cattle fattening farm adjacent to their accommodation. The workers complained of the foul odor emanating from the adjacent farm as well as the flies that dwell on the uncollected cow dung that may be carrying pathogens that may compromise their health. The workers were afraid to file a formal complaint since the owner of the cows was their superior. The case was secretly passed on to CSC Jr. Environment Specialist who reported the facts of the case to the RSRGS. A formal report of the case was sent to the CSC team leader who promptly instructed the Contractor Project Manger to act on the complaints of their workers by relocating the cows. **Table 6.1** contains a summary of the recorded complaints related to environment that the Project received and addressed at the site level.

6.6 Covid-19 Prevention Program

99. 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.

100. 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.

101. There have been about 14 reported positive cases of Covid-19 infection during the reporting period, all staff and no workers. Some of these patients were already fully vaccinated. The CSC has a total of 6 cases of which 5 had fully recovered while there is 1 still in home quarantine by the end of the reporting period. CTM JV has a total of 8 positive cases of staff being infected by the virus. All have fully recovered by the end of June 2021. The infected staff were given a choice on where they wish to be quarantined. Since the cases were less severe, the patients opt to have their respective quarantine done in their respective homes. **Table 6.2** contains the status of reported Covid-19 positive cases in the Project.

102. In view of the worsening pandemic situation in the country, all Project personnel had been advised to continue to observe government prescribed health protocols in the work place, during meetings and field inspections that may also involve high ranking Ministry, BR, ADB or other relevant government agencies. CSC has been active in reminding the Employer, contractor, subcontractors and visitors to strictly abide by government prescribed health protocols even if at times the reminder is being disregarded by BR officials and visitors for being too irritating. **Annex 3** contains photographs of the Covid-19 prevention measures in place.

Table 6.2. Status of Reported Covid-19 Positive Cases in the ALDLP

S.I.	Organization	Covid-19 Positive Cases		
		Total Cases	Recovered	Remaining Cases
1	CSC	6	5	1
2	CTM MAX	6	6	0
3	CTM TCCL	2	2	0
	Total	14	13	1

Table 6.1. Complaints Registered

Complaint Number	Date	Complaint through (phone/letter /site)	Name of Complainer	Complaint Details	Action Taken by Contractor/PMU/CSC	Date- case resolved (days required)	Remarks-further action, if any
Section 1							
1	15 May 2021	Mobilephone	Councillor Shahalom Khan	Embankment works will cover the existing drainage canal of the village which will cause water logging in the area.	• CSC Safeguards and Earthworks Engineers reviewed the construction drawings and made appropriate corrections were made. • The adjustments in the design allowed the construction of a 1 meter wide drainage canal done by the contractor.	3	A tin shed was partially affected. The owner was included in the Supplemental RP and will be compensated once funds are made available by Bangladesh government.
Section 2							
2	28 May	Verbal notice to contractor	Kazi Sahadat (local leader at Mouza Sasangacha, Comilla City Corpn.	The embankment works have covered the existing drainage canal in the down line Sasangacha Mouza community area. This may cause waterlogging that will affect the health, private property, and make access very difficult during the rainy months.	• CSC Safeguards and Earthworks Engineers reviewed the construction drawings including a proposal for a trapezoidal canal to be constructed at the affected site. • Modifications were made on the proposed canal drawings to avoid land acquisition. • Local community agreed to resolve any resettlement issue arising from the earth canal construction. • Contractor built the drainage canal as agreed by all parties (i.e. BR, CSC, Contractor and local community).	10	• A Member of Parliament has sent a request to BR to have the completed earth canal lined with concrete. The request is under review. • However, the local government of Comilla City Corporation is implementing a drainage improvement project with JICA Funding. The upline side has already a concrete-lined canal. The MP should instead file his request to the LGU.
Section 3							
3	29 April	Verbal notice to CSC Jr. Environment Specialist	Construction workers of CTM TCCL	A senior supervisor of the Contractor is operating a cattle fattening farm beside the worker's accommodation. The farm is emitting foul odor and flies frequent the area which may contaminate worker's food or belongings.	• CSC Safeguard specialist sent a report to higher management recommending the relocation of the illegal cow farm located beside the worker's camp. • Instructions was issued by CSC Team Leader to the Contractor to relocate the cattle farm to an appropriate place far from the worker's accommodation.	30	• It was suggested that the cattle fattening farm be relocated beside the plant nurseries also found within the Quasba Station Yard. The plants can benefit from the cow dung produced by the cows.

6.7 Training/Capacity Building Status

103. During the reporting period, a capacity building activity was held on 23-24 March 2021. The objective of the activity was to introduce the new monitoring system to the actual preparers and users. The new system involves the use of an MS Excel based series of spreadsheets where compliance to the major Environmental Management Plan (EMP) mitigation measures at every major project components (i.e. stations, bridges, culverts, embankment and track) can be rated. Numerical ratings can be place on the spreadsheet representing full compliance (>4); partial compliance (<4 to >3) and non-compliance (<3). The spreadsheet will automatically do the averaging and yield a single number that will represent the overall Contractor compliance to the EMP. The system also features a mechanism by which non-compliance and their specific location/ project component are monitored as well as the status of their resolution.

104. The Resident Social, Resettlement and Gender Specialist who also serve as the temporary Resident Environment Specialist developed the new system based on the experience from other ADB Projects. The system was adopted to the Project specific EMP and project locations. The system was fully adopted in May 2021 to provide the Contractor and the third party monitor to adjust to the new system. The international consultant was the main resource person for the training, but was supported by other CSC Safeguard specialists as workshop facilitators, training moderator, and field work coordinators. The training included both lecture/discussion, hands-on workshop on the use of the reporting system, as well as field work to apply the participant's acquired skills on the use of the system in the field.

105. The participants to the training/workshop were Project officers and staff that are directly involved in the implementation of the EMP as well as users of the reports generated. A total of 10 persons attended the face-to-face workshop that was conducted at the CTM JV Conference room at Comilla Station. The Employer send 2 Deputy Directors to participate in the activity which includes DD Tania Mostafa (Headquarters) who is concurrently the focal person for Environment. Also present was the DD for Signal & Telecommunications. CSC participants include the 2 Jr. Environmental Specialists and 2 Social Safeguard Specialists. The Contractor CTM JV has sent their two senior engineers responsible for Environment, Health & Safety (Mr.Hanif and Mr. Habib) ; while the Subcontractor doing the third party environmental monitoring (EQMS) sent 2 representatives who were also involved in the actual EMP compliance and environmental quality monitoring of the Project; while the Subcontractor doing the Compensation Tree Plantation and Rehabilitation Program had their owner and consultant as participants.

106. The contractor CTM JV has also held 4 trainings during the reporting period. These capacity building activities include: a) Electrical safety and awareness program (30 June 2021); b) Hazard identification and risk assessment for safety personnel (10 May 2021); c) Awareness for "Covid-19" or "Hazardous Material" (5 May 2021) and d) Awareness for "Track Work" Safety & "Manual Handling"(4 January 2021); where a total of 51 participants that is broken down to 10, 14, `12 and 15 participants respectively. The resource persons were senior CTM JV Environment, Health & Safety Officers. **Table 6.3** has the summary of ALDLP trainings during the reporting period.

Table 6.3. Training and Capacity Building Activities

Date	Name of Training	Trainers Details	No. of Participants
1. ***CSC Initated Trainings/Workshops***			
23-24 March 2021	Environmental Monitoring Workshop	***Main resource person***: Alan Salvador (ALDLP CSC Resident Social, Resettlement & Gender Secialist). Educational Background: MS Environmental Engineering. ***Workshop facilitators:*** CSC Jr. Environmental Specialist Mr. Mugdho and Mahdhi Hassan.	10
2. ***Contractor Initiated Trainings***			
30.June.2021	Electrical Safety and Awareness Program	Md. Abu Hanif, In-charge of HSE (max part)	10
10 May 2021	Hazard Identification and Risk Assessment for Safety Personnel	Md. Abu Hanif, In-charge of HSE (max part)	14
05 May 2021	Awareness for "Covid-19" Or "Hazardous Material"	Md. Mozibur Rahman. Accident Prevention Officer	12
04.01.2021	Awareness for "Track Work" Safety. & "Manual Handling"	Md. Mirja Hasanul Habib. Environment Engineer	15

VII. Occupational Health and Safety

7.1 Main Objective in Health and Safety

107. The main objectives of the health & safety program include:

- Identify hazards involved in the work
- Assess the risk of harm to health and safety arising from the hazards identified
- Eliminate or control any foreseeable risks
- Review risk assessment and control measures
- Provide instruction, training and information about safety
- procedures Provide reasonable supervision for employee
  Provide personal protective equipment (PPE) where
- required Provide emergency procedures for the
- workplace
- Provide and maintain amenities such as the facilities for toilets, drinking
- water Provide Appropriate First Aid facilities and trained personnel

7.2 H&S Management system principles

108. HSE main principle is “keep safe workplace, keep safe people”. So, if we want to ensure this principle, then we must need our employee are to know-what is safety and why it is necessary. So, contractors take a smart way for keep their all type of employee under the same roof.

109. CTM recognizes the inherent & operational hazards associated with construction projects and clearly belief that a strong, effective & employment driven HSE Management Systems with commitment, support and share responsibility from all project personnel are the basic requisites to achieve the injury & illness free construction work.

7.3 Managing Risk in the workplace

110. CTM persons are using “risk management” approach to address workplace health and safety issues. This involves:

- Identifying the hazards
- Assessment of risks
- Eliminate or control the risk
- Monitoring control measures

111. These are the elements of a risk management process and is being done in consultation with the people most likely to be affected, such as employees, sub-contractors of contractor, and vendors who may also be working on the same work site.

7.4 Providing of Safety Tools

112. The contractors have provided for their own staff, and the engineer, all appropriate protective clothing, including safety vests, helmets, and steel capped boots, and other equipment for the work to be done, and ensured proper use of the protective clothing. All safety and rescue equipment are always being fully maintained and made available at site.

7.5 Training, awareness and supervision

113. The contractor is taking all reasonable steps for training and promote safety awareness. The training includes the following:

- Training and record keeping
- General health and safety induction training
- Work activity-based health and safety induction training
- Site specific health and safety induction

114. CTM conducts every week general safety awareness training to their officers, engineers, supervisors and workers. They try to keep update their employees HSE knowledge.

7.6 Welfare facilities

115. Contractor is making available site welfare facilities for his people. Contractor people who shall work on any site shall have access to adequate toilet and washing facilities. The welfare facilities shall be made enough for everybody who is working in the site. Welfare facilities shall be made easily available to people working on the site.

7.7 Sanitary conveniences

116. Adequate numbers of toilets have been provided for people working on site. Toilet shall be flushed by water and connected to a mains drainage system. Men and women shall use the separate toilet. A washbasin with water, soap and towels shall be located close to the toilets.

7.8 Washing facilities

117. Contractor is being provided basins in all sites to allow people to wash their faces, hands and forearms. All basins shall have a supply of clean hot or cold or warm, running water.

7.9 Drinking water

118. Contractor has supplied of safe drinking water for the workers in the site. A tap direct from the mains shall be made available, and also bottles or tanks of water shall be used for storage. If water is stored, it shall be protected from possible contamination and changed often enough to prevent it from becoming stale or contaminated.

7.10 Precautions to prevent fire

119. All types of measures for precaution have been taken to prevent fires. The following precautions have been taken to prevent fires:

- Use less-easily ignited and fewer flammable materials
- Low-solvent adhesives and paint
- Keep the quantity of flammables at the workplace to a minimum
- Always keep and carry flammable e liquids in suitable closed containers
- To minimize the risk of gas leaks and fires involving gas-fired plant
- Store flammable solids, liquids and gases safety
- Have an extinguisher to hand when doing hot work such as welding or using a disc cutter that produces sparks

7.11 Precaution in case of fire

120. People shall be able to escape from fire if a fire shall break out. Where hot work is to be conducted in an area surrounding bush land or scrubland, extreme care shall be taken. Control shall be in place to prevent sparks and hot material contacting combustible material prior to the ignition source occurring.

7.12 First aid

121. First aid can save lives, reduce pain and help an injured person make a quicker recovery. First aid box for all sites has been provided with enough equipment to cope with the number of workers on site. An appointed person has taken charge of first-aid arrangements.

7.13 Site Security

122. The contractor is responsible for the security of the site and for maintaining it as a safe-working environment at all sites. The overall site boundary as well as the specific boundaries of the various site facilities is being identified by contractor and be submitted to the Engineer for approval, complete details of the contractor's proposed method or methods for maintaining the security of the various boundaries and for the security of the buildings, personnel, material and equipment contained therein.

7.14 Work in the Rail Corridor

123. The work site protection plan is in place which identifies any pedestrian, commuter, or traffic management issues. There remains watchman. It is the responsibility of the site supervisor to ensure controls documented in the worksite protection plan are implemented.

7.15 Safety measures during construction period

124. 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.

125. During the reporting period January-June 2021, the Project has shown good performance in terms of prevention of accidents in the workplace. No fatal accidents had occurred, only 9 lost time injuries (LTI) was recorded, no worker was in need of major medical treatment with the exception 37 cases that only require first-aid treatment for minor cuts and bruises. There were 3 health incidents related to staff getting infected by Covid-19 virus but were promptly isolated, tested, and quarantined until they have fully recovered. There were no fires, no near misses, and only 1 security incident which was promptly addressed by the Contractor's security force. During the reporting period, there were a total of 1,441 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 2021.

Table 7.1. Summary of Accidents/Incidents

SL	Description	From January-June 2021	Till June 2021
1	Fatal Accidents	0	02
2	Lost Time injury (LTI)	9	24
3	Medical Treatment (MT)	0	7
4	First Aid Cases (FAC)	37	225
5	Health Incident	3	18
6	Fire//Explosion	0	0
7	Security Incident	1	5
8	Near Miss	0	13
9	Environment (EN)	0	0
10	Tool Box Talks	1,441	12,389

7.16 Safety Notice Board

126. The contractor has set up adequate safety notice board located within their workplace. Relevant safety information that has been displayed is:

- Caution of workplace
- Color post demarcation of Rail Track 3m apart
- Toe line demarcation
- Signs of level crossing
- Signs of work on-going

- First aid kit locations
- Emergency contact details
- Evacuation procedures
- Site maps
- Existing hazards in the workplace
- Meeting minutes Name of first aiders and the safety representative

7.17 PPE requirements and Training

127. The relevant mandatory safety equipment shall be issued to all employees. Minimum PPE requirements for projects include:

- Medium impact safety glasses
- Steel capped boots (with lace up ankle supports)
- Long pants
- Long sleeved safety orange shirt
- Safety orange vest
- Safety helmet with brim
- Stay safe booklets
- Water containers

7.18 Safety promotional event

128. Based on the HSE principle CTM organize safety promotional event and carry out other promotional activities. They are giving various HSE training and visual presentation for their employee by this event. The safety promotional events content elements such as – Awareness Training, Fire Fighting 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.

7.19 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

129. Many workers are working in the ALDLP and adjacent to project area lot of community people are working. The workers and the community people are not aware of the HIV/AIDS. Orientation session on HIV/AIDS and STI Awareness/Prevention under ALDLP has been conducted in the construction sites and communities. Table 7.2 contains the summary of orientation sessions on HIV/AIDS STD awareness/prevention.

Table 7.2. Orientation session on HIV/AIDS and STI awareness/prevention

SI No	Location	Date
01	Rajapur and Mandabag Station	26-27 January 2021
02	Rasulpur, Mandabag Stations, Bridge No. 1	15-16 February 2021
03	Comilla and Imambari Station	March 2021
04	Sadar Rasulpur	4 April 2021
05	Comilla Station and Bridge 272	30-31 May 2021

Figures 7.1 Orientation Session on HIV/AIDS and STI awareness

7.20 Status of implementation of the safety execution plan

130. 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.

7.21 COVID -19 Strategy

131. 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.

132. 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.

7.22 Action taken against the spreading of Covid-19

133. 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
- Body temperature checked by Thermal body temperature machine at potential entry points

VIII. Conclusion

134. 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).

135. There are however, site specific deficiencies of the contractor that needs to be addressed which include: a) noise abatement measures for heavy equipment and “silent zones” such as railway mosques; b) dust control; c) proper storage of petroleum products and disposal of waste oil; c) wearing of PPE at the workplace; and d) orientation of workers most especially those that are engaged in hazardous task.

136. 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 3 railway station mosques and 1 railway station 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.

137. The Compensation Tree Plantation Establishment and Rehabilitation Program had performed poorly during the reporting period. Of the total 45,882 tree saplings planted in 2020, only 13,900 had survived (30.3% survival rate) primarily due to inadequate protection and

maintenance work done during the long dry season. A draft site specific tree plantation establishment and rehabilitation program was prepared jointly be CSC-CTM JV-Gomti Nursery which seeks to establish new plantation as well as replace last year's plantation mortality with 57,500 and 32,500 saplings respectively. This year watch guards that also serve as plantation maintenance persons will be deployed on a one guard for every 2 km of plantation basis up to the end of the Project.

138. A corrective action plan (Table 5.1) has been proposed for action by CTM JV that aims to resolve the site specific non-compliant or partially compliant mitigation measures. The CAP contains the issues that need action, their location, responsible party and time-line. The next Semi-Annual Report will delve on the resolution of these issues, among others.

139. This Semi-Annual Report (January-June 2021) is the first 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 the report users such as ADB, EIB, DOE and BR-PIU.

140. Grievance redress had been kept at the Project site level with CSC Environment team doing the resolution of cases with environmental concerns. There was no need to for the moment to elevate such environment related issues to the BR PIU level. Other grievances encountered at the site are involuntary resettlement in nature, is handled by INGO SAMAHAR and not covered in this report.

141. 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 2021

Mitigation Measures	SECTION 1																													
	STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
	Laksam Station	Akhaihar Station	Lalmai Station	Mainamat 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+200	AVERA
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 such as mufflers for effective noise control, in compliance with DoE regulations.	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	5	5	4.7
3 Locate rock crushing, concrete mixing and aggregate materials storage 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	5	5	5	5	5	5	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 Project Construction exceeds DOE prescribed thresholds.	5	5	5	5	5	5	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 workers and supervisors exposed to extremely noisy working environment, to be provided with suitable noise protection equipment like ear muffs, etc.	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
6 Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	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
Average Rating	5.0	4.0	4.7	4.7	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	4.9
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	1.0
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 used.	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	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
6 Air quality monitoring to be carried out as per the 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

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures		SECTION 1																												
			STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
			Laksam Station	Akhaurar Station	Lamai 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+200	AVERA
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 approved or directed by the Engineer.		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, and/or seepage.		5	3	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	4.8
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 require dust suppression.		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	3.2	3.4	3.4	3.2	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
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, after the completion of the works.		5	5	5	5	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 sedimentation and contamination from fuel and lubricants.		5	5	5	5	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 spoils should not to block stream flow.		5	5	5	5	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 watercourses.		5	5	5	5	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 designated disposal sites approved by the Engineer.		5	5	5	5	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	5.0
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 vectors.		5	5	5	5	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 2021

		Mitigation Measures	SECTION 1																												
			STATION BUILDINGS					BRIDGES			CULVERTS															TRACK WORK					AVERAGE RATING
			Laksam Station	Akhaurar 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+200	AVERA
		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	5.0
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	5.0
	2	No construction-related debris shall be left lying on the surface of the ground, pond or buried in any agricultural land.	5	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	4.8
	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 Engineer.	5	5	5	5	5	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	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	5.0
		Average Rating	5	4.5	4.5	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	4.9
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, radiator coolant, 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	5.0
	2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum products into the 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	5.0
	3	Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	5	5	5	5	5	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	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 fuel dispensing units.	5	5	5	5	5	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 these equipment are to be properly trained on its use.	5	5	5	5	5	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	All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, and shall be maintained in good 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	5.0
	7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	3	1	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	4.7
		Average Rating	4.714286	4.428571	4.714286	5	5	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		**Control of Petroleum Producrts**																													

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 1																													
		STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
		Laksam Station	Akhaurar Station	Lalmai Station	Mamamati 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+200	AVERA
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 contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5	1	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	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	5	5	5	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	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	5	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 blocks will be used instead.	5	5	5	5	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 avoided in order to prevent water logging.	5	5	5	5	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 disposal 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	5.0
	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	5.0
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, harness, safety goggles and ear protection, and others; and enforce its proper use.	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
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.	5	5	5	5	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 construction foremen with the workers prior to starting the work day.	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
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	5.0

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

		Mitigation Measures		SECTION 1																													
				STATION BUILDINGS					BRIDGES			CULVERTS																TRACK WORK					AVERAGE RATING
				Laksam Station	Akaihar Station	Laimai 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+200	AVERAGE
	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	5.0
	6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,		5	3	3	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	4.5
	7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.		5	5	5	5	5	5	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	5.0
		Average Rating		4.50	4.25	4.25	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	4.50	4.50	4.4
		Overall all Ratimg		4.27	3.64	4.16	4.19	4.21	4.27	4.27	4.27	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.3

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 2																									
		STATION BUILDINGS				BRIDGES					CULVERTS											Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajapur Station	Shahidal Station	Salda 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
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	5.0
	2 All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	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	4.6
	3 aggregate materials storage 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 Project Construction exceeds DOE prescribed thresholds.	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 Construction Workers and supervisors exposed to extremely noisy working 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	4.9
	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	4.7	4.7	4.7	3.7	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	4.9
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	1.0
	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	5.0
	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	5.0
	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 used.	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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0
	6 Air quality monitoring to be carried out as per the 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

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS												Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajapur Station	Shashidal Station	Saida 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	AVERA
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 approved or directed by the Engineer.	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, and/or seepage.	5	5	5	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 require dust suppression.	3	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	5.0
	Average Rating	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.7	3.7	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, after the completion of the works.	5	5	5	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 sedimentation and contamination from fuel and lubricants.	5	5	5	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 spoils should not to block stream flow.	5	5	5	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 watercourses.	5	5	5	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 designated disposal sites approved by the Engineer.	5	5	5	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	5.0
4	Borrow and Dredging Site Impacts																											

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS											Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajapur Station	Shashidal Station	Saida 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
1	Secure and properly rehabilitate borrow sites, to prevent soil erosion/sedimentation and serve as breeding grounds for rodents and insect vectors.	5	5	5	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	5.0
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.	3	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	4.5
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 Engineer.	5	5	5	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	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	4.5	4.5	4.5	4.5	4.5	4.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.9
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, radiator coolant, 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	5.2
2	The Contractor shall ensure that all hydraulic, fuel and lubricating systems, are maintained in good working condition to avoid leakage of petroleum products into the 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	5.2
3	Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	5	5	5	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	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 fuel dispensing units.	5	5	5	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 these equipment are to be properly trained on its use.	5	5	5	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	All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, and shall be maintained in good working conditio n 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	5.2
7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	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	4.8
	Average Rating	4.714286	4.714286	4.714286	4.714286	4.714286	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.1
7	Control of Petroleum Producrta																											

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS											Track Work				Gumti Nursery	AVERAGE RATING
		Sadar Rasulpur Station	Rajapur Station	Shashidal Station	Saida 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
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 contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5	5	3	3	3	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	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.0
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	5.1
2	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	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 blocks will be used instead.	5	5	5	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 avoided in order to prevent water logging.	5	5	5	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 disposal 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	5.0
	Average Rating	5	5	3	4.6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2
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, harness, safety goggles and ear protection, and others; and enforce its proper use.	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	3.1
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.	5	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	5.1

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

		SECTION 2																										
		STATION BUILDINGS				BRIDGES					CULVERTS												Track Work				Gumti Nursery	AVERAGE RATING
	Mitigation Measures	Sadar Rasulpur Station	Rajapur Station	Shashidal 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
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 construction foremen with the workers prior to starting the work day.	3	3	1	1	1	1	1	1	1	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.7
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	3	5.1
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	3	5.1
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4.6
7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.	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	5.1
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	3	5.1
	Average Rating	4.25	4.25	4.00	4.00	4.00	4.00	4.25	4.25	4.25	4.75	4.75	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	3.00	4.5
	Overall all Ratimg	4.16	4.16	3.93	3.89	3.83	4.19	4.27	4.27	4.27	4.32	4.32	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.17	4.3

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

Mitigation Measures	SECTION 3																																AVERAGE RATING
	STATION BUIDINGS					BRIDGES				CULVERTS																								
	Mandabag Station	Quaiba Station	Imaribari 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 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+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	5.0
2 All powered mechanical equipment and machinery to be fitted with noise abating gear such as mufflers for effective noise control, in compliance with DoE regulations.	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	4.7
3 aggregate materials storage 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	5.0
4 Install temporary noise barriers near sensitive locations such as schools, religious places and hospitals; whenever ambient noise generated by Project Construction exceeds DOE prescribed thresholds.	5	5	5	5	5	5	5	5	5	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 Workers and supervisors exposed to extremely noisy working 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	5	5	5.0
6 Noise level monitoring to be carried out as per the prescribed schedule in the environmental monitoring plan.	3	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	5.0
Average Rating	4.3	4.7	4.7	4.3	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	4.9
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	1.0
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	5.0
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	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 used.	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	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
6 Air quality monitoring to be carried out as per the 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	5.0
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 approved or directed by the Engineer.	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, and/or seepage.	5	5	5	5	5	5	5	5	5	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 require dust suppression.	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

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

	Mitigation Measures	SECTION 3																														AVERAGE RATING
		STATION BUIDINGS					BRIDGES				CULVERTS																						
		Mankachar Station	Quaidia Station	Imambari 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 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+300	km 180+300 to 185+200	km 185+200 to 190+200	km 190+200 to 195+200	km 195+200 to 203+650	
	Average Rating	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
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, after the completion of the works.	5	5	5	5	5	5	5	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 sedimentation and contamination from fuel and lubricants.	5	5	5	5	5	5	5	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 spoils should not to block stream flow.	5	5	5	5	5	5	5	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 watercourses.	5	5	5	5	5	5	5	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 designated disposal sites approved by the Engineer.	5	5	5	5	5	5	5	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	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 vectors.	5	5	5	5	5	5	5	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	5.0
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	5.0
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	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 Engineer.	5	5	5	5	5	5	5	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	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	5.0
	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	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, radiator coolant, 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	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 products into the 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	5.0
3	Fuel spills will not be tolerated and care shall be taken to avoid overfilling machines.	5	5	5	5	5	5	5	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	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 fuel dispensing units.	5	5	5	5	5	5	5	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 2021

	Mitigation Measures	SECTION 3																																		AVERAGE RATING
		STATION BUIDINGS					BRIDGES				CULVERTS																										
		Mandalay Station	Oumba Station	Imamibari 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 281	Culvert 282	Culvert 1	Culvert 2	km 175+200 to 180+300	km 180+300 to 185+200	km 185+200 to 190+200	km 190+200 to 195+200	km 195+200 to 202+460	
5	The Contractor shall heve oil spill abatement equipment such as oil drip pans among others, on the site at all times. Persons assigned to operate these equipment are to be properly trained on its use.	5	5	5	5	5	5	5	5	5	5	5	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	All type of equipment to be used in the Project, shall be subject to theapproval of the Engineer, a nd shall be maintained in good 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	5.0
7	Disposal of used oil, lubricants, tires, etc. shall be in accordance with the EMP or as directed by the Engineer.	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	5	5	4.7
	Average Rating	4.714285714	4.428571429	4.714285714	4.714285714	5	5	5	5	5	5	5	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	**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 contamination, impermeable liner shall be placed on subsurface of the petroleum products storage area.	5		5	5	5	5	5	5	5	5	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	5	5	5	5	5	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
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	5	5	5	5	5	5	5	5	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	Promptly protect open soil erosion-prone areas such as embankment slopes using appropriate methods such as vegetative measures, hydro-seeding and others.	5	5	5	5	5	5	5	5	5	5	5	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 blocks will be used instead.	5	5	5	5	5	5	5	5	5	5	5	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 avoided in order to prevent water logging.	5	5	5	5	5	5	5	5	5	5	5	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 disposal 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	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	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, harness, safety goggles and ear protection, and others; and enforce its proper use.	1	1	1	1	1	1	1	1	5	1	3	1	3	1	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.4
2	Prepare, submit and implement a Health and Safety Program acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	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 construction foremen with the workers prior to starting the work day.	1	1	1	1	1	1	1	1	5	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	2.6
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	5.0

AKHAURA-LAKSAM DOUBLE LINE PROJECT

DETAILED ENVIRONMENTAL MANAGEMENT PLAN COMPLIANCE STATUS AS OF MAY 2021

		SECTION 3																																				
		STATION BUIDINGS					BRIDGES				CULVERTS																												AVERAGE RATING
	Mitigation Measures	Mandalbag Station	Quasba Station	Imambari 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 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	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	5	5	5.0
6	Provide adequate number of toilet and other sanitation facilities in the offices, workplace, and worker's accommodations.,	1	3	3	3	3	1	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	5	5	5	5	4.4
7	Prepare and implement an HIV/AIDS STD prevention Program, acceptable to the Engineer.	5	5	5	5	5	5	5	5	5	5	5	5	5	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	5	5	5.0
	Average Rating	3.50	3.75	3.75	3.75	3.75	3.50	3.75	4.00	4.75	4.25	4.50	4.25	4.50	4.25	4.75	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	4.3
	Overall all Rating	4.10	3.73	4.16	4.12	4.19	4.19	4.22	4.24	4.32	4.27	4.29	4.27	4.29	4.27	4.32	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.29	4.3

ANNEX 2
SITE SPECIFIC TREE PLANTATION

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE- (MAX PART)

		ACTIVITIES	Unit	Overall Target	JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER			
					W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1		**Nursery Operation**																														
	1	Sapling Production	Saplings	28,000																												
		a. Timber Trees	Saplings	14,500				750	1,275	1,500	1,500	1,500	1,500	1,000	1,000	750	750	1,000	750	725												
		b. Fruit Trees	Saplings	8,500				450	765	900	900	900	900	600	600	450	450	600	450	435												
		c. Medicinal Trees	Saplings	2,600				150	255	300	300	300	300	200	200	150	150	200	150	145												
		d. Fuel Trees	Saplings	2,400				150	255	300	300	300	300	200	200	150	150	200	150	145												
		Total	Saplings	28,000				1,500	2,550	3,000	3,000	3,000	3,000	2,000	2,000	1,500	1,500	2,000	1,500	1,450												
	2	**Sapling Procurement**	Saplings	29,000																												
		a. Timber Trees	Saplings	15,000				1,500	2,250	2,250	2,250	3,000	2,250	2,250	2,250	3,000	2,250	1,750	1,750	2,250												
		b. Fruit Trees	Saplings	8,500				1,100	1,350	1,350	1,350	1,800	1,350	1,350	1,350	1,800	1,050	1,050	1,050	1,350												
		c. Medicinal Trees	Saplings	2,700				450	450	450	450	600	450	450	450	600	350	350	350	450												
		d. Fuel Trees	Saplings	2,800				450	450	450	450	600	450	450	450	600	350	350	350	450												
		Total	Saplings	29,000				2,000	2,250	2,250	2,250	3,000	2,250	2,250	2,250	3,000	1,750	1,750	1,750	2,250												
	3	Sapling Maintenance	Saplings	57,000				3,000	4,500	4,500	4,500	6,000	4,500	4,500	4,500	6,000	3,500	3,500	3,500	4,500												
2		**Plantation Establishment**																														
	1	Site preparation (Staking/hole digging/fertilization)	hectares /holes	57,000			3,000	4,500	4,500	4,500	6,000	4,500	4,500	4,500	6,000	3,500	3,500	3,500	4,500														
		Location	chainage	130+675 to 159+00 up and down line; 165+900 to 171+320 up and down line			130+675 to 141+00 up and down line; Laksam to Lalmai					141+00 to 154+00 up and down line; Lalmai to Comilla				154+00 to 159+00 up and down line; Comilla to Sadar Rosulpur				165+900 to 171+320 up and down line Rajapur (end of BCZ) to end of Max part												
	2	New plantation establishment	hectares /holes	27,500					2,000	2,500	2,500	2,000	3,500	2,500	2,000	2,000	2,500	2,500	1,500	2,000												
		Location	chainage	130+675 to 159+00 up and down line; 165+900 to 171+320 up and down line			130+675 to 141+00 up and down line; Laksam to Lalmai					141+00 to 154+00 up and down line; Lalmai to Comilla				154+00 to 159+00 up and down line; Comilla to Sadar Rosulpur				165+900 to 171+320 up and down line Rajapur (end of BCZ) to end of Max part				165+900 to 171+320 up and down line; Rajapur (end of BCZ) to end of Max part							
3		**Plantation Maintenance & Protection**																														
	1	Fencing	km	33.745					10.325 km				13 km				5 km				5.42 km											
		Location	chainage	130+675 to 159+00 up and down line; 165+900 to 171+320 up and down line					130+675 to 141+00 up and down line;				141+00 to 154+00 up and down line;				154+00 to 159+00 up and down line;				165+900 to 171+320 up and down line;											
	2	Ring weeding/fertilization/	Saplings	57,000					4,000	10,000	15,500	19,500	26,500	31,500	36,000	40,000	45,000	50,000	53,000	57,000			57,000										
	3	Protection	hectares /holes	33.745					3000	10,000	15,500	19,500	26,500	31,500	36,000	40,000	45,000	50,000	53,000	57,000			57,000										
		Location	chainage	130+675 to 159+00 up and down line; 165+900 to 171+320 up and down line					130+675 to 141+00 up and down line;				130+00 to 154+00 up and down line;				130+00 to 159+00 up and down line;				130+00 to 159+00 up and down line; 165+900 to 171+320 up and down line;											
4		**Plantation Rehabilitation**																														
	1	Replacement Planting	Saplings	29,500 (Which is included in total amount 57000					2,000	3,500	3,000	2,000	3,500	2,500	2,500	2,000	2,500	2,500	1,500	2,000		29500										
		Location	chainage	33.745					130+600 to 141+00 up and down line;				141+00 to 154+00 up line;																			
5		**Plantation Survival Rate**																														
	1	Healthy Saplings	Saplings	51,300					17,550				36,000				51,300				51,300 (overall)				51,300 (overall)				51,300 (overall)			
	2	Dead Saplings	Saplings	5,700					1,950				4,000				5,700				5,700				5,700				5,700			
	3	Survival Rate	%	90%					90%				90%				90%				90%				90%				90%			

PROGRESS OF TREE PLANTATION ESTABLISHMENT & MAINTENANCE. (TOMA PART)

	ACTIVITIES	Unit	Overall Target	JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER			
				W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1	**Nursery Operation**																														
1	Sapling Production	Saplings	14,000																												
	a. Timber Trees	Saplings	7,000					650	700	550	550	600	650	650	700	700	500	400	350												
	b. Fruit Trees	Saplings	4,200					390	420	330	330	360	390	390	420	420	300	240	210												
	c. Medicinal Trees	Saplings	1,400					130	140	110	110	120	130	130	140	140	100	80	70												
	d. Fuel	Saplings	1,400					130	140	110	110	120	130	130	140	140	100	80	70												
	Total	Saplings	14,000					1300	1400	1100	1100	1200	1300	1300	1400	1400	1000	800	700												
2	**Sapling Procurement**	Saplings	16,000																												
	a. Timber Trees	Saplings	8,000					750	800	750	800	750	750	650	700	600	600	450	400												
	b. Fruit Trees	Saplings	4,800					450	480	450	480	450	450	390	420	360	360	270	240												
	c. Medicinal Trees	Saplings	1,600					150	160	150	160	150	150	130	140	120	120	90	80												
	d. Fuel	Saplings	1,600					150	160	150	160	150	150	130	140	120	120	90	80												
	Total	Saplings	16,000					1,500	1,600	1,500	1,600	1,500	1,500	1,300	1,400	1,200	1,200	900	800												
3	Sapling Maintenance	Saplings	30,000					2,800	3,000	2,800	2,700	2,700	2,800	2,600	2,800	2,600	2,200	1,700	1,500												
4	**Plantation Establishment**																														
1	Site preparation (Staking/hole digging/fertilization)	hectares /holes	30,000				2,800	3,000	2,600	2,700	2,700	2,800	2,600	2,800	2,600	2,200	1,700	1,500													
	Location	chainage	1,2,3,4,5,6,7,8,9 & 10.					1,2,3				4,5,6				7,8,9,10															
2	New plantation establishment	hectares /holes	30,000					2,800	3,000	2,600	2,700	2,700	2,800	2,600	2,800	2,600	2,200	1,700	1,500												
	Location	chainage	1,2,3,4,5,6,7,8,9 & 10.					1,2,3				4,5,6				7,8,9,10															
3	**Plantation Maintenance & Protection**																														
1	Fencing	km	24.675					7.15 km				7.15+4.825=11.975 km				11.975+12.7=24.675 km				24.675km											
	Location	chainage	1,2,3,4,5,6,7,8,9 & 10.					1,2,3				4,5,6				7,8,9,10				1,2,3,4,5,6,7,8,9 & 10.											
2	Ring weeding/fertilization/	Saplings	30,000					2,800	5,800	8,400	11,100	13,800	16,600	19,200	22,000	24,600	26,800	28,500		30,000											
3	Protection	hectares /holes	30,000					2,800	5,800	8,400	11,100	13,800	16,600	19,200	22,000	24,600	26,800	28,500		30,000											
	Location	chainage	1,2,3,4,5,6,7,8,9 & 10.					1,2,3,4,5,6,7,8,9 & 10.																							
4	**Plantation Rehabilitation**																														
1	Replacement Planting	Saplings	3,000								1,110				1,110				800												
	Location	chainage	1,2,3,4,5,6,7,8,9 & 10.																												
5	**Plantation Survival Rate**																														
1	Healthy Saplings	Saplings	27,000								9,990				19,800				27,000												
2	Dead Saplings	Saplings	3,000								1,110				2,200				3,000												
3	Survival Rate	%	90%								90%				90%				90%												

Note: This is a potential tree report. *Replacement=3000(As we are assuming 90% survival rate. so 10% will be mortality rate. It may change while filed level plantation activities. Location of replacement will depend on site situation)
Last season's tree chainage and new work progress are linked above.
Location: 1,2,3 10
Location List of Chainage for Tree Plantation. June-2021.
1. Hori-Mangal. L/S 171+320 to 173+520 2.200 km
2.Shasidal-Salda. L/S 174+100 to 177+300 3.200 km
3.Salda. L/S 177+650 to 179+400 1.750 km
4.Mandobag. L/S 180+000 to 181+850 1.850 km
5.Gangasagar. L/S 197+150 to 198+600 1.450 km
6.Mandobag. R/S 180+900 to 181+425 .525 km
7.Majlishpur. R/S 188+000 to 189+900 1.900 km
8. Mandobag- Quesba. 181+850 to 185+450 3.600 km
9. Imam-bari. 191+400 to 186+200 5.200 km
10. Gangasagar 192+300 to 195+300 3.000 km

Total Km 24.675

ANNEX 3. PHOTOGRAPHS

Annex 3A. Compensation Tree Planting Photographs

Plate 1: Preparation for fencing

Plate 2: Sapling rearing at nursery

Plate 3: Site preparation for fencing and pit digging

Plate 4: Inspection of Site preparation for fencing and pit digging

Plate 5: Nursery visit

Plate 6: Sapling rearing at nursery

ANNEX 3B. Control of Impacts on Water Bodies

Plate 7: Installation of reinforced pipe (arrow) on temporary diversion to allow surface water flow

Plate 8: Erosion protection measures

Plate 9: Installation of reinforced pipe (arrow) on temporary diversion to allow surface water flow

ANNEX 3C. Disposal of Construction Debris and Other Waste Materials

Plate 10: Garbage bins are provided at Gangasagar camp

Plate 11: Garbage bins are provided at Akhaura

Plate 12: Garbage bins are provided at Kasba Camp

ANNEX 3D. Dust Control

Plate 13: Water Broacher heading out for watering along community road

Plate 14: Watering inside camp area

Plate 15: Watering at unpaved haul road

ANNEX 3E. Control of Water Pollution

Plate 15: Petrol filling station is provided with impermeable liner and roof over it

Plate 16: Used Oil drums kept under roof shed and over impermeable liner to prevent seepage to sub surface water

Plate 17: Sanitary toilet provided for the use of workers which will prevent pollution of nearest water body

ANNEX 3F. Environmental Sampling Photographs: January-June 2021

Plate 18: GW sample collection at Gangasagar

Plate 19: Noise level monitoring at sensitive receptor-Cumilla

Plate 20: Air quality monitoring at Kasba Station work site

Plate 21: Air quality monitoring at Saldanodi station work site

Plate 22: GW sample collection at Lalmai station

Plate 23: Surface water sample collection at Sindai river/Khal

ANNEX 3G. Occupational Health and Safety

Plate 24: Safety barrier & Signage around work site at Akhaura food godown

Plate 25: Safety signboard at LC gate

Plate 26: Caution barrier round work place

Plate 27: EHS training at workplace

Plate 28: Safety awareness at Level crossing gate

Plate 29: Dedicated gateman at unauthorized LC gate

ANNEX 3H COVID-19 Virus Prevention Program

Plate 30: Hand washing facility at labor camp

Plate 31: COVID-19 awareness talk during work

Plate 32: Hand washing facility at work site

Plate 33: COVID-19 awareness poster at labor camp

Annex 3I. Compensation Tree Plantation Establishment Photographs

Plate 34: Sapling plantation in to Pit

Plate 35: Filling Up the pit after plantation

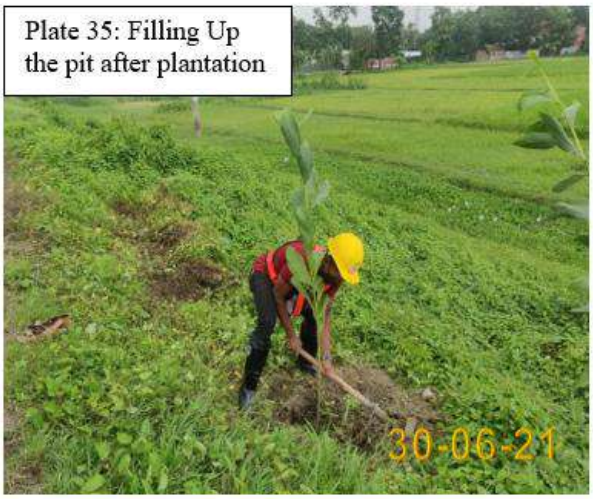


Plate 36: Pit digging

Plate 37: Placing the sapling into the pit

Plate 38: Pit digging and cite clearing by weeding

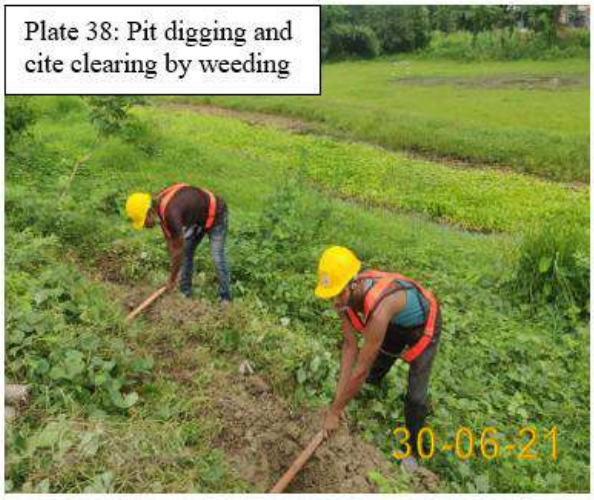


Plate 39: Support Pole placing

ANNEX 4. LABORATORY TEST RESULTS

SL No: 024198

Ref: EQMS/Air Quality//2019072501101562

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 : 5 January 2021 to 7 January 2021
Reporting Date : 28 January 2021
Monitoring Location : Rajapur and Akhaura 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°09'08.0"E	31.18	43.56	101.64	2.86	14.23	0.03
AAQ-2	Akhaura Railway Station	23°52'08.7"N 91°12'21.3"E	42.92	69.30	139.88	3.39	32.94	0.03
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.

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SL No: 024199

Ref: EQMS/Noise Level/2019072501101563

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 : 5 January 2021 to 7 January 2021
Reporting Date : 28 January 2021
Monitoring Location : Rajapur and Akhaura 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	53.64	Mixed	60	Low
2	ANL-2	Rajapur Railway Station Jame Mosque	23°34'51.5"N 91°09'10.7"E	48.83	Silent	50	Low
3	ANL-3	Akhaura Railway Station	23°52'10.7"N 91°12'21.4"E	59.18	Mixed	60	Low
4	ANL-4	Akhaura Railway Station Jame Mosque	23°52'07.6"N 91°12'21.7"E	57.41	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

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SL No: 024200

Ref: EQMS/Water Quality/2019072501101564

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 : 7 January 2020
Reporting Date : 28 January 2021
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	7.11	22.5	0.16	80	8.2	0.3	21	53
SWQ-2	Haora River (Downstream)	23°50'03.3"N 91°11'51.8"E	7.07	23.2	0.16	80	8.3	0.3	26	84
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)

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Ref: EQMS/Water Quality/2019072501101565

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 5 January 2021 to 7 January 2021
Reporting Date : 28 January 2021
Monitoring Location : Rajapur and Akhaura 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	6.60	26.2	1.2	0.04	<0.01	0.01	0
GWQ-2	Akhaura Railway Station	23°52'10.5"N 91°12'23.4"E	6.53	27.3	1.4	0.03	<0.01	0.14	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)

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SL No: 024307

Ref: EQMS/Air Quality/2019072501101640

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 : 15 February 2021 to 17 February 2021
Reporting Date : 9 March 2021
Monitoring Location : Sadar Rasulpur 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	Sadar Rasulpur Railway Station	23°31'09.4"N 91°10'07.3"E	18.44	39.71	66.12	23.48	20.31	0.11
AAQ-2	Gangasagar Railway Station	23°49'32.7"N 91°11'37.2"E	24.15	51.73	74.11	9.06	6.38	0.12
Bangladesh Standard**			65	150	200	365	100*	9
Duration (Hours)			24	24	8	24	24	8

* The Bangladesh Standards for Oxides of Nitrogen (NO_2) 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.

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SL No: 024316

Ref: EQMS/Noise Level/2019072501101641

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 : 15 February 2021 to 17 February 2021
Reporting Date : 9 March 2021
Monitoring Location : Sadar Rasulpur 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	Sadar Rasulpur Railway Station	23°31'08.7"N 91°10'07.2"E	59.29	Mixed	60	Low
2	ANL-2	Sadar Rasulpur Railway Station Jame Mosque	23°31'10.2"N 91°10'09.3"E	47.18	Silent	50	Low
3	ANL-3	Gangasagar Railway Station	23°49'33.8"N 91°11'38.0"E	57.64	Mixed	60	Low
4	ANL-4	Gangasagar Railway Station Jame Mosque	23°49'49.1"N 91°11'44.7"E	48.13	Silent	50	Low
Bangladesh Standard*							
		Silent area				50	
		Residential area				55	
		Mixed area				60	
		Commercial area				70	
		Industrial area				75	

*Noise Pollution (Control) Rules, 2006

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SL No: 024317

Ref: EQMS/Water Quality/2019072501101642

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 : 15 January 2020
Reporting Date : 9 March 2021
Monitoring Location : Gomti 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	Gomti River (Upstream)	23°29'08.9"N 91°09'47.3"E	7.79	23.6	0.13	60	6.2	0.8	27	82
SWQ-2	Gomti River (Downstream)	23°29'08.6"N 91°09'42.3"E	7.87	23.6	0.13	70	6.5	0.8	21	108
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)

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Ref: EQMS/Water Quality/2019072501101643

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 15 February 2021 to 17 February 2021
Reporting Date : 9 March 2021
Monitoring Location : Sadar Rasulpur 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	Sadar Rasulpur Railway Station	23°31'09.1"N 91°10'07.5"E	6.90	26.9	0.1	0.02	<0.01	0.09	0
GWQ-2	Gangasagar Railway Station	23°49'30.8"N 91°11'36.2"E	6.62	27.6	0.2	0.1	<0.01	0.08	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)

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Ref: EQMS/Air Quality/2019072501101724

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 : 21 March 2021 to 22 March 2021
Reporting Date : 1 April 2021
Monitoring Location : Cumilla and Kasba 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	Cumilla Railway Station	23°27'48.5"N 91°10'00.1"E	42.56	68.27	121.35	9.74	6.12	0.07
AAQ-2	Kasba Railway Station	23°44'24.9"N 91°09'20.4"E	25.76	27.73	72.86	6.13	16.79	0.03
Bangladesh Standard**			65	150	200	365	100*	9
Duration (Hours)			24	24	8	24	24	8

* The Bangladesh Standards for Oxides of Nitrogen (NO_2) 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.

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SL No: 024435

Ref: EQMS/Noise Level/2019072501101725

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 : 21 March 2021 to 22 March 2021
Reporting Date : 1 April 2021
Monitoring Location : Cumilla and Kasba 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	Cumilla Railway Station	23°27'49.9"N 91°09'59.9"E	56.07	Mixed	60	Low
2	ANL-2	Cumilla Railway Station Jame Mosque	23°27'48.6"N 91°10'02.4"E	54.18	Silent	50	High
3	ANL-3	Kasba Railway Station	23°44'23.9"N 91°09'19.9"E	56.41	Mixed	60	Low
4	ANL-4	Kasba Railway Station Jame Mosque	23°44'27.9"N 91°09'20.6"E	49.73	Silent	50	Low
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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Ref: EQMS/Water Quality/2019072501101726

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 : 21 January 2020
Reporting Date : 1 April 2021
Monitoring Location : Sindai 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	Sindai River (Upstream)	23°46'51.3"N 91°09'58.7"E	6.52	29.7	0.12	60	6.6	3.1	31	164
SWQ-2	Sindai River (Downstream)	23°46'52.5"N 91°09'56.9"E	6.57	29.6	0.13	60	5.6	1.2	43	116
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)

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EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 21 March 2021 to 22 March 2021
Reporting Date : 1 April 2021
Monitoring Location : Cumilla and Kasba 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	Cumilla Railway Station	23°27'48.7"N 91°10'01.4"E	6.71	32.5	0.8	0.05	<0.01	0.13	0
GWQ-2	Kasba Railway Station	23°44'26.4"N 91°09'19.7"E	6.59	27.3	1.1	0.03	<0.01	0.97	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)

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SL No: 5168

Ref: EQMS/Air Quality/20190725011011112

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 : 26 April 2021 to 28 April 2021
Reporting Date : 12 May 2021
Monitoring Location : Mainamati and Mandabag 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	Mainamati Railway Station	23°25'57.4"N 91°10'16.3"E	14.96	15.54	41.45	2.41	21.03	0.08
AAQ-2	Mandabag Railway Station	23°41'18.1"N 91°09'08.2"E	12.95	22.93	36.17	2.04	4.40	0.01
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.

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OHSAS 18001:2007

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SL No: 5169

Ref: EQMS/Noise Level/20190725011011113

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 : 26 April 2021 to 28 April 2021
Reporting Date : 12 May 2021
Monitoring Location : Mainamati and Mandabag 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	Mainamati Railway Station	23°26'03.2"N 91°10'15.7"E	64.73	Mixed	60	High
2	ANL-2	Mainamati Railway Station Jame Mosque	23°25'57.9"N 91°10'16.7"E	58.39	Silent	50	High
3	ANL-3	Mandabag Railway Station	23°41'17.8"N 91°09'08.4"E	54.28	Mixed	60	Low
4	ANL-4	Mandabag Railway Station Jame Mosque	23°41'19.3"N 91°09'06.7"E	49.21	Silent	50	Low
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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SL No: **5170**

Ref: EQMS/Water Quality/20190725011011114

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 : 26 April 2021
Reporting Date : 12 May 2021
Monitoring Location : Goniajuri 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	Goniajuri River (Upstream)	23°22'50.0"N 91°09'28.5"E	7.12	28.5	0.36	180	6.2	1.0	31	94
SWQ-2	Goniajuri River (Downstream)	23°22'49.6"N 91°09'30.2"E	7.12	28.4	0.35	170	6.5	1.2	34	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 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)

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Ref: EQMS/Water Quality/20190725011011115

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 26 April 2021 to 28 April 2021
Reporting Date : 12 May 2021
Monitoring Location : Mainamati and Mandabag 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	Mainamati Railway Station	23°25'56.8"N 91°10'16.2"E	6.90	29.0	1.5	0.02	<0.01	0.02	0
GWQ-2	Mandabag Railway Station	23°41'17.2"N 91°09'08.7"E	6.80	28.5	0.8	0.05	<0.01	0.75	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)

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SL No: 5293

Ref: EQMS/Air Quality/2021042825

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 : 24 May 2021 to 26 May 2021
Reporting Date : 6 June 2021
Monitoring Location : Lalmai and Saldanodi 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	Lalmai Railway Station	23°21'23.2"N 91°09'06.0"E	16.21	24.34	45.16	3.01	12.31	0.03
AAQ-2	Saldanodi Railway Station	23°40'15.4"N 91°09'21.2"E	9.03	15.87	33.73	2.56	11.27	0.05
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.

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SL No: 5294

Ref: EQMS/Noise Level/20210427826

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 : 24 May 2021 to 26 May 2021
Reporting Date : 6 June 2021
Monitoring Location : Lalmai and Saldanodi 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	Lalmai Railway Station	23°21'22.7"N 91°09'05.8"E	59.77	Mixed	60	Low
2	ANL-2	Lalmai Railway Station Jame Mosque	23°21'23.1"N 91°09'03.5"E	53.64	Silent	50	High
3	ANL-3	Saldanodi Railway Station	23°40'14.9"N 91°09'21.0"E	57.26	Mixed	60	Low
4	ANL-4	Ganganagar Jame Mosque	23°40'14.2"N 91°09'17.9"E	49.04	Silent	50	Low
Bangladesh Standard*							
	Silent area					50	
	Residential area					55	
	Mixed area					60	
	Commercial area					70	
	Industrial area					75	

*Noise Pollution (Control) Rules, 2006

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SL No: **5295**

EQMS

Ref: EQMS/Water Quality/2021042827

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 : 26 May 2021
Reporting Date : 6 June 2021
Monitoring Location : Salda 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	Salda River (Upstream)	23°40'17.3"N 91°09'24.4"E	6.63	29.3	0.08	40	8.4	1.4	16	65
SWQ-2	Salda River (Downstream)	23°40'18.6"N 91°09'21.3"E	6.52	29.2	0.07	40	7.5	1.5	14	68
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)

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SL No: **5296**

EQMS

Ref: EQMS/Water Quality/2021042828

EQMS WET LABORATORY

Test Results of Groundwater Quality

Name of Project : Akhaura-Laksam Double Line Project (ALDLP)
Description of Sample : Groundwater Quality
Sampling Date : 24 May 2021 to 26 May 2021
Reporting Date : 6 June 2021
Monitoring Location : Lalmai and Saldanodi 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	Lalmai Railway Station	23°21'23.0"N 91°09'05.9"E	6.76	31.1	0.2	0.01	<0.01	0.42	0
GWQ-2	Saldanodi Railway Station	23°40'16.8"N 91°09'20.7"E	6.60	26.8	0.3	0.01	<0.01	0.26	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)

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Appendix 5
EXAMPLE OF GRIEVANCE REDRESS MECHANISM IN ACTION

ANNEX 5. MINUTES OF THE MEETING WITH THE LOCAL LEADERS OF MOUZA SASANGACHA, CUMILLA

MINUTES OF THE MEETING

Date: 28 May 2021

Venue: Mura Para Rail Gate, Mouza Sashagacha, Comilla

Proceedings

1. On 28 May 2021 a meeting was held at the Mura Para Rail Gate, Mouza Sashangacha, Cumilla. The meeting was requested by the local community residing beside the ALDLP railway track at chainage 154 +175 to 155 +125.
2. The participants include the residents of Mouza Sashangacha led by their leader Mr. Kazi Sahadat. The ALDLP CSC representatives include Resident Social, Resettlement, Gender Specialist Alan Salvador; Jr. Resettlement Specialist Golam Faroque, and Jr. Earthworks Engineer Aliur Rahman. CTM JV was represented by Sr. Site Engineer Sultan Miah, Deputy Construction Engineer Amjad Hossain and Jr. Quality Surveyor and AutoCad Engineer Mukul Miah.
3. Local leader Mr. Kazi Sahadat relayed his constituents request for ALDLP to construct an earth drainage canal parallel to the existing railway downline track, starting from the road crossing at the Comilla-Chittagong Bypass Road (chainage 154+175) to the Mura para rail gate (chainage 155+125). The local community hope that this canal can help prevent water logging in their area especially during the rainy season. The local leader also said that they are willing to take charge of any resettlement issues that may arise from the construction of the drainage canal.
4. CSC Resident Social, Resettlement and Gender Specialist Alan Salvador said that ALDLP can construct the earth drainage canal so long as: a) no additional titled property will need to be acquired in order to build the canal; b) the Construction drawings of the Contractor CTM JV will be revised and its alignment to be located within railway lands subject to the approval of CSC Team Leader; c) the local community will issue a written statement to be signed by all concerned, certifying that they will resolve among themselves any resettlement issue related to the construction of the canal, and no claim for compensation will be made against the Bangladesh Railway; d) the brothers Md Tarif Rahman and Md Arifur Rahman who operates a fishpond at chainage km155 +120 that may be affected by the canal construction, will not seek compensation from Bangladesh Railway; and e) the local community will allow the ALDLP Project construction to continue.
5. Mr. Kazi Sahadat and the local community agrees with the conditions set by CSC Mr. Alan Salvador. The local community will require a day to have all concerned persons to sign their written statement to resolve among themselves, all possible resettlement issues related to the construction of the drainage canal, and submit it to CSC Mr. Alan Salvador for documentation.
6. It was agreed that a Minutes of Meeting written in English will be prepared by CSC Mr. Salvador which will be signed by the local leader Mr. Sahadat and noted by the Union Chairman. Copies of the Minutes are to be provided to the local community of Mouza Sasangacha as represented by Mr.Abul Kalam Azad Chairman, Durgapur Union, Cumilla.
7. There being no more issues to discuss, the meeting ended at about 10:30 am.

Prepared by:

Alan Salvador
Resident Social, Resettlement &
Gender Specialist
Akhaura-Laksam Double Line Project
Bangladesh Railway

Concurred by:

Kazi Sahadat
Local Leader
Mouza Sasangacha

Witness by:

Md.Sultan Miah
CTM JV

Noted by:

Md. Abul Kalam Azad
Chairman
Durgapur Union, Cumilla

QUIT CLAIM

Whereas we the residents of Mouza Sasangacha, Union Durgapur, Cumilla City Corporation, had requested the Akhauara-Laksam Double Line Project (ALDLP) to construct an earth drainage canal parallel to the downline railway track from the road crossing at the Cumilla-Chitaggong By-Pass Road to the Mura Bara rail crossing (chainage km154+175 to km 155+125).

Whereas, if there are any resettlement issues arising from the construction of the earth drainage canal, we the residents will be responsible to resolve them, and will not demand any compensation from Bangladesh railway.

Attached herewith is the list of our names and signatures to confirm our commitment. This Quit Claim is done this day of 30 May 2021.

This Quit Claim is Witnessed by the undersigned.

WITNESS:

Mr. Kazi Sahadat
Local Leader

NOTED:

Md. Abul Kalam
Chairmman
Durgapur Union,
Cumilla City Corporation

ক্রমিক নং	নাম	মোবাইল নাম্বার
১	মোঃ আবুল কালাম আজাদ	01843525056
২	আহম্মেদ নিয়াজ কামাল	01713358570
৩	তোফাজ্জল হোসেন ভূঁইয়া	01825202228.
৪	কাজী আনোয়ার হোসেন	০১৭১৬৪৭৪৩৩৩.
৫	মো: রাসেল	০১৭১৭৯৬১১১৭
৬	রাব্বি রহমান	01987920480
৭	মো: আরিফ	01987920480
৮	মুনতাসির উদ্দীন	01771507936 01920397715
৯	রুবেল মিয়া	01533456783
১০	আফরিন	
১১	সজল	01706364166
১২	মোঃ ইমরান চৌধুরী	01818928456.
১৩	মো: সাঈদ উল্লাহ আল ইমরান	01764021158
১৪	মো: তোফাজ্জল হোসেন হিমেল	01521448884

	মো: ইসমাইল হোসেন	01731364051
১৬	মো: বাবলু	01778757621
১৭	আবু. রহিম	01731 36 40 51.
১৮	মোস্তাফিজুর রহমান	01816804468
১৯	মো: ফারুক	01
২০	[illegible]	01849584975
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ANNEX 6A. 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 6B

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 6C

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 7. CALIBRATION CERTIFICATE

Peerless
Calibration Services

CALIBRATION CERTIFICATE

FR-QT-21					Page 1 of 1
Certificate No	:	PCSL-201013-1-1	Date of Issue	:	15-Oct-20
Date of Calibration	:	13-Oct-20	Valid Up To	:	12-Oct-21
Customer Details	:		Receipt No.	:	PCSL-201013-1
EQMS Consulting Ltd.			Challan No	:	Form
Flat# F1, H# Ta-134/A, Boishakhi Sarani,			Date of Receipt	:	13-Oct-20
Gulshan-Badda Link Road,			Cond. On Receipt	:	Satisfactory
Dhaka- 1212, Bangladesh.			Location	:	--
Description	:	Air Quality Monitor			
Range	:	As Per Report	Identification No.	:	EQMS 136
Least Count	:	As Per Report	Make	:	LATA ENVIROTECH
Serial No	:	--	Model	:	APM 250

Details of Standard Used:

Name	SR/ID NO	Valid upto	Traceability
Digital Stop Watch	PCSL_ET_02	25-Feb-21	G&B Mumbai
Digital Anemometer	PCSL_ENV_07	20-Jan-21	Askib Engineers Pvt. Ltd

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Calibration Results

Flow Totalizer (PM2.5)

Time Interval	STD Readings	UUC Reading	Error	Uncertainty(±)
	in m^3	in m^3	in m^3	in m^3
Start	0.00	0.000	0.000	0.01
10 min	0.10	0.102	0.002	
30 min	0.29	0.293	0.003	
1 hour	0.59	0.595	0.005	
2 hour	1.23	1.236	0.006	
3 hour	1.95	1.956	0.006	

Flow Totalizer (PM10)

Time Interval	STD Readings	UUC Reading	Error	Uncertainty(±)
	in m^3	in m^3	in m^3	in m^3
Start	0.00	0.000	0.000	0.01
10 min	0.12	0.124	0.004	
30 min	0.32	0.325	0.005	
1 hour	0.64	0.644	0.004	
2 hour	1.33	1.336	0.006	
3 hour	2.03	2.021	-0.009	

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

FR-QT-21 Page 1 of 1

Certificate No	:	PCSL-201013-1-1	Date of Issue	:	15-Oct-20
Date of Calibration	:	13-Oct-20	Recom. Due Date	:	12-Oct-21

Calibration Results

Time :

UUC Reading	Standard reading	Error	Uncertainty
in hrs:min:sec	in hrs:min:sec:sec/1000	in hrs:min:sec:sec/1000	in sec
00:10:00	00:10:00:231	-00:00:00231	0.5
00:30:00	00:30:00:532	-00:00:00532	0.5
01:00:00	01:00:00:453	-00:00:00453	1.0
02:00:00	02:00:01:634	-00:00:01:634	2.0
03:00:00	03:00:01:275	-00:01:00:275	4.0
04:00:00	04:00:02:212	-00:00:02:212	4.0

Remarks:

1) Calibration results given are the average of 3 readings.
2) Calibration points are taken as per customer request.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4)The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
- This certificate refers only to particular item(s) submitted for calibration.
- Peerless Calibration Service Ltd. is not liable for any change in calibration data & performance specification on account of malfunctioning of Standards/instruments/Equipment covered by this certificate due to damage caused to it after issuance of this certificate.
- The calibration results reported are valid at the time of and under the stated conditions ot the measurements.
- This certificate shall not be reproduced in full/part without prior permission of Peerless Calibration Service Ltd. Satisfactory calibration report in on ways implies that the equipment calibrated is appoved by Accreditation body.
- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-1	Date of Issue	: 16-Sep-20
Date of Calibration	: 15-Sep-20	Valid Upto	: 14-Sep-21
Customer Details	:	Receipt No	: PCSL-200914-1
EQMS Consulting Ltd.		Calibrated at	: Onsite
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14-Sep-20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			

Details of Under Calibration Instrument:

Description	: Digital Weighing Balance	Model No.	: KD-TN
Range	: 0.1000 to 200 g	Serial No	: G611017001
Least Count	: 0.0001 g	Identification No.	: EQMS # 187
Make	: -	Accuracy	: Class I

Details of Standard Used :

Name	Sr./ Id No.	Valid upto	Traceability
Weight Set (E2)	WT/AS-II/2019/3147	21-Nov-22	WMCL,Delhi

Environmental Details : : Temperature : 23.7 °C Relative Humidity : 59.3 % RH

Remarks :

1) This calibration certificate will not be legal for the purpose of the Standard of "Weights & Measure (enforcement) act 1985".
2) This calibration certificate is issued as per customer request.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor $k=2$
4) This calibration certificate is valid for scientific & industrial purpose only.
5) Overall uncertainty of weighing balance ± 0.0860 g
6) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
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- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

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CALIBRATION CERTIFICATE

Certificate No : PCSL-200914-1-1

Calibration Results(Mechanical-Mass)

1. Repeatability Test :

50 % of Range : 100 g

100 % of Range : 200 g

Sl. No	50% of Range	100% of Range
	g	g
1	99.9527	199.9148
2	99.9529	199.9148
3	99.9529	199.9147
4	99.9529	199.9148
5	99.9528	199.9147
6	99.9528	199.9147
7	99.9529	199.9149
8	99.9527	199.9149
9	99.9528	199.9148
10	99.9529	199.9148
Mean	99.9528	199.9148
Standard Deviation	0.0001	0.0001
Max. Drift	-0.0472	-0.0852

2. Linearity Test :

S.No.	Applied Mass (g)	Test Reading (g)	Error (g)	Uncertainty ± (g)
1	0.100004	0.0200	-0.080004	0.0007
2	0.500005	0.5000	-0.000005	0.0007
3	1.000012	1.0000	-0.000012	0.0007
4	2.000017	1.9999	-0.000117	0.0007
5	5.000021	4.9996	-0.000421	0.0007
6	10.000006	9.9992	-0.000806	0.0007
7	20.000027	19.9973	-0.002727	0.0007
8	49.999999	49.9725	-0.027499	0.0007
9	100.000022	99.9527	-0.047322	0.0007
10	200.000073	199.9148	-0.085273	0.0007

Verified by:

Mujammil Hossen Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No : PCSL-200914-1-1 Page 3 of 3

Calibration Results(Mechanical-Mass)

3. Eccentricity Test :

S.No.	Position of Weights used	Test Reading (g)	Error between centre(1) and Other points (g)
1	Top Left	99.9528	0.0000
2	Top Right	99.9528	0.0000
3	Centre	99.9528	0.0000
4	Bottom Left	99.9527	0.0001
5	Bottom Right	99.9528	0.0000

Maximum Error between centre and other points = 0.0001 g

Verified by:

Mujammil HossenAsst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal HussainDirector & CEO

NOTE

- Equipment used for calibration were calibrated & traceable to National & International Standards.
- This certificate refers only to particular item(s) submitted for calibration.
- Peerless Calibration Service Ltd. is not liable for any change in calibration data & performance specification on account of malfunctioning of Standards/instruments/Equipment covered by this certificate due to damage caused to it after issuance of this certificate.
- The calibration results reported are valid at the time of and under the stated conditions ot the measurements.
- This certificate shall not be reproduced in full/part without prior permission of Peerless Calibration Service Ltd. Satisfactory calibration report in on ways implies that the equipment calibrated is appoved by Accreditation body.
- All precautions have been taken for any error or omission while calibrating the instruments and issuing this
- certificate. Peerless Calibration Service Ltd. shall not be liable for any loss or liability that may be arise to any party in this regards.

Peerless

CALIBRATION CERTIFICATE

Certificate No	: PCSL-210204-68-2	Date of Issue	: 13-Feb-21
Date of Calibration	: 12-Feb-21	Valid Up To	: 12-Feb-22
Customer Details	:	Receipt No.	: PCSL-210204-68
EQMS Consulting Ltd.		Challan No	: PCSL-CH-0053
2nd & 3rd Floor, House # 53		Date of Receipt	: 4-Feb-21
Road # 4, Block # C, Banani,		Cond. On Receipt	: Satisfactory
Dhaka - 1213, Bangladesh.		Location	: ---

Details of Under Calibration Instrument:

Description	: HAZ-Scanner		
Range	: (SO2 0-5, NO2 0-5, NO 0-25) ppm	Identification No.	: ---
Least Count	: As Per Report	Serial No	: 919118
Make	: Environmental Divice Corporation	Model	: HIM-6000

Details of Standard Used:

Name	SR/ID NO	Valid upto	Traceability
Portable Flue Gas Analyzer	'PCSL_ENV_16	20-Dec-21	PCSL, Dhaka

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Inspection Results

Parameter / Range	DUC value		Std Value		Error in ppm
	Coverted Value in ppm	in ppb	In ppm	Converted Value In ppb	
Gas Conc.					
NO	4	4000	5	5000	-1
NO_2	3	3000	4	4000	-1
SO_2	5	5000	6	6000	-1

Remarks:

1) Test results given are the average of 3 readings.
2) The Certificate Is Issued Subject To Conditions Stated Overleaf.
3) Here, Standard Gas Mixture Was Used As Calibration Source.
4) Test points are taken as per customer's request. DUC = Device Under Calibration.

Peerless Calibration Services Ltd

Authorized Signatory : Afzal Hussain
Designation : QM
Calibrated By : Mujammil Hossen
Designation : Asst. Technical Manager

= =End of Certificate = =

Peerless

CALIBRATION CERTIFICATE

Certificate No	: PCSL-210204-68-1	Date of Issue	: 5-Feb-21
Date of Calibration	: 4-Feb-21	Recom. Due Date	: 4-Feb-22
Customer Details :		Receipt No.	: PCSL-210204-68
EQMS Consulting Ltd.		Date of Receipt	: 4-Feb-21
2nd & 3rd Floor, House # 53		Challan No	: PCSL-CH-0053
Road # 4, Block # C, Banani,		Challan Date	: 2-Feb-21
Dhaka - 1213, Bangladesh.		Calibrated At	: Inhouse
		Cond. On Receipt	: Satisfactory
		Location	: --
Description	: Flue Gas Analyzer		
Range	: As Per Report	Identification No.	: Q-ID-10192
Least Count	: As Per Report	Make	: Testo
Serial No	: 6172352	Model	: Testo 340

Details of Standard Used:

Name	Ref. No	Batch No.	Valid Up To
Standard Calibration Gas Mixture	CSL-150320-102426-2-1	102426	15-Mar-21
Standard Calibration Gas Mixture	CSL-150320-102426-3-1	102426	15-Mar-21

Environmental Details: Temperature: (25±5) °C Relative Humidity: (50±15)%

Inspection Results

Parameter / Range	Unit	DUC value	Std Value	Error
Gas Conc.				
NO	ppm	154	158	-4
NO_2	ppm	246	251	-5
SO_2	ppm	2519	2508	11

Remarks:

1) Test results given are the average of 3 readings.
2) The Certificate Is Issued Subject To Conditions Stated Overleaf.
3) Test points are taken as per customer's request. DUC = Device Under Calibration.

Authorized Signatory : Afzal Hussain
Designation : QM
Calibrated By : Mujammil Hossen
Designation : Asst. Technical Manager

Peerless Calibration Services Ltd.

= =End of Certificate = =

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	:	PCSL-200914-1-8	Date of Issue	:	16/Sep/20
Date of Calibration	:	15/Sep/20	Valid Upto	:	14/Sep/21
Customer Details	:		Receipt No.	:	PCSL-200914-1
EQMS Consulting Ltd.			Challan No	:	PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,			Date of Receipt	:	14/Sep/20
Gulshan–Badda Link Road,			Cond. On Receipt	:	Satisfactory
Dhaka- 1212, Bangladesh.					
Details of Under Calibration Instrument:			Sr. No.	:	2019018235
Description	:	Sound Level Meter	Identification No.	:	EQMS # 263
Range	:	30 to 130 dBA	Least Count	:	0.1 dB
Make / Model	:	KASUNTEST/KT-200	Accuracy	:	-

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Calibrator	PCSL_SD_01	15-Oct-20	IDEMI,Mumbai

Environmental Details: Temperature: 23.6 °C Relative Humidity: 59.8 %RH

Calibration Results

Std. Readings in dBA	UUC Readings in dBA	Error in dBA	Uncertainty(±) in dBA
94	93.5	-0.5	1.3
114	113.8	-0.2	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor *k*=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	: PCSL-200914-1-7	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid Upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Details of Under Calibration Instrument:		Sr. No.	: 070404820
Description	: Sound Level Meter	Identification No.	: EQMS # 170
Range	: 30 to 130 dB	Least Count	: 0.1 dB
Make / Model	: CENTER / 322 DATA LOGGER		

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Calibrator	PCSL_SD_01	15-Oct-20	IDEMI,Mumbai

Environmental Details: Temperature: 23.6 °C Relative Humidity: 59.8 %RH

Calibration Results

Std. Readings	UUC Readings	Error	Uncertainty(±)
dB	dB	dB	dB
94	94.4	0.4	1.3
114	115.1	1.1	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No.	:	PCSL-200914-1-6	Date of Issue	:	16/Sep/20
Date of Calibration	:	15/Sep/20	Valid Upto	:	14/Sep/21
Customer Details	:		Receipt No.	:	PCSL-200914-1
EQMS Consulting Ltd.			Challan No	:	PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,			Date of Receipt	:	14/Sep/20
Gulshan–Badda Link Road,			Cond. On Receipt	:	Satisfactory
Dhaka- 1212, Bangladesh.					
Details of Under Calibration Instrument:			Sr. No.	:	160324209
Description	:	Sound Level Calibrator	Identification No.	:	EQMS # 134
Range	:	As Per Report	Least Count	:	As Per Report
Make / Model	:	REED INSTRUMENT/R8090			

Details of Standard Used:

Name	Sr./ID No.	Valid upto	Traceability
Sound Level Meter	PCSL_ENV_05	18-Feb-21	G & B, Mumbai

Environmental Details: Temperature: 23.2 °C Relative Humidity: 59.7 %RH

Calibration Results

Std. Readings in dB (at 1kHz)	UUC Readings in dB (at 1kHz)	Error in dB (at 1kHz)	Uncertainty(±) in dB
94	94.2	0.2	1.3
114	114.3	0.3	1.3

Remarks:

1) UUC = Unit Under Calibration.
2) Calibration results given are the average of 3 readings.
3) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
4) The certificate is issued subject to conditions stated overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Azal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-3	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Description	: Dissolved Oxygen (DO) Meter	Identification No.	: EQMS # 99
Range	: 0 to 20.0 mg/L	Least Count	: 0.1 mg/L
Make/Model	: Lutron/DO-5509	Sr. No.	: R.027879

Details of Standard Used:

Name	Sl/ID	Valid upto	Traceabelity
Zero Oxygen Solution (0.0 mg/L)	SO127 /79	Nov-24	Hanna Instrument

Environmental Details: Temperature: 23.5 °C Relative Humidity: 58.9 % RH

Calibration Result

Do Value :

UUC Readings (in mg/L)	STD Readings (in mg/L)	Error (in mg/L)	Uncertainty(±) (in %)
00.1	0.0	0.1	0.5 %

Remarks:

1) Calibration results given are the average of 3 readings..

2) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor *k*=2

3) UUC = Unit Under Calibration.

4) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

Peerless
Calibration Services

CALIBRATION CERTIFICATE

Certificate No	: PCSL-200914-1-2	Date of Issue	: 16/Sep/20
Date of Calibration	: 15/Sep/20	Valid upto	: 14/Sep/21
Customer Details	:	Receipt No.	: PCSL-200914-1
EQMS Consulting Ltd.		Challan No	: PCSL/CH/035
Flat# F1, H# Ta–134/A, Boishakhi Sarani,		Date of Receipt	: 14/Sep/20
Gulshan–Badda Link Road,		Cond. On Receipt	: Satisfactory
Dhaka- 1212, Bangladesh.			
Description	: Digital Hygrometer	Identification No.	: EQMS # 21
Range	: As Per Report	Least Count	: 0.1 °C & 1 %RH
Make/Model	: ZEAL/---	Sr. No.	: -

Details of Standard Used:

Name	Sl/ID	Valid upto	Traceabelity
Temp. & Humidity Meter	201511008711/PCSL_TH_05	02-Dec-20	G & B,Mumbai

Environmental Details: Temperature: 23.9 °C Relative Humidi 57.9 % RH

Calibration Results

Range of UUC	UUC Readings	Corrected Std. Readings	Error	Uncertainty(±)
	(in °C)	(in °C)	(in °C)	(in °C)
10 to 50°C@50%rh	20.3	20.2	0.1	0.80
	23.6	23.4	0.2	0.80
	30.6	30.3	0.3	0.80
	45.8	45.5	0.3	0.80
Range of UUC	UUC Readings	Corrected Std. Readings	Error	Uncertainty(±)
	(in %rh)	(in %rh)	(in %rh)	(in %rh)
10 to 99%@25°C	50	50.52	-0.52	2.2
	55	55.97	-0.97	2.2
	60	61.03	-1.03	2.2
	65	66.10	-1.10	2.2

Remarks:

1) Calibration results given are the average of 3 readings..
2) The reported Expanded Uncertainty is calculated at 95.45 % C.L with coverage factor k=2
3) UUC = Unit Under Calibration.
4) The Certificate Is Issued Subject To Conditions Stated Overleaf.

Verified by:

Mujammil Hossen
Asst. Technical Manager

Peerless Calibration Services Ltd

Approved by:

Md. Afzal Hussain
Director & CEO

OTS
when accuracy matters..

AJA EUROPE ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel : +880 1755585553-7, +88-02-58154510-11, 58156837
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Certificate No. 020/(14-09)/5246
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Combo Meter
Manufacturer	HANNA
Model/Type	HI-98130
Serial Number	N/A
ID No.	**EQMS#97**
Range/working Range	(PH:0.00 to) (14.00 EC: 0.00 to MS/CM) (TDS: 0.00 to 10.00 ppt)
Least Count	Ref. On Obs.
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5246
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure COP/OTS/35. (Procedure based on Comparison 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±4
Relative Humidity (%RH)	<70

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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AJA EUROPE ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel : +880 1755585553-7, +88-02-58154510-11, 58156837
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Lot Number	Validity	Calibrated By
01	pH 4	HANNA	OTS/PH/04	3714	31/12/2023	HANNA
02	pH 7	HANNA	OTS/PH/07	4214	31/05/2024	HANNA
03	pH 10	HANNA	OTS/PH/10	4243	31/05/2021	HANNA
04	Conductivity Solution 5(µs)	Traceable Standard Solution				
05	Conductivity Solution 10(µs)	Traceable Standard Solution				
06	TDS Solutions	Traceable Standard Solution				
07	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
08	Distilled Water	Grade 3, Complying with ISO 3696 grade 3 water				

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:

Calibration Data For pH Electrode

Sl. No.	Solution (pH)	U.U.C Value (pH)	Error (pH)	Tolerance	Status	Uncertainty
01	4.01	4.01	0.00	N/S	D	±0.234% of rdg
02	7.01	7.02	0.01	N/S	D	
03	10.01	10.02	0.01	N/S	D	

Conductivity : (verified against calibrated equipment)

Obs. No.	Conductivity Solution	Target (µs)	Observed Value(µs)	Tolerance	Status	Uncertainty
1	5(µs)	5	4.97	N/S	D	±0.05% of rdg
2	10 (µs)	10	9.95			

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TDS : (verified against calibrated equipment)

Obs. No.	TDS Solution	Target (ppt)	Observed Value (ppt)	Tolerance	Status	Uncertainty
1	3 (ppt)	3	3.02	N/S	D	±0.03% of rdg
2	5 (ppt)	5	5.01			
3	10 (ppt)	10	10.01			

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 Specifiec

Calibrated By:
Md. Golam Rabbani
(Calibration Engineer)

Checked By:
Md. Shohel Sardar
(Calibration Engineer)

Authorized By:
Md. Reza Hossain
(Asst.Technical Manager)

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

END

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Certificate No. AJAEU/19/14788A

CERT.NO.02.004.15 BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17025:2005

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Tel: +88-02-58154510-11, 58156837, 01755585553-7
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Certificate No. 020/(14-09)/5250
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Beaker
Manufacturer	Indian
Model/Type	Pyrex
Serial Number	N/P
ID No.	**EQMS#251**
Range/working Range (ml)	100
Least Count (ml)	10
Accuracy Class	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5250
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure OTS.WI-011M (Procedure based on IS/ISO 4787:2010 glasswares, graviemetric method at 27°C).
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 were during the calibration 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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AJA REGISTRARS ISO 9001:2015 0273
Certificate No. AJAEU/19/14788A

CERT.NO.02.004.15 BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17025:2005

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**

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Tel: +88-02-58154510-11, 58156837, 01755585553-7
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Weighing Balance(Upto 125g)	Swiss Made	OTS/BL/05	020/(22-08)/OTS/WB/05	21/02/2021	OTS
02	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
03	D-ionized/ Distilled Water	Grade 3, Complying with ISO 3696 grade 3 water				
04	Digital Thermo Hygrometer	Testo	OTS/DL/01	020/(25-03)/OTS/DL/01	24/03/2021	OTS

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:

Volume: (verified against calibrated master equipment)

Sl. No.	Target Value (ml)	Actual Value (ml)	Error (ml)	Tolerance	Status	Uncertainty (ml)
01	10.00000	9.99989	0.00011	N/S	D	±0.05
02	30.00000	29.99972	0.00028	N/S	D	
03	50.00000	49.99965	0.00035	N/S	D	
04	80.00000	79.99958	0.00042	N/S	D	
05	100.00000	99.99939	0.00061	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. Golam Rabbani
(Calibration Engineer)

Checked By:
Md. Shohel Sardar
(Calibration Engineer)

Authorized By:
OTS Pvt. Ltd. Dhaka-1215
Md. Reza Hossain
(Asst. Technical Manager)

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

END

020/(14-09)/5250

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Accreditated
Certificate No. CC-2409

CERTIFICATE of CALIBRATION

Issued by **OTS (Pvt.) Limited**
Navana DH Tower, Level 3, 6 Panthapath, Dhaka-1215
Tel : +880 1755585553-7, +88-02-58154510-11, 58156837
Fax: +88 02 58156739, E-mail: info@otsbd.com, www.otsbd.com

Certificate No. 020/(14-09)/5258
Issue Date 15/09/2020

Customer Details:

Name	**EQMS Consulting Ltd., Bangladesh.**
Address	Flat# F1, House# Ta-134/A, Boishakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.
Tel	+880 1882 231338
E-mail	saifur.rahman@eqms.com.bd

Details of Unit Under Calibration (UUC):

Description	Thermometer
Manufacturer	ZEAL
Model/Type	Glass Type
Serial Number	N/P
ID No.	**EQMS#262**
Range/Working Range (°C)	0 to 360
Least Count (°C)	2
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Inst. Receipt	14/09/2020
Date of Calibration	14/09/2020
Suggested Due Date	13/09/2021
Service Request No.	5258
Calibration Procedure	The calibration has been performed under controlled conditions using OTS Laboratory reference standards, which are periodically referenced to one or more of the primary standards traceable to NPL/NIST or other national physical measures as equivalent to NIST. The calibration had been performed in accordance with calibration procedure OTS.WI-022. Temperature Scale: ITS-90.
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±2.5
Relative Humidity (%RH)	35 to 65

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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Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	RTD Sensor With Indicator	Tempsens; Eurotherm	OTS/RTD/6482; OTS/TUSR/01	FL/C/TH/24012020-C001	28/01/2021	FARELABS
02	Digital Thermo Hygrometer	Testo	OTS/DL/01	020/(25-03)/OTS/DL/01	24/03/2021	OTS

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:

Temperature: (verified against calibrated instruments)

Sl. No.	Standard Value (°C)	U.U.C. Value (°C)	Error (°C)	Tolerance (°C)	Status	Uncertainty (°C)
01	0.000	0.00	0.000	N/S	D	±0.60
02	50.384	50.00	-0.384	N/S	D	
03	100.648	100.00	-0.648	N/S	D	
04	201.079	200.00	-1.079	N/S	D	
05	301.387	300.00	-1.387	N/S	D	

The overall uncertainy 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. Golam Rabbani
(Calibration Engineer)

Checked By:
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(Calibration Engineer)

Authorized By:
Md. Reza Hossain
(Asst. Technical Manager)

F01(7.8/01/C) Rev No. 01 Date of Rev. :26/12/2018

END