

Semi-annual Environmental Monitoring Report

**Project No. 42378-017
June 2020**

**Power System Expansion and Efficiency Improvement Investment Program-Tranche-3
Ashuganj 400 Mw (East) Combined Cycle Power Plant Project
Ashuganj, Brahmanbaria**

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3 D View of the Project



9th Semi Annual (January-June, 2020) Report

Environmental Monitoring Report(Revised)

Aerial View of The Project Construction Site



Aerial View of The Water Intake Construction Site



Aerial View of The Overall Project Construction Site



Ashuganj 400 MW (East) Combined
Cycle Power Plant Project (CCPP)
Ashuganj Power Station Company Ltd.
Ashuganj, Brahmanbaria.

Environmental Monitoring Report (Revised)

9th Semi-Annual (January – June 2020) Report



ASHUGANJ 400 MW (EAST) COMBINED CYCLE POWER PLANT PROJECT

At Ashuganj, Brahmanbaria



Ashuganj Power Station Company Limited (APSCCL)

9th Semi Annual Environmental Monitoring Report (Revised)



Rev	Date	Prepared By	Approved By	Description
00	June 2020	 30/06/2020 A.K.M. Humayan Kabir Dewan Deputy Manager (HS&E) Ashuganj 400 MW East Project APSCL.	 06.07.2020 Md. Atiqur Rahman, Manager (HS&E), APSCL.	9 th Semi-Annual Environmental Monitoring Report (Revised)

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EXECUTIVE SUMMARY

During the period from January to June 2020, the EPC Contractor has carried out mainly HRSG foundation works, Central Control Building (CCB), Main Building and Turbine Base, Gas booster and conditioning station, Exhaust Stack, Air compressor Building, Air Storage tank, Service and Firewater pump house, Service and Firewater tank, Emergency Oil pit, Oily wastewater treatment station, sewage treatment station etc. To complete those works, they mobilize the equipment's, workers and materials.

In this period there is no discharge and for this, there is no impact on the living things in the water body. Air Pollution caused by dust emission during construction traffic activities is controlled by good management practices like continuous water spray over the unpaved or bare surfaces, covering soil materials pile. This plant is constructed by replacing old inefficient Unit-3 plant (150 MW) that is now generating in a total of 129 MW and emits 17,78,010 ton of CO₂ per year. But when 400 MW CCPP (East) plant will come in operation the Unit-3 will be closed and this 400 MW CCPP (East) will emit only 10,23,860 ton of CO₂ per year at full load. So, compared to that old inefficient power plant unit, this new 400 MW CCPP (East) plant will reduce 7,54,150 ton of CO₂ per year. That will be a significant reduction of GHG emission.

Soil and water pollutions are also prevented by proper management like spill prevention and well drainage system. Solid waste is managed by the waste management plan. Noise pollution is also a regarding the issue during Steel Structure Erection activities for using of demolition equipment's and for traffic and transport. Noise level is reduced by using fine-tuned low noise level construction equipment's and by the proper traffic management system. Every personnel use personal protective equipment to ensure their safety. The remarkable achievement in this period is that till now there is no record of accident or injury.

Besides this, visual monitoring included traffic volume, site security, personal protective equipment, incident record and reporting, solid and oily wastes generation and disposal, worker's health, complaints from neighbors, safety orientation and training of workers, sanitation and drinking water facilities to the worker's and site drainage is covered during this period and its found that all aspects regarding visual monitoring were found in line with the environmental management plan and required environmental guidelines.

APSCL is committed to keeping the accident level in Zero by implementing its proper occupational health and safety management system. This project also has a positive effect on the socio-economic condition. Local skilled and semi-skilled peoples are engaged in different levels of construction activities and they are happy about getting employment opportunities.

On March 8, Bangladesh confirmed three cases of novel coronavirus on its territory. After that, APSCL has been paying close attention to the latest situation of COVID-19 spreading in Bangladesh and we are currently raising awareness & taking preventive action as a continuous process on this matter. During this critical period, APSCL immediately took the necessary precautions to protect all of its staff against virus infection and has taken

immediate action on EPC contractors to prevent the spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL.

APSCL follows WHO & Govt. of Bangladesh guidelines to prevent COVID-19 situation. Besides this, APSCL has taken its own policy to protect its community from COVID-19 and it is also mandatory for EPC contractor of this project to follow APSCL's policy, WHO and Government of Bangladesh guidelines on this issue. EPC contractor is also following its own stringent COVID-19 policy to prevent this disease at the project site.

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Location of the Project

The power plant is setting up at the existing power plant area of Ashuganj Power Station Company Ltd. (APSCL) at Ashuganj, Brahmanbaria, Bangladesh. Ashuganj is located on the east bank of the Meghna River about 91 km Northeast to Dhaka & is connected by railway & highway way with Dhaka. There also exists good waterway connection to the site by seaports of Chittagong and Mongla. The project is in Sonaram Mouza of Ashuganj Upazila, Brahmanbaria District. The location map of APSCL 400 MW (East) is shown in Figure 1. Bangladesh UK Friendship Bridge across the river Meghna (Meghna Bridge) connects both the banks of Bhairab and Ashuganj which connects with Dhaka-Sylhet highway which passes at the south side of the project. Meghna River is in the north side of the project. A khal is situated in the east side of the project and the total APSCL complex including APSCL office is located on the west side of the project. The detail unit wise maximum electricity Generation of APSCL is given **Table-1**.



Figure 1: Location Map of APSCL 400 MW CCPP (East) project

Table-1: Unit Wise Maximum Electricity Generation of APSCL

Description	UNIT-3	UNIT-4	UNIT-5	50 MW GE	225MW CCPP	Ashuganj CCPP (South)	Ashuganj 450MW CCPP (North)	Total
Installed Capacity (MW)	150	150	150	53	223	382	389	1497

Present (De-rated) Capacity (MW)	129	138	128	46	222	359	360	1382
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Source: APSCL Website

1.2 Brief Project Description

A Combined Cycle Power Plant of Total net 400±5% MW capacity at site condition (35 °C, 1.013 bars, 98% R.H.) is intended to be set by Ashuganj Power Station Company Limited inside the existing premises. The Power Station will be connected with the Ashuganj 400 KV Gas Insulated Switchgear (GIS) Grid Sub-Station with necessary electrical equipment. The basic concept for the Ashuganj 400 MW CCPP (East) project shall be a CCGT Plant based on one Gas Turbine Generator unit (GTG), one Unfired Heat Recovery Steam Generator and one Steam Turbine Generator unit (STG). Water-steam cycle will be three pressure levels (HP, IP and LP) with reheat. The Ashuganj 400 MW (East) Combined Cycle Power Plant Project complex is located on the Southern bank of Meghna river, just outside and to the East of Bhairab Bridge. The power plant is in Ashuganj Upazilla. The entire power plant is completely enclosed, covers an area of about 4.50 acres and is owned by the Ashuganj Power Station Company Limited (APSCL).

1.3 Objective of the Report

The objective of the environmental safeguard management and monitoring is to record environmental impacts resulting from the project activities and to ensure implementation of the “mitigation measures” identified earlier in order to reduce adverse impacts and enhance positive impacts from specific project activities. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during construction and operation phases of the project.

The EMP clearly layout:

- (a) the measures to be taken during both construction and operation phases of the project to eliminate or offset adverse environmental impacts, or reduce them to acceptable levels;
- (b) the actions needed to implement these measures; and
- (c) a monitoring plan to assess the effectiveness of the mitigation measures employed.

Environmental management and monitoring activities for the under-construction power plant project could be divided into management and monitoring:

- (a) during the construction phase, and (b) during the operation phase.

The application of this plan involved an environmental control and monitoring of the work by a technical team to verify compliance with all the indications, limitations or environmental restrictions set forth in the Environmental Management Plan (EMP), EIA and the Project, with the minimal damage caused by work on the environment.

The information obtained by the implementation of the Environmental Action Plan is required to define preventive measures or define corrective actions. The information generated because of implementing the Environmental Action Plan must be duly forwarded to the Department of Environment (DoE).

This report is the Ninth semi-annual Environmental Monitoring Report, which covers the period from January 2020 to June 2020, in compliance with the environmental scope of the construction supervision.

This report is prepared by Ashuganj Power Station Company Limited (APSCL) under the Asian Development Bank, ADB Loan Project Loan/ Grant Nos.: Loan 3350-BAN: Power System Expansion and Efficiency Improvement investment Program, Tranche-3.

1.4 Project Progress Status and Implementation Schedule

The basic concept for the Ashuganj East project shall be a CCGT Plant based on

- one Gas Turbine Generator unit (GTG),
- one Unfired Heat Recovery Steam Generator and
- one Steam Turbine Generator unit (STG).

Water-steam cycle will be three pressure levels (HP, IP and LP) with reheat.

General components of the proposed CCGT project include the following:

- (i) 400±5% MW CCGT unit complete with necessary auxiliaries including air intake filtration facilities, inlet and exhaust silencers, control systems, main stack with delivery damper, gas fuel treatment system,
- (ii) Power generator for the gas turbine unit with all auxiliaries including cooling system, control system, excitation system;
- (iii) one Steam turbine unit complete with necessary auxiliaries including heater, pumps, steam turbine bypass, control systems;
- (iv) Power generator for the steam turbine unit with all auxiliaries including cooling system, control system;
- (v) (Heat Recovery Steam Generating system with auxiliaries including deaerators, pumps, exhaust stack, control system;
- (vi) Gas booster compressor system with all auxiliaries and control system;
- (vii) Di-mineralized water system complete with pumps, tanks, control system
- (viii) Effluent treatment system with all auxiliaries including, chemical dosing systems, settling units, control system, pumps;
- (ix) CEMS, AQMS and Oily waste water treatment System.
- (x) Other essential plant equipment including air compressor, natural gas supply system with 2200 m gas pipeline, circulating water system, cooling water pond, raw water intake structure, condensate system;
- (xi) Construction of internal roads.
- (xii) Switch room
- (xiii) Emergency generator and transformer.

A. Project Progress Status

The updated status of Ashuganj 400 Mw (East) Combined Cycle Power Plant Project (CCPP) from January 2020 to June 2020 is given below in Table:

Sl. No.	Work Description	Status
1.	Demolition of old Power Plant	Completed 100%

	Old power plant will be demolished	
	Civil Works:	Description
	Main Building	Foundation work has finished and Super Structure work going on
	Bypass Stack	Foundation work has finished.
	Heat Recovery Stream Engine (HRSG)	Super Structure work is going on
	Exhaust Stack	Super Structure work is going on
	Gas booster and conditioning station	Site Processing work has Started
	Gas cold vent stack	Not yet started
	Start Up boiler	Not yet started
	Air compressor Building	Super Structure work is going on
	Air Storage tank	Foundation work has completed
1.	Service and Fire water pump house	Foundation work has completed
	Service and Fire water tank	Foundation work has completed
	Emergency Oil pit, Oily waste water treatment station, sewage treatment station	Not yet started
	Power control center	Super Structure work is going on
	Central control Building (CCB)	Super Structure work is going on
	RMS	Site Processing work has Started
	Transformer	Site Processing work Started
	Condenser Pit	Foundation work finished
	Turbine Generator	Foundation work finished
	Mechanical and Electrical Facilities	Description
2.	Consist of: -Erection of HRSG, Steam Turbine, Generator, Cooling Tower, CW Pump House and all other BOP Equipment's /Components of Power Plant. -Electrical and I&C works with commissioning	Not yet started

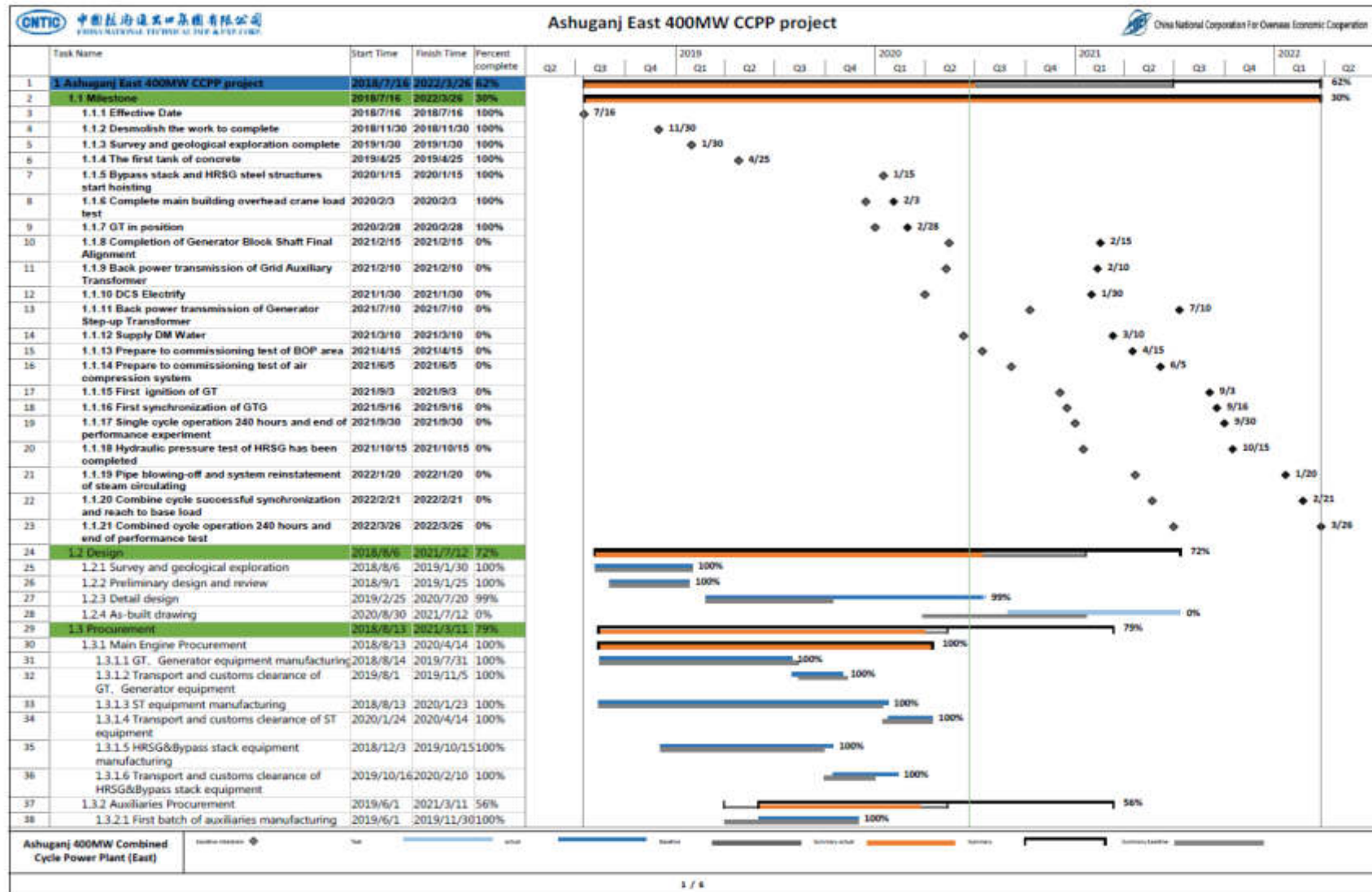


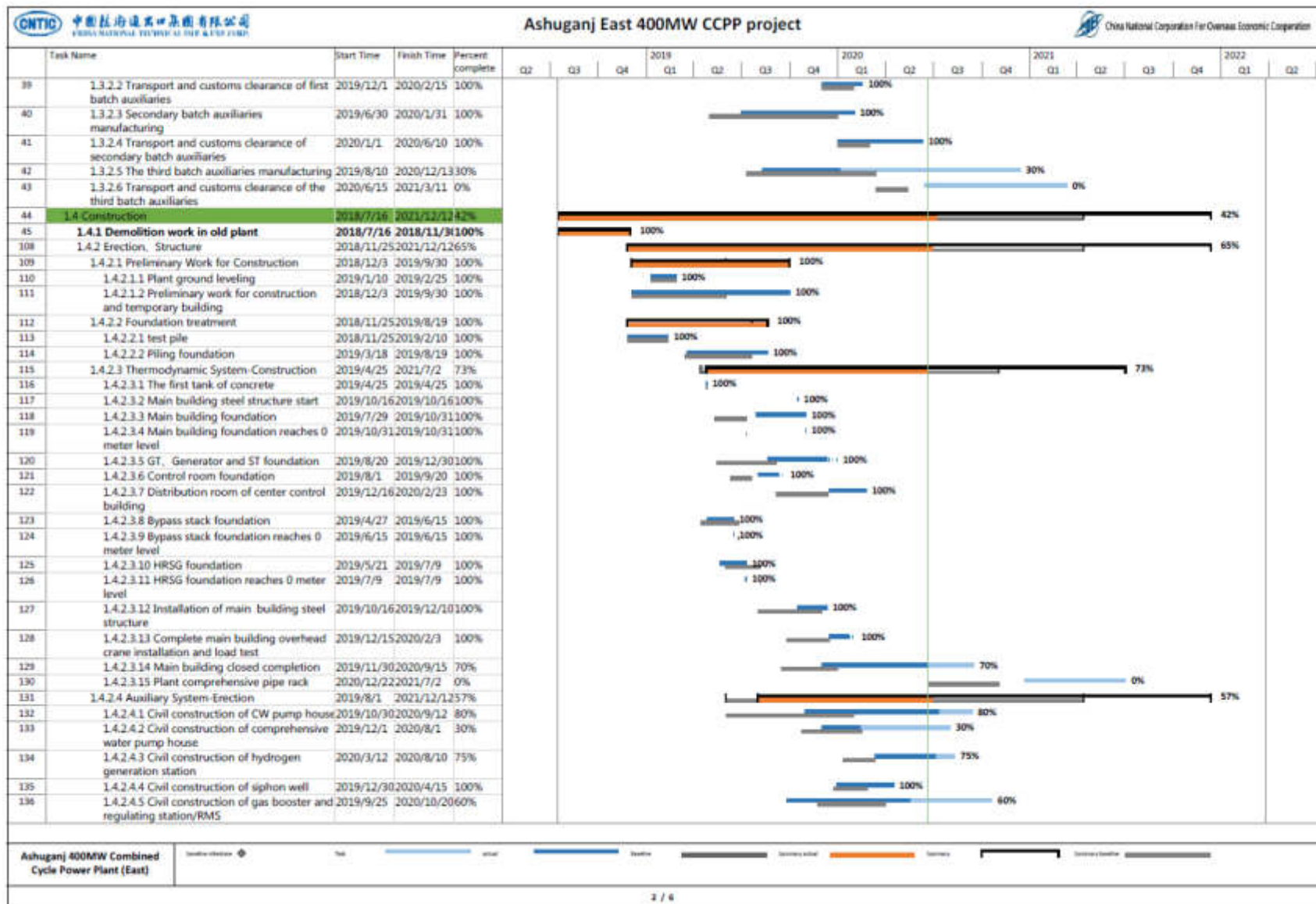
Fig-2: Latest Picture of the Project Site-Top View (Construction is going on)

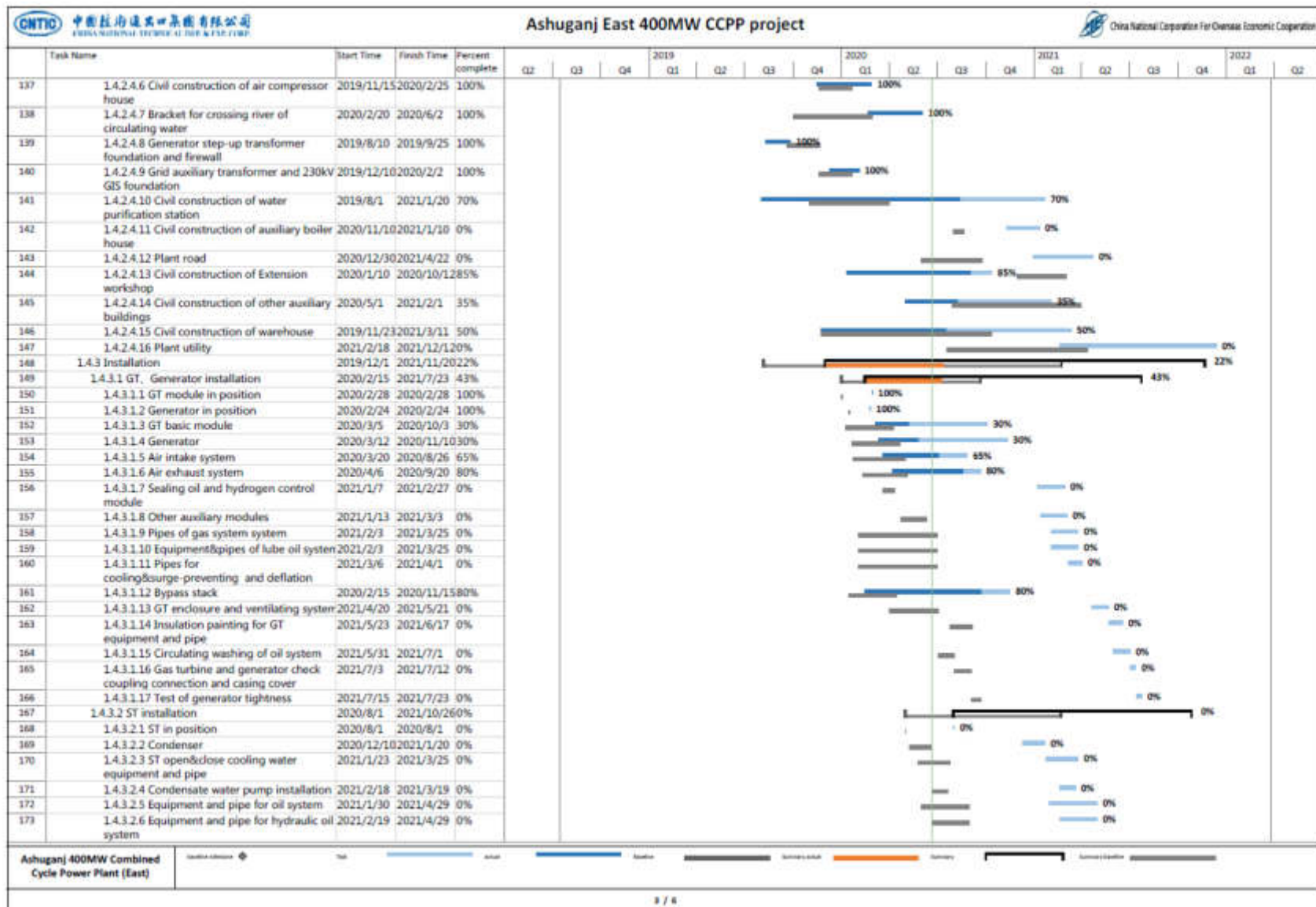
B. Implementation Schedule for the Project:

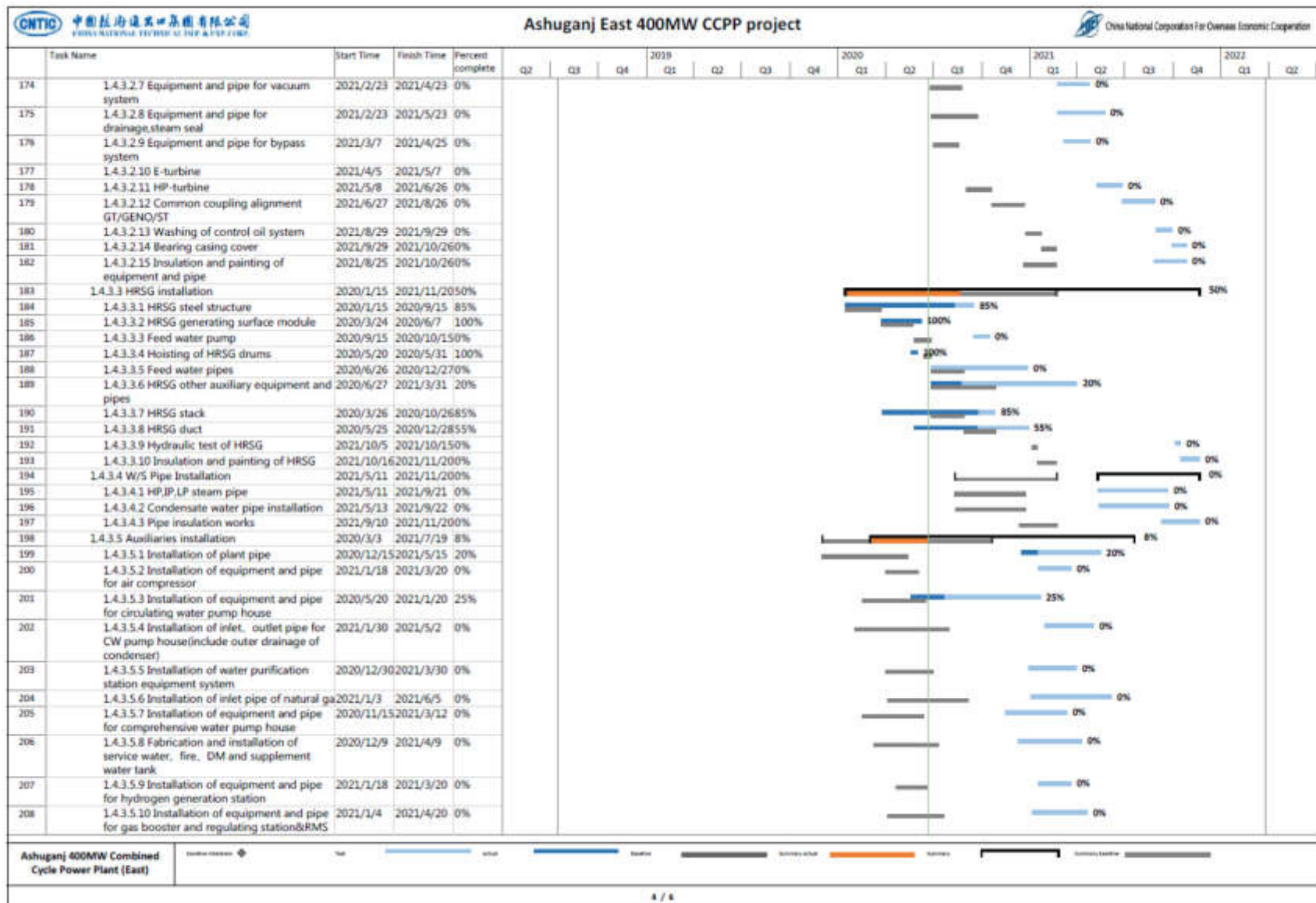
The tentative implementation schedule of Ashuganj 400 MW (East) Combined Cycle Power Plant Project (CCPP) is given below:

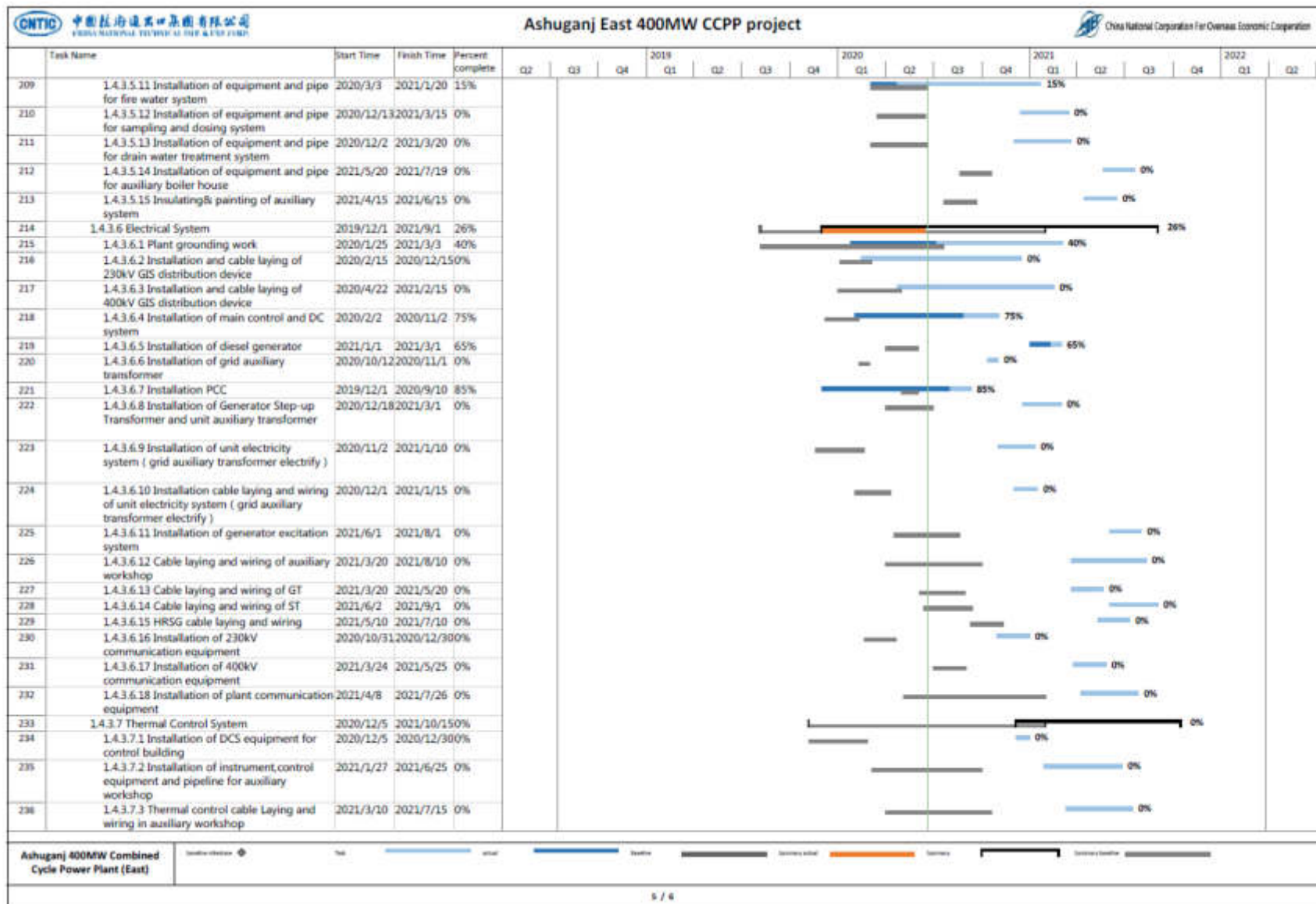
Implementation Schedule (Tentative):

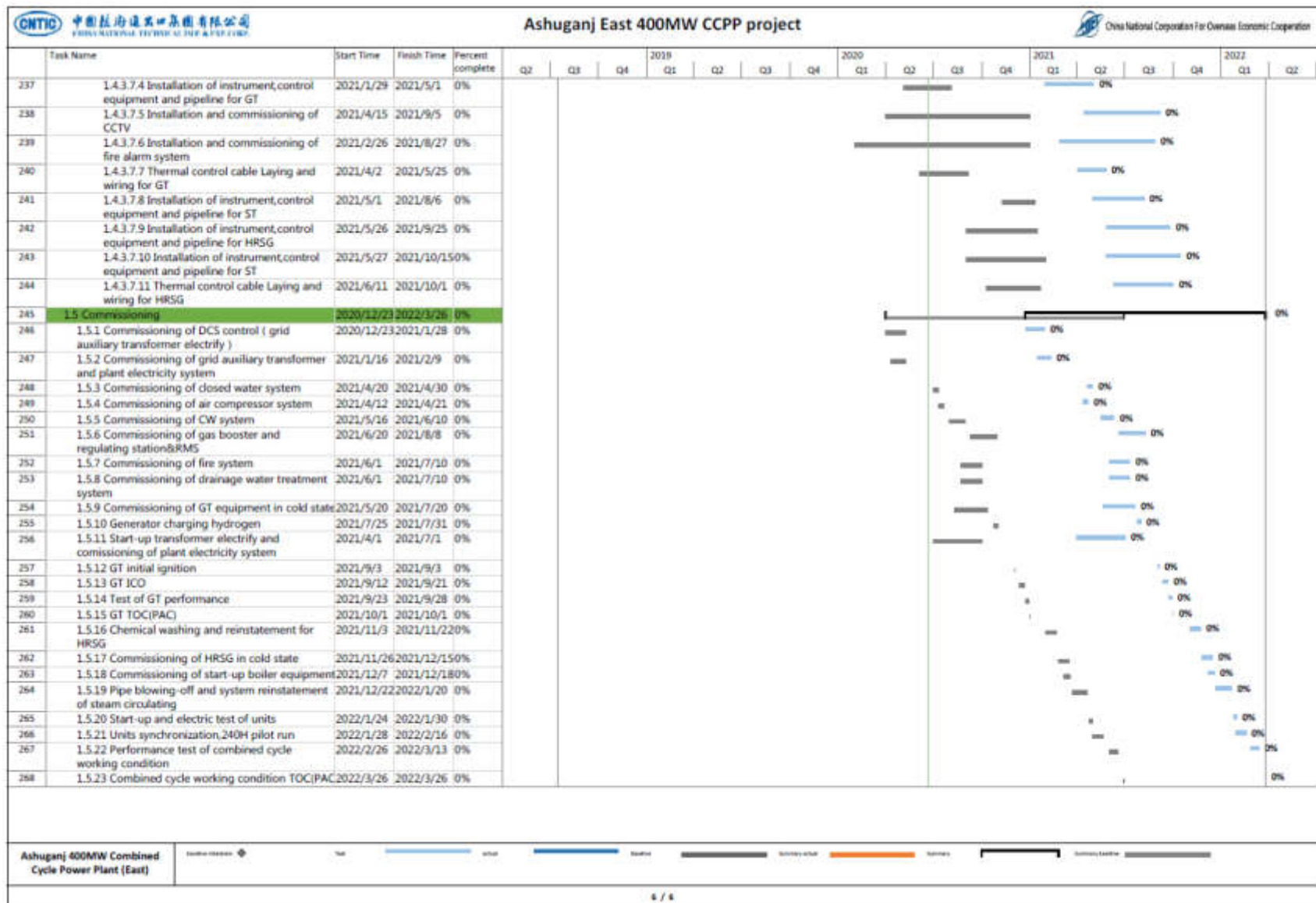












CHAPTER 2

ENVIRONMENTAL RESPONSIBILITIES & INSTITUTIONAL SETUP

2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP

2.1 Environmental Responsibilities, Institutional Arrangements, and Implementation Schedule

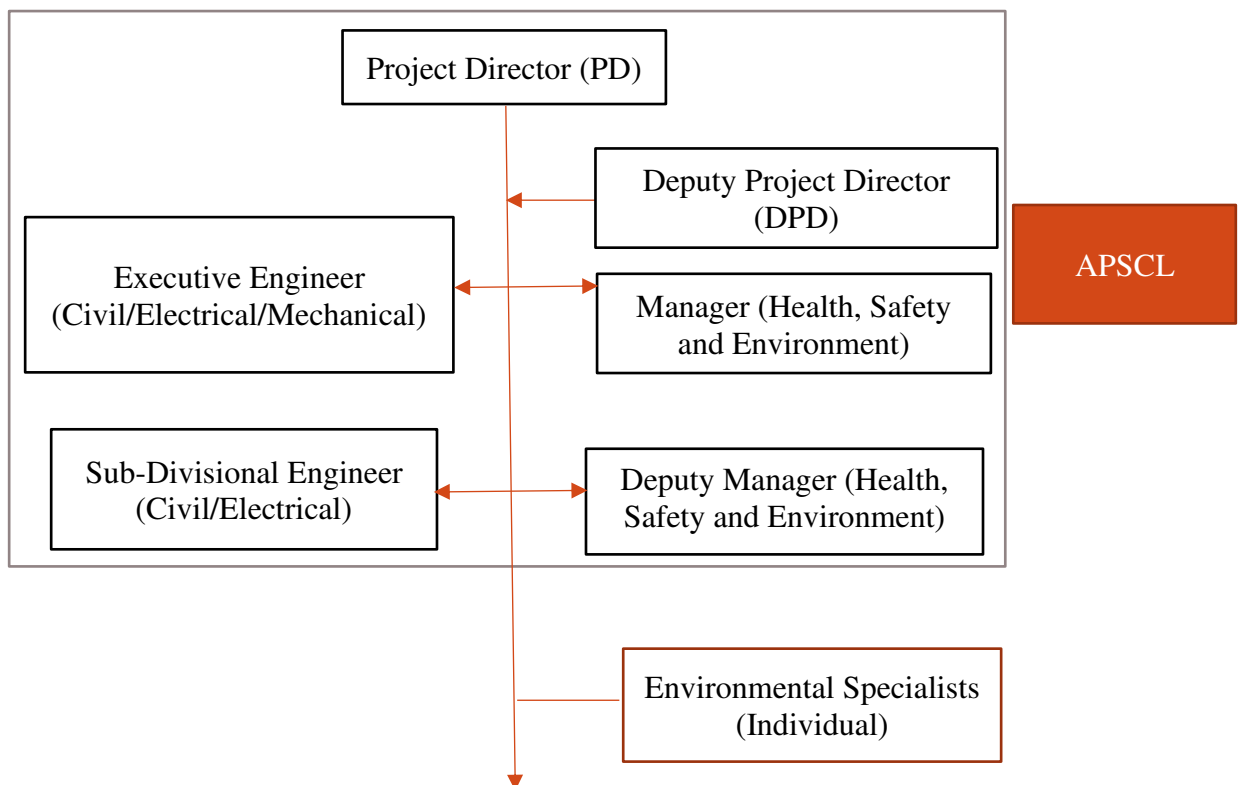
For the realization of SEMP, it is necessary to identify persons responsible for the performance of impact decrease/prevention actions, and those responsible for control over the given actions and to define their role at all stages of the project implementation.

During construction, APSCL, in collaboration with EPC Contractor and any sub-contractors, has been established, maintained, and strengthen as necessary an organisational structure that defines roles, responsibilities and authority to implement the SEMP.

Key SEMP responsibilities are defined and have been communicated to the relevant personnel and the rest of ASPCL as well as CNTIC and sub-contractors. Sufficient management sponsorship and human and financial resources will be provided on an on-going basis to achieve effective and continuous SEMP performance.

Management of environmental and social risks and impacts during construction is primarily the responsibility of the EPC Contractor through the EPC contract. During the construction phase, APSCL review and monitor EPC Contractors performance following the SEMP.

The overall Project organizational structure for the implementation of the SEMP is shown in Figure 3 and key roles for implementation and supervision of the SEMP are described in Annex-IV.



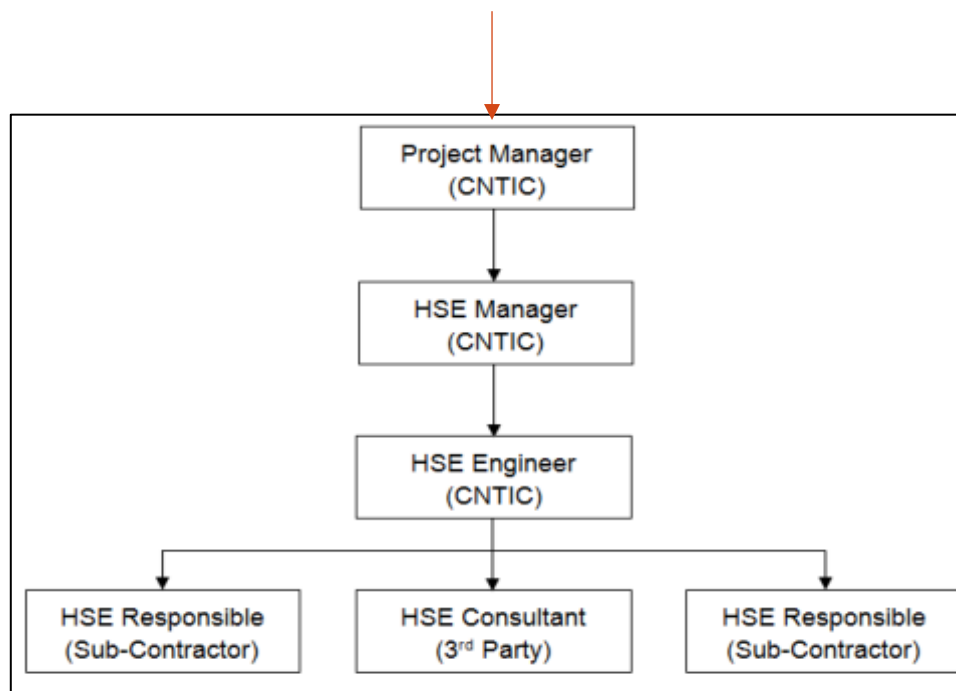


Figure-3: SEMP Organizational Structure

Project Environmental Key Personnel, Contact Names and Telephone Numbers

Sl. No.	Project Key personnel	Name of Key personnel	Telephone No.
01	Manager (HS&E), APSCL	Md. Atiqur Rahman	01717462670
02	Executive Engineer (Electrical.)	Md. Imrose Islam	01711100873
03	Executive Engineer (Civil.)	Mohammad Asadujjaman	01712238642
04	Manager (Chemical)	Md. Ashraful Islam	01717650871
05	Deputy Manager (HS&E)	A.K.M. Humayan Kabir Dewan	01730025431
06	Sub-Divisional Engineer (Electrical)	Aminul Islam	01739653761
07	Deputy Manager (Chemical)	Md. Yasin Molla	01923606305
08	Operator (3 Nos.)	1. Milon Kanti Das 2. Md. Wasi Uddin 3. Ashiq Hasan	
09	Independent Environmental Specialist	Mohammad Arifur Rahman	01711128593

2.2 Grievance Redressed Mechanism

A grievance redress mechanism (GRM) provides an opportunity for project affected persons to settle their complaints and grievances amicably. The established grievances redress procedures and mechanism ensures that project affected persons are provided with the appropriate compensations and that all administrative measures are in line with the law. It also allows project affected persons not to lose time and resources from going through lengthy administrative and legal procedures. During the construction phase of the project, the complaints that may be anticipated are mostly related to noise & vibration of the engines.

However, unforeseen issues may occur. To settle such issues effectively, an effective and transparent channel for lodging complaints and grievances is established. For ensuring proper implementation of GRM, APSCL has set-up a grievance redress committee (GRC) that will address any complaints during operational period of this project. But no grievance is recorded.

The representation in the committee makes project affected persons to have trust and build confidence in the system. The grievance redress committee reports its plan and activities to the Implementation committee. The following list presents members of the committee a figure-5 represents the step wise procedure of GRM.

Table-2: Members of the Committee of Grievance Redress (GRC)

Sl No	Designation
1.	Project Director (Chief Engineer), Ashuganj 400 MW East Project
2.	Chief Engineer (O&M), APSCL.
3.	Manager (HRM), APSCL.
4.	Manager (HS&E), APSCL.
5.	Deputy Manager (Security & Discipline), APSCL.
6.	Assistant Manager (Security & Discipline), APSCL.
7.	Chairman, Ashuganj Union Parishod, Member.

GRC will maintain a Complaints Database, which will contain all the information on complaints or grievances received from the communities or other stakeholders. This would include: the type of complaint, location, time, actions to address these complaints, and outcome.

The procedures to be followed and adopted by the grievance redress should be transparent and simple to understand or uniform process for registering complaints provide project affected persons with free access to the procedures. The response time between activating the procedure and reaching a resolution should be as short as possible. An effective monitoring system will inform project management about the frequency and nature of grievances. GRC will arrange half yearly meetings where the activities and the outcomes/measures taken according to the Complaints Database are to be monitored and reviewed to ensure the required transparency. In addition to the above, if there are any grievances related to environmental management issues in the project area, the GRC will record these grievances and suggestions and pass it on to the relevant personnel for necessary action and follow-up.

GRC will be responsible to response for the grievances within a time limit. The initial movement to identify the causes should be taken within 48 hours. The GRC will not take more than two weeks to take the final initiative.

In case a dispute is not resolved by arbitral tribunal, then if any of the Party disagrees, the aggrieved party has the right to appeal to the ordinary courts of law. However, the preferred option of dispute settlement ought to be the option of settling

the dispute amicably because recourse to courts may take a very long-time even years before a final decision is made and therefore, should not be the preferred option for both parties.

Beside this as per Labor Law 2018 and Clause no 81 of Labor Rules 2015, APSCL has an active ‘Safety Committee’ to address and solve the internal grievance regarding Health, Safety and Environmental issues. APSCL has established and published ‘Citizen’s Charter’ System to address any grievance related to it and to rectify the problem rapidly by proper system. The web link of this is: https://apscl.portal.gov.bd/site/view/citizen_charter/-.

APSCL has also online Grievance Redress System. The useful links of these are: <http://apscl.gov.bd/site/page/929f626c-752c-4724-9680-845d0414883f/Process-Map> & <http://www.grs.gov.bd/> .

If anybody is affected by this 400 MW CCPP (East) project activities or any other power generating unit of APSCL can give complain here.

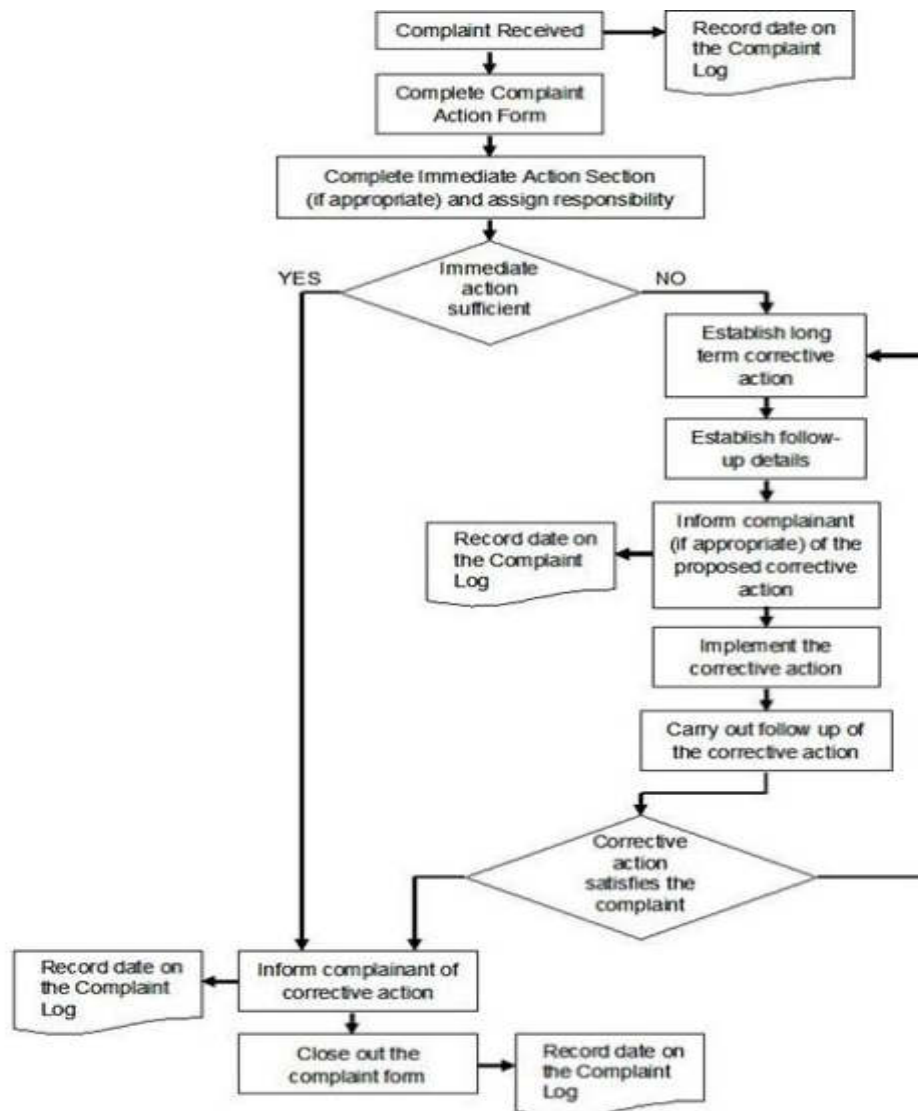


Figure- 4 : Flowchart of Complain/Grievance Procedure

CHAPTER 3

COMPLIANCE OF NATIONAL REGULATIONS AND ADB LOAN COVENANTS

3.0 COMPLIANCE OF NATIONAL REGULATIONS

3.0.1 Environmental Conservation Rules 1997

3.0.1.2 Regulatory Compliance Progress:

Government of Bangladesh (GoB) Guidelines for Air and Noise Quality

For carrying out the production, the standard for air and noise quality of the environment shall be determined in accordance with the standard specified in Schedule 2 and Schedule 4 in the Environment Conservation Rules 1997, compiled by DoE, Ministry of Environment and Forest, GoB. Schedule 2 and 4 are presented in Table 4 and Table 5 respectively. The revised National Ambient Air Quality Standards Published in the Bangladesh Gazette (19 July 2005) and Noise Level Standard Published in the Bangladesh Gazette (7 September 2006) is shown in Table 6 and Table 7 respectively.

The guidelines for acceptable noise level, especially outside plant boundary have been considered as levels recommended by internationally acclaimed standards. Bangladesh has categorized the noise by the following levels.

Table -3: Bangladesh Standards for Ambient Air

Location	Unit	SPM (Suspended Particulate matters)	SO ₂ (Sulphur dioxide)	NO _x (Oxide of Nitrogen)
Industrial and mixed area	mg/m ³	500	120	100
Commercial and mixed area	mg/m ³	400	100	100
Residential and Rural area	mg/m ³	200	80	80
Sensitive area	mg/m ³	100	30	30

*Source: (Schedule-2, Rule 12, Environment Conservation Rules 1997)

Notes:

- The sensitive area includes national monuments, health resorts, hospital, archaeological sites, educational institutions and other government-designated area (If any).
- Any industrial unit located not in a designated industrial area will not discharge such pollutants, which may contribute exceed the ambient air quality above in the surrounding areas of residential and sensitive areas.
- Suspended particulate matters mean airborne particles of diameters of 10 microns or less.

Table -4: Bangladesh Standards for Noise

Location Category	Standards determined at dB(A) unit	
	Day	Night
Silent Zone	45	35
Residential Area	50	40
Mixed Area (Basically, residential, and together used for commercial and Industrial purposes)	60	50
Commercial area	70	60
Industrial area	75	70

*Source: ECR Schedule 4, A Compilation of Environmental Laws, DoE

Notes:

- Limits presented are one-hour energy equivalent sound exposure limits;
- 'Daytime' is 06.00 AM to 09.00 PM, 'Nighttime' is 09.00 PM to 06.00 AM; and
- Sound exposure at a receptor resulting solely from the facility, irrespective of ambient sound levels, should not exceed the presented limits.

Table -5: Bangladesh Standards for Ambient Air (Revised 19th July, 2005)

Pollutant	Objective	Averaging Time
PM _{2.5}	15 µg /m ³	Annual (f)
	65 µg /m ³	24-hour (h)
PM ₁₀	50 µg /m ³	Annual (b)
	150 µg /m ³	24-hours(g)
SPM	200 µg /m ³	8-hours
SO ₂	80 µg / m ³ ; (0.03 ppm)	Annual
	365 µg / m ³ ; (0.14 ppm)	24-hour (a)
NO _x	100 µg /m ³ ; (0.053 ppm)	Annual
CO	10mg/m ³ ; (9 ppm) (a)	8-hours (a)
	40mg/m ³ ; (35 ppm) (a)	1-hour (a)
Lead	0.5 µg/m ³	Annual (i)
Ozone	157 µg /m ³ ; (0.08 ppm)	8-hour (e)
	235 µg /m ³ ; (0.12 ppm)	1-hour(d)

Notes:

- Not to be exceeded more than once per year
- The objective is attained when the annual arithmetic mean is less than or equal to 50µg/m³.
- The objective is attained when the expected number of days per the calendar year with a 24-hour average of 150µg/m³ is equal to or less than 1.
- The objective is attained when the expected number of days per the calendar year with the maximum hourly average of 0.12 ppm is equal to or less than 1.
- 3-year average of annual 4th highest concentration
- Spatially averaged over designated monitors
- From the 99th percentile.
- From the 98th percentile,
- Annual arithmetic average based on lead analysis of TSP samples operated on an every 6th-day schedule.

Table -6: Bangladesh Standards for Noise (Revised 7th September, 2006)
Schedule -1 Rules 5(2) (Area Based Noise level value)

Location Category	Standards determined at dB(A) Leq unit	
	Day	Night
Silent Zone	50	40
Residential Area	55	45
Mixed Area (Basically residential and together used for commercial and Industrial purposes)	60	50
Commercial area	70	60
Industrial area	75	70

*Source: ECR Schedule 1 (Revised 7th September 2006), A Compilation of Environmental Laws, DoE

3.1 COMPLIANCE OF ENVIRONMENTAL COVENANTS FROM THE ADB LOAN AGREEMENT

3.1.1 Covenants from the ADB Loan Agreement

Covenants	Reference	Compliance status
Environment		
<p>The borrower shall ensure, or cause APSCL to ensure, that the preparation, design, construction implementation, operation and decommissioning of the project and all project facilities comply with</p> <p>(a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety;</p> <p>(b) The environmental safeguards;</p> <p>(c) The EARF; and</p> <p>(d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguards monitoring report</p>	LA, Schedule 5, Para 2	<p>a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety is followed strictly in the project.</p> <p>b) The environmental safeguards and its related all safety measure are maintained in the project</p> <p>c) The EARF is followed as per requirements.</p> <p>d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguard monitoring report is followed and maintained properly and updated time to time. The proper environmental monitoring already carried out during pre-construction stage and is going on in construction and will be continue for post-construction phase or operation phase .</p>
Land Acquisition and Involuntary Resettlement		
<p>The borrower shall ensure, or cause APSCL to ensure, that all land and all rights-of-way required for the project, and all project facilities are made available to</p>	LA, Schedule 5, Para 3	<p>In the case of APSCL, this type of issues does not arise due to the project location. The project location is inside the premises</p>

Covenants	Reference	Compliance status
<p>the works contractor in accordance with the schedule agrees under the related works contract and all land acquisition and resettlement activities are implemented in compliance with</p> <p>(a)all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement;</p> <p>(b)the involuntary resettlement safeguards;</p> <p>(c)the RF; and</p> <p>(d) All measures and requirement set forth in the respective RP, and any corrective or preventive actions set forth in a safeguards monitoring report.</p>		<p>of APSCL own land. So, there is no requirements of Land Acquisition and Involuntary Resettlement</p>
Safeguards – Related provisions in bidding documents and works contracts		
<p>The borrower shall ensure, or cause each projects executing agency to ensure, that all bidding documents and contracts for works contain provisions that require the contractor to:</p> <p>(a) Comply with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report;</p> <p>(b) Make available a budget for all such environmental and social measures;</p> <p>(c) Provide the borrower with a written notice of any unanticipated environmental, resettlement or small ethnic community people risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP, the RP or any small ethnic community peoples plan;</p> <p>(d) Adequately record the condition of roads,</p>	<p>LA, Schedule 5, Para 7</p>	<p>(a) APSCL complies with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report;</p> <p>(b) Proper budget is allocated for all such environmental and social measures.</p> <p>(c) APSCL followed that properly as per requirements and standard of ADB Social Safeguard Policy.</p> <p>(d) its maintained as given guideline.</p> <p>(e) it followed as per requirements.</p>

Covenants	Reference	Compliance status
<p>agricultural and other infrastructure prior to starting to transport materials and construction;</p> <p>(e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.</p>		
Safeguards- Monitoring and Reporting		
<p>The borrower shall do the following or shall cause APSCL to do the following:</p> <p>(a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission;</p> <p>(b) If any unanticipated environmental and or social risks and impacts arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP or the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan;</p> <p>(c) No later than the mobilization of the turnkey contractor for APSCL's power plant, engage qualified and experienced external experts or qualified non-governmental organizations under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process, and facilitated the carrying out of any verification by such external experts; and</p> <p>(d) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP or the RP promptly after becoming aware of the breach.</p>	<p>LA, Schedule 5, Para 7</p>	<p>a) The proper Safeguards monitoring already being carried out during pre-construction stage and is going on in construction and will be continue for post-construction phase or operation phase.</p> <p>b) It is followed as per the ADB guideline.</p> <p>c) One Environmental Expert is engaged already, and he is monitoring and given his valuable comments and feedback to APSCL.</p> <p>d) As per EMP, we will follow the instruction.</p>
Labor standards		

Covenants	Reference	Compliance status
<p>The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors</p> <p>(a) Comply with all applicable labor laws and related international treaty obligations of the borrower and do not employ child labor as defined under Bangladesh law;</p> <p>(b) Provide safe working conditions for male and female workers;</p> <p>(c) Carry out HIV/ AIDS and human trafficking prevention and awareness campaigns in the campsites and corridors of influence;</p> <p>(d) Engage women worker as wage laborers depending on their skill; and</p> <p>(e) Provide equal wages for equal work between men and women</p>	LA, Schedule 5, Para 10	<p>a) APSCL complies exiting all labor laws and related international treaty obligations of the borrower and not engaged any child labor at the project site.</p> <p>b) APSCL is committed to provide safe working condition both for male and female workers and follow up regularly.</p> <p>c) APSCL arrange this type awareness program at the foundation training of the worker.</p> <p>d) Depend on woman worker skill we engaged them.</p> <p>e) Its maintained strictly.</p>

As per Asian Development Bank, Aide Memoire of Midterm Review Mission Loan 3350-BAN: Power System Expansion and Efficiency Improvement investment Program, Tranche-3 (19-30 April 2020), for successful implementation of the Project in time, the Mission advised to take immediate steps on the agreed time-bound actions as listed below(Annex-V):

Table- 7: Agreed Time-Bound Action Plans

Sl. No.	Action	Responsible Agency	Deadline	Status
1	Medical Facilities with immediate appointment of qualified doctor.	APSCL	30 June 2020	Engagement of medical doctor under process.
2	Translate all safety signage in Bangla	APSCL	15 June 2020	Bangla sign is in process but at present no Bangladeshi labour is working at this premises until the

				effect of corona virus declined.
3	Cumulative environmental impact analysis by APSCL for all of its power plant	APSCL	30 July 2020	We have done Environmental Impact Assessment (EIA) of Ashuganj East Project which is our extreme target but cumulative one under our consideration, delayed due to COVID-19 pandemic situation. Now we are in process to develop the TOR for Cumulative Environmental Impact Assessment.
4	Submit improved EMR with quality acceptable to ADB	APSCL	30 June 2020	Already done it.

CHAPTER 4

COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN

4.0 COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN

4.1 Major Environmental Activities of the Project

Major Environmental Activities of the project which will be during the construction period are given below:

- Influx of workers
- Transportation of equipment, materials and personnel; storage of materials
- Construction activities, including the operation of construction equipment.

4.1.1 Site-Specific Environmental Management Plan (SEMP)

The status is shown in following Table-8 and Table-9.

Table-8: HS&E and Social Mitigation and Management Plan for Pre-construction and Construction Phase

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
1	<ul style="list-style-type: none"> Dust emissions caused by construction activities, construction vehicle movements, transport of construction materials. Exhaust emissions from vehicles being used for transportation/operation of construction, materials/supplies and workforce. 	Air Quality	<ul style="list-style-type: none"> Appropriate siting and maintenance of stockpiles of materials so as to minimize dust blow (seek to achieve a distance of at least 500m from nearest sensitive receptors); The design of stockpiles will be optimized to retain a low profile with no sharp changes in shape; Minimizing drop heights for material transfer activities such as unloading of materials; All chutes, conveyors and skips will be covered at all times. Site access and roads will be regularly kept damp via a water browser; Wheel wash for all vehicles leaving the Project site will be provided; Open burning on the project site will be prohibited; Roads will be compacted and graveled if necessary; Site roads will be maintained in good order; Lorries transporting construction materials and soil will be covered appropriately to 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> SPM, PM_{2.5}, PM₁₀, NO₂, SO and CO monitoring at sensitive receptors in accordance with the requirements specified in Table 3; Vehicle, equipment and machinery checklists are observed; Annual maintenance records are observed. Community grievance mechanism implemented and records documented.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			avoid soil dispersion; <ul style="list-style-type: none"> • Enforcement of vehicle speed limits within the APSCL site to not exceed 10 km/h; • All sand and aggregates will be stored in bounded areas and will not be allowed to dry out unless specifically required; • On-site and off-site haul roads will be inspected for integrity and necessary repairs to the surfaces will be undertaken as soon as reasonable practicable; • All vehicles, equipment and machinery will undergo a pre-use inspection prior to use; • All vehicles will undergo periodic maintenance inspections; • Implement community grievance mechanism shown in the stakeholder engagement plan in Annex D. • Monitoring of Suspended Particulate Matter (SPM), Particulate Matter 2.5 (PM_{2.5}) and Particulate Matter 10 (PM₁₀), Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂) and Carbon Monoxide (CO) by third party consultant. 			
2	Increased noise in the Project area and at sensitive receptors a result	Noise	<ul style="list-style-type: none"> • Provision of a noise barrier around the project site to reduce off-site noise levels; 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S 	<ul style="list-style-type: none"> • Noise monitoring at sensitive receptors in accordance with

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
	of the use of construction activities, machinery and increased vehicle movements.		<ul style="list-style-type: none"> • Enforcement of vehicle speed limits which will not exceed 10 km/h within the APSCL site; • Strict controls of vehicle routing; • Diesel engine construction equipment will be fitted with silencers; • Noisy construction activities will be limited at night; • Light vehicle movements will be prohibited at night; • Piling activities will be carried out during the daytime hours (i.e. 7AM to 6PM); • Where possible the CCGT construction works and activities will conclude at 6PM daily; • Implementation of a community grievance mechanism shown in the stakeholder engagement plan in Annex D; • Monitoring of noise by a third party consultant. 		<p>Safeguard Consultants;</p> <ul style="list-style-type: none"> • Independent Local Environmental and Social Monitoring Consultant. 	<p>the requirements specified in Table 3;</p> <ul style="list-style-type: none"> • Community grievance mechanism implemented and records documented.
3	Site Clearance-Vegetation removal and Habitat disturbance	Terrestrial Biodiversity	<ul style="list-style-type: none"> • Hunting and poaching will be prohibited for staff, workers, all contractors and personnel engaged in or associated with the Project, with penalties levied, including fines and dismissal, and prosecution under the 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S Safeguard Consultants; 	<ul style="list-style-type: none"> • Vegetation clearance areas marked/fenced; • No. of floral species conserved or

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<p>relevant laws for clearing vegetation;</p> <ul style="list-style-type: none"> • Training to staff and workers on all rules, regulations and information concerning restrictions related to hunting and poaching will be provided, as well as the punishment that can be expected if any staff or workers or other person associated with the Project violates rules and regulations; • All vehicles are to maintain a speed of a maximum of 10km/hr within the APSCL site to reduce the risk of fauna strike; • The planned vegetation clearance area for the construction works shall be clearly identified and marked/fenced to avoid accidental clearing. 		<ul style="list-style-type: none"> • Independent Local Environmental and Social Monitoring Consultant. 	<p>planted recorded, if any;</p> <ul style="list-style-type: none"> • Workers Training Records showing appropriate training.
4	<p>Site clearance, excavation and disposal of material activities resulting in exposure of potentially contaminated soils and impacting groundwater.</p> <p>Spillage or leakage of substances on land, movement of equipment and vehicles on site resulting in contamination</p>	Soils and Groundwater	<ul style="list-style-type: none"> • Development of an effective site drainage systems designed to include allowance for climate change; • Restrict site access only to construction site areas; • Disposal of waste materials unsuitable for reuse on-site, (e.g. for landfilling) at appropriately licensed sites; • Installation of oil and suspended solid interceptors; • Management of excavations during 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> • Groundwater Monitoring in accordance with the requirements specified in Table 3. • Soil Quality Monitoring in accordance with the requirements specified in Table 3.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
	of soils and groundwater.		<p>construction to avoid the generation of drainage pathways to underlying aquifers;</p> <ul style="list-style-type: none"> • Provision of impermeable bases in operational areas to prevent absorption of spillages. • Scheduling clearance activities to avoid extreme weather events such as heavy rainfall, extreme dry and high winds. • Demarcate routes for movement of heavy vehicles to minimize disturbance of exposed soils and compaction of sub-surface layers. • Reuse topsoil within rehabilitation activities. • Control erosion through diversion drains, sediment fences, and sediment retention basins. • Stockpiles are to be located in areas surrounded by natural wind barriers to minimize the potential for wind erosion. • No septic tanks will be installed within 500m of a deep or shallow tube well used by the community for drinking water. • Septic tanks will be installed in well drained and permeable soils well above high groundwater level and where sufficient soil percolation exists for design wastewater loading rate. It will be appropriately 			

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<p>designed to prevent hazards to human health or contamination of land or water. Regular maintenance will be undertaken. No overflow of septic tank is permitted.</p> <ul style="list-style-type: none"> Quarterly monitoring of groundwater wells within 1 km of septic tanks by third party consultant; Annual soil quality sampling by third party consultant. 			
5	Increased suspended sediment and pollutant loads, permanent loss and disturbance to aquatic flora and fauna due to the construction of the intake structure and water discharge structure.	Aquatic Environment and River Water Quality	<ul style="list-style-type: none"> Construction Method Statement to be produced by the CNTIC; Coffer dam to be used during in-channel works to minimize downstream sediment release; Inlet structure construction in river will be undertaken outside the breeding season of fishes; Dredged areas will be limited to the minimum area required; Disposal of dredged sediments to an agreed site only; All works will be made clearly visible using flags, beacons and/or signals; Bank area will be reinstated following construction; 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Construction Method Statement by CNTIC River water sampling in accordance with the requirements specified in Table 3.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<ul style="list-style-type: none"> River water sampling during dredging and in river works by third party consultant. 			
6	Contamination of the aquatic environment as a result of construction activities on land e.g. spillages, disposal of liquid wastes; surface run-off, exposure of contaminated soils.	Aquatic Environment and River Water Quality	<ul style="list-style-type: none"> No discharge of effluents into the river. All effluents shall be collected and removed off site for treatment by approved firms or disposed after appropriate treatment at site (records of effluent transfers to be maintained); No discharge of surface water runoff direct into the river; Development of a temporary site drainage plan which reduces flow velocity and sediment load by passing discharge through a sediment pond; Protection of temporary stockpiles of soil from erosion by using a reduced slope angle where practical, sheeting and by incorporating sediment traps in drainage ditches; Stockpiles will be located at least 100 m from water bodies; All fuel, oil and chemicals will be stored in bounded area to accommodate 110% volume; Impermeable surfaces will be used for refueling; 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Waste transfer note system to document transport of waste; Temporary Site Drainage Plan; Workers Training Records showing appropriate training; River water sampling in accordance with the requirements specified in Table 3.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<ul style="list-style-type: none"> Regular training of all workers in spill response; Provision of spill equipment at easily accessible locations around the site; River water sampling by third party consultant. 			
7	Generation, handling, treatment and disposal of solid and liquid hazardous and non- hazardous wastes.	Environmental Quality	<ul style="list-style-type: none"> All waste taken off-site will be undertaken by a licensed contractor and the CNTIC will audit the disposal procedure; Collection and segregation of wastes and safe storage onsite will be undertaken; Prior agreement of standards for storage, management and disposal with relevant authorities will be obtained. Construction of sanitary latrine and septic tank system (one latrine for 20 persons); Erecting “no litter” sign, provision of waste bins/cans, where appropriate; Waste minimization, recycle and reuse will be undertaken; Appropriate disposal of solid waste (in designated waste bins); Development of a Waste Inventory (hazardous and non-hazardous) detailing waste name, waste classification, waste type, 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Waste Inventory (hazardous and non-hazardous) implemented. Waste transfer note system to document transport of waste.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<p>source of waste, waste storage area, storage quality, delivery quality, balance quality, agreement information with disposal company.</p> <ul style="list-style-type: none"> A system for documenting waste movements to be created. A trip ticket or waste transfer note system to be used to document all waste types leaving the Project area, their haulier, source, proposed disposal site etc. These tickets should be produced as counterfoil to create a full audit trail. 			
8	Health and Safety impacts due to construction traffic.	Local communities and workers.	<ul style="list-style-type: none"> Traffic Management Plan shown in Annex E to be implemented and updated as required; Adherence of abnormal load movements to prescribed routes, outside peak hours and advance publication to of movements to communities if required; Construction shifts will be staggered; Scheduling of traffic to avoid peak hours on local roads; Routing of transport to avoid residential areas; Provision of adequate signage and flagmen along transport route and at site entrance; Transportation of construction workers by 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Traffic Management Plan implemented and updated; Survey of roads and bridges prior to start of works for safety; Vehicle checklists observed; Annual maintenance vehicle records observed; Driver training records observed; Speed test monitoring results

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			contract bus; <ul style="list-style-type: none"> • Ensure all roads and bridges used by construction traffic are maintained in at least their current state during construction with any damage immediately repaired; • Condition survey of roads and bridges to be undertaken by third party consultant prior to start of works to provide a baseline for monitoring compliance; • Installation of appropriate traffic sign and warnings; • Enforce speed limit regulations on off-site access roads; • Speed limit of 10 km per hour within APSCL site; • Vehicles will be kept in good condition, with regular checks of vehicle condition undertaken to ensure compliance with national standards; • Ensure all Project drivers are trained in safety awareness; • Implement a grievance mechanism for communities. 			(onsite and offsite) observed; <ul style="list-style-type: none"> • Community grievance mechanism implemented and records documented.
9	Health and Safety impacts due to unauthorized	Local Communities.	<ul style="list-style-type: none"> • Public access to the site will be restricted; 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S 	<ul style="list-style-type: none"> • Site Security Procedures

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
	persons accessing the site.		<ul style="list-style-type: none"> Site security procedures to be established. 		Safeguard Consultants; <ul style="list-style-type: none"> Independent Local Environmental and Social Monitoring Consultant. 	established and implemented.
10	Health and Safety impacts due to influx of workers.	Local Communities.	<ul style="list-style-type: none"> Regular talks on communicable diseases including HIV to be held for all workers; Compulsory medical examinations for construction workers; Liaison with the local police and healthcare providers to ensure no additional pressure has been placed on them due to construction worker influx; Implement community grievance mechanism shown in the stakeholder engagement plan in Annex D. 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants; Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Workers Health and Education Procedures established and implemented; Workers Training Records showing appropriate trainings. Medical Examination Records observed; Records of engagement with local police and healthcare providers Community grievance mechanism implemented and

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
						records documented.
11	Potential chance finds of archaeological remains during Construction.	Cultural Heritage and Archaeology	<p>If remains are found, the following actions will be undertaken:</p> <ul style="list-style-type: none"> • Cease activities and consult archaeological department and DOE; • Protection in situ if possible; • Excavation of areas where protection not feasible following discussion and agreement of archaeological department and DOE. 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant 	<ul style="list-style-type: none"> • Cultural Heritage and Archaeology Site Find Records (if remains are found).
12	Occupational Health and Safety	Workers Health and Safety	<ul style="list-style-type: none"> • Sufficient and qualified HSE staff to ensure safe working practices. • Pre-construction and continued assessment of the HSE and social risks and hazards by implementing an HSE and social Risk Register; • Implementation of contractors HSE Plan which will considers the requirements of the WBG HSE Guidelines for Occupational, Health Safety; • Method Statement and Permit to Work procedures to be implemented. • Implementation of Fire Safety Plan prior to commissioning any part of the plant; 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> • APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant 	<ul style="list-style-type: none"> • HSE capacity and competency observed to be appropriate; • HSE and Social Risk Register established and reviewed; • Contractors HSE Plan established and implemented; • Method Statement and Permit to Work Procedures implemented

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<ul style="list-style-type: none"> • Implementation of Emergency Response and Disaster Management Plan shown in Annex F. • Provision of appropriate training on HSE issues for all workers; • Provision of health and safety information; • Regular inspection, review and recording of HSE performance; • Appointment of site nurse and provision of free on-site medical care for all construction staff; • Pest and vector borne disease control procedures established and be implemented; • Maintenance of a high standard of housekeeping at all times. • Provision of first aid equipment at easily • No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. And no unprotected ear should be exposed to a peak sound pressure level of more than 140 dB(C). The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reaches 140 dB(C), or the average maximum 			<p>appropriately.</p> <ul style="list-style-type: none"> • Fire Safety Plan; • Emergency Response and Disaster Management Plan established and implemented; • HSE Training Plan established and implemented; • HSE Training Records showing appropriate training; • Pest and vector borne disease control procedures established and implemented • Incident Reporting Procedure (records of fatalities, incidents, accidents, near misses and corrective actions) established and

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<p>sound level reaches 110 dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85dB(A);</p> <ul style="list-style-type: none"> Monthly monitoring of the quality of workers drinking water by third party consultant. 			<p>implemented.</p> <ul style="list-style-type: none"> Drinking water quality monitoring in accordance with requirements shown in Table 4.0.1.
13	COVID-19 Management	Workers Health and Safety	<ul style="list-style-type: none"> During this critical period, APSCL immediately formed a committee to take precautionary action against COVID-19 pandemic. Taken immediate action on to prevent spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL. Supply safety leaflet to office staff about mandatory requirements for wearing face masks, hand washing and other protective measures. Provide adequate hand washing facility at different location of plants. Restriction of people's movement in Plant & Residential areas. 	CNTIC (EPC Contractor)	<ul style="list-style-type: none"> APSCL; OE E&S Safeguard Consultants. Independent Local Environmental and Social Monitoring Consultant. 	<ul style="list-style-type: none"> Mandatory requirements for wearing face masks, hand washing and other protective measures. Daily body temperature check for all employees. Shifting duties for less gathering at site.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<ul style="list-style-type: none"> Prohibition of outsider's entry in residential areas. Regular announcement in residential colonies about updated decision/information of COVID-19 Committee of APSCL. Place the disinfectant items in prominent locations, including antiseptic liquid, hand sanitizer, disinfectant water spray for surface disinfection, disinfectant air spray for vehicles, etc. Distribute 2-layered fabric masks to all employees, all security personnel & enforcement to ensure use of it. LASER Temperature measurement thermometers to measure temperature of employees at each entry gate/point. Disinfect the workplace, canteen and other public area: 3 times a day & as required (at 8am and 5pm). Disinfect the facilities, operational vehicles: 3 times a day & as required (at 8am to 5pm). Vehicles need to be disinfected when entering or leaving. 			

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			<ul style="list-style-type: none"> Daily body temperature checking for all employees and outside parties, Local & foreign project workers on site: Every entry time a day (at 8am and 10pm). Maintaining “not to attend in office & no going to outside policy” if anybody feels fever/cough/any symptom of COVID-19 situation or other seasonal viral fever & immediate medical attention for it. Form a quarantine center with logistics to accommodate 25 persons (17 Male and 08 Female) at a time to ensure 14-day quarantine if needed and ensure home quarantine if anybody arrives from foreign country or from different part of Bangladesh to the plant. Two Ambulances with 24 hours service. An ambulance is fully dedicated for COVID-19 related services keeping a driver in spare. 			

Table-9: HS&E and Social Monitoring Plan for Construction

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
1	Air Quality	Dust generation and exhaust emissions.	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Dust generation activities onsite and offsite.	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> Bangladesh Environmental Conservation Rules, 1997. WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to ensure the implementation of mitigation measures by all contractors.	Weekly	APSCL	Dust generation activities onsite and offsite.	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB. 	<ul style="list-style-type: none"> Bangladesh Environmental Conservation Rules, 1997. WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			SPM, PM _{2.5} , PM ₁₀ , NO ₂ , SO ₂ and CO monitoring by third party	Once per month for a 24 hour period.	CNTIC	<ul style="list-style-type: none"> South-West side of Project area near APSCL Admin building. Location: 	<u>Particulates</u> Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. 	<ul style="list-style-type: none"> Bangladesh National Ambient Air Quality Standards –

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			consultant.			24°02'38.5'' N and 91°1'0.0'' E • Settlement, near south east corner of the project – Location: 24°02'34.7'' N and 91°01'8.7'' E • PDB High School – Location: 24°02'30.5'' N and 91°0'42.2'' E • Hazzi Jolli High School – Location: 24°02'31.7'' N and 91°0'30.3'' E • APSCL Dormitory – Location: 24°02'58.5'' N and 91°01'23.9'' E.	Particulate Sampler (Model-Envirotech India AAS-127BL). <u>Nitrogen Dioxide</u> Gravimetric <u>Sulphur Dioxide</u> Gravimetric <u>Carbon Monoxide</u> Gravimetric	• APSCL Semi-Annual Environmental Report for ADB	Environmental Conservation Rules – Schedule 2 (Amended in 2005) by S.R.O. No: 220-Law/2005. Refer to Annex G.
			Community Grievance	As received.	CNTIC	Not applicable	Visual observation	• CNTIC Monthly HSE Monitoring	• ADB Safeguards

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			Records					Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	Policy Statement: Environmental Safeguards, 2009.
2	Noise	Construction noise from machinery and vehicle movements	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Noise generation activities onsite and offsite.	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• Bangladesh Environmental Conservation Rules, 1997. • WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Noise generation activities onsite and offsite.	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	• Bangladesh Environmental Conservation Rules, 1997. • WBG General EHS Guidelines for Construction and Decommissioning, 2007.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			Noise monitoring of LAeq, one 1 hour noise levels by third party consultant.	Once per month for a 24 hour period.	CNTIC	<ul style="list-style-type: none"> • South-West side of Project area near APSCL Admin building. Location: 24°02'38.5'' N and 91°1'0.0'' E • Settlement, near south east corner of the project – Location: 24°02'34.7'' N and 91°01'8.7'' E • PDB High School – Location: 24°02'30.5'' N and 91°0'42.2'' E • Hazzi Jolli High School – Location: 24°02'31.7'' N and 91°0'30.3'' E • APSCL Dormitory – Location: 	Noise quality is being measured instantly on the site by CEM Sound level meter (Model DT8850. Continuous monitoring observed at each location.	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB. 	<ul style="list-style-type: none"> • Bangladesh Standard for Sound – Environmental Conservation Rules – Schedule 4. Refer to Annex G. • WBG General EHS Guidelines for Construction and Decommissioning, 2007.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
						24°02'58.5'' N and 91°01'23.9'' E.			
			Community Grievance Records	As received.	CNTIC	Not applicable	Visual observation	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> • ADB Safeguards Policy Statement: Environmental Safeguards, 2009.
3	Terrestrial Biodiversity	Site Clearance - Vegetation removal and Habitat disturbance	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site	Visual observation	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> • ADB Safeguard Policy Statement: Environmental Safeguards, 2009.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Construction Site	Visual observation	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental 	<ul style="list-style-type: none"> • ADB Safeguard Policy Statement: Environmental Safeguards, 2009.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
								Report for ADB.	
4	Soils and Groundwater	Site clearance, excavation and disposal of material, exposure of potentially contaminated soils, spillage or leakage of substances on land, movement of equipment and vehicles on site.	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site	Visual observation	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> • WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Construction Site	Visual observation	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB. 	<ul style="list-style-type: none"> • WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Groundwater monitoring for Groundwater level, pH, TDS, Ammonia, Nitrate, Phosphate,	Quarterly (every 3 months)	CNTIC	i. Inside the project area. Location: 24° 02'38.1"N and 91° 0'58.0"E ii. South-west side of Project area near PDB High School. Location: 24°	pH – pH meter; TDS – TDS meter Ammonia – Photometric. Nitrate –	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental 	<ul style="list-style-type: none"> • Bangladesh Standard for Drinking Water – Environmental Conservation Rules – Schedule 3.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			Arsenic (As), Iron (Fe), Manganese (Mn) and Coliforms by third party consultant.			2'30.5"N and 91°00'42.2"E. iii. South-East side of the project. Location: 24° 02'34.1"N and 91° 1' 9.3"E iv. North-East side of the project area. Location: 24° 02' 47.2"N and 91° 1' 12.3"E	Potentiometric. Phosphate – Photometric. As – Atomic Absorption Spectroscopy. Fe – Spectrophotometer. Mn – Atomic Absorption Spectroscopy. Coliforms – Membrane Filter Techniques.	Report for ADB.	Refer to Annex G.
			Soil quality monitoring for Chromium (Cr), Cadmium (Cd), Lead (Pb) and Oil & Grease.	Annual	CNTIC	One location on the construction site.	Cr - Acid digestion and AAS; Cd - Acid digestion and AAS; Pb - Acid digestion and AAS; Oil & Grease - EPA	<ul style="list-style-type: none"> • CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB. 	

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
							9071 B (Oil & Grease) in soil.		
5, 6	Aquatic Environment and River Water Quality	Increased suspended sediment and pollutant loads, permanent loss and disturbance to aquatic flora and fauna due to construction of the intake structure and water discharge structure.	Implementation of mitigation measures and assessment of performance indicators.	Daily during dredging and in river works.	CNTIC	Dredging area and in river works.	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly during dredging and in river works.	APSCL	Dredging area and in river works.	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB. 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			River water sampling during dredging and in river works for Temperature, pH, Chemical	Weekly during dredging and in river works.	CNTIC	i. North-West side of Project area near the project location (Upstream) Location: 24°02'53.1'' N and 91°01' 3.1'' E ii. North-West side	Temperature – Mercury Filled Thermometer; pH – pH meter; COD – Open Reflux; BOD – 5-day BOD test; DO – DO meter. Oil & Grease – APHA	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental 	<ul style="list-style-type: none"> Bangladesh Standard for Inland Surface Water – Environmental Conservation Rules – Schedule 3.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			Oxygen Demand (COD), Biochemical Oxygen Demand 5 (BOD5), Dissolved Oxygen (DO), oil & grease, Chromium (Cr), Cadmium (Cd) and Lead (Pb) by third party consultant.			of Project area and near Ashuganj Chor Sonarampur (Down stream) Location: 24°02'44.0'' N and 91°00' 33.2'' E iii. North-East side of Project area near APSCL power plant area (outfall) Location: 24°02'40.3'' N and 91°01' 10.8'' E	– 5520. B Cr – Atomic Absorption Spectroscopy Cd- Atomic Absorption Spectroscopy Lead - Atomic Absorption Spectroscopy	Report for ADB	Refer to Annex G.
		Contamination of the aquatic environment as a result of construction activities on land e.g. spillages, disposal of liquid	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to	Weekly	APSCL	Construction Site	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for 	<ul style="list-style-type: none"> WBG General EHS Guidelines for

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
		wastes; surface run-off, exposure of contaminated soils.	ensure the implementation of the mitigation measures.					APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	Construction and Decommissioning, 2007.
			River water sampling for Temperature, pH, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand 5 (BOD5), Dissolved Oxygen (DO), oil & grease, Chromium (Cr), Cadmium (Cd) and Lead (Pb) by third party consultant.	Monthly	CNTIC	i. North-West side of Project area near the project location (Upstream) Location: 24°02'53.1'' N and 91°01' 3.1'' E ii. North-West side of Project area and near Ashuganj Chor Sonarampur (Down stream) Location: 24°02'44.0'' N and 91°00' 33.2'' E iii. North-East side of Project area near APSCL power plant area (outfall) Location: 24°02'40.3'' N and 91°01' 10.8'' E	Temperature – Mercury Filled Thermometer; pH – pH meter; COD – Open Reflux; BOD – 5-day BOD test; DO – DO meter. Oil & Grease – APHA – 5520. B Cr – Atomic Absorption Spectroscopy Cd- Atomic Absorption Spectroscopy Lead - Atomic Absorption Spectroscopy	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• Bangladesh Standard for Inland Surface Water – Environmental Conservation Rules – Schedule 3. Refer to Annex G.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
7	Waste Management	Generation, handling, treatment and disposal of solid and liquid hazardous and non-hazardous wastes.	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Construction Site	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB. 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
8, 9, 10	Community Health and Safety	Construction Traffic;	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site and Offsite	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB 	<ul style="list-style-type: none"> WBG General EHS Guidelines for Construction and Decommissioning, 2007.
		Health and safety impacts due to influx of workers;	Monitoring	Weekly	APSCL	Construction Site	Visual observation	<ul style="list-style-type: none"> CNTIC Monthly 	<ul style="list-style-type: none"> WBG General

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
		safety impacts due to unauthorized persons accessing the site.	and supervision to ensure the implementation of the mitigation measures.			and Offsite		HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	EHS Guidelines for Construction and Decommissioning, 2007.
11	Cultural Heritage and Archaeology	Chance finds of archaeological remains.	Implementation of mitigation measures and assessment of performance indicators if archaeological remains discovered.	During the period when archaeological remains are found.	CNTIC and APSCL	Location of archaeological remains.	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• WBG General EHS Guidelines for Construction and Decommissioning, 2007.
12	Occupational Health and Safety	Workers Health and Safety	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• WBG General EHS Guidelines for Construction and Decommissioning, 2007.
			Monitoring and	Weekly	APSCL	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring	• WBG General EHS

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
			supervision to ensure the implementation of the mitigation measures.					Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	Guidelines for Construction and Decommissioning, 2007.
			Drinking water sampling for pH, Ammonia, Nitrate, Phosphate, Arsenic (As), Iron (Fe), Manganese (Mn) and Coliforms by third party consultant.	Monthly	CNTIC	Drinking water stations of the Project	pH – pH Meter; Ammonia – Photometric; Nitrate – Potentiometric; Phosphate – Photometric; As - Atomic Absorption Spectroscopy; Fe – Spectrophotometer; Mn - Atomic Absorption Spectroscopy; Coliforms - Membrane Filter Technique.	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	• Bangladesh Standard for Drinking Water – Environmental Conservation Rules – Schedule 3. Refer to Annex G.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
13	Plantation	Act as noise buffer, carbon sink,	Visual inspection to observe growth of saplings as per provided green belt design	Monthly	CNTIC	Project site	Visual monitoring	CNTIC Monthly HSE Monitoring Report for APSCL and DOE. APSCL Semi-Annual Environmental Report for ADB.	No standard.
14	COVID-19 Management	Workers Health and Safety	Mandatory requirements for wearing face masks, hand washing and other protective measures. Daily body temperature checking for all employees. Continue shifting duties for less gathering at site.	Daily	CNTIC	Project site	Visual observation	<ul style="list-style-type: none"> • CNTIC Weekly HSE Monitoring Report for APSCL. • APSCL Semi-Annual Environmental Report for ADB. 	WHO, CDC, ADB and Bangladesh Govt. guidelines.

CHAPTER 5

SEMI-ANNUAL ASSESSMENT OF CONSTRUCTION WORK'S IMPACT ON ENVIRONMENT

5. SEMIANNUALLY ASSESSMENT OF CONSTRUCTION WORK'S IMPACT ON AIR, WATER, NOISE, CONSTRUCTION WASTE AND LABOR CAMP MANAGEMENT

5.1 Impact on Air Quality

During the construction phase of the power plant project, the important sources of emissions would include those from the operations of construction equipment and machinery, vehicles carrying construction materials to the site and taking construction debris out of the site. If construction equipment, such as stone (aggregate) crusher is used at the site, this may result in significant emission of particulate matter during its operation. But to control it, the batching plant is situated in an isolated place outside of project area which has no impacts on the project and also its adjacent places. Since the construction of the power plant project would most likely involve significant earthworks, increase in particulate matter in the air from wind-blown dust is also a concern, to the project site. Ambient Air Quality was monitored from four different places at Ashuganj 400 MW CCPP (East) project such as Northside and south side of the plant. Test Results of Ambient Air Quality from these different places are presented in Table 12.

From the analysis of last Four months of 2020 results it is observed that the concentrations of all these parameters are within the allowable limit according to DoE and IFC/World Bank Standard.

So, the project construction activities do not hamper the air quality in the project area.

Table-10: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Analytical)

SI No.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks
				C	PC	NC	
1.	Ambient air Quality	PM10, PM2.5 SPM, SO _x , NO _x , CO, CO ₂ .	Monthly	√			
2.	River water	Temp., DO, BODs, COD, Oil and Grease and heavy metals (Cr, Cd, Pb)	Monthly	√			
3.	Groundwater	Ground water level, pH, TDS, Ammonia, Nitrate, Phosphate, As, Fe, Mn and Total Coliforms, Faecal coliform, faecal streptococci, vibrio cholera	Once in 3 months	√			
4.	Soil quality	Cr, Cd, Grease, Pb and Oil and	Once in 12 months	√			
5.	Noise level	Noise at different locations	Monthly	√			

SI N o.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Re ma rks
				C	PC	NC	
6.	Drinking water	pH, Ammonia, Nitrate, Phosphate, As, Fe, Mn and Total Coliforms, Faecal coliform, faecal streptococci, vibrio cholera	Monthly	√			

¹ C- Compliance, PC- Partially Compliance, NC- Non-Compliance

Table- 11: Test Result of Ambient Air Quality

PARTICULATE MATERIAL	LIMITS		JANUARY 2020					
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	AVERAGE JANUARY
PM 2.5	65 µg/m³	75 µg/m3	39.96	28.22	47.29	32.31	51.01	39.76
PM 10	150 µg/m³	150 µg/m3	133.45	104.4	96.18	118.66	143.33	119.21
SPM	200 µg/m³	NF	181.27	143.2	150.73	153.42	196.71	165.1
SO₂	365 µg/m³	125 µg/m³	14.39	11.73	21.18	9.22	21.13	15.53
NOx	NF	200 µg/m³	24.66	20.03	24.62	19.08	44.17	26.51
CO	9 ppm	NF	0	2	4	0	2	1.6
<div>Comments</div> <div>From the result, it is observed that the concentrations of all these parameters are within the allowable limit according to DoE and IFC/ World Bank Standard.</div>								
PARTICULATE MATERIAL	LIMITS		FEBRUARY 2020					
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	AVERAGE FEBRUARY
PM 2.5	65 µg/m³	75 µg/m3	33.07	38.31	31.26	38.72	38.52	35.98
PM 10	150 µg/m³	150 µg/m3	102.55	119.18	101.32	107.54	144.2	114.97
SPM	200 µg/m³	NF	143.73	167.16	142.63	151.47	180.3	157.07
SO₂	365 µg/m³	125 µg/m³	9.18	14.13	16.37	16.26	13.06	13.8
NOx	NF	200 µg/m³	18.06	22.41	20.17	19.58	28.44	21.73
CO	9 ppm	NF	2	8	0	0	8	3.6
<div>Comments</div> <div>From the result, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.</div>								
PARTICULATE MATERIAL	LIMITS		MARCH 2020					
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	AVERAGE MARCH
PM 2.5	65 µg/m³	75 µg/m3	30.31	37.14	33.15	29.46	42.17	34.45

PM 10	150 µg/m ³	150 µg/m ³	113.94	107.22	119.52	100.08	123.21	112.79
SPM	200 µg/m ³	NF	148.14	151.44	161.76	140.17	166.82	153.67
SO ₂	365 µg/m ³	125 µg/m ³	11.77	12.14	13.77	9.16	14.92	11.71
NO _x	NF	200 µg/m ³	16.73	18.84	18.74	28.22	20.46	20.6
CO	9 ppm	NF	0	0	4	0	4	1.6
<p style="text-align: center;"><u>Comments</u></p> <p>From the result, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.</p>								
PARTICULATE MATERIAL	LIMITS		JUNE 2020					
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	AVERAGE JUNE
PM 2.5	65 µg/m ³	75 µg/m ³	28.12	33.36	41.16	29.63	33.71	33.2
PM 10	150 µg/m ³	150 µg/m ³	101.55	98.72	119.01	100.31	92.15	102.34
SPM	200 µg/m ³	NF	133.32	135.45	169.71	128.22	136.20	140.58
SO ₂	365 µg/m ³	125 µg/m ³	11.10	10.71	6.92	8.81	13.35	10.18
NO _x	NF	200 µg/m ³	17.72	12.29	13.06	11.04	16.71	14.16
CO	9 ppm	NF	2	0	0	0	0	0.4
<p style="text-align: center;"><u>Comments</u></p> <p>From the analysis, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.</p>								

Keynote: Due to COVID-19 Pandemic, Monitoring of Ambient Air Quality was not performed for the Month of April and May-2020.

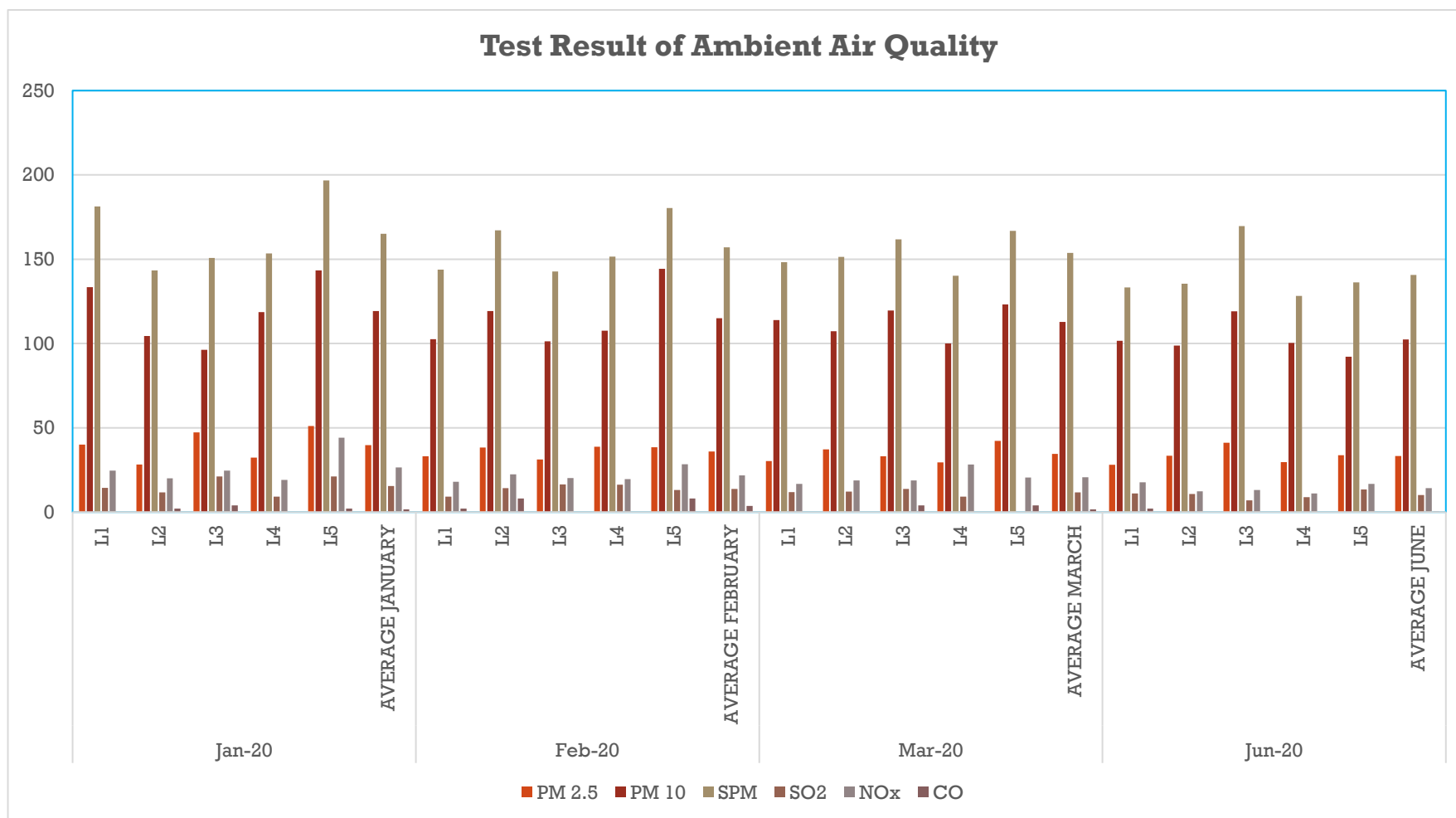


Figure- 5: Ambient Air Quality Test Result

5.2 Impact on Noise

During construction stage, major source of noise is expected to stem from transport vehicles which include barges and trucks. Also, noise is expected to be produced from plant construction activities. The construction phase may be broadly classified into two different groups:

- General Site and Plant Construction,
- Water and Effluent Treatment Plant construction, and
- Access Road Construction.

The measured noise level in the construction site is summarized in Table 13.

From these studies it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard.

It is also observed that last Four-months of 2020 noise level results have not exceed the previous year's (2019) last six-month results.

So, the project construction activities do not hamper the noise quality in the project area.

Table-12: Test Result of Noise Quality

NOISE	LIMITS		JANUARY 2020					
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Avg. January
Day (Min)	75	70	58.2	64.4	44.9	58.4	59.5	57.08
Day (Max)	75	70	67.0	68.1	57.8	64.8	64.9	64.52
Night (Min)	70	70	59.2	54.2	52.5	64.5	57.5	57.58
Night(Max)	70	70	63.1	57.2	55.8	66.6	59.0	60.34
Comments								
From these studies, it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard.								
NOISE	LIMITS		FEBRUARY 2020					
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Avg. February
Day (Min)	75	70	58.1	50.6	52.6	57.1	51.5	53.98
Day(Max)	75	70	64.6	62.5	60.3	62.9	61.7	62.4
Night (Min)	70	70	52.2	50.7	51.5	54.3	54.8	52.7
Night(Max)	70	70	57.3	56.7	59.4	62.4	61.3	59.95
Comments								
From these studies, it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard.								

NOISE	LIMITS		MARCH 2020					
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Avg. March
Day (Min)	75	70	59.4	48.4	58.2	61.3	54.1	56.28
Day(Max)	75	70	63.3	61.2	64.4	65.0	60.4	62.86
Night (Min)	70	70	53.2	44.5	55.7	50.4	48.1	50.38
Night(Max)	70	70	55.1	54.3	59.2	59.1	54.2	56.38
<p style="text-align: center;"><u>Comments</u></p> <p>From these studies, it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard.</p>								
NOISE	LIMITS		JUNE 2020					
(LAeq) dBA	DoE (Bangladesh) Standard *	IFC/World Bank Standard	L1	L2	L3	L4	L5	Avg. June
Day (Min)	75	70	53.3	51.6	45.2	50.5	41.1	48.34
Day(Max)	75	70	60.2	59.1	54.1	56.2	48.6	55.64
Night (Min)	70	70	49.2	50.2	42.5	48.3	42.1	46.46
Night(Max)	70	70	55.6	54.1	52.8	51.5	51.3	53.06
<p style="text-align: center;"><u>Comments</u></p> <p>From these studies, it was found that the ambient noise qualities of the Project area were found within the allowable limit of DoE, Bangladesh & IFC Standard.</p>								

Key Note: Due to COVID-19 Pandemic, Monitoring of Ambient Noise Quality was not performed for the Month of April and May-2020.

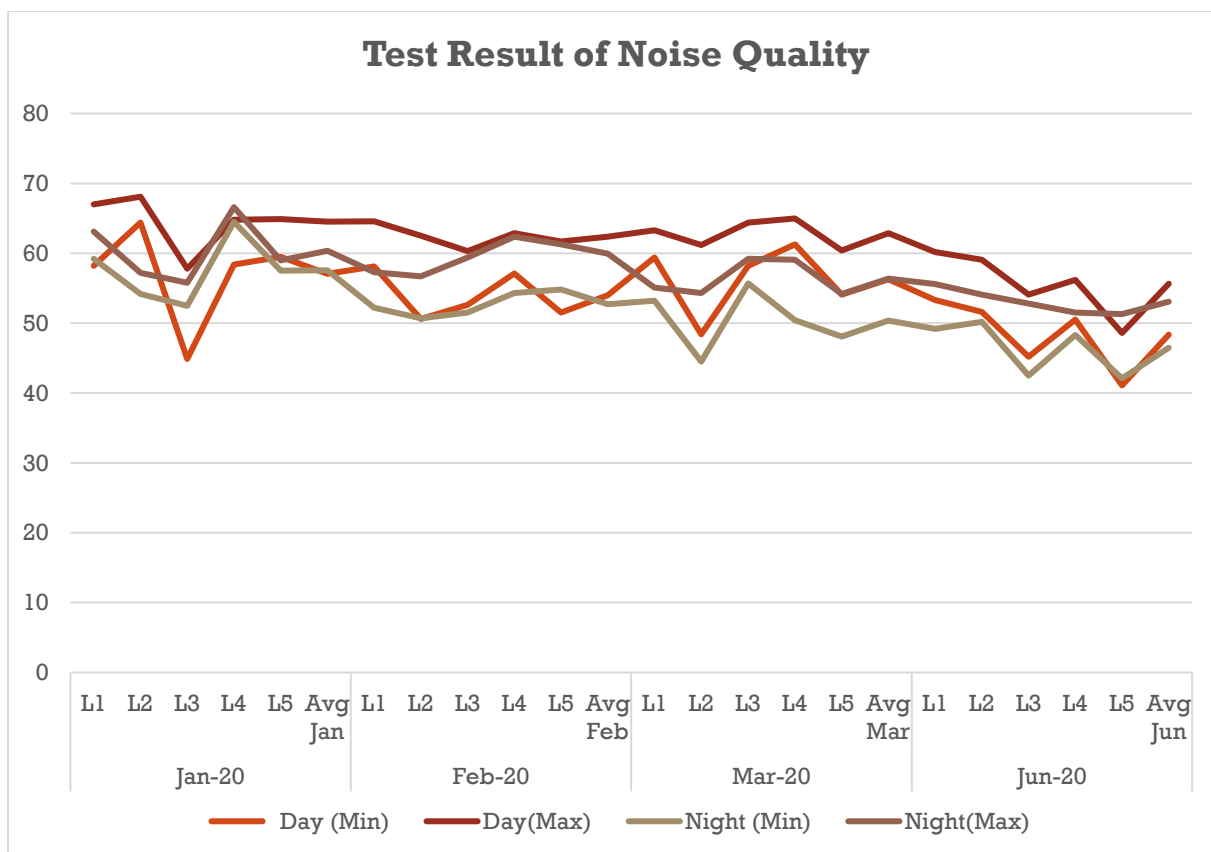


Figure- 6: Ambient Noise Quality Test Result

5.3 Impact on Water Quality

Health, Safety & Environment Division of APSCL has provided pure drinking water at several locations in APSCL plant area that also covers the under construction 400 MW CCPP (East) project to supply pure and safe drinking water to all the workers of this project and also to other employees, contractors and visitors of APSCL. Inside the project, drinking water jars are also filled with this pure drinking water for workers' convenience and easy availability of pure drinking water. The drinking, surface and groundwater sample were collected from the supplied drinking water, Meghna River and groundwater. The Meghna River passes through from East to West direction near the project area and there are few industries at the right bank of this river. So, the water of this river is less polluted that was also found from environmental monitoring. In Ground water samples we found excess amount of Fe, Mn, and As. Here are the probable causes:

Occurrence of high concentration of iron (Fe) in groundwater is very common particularly in areas of tropical climate. In groundwater, Fe generally occurs in the oxidation state - reduced soluble divalent ferrous iron (Fe^{2+}). When groundwater comes in contact with oxygen of the atmosphere, the Fe is oxidized to the ferric state and is precipitated as Fe-mineral. The subsurface reducing conditions have significant influence on the high Fe content of groundwater that is not influenced by project activities.

Manganese (Mn) is a metal that occurs naturally in soils, rocks and minerals. In the aquifer, groundwater meets this solid material dissolving it, releasing its constituents to the water.

Arsenic (As) is a natural element in soils, rocks, and minerals. In the aquifer, groundwater meets this inorganic arsenic to dissolve it, releasing its constituents to the water. This region is a Meghna delta. The origin of arsenic rich groundwater is due to a natural process, and it seems that the arsenic in groundwater has been present for thousands of years without being flushed from the delta. Arsenic is assumed to be present in alluvial sediments with high concentrations in sand grains as a coating of iron hydroxide. The sediments were deposited in valleys at upstream that eroded in the delta when the stream base level was lowered due to the drop in sea level during the last glacial advance. This is done by geochemical mobilization of arsenic that is not influenced by project activities.

It has been observed that from October, 2018 to December, 2019 the ground water is free from Arsenic and three sample locations out of four are at outsides of project area (Only G1 is nearby the project area). CNTIC-CCOEC Consortium has informed the local peoples as well as workers surrounding the locations marked G2, G3 & G4 for not to use this water for drinking purpose as the concentration of Arsenic is high.

From the analysis of all the parameters of drinking water, it was found within standard limit of DoE, Bangladesh & WHO. The drinking water is purified by six stages purification systems with alkaline RO and UV disinfection system that is produced from supplied water system of APSCL that is treated river water.

From the analysis, it has been observed that surface water quality was found within the acceptable limit of DoE and IFC. These indicate that the project is not posing any detrimental effect to surrounding environment by surface water pollution.

Table-13: Drinking Water Quality Test Result

DRINKING WATER	LIMITS		JANUARY 2020				
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	D1	D2	D3	D4	AVERAGE JANUARY
pH	6.5-8.5	6.5-8.5	7.04	7.02	7.02	7.02	7.02
Ammonia	0.5 mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	50 mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Phosphate	6 mg/l	---	<0.04	<0.04	<0.04	<0.04	<0.04
As	0.05 mg/l	0.01 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fe	0.3 -1 mg/l	0.3 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	0.1 mg/l	0.5 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Total Coliform	0/100 ml	0/100 ml	0	0	0	0	0
Faecal Coliform	0/100 ml	0/100 ml	0	0	0	0	0

<p style="text-align: center;"><u>Comments</u></p> <p style="text-align: center;">From the above analysis result, it is found that all the parameters are within allowable limit.</p>							
DRINKING WATER	LIMITS		FEBRUARY 2020				
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	D1	D2	D3	D4	AVERAGE FEBRUARY
pH	6.5-8.5	6.5-8.5	7.02	7.03	7.02	7.04	7.02
Ammonia	0.5 mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	50 mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Phosphate	6 mg/l	---	<0.04	<0.04	<0.04	<0.04	<0.04
As	0.05 mg/l	0.01 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fe	0.3 -1 mg/l	0.3 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	0.1 mg/l	0.5 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Total Coliform	0/100 ml	0/100 ml	0	0	0	0	0
Faecal Coliform	0/100 ml	0/100 ml	0	0	0	0	0
<p style="text-align: center;"><u>Comments</u></p> <p style="text-align: center;">From the above analysis result it is found that, all the parameters are within allowable limit.</p>							
DRINKING WATER	LIMITS		MARCH 2020				
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	D1	D2	D3	D4	AVERAGE MARCH
pH	6.5-8.5	6.5-8.5	7.12	7.10	6.82	6.88	6.98
Ammonia	0.5 mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	50 mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Phosphate	6 mg/l	---	<0.04	<0.04	<0.04	<0.04	<0.04
As	0.05 mg/l	0.01 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fe	0.3 -1 mg/l	0.3 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	0.1 mg/l	0.5 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Total Coliform	0/100 ml	0/100 ml	0	0	0	0	0
Faecal Coliform	0/100 ml	0/100 ml	0	0	0	0	0
<p style="text-align: center;"><u>Comments</u></p> <p style="text-align: center;">From the above analysis result, it is found that all the parameters are within allowable limit.</p>							
DRINKING WATER	LIMITS		JUNE 2020				
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	D1	D2	D3	D4	AVERAGE JUNE
pH	6.5-8.5	6.5 -8.5	7.10	7.13	6.94	7.02	7.04
Ammonia	0.5 mg/l	---	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate	10 mg/l	50 mg/l	<1.0	<1.0	<1.0	<1.0	<1.0
Phosphate	6 mg/l	---	<0.04	<0.04	<0.04	<0.04	<0.04

As	0.05 mg/l	0.01 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Fe	0.3 -1 mg/l	0.3 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	0.1 mg/l	0.5 mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Total Coliform	0/100 ml	0/100 ml	0	0	0	0	0
Faecal Coliform	0/100 ml	0/100 ml	0	0	0	0	0
<p style="text-align: center;">Comments</p> <p>From the above analysis result it is discernible that, all the parameters conform to the given standards.</p>							

Keynote: Due to COVID-19 Pandemic, Monitoring of Drinking Water Quality was not performed for the Month of April and May-2020.

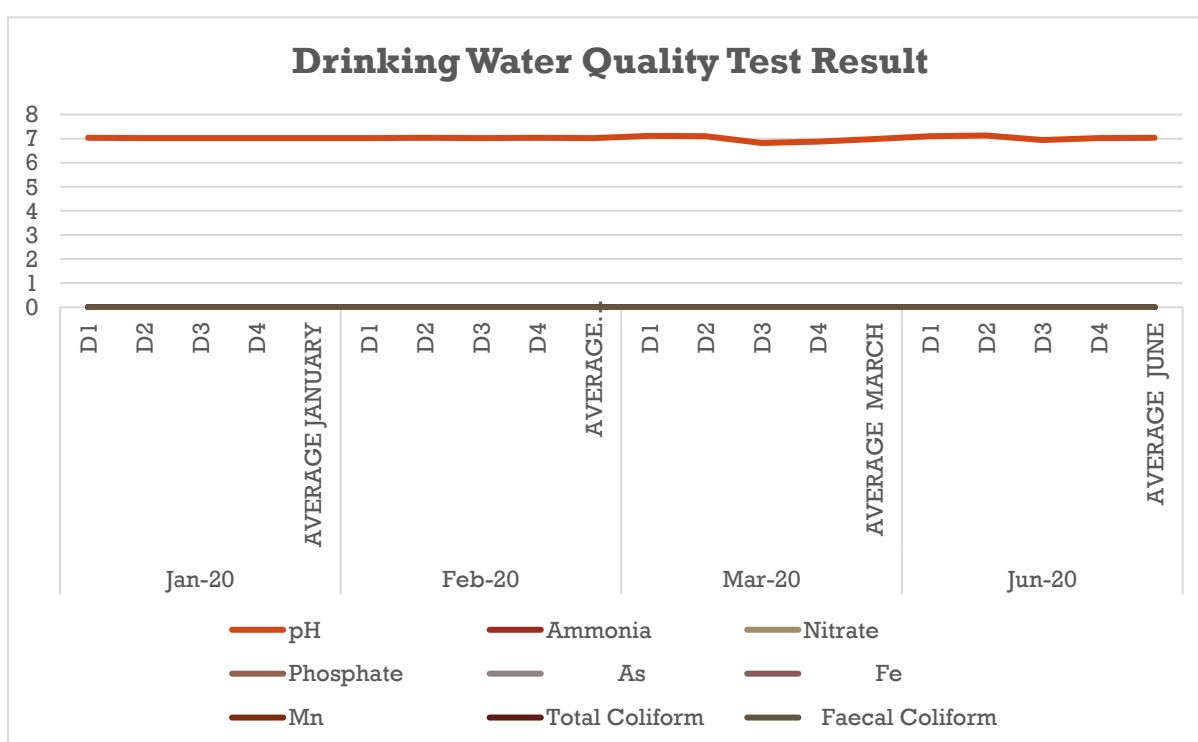


Figure- 7: Drinking Water Quality Test Result

Table-14: River Water Quality Test Result

RIVER WATER	LIMITS		JANUARY 2020			
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Upstream	Downstream	Outfall	AVERAGE JANUARY
Temperature	40°C	---	21.4	21.8	19.5	20.9
Dissolved Oxygen (DO)	4.5-8 mg/l	---	7.12	6.94	7.51	7.19
BOD5	50 mg/l	50 mg/l	0.6	0.3	1.0	0.63

COD	200 mg/l	250 mg/l	2.9	2.4	6.7	4
Chromium (Total)	0.5 mg/l	0.5 mg/l	0.05	0.02	0.02	0.03
Cadmium	0.5 mg/l	0.1 mg/l	<0.002	<0.002	<0.002	<0.002
Lead (Pb)	0.1 mg/l	0.1 mg/l	<0.05	<0.05	<0.05	<0.05
Oil & Grease	10 mg/l	10 mg/l	2.9	1.4	0.7	1.67

Comments

From the analysis, it has been observed that all parameters were found within the acceptable limit of DoE and IFC. These indicate that the project is not posing any detrimental effect to surrounding environment by surface water pollution.

RIVER WATER	LIMITS		FEBRUARY 2020			
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Upstream	Downstream	Outfall	AVERAGE FEBRUARY
Temperature	40°C	---	22.6	24.0	20.2	22.27
Dissolved Oxygen (DO)	4.5-8 mg/l	---	6.87	6.92	6.90	6.9
BOD5	50 mg/l	50 mg/l	1.0	0.3	1.0	0.77
COD	200 mg/l	250 mg/l	4.6	1.6	5.2	3.8
Chromium (Total)	0.5 mg/l	0.5 mg/l	<0.02	<0.02	<0.02	<0.02
Cadmium	0.5 mg/l	0.1 mg/l	<0.002	<0.002	<0.002	<0.002
Lead (Pb)	0.1 mg/l	0.1 mg/l	<0.05	<0.05	<0.05	<0.05
Oil & Grease	10 mg/l	10 mg/l	0.5	0.5	1.3	0.77

Comments

From the analysis, it has been observed that all parameters were found within the acceptable limit of DoE and IFC. These indicate that the project is not posing any detrimental effect to surrounding environment by surface water pollution.

RIVER WATER	LIMITS		MARCH 2020			
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Upstream	Downstream	Outfall	AVERAGE MARCH
Temperature	40°C	---	24.4	25.4	23.6	24.47
Dissolved Oxygen (DO)	4.5-8 mg/l	---	6.94	6.66	6.84	6.81
BOD5	50 mg/l	50 mg/l	0.9	0.4	0.9	0.73
COD	200 mg/l	250 mg/l	4.1	1.8	4.7	3.53
Chromium (Total)	0.5 mg/l	0.5 mg/l	<0.02	<0.02	<0.02	<0.02
Cadmium	0.5 mg/l	0.1 mg/l	<0.002	<0.002	<0.002	<0.002
Lead (Pb)	0.1 mg/l	0.1 mg/l	<0.05	<0.05	<0.05	<0.05
Oil & Grease	10 mg/l	10 mg/l	1.6	2.8	0.9	1.76

<p style="text-align: center;"><u>Comments</u></p> <p>From the analysis, it has been observed that all parameters were found within the acceptable limit of DoE and IFC. These indicate that the project is not posing any detrimental effect to surrounding environment by surface water pollution.</p>						
RIVER WATER	LIMITS		JUNE 2020			
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	Upstream	Downstream	Outfall	AVERAGE JUNE
Temperature	40°C	---	21.4	22.7	19.0	21.03
Dissolved Oxygen (DO)	4.5-8 mg/l	---	6.14	6.27	6.61	6.34
BOD5	50 mg/l	50 mg/l	0.5	0.5	1.0	0.67
COD	200 mg/l	250 mg/l	4.0	4.8	4.1	4.3
Chromium (Total)	0.5 mg/l	0.5 mg/l	<0.02	<0.02	<0.02	<0.02
Cadmium	0.5 mg/l	0.1 mg/l	<0.002	<0.002	<0.002	<0.002
Lead (Pb)	0.1 mg/l	0.1 mg/l	<0.05	<0.05	<0.05	<0.05
Oil & Grease	10 mg/l	10 mg/l	1.0	1.0	1.0	1.0
<p style="text-align: center;"><u>Comments</u></p> <p>From the analysis, it has been observed that all parameters were found within the acceptable limit DoE and IFC. These indicate that the project is not posing any detrimental effect to surrounding environment by surface water pollution.</p>						

N.B: Due to COVID19 Pandemic Monitoring of River Water Quality was not performed for the Month of April and May-2020.

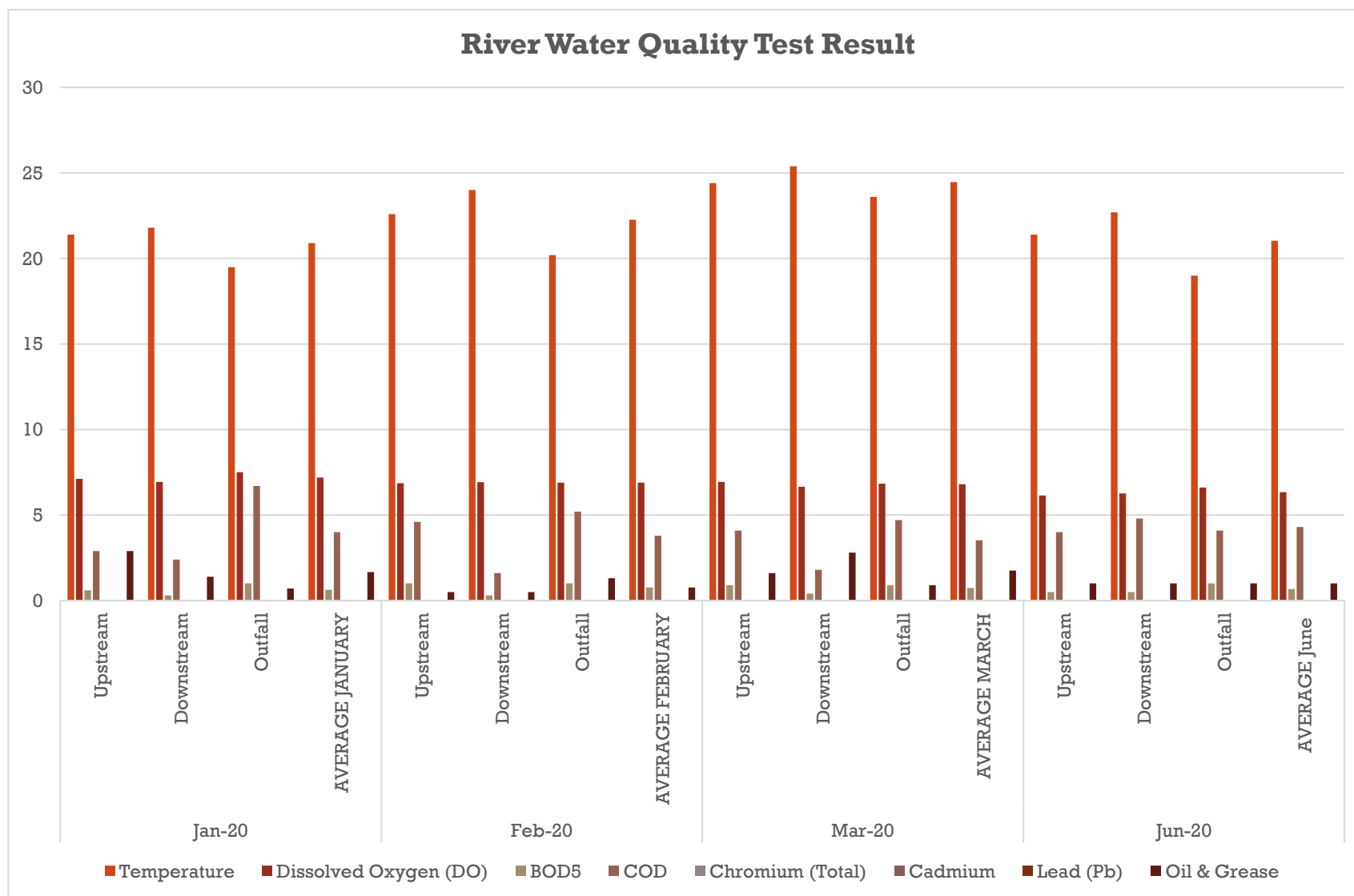


Figure- 8: River Water Quality Test Result

Table-15: Ground Water Quality

GROUND WATER	LIMITS		JANUARY 2020				
PARAMETER	DoE (Bangladesh) Standard *	IFC/World Bank Standard	G1	G2	G3	G4	AVERAGE JANUARY
pH	6.5-8.5	6.5-8.5	5.95	5.78	5.78	6.37	5.97
TDS	1000 mg/l	1200 mg/l	296	321	302	318	309.25
Ammonia	0.5 mg/l	---	<0.01	<0.01	0.05	<0.01	0.015
Nitrate	10 mg/l	50 mg/l	<1	3.5	1.6	1.5	
Phosphate	6 mg/l	---	0.08	0.18	0.2	0.1	0.14
As	0.05 mg/l	0.01 mg/l	0.003	0.09	0.09	0.004	0.07
Fe	0.3 - 1 mg/l	0.3 mg/l	0.43	11.48	2.48	2.21	4.15
Mn	0.1 mg/l	0.5 mg/l	<0.1	0.1	0.1	0.2	0.125
Total coliform	0/100 ml	0/100 ml	0	0	0	0	
Faecal Coliform	0/100 ml	0/100 ml	0	0	0	0	

Comments

From the analysis most of the parameters of ground water were found within standard limit of DoE, Bangladesh & WHO except:

- Concentration of Iron (Fe) at location G2, G3 and G4 exceeds the limit to some extent.
- Concentration of Arsenic (As) at location G2, and G3 exceeds the limit to some extent.
- Concentration of Manganese (Mn) at G4 exceeds the limit to some extent.
- These are done by geochemical mobilization of these naturally occurring elements in subsurface soil & ground water that are not influenced by project activities. This ground water is not used for drinking or any other purpose here. So, there is no significant negative impact of this water on people and environment.

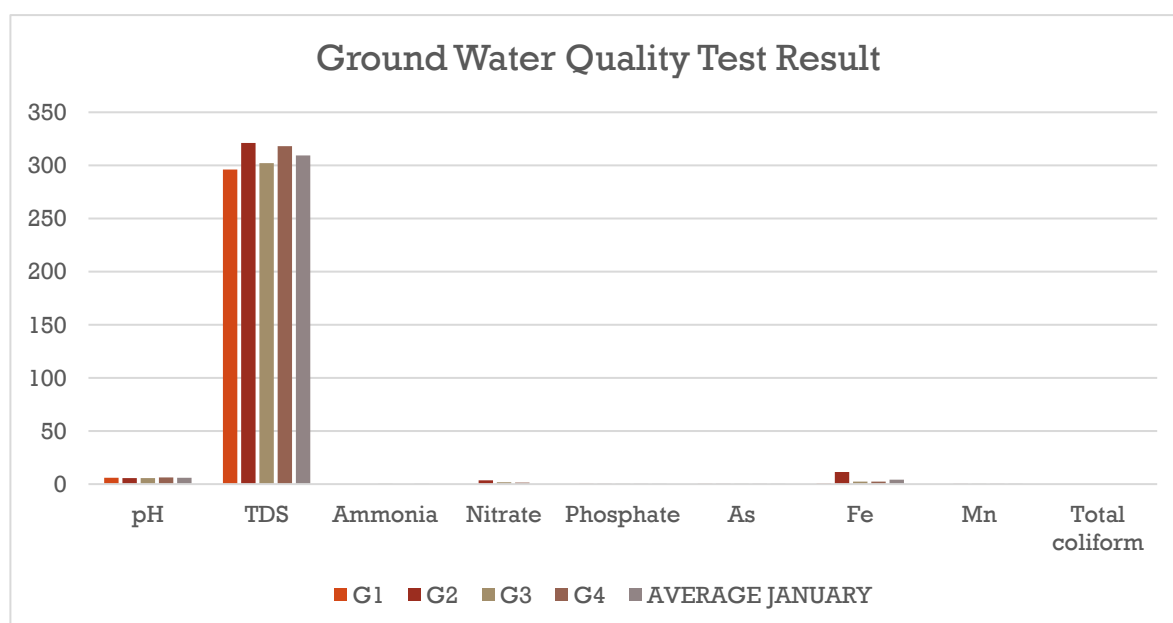


Figure-9: Ground Water Quality Test Result

5.4 Impact on Waste and Labor Camp

Construction debris and wastes to be generated during the construction phases are scrap iron, steel, wooden frames, piping, and other solid wastes. Most of them are generated toward the end of the construction phase during carrying out of the finishing works, while the site will be cleared of waste materials. The volume of such construction wastes is likely to be significant. Indiscriminate storage and disposal of this construction debris and wastes could create local waterlogging and ponding by blocking drainage lines and would be aesthetically displeasing. Proper disposal of these wastes is described in Section 5.5

Solid waste of domestic nature that would be generated in the temporary labor sheds at the construction site is not likely to be significant in volume. But indiscriminate disposal of such solid waste would create environmental pollution and the unhealthy situation at the project site. These solid wastes are disposed of properly as outlined in Section 5.5.

Assessment of Construction Impact on Air, Water, Noise, Construction Waste and Labor Camp Management

Table-16 summarizes the effect of project activities on physicochemical environmental parameters during the construction phase of the project. The physicochemical environmental parameters that could be affected by the project activities include water, air quality and noise level. As discussed above, water quality could be affected mainly by project activities such as mobilization of equipment and personnel (e.g., solid and liquid waste from labor sheds), and site preparation. Effects of solid and liquid wastes generated during the construction phase would not be incredibly significant, especially if mitigation measures as outlined in Section 6.4 are adopted. The overall negative impact of such activities is likely to be “short-term (Sh)” and of “low” intensity.

Deterioration of air quality during the construction phase may result from the increased concentration of particulate matter in the air from construction activities such as vehicular movement and wind-blown dust. However, these adverse impacts are greatly minimized by adopting mitigation measures as outlined in Section 6.4.

The likely noise level to be generated for different construction activities and its impact on the surrounding environment was assessed using a noise meter. Results of the assessment are presented in table-16 shows that different construction activities would generate significant noise and would produce some adverse impacts.

Similarly, the cumulative noise caused by the heavy trucks and excavator simultaneously during the construction of the access road is also of some concern. The adverse effect of project activities on noise level has therefore been categorized as “short-term (Sh)” and of “moderate” intensity.

Table -16: Effect of project activities on physico-chemical environmental parameters during construction phase

Physico-chemical parameters	Environmental Examination						
	Positive Impact			No Impact	Negative Impact		
	Low	Moderate	High		Low	Moderate	High
Air Quality				X			
Noise Level				X			
Drinking Water Quality					X (Sh)		
River Water Quality				X			
Ground Water Quality					X (Sh)		

Note: Sh=Short-term; Lo=Long-term

5.4.1 Visual Monitoring and Observations

Table-17: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Visual)

SI No.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks
				C	PC	NC	
1.	Traffic volume	Incoming & outgoing traffic, traffic movement records	Monthly	√			
2.	Site Security	Proper fencing, isolation of site from general access, marked passage for workers and visitors	Monthly	√			
3.	Personal Protective Equipment	Ensure every single person involved in the construction activity wear proper PPE	Monthly	√			
4.	Incident record & reporting	Documented record of all incident, accident, near misses etc. and its remedial process.	Monthly	√			
5.	Solid waste	Quantity of solid waste, segregation, and disposal process	Monthly		√		Need to improve ment
6.	Oily waste generation & disposal system	Quantity of oily waste, storage and disposal process	Monthly		√		Need to improve ment
7.	Worker's health	Monitoring process of worker's health	Monthly	√			
8.	Complain from neighbours	Any significant complain from neighbours and its remedial	Monthly	√			

SI N o.	Issue	Key aspects	Monitoring Frequency	¹ Compliance status			Remarks
				C	PC	NC	
		procedure					
9.	Safety orientation & training of workers	Frequency of training & orientation of workers for safety	Monthly	√			
10.	Sanitation & drinking water facility to workers	Availability of safe drinking water and sanitation to the workers	Monthly	√			
11.	Site Drainage	Maintaining proper drainage	Monthly	√			

¹ C- Compliance, PC- Partially Compliance, NC- Non-Compliance

5.4.2 Traffic Volume

The Project is under construction phase now. Construction activity has already started. The daily traffic details on day to day basis are being monitored and recorded in the registered book properly. Total 445 Numbers of vehicles enter the site in up to the month of June-2020. It is suggested that the detail traffic management measures shall include:

- ✓ Recording details of regular inspections/audits for traffic management measures of cargoes/packages weighing more than 20Tons and long-body trailers from port to project site.
- ✓ Recording the delays and other disruptions resulting from slow-moving heavy-lift and/or oversized cargoes.
- ✓ Reporting of any incident/accident occurs during transportation of goods.

Table-18: Total Number of Vehicles Based on their Categories

Name of vehicle	January, 20	February,20	March,20	June,20
	Number of Vehicle	Number of Vehicle	Number of Vehicle	Number of Vehicle
Truck	49	48	18	48
Tailor (load>20T)	12	12	10	12
Microbus	54	33	14	38
Motorcycles, Cars	23	27	0	47
Total	138	120	42	145

5.4.3 Site Security

During site visit on June 2019, CNTIC-CCOEC Consortium have already constructed of site boundary fencing to isolate the project site. Marked passages for workers and visitors have not yet been done, necessary action to be taken to accomplish the same. Elevated platforms, walkways and ramps will be installed and equipped with handrails, toe-plates, and non-slip surfaces. Safe walkway will be marked by colour in respective area such as Turbine hall, store etc. Proper sign boards and pictorial safety are given mentioning with caution for the area of petroleum, sprit & highly flammable materials & general awareness prohibiting smoking inside the power plant.

With the incorporation of the security system at the main entry gate, overall site security system will come into a good shape and eventually will be under proper control.



Figure-10: Present fencing conditions of the Project Site



Figure-11: Sign boards and pictorial safety at the Project Site

5.4.4 Personal Protective Equipment

The working personnel involved in the construction activities has to be under the safeguard of PPE properly. Figure-20 shows that, the workers were found to involve in construction works of pile.

The workers involved in with these works were found with PPE, such as Safety Jacket, Safety Shoes, Helmet and Hand Gloves etc.

Table- 19: List of Personal Protective Equipment Used in Project Site

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



Figure -12: Workers with proper PPE at Construction Works.

5.4.5 Incident Record & Reporting

Coordination of CNTIC-CCOEC Consortium along with APSCL, HSE division has been developed to monitor any incident, accident, near misses recording and reporting system with proper format. It was observed that the Incident Record & Reporting are being properly monitored and recorded in the register book. Based on previous accident report more stringent measure like awareness program, continues monitoring initiative has been taken by APSCL and CNTIC. So, no accident record was found in the register book up to the month of June. CNTIC-CCOEC Consortium assured that no Incident occurred during this time. If any incidental issue arises, immediately it must be reported & recorded properly in the prescribed format. Remedial measures are to be taken for such incident and accident.

5.5 Solid Waste

Solid wastes are generated from construction works (construction waste) and workers activities (kitchen waste, paper waste) at the project site. Solid waste logbook for keeping

record of this wastes in this plant are being properly maintained. It is necessary to erect all kinds of relevant signs regarding waste minimization in respective places of the project and main gate of APSCL. Transfer notes for all solid waste to be transported outside the project site is recorded.

Table- 20: Waste Inventory Log of CNTIC-CCOEC Consortium

SI	Wastage Name	Wastage Classification	Wastage Type	Source of wastage	Wastage storage area	Storage quantity (kg)	Delivery quantity (kg)	Agreement	Remarks
1	Plastic Pipe	Hazardous	Solid	Construction Site	On site	3.1	3.1	Ok	Ok
2	Brick	Non-Hazardous	Solid	Construction Site	On site	15.7	15.7	Ok	Ok
3	Rubbish	Non-Hazardous	Solid	Construction Site	On site	3.0	3.0	Ok	Ok
4	Scrap	Hazardous	Solid	Construction Site	On site	2.6	2.6	Ok	Ok
5	Cable	Non-Hazardous	Solid	Construction Site	On site	1.2	1.2	Ok	Ok
6	Aggregate	Non-Hazardous	Solid	Construction Site	On site	13.3	13.3	Ok	Ok

Solid Waste Management Plan

Step-01: Collection System

All solid wastes including construction wastes, waste generated by workers activities (kitchen waste, paper waste) and other waste will be accumulated on site after collecting from the source of generation.

Step-02: Segregation

There are various types of solid wastes; these will be segregated in the project site according to their natures as described below.

Construction waste: Electrical wiring, rebar, wood, plaster, scrap metal, cement, and bricks.

Organic waste: kitchen waste, vegetables, flowers, leaves, fruits.

Toxic waste: old medicines, paints, chemicals, bulbs, spray cans, fertilizer and pesticide containers, batteries, shoe polish.

Recyclable waste: paper, glass, metals, plastics.

Step-03: Transportation

After segregation of solid waste from the project site, proper solid waste log is maintained and transported to disposal point by trucks.

Step- 04: Disposal System

From the transported solid waste, the recyclable inorganic solid waste will be recycled and biodegradable organic solid waste will be disposed in the disposal location. From this location, the Municipal Authority collect this waste to dump their location. Remaining non-biodegradable waste will be sold to secondary vendors. The disposal location has been shown in **figure-13**.

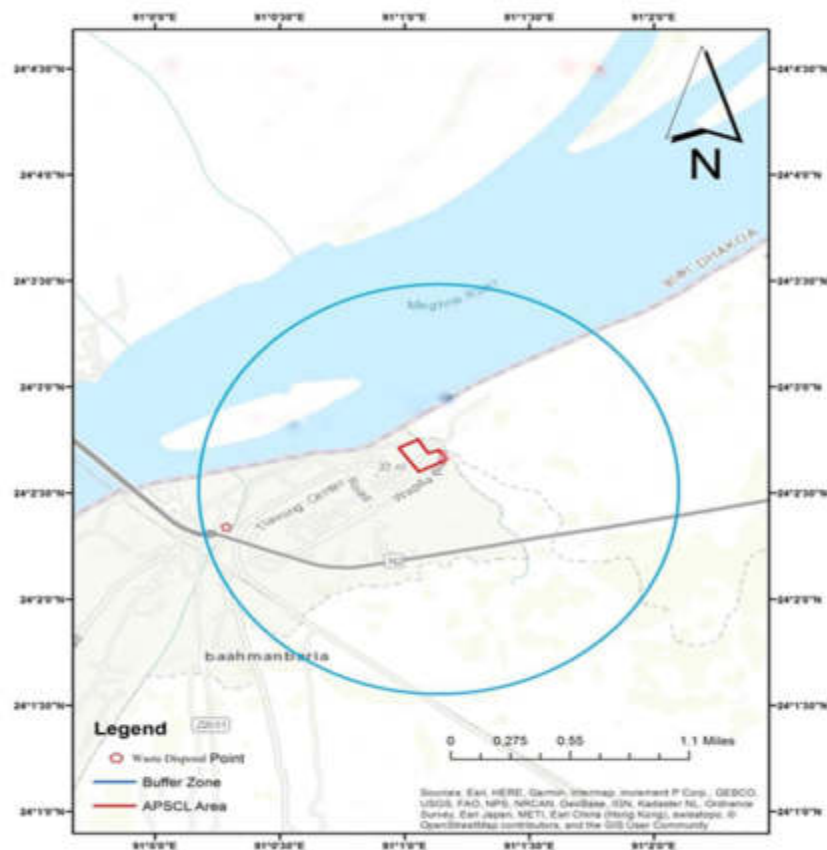


Figure-13: Solid Waste Disposal Location

5.6 Worker's Health

The CNTIC-CCOEC consortium will provide all kinds of treatment facilities and pay compensation according to Bangladesh Labor Law 2006, amendment in 2018. Worker's health is checked properly once in a year. Besides, an understanding with a local hospital for the emergency incident related to the worker's health of the plant and CNTIC-CCOEC Consortium has been established such health monitoring system of the workers shortly. In addition, necessary steps are taken for arrangement of ambulance service in the plant area to support any emergency medical aid and shifting to the hospital/medical centre. Necessary first aid facilities are also available at site.

CNTIC has a Covid-19 response plan and Details are given below:

- Wear face masks in public area. Cover the mouth and nose with bent elbow or tissue when cough or sneeze and dispose of the used tissue immediately.
- Provide training to raise employees' awareness of CODIV-19, inform related knowledge and information, and tell every how to do daily protection and how to protect themselves from virus infection.

measures should be taken accordingly. Though the project site is within the APSCL boundary, the North West side of the project site is near to some houses of neighbors. CNTIC-CCOEC Consortium has set up a suggestion box in front of the gates to facilitate the neighbours to raise complains and take immediate measure to resolve the complaints.



Figure-15: Photograph of Suggestion Box

5.8 Safety Orientation & Training of Workers

Training is essential to maintain the employees' health and safety. Both theoretical and practical training will be conducted for the employees on the hazards, precautions, and procedures for the safe storage, handling, and use of all potentially harmful materials. Safety orientation & training for the workers must be provided to all working personnel during the fresh enrolment / employment. Routine safety training on regular basis must be maintained. It is suggested that CNTIC-CCOEC Consortium will arrange routine safety training at definite time interval for the workers throughout the construction phase of the project. In addition, Training procedure will incorporate information from the Material Safety Data Sheets (MSDS) for potentially harmful materials.



Figure -16: Photograph of training for fresh enrolment employee and safety meeting



Figure-17: Toolbox meeting for workers

5.9 Sanitation & Drinking Water Facility to Workers

Ground water is being supplied through the arrangement of piping network in the construction site and this water is available for the workers for the washing and toilet facilities. Besides, CNTIC-CCOEC Consortium Management supplies drinking water Jar for drinking purpose of the workers. Robust drinking water purification system with reverse osmosis or UV and hot and cool water system will be installed at various locations in adequate number at the plant site for operational phase. Adequate toilets for male and female workers have already been constructed.



Figure -18: Pure Drinking Water & Sanitation facility to workers

5.10 Site Drainage

In the Construction site, proper drainage system has to be developed for outer/inter drainage in the project site. At present, inside drainage construction has been started. After completion of construction works, necessary outer drainage will be constructed.



Figure-19: Existing outer drainage and rainy water reservoir

5.11 Surface water drainage

The surface water drainage system manages all run off of the project site through a system of underground pipes, manholes and finally discharge into the surface water body subject to ensuring the quality standard of Bangladesh and ADB guidelines. To some extent, collected rainwater is reused to spray for dust suppression in sunny day.

5.12 Dust Control

There is dust around the project site due to on-going construction work. To control the dust nuisance during dry weather, CNTIC-CCOEC Consortium sprays water at prescribed interval regularly at least 3 times but if need more we spray that time.



Figure -20: Regular spraying of water for dust suppression & control.

5.13 Monthly HS&E Management

5.13.1 Safety Management

- ✓ Performing regular toolbox meeting for all of the workers.
- ✓ Performing site visit in the premises regularly.
- ✓ Checking and monitoring the Proper Personal Protective Equipment (PPE) of the workers in the premises.
- ✓ Performing safety report weekly and monthly.
- ✓ Checking the performance equipment that is being used in the premises.
- ✓ Checking adequate intensity of light, ventilation in the workplace.
- ✓ Checking the workplace pathways okay or not.

5.13.2 Health Management

- ✓ Checking the hygiene of the workplace as well as worker's health.
- ✓ Ensure PPE for all of the workers in the workplace.
- ✓ Inspection area tidy, clean and well organized.
- ✓ Checking the proper drinking water supply to the workers.
- ✓ First Aid Box, Ambulance are to be available at the project site and Doctor are available on project site to meet up emergency occurrences.

5.13.3 Environmental Management

- ✓ Checking the workplace for dust free.
- ✓ Checking the workplace air quality.
- ✓ Checking the workplace free from environmental pollution.
- ✓ Checking the workplace that is not creating pollution that is harmful for the environment.
- ✓ Installing fencing at construction site for dust control.
- ✓ Installing water pipeline for proper housekeeping and dust control.

CHAPTER 6

ENVIRONMENTAL MITIGATION MEASURES IMPLEMENTATION

6. ENVIRONMENTAL MITIGATION MEASURES

6.1 Air Quality

Construction materials at the site are properly covered while hauled and stored, roads thoroughly cleaned, and water sprayed to minimize the concentration of dust in the air when dust increases. Vehicle movement to and from the site is effectively managed to ensure that does not significantly aggravate the traffic problem and air pollution. Stone (aggregate) crushing activities are properly done in fine tune batching plant which is far away from the construction site and not allowed within the Ashuganj plant premises. Health status of all workers has monitored regularly at the Health Center established at the project site.

6.2 Water Quality

The human wastes from the labour camp are appropriately disposed of through construction of sanitary latrines connected to an appropriately designed septic tank system (consisting of a septic tank and soakage pit). Wastewater generated from different construction activities is not likely to be significant in volume. Disposal of such wastewater is carried out by draining them in shallow pits (1 to 1.5 m deep) dug in the ground at appropriate locations and filling them up with sand at the end of the construction phase.

6.3 Noise Level

- Use “quiet” equipment (i.e., equipment designed with noise-control elements);
- Route truck traffic away from noise-sensitive areas, where feasible.
- Install sound barriers for pile driving activity, where practicable (e.g., use an acoustic curtain or blanket around the point of impact);
- Unnecessary vehicle movement are avoided
- Switch off the engines while remaining unused.
- Prefer daytime to do the major construction works.

6.4 Solid Waste

The solid wastes of domestic nature generated mainly in the labor sheds are collected and stored separately (i.e., without mixing it with construction wastes/debris) in appropriate containers within the construction site. The solid wastes are disposed of away from the site (e.g., in a municipal landfill/waste dumping ground) outside the complex, at the responsibility of the Contractor & monitored by APSCL.

6.5 Progress of Work

Ambient Air Quality Monitoring: Measurements of selected air quality parameters for PM_{2.5}, PM₁₀ and SPM has been carried out (January–June 2020) during the ongoing construction work. Air samples were collected for measurements of selected air quality parameters for PM_{2.5}, PM₁₀ and SPM. Test report also is shown in Table-12.

Drinking Water Monitoring: Drinking water sample was collected from supplied water by water purifier & dispenser at the site in January-June 2020 for analyzing pH, Ammonia, nitrate, phosphate, As, Fe, Mn, Fecal and total coliform. Test report also is shown in Table-14.

River Water Monitoring: River water sample was collected from Meghna River in January-June 2020 for analyzing temperature, dissolved oxygen (DO) along with BOD₅, COD, Oil and Grease, and selected heavy metals (Cr, Cd, Pb). Test report also is shown in Table-15.

Groundwater Monitoring: Groundwater sample was collected from supply water in January-June 2020 for analyzing pH, TDS, Ammonia, nitrate, phosphate, As, Fe, Mn, Fecal and Total Coliform. Test report also is shown in Table-16.

Noise Level Monitoring: Noise level monitoring is also necessary during the construction period because the use of heavy construction equipment may increase the noise level at the work location. So, Noise level data were collected from selected 5 locations. Test report also is shown in Table-13.

Waste Management and Process Waste Monitoring: Disposal of construction debris away from the site and their appropriate disposal sanitary landfill are ongoing. Hazardous waste and non-hazardous waste are also disposing of by proper way.

Trees Cutting: The project site is in a bare field. So, there was no scope of tree cutting. But tree plantation program and landscaping are going on for providing a better environment at the project site and APSCL area.

Others: There is no significant impact on the existing road network in the project area. Major transportation of plant and construction material are done by the Meghna River with unloading of materials by crane owned by APSCL and at the jetty which is within the existing APSCL complex.

All slopes are protected, and suitable erosion protection measures are employed to reduce any impact from runoff during the monsoon rainy season.

Health and Safety: The general health and safety of workers is safeguarded with the provision of medical and health facilities on-site, the provision of personal protective equipment (hard hats, safety belt, full body safety harness, ear plugs, ear muff, welding shield, grinding shield, safety shoe, safety goggle, welding apron, hand gloves, safety jacket, anti-dust masks, anti-gas masks etc. as required). There is an emergency response system and workers and supervisors are received training on any accident and immediate medical facility in its own round the clock medical center. There is a full-time emergency ambulance to provide immediate service if required. Safe drinking water and sanitation facilities are established and provided to all project related employees (officer, staff, and workers) at the site.

Set up of the in-house monitoring system

APSCL is being set up of the in-house monitoring system and require manpower with its own staffs. In-house environmental monitoring system with manpower is as follows.

Manpower for Environmental Management Plan.

1. Manager (Health, Safety & Environment) – 1 No's.
2. Deputy Manager (Health, Safety & Environment), for ambient air, stacks emission and noise etc.-01 No's.
3. Manager (Chemical) For ETP, WTP, etc. -1 No's.
4. Deputy Manager (Chemical) For ETP, WTP, etc. - 1 No's.
5. Operator – 3 No's.
6. Environmental Specialist – 1 No's.

Environmental Clearance Certificate /Renewal of Environment Clearance:

ASPCL received an exemption of IEE and approval of Term of Reference (ToR) for EIA for Implementation of APSCL 400 MW CCPP (East) from DoE. APSCL also received the EIA approval letter from the DoE, Bangladesh on 08.10.2015.

Based on the EIA approval letter from DoE, APSCL has started bidding work and after successful completion of that construction activities will be started. After completion of construction work, APSCL will apply for environmental clearance certificate for operation of the plant. DoE did not provide any environmental certificate or any condition in the EIA approval letter, hence no renewal issue arises.

Table-21: List and Status of Regulatory Requirements for Asghuganj 400 MW CCPP (East) Project

Legal Documents		
SL No	Name of Certificate/License	Present Status
1	Trade License	During Construction phase no need to bring this license except EIA approval from DoE office.
2	BERC License	
3	Fire License	
4	Factory License	
5	ACID License	
6	Environmental Clearance Certificate	

6.6 WORKSHOP AND TRAINING MEETING AND DISCUSSION

At present an environmental team headed by Md. Atiqur Rahman, Manager (Health, Safety & Environment of APSCL) looking after an overall supervising the monitoring of 400 MW CCPP East Project environmental issues. The consultant conducted a training programmed on environmental issues for APSCL personnel and EPC contractors.

A training program for capacity building program of APSCL personnel and EPC contractors will be arranged upon the availability of requiring manpower. There will be environmental meeting performed in every month and will be discussed the overall performance of the environmental issues of under construction power plant. Beside this Mock drill on Fire and Earth Quake, Electric shock, Acid and chemical spillages are continuing regularly as per set schedule in the power plant.

Various training related to HSE usually conducted in this time period. The main topic of these training is headed by waste management, good housekeeping, induction, environmental issues, PPE and so on.

Some meetings have conducted in this time frame among EPC contractor, APSCL, Subcontractors regarding emergency cases, PPE, good housekeeping and so on. Also, some meetings regarding HSE monitoring have done between the consultants of APSCL and HSE representative of EPC contractor.

6.6.1 Audit and Visit

On 15th February 2020, Secretary of Power Division Dr. Sultan Ahmed visited the project site. He discussed regarding the improvement of Fire protection. He also mentioned about safety sign, environmental parameter monitoring, waste management etc. Few pictures have attached in the Annex-I.

CHAPTER 7

SAFEGUARD MONITORING RESULTS AND UNANTICIPATED IMPACTS

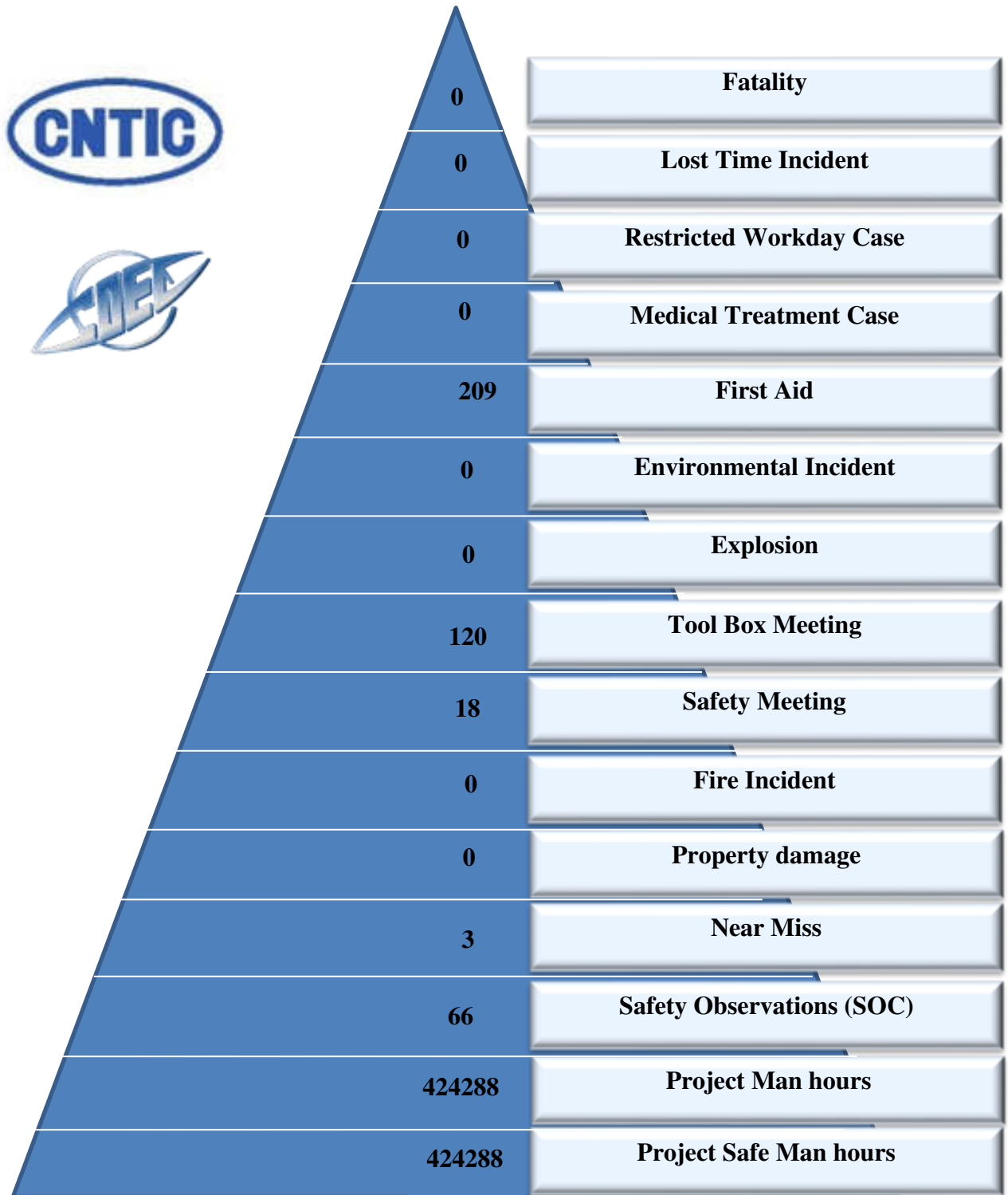
7.SAFEGUARD MONITORING RESULTS AND UNANTICIPATED IMPACTS

7.1 Safety Assurance of the Project Site

Personal Safety Equipment (PSE):

Use of proper safety materials is mandatory for all at the project site. Workers use appropriate personal protective equipment, such as safety boots, helmet, safety jacket, safety belt, safety harness, gloves, protective clothing, goggles, grinding shield, welding shield, anti-dust mask, anti-gas mask and ear protection etc. Daily toolbox meeting before starting of work is a mandatory practice at the project site. So long as safety does not suffer due to this action. There is no fatality and another casualty (Zero accident) and detail of safety issue are described in the following HSE Statistics chart.

HSE STATISTICS



7.2 OTHERS

7.2.1 Weather condition

The weather condition during the ambient air quality and noise monitoring was cold and partly sunny during the sampling. Wind direction was found calm. Hence there is no impact on monitoring due to weather condition.

7.2.2 Other factors which affect the monitoring results

Air monitoring: Factors which affect the air monitoring results including:

- Topography
- Congested Space
- Physical and chemical properties of pollutants
- Air Pressure
- Air Turbulence

Water monitoring: Factors which affect the water monitoring results including:

- Soil erosion
- Waste discharge
- Surface runoff
- Large numbers of bottom feeders (such as carp), which stir up bottom sediments
- Excessive algal growth.

Noise Monitoring: Factors which affect the noise monitoring results including:

- Type of source (point or line)
- Distance from source
- Atmospheric absorption
- Obstacles such as barriers and buildings
- Ground absorption
- Reflections
- Humidity

Chapter 8

COVID-19 AND APSCL RESPONSE PLAN

8.0 COVID-19 AND APSCL RESPONSE PLAN

On March 8, Bangladesh confirmed three cases of novel coronavirus on its territory. The Institute of Epidemiology, Disease Control and Research (IEDCR) Director said at press conference that two men and a woman tested positive for the coronavirus and they are under treatment in hospital now.

After declaring the outbreak an international health emergency in January, the World Health Organization (WHO) lastly updated the global risk level to “very high”, which means every effort should be made to stop, contain, control, delay and reduce the impact of this virus at every opportunity.

APSCL has been paying close attention to the latest situation of COVID-19 spreading in Bangladesh and we are currently raising awareness & taking preventive action as continuous process on this matter. During this critical period, APSCL immediately took the necessary precautions to protect our staff against virus infection as well as taken immediate action on EPC contractors to prevent spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL to take the necessary precautions to protect our staff against virus infection.

APSCL strictly followed govt. declared lock down period with the regular payment of salary to all permanent & outsourced staff. APSCL follows WHO & Govt. of Bangladesh guidelines to prevent COVID-19 situation. Beside this, APSCL has taken its own policy to protect its community from COVID-19.

The precautions APSCL have already taken:

1. Strengthen publicity and education

- Organize epidemic prevention knowledge trainings that teach the correct method of wearing face masks, handwashing, and other protective measures.
- Inform all employees of the latest situation of COVID -19 and Govt. of Bangladesh & WHO recommendations.
- Post safety signs in office about mandatory requirements for wearing face masks & other PPEs.
- Restriction of people’s movement in Plant & Residential areas.
- Prohibition of outsider’s entry in residential areas.
- Regular announcement in residential colonies about updated decision/information of COVID-19 Committee of APSCL.

2. Purchase epidemic prevention supplies and implement specific management

- Place the disinfectant items in prominent locations, including antiseptic liquid, hand sanitizer, disinfectant water spray for surface disinfection, disinfectant air spray for vehicles, etc.
- Distribute 2-layered fabric masks to all employees, all security personnel & enforcement to ensure use of it.
- LASER Temperature measurement thermometers to measure temperature of employees at each entry gate/point.

3. Strengthen daily disinfection

- Disinfect the workplace, canteen and other public area: 3 times a day & as required (at 8am and 5pm).
- Disinfect the facilities, operational vehicles: 3 times a day & as required (at 8am to 5pm).
- Vehicles need to be disinfected when entering or leaving.

4. Strengthen employee health monitoring

- Daily body temperature check for all employees and outside parties, Local & foreign project workers, visitors, contractors, or other parties on site : Every entry time a day (at 8am and 10pm).
- Check whether employees and outside parties, visitors, or other parties on site have fever, cough, etc. immediately and keep a record.
- Maintaining “not to attend in office & no going to outside policy” if anybody feels fever/cough/any symptom of COVID-19 situation or other seasonal viral fever & immediate medical attention for it.

5. Strengthen personnel management

- For the personnel who just arrived Bangladesh from China and other severely infected countries recently, or from any other location from Bangladesh (inter district or hot spot/affected areas) a 14-day quarantine is compulsory for public safety. Only after confirming that there are no abnormalities can they enter the plant & project to work normally and for other family members of employees they can move inside the residential colony.
- Provide separate office and separate accommodation to minimize shared space.
- Provide a separate car, designate a dining place at a distance from employees to prevent cross-contamination.
- Discourage employees for restricted movement in plant & residential areas.

6. Strengthen on-site access management

- Anyone entering the site needs to take a temperature measurement and record at the entrance, whether APSCL employees, project workers, contractors or other visitors.

- Persons who refuse to take measurements are forbidden to enter the site.

7. Making Quarantine Center

- APSCL has made a furnished quarantine center with proper system considering to provide service to 25 persons (17 Male & 8 Female) with all logistic supports for any emergency regarding COVID-19 situation with dedicated Medical center.
- Two Ambulances with 24 hours service. 1 ambulance with alternative driver is fully dedicated for COVID-19 related services.



Figure-21: COVID-19 related information flyer



Figure- 22: Alcohol based Hand sanitizer prepared by HS&E Division & Chemical Division of APSCL are regularly provided to all employees & placed in workplace



Figure- 23: Liquid Hand Wash is placed in workplace and Non-hand Touching washbasin

Chapter 9

CONCLUSION AND RECOMMENDATION

9.0 CONCLUSION AND RECOMMENDATION

The environmental monitoring report is consisting of 9th Semiannually environmental monitoring reporting based on monthly measured ambient air, noise, drinking water, ground and river water quality parameters. The work has been assigned EPC contractor CNTIC-CCOEC Consortium performed for the period of January to June 2020. Ambient air quality parameters were determined in the site with the help of high-volume sampler and noise quality was done by noise level meter. Drinking water, ground and surface water quality parameters were analyzed in the laboratory. All the mitigation measures are taken following ADB Environmental Safeguard Policy 2009, IFC/World Bank Thermal Power plant guideline 2008 and DoE, Bangladesh guideline.

During the Visual monitoring on Traffic Volume, Personal Protective Equipment, Incident Record & Reporting, Solid Waste, Oily Waste Generation & Disposal System, Worker's Health, Safety Orientation & Training of Workers, Sanitation & Drinking Water facility to workers, Site Drainage all are found in progress for January- June, 2020. Most of the records are being maintained in the Project site. However, it was assured by CNTIC-CCOEC Consortium that they will develop remaining required system as appropriate prior to start operation activity

From the analysis, it is found that the ambient air quality results found within DoE standards. This value are cumulative with surrounding ambient air and noise level. SO_x and CO are not a problem of the construction period of the power plant. But SPM, PM_{2.5}, PM₁₀ level during the construction period of the power plant is controlled by taking proper mitigation measures and spraying of water.

Noise level quality of Ashuganj CCPP has also been measured by EPC contractor. According to the measurement, the noise level around the plant area found within the allowable limit of Industrial zone both day and at nighttime. The noise level is controlled by using modern, new, and fine-tuned equipment.

Surface water quality parameter at Meghna River was performed to evaluate whether this plant poses any detrimental effect on the water environment. From the analysis, it has been found that the project does not contaminate water pollution to the natural environment. Otherwise, any spill is not detected next to riverbeds around the worksite (oils, concrete waste, or conglomerate asphalt, any colour changes of the water, etc.). Drinking water quality is also found good. But the ground water quality is good except the As, Mn and Fe to same extend that are caused by natural geochemical processes and are not influenced by present project activities.

Supply of pure mineral drinking water is ensured for all in the plant area by enough high-quality Drinking water purifier & Dispenser at suitable locations that are visible to all.

Housekeeping is also in good condition at the plant site. All solid, liquid, and hazardous waste are disposed of the designated container at the plant site. Most of the solid wastes are

disposed of by landfill. The usable solid wastes are handed over to proper party for recycling.

This plant is constructed by replacing old inefficient Unit-3 plant (150 MW) that is now generating in total of 129 MW and emits 17,78,010 ton of CO₂ per year. But when 400 MW CCPP (East) plant will come in operation the Unit-3 will be closed and this 400 MW CCPP (East) will emit only 10,23,860 ton of CO₂ per year at full load. So, compared to that old inefficient power plant unit, this new 400 MW CCPP (East) plant will reduce 7,54,150 ton of CO₂ per year. That will be a significant reduction of GHG emission.

Finally, it can be concluded that the plant has a minor detrimental impact for short period on the environment in terms of ground water quality during the construction period. The plant provides a good working environment for the workers.

Chapter:10

ANNEXURE

ANNEX- I: Responses of Comments of ADB On Semi-Annual Environmental Monitoring Report (January -June 2020)

Responses of Comments of ADB on Semi-Annual Environmental Monitoring Report (January -June 2020) for Ashuganj 400 MW Combined Cycle Power Plant (East) Project

SL No.	Description	Comments	Responses	Article No.	Page No.
1.	Executive Summary	Please provide updates on the strategy taken by APSCL manage to control COV-19 in the facility	On March 8, Bangladesh confirmed three cases of novel coronavirus on its territory. After that, APSCL has been paying close attention to the latest situation of COVID-19 spreading in Bangladesh and we are currently raising awareness & taking preventive action as a continuous process on this matter. During this critical period, APSCL immediately took the necessary precautions to protect all of its staff against virus infection and has taken immediate action on EPC contractors to prevent the spread of Covid-19 from new project activities like under construction 400 MW CCPP (East) Project by controlling of movement of foreigners, local workers and other construction & maintenance activities of APSCL. APSCL follows WHO & Govt. of Bangladesh guidelines to prevent COVID-19 situation. Besides this, APSCL has taken its own policy to protect its community from COVID-19 and it is also mandatory for EPC contractor of this project to follow APSCL's policy, WHO and Government of Bangladesh guidelines on this issue. EPC contractor is also	N/A	6

SL No.	Description	Comments	Responses	Article No.	Page No.
			following its own stringent COVID-19 policy to prevent this disease at the project site.		
2.	During construction, APSCL, in collaboration with EPC Contractor and any sub-contractors, will establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities, and authority to implement the SEMP.	Construction has already been started but mentioned section 2.1 still discussing on planning. Please correct	For the realization of SEMP, it is necessary to identify persons responsible for the performance of impact decrease/prevention actions, and those responsible for control over the given actions and to define their role at all stages of the project implementation. During construction, APSCL, in collaboration with EPC Contractor and any sub-contractors, has been established, maintained, and strengthen as necessary an organizational structure that defines roles, responsibilities and authority to implement the SEMP.	2.1	19
3.	Key SEMP responsibilities are defined and will be communicated to the relevant personnel and to the rest of ASPCL as well as CNTIC and sub-contractors. Sufficient management sponsorship and human and financial resources will be provided on an on-going basis to achieve effective and continuous SEMP performance.	Responsibilities of relevant personnel should have been communicated already but from the report it gives an impression that this is still not done. Please clarify.	Key SEMP responsibilities are defined and have been communicated to the relevant personnel and the rest of ASPCL as well as CNTIC and sub-contractors. Sufficient management sponsorship and human and financial resources will be provided on an on-going basis to achieve effective and continuous SEMP performance. Management of environmental and social risks and impacts during construction is primarily the responsibility of the EPC Contractor through the EPC contract. During the construction phase, APSCL review and	2.1	19

SL No.	Description	Comments	Responses	Article No.	Page No.
			monitor EPC Contractors performance following the SEMP.		
4.	Table-2: Role & Responsibilities for SEMP Implementation	Please keep this part as annex if required	Annex-IV: Role & Responsibilities for SEMP Implementation	2.1	20
5.	2.2 Grievance Redressed Status	Title and description are not same. Please check carefully and update the status of project grievance status with incorporation of grievances related to environment, H&S etc. GRM procedure is not required to be described here.	2.3 Grievance Redressed Mechanism	2.2	24
6.	(a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety. (b) The environmental safeguards. (c) The EARF; and (d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguards monitoring report	Please provide inputs specifically for all the points specified in the loan covenants.	a) All applicable laws and regulations of the Borrower relating to the environment, health, and safety is followed strictly in the project. b) The environmental safeguards and its related all safety measure are maintained in the project c) The EARF is followed as per requirements. d) All measures and requirement set forth in the respective EIA, IEE and EMP, and any corrective or preventive actions set forth in a safeguard monitoring report is followed and maintained properly and updated time	3.1.1	30

SL No.	Description	Comments	Responses	Article No.	Page No.
			to time.		
7.	The environmental monitoring has been carried out in all three phase i.e. preconstruction, during construction and postconstruction phase or operation phase	Please carefully check the inputs provided for compliance status. The project is still under construction period, how can be environmental monitoring for operation period has been carried out.	The proper environmental monitoring already carried out during pre-construction stage and is going on in construction and will be continue for post-construction phase or operation phase.	3.1.1	30
8.	(a) Comply with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Make available a budget for all such environmental and social measures; (c) Provide the borrower with a written notice of any unanticipated environmental, resettlement or small ethnic community people risks or impacts that arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP, the RP or any		(a) APSCL complies with the measures and requirements relevant to the contractor set forth in the EIA, IEE, the EMP, the RP and any small ethnic community peoples plan(to the extent they concern impacts on affected people during construction), and any corrective or preventive actions set out in a safeguards monitoring report; (b) Proper budget is allocated for all such environmental and social measures. (c) APSCL followed that properly as per requirements and standard of ADB Social Safeguard Policy. (d) its maintained as given guideline. (e) it followed as per requirements.	3.1.1	31

SL No.	Description	Comments	Responses	Article No.	Page No.
	<p>small ethnic community peoples plan.</p> <p>(d) Adequately record the condition of roads, agricultural and other infrastructure prior to starting to transport materials and construction.</p> <p>(e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.</p>				
9.	<p>(a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission;</p> <p>(b) If any unanticipated environmental and or social risks and impacts arise during construction, implementation or operation of the project that were not considered in the EIA, the IEE, the EMP or the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan;</p> <p>(c) No later than the mobilization of the turnkey contractor for APSCL,s power plant, engage qualified and experienced external experts or qualified no-governmental</p>		<p>a) The proper Safeguards monitoring already being carried out during pre-construction stage and is going on in construction and will be continue for post-construction phase or operation phase.</p> <p>b) It is followed as per the ADB guideline.</p> <p>c) One Environmental Expert is engaged already, and he is monitoring and given his valuable comments and feedback to APSCL.</p> <p>d) As per EMP, we will follow the instruction.</p>	3.1.1	31

SL No.	Description	Comments	Responses	Article No.	Page No.
	organizations under a selection process and terms of reference acceptable to ADB, to verify information produced through the project monitoring process, and facilitated the carrying out of any verification by such external experts; and (d) Report any actual or potential breach of compliance with the measures and requirements set forth in the EMP or the RP promptly after becoming aware of the breach.				
10.	(a) Comply with all applicable labor laws and related international treaty obligations of the borrower and do not employ child labor as defined under Bangladesh law; (b) Provide safe working conditions for male and female workers; (c) Carry out HIV/ AIDS and human trafficking prevention and awareness campaigns in the campsites and corridors of influence; (d) Engage women worker as wage laborers depending on their skill; and (e) Provide equal wages for equal work between men and women		f) APSCL complies exiting all labor laws and related international treaty obligations of the borrower and not engaged any child labor at the project site. g) APSCL is committed to provide safe working condition both for male and female workers and follow up regularly. h) APSCL arrange this type awareness program at the foundation training of the worker. i) Depend on woman worker skill we engaged them j) Its maintained strictly.	3.1.1	32
11.	We have done environmental effect of Ashuganj East Project which is our	Please clarify what is environmental effect and	We have done Environmental Impact Assessment (EIA) of Ashuganj East Project	Table 8	33

SL No.	Description	Comments	Responses	Article No.	Page No.
	extreme target but cumulative one under our consideration, delayed due to COVID-19 pandemic situation.	how it has been assessed.	which is our extreme target but cumulative one under our consideration, delayed due to COVID-19 pandemic situation. Now we are in process to develop the TOR for Cumulative Impact Assessment.		
12.	4.1.1 Site-Specific Environmental Management Plan (SEMP)	SEMP needs to be updated to incorporate the control measures taken against COV-19. Presently it is missing.	SEMP has been updated. Details is given at 48 page, Number 13 and 64 page number 14.	4.1.1	35
13.	Key Performance Indicators <ul style="list-style-type: none"> Vehicle, equipment, and machinery checklists observed. Annual maintenance records observed. 	Please check the typo and grammar.	Key Performance Indicators <ul style="list-style-type: none"> Vehicle, equipment, and machinery checklists are observed. Annual maintenance records are observed. 	Table 9	36
14.	Chapter 5: Semiannually Assessment of Construction Impact on Environment	Please check the title and revise as appropriate.	Semi-Annual Assessment of Construction Work's Impact on Environment	5	63
15.	5.1 Impact on Air Quality	Please incorporate the test results in the main report not as annex.	It has been rearranged as per the given instructions.	5.1	64
16.	Arsenic (As) is a natural element in soils, rocks, and minerals. In the aquifer, groundwater meets this inorganic arsenic to dissolve it, releasing its constituents to the water. This region is a Meghna delta. The origin of arsenic rich groundwater is due to a natural process, and it	Please justify your explanation comparing with the baseline water quality data.	Arsenic (As) is a natural element in soils, rocks, and minerals. In the aquifer, groundwater meets this inorganic arsenic to dissolve it, releasing its constituents to the water. This region is a Meghna delta. The origin of arsenic rich groundwater is due to a natural process, and it seems that the arsenic in groundwater has been present for	5.3	65

SL No.	Description	Comments	Responses	Article No.	Page No.
	seems that the arsenic in groundwater has been present for thousands of years without being flushed from the delta. Arsenic is assumed to be present in alluvial sediments with high concentrations in sand grains as a coating of iron hydroxide. The sediments were deposited in valleys at upstream that eroded in the delta when the stream base level was lowered due to the drop in sea level during the last glacial advance. This is done by geochemical mobilization of arsenic that is not influenced by project activities.		thousands of years without being flushed from the delta. Arsenic is assumed to be present in alluvial sediments with high concentrations in sand grains as a coating of iron hydroxide. The sediments were deposited in valleys at upstream that eroded in the delta when the stream base level was lowered due to the drop in sea level during the last glacial advance. This is done by geochemical mobilization of arsenic that is not influenced by project activities. It has been observed that from October, 2018 to December, 2019 the ground water is free from Arsenic and three sample location out of four is outside of project area (Only G1 is nearby the project area). CNTIC-CCOEC Consortium has informed the local peoples as well as workers surrounding the locations marked as G2, G3 & G4 for not to use this water for drinking purpose as the concentration of Arsenic is high.		
17.	The Meghna River passes through from East to West direction near the project area and there are few industries at the right bank of this river which are very less compared to other rivers status in Bangladesh. So, the water of this river is less polluted that was also found from environmental monitoring. The DO	Please check your inputs. From the report it gives an impression that due to existence of industries nearby the river, water is less polluted !!! Provided explanation seems surprising.	The Meghna River passes through from East to West direction near the project area and there are few industries at the right bank of this river. So, the water of this river is less polluted that was also found from environmental monitoring. The DO level of this water is more than 6.5 mg/L which is within DoE standard level. The BOD 5 is also in a lower level than DoE standards.	5.3	65

SL No.	Description	Comments	Responses	Article No.	Page No.
	level of this water is more than 6.5 mg/L which is within DoE standard level. The BOD 5 is also in a lower level than DoE standards.				
18.	Table-11: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Visual)	How could you decide compliance based on visual observation of environmental parameters !!!	Table-11: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Analytical)	Table 11	66
19.	Table- 12: Test Result of Ambient Air Quality	this should have been placed under section 5.1	It has been rearranged as per the given instructions.	Table 12	66
20.	Table-13: Test Result of Noise Quality	This should have been placed under section 5.2. It is also not quite clear whether the noise monitoring was done for 24 hours Leq basis or not. Please explain. Moreover heavy construction work was going on during the mentioned period and noise level never crossed the allowable limit !!! Please clarify	It has been rearranged as per the given instructions. As per DoE guideline we need to collect the sound level data at least 24 hours. We are following the standard and monitor properly during the data collection time. Its 24-hour Leq basis data collection method is applied as per DoE guideline. As per data collection record all the noise level is within the permissible limits both day and nighttime.	Table 13	69
21.	Table-15: River Water Quality Test Result	This should have been placed under section 5.3	It has been rearranged as per the given instructions.	Table 15	73
22.	Table-16: Ground Water Quality	This should have been	It has been rearranged as per the given	Table 16	76


SL No.	Description	Comments	Responses	Article No.	Page No.																																						
		placed under section 5.4	instructions.																																								
23.	Table -17: Effect of project activities on physico-chemical environmental parameters during construction phase <table border="1"> <tr> <th rowspan="3">Physico-chemical parameters</th> <th colspan="7">Environmental Examination</th> </tr> <tr> <th colspan="3">Positive Impact</th> <th>No Impact</th> <th colspan="3">Negative Impact</th> </tr> <tr> <th>Low</th> <th>Moderate</th> <th>High</th> <th></th> <th>Low</th> <th>Moderate</th> <th>High</th> </tr> <tr> <td>Air Quality</td> <td></td> <td></td> <td></td> <td>N</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Noise Level</td> <td></td> <td></td> <td></td> <td>N</td> <td></td> <td></td> <td></td> </tr> </table>	Physico-chemical parameters	Environmental Examination							Positive Impact			No Impact	Negative Impact			Low	Moderate	High		Low	Moderate	High	Air Quality				N				Noise Level				N				There will definitely some impact during construction phase. How come this has been tagged as "no impact". Please clarify.	The project location is within the APSCL premises. Based on the Air Quality and Noise Quality data, there is no impact on the surrounding environment. All this data is within the permissible limits of DOE and IFC/WB standard.	Table 17	78
Physico-chemical parameters	Environmental Examination																																										
	Positive Impact			No Impact	Negative Impact																																						
	Low	Moderate	High		Low	Moderate	High																																				
Air Quality				N																																							
Noise Level				N																																							
24.	Table-18: Implementation of Environmental Monitoring Plan during Construction Phase of the Project (Visual) <table border="1"> <tr> <td>3. Solid waste</td> <td>Quantity of solid waste, segregation, and disposal process</td> <td>Monthly</td> <td></td> <td></td> <td></td> <td>Need to improve more</td> </tr> <tr> <td>4. Oily waste generation & disposal system</td> <td>Quantity of oily waste, storage and disposal process</td> <td>Monthly</td> <td></td> <td></td> <td></td> <td>Need to improve more</td> </tr> </table>	3. Solid waste	Quantity of solid waste, segregation, and disposal process	Monthly				Need to improve more	4. Oily waste generation & disposal system	Quantity of oily waste, storage and disposal process	Monthly				Need to improve more	Please propose relevant mitigation measures to improve the present scenario for solid waste and oily waste generation and disposal system	Brief Description was given to 5.5 chapter of Solid Waste Management plant.	Table	78																								
3. Solid waste	Quantity of solid waste, segregation, and disposal process	Monthly				Need to improve more																																					
4. Oily waste generation & disposal system	Quantity of oily waste, storage and disposal process	Monthly				Need to improve more																																					
25.	It is suggested that the detail traffic management measures shall include:	Detail traffic management plan should have been included this in the very beginning of the project.	Detail traffic management plan has been included in the EIA report at Annexure-14(a).	5.4.2	79																																						
26.	Figure -12: At the Construction Works, Workers were Found with Proper Apron, Helmet, and Hand Gloves Etc.	fig 12: Downside left corner pictures shows "Work at height" activity but proper safety measures i.e. installation of scaffolding, safety net were not provided. though from the picture it was not	All the workers using proper safety gear including full body harness with shock absorber for works at height and others necessary PPE for self-protection. The figure shows the preparation of outside scaffolding and covering by safety net from top of the building (green colored net) of the CCB for outer side works. Before works, all sides were	Figure 12	82																																						

SL No.	Description	Comments	Responses	Article No.	Page No.
		evident whether all the workers were using safety belt or not. It is also not clear whether any lifeline were provided or not. Please explain.	fully covered by safety net. Both vertical and horizontal Life liner were provided during the turbine hall erection work and it is used when and where it requires.		
27.	No accident record was found in the register book up to the month of June.	This is very surprising as heavy construction work is going on but not even first aid cases also happened. Could you please confirm and check the database whether there is any system of recording first aid cases along with near miss reporting.	Coordination of CNTIC-CCOEC Consortium along with APSCL, HSE division has been developed to monitor any incident, accident, near misses recording and reporting system with proper format. It was observed that the Incident Record & Reporting are being properly monitored and recorded in the register book. Based on previous accident report more stringent measure like awareness program, continues monitoring initiative has been taken by APSCL and CNTIC. So, no accident record was found in the register book up to the month of June. CNTIC-CCOEC Consortium assured that no Incident occurred during this time. If any incidental issue arises, immediately it must be reported & recorded properly in the prescribed format. Remedial measures are to be taken for such incident and accident.	5.4.5	82

SL No.	Description	Comments	Responses	Article No.	Page No.
28.	biodegradable organic solid waste will be deposited in open space	Could you please confirm whether there is any environmental impact or not due to open dumping?	From the transported solid waste, the recyclable inorganic solid waste will be recycled and biodegradable organic solid waste will be disposed in the disposal location. From this location, the Municipal Authority collect this waste to dump their location. Remaining non-biodegradable waste will be sold to secondary vendors.	5.5	83
29.	5.6 Worker's Health	What measures have been taken by CNTIC against COV-19.	<p>CNTIC has a Covid-19 response plan and Details are given below:</p> <ul style="list-style-type: none"> ➤ Wear face masks in public area. Cover the mouth and nose with bent elbow or tissue when cough or sneeze, and dispose of the used tissue immediately. ➤ Provide training to raise employees' awareness of CODIV-19, inform related knowledge and information, and tell every how to do daily protection and how to protect themselves from virus infection. ➤ Daily temperature checking is performed on CNTIC staff and external personnel entering the on-site office twice a day at 8am and 8pm, and regularly recording and reporting. Fever is defined as a temperature above 38°C (100.4°F). ➤ Wash hands frequently and thoroughly with soap and water or 	5.6	84

SL No.	Description	Comments	Responses	Article No.	Page No.
			<p>using alcohol-based hand rub to kill viruses that may be on hands.</p> <ul style="list-style-type: none"> ➤ Maintain at least 1-meter (3 feet) distance from others in public area such as workplace, corridors and canteen. ➤ Avoid touching eyes, nose and mouth with hands, which can transfer virus from the hands to eyes, nose or mouth and then enter the body. ➤ Keep the dormitory and workplace ventilated. <p>What to do if someone have symptoms? For someone with suspected COVID-19 infection who present with mild symptoms*:</p> <ul style="list-style-type: none"> ➤ Stay at the dormitory for a 7-day self-isolation, which will help to protect others in the community while you are infectious. Do not go to the hospital right away, where the risk of infection is much more higher. ➤ If you feel better and no longer have a high temperature after 7 days, you can return to your normal routine. If the symptoms worsen during isolation or are no better after 7 days, seek medical care early. 		
30.	Bangladesh Labor Law 2018.	Please check and correct accordingly.	Bangladesh Labor Law 2006, amendment in 2018	5.6	84

SL No.	Description	Comments	Responses	Article No.	Page No.
31.	Figure-19: Existing outer drainage and rainy water reservoir	Fig-19: From the pictures it is evident that during rainy season the drain will be blocked due to siltation. Please propose corrective action measures.	In the Construction site, proper drainage system has to be developed for outer/inter drainage in the project site. At present, inside drainage construction has been started. After completion of construction works, necessary outer drainage will be constructed.	5.10	87
32.	CNTIC-CCOEC Consortium sprays water at prescribed interval regularly.	Please provide details on the number and timeframe of water spraying to control dust.	There is dust around the project site due to on-going construction work. To control the dust nuisance during dry weather, CNTIC-CCOEC Consortium sprays water at prescribed interval regularly at least 3 times but if need more we spray that time.	5.12	87
33.	In all cases, the wastewater streams are separated from the stormwater stream, which is disposed of separately utilizing the existing stormwater disposal system at the plant area.	From the text it gives an impression of using stormwater drainage facility to discharge the waste water. Is this correct? Please clarify.	In all cases, the wastewater streams are separated from the stormwater stream, which is disposed of separately utilizing the existing stormwater disposal system at the plant area.	6.2	90
34.	6.3 Noise Level	For Noise Level, GIIP is schedule of construction should be done in a manner that major activities will be done during the day time which has not been set as standard here.	<ul style="list-style-type: none"> • Use “quiet” equipment (i.e., equipment designed with noise-control elements); • Route truck traffic away from noise-sensitive areas, where feasible; • Install sound barriers for pile driving activity, where practicable (e.g., use an acoustic curtain or blanket around the point of impact); • Unnecessary vehicle movement are avoided 	6.3	90

SL No.	Description	Comments	Responses	Article No.	Page No.
			<ul style="list-style-type: none"> Switch off the engines while remaining unused. Prefer daytime to do the major construction works. 		
35.	<p>Table-22: List and Status of regulatory Requirements for Ashuganj 400 MW CCPP (East) Project.</p> 	Fire license is not required for construction phase !!! Could you please check with relevant authority?	During Construction phase no need to bring this license except EIA approval from DoE office.	Table 22	92
36.	ANNEX-I: Photo Appendix	Please reduce the number of pictures. Keep the required one.	We will incorporate it.	ANNEX-I	102
37.	ANNEX-V: Aide Memoire	Please remove. Updates of AM has already provided in earlier section.	We will incorporate it.	ANNEX-V	126

Annex-II: Photo Appendix



Fig: Photograph of Superstructure Construction of HRSG and Exhaust Stack



Fig: Photograph of Super structure construction of Turbine Hall



Fig: Construction of Central Control Building (CCB)



Fig: Construction of Turbine Hall



Fig: Generator Setup transformer location



Fig: Superstructure Construction of HRSG and Exhaust Stack



Fig: Water Discharge Pipe



Fig.: Power Control Centre



Fig: Construction of chemical plant



Fig: Construction of water intake plant



Fig: HRSG blown cooling water pool



Fig: Construction of oily waste water treatment station and service fire water tank



Fig: Batching plant



Fig: Construction of RMS Building



Fig.: Air Quality Monitoring Location in front of Admin Building, APSCL.



Fig.: Air Quality Monitoring Location at PDB School



Fig.: Air Quality Monitoring Location at TSK site



Fig.: Air Quality Monitoring Location at Laydown Area



Fig. : Air Quality Monitoring Location at Govt. Haji Abdul Jalil High School



Fig.: Noise Quality Monitoring Location in front of Admin Building, APSCL



Fig.: Noise Quality Monitoring Location at PDB School



Fig.: Noise Quality Monitoring Location at TSK site



Fig.: Noise Quality Monitoring Location at Laydown area



Fig. : Noise Quality Monitoring Location at Govt. Haji Abdul Jalil High School



Fig.: River water sampling from upstream side



Fig. : River water sampling from downstream side



Fig.: River water sampling from outfall area



**Fig.: Drinking Water Sampling
(North-West side of the project area at canteen)**



**Fig.: Drinking Water Sampling
(In front of APSCL Main Gate)**



**Fig.: Drinking Water Sampling
(Adjacent to Admin building)**



**Fig.: Drinking Water Sampling
(North-West side of the project area near Civil Dept.)**



Fig: Present fencing conditions of the Project Site



Fig: Photograph of Ground Water Level Measuring



Site visit by the Secretary of Power Division

Site visit by the Secretary of Power Division

Annex-III: Methodology

1. Methodology for Air Quality Assessment

During the operation phase of this power plant project, the important sources of emissions would include those from the operations of equipment and machinery, vehicles carrying materials to the site and taking debris out of the site and stack emission for electricity generation.

Particulate monitoring is usually accomplished with a **Respirable Dust sampler**, which is a vacuum type device that draws air with particulate matter through a filter paper. This sampling filter paper is dried up in the laboratory and the weight difference is the amount of SPM, PM₁₀ or PM_{2.5}, content measured in micrograms per cubic meter of air collected over a period of 24 hours. Sulfur dioxide and Oxide of Nitrogen sampling are conducted by using 20 ml absorbing reagent. Ambient Air Quality monitoring was done from five different places at Ashuganj 400 MW East Combined Cycle power plant project described in Table 4.2.1 and illustrated in Figure 4.1. Test Results of Ambient Air Quality from these different places are presented in Table 4.3.2.

Table 1: Measuring Points of Ambient Air Quality

SN	Location	Latitude	Longitude	Description of the Location
1.	Location 1	24°02'30.5"N	91°0'42.2" E	South-west side of Project area near PDB High School
2.	Location 2	24°02'31.7"N	91 °0'30.3" E	South-West side of Project area near Haji Abdul Jalil High School
3.	Location 3	24°02'58.5"N	91°01'23.9"E	North-East side of Project area near APSCL dormitory.
4.	Location 4	24°02'34.7"N	91°01'8.7"E	South-East side of Project area near APSCL power plant
5.	Location 5	24°02'31.1"N	91°0'3.8"E	South-West side of Project area near APSCL Admin building.

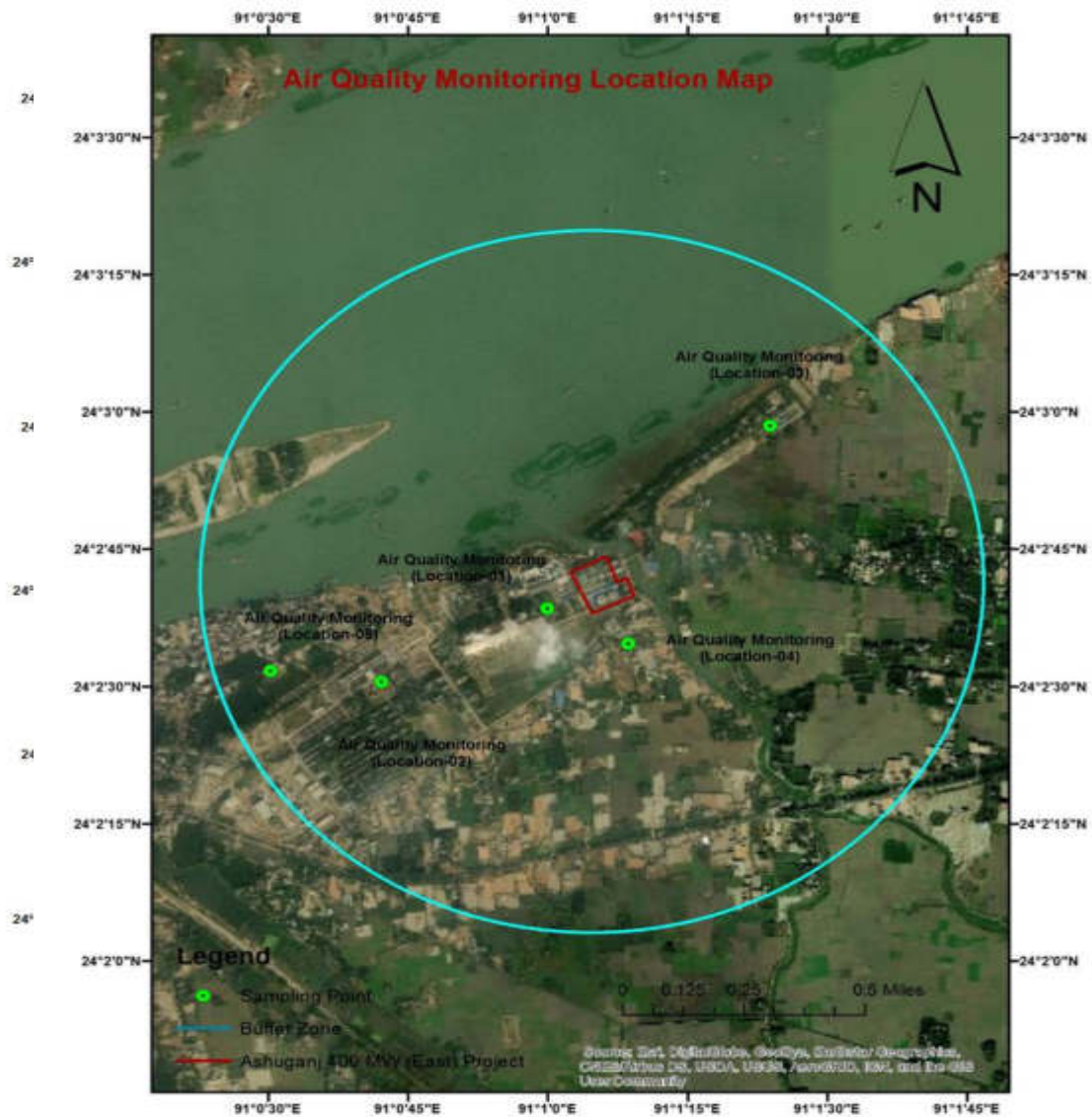


Figure 1: Sampling Points for Ambient Air Quality Measurement

2. Methodology for Ambient Noise Measurement

To assess the noise generated by different activities it is essential to identify the equipment to be used at various stages of the operation work. Therefore, an inventory of the probable equipment to be used and their reference noise generation data are of utmost importance. The noise level in the control room was tried to measure in the maximum silent condition. The noise was measured at different points of the project area at receptor levels; Table 4.2.2 and described in Figure 4.2; like a control room, turbine building, Water Treatment Area, Transformer area, GIS area and other outdoor places to determine the impact of noise generated from plant operational activities. The noise measurement was carried out with calibrated CEM Digital Sound Level Meter (Model No:

DT 8850). Five noise reading was taken for each point placing the noise meter 1 meter above from the ground and 1 meter away from the source. The measured noise level in the operational sites is summarized in table 4.3.3.

Table 2: Measurement Points of Ambient Noise

SN	Latitude	Longitude	Description of the Location
1.	24°02'30.5" N	91°0'42.2" E	South-west side of Project area near PDB High School
2.	24°02'31.7" N	91°0'30.3" E	South-West side of Project area near Haji Abdul Jalil High School
3.	24°02'58.5" N	91°01'23.9" E	North-East side of Project area near APSCL dormitory
4.	24°02'34.7" N	91°01'8.7" E	South-East side of Project area near APSCL power plant
5.	24°02'31.1" N	91°0'3.8" E	South-West side of Project area near APSCL Admin building.

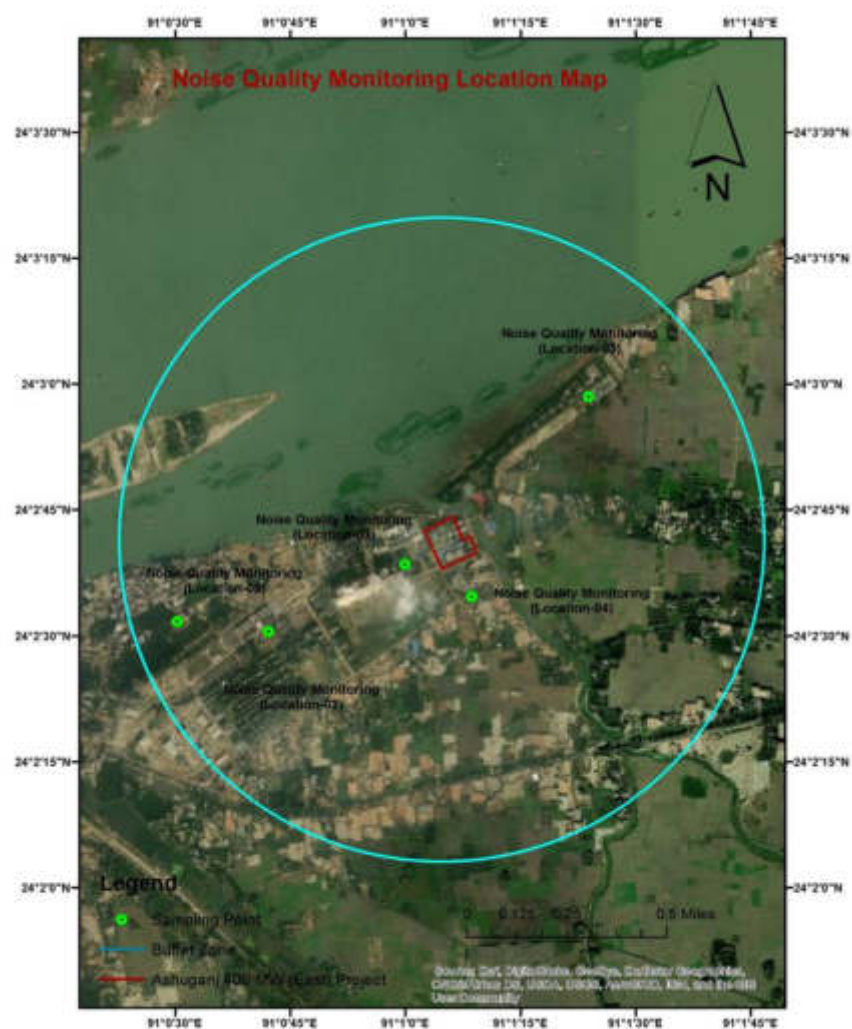


Figure 2: Noise Measuring Points in Project Area

3. Methodology for Water Quality Measurement

The drinking water, groundwater and a river water sample were collected from the tube well & supplied water, Tube Well & Pump and Meghna River (Table 4.2.3 & Figure 4.3,4.4 and 4.5) respectively. After sampling, temperature, P^H , Total Dissolved solid and Dissolved oxygen was measured on the field and transferred immediately to Environmental Lab for further analytical experiment maintaining sampling protocol. The following Table 4.2.3, show here the parameters tested along with their method for drinking water, surface water and groundwater respectively. The tested results are presented in Table 4.3.4, 4.3.5 and 4.3.6 separately for drinking water, river and groundwater.

Table 3: Measuring Points of Drinking water, Groundwater and River water

Location	Latitude	Longitude	Description of the Location
Drinking water			
Location-1 (D1)	24° 02' 43.22'' N	91° 1' 3.52'' E	Inside the project area
Location-2 (D2)	24° 2' 38.61'' N	91° 1' 4.99'' E	South-West side of the project at PDB High School
Location-3 (D3)	24° 02' 34.1'' N	91° 1' 9.3'' E	South-East side of the project at Local Settlement
Location-4 (D4)	24° 02' 57.9'' N	91° 1' 24.3'' E	North-East side of Project area near APSCL dormitory.
Groundwater			
Location 1: G1	24° 02' 38.1'' N	91° 0' 58.0'' E	Inside the project area
Location 2: G2	24° 2' 30.5'' N	91° 00' 42.2'' E	South-west side of Project area near PDB High School
Location 3: G3	24° 02' 34.1'' N	91° 1' 9.3'' E	South-East side of the project
Location 4: G4	24° 02' 47.2'' N	91° 1' 12.3'' E	North-East side of the project area
River water			
Upstream	24° 02' 53.1'' N	91° 01' 3.1'' E	North-West side of Project area near the project location
Downstream	24° 02' 44.0'' N	91° 00' 33.2'' E	North-West side of Project area and near Ashuganj Chor Sonarampur
Outfall	24° 02' 40.3'' N	91° 01' 10.8'' E	North-East side of Project area near APSCL power plant area

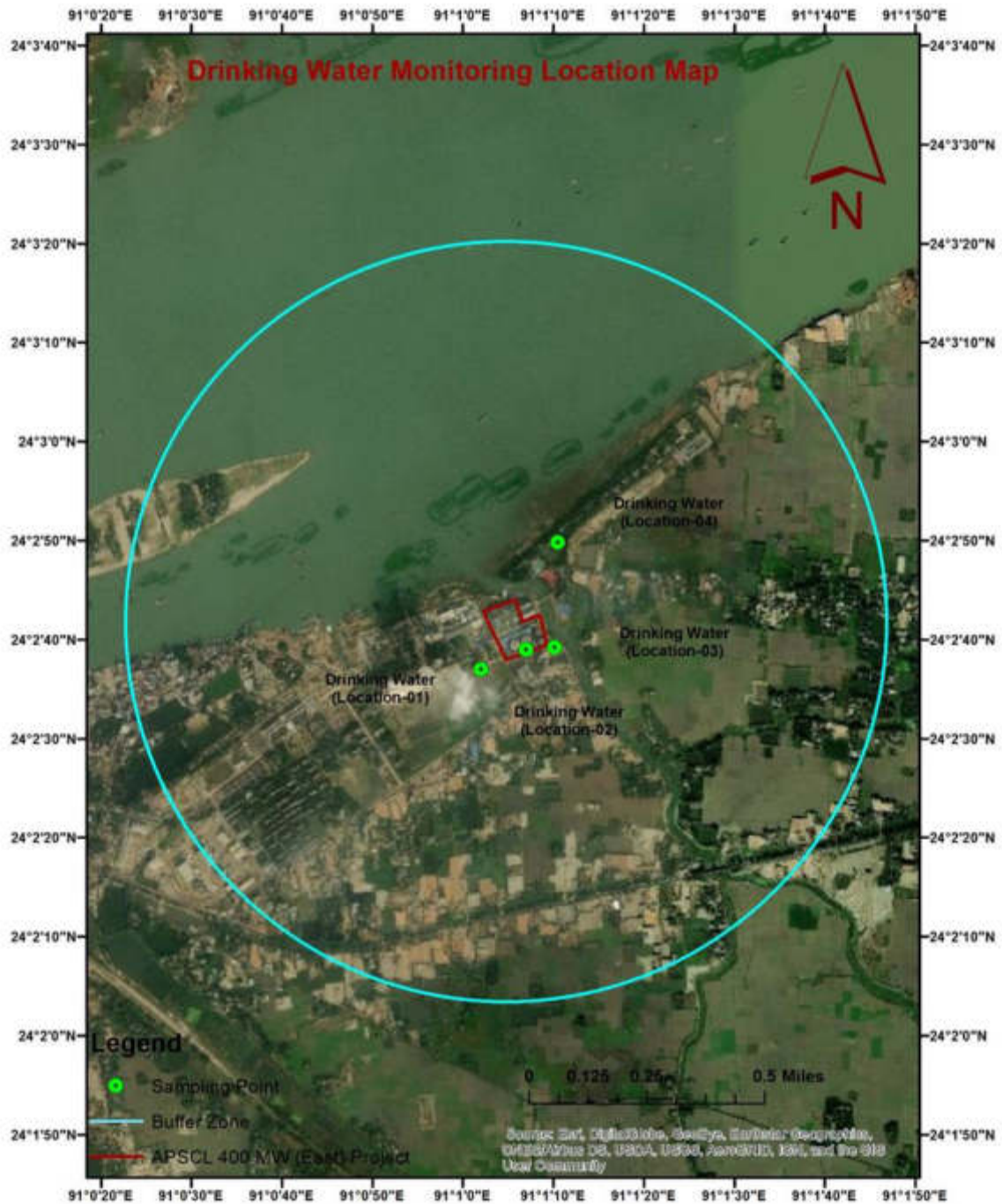


Figure 3: Drinking water Measuring Points in Project Area

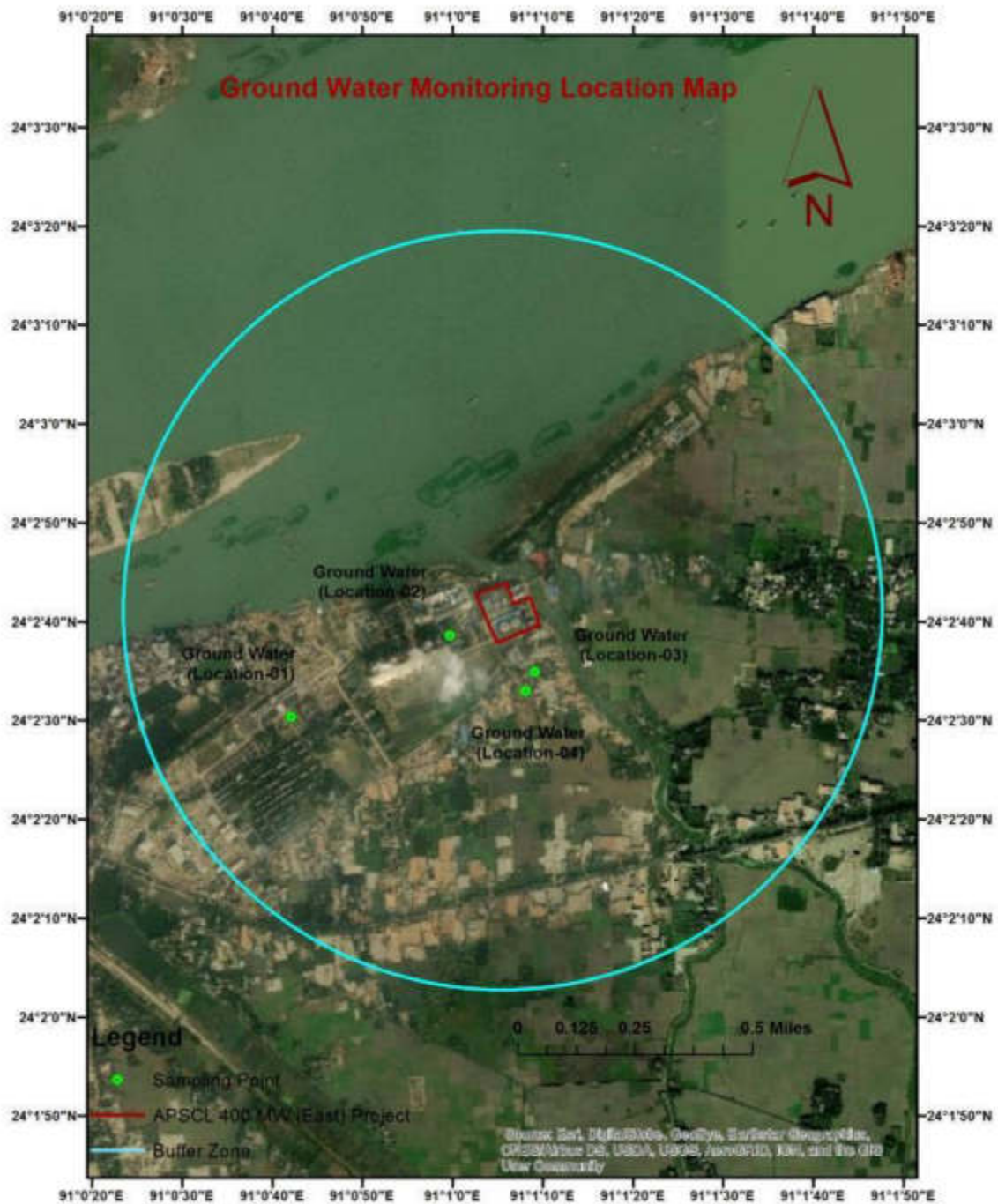


Figure 4: Groundwater Measuring Points in Project Area

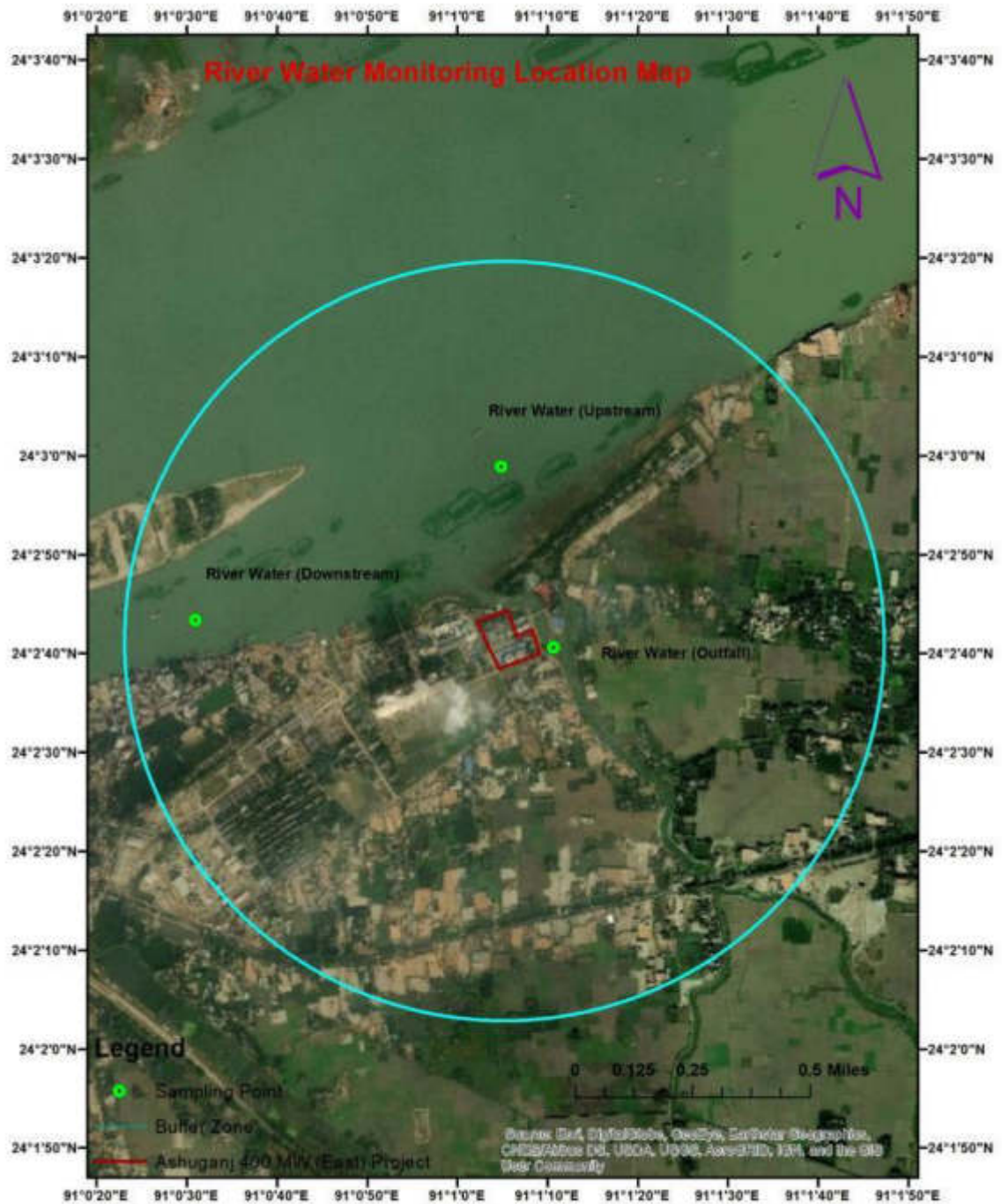


Figure 5: River Water Measuring Points in Project Area

4. Methodology for Soil Quality Monitoring:

The soil sample were collected from inside the project site of three different location (Table 4.2.4 & Figure 4.6) respectively. The following Table 4 show here the parameters tested along with their method for soil quality monitoring respectively. The tested results are presented in Table 4.3.7 for Soil Quality Monitoring.

Table 4: Measurement Points of Soil Quality Monitoring

SN	Latitude	Longitude	Description of the Location
1.	24° 02' 41.82'' N	91° 1' 3.83'' E	Inside the project site
2.	24° 2'40.27'' N	91° 1'6.05''E	Inside the project site
3.	24° 02' 39.72'' N	91° 1' 8.25'' E	Inside the project site

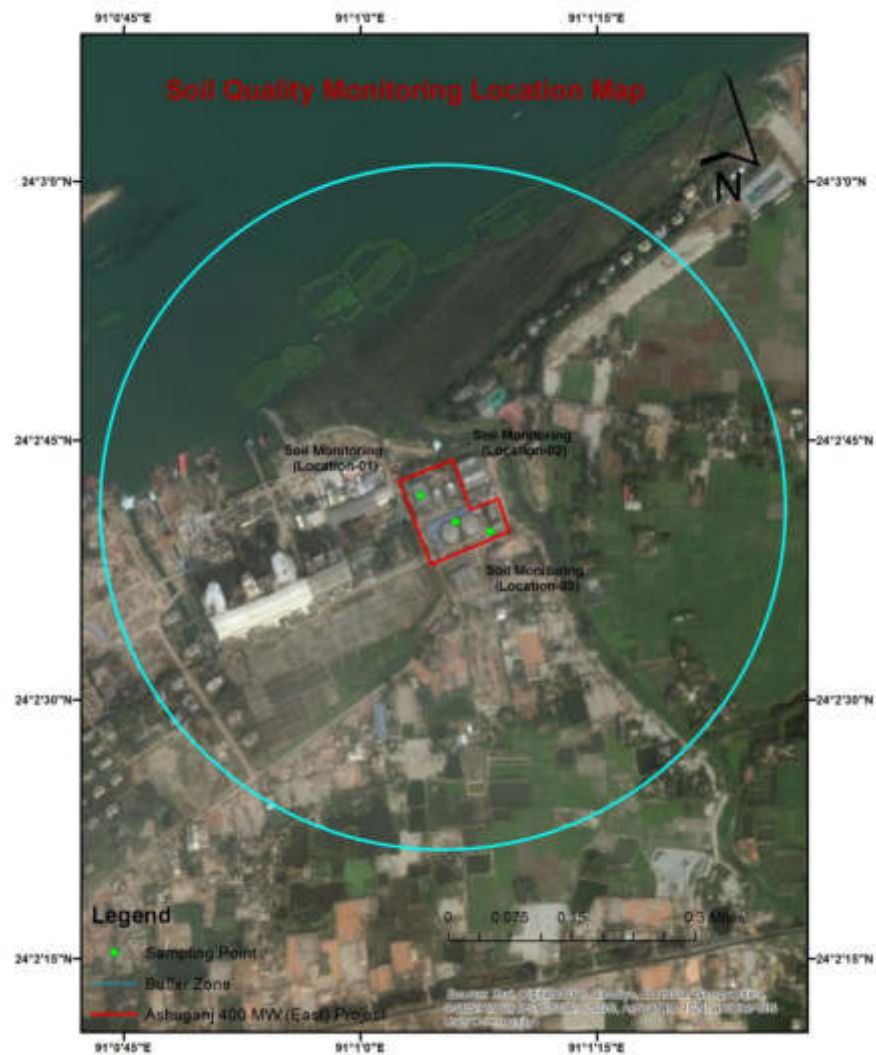


Figure 6: Soil Quality Measuring Points in Project Area

ANNEX-IV: Role & Responsibilities for SEMP Implementation

Role & Responsibilities for SEMP Implementation

Role and Responsibilities	Key Staff Responsibilities
<p><u>Ashuganj Power Station Company Ltd - Project Monitoring Unit (PMU):</u></p> <ul style="list-style-type: none"> ○ Overall responsibility for the environmental performance of the Project during construction; ○ Decision-maker on applicable policies for the Project; ○ Oversight supervisory role during construction. ○ Review reports of the Independent Environmental Monitoring Consultant; ○ Approves changes to the SEMP, as necessary, as part of an adaptive approach to HSE and social management of the Project; ○ Responsible for working with stakeholders as required; ○ Establishing an HSE department to implement the SEMP requirements; ○ Management, implementation, monitoring and compliance of the SEMP, sub-contractors; ○ Review of SEMP performance and implementation of corrective actions, or stop work procedures, in the event of breaches of SEMP conditions, that may lead to serious impacts on local communities, or affect the reputation of the Project; ○ Ensure effective communication and 	<p><u>APSCL Project Director:</u></p> <ul style="list-style-type: none"> ○ Actively promote and participate in the Project HSE and social programs. ○ Ensure that the HSE and social programs reflect the requirements of the Project in terms of resources; ○ Ensure that all legislative and company requirements are complied with; ○ Ensure that the work scope is conducted in accordance with the Project HSE rules and regulations, work practices and procedures, as detailed in this SEMP and other associated documentation; ○ Ensure that all contractors are made aware of their roles and responsibilities with regard to HSE and social management; ○ Ensure that safety is an agenda item in every contractor meeting; ○ Ensure that all contractors are evaluated throughout the duration of the Project, as to their capabilities and performance; and ○ Ensure implementation of HSE and social audits and recommendations for addressing non-compliances/corrective actions.
	<p><u>APSCL HSE Department:</u></p> <ul style="list-style-type: none"> ○ Manage, review and develop the HSE program to ensure that it fulfills Project requirements, including measures observed in this SEMP, and monitoring the implementation of the SEMP; ○ Coordinate and evaluate the effectiveness of all program elements; ○ Liaison with related government bodies as necessary; ○ Manage the Project HSE and social team and supervise them to ensure that all areas of the project are given the required level of safety support and attention; ○ Ensure proper housekeeping and waste disposal in accordance with company requirements and regulations;

Role and Responsibilities	Key Staff Responsibilities
<p>dissemination of the content and requirements of the SEMP to contractors and sub-contractors;</p> <ul style="list-style-type: none"> ○ Assisting the contractor with implementation of SEMP; ○ Ensuring compliance to all Project social commitments, ○ Report on environmental performance to DOE, the ADB, and other regulators as required; ○ Prepare environmental reports summarizing project activities, as required; ○ Representing the Project at community meetings ○ Ensuring effective community liaison and fulfilling commitments to facilitate public consultation throughout construction. 	<ul style="list-style-type: none"> ○ Ensure that the respective control areas are given the required level of safety support and attention; ○ Ensure that all HSE and social reports/findings of any unsafe conditions/practices are brought to attention and those are immediately corrected, and coordinate accident/incident investigations and report to the Project Director; and ○ Manage HSE and social audits and report the results to the Project Director.
<p><u>CNTIC</u></p> <ul style="list-style-type: none"> ○ Implementation of the SEMP; ○ Prepare and maintain records and all required reporting data as stipulated by the SEMP, for submission to APSCL. ○ Ensure that all construction personnel and sub-contractors are informed of the intent of the SEMP and are made aware of the required measures for environmental and social compliance and performance. 	<p><u>CNTIC HSE Department:</u></p> <ul style="list-style-type: none"> ○ Actively promote and implement all Project HSE and social plans related with the work they are performing; ○ Make sure that all activities under his/her responsibility shall follow all safety regulation/requirements, coordinating with APSCL's HSE Manager; ○ Ensure that committed resources (personnel, material, and equipment) used are consistent with achieving the objectives and requirements of Project HSE and social plans. <p><u>Construction Workers</u></p> <ul style="list-style-type: none"> ○ Familiarize themselves with the concept of the Project HSE and social rules and regulations; ○ Work in accordance with Project HSE procedures, safe work practices, and method statements, risk assessments, permits to work and any other instructions that apply to their works; ○ Use only tools/equipment and materials, which have been approved for use, and employ them only for

Role and Responsibilities	Key Staff Responsibilities
	<p>the purpose for which they were designed;</p> <ul style="list-style-type: none"> ○ Take an active part in the protection of themselves, fellow workers, property and the environment from accidental losses; ○ Immediately report to his respective supervisor or HSE officer/inspector if any potential hazards (relates to unsafe conditions and/or unsafe acts), which could lead to an accident, are found; ○ Report promptly to immediate supervisor and HSE officer/inspector if any incidents/near misses as well as injuries, regardless how minor; and ○ Shall attend Project safety training and drills programs as required.
<p><u>Supervising/Owners Engineer (OE):</u></p> <ul style="list-style-type: none"> ○ Assistance in preparation and implementation of the SEMP; ○ Reporting any incidents or non-compliance with the SEMP to APSCL. 	<p><u>OE Environmental and Social Safeguard Consultants:</u></p> <ul style="list-style-type: none"> ○ An OE local consultant and international consultant will report to APSCL and the ADB on compliance with the HSE and social commitments in the SEMP. ○ Preparation and implementation of the Environmental Supervision Plan during construction. ○ Preparation and implementation of the Environmental Monitoring Plan during construction ○ Supervision of contractor performance on implementation of the Construction and Work Camp Management Plan. ○ Reporting any incidents or non-compliance with the SEMP to the PMU. ○ Ensuring adequate training and education of all staff involved in environmental supervision. ○ Making recommendations to the APSCL (PMU) regarding SEMP performance as part of an overall commitment to continuous improvement.

ANNEX-V: DoE Clearance of EIA

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

Memo No : DoE/Clearance/5484/2015/ 491

Date: 08/10/2015

Subject: Approval of Environmental Impact Assessment (EIA) Report for Ashuganj 400 MW Combined Cycle Power Plant (East) at Ashuganj under Brahmanbaria District.

Ref: Your Application dated 06/08/2015.

With reference to the above, the Department of Environment (DOE) is pleased to approve Environmental Impact Assessment (EIA) Report for Ashuganj 400 MW Combined Cycle Power Plant (East) at Ashuganj under Brahmanbaria District subject to fulfilling the following terms and conditions.


1. This EIA report is approved only for 400 MW Combined Cycle power plant. Any expansion or extension of this power plant will be required further/fresh EIA study for the Environmental clearance from the Department of Environment (DOE).
2. Project Proponent may undertake activities for land development and infrastructural development of the project.
3. Project Proponent may open L/C (Letter of Credit) for importing machineries for the project which shall also include machineries relating to waste treatment plant and other pollution control devices.
4. The activity under the Power Plant Construction Project shall not result in the loss of containment of any materials that would affect health or will have damaging impact on the environment or natural resources.
5. Proper and adequate mitigation measures shall be ensured throughout preparation, construction and operation period of the proposed Power Plant Construction Project activities.
6. Any heritage sight, ecological critical area, and other environmentally and/or religious sensitive places shall be avoided during project construction phase.
7. Proper construction and development practices shall be followed that minimize loss of habitats and fish breeding, feeding & nursery sites.
8. Construction works shall be restricted to day time hours so as to avoid/mitigate the disturbance of local lives as well as implementation schedules of the works shall be notified in advance to nearby residents.
9. Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project period.



10. In order to control noise pollution, vehicles & equipment shall be maintained regularly; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.
11. No solid waste can be burnt in the project area. An environment friendly solid waste management should be in place during the whole period of the project in the field.
12. Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be demolished or destroyed.
13. All the required mitigation measures suggested in the EIA report along with the emergency response plan are to be strictly implemented and kept operative/functioning on a continuous basis.
14. To reduce dust, spraying of water over the earthen materials should be carried out from time to time.
15. Storage area for soils and other construction materials shall be carefully selected to avoid disturbance of the natural drainage.
16. Adequate considerations should be given to facilitate drainage system for run off water from rain.
17. Adequate facilities should be ensured for silt trap to avoid clogging of drain/canal/water bodies.
18. Construction material should be properly disposed off after the construction work is over.
19. The project authority shall submit a detail work plan with time schedule of development activities at least 7 (seven) days ahead of the work commences in the field to the Brahmanbaria District Office, Chittagong Regional Office and Headquarters of the Department of Environment simultaneously.
20. Environmental Monitoring Reports shall be made available simultaneously to DOE Brahmanbaria District Office, Chittagong Regional Office and Headquarters on a monthly basis during the construction period of the project.
21. The following records must be kept in respect of any samples required to be collected for the purposes of environmental monitoring activities :
 - (a) the date(s) on which the sample was taken;
 - (b) the time(s) at which the sample was collected;
 - (c) the point at which the sample was taken; and
 - (d) the name of the person who collected the sample.
22. The results of any monitoring required to be conducted under this EIA report must be recorded.
23. In case of any emergency, the following information shall immediately be reported to Brahmanbaria District Office, Chittagong Regional office and Headquarters of the Department of Environment (DOE) simultaneously
 - a) Nature of incident (land slides, fire, accident, collision, etc.)
 - b) Personnel affected (injured, missing, fatalities, etc.)
 - c) Emergency support available and its location (standby transport, medical facilities, etc.)
 - d) Weather conditions



- e) Current operations (abandoning the site, fire fighting, etc.)
24. Appropriate permission would require to be obtained from the Forest Department in favor of cutting/felling of any plant/tree/sapling forested by any individual or government before doing such type of activity.
 25. The project authority shall extend active cooperation to DOE officials to facilitate their visit to the site as and when necessary.
 26. The project authority shall, after land development, infrastructural development and installation of the power plant, apply for Environmental Clearance to the Brahmanbaria District Office of DOE with a copy to the Head Office of DOE in Dhaka.
 27. Without obtaining Environmental Clearance, the project authority shall not start the operation of the project.
 28. Violation of any of the above conditions shall render this approval void.
 29. The project authority shall, after land development, infrastructural development and installation of the plant, apply for Environmental Clearance Certificate without which proponent shall not start operation of the project.
 30. This EIA Approval has been issued with the approval of the appropriate authority.


08.10.2015

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 02-8181778

Managing Director
Ashuganj 400 MW Combined
Cycle Power Plant (East)
Sunarampur, Ashuganj
Brahmanbaria.

Copy Forwarded to :

- 1) PS to Secretary, Ministry of Environment and Forests, Bangladesh Secretariat, Dhaka.
- 2) Director, Department of Environment, Chittagong Divisional Office, Chittagong.
- 3) Deputy Director/Office In-charge, Department of Environment, Brahmanbaria District Office, Brahmanbaria.
- 4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

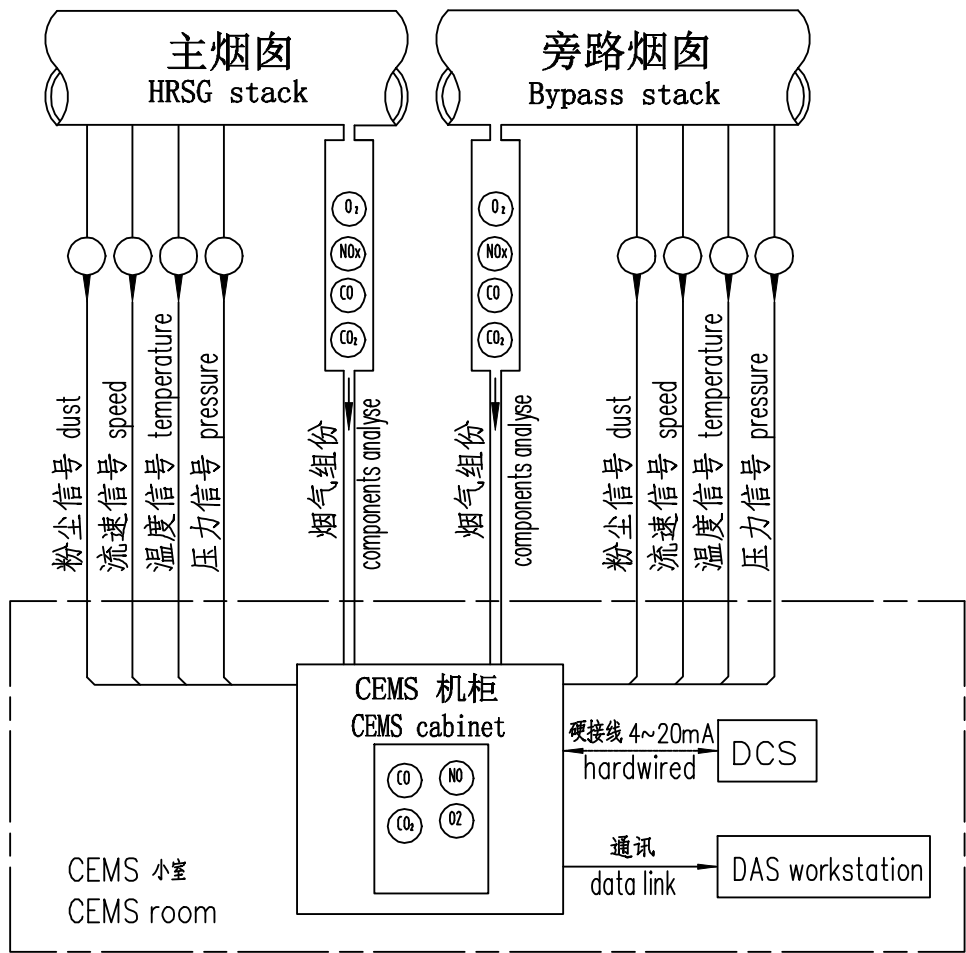
Annex-VI: Carbon Footprint Analysis of Ashuganj 400MW CCPP East Project

BAN: Power System Expansion and Efficiency Improvement Investment Program-Tranche 3

Ashuganj 400 MW CCPP East Project

			<u>Methodology</u>			
SI	Description		SI	Description		
	Electricity Outputs	MW	7	New Plant Efficiency:	58.75%	
1	Grid electricity:	150	8	Emission factor for gas:	56.1 kgCO ₂ /GJ	0.0561 tCO ₂ /GJ
2	Existing power plant's output:	250	9	Grid emission factor for BAN:		0.648 tCO ₂ /MWh
3	Project Output:	400	10	fuel consumption per year, GJ/year:		3.6
4	Time (hrs/yr):	8,760				
5	New plant availability:	85%				
6	Old plant availability:	36%				
<u>Calculation</u>						
SI	Description				MWh/yr	
1	Baseline generation from the old power plant (Existing Output*Time*New Plant Availability):				1,861,500	
2	Baseline generation from Grid (Grid*Time*New Plant Availability):				1,116,900	
3	Baseline generation from the old power plant:					
4	Fuel consumption-old power plant: (GJ/year)				18,792,485	
5	Baseline emission—old power plant:				1,054,258	tCO ₂ /yr
6	Baseline emission—grid:				723,751	tCO ₂ /yr
7	Total baseline emission:				1,778,010	tCO₂/yr
SI	Description					
1	Project electricity generation:				2,978,400	MWh/yr
2	Project fuel consumption:				18,250,621	GJ/yr
3	Project Emission:				1,023,860	tCO₂/yr
	Emission Reduction from the Project (Tentative)				754,150	tCO₂/yr

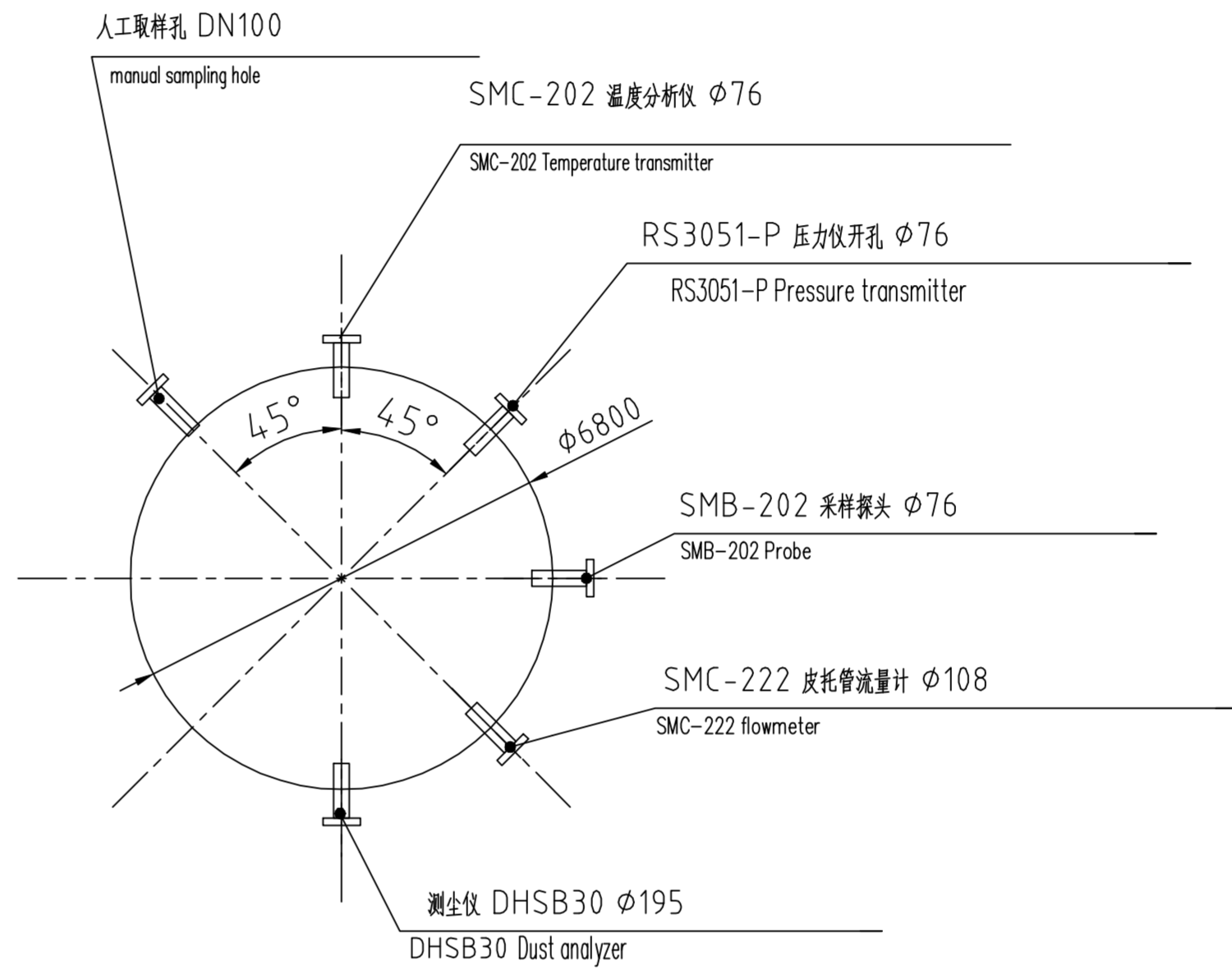
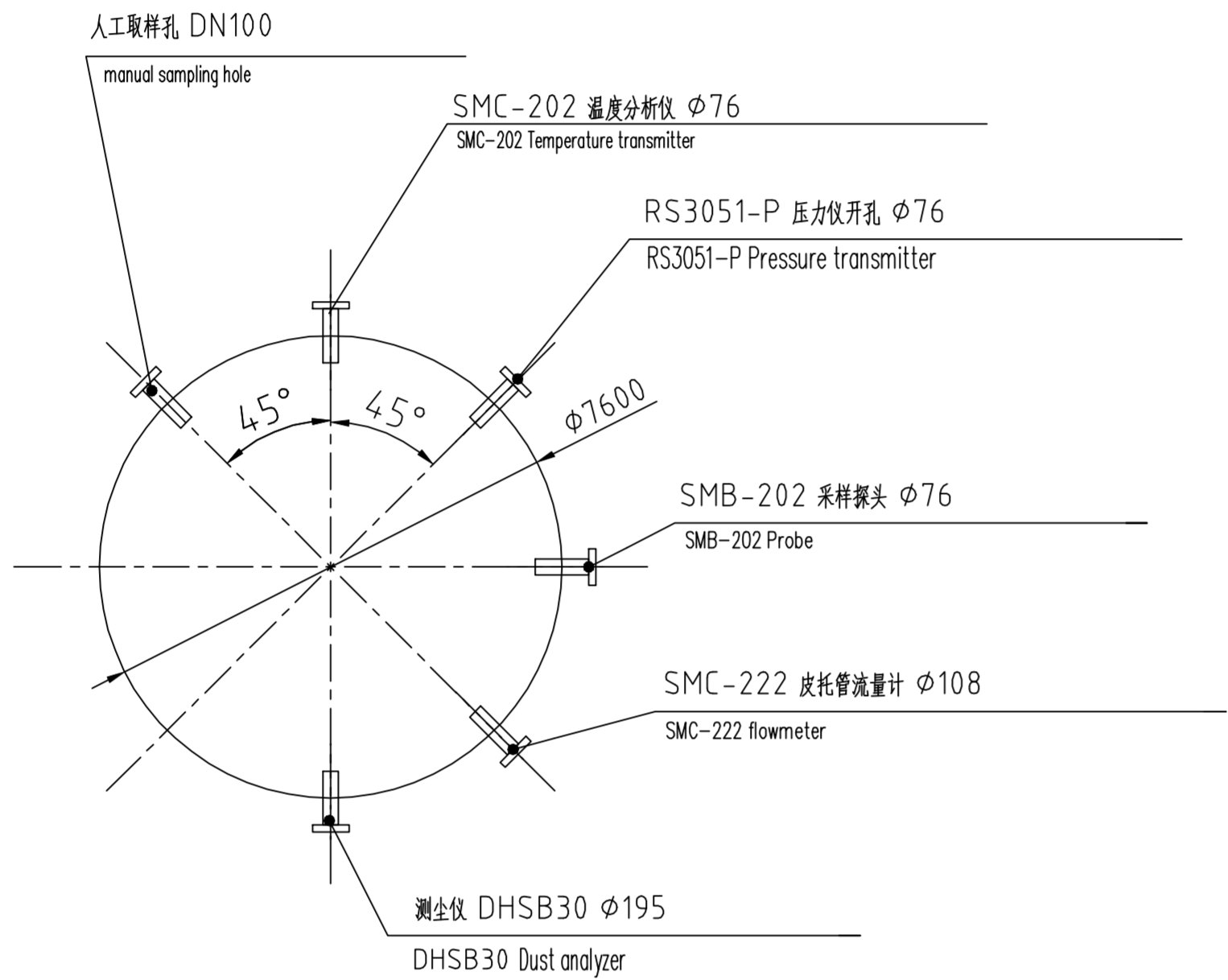
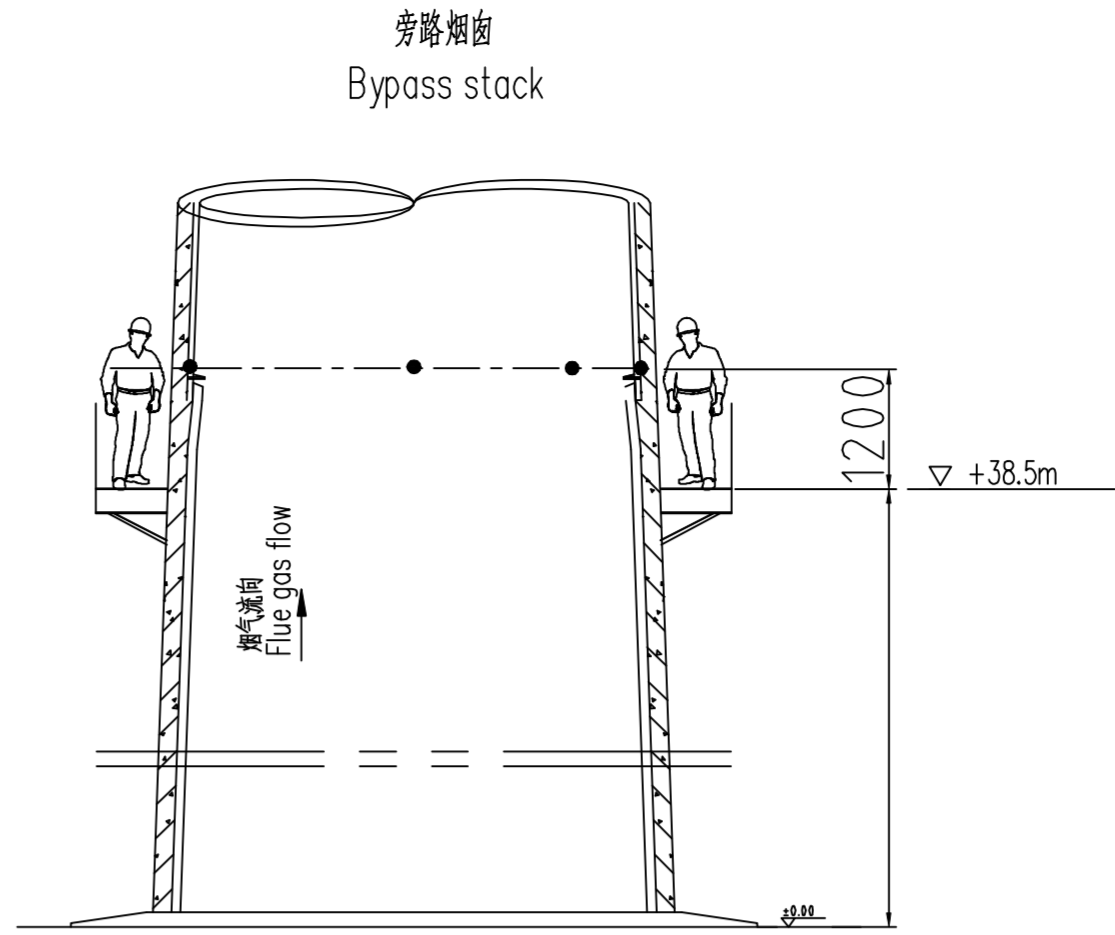
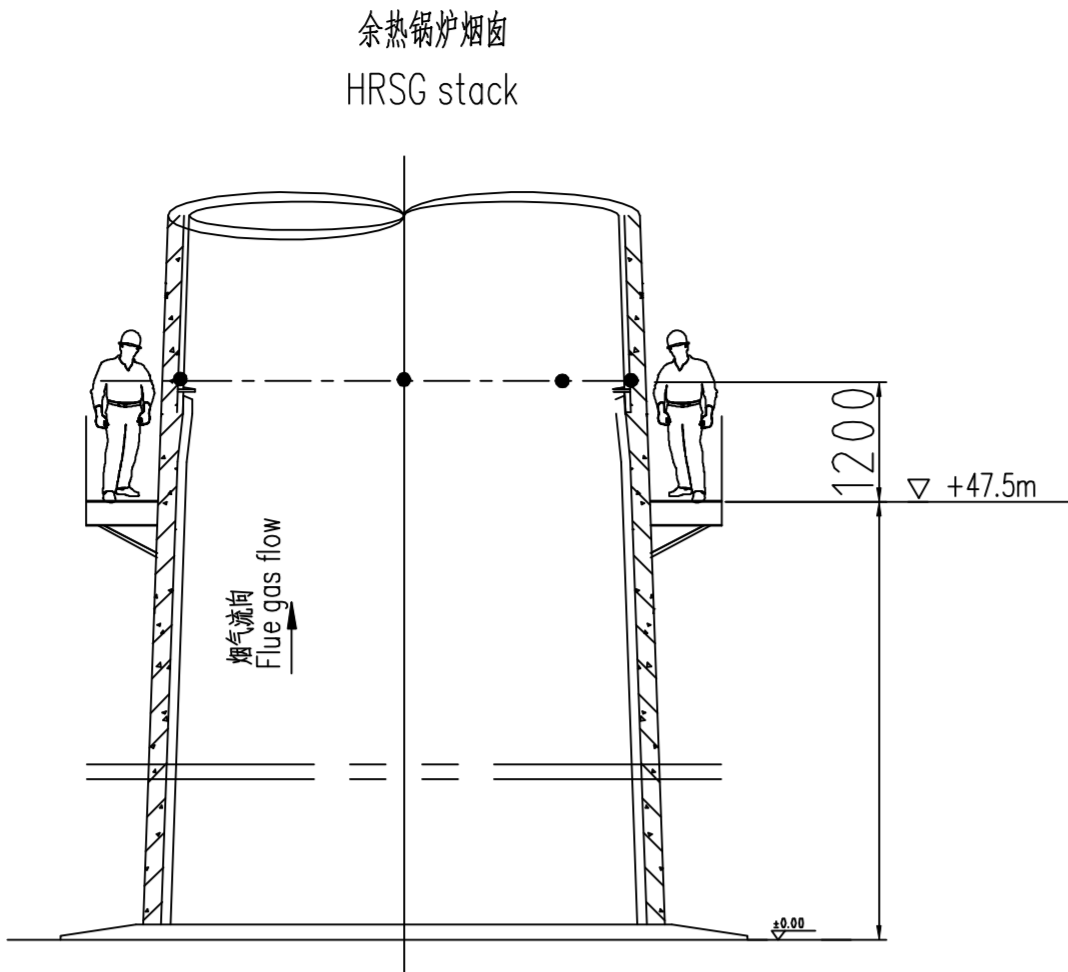
Annex-V: CEMS, AQMS and Oily wastewater treatment system diagram of East Project



说明:
Note:
1. 本图根据厂家图纸00-001绘制, 现场以实际到货为准。
1. This drawing is designed according to vendor drawings :00-001. It should be subject to the actual delivery drawings.

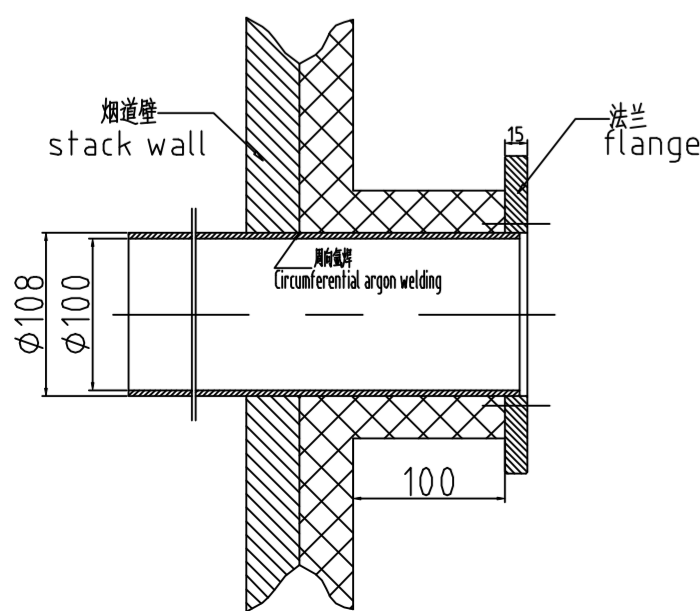
0	2019.07	First issue
版本REV.	日期DATE	升版内容 Contents of Revised
<div><div></div>ASHUGANJ POWER STATION COMPANY Ltd.</div>		
<div><div>CNTIC</div><div></div>CNTIC-CCOEC Consortium</div>		
<div><div><div></div>中国电建集团福建省电力勘测设计院有限公司 POWERCHINA FUJIAN ELECTRIC POWER SURVEY & DESIGN INSTITUTE CO.,LTD.</div></div>		孟加拉国阿苏甘杰东400MW联合循环燃机电站工程 Ashuganj 400MW CCPP (East) Project
施工图 Design phase		Detail
批准 APPR.	余建	校核 CHECKER
审核 REVIEWER	胡明华	设计DESIGN
比例SCALE		日期DATE
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		35-F403S-K0602-02

CEMS系统总图
CEMS system diagram

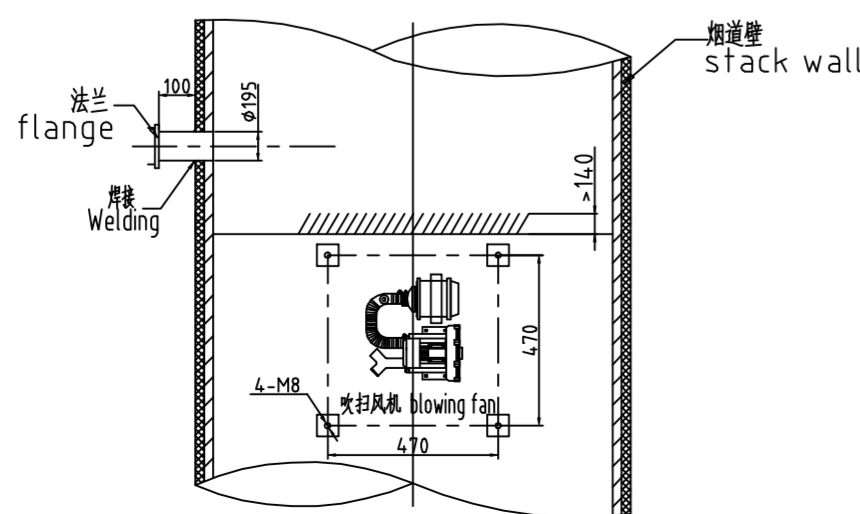


- 说明:
Note:
1. 本图根据厂家图纸00-007/008/009/010/011绘制, 现场以实际到货为准。
 2. 测点位置应避开烟道弯头和断面急剧变化的部位。
 3. 对于气态污染物, 测点应设置在距弯头下游方向 ≥ 2 倍烟道直径, 以及距上游方向 ≥ 0.5 倍烟道直径处。
1. This drawing is designed according to vendor drawings :00-007/008/009/010/011, It should be subject to the actual delivery drawings.
2. Measuring point should avoid the turning and sharp change of section.
3. For the gaseous pollutants, measuring point should be set up in the elbow downstream direction is ≥ 2 times the flue diameter, and upstream direction is ≥ 0.5 times the flue diameter.

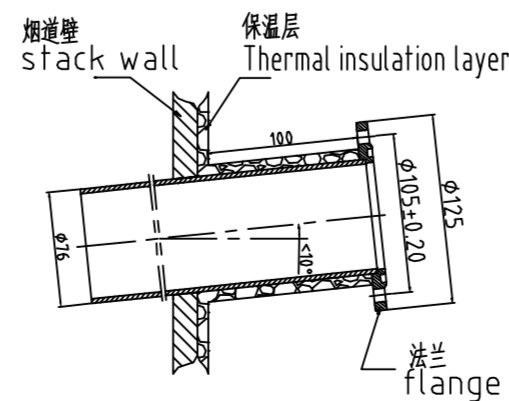
SMC-222 流量计 安装孔接口详图
Dimensional Drawing: Mounting of SMC-222 flowmeter



DHSB30 测尘仪 安装孔接口详图
Dimensional Drawing: Mounting of DHSB30 Dust analyzer

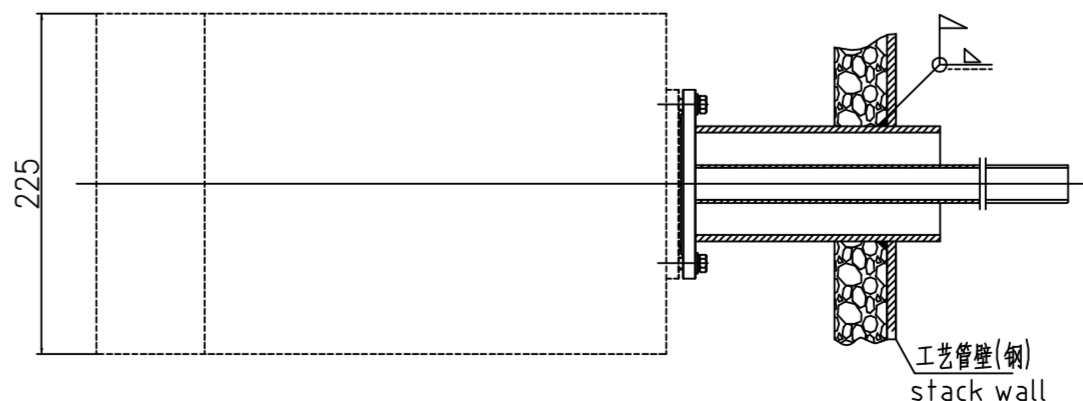


SMB-202 采样探头/SMC-202 温度变送器
RS3051-P 压力变送器 安装孔接口详图
Dimensional Drawing: Mounting of
SMB-202 Probe/SMC-202 Temperature
transmitter/ RS3051-P Pressure
transmitter



适用于主旁路烟道
HRSG stack

SMB-202 采样探头安装孔接口详图
Mounting of SMB-202 Probe



SMC-202 温度变送器
RS3051-P 压力变送器 安装孔接口详图
Dimensional Drawing: Mounting of
SMC-202 Temperature transmitter/
RS3051-P Pressure transmitter

适用于旁路烟道
Bypass stack

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孟加拉国阿苏甘杰东400MW联合循环燃机电站工程 Ashuganj 400MW CCPP (East) Project		施工图 设计 Detail 阶段 phase
批准 APPR.	审核	CEMS 仪表开孔图 CEMS instrument arrangement diagram
校核	设计	
日期 DATE	比例 Scale	
图号	35-F403S-K0602-04	

A

B

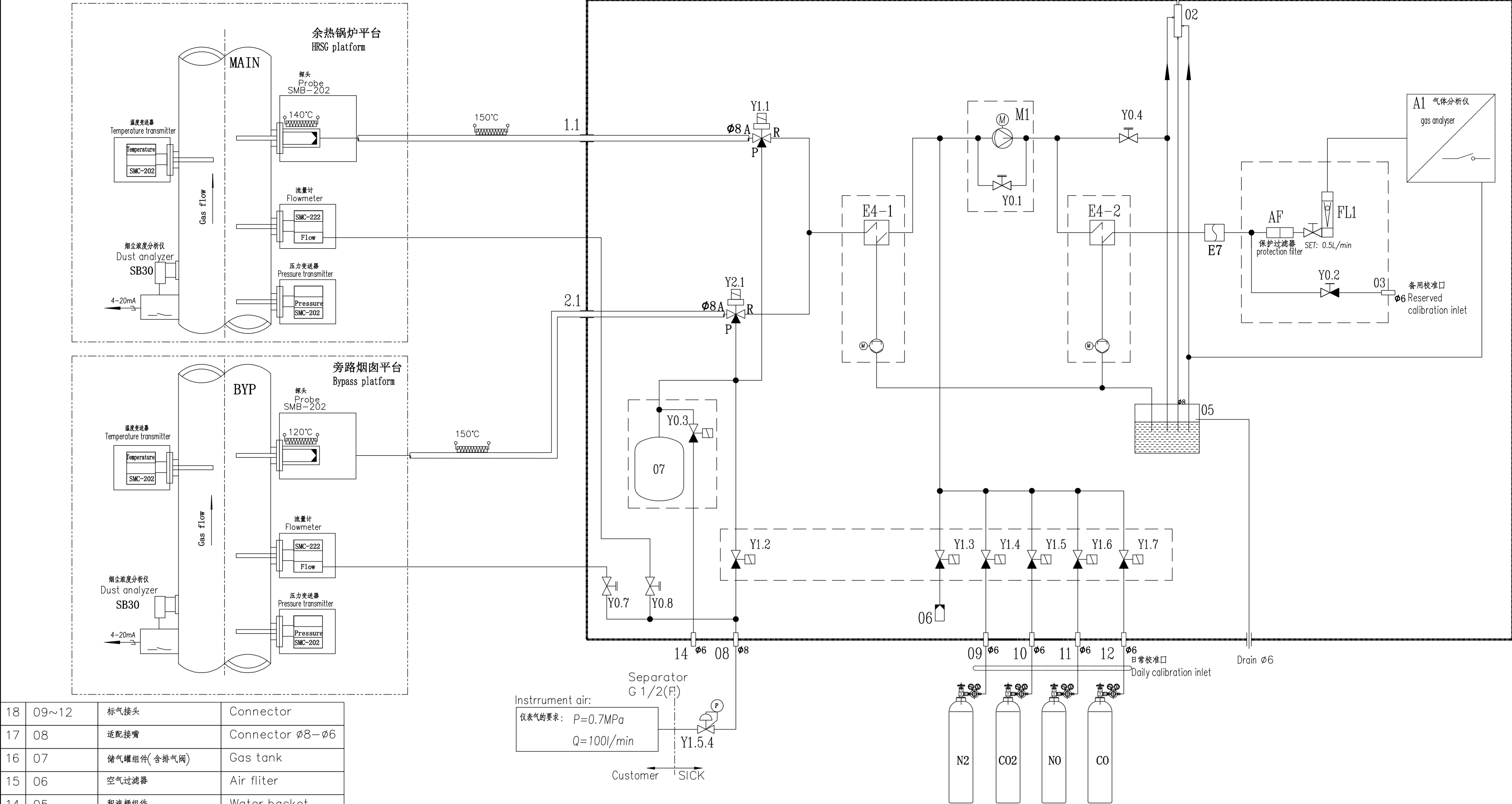
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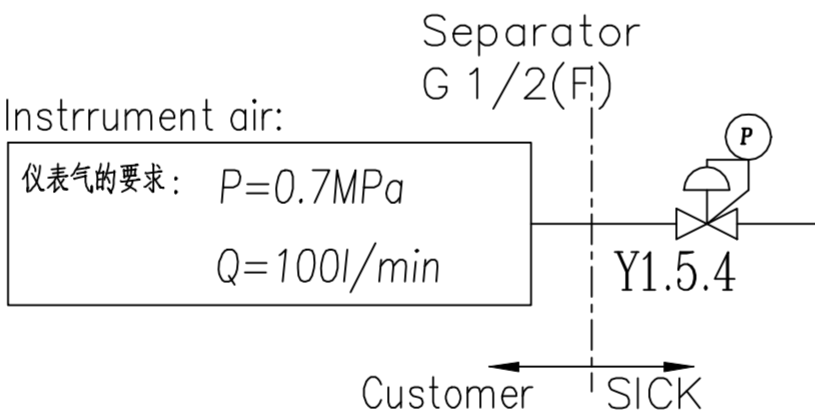
E

F

G



18	09~12	标气接头	Connector
17	08	适配接管	Connector $\phi 8-\phi 6$
16	07	储气罐组件(含排气阀)	Gas tank
15	06	空气过滤器	Air fliter
14	05	积液桶组件	Water bucket
13	03	穿板接头	Connector $\phi 6-\phi 6$
12	02	多路排气管	Gas outlet
11	1.1/2.1	样气入口格兰	Inlet gland
10	E7	NO2~NO 转化炉	NO2~NO Converter
9	E4	致冷器	Cooler
8	FL1	防腐调节流量计	Flowmeter
7	AF	保护过滤器	Filter
6	A1	红外分析仪(S710)	S710 analyzer
5	M1	采样泵+ 回路调节阀	Sample pump
4	Y0.4/Y0.7/Y0.8	防腐调节阀	Manual valve
3	Y0.2	不锈钢两通阀	Ball valve
2	Y1.2~Y1.7	标气电磁阀组	Solenoid valves
1	Y1.1	电磁阀总成	Solenoid valve
NO	标识符 identifier	物料名称	Part Name

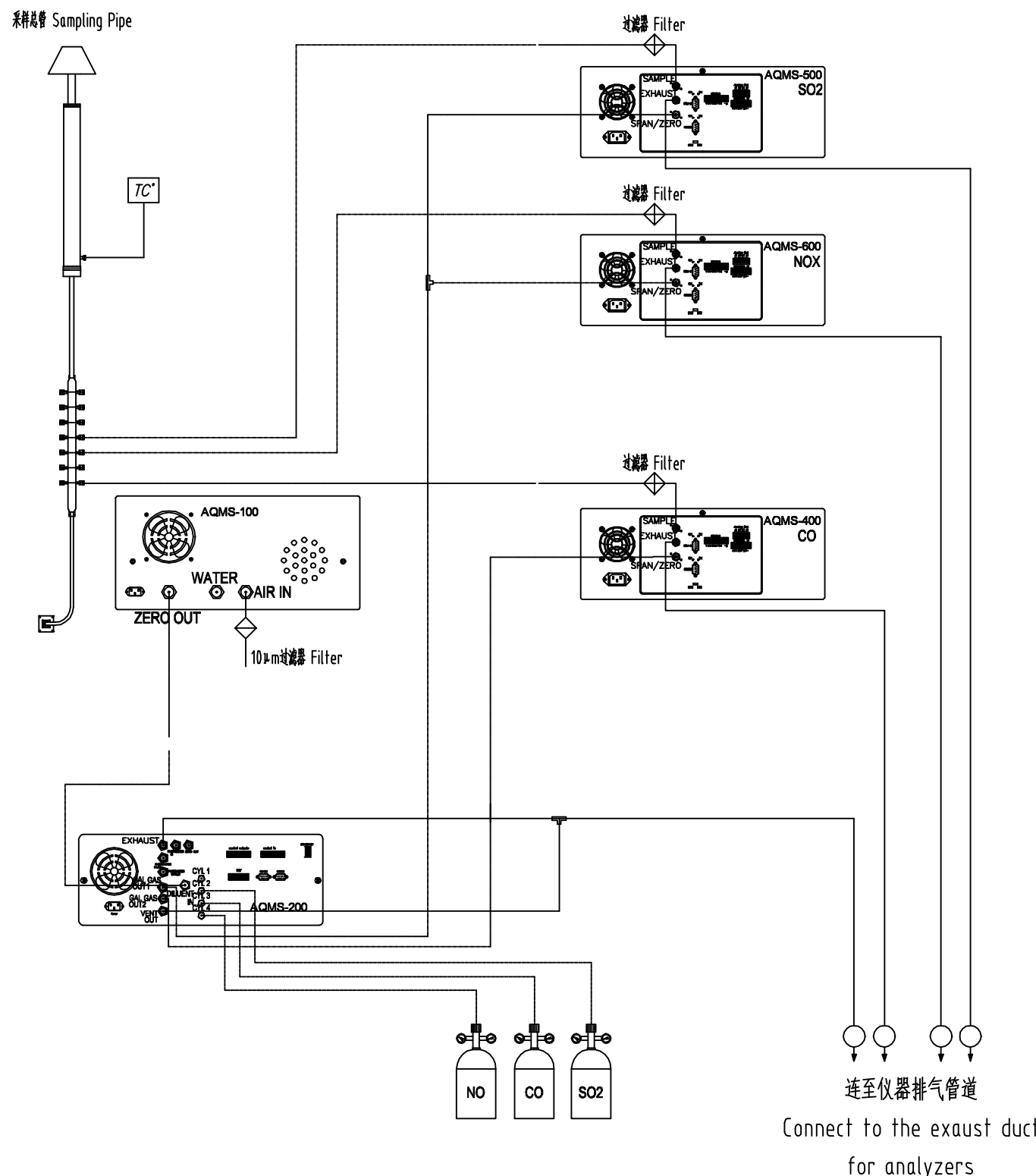


说明:
Note:
1. 本图根据厂家图纸10-000绘制, 现场以实际到货为准。
1. This drawing is designed according to vendor drawings :10-000. It should be subject to the actual delivery drawings.



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孟加拉国蒙甘杰东400MW联合循环燃气电站工程 Ashuganj 400MW CCPP (East) Project		施工图 设计Design Detail 阶段phase
批准APPR.	审核REVIEWED	CEMS气路流程图 CEMS flue gas analyse system diagram
校核CHECKED	设计DESIGN	
日期DATE	比例Scale	
图号DRAWING NO.	35-F403S-K0602-05	





说明 Note:

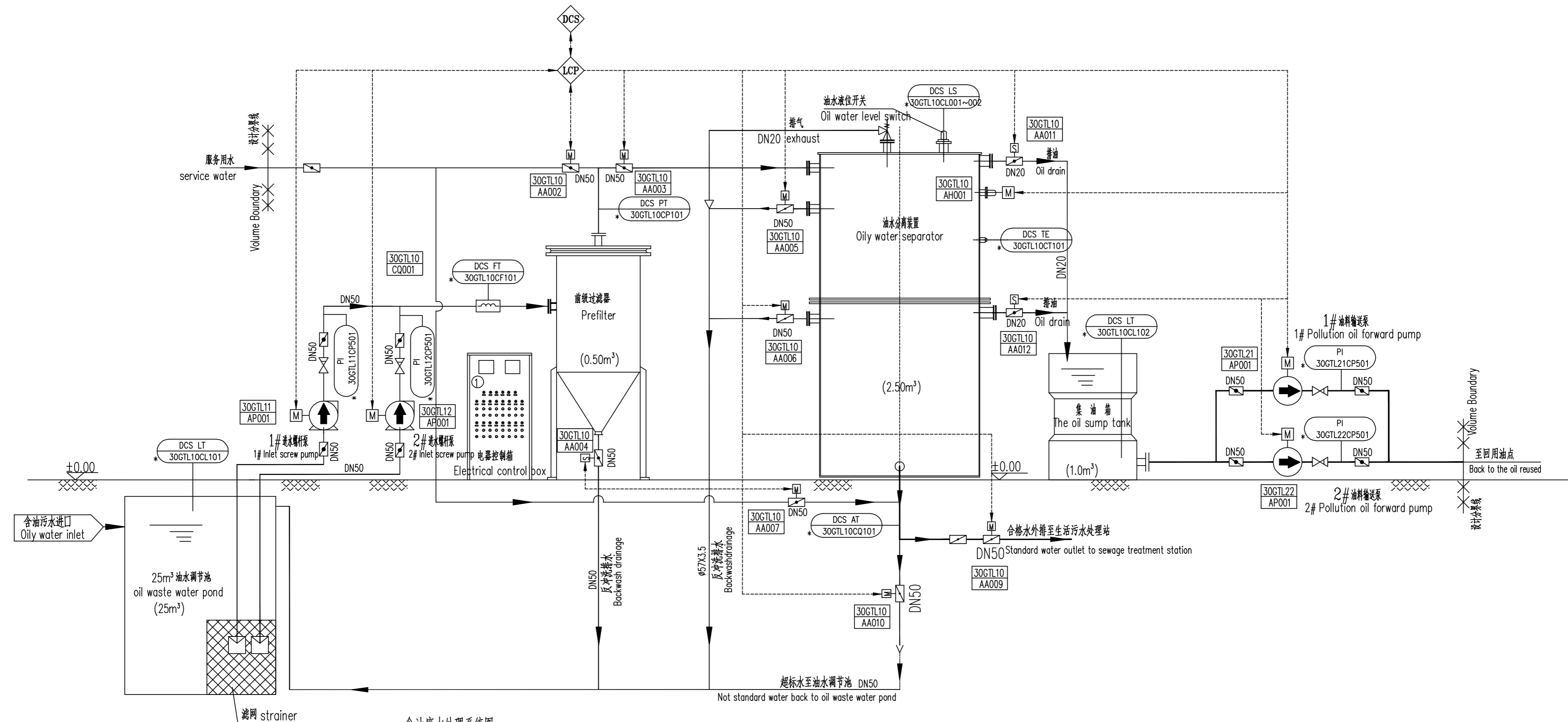
- 中心线表示1/4" PTFE管 — 品红
Center line for 1/4" PTFE tube, Pink
- 虚线表示1/8" PTFE管 — 红色
Dashed line for 1/8" PTFE tube, Red
- 点划线表示1/4" 不锈钢管 — 青色
Dot dash line for 1/4" for stainless steel tube, Cyan
- 单点双划线表示1/8" 不锈钢管 — 绿色
Dot double dash line for 1/8" stainless steel tube, Green
- 实线表示1/4" PVC管 — 蓝色
Continuous line for 1/4" PVC tube, Blue

备注 Remark:

- BPM-200 (PM10、PM2.5) 单独采样
BPM-200 (PM10, PM2.5) has individual sampling system.

0	2019.10	First issue
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批准 APPR.		施工图 Design phase
审核 REVIEWER		设计DESIGN
比例SCALE		图号 DRAWING NO.
		35-F403S-K0605-03

工程建设图纸
专用章
甲级 A135003685



含油废水处理系统图
Oily wastewater treatment system

说明:

1. 本图根据工艺专业提供的图纸35-F403S-S0405-01绘制。
2. 图纸中所有带*的仪表由厂家成套提供。

Note:

1. The diagram is drawn as per 35-F403S-S0405-01 supplied by water supply major.
2. All instruments with * are supplied by vendor.

工程建设图纸
专用章
甲级 A135003685

0	2019.12.20	First issue	
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<div>中国电建集团福建省电力勘测设计院有限公司 POWERCHINA FUJIAN ELECTRIC POWER SURVEY & DESIGN INSTITUTE CO., LTD.</div>		<div>孟加拉国阿苏甘杰东400MW联合循环燃机电站工程 Ashuganj 400MW CCPP (East) Project</div>	<div>施工图 Detailed</div> <div>设计阶段 Design phase</div>
批准 APPR.	<div>刘建春</div>	校核 CHECKER	<div>陈晚霞</div>
审核 REVIEWER	<div>陈晚霞</div>	设计DESIGN	<div>陈晚霞</div>
比例SCALE		日期DATE	2019.12
		含油废水处理仪表控制系统图 P&ID of oily waste water treatment system	
		图号 DRAWING NO.	35-F403S-K0512-02