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

Environmental Monitoring Report

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

Environmental Monitoring Report

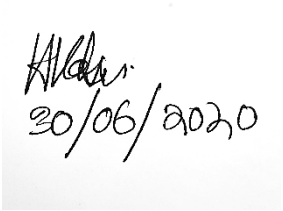
9th Semi-Annual (January – June 2020) Report

ASHUGANJ 400 MW (EAST) COMBINED CYCLE POWER PLANT PROJECT

At Ashuganj, Brahmanbaria

Ashuganj Power Station Company Limited (APSCL)

9th Semi Annual Environmental Monitoring Report

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

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Semi-Annual Monitoring Report

For Ashuganj 400 MW (East) Combined Cycle Power Plant (CCPP) Project
(Ashuganj, Brahmanbaria)

Period: 9th Semi-Annual (January –June 2020)
Monitoring: Ambient Air, Water & Noise Quality

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 Fire water pump house, Service and Fire water tank, Emergency Oil pit, Oily waste water treatment station, sewage treatment station etc. In order 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 total of 129 MW and emits 17,78,010 ton of CO_2 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 CO_2 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 CO_2 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 issue during Steel Structure Erection activities for using of demolition equipment's and also for traffic and transport. Noise level is reduced by using of fine-tuned low noise level construction equipment's and by the proper traffic management system. Every personnel uses personal protective equipment to ensure own safety. The remarkable achievement in this period is that till now there is no record of accident or injury. Beside 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 environment 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.

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**.

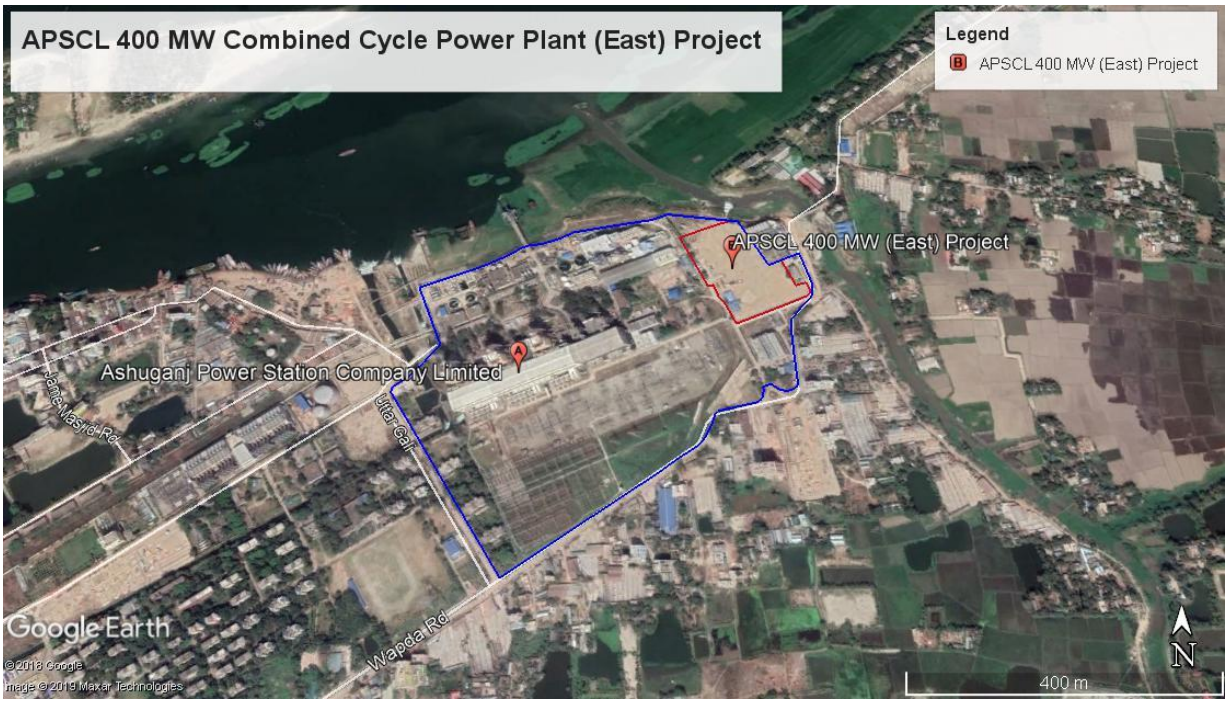


Figure-1: Location Map of APSCL 400 MW CCPP (East) project

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**

Source: APSCL Website

1.2 Brief Project Description

A Combined Cycle Power Plant of Total net 400±5% MW capacity at site condition (35 ºC, 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 located 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 Nineth 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) 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; (x) Construction of internal roads. (xi) Switch room (xii) 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** Old power plant will be demolished	Completed 100%
	Civil Works:	Description
1.	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
	Service and Fire water pump house	Foundation work has completed
	Service and Fire water tank	Foundation work has completed

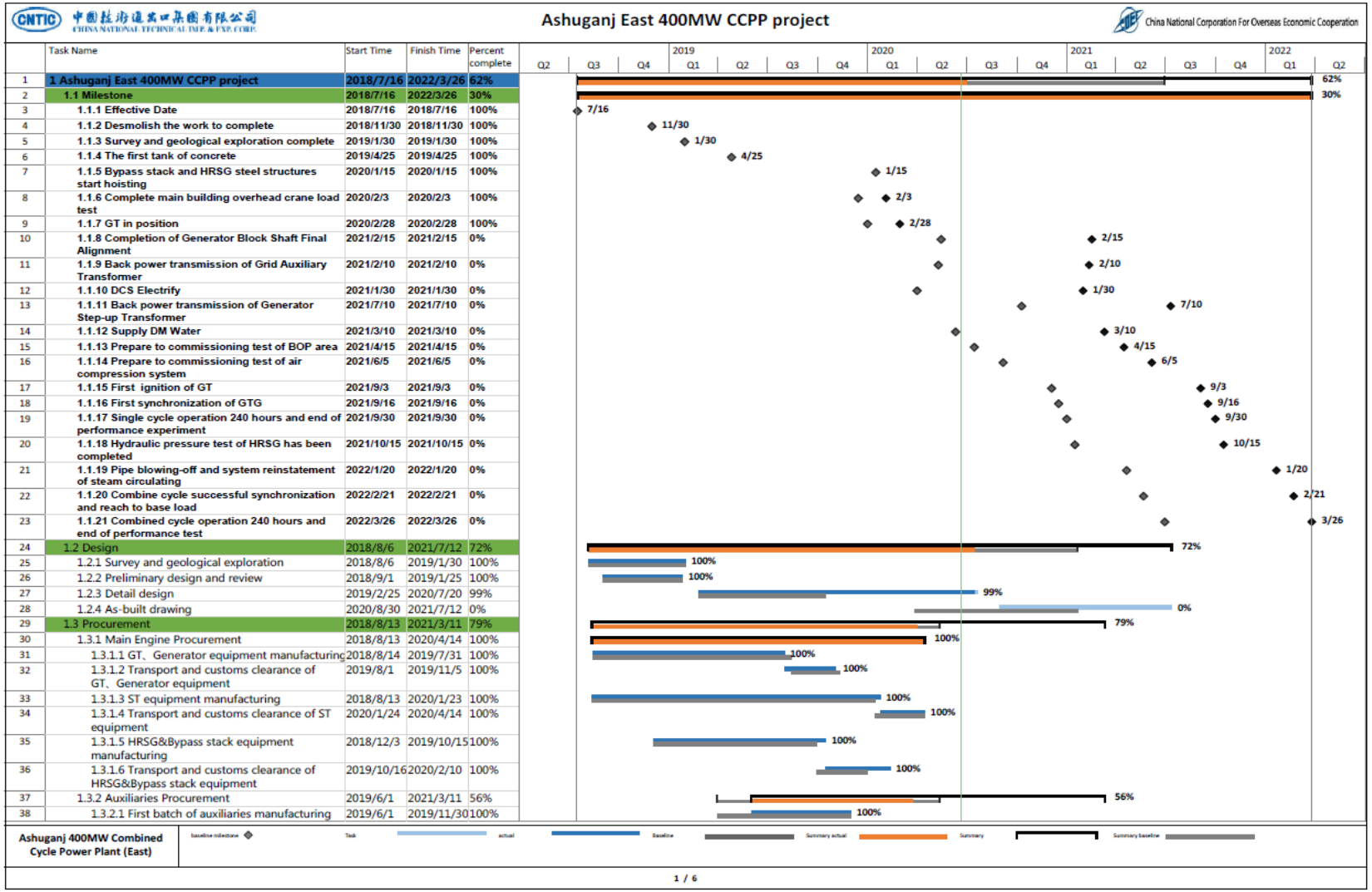
	Emergency Oil pit, Oily waste water treatment station, sewage treatment station	Not yet started
	Power control center	Super Structure work is going on
	Central control Building (CCB)	Super Structure work is going on
	RMS	Site Processing work has Started
	Transformer	Site Processing work Started
	Condenser 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):



Ashuganj East 400MW CCPP project

China National Corporation For Overseas Economic Cooperation

	Task Name	Start Time	Finish Time	Percent complete
1	1 Ashuganj East 400MW CCPP project	2018/7/16	2022/3/26	62%
2	1.1 Milestone	2018/7/16	2022/3/26	30%
3	1.1.1 Effective Date	2018/7/16	2018/7/16	100%
4	1.1.2 Desmolish the work to complete	2018/11/30	2018/11/30	100%
5	1.1.3 Survey and geological exploration complete	2019/1/30	2019/1/30	100%
6	1.1.4 The first tank of concrete	2019/4/25	2019/4/25	100%
7	1.1.5 Bypass stack and HRSG steel structures start hoisting	2020/1/15	2020/1/15	100%
8	1.1.6 Complete main building overhead crane load test	2020/2/3	2020/2/3	100%
9	1.1.7 GT in position	2020/2/28	2020/2/28	100%
10	1.1.8 Completion of Generator Block Shaft Final Alignment	2021/2/15	2021/2/15	0%
11	1.1.9 Back power transmission of Grid Auxiliary Transformer	2021/2/10	2021/2/10	0%
12	1.1.10 DCS Electrify	2021/1/30	2021/1/30	0%
13	1.1.11 Back power transmission of Generator Step-up Transformer	2021/7/10	2021/7/10	0%
14	1.1.12 Supply DM Water	2021/3/10	2021/3/10	0%
15	1.1.13 Prepare to commissioning test of BOP area	2021/4/15	2021/4/15	0%
16	1.1.14 Prepare to commissioning test of air compression system	2021/6/5	2021/6/5	0%
17	1.1.15 First ignition of GT	2021/9/3	2021/9/3	0%
18	1.1.16 First synchronization of GTG	2021/9/16	2021/9/16	0%
19	1.1.17 Single cycle operation 240 hours and end of performance experiment	2021/9/30	2021/9/30	0%
20	1.1.18 Hydraulic pressure test of HRSG has been completed	2021/10/15	2021/10/15	0%
21	1.1.19 Pipe blowing-off and system reinstatement of steam circulating	2022/1/20	2022/1/20	0%
22	1.1.20 Combine cycle successful synchronization and reach to base load	2022/2/21	2022/2/21	0%
23	1.1.21 Combined cycle operation 240 hours and end of performance test	2022/3/26	2022/3/26	0%
24	1.2 Design	2018/8/6	2021/7/12	72%
25	1.2.1 Survey and geological exploration	2018/8/6	2019/1/30	100%
26	1.2.2 Preliminary design and review	2018/9/1	2019/1/25	100%
27	1.2.3 Detail design	2019/2/25	2020/7/20	99%
28	1.2.4 As-built drawing	2020/8/30	2021/7/12	0%
29	1.3 Procurement	2018/8/13	2021/3/11	79%
30	1.3.1 Main Engine Procurement	2018/8/13	2020/4/14	100%
31	1.3.1.1 GT、Generator equipment manufacturing	2018/8/14	2019/7/31	100%
32	1.3.1.2 Transport and customs clearance of GT、Generator equipment	2019/8/1	2019/11/5	100%
33	1.3.1.3 ST equipment manufacturing	2018/8/13	2020/1/23	100%
34	1.3.1.4 Transport and customs clearance of ST equipment	2020/1/24	2020/4/14	100%
35	1.3.1.5 HRSG&Bypass stack equipment manufacturing	2018/12/3	2019/10/15	100%
36	1.3.1.6 Transport and customs clearance of HRSG&Bypass stack equipment	2019/10/16	2020/2/10	100%
37	1.3.2 Auxiliaries Procurement	2019/6/1	2021/3/11	56%
38	1.3.2.1 First batch of auxiliaries manufacturing	2019/6/1	2019/11/30	100%

Ashuganj 400MW Combined Cycle Power Plant (East)

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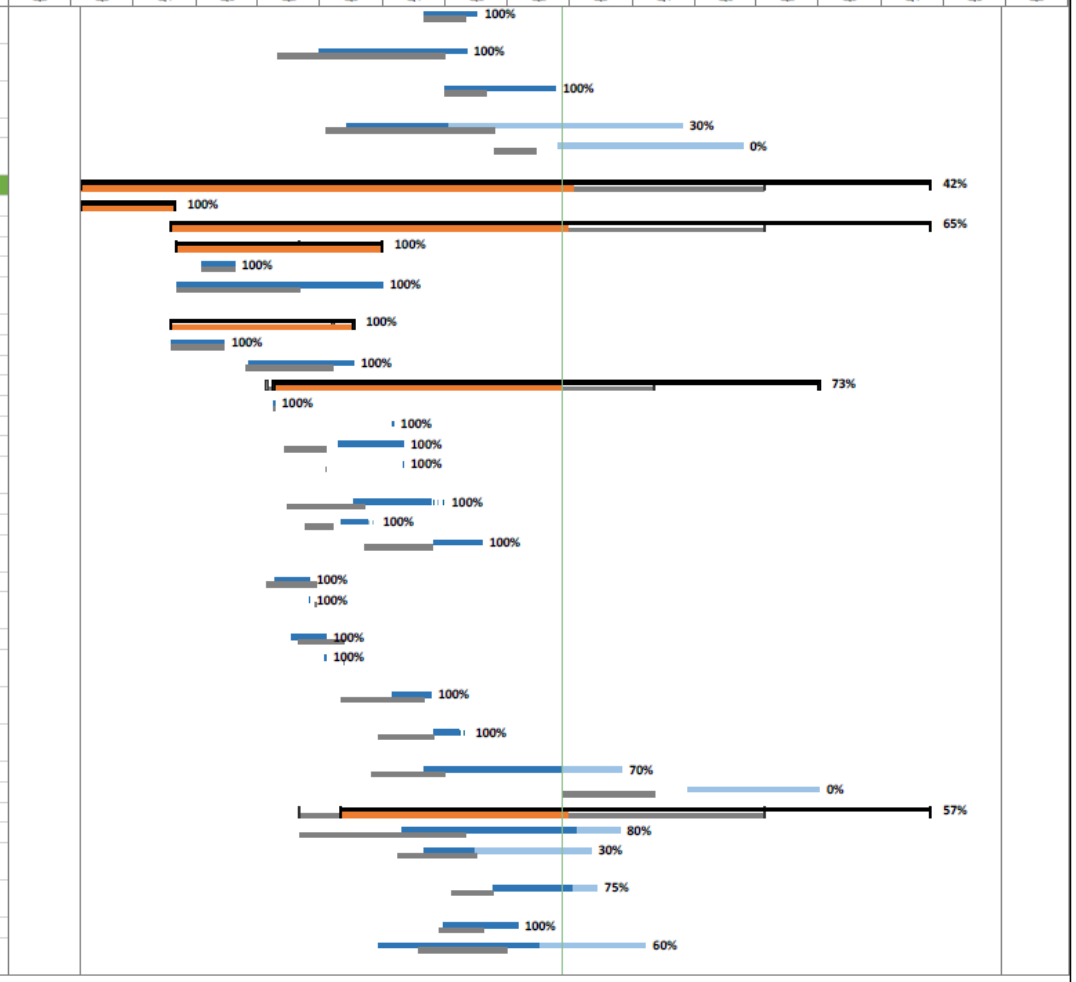
Ashuganj East 400MW CCPP project

China National Corporation For Overseas Economic Cooperation

	Task Name	Start Time	Finish Time	Percent complete
39	1.3.2.2 Transport and customs clearance of first batch auxiliaries	2019/12/1	2020/2/15	100%
40	1.3.2.3 Secondary batch auxiliaries manufacturing	2019/6/30	2020/1/31	100%
41	1.3.2.4 Transport and customs clearance of secondary batch auxiliaries	2020/1/1	2020/6/10	100%
42	1.3.2.5 The third batch auxiliaries manufacturing	2019/8/10	2020/12/13	30%
43	1.3.2.6 Transport and customs clearance of the third batch auxiliaries	2020/6/15	2021/3/11	0%
44	1.4 Construction	2018/7/16	2021/12/12	42%
45	**1.4.1 Demolition work in old plant**	**2018/7/16**	**2018/11/3**	**100%**
108	1.4.2 Erection、Structure	2018/11/25	2021/12/12	65%
109	1.4.2.1 Preliminary Work for Construction	2018/12/3	2019/9/30	100%
110	1.4.2.1.1 Plant ground leveling	2019/1/10	2019/2/25	100%
111	1.4.2.1.2 Preliminary work for construction and temporary building	2018/12/3	2019/9/30	100%
112	1.4.2.2 Foundation treatment	2018/11/25	2019/8/19	100%
113	1.4.2.2.1 test pile	2018/11/25	2019/2/10	100%
114	1.4.2.2.2 Piling foundation	2019/3/18	2019/8/19	100%
115	1.4.2.3 Thermodynamic System-Construction	2019/4/25	2021/7/2	73%
116	1.4.2.3.1 The first tank of concrete	2019/4/25	2019/4/25	100%
117	1.4.2.3.2 Main building steel structure start	2019/10/16	2019/10/16	100%
118	1.4.2.3.3 Main building foundation	2019/7/29	2019/10/31	100%
119	1.4.2.3.4 Main building foundation reaches 0 meter level	2019/10/31	2019/10/31	100%
120	1.4.2.3.5 GT、Generator and ST foundation	2019/8/20	2019/12/30	100%
121	1.4.2.3.6 Control room foundation	2019/8/1	2019/9/20	100%
122	1.4.2.3.7 Distribution room of center control building	2019/12/16	2020/2/23	100%
123	1.4.2.3.8 Bypass stack foundation	2019/4/27	2019/6/15	100%
124	1.4.2.3.9 Bypass stack foundation reaches 0 meter level	2019/6/15	2019/6/15	100%
125	1.4.2.3.10 HRSG foundation	2019/5/21	2019/7/9	100%
126	1.4.2.3.11 HRSG foundation reaches 0 meter level	2019/7/9	2019/7/9	100%
127	1.4.2.3.12 Installation of main building steel structure	2019/10/16	2019/12/10	100%
128	1.4.2.3.13 Complete main building overhead crane installation and load test	2019/12/15	2020/2/3	100%
129	1.4.2.3.14 Main building closed completion	2019/11/30	2020/9/15	70%
130	1.4.2.3.15 Plant comprehensive pipe rack	2020/12/22	2021/7/2	0%
131	1.4.2.4 Auxiliary System-Erection	2019/8/1	2021/12/12	57%
132	1.4.2.4.1 Civil construction of CW pump house	2019/10/30	2020/9/12	80%
133	1.4.2.4.2 Civil construction of comprehensive water pump house	2019/12/1	2020/8/1	30%
134	1.4.2.4.3 Civil construction of hydrogen generation station	2020/3/12	2020/8/10	75%
135	1.4.2.4.4 Civil construction of siphon well	2019/12/30	2020/4/15	100%
136	1.4.2.4.5 Civil construction of gas booster and regulating station/RMS	2019/9/25	2020/10/20	60%



Ashuganj 400MW Combined Cycle Power Plant (East)

baseline milestone ◆ Task actual Baseline Summary actual Summary Summary baseline

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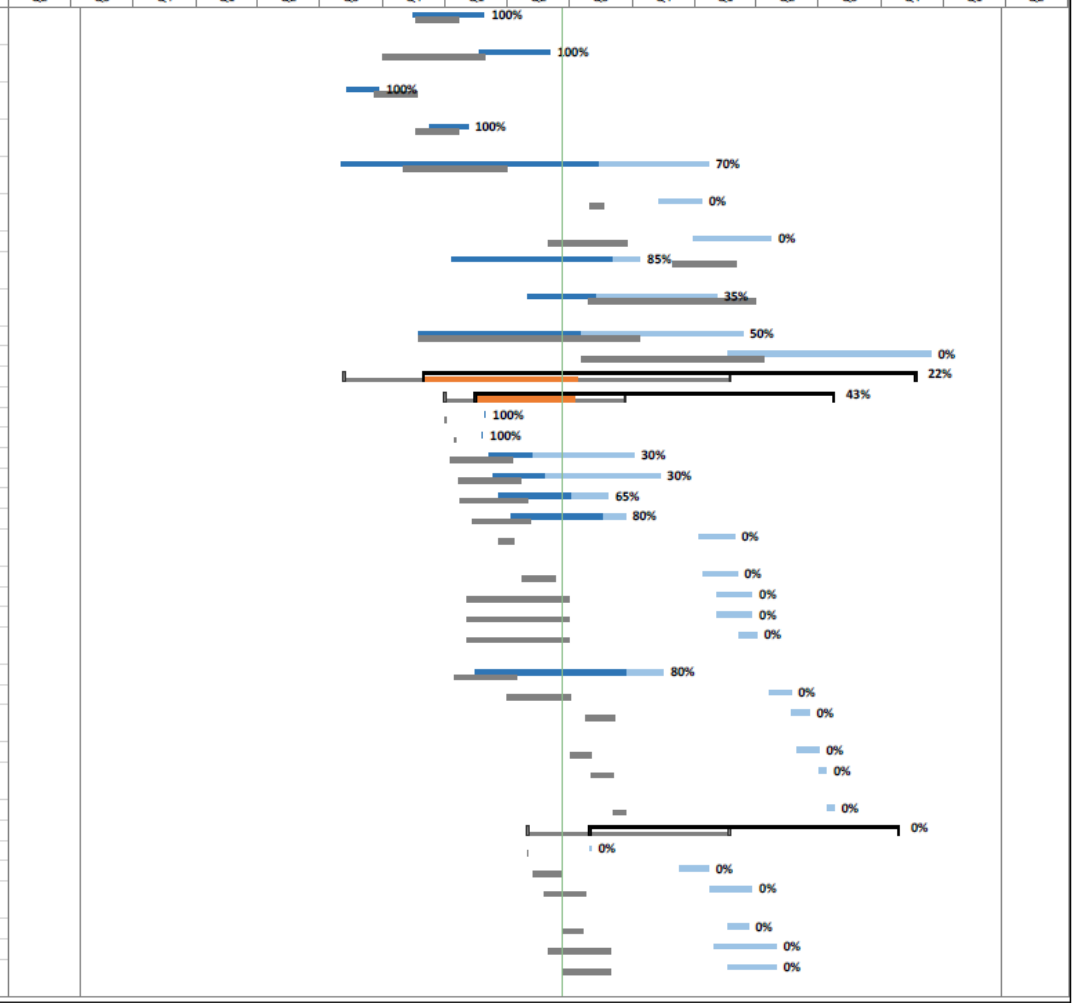
Ashuganj East 400MW CCPP project

China National Corporation For Overseas Economic Cooperation

	Task Name	Start Time	Finish Time	Percent complete
137	1.4.2.4.6 Civil construction of air compressor house	2019/11/15	2020/2/25	100%
138	1.4.2.4.7 Bracket for crossing river of circulating water	2020/2/20	2020/6/2	100%
139	1.4.2.4.8 Generator step-up transformer foundation and firewall	2019/8/10	2019/9/25	100%
140	1.4.2.4.9 Grid auxiliary transformer and 230kV GIS foundation	2019/12/10	2020/2/2	100%
141	1.4.2.4.10 Civil construction of water purification station	2019/8/1	2021/1/20	70%
142	1.4.2.4.11 Civil construction of auxiliary boiler house	2020/11/10	2021/1/10	0%
143	1.4.2.4.12 Plant road	2020/12/30	2021/4/22	0%
144	1.4.2.4.13 Civil construction of Extension workshop	2020/1/10	2020/10/12	85%
145	1.4.2.4.14 Civil construction of other auxiliary buildings	2020/5/1	2021/2/1	35%
146	1.4.2.4.15 Civil construction of warehouse	2019/11/23	2021/3/11	50%
147	1.4.2.4.16 Plant utility	2021/2/18	2021/12/12	0%
148	1.4.3 Installation	2019/12/1	2021/11/20	22%
149	1.4.3.1 GT、Generator installation	2020/2/15	2021/7/23	43%
150	1.4.3.1.1 GT module in position	2020/2/28	2020/2/28	100%
151	1.4.3.1.2 Generator in position	2020/2/24	2020/2/24	100%
152	1.4.3.1.3 GT basic module	2020/3/5	2020/10/3	30%
153	1.4.3.1.4 Generator	2020/3/12	2020/11/10	30%
154	1.4.3.1.5 Air intake system	2020/3/20	2020/8/26	65%
155	1.4.3.1.6 Air exhaust system	2020/4/6	2020/9/20	80%
156	1.4.3.1.7 Sealing oil and hydrogen control module	2021/1/7	2021/2/27	0%
157	1.4.3.1.8 Other auxiliary modules	2021/1/13	2021/3/3	0%
158	1.4.3.1.9 Pipes of gas system system	2021/2/3	2021/3/25	0%
159	1.4.3.1.10 Equipment&pipes of lube oil system	2021/2/3	2021/3/25	0%
160	1.4.3.1.11 Pipes for cooling&surge-preventing and deflation	2021/3/6	2021/4/1	0%
161	1.4.3.1.12 Bypass stack	2020/2/15	2020/11/15	80%
162	1.4.3.1.13 GT enclosure and ventilating system	2021/4/20	2021/5/21	0%
163	1.4.3.1.14 Insulation painting for GT equipment and pipe	2021/5/23	2021/6/17	0%
164	1.4.3.1.15 Circulating washing of oil system	2021/5/31	2021/7/1	0%
165	1.4.3.1.16 Gas turbine and generator check coupling connection and casing cover	2021/7/3	2021/7/12	0%
166	1.4.3.1.17 Test of generator tightness	2021/7/15	2021/7/23	0%
167	1.4.3.2 ST installation	2020/8/1	2021/10/26	0%
168	1.4.3.2.1 ST in position	2020/8/1	2020/8/1	0%
169	1.4.3.2.2 Condenser	2020/12/10	2021/1/20	0%
170	1.4.3.2.3 ST open&close cooling water equipment and pipe	2021/1/23	2021/3/25	0%
171	1.4.3.2.4 Condensate water pump installation	2021/2/18	2021/3/19	0%
172	1.4.3.2.5 Equipment and pipe for oil system	2021/1/30	2021/4/29	0%
173	1.4.3.2.6 Equipment and pipe for hydraulic oil system	2021/2/19	2021/4/29	0%



Ashuganj 400MW Combined Cycle Power Plant (East)

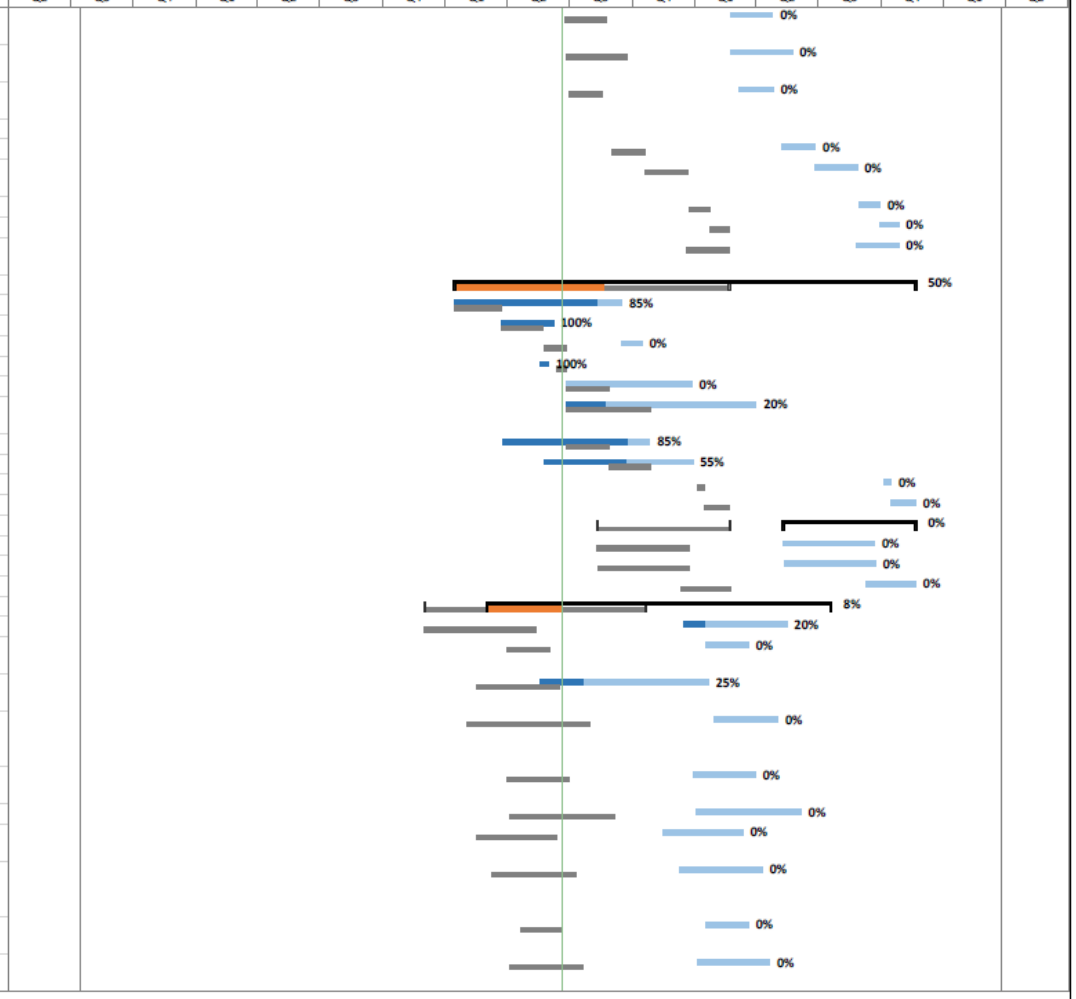
baseline milestone ◆ Task actual Baseline Summary actual Summary Summary baseline

CNTIC 中国技术进出口集团有限公司 CHINA NATIONAL TECHNICAL IMP. & EXP. CORP.

Ashuganj East 400MW CCPP project

China National Corporation For Overseas Economic Cooperation

	Task Name	Start Time	Finish Time	Percent complete
174	1.4.3.2.7 Equipment and pipe for vacuum system	2021/2/23	2021/4/23	0%
175	1.4.3.2.8 Equipment and pipe for drainage,steam seal	2021/2/23	2021/5/23	0%
176	1.4.3.2.9 Equipment and pipe for bypass system	2021/3/7	2021/4/25	0%
177	1.4.3.2.10 E-turbine	2021/4/5	2021/5/7	0%
178	1.4.3.2.11 HP-turbine	2021/5/8	2021/6/26	0%
179	1.4.3.2.12 Common coupling alignment GT/GENO/ST	2021/6/27	2021/8/26	0%
180	1.4.3.2.13 Washing of control oil system	2021/8/29	2021/9/29	0%
181	1.4.3.2.14 Bearing casing cover	2021/9/29	2021/10/26	0%
182	1.4.3.2.15 Insulation and painting of equipment and pipe	2021/8/25	2021/10/26	0%
183	1.4.3.3 HRSG installation	2020/1/15	2021/11/20	50%
184	1.4.3.3.1 HRSG steel structure	2020/1/15	2020/9/15	85%
185	1.4.3.3.2 HRSG generating surface module	2020/3/24	2020/6/7	100%
186	1.4.3.3.3 Feed water pump	2020/9/15	2020/10/15	0%
187	1.4.3.3.4 Hoisting of HRSG drums	2020/5/20	2020/5/31	100%
188	1.4.3.3.5 Feed water pipes	2020/6/26	2020/12/27	0%
189	1.4.3.3.6 HRSG other auxiliary equipment and pipes	2020/6/27	2021/3/31	20%
190	1.4.3.3.7 HRSG stack	2020/3/26	2020/10/26	85%
191	1.4.3.3.8 HRSG duct	2020/5/25	2020/12/28	55%
192	1.4.3.3.9 Hydraulic test of HRSG	2021/10/5	2021/10/15	0%
193	1.4.3.3.10 Insulation and painting of HRSG	2021/10/16	2021/11/20	0%
194	1.4.3.4 W/S Pipe Installation	2021/5/11	2021/11/20	0%
195	1.4.3.4.1 HP,IP,LP steam pipe	2021/5/11	2021/9/21	0%
196	1.4.3.4.2 Condensate water pipe installation	2021/5/13	2021/9/22	0%
197	1.4.3.4.3 Pipe insulation works	2021/9/10	2021/11/20	0%
198	1.4.3.5 Auxiliaries installation	2020/3/3	2021/7/19	8%
199	1.4.3.5.1 Installation of plant pipe	2020/12/15	2021/5/15	20%
200	1.4.3.5.2 Installation of equipment and pipe for air compressor	2021/1/18	2021/3/20	0%
201	1.4.3.5.3 Installation of equipment and pipe for circulating water pump house	2020/5/20	2021/1/20	25%
202	1.4.3.5.4 Installation of inlet、outlet pipe for CW pump house(include outer drainage of condenser)	2021/1/30	2021/5/2	0%
203	1.4.3.5.5 Installation of water purification station equipment system	2020/12/30	2021/3/30	0%
204	1.4.3.5.6 Installation of inlet pipe of natural ga	2021/1/3	2021/6/5	0%
205	1.4.3.5.7 Installation of equipment and pipe for comprehensive water pump house	2020/11/15	2021/3/12	0%
206	1.4.3.5.8 Fabrication and installation of service water、fire、DM and supplement water tank	2020/12/9	2021/4/9	0%
207	1.4.3.5.9 Installation of equipment and pipe for hydrogen generation station	2021/1/18	2021/3/20	0%
208	1.4.3.5.10 Installation of equipment and pipe for gas booster and regulating station&RMS	2021/1/4	2021/4/20	0%



Ashuganj 400MW Combined Cycle Power Plant (East)

baseline milestone ◆ Task actual Baseline Summary actual Summary Summary baseline

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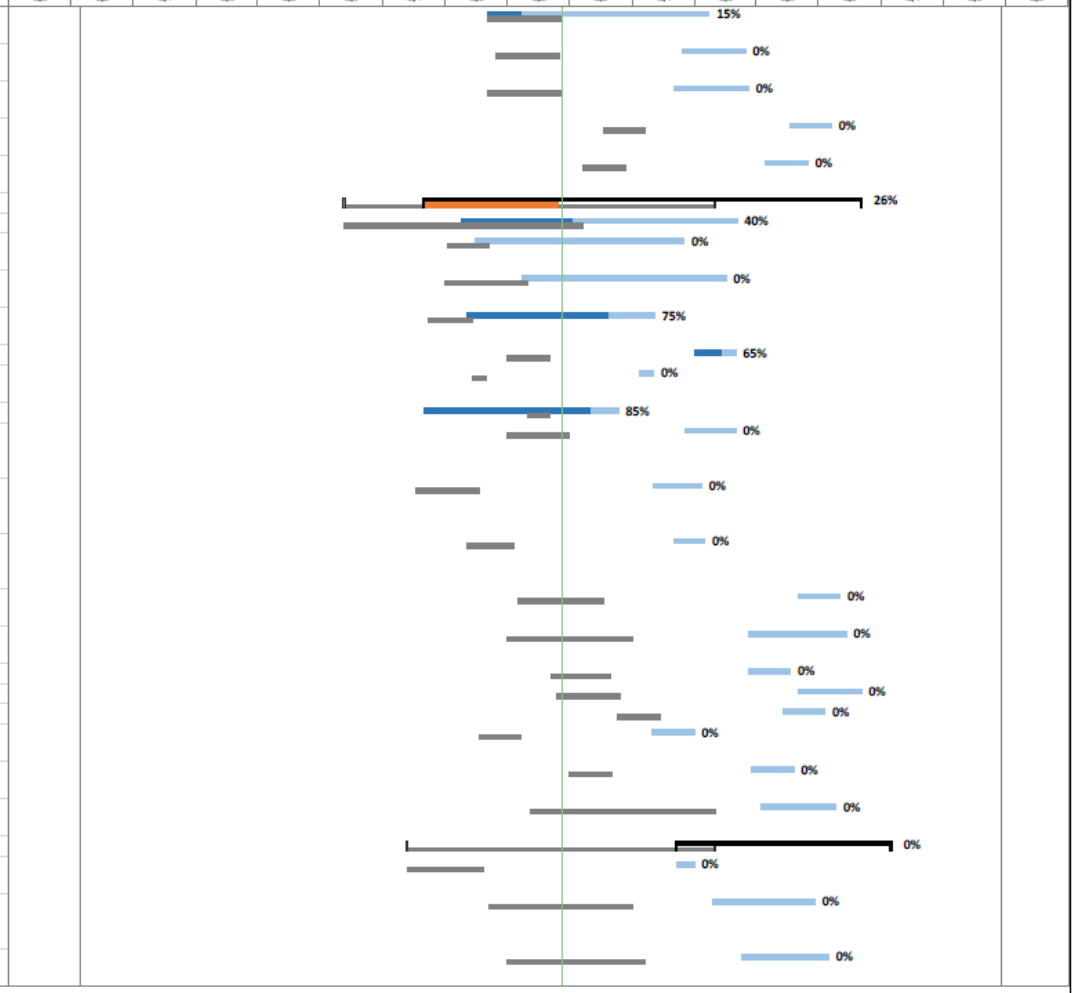
Ashuganj East 400MW CCPP project

China National Corporation For Overseas Economic Cooperation

	Task Name	Start Time	Finish Time	Percent complete
209	1.4.3.5.11 Installation of equipment and pipe for fire water system	2020/3/3	2021/1/20	15%
210	1.4.3.5.12 Installation of equipment and pipe for sampling and dosing system	2020/12/13	2021/3/15	0%
211	1.4.3.5.13 Installation of equipment and pipe for drain water treatment system	2020/12/2	2021/3/20	0%
212	1.4.3.5.14 Installation of equipment and pipe for auxiliary boiler house	2021/5/20	2021/7/19	0%
213	1.4.3.5.15 Insulating& painting of auxiliary system	2021/4/15	2021/6/15	0%
214	1.4.3.6 Electrical System	2019/12/1	2021/9/1	26%
215	1.4.3.6.1 Plant grounding work	2020/1/25	2021/3/3	40%
216	1.4.3.6.2 Installation and cable laying of 230kV GIS distribution device	2020/2/15	2020/12/15	0%
217	1.4.3.6.3 Installation and cable laying of 400kV GIS distribution device	2020/4/22	2021/2/15	0%
218	1.4.3.6.4 Installation of main control and DC system	2020/2/2	2020/11/2	75%
219	1.4.3.6.5 Installation of diesel generator	2021/1/1	2021/3/1	65%
220	1.4.3.6.6 Installation of grid auxiliary transformer	2020/10/12	2020/11/1	0%
221	1.4.3.6.7 Installation PCC	2019/12/1	2020/9/10	85%
222	1.4.3.6.8 Installation of Generator Step-up Transformer and unit auxiliary transformer	2020/12/18	2021/3/1	0%
223	1.4.3.6.9 Installation of unit electricity system (grid auxiliary transformer electrify)	2020/11/2	2021/1/10	0%
224	1.4.3.6.10 Installation cable laying and wiring of unit electricity system (grid auxiliary transformer electrify)	2020/12/1	2021/1/15	0%
225	1.4.3.6.11 Installation of generator excitation system	2021/6/1	2021/8/1	0%
226	1.4.3.6.12 Cable laying and wiring of auxiliary workshop	2021/3/20	2021/8/10	0%
227	1.4.3.6.13 Cable laying and wiring of GT	2021/3/20	2021/5/20	0%
228	1.4.3.6.14 Cable laying and wiring of ST	2021/6/2	2021/9/1	0%
229	1.4.3.6.15 HRSG cable laying and wiring	2021/5/10	2021/7/10	0%
230	1.4.3.6.16 Installation of 230kV communication equipment	2020/10/31	2020/12/30	0%
231	1.4.3.6.17 Installation of 400kV communication equipment	2021/3/24	2021/5/25	0%
232	1.4.3.6.18 Installation of plant communication equipment	2021/4/8	2021/7/26	0%
233	1.4.3.7 Thermal Control System	2020/12/5	2021/10/15	0%
234	1.4.3.7.1 Installation of DCS equipment for control building	2020/12/5	2020/12/30	0%
235	1.4.3.7.2 Installation of instrument,control equipment and pipeline for auxiliary workshop	2021/1/27	2021/6/25	0%
236	1.4.3.7.3 Thermal control cable Laying and wiring in auxiliary workshop	2021/3/10	2021/7/15	0%



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Ashuganj East 400MW CCPP project

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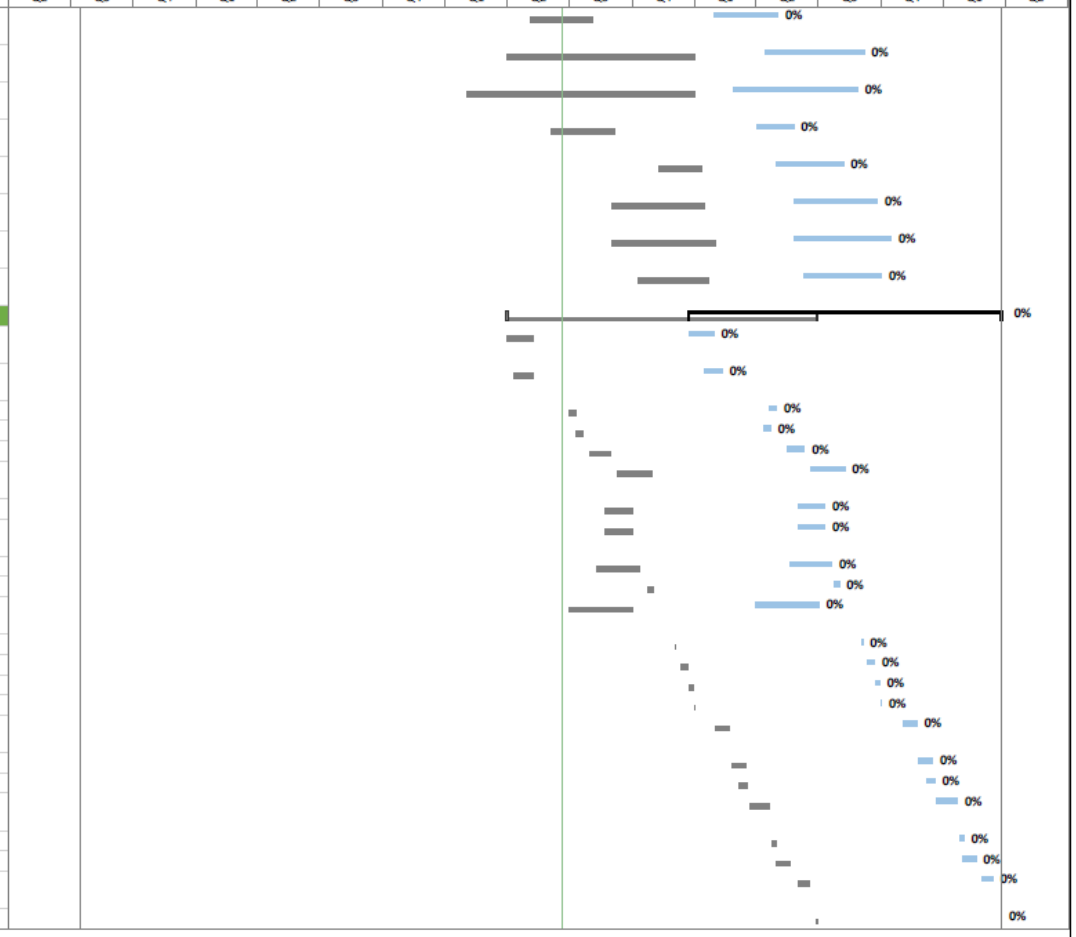
	Task Name	Start Time	Finish Time	Percent complete
237	1.4.3.7.4 Installation of instrument,control equipment and pipeline for GT	2021/1/29	2021/5/1	0%
238	1.4.3.7.5 Installation and commissioning of CCTV	2021/4/15	2021/9/5	0%
239	1.4.3.7.6 Installation and commissioning of fire alarm system	2021/2/26	2021/8/27	0%
240	1.4.3.7.7 Thermal control cable Laying and wiring for GT	2021/4/2	2021/5/25	0%
241	1.4.3.7.8 Installation of instrument,control equipment and pipeline for ST	2021/5/1	2021/8/6	0%
242	1.4.3.7.9 Installation of instrument,control equipment and pipeline for HRSG	2021/5/26	2021/9/25	0%
243	1.4.3.7.10 Installation of instrument,control equipment and pipeline for ST	2021/5/27	2021/10/15	0%
244	1.4.3.7.11 Thermal control cable Laying and wiring for HRSG	2021/6/11	2021/10/1	0%
245	1.5 Commissioning	2020/12/23	2022/3/26	0%
246	1.5.1 Commissioning of DCS control (grid auxiliary transformer electrify)	2020/12/23	2021/1/28	0%
247	1.5.2 Commissioning of grid auxiliary transformer and plant electricity system	2021/1/16	2021/2/9	0%
248	1.5.3 Commissioning of closed water system	2021/4/20	2021/4/30	0%
249	1.5.4 Commissioning of air compressor system	2021/4/12	2021/4/21	0%
250	1.5.5 Commissioning of CW system	2021/5/16	2021/6/10	0%
251	1.5.6 Commissioning of gas booster and regulating station&RMS	2021/6/20	2021/8/8	0%
252	1.5.7 Commissioning of fire system	2021/6/1	2021/7/10	0%
253	1.5.8 Commissioning of drainage water treatment system	2021/6/1	2021/7/10	0%
254	1.5.9 Commissioning of GT equipment in cold state	2021/5/20	2021/7/20	0%
255	1.5.10 Generator charging hydrogen	2021/7/25	2021/7/31	0%
256	1.5.11 Start-up transformer electrify and comissioning of plant electricity system	2021/4/1	2021/7/1	0%
257	1.5.12 GT initial ignition	2021/9/3	2021/9/3	0%
258	1.5.13 GT ICO	2021/9/12	2021/9/21	0%
259	1.5.14 Test of GT performance	2021/9/23	2021/9/28	0%
260	1.5.15 GT TOC(PAC)	2021/10/1	2021/10/1	0%
261	1.5.16 Chemical washing and reinstatement for HRSG	2021/11/3	2021/11/22	0%
262	1.5.17 Commissioning of HRSG in cold state	2021/11/26	2021/12/15	0%
263	1.5.18 Commissioning of start-up boiler equipment	2021/12/7	2021/12/18	0%
264	1.5.19 Pipe blowing-off and system reinstatement of steam circulating	2021/12/22	2022/1/20	0%
265	1.5.20 Start-up and electric test of units	2022/1/24	2022/1/30	0%
266	1.5.21 Units synchronization,240H pilot run	2022/1/28	2022/2/16	0%
267	1.5.22 Performance test of combined cycle working condition	2022/2/26	2022/3/13	0%
268	1.5.23 Combined cycle working condition TOC(PAC	2022/3/26	2022/3/26	0%



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CHAPTER 2

ENVIRONMENTAL RESPONSIBILITIES & INSTITUTIONAL SETUP

2.0 ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SETUP

2.1 Environmental Responsibilities, Institutional Arrangements, and Implementation Schedule

For realization of SEMP, it is necessary to identify persons responsible for 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.

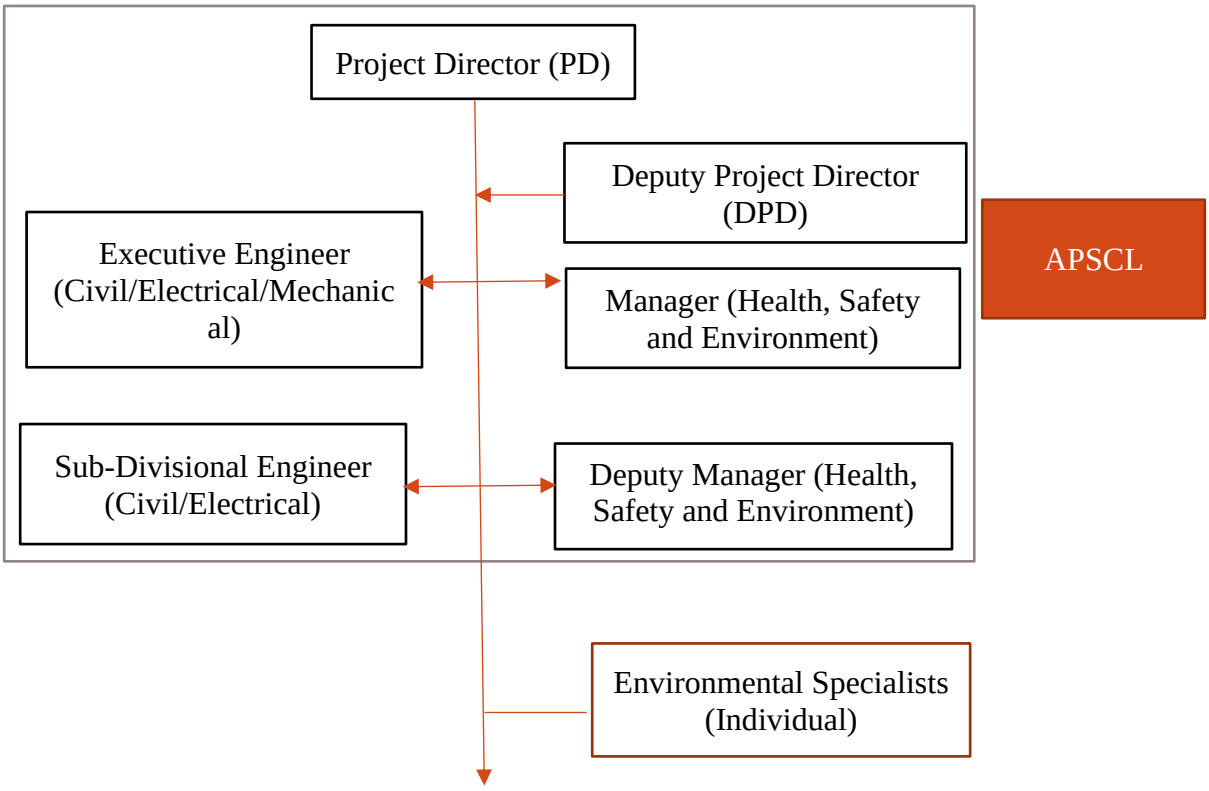
During construction, APSCL, in collaboration with EPC Contractor and any sub-contractors, will establish, maintain, and strengthen as necessary an organisational structure that defines roles, responsibilities and authority to implement the SEMP.

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.

Management of environmental and social risks and impacts during construction will primarily be the responsibility of the EPC Contractor through the EPC contract. During the construction phase, APSCL will review and monitor EPC Contractors performance in accordance with the SEMP.

During the construction phase, APSCL will review and monitor CNTICs (CNTIC) performance in accordance with 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 Table 2.



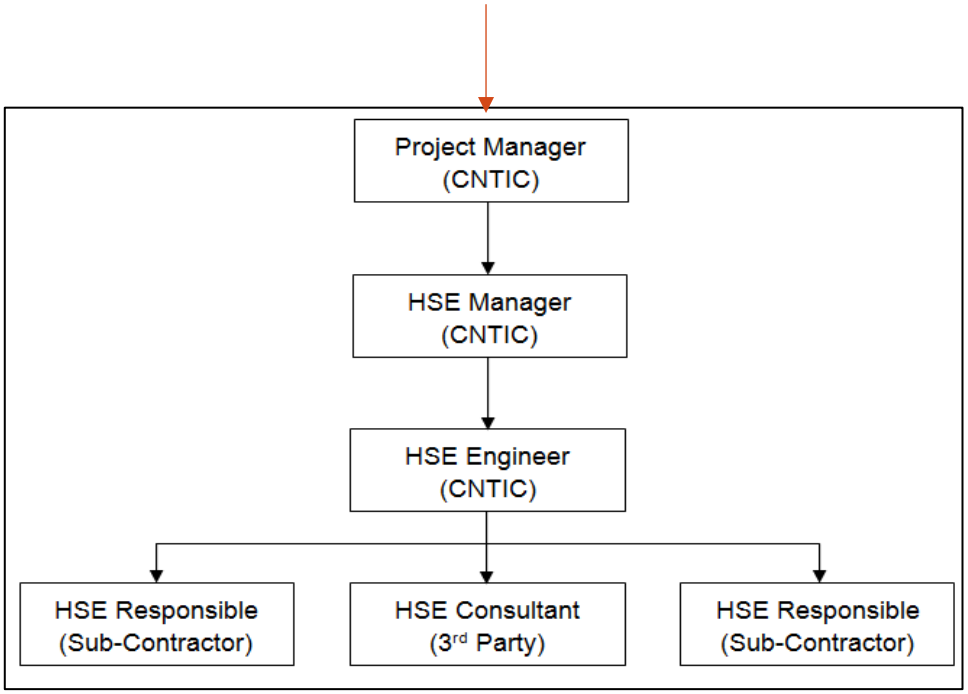


Figure-3: SEMP Organizational Structure

Table-2: Role & Responsibilities for SEMP Implementation

Role and Responsibilities	Key Staff Responsibilities
<u>Ashuganj Power Station Company Ltd - Project Implementation Unit (PMU):</u> ○ Overall responsibility for 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	<u>APSCL Project Director:</u> ○ 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.

Role and Responsibilities	Key Staff Responsibilities
SEMP requirements; ○ Management, implementation, monitoring and compliance of the SEMP, sub-contractors; ○ Review of SEMP performance and implementation of correction 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 dissemination of the content and requirements of the SEMP to contractors and sub-contractors; ○ 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.	<u>APSCL HSE Department:</u> ○ 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; ○ 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.
<u>CNTIC</u> ○ Implementation of the SEMP;	<u>CNTIC HSE Department:</u> ○ Actively promote and implement all Project HSE

Role and Responsibilities	Key Staff Responsibilities
○ 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.	and social plans related with the work they are preforming; ○ 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. <u>Construction Workers</u> ○ 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 the purpose for which they were designed; ○ 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.
<u>Supervising / Owners Engineer (OE):</u> ○ Assistance in preparation and implementation of the SEMP; ○ Reporting any incidents or non-compliance with the SEMP to APSCL.	<u>OE Environmental and Social Safeguard Consultants:</u> ○ 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

Role and Responsibilities	Key Staff Responsibilities
	Camp Management Plan. o Reporting any incidents or non-compliance with the SEMP to the PMU. o Ensuring adequate training and education of all staff involved in environmental supervision. o Making recommendations to the APSCL (PMU) regarding SEMP performance as part of an overall commitment to continuous improvement.

A Synopsis of Work Needs to be undertaken during the Construction Period

According to environmental monitoring, during the construction phase and assignment, the main work will be to collect the ambient air samples to measure air pollutants and noise level data from the project area. For river water analysis the water sample will also be collected from the nearby Meghna River and for groundwater analysis the water sample will be collected from the project area.

Description of Work	9th Semiannually (January-June, 2020)	Frequency
Ambient Air Quality	Done with Measurement	Monthly
Noise Level	Done with Measurement	Monthly
Drinking Water Level	Done with Measurement	Monthly
River Water	Done with Measurement	Monthly
Groundwater Level	Done with Measurement	Quarterly
Soil Quality	Done with Measurement	Annually
Process Waste	Done with Measurement	Quarterly
Health Checkup	No Need to Measure	Daily

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 Status

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 operational 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-3: 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 arbitrational 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.

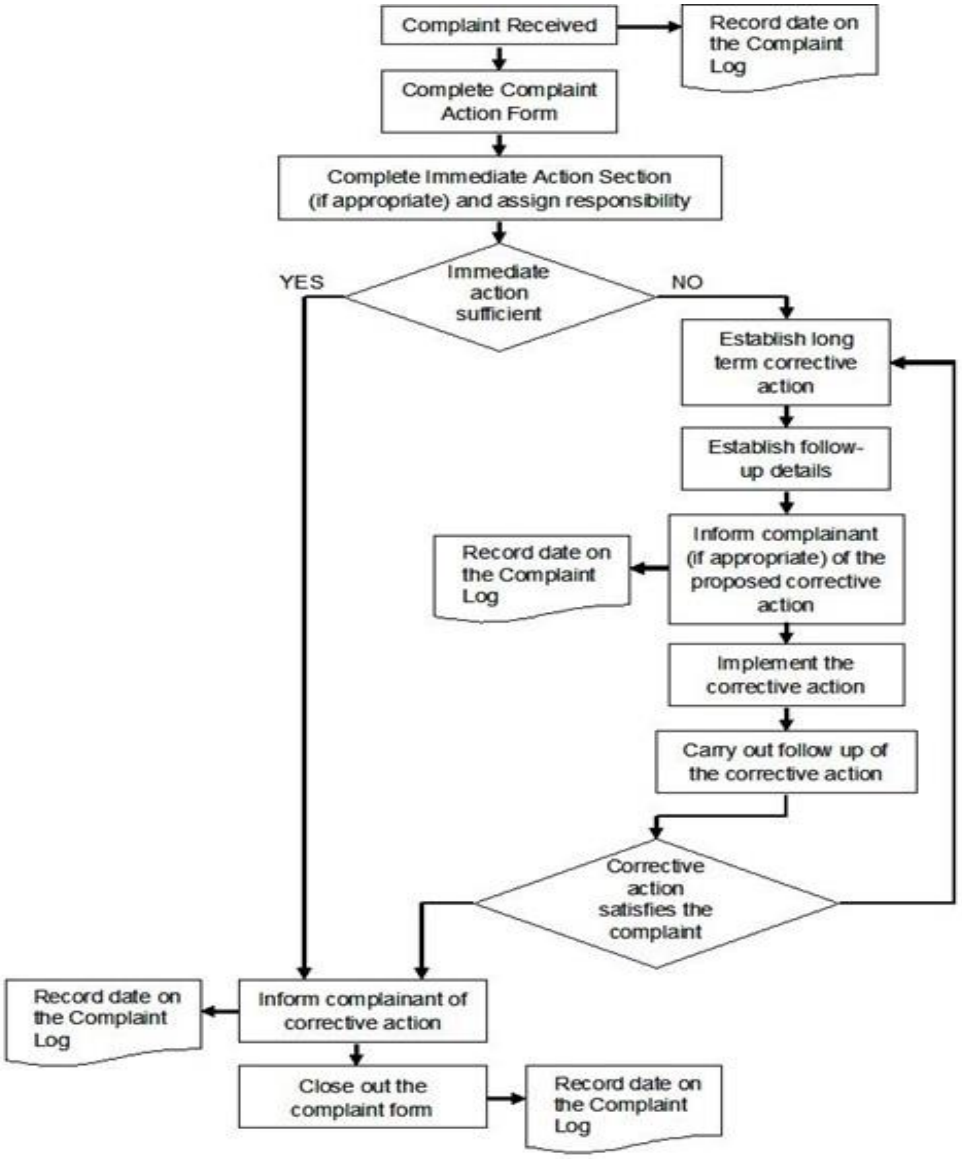


Figure- 4 : Flowchart of Complain/Grievance Procedure

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 -4: 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 -5: 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 -6: 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:

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

Table -7: 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		
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 (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	LA, Schedule 5, Para 2	The environmental monitoring has been carried out in all three phase i,e. pre-construction, during construction and post-construction phase or operation phase
Land Acquisition and Involuntary Resettlement 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 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 (a)all applicable laws and regulations of the borrower relating to land acquisition and involuntary resettlement; (b)the involuntary resettlement safeguards; (c)the RF; and (d) All measures and requirement set forth in the respective RP, and any corrective or preventive actions set forth in a safeguards monitoring report.	LA, Schedule 5, Para 3	In the case of APSCL, this type of issues does not arise due to the project location. The project location is inside the premises of APSCL own land. So, There is no requirements of Land Acquisition and Involuntary Resettlement
Safeguards – Related provisions in bidding		

documents and works contracts		
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: (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 small ethnic community peoples plan; (d) Adequately record the condition of roads, agricultural and other infrastructure prior to starting to transport materials and construction; (e) Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.	LA, Schedule 5, Para 7	The safeguards- related provisions in bidding documents and work contracts have been followed strictly and update time to time for further requirements.
Safeguards- Monitoring and Reporting		
The borrower shall do the following or shall cause APSCL to do the following: (a) Submit semiannual safeguards monitoring reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission; (b) If any unanticipated environmental and or social risks and impacts arise during	LA, Schedule 5, Para 7	The Safeguards monitoring has been carried out in all three phase i,e. pre-construction, during construction and post-construction phase or operation phase

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; (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 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.		
Labor standards		
The borrower shall ensure that all works contract documents to be prepared under the project incorporate provisions and budget to the effect that contractors (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	LA, Schedule 5, Para 10	The labor standards have been followed strictly.

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- 8: 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 effect of Ashuganj East Project which is our extreme target but cumulative one under our consideration, delayed due to COVID-19 pandemic situation.
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-9 and Table-10.

Table-9: 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	• 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	• Appropriate sitting 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• SPM, $PM_{2.5}$, PM_{10}, NO_2, SO and CO monitoring at sensitive receptors in accordance with the requirements specified in Table 3; • Vehicle, equipment and machinery checklists observed; • Annual maintenance records observed. • Community grievance mechanism implemented and records documented.

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			avoid soil dispersion; • 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 (PM_{10}), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2) and Carbon Monoxide (CO) by third party consultant.			
2	Increased noise in the Project area and at sensitive receptors a result	Noise	• Provision of a noise barrier around the project site to reduce off-site noise levels;	CNTIC (EPC Contractor)	• APSCL; • OE E&S	• 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.		• 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.		Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	the requirements specified in Table 3; • Community grievance mechanism implemented and records documented.
3	Site Clearance-Vegetation removal and Habitat disturbance	Terrestrial Biodiversity	• 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)	• APSCL; • OE E&S Safeguard Consultants;	• Vegetation clearance areas marked/fenced; • No. of floral species conserved or

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
			relevant laws for clearing vegetation; • 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 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.		• Independent Local Environmental and Social Monitoring Consultant.	planted recorded, if any; • Workers Training Records showing appropriate training.
4	Site clearance, excavation and disposal of material activities resulting in exposure of potentially contaminated soils and impacting groundwater. Spillage or leakage of substances on land, movement of equipment and vehicles on site resulting in contamination	Soils and Groundwater	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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.		construction to avoid the generation of drainage pathways to underlying aquifers; • 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	
			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. • 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	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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	
			• 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	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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	
			• 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	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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	
			source of waste, waste storage area, storage quality, delivery quality, balance quality, agreement information with disposal company. • 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.	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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; • 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; • Community grievance mechanism implemented and records documented.
9	Health and Safety impacts due to unauthorized	Local Communities.	• Public access to the site will be restricted;	CNTIC (EPC Contractor)	• APSCL; • OE E&S	• Site Security Procedures

Mitigation No.	Issue/Impact	Receptor	Mitigation	Responsibility		Key Performance Indicators
				Implementation	Supervision	
	persons accessing the site.		• Site security procedures to be established.		Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	established and implemented.
10	Health and Safety impacts due to influx of workers.	Local Communities.	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant.	• 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	If remains are found, the following actions will be undertaken: • 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant	• Cultural Heritage and Archaeology Site Find Records (if remains are found).
12	Occupational Health and Safety	Workers Health and Safety	• 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)	• APSCL; • OE E&S Safeguard Consultants; • Independent Local Environmental and Social Monitoring Consultant	• 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	
			• 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			appropriately. • 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	
			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); • Monthly monitoring of the quality of workers drinking water by third party consultant.			implemented. • Drinking water quality monitoring in accordance with requirements shown in Table 4.0.1.

Table-10: 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	• 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	Weekly	APSCL	Dust generation activities onsite and	Visual observation	• CNTIC Monthly HSE Monitoring	• Bangladesh Environmental

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 mitigation measures by all contractors.			offsite.		Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	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 consultant.	Once per month for a 24 hour period.	CNTIC	• 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	Particulates Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model-Envirotech India AAS-127BL). Nitrogen Dioxide Gravimetric Sulphur Dioxide Gravimetric Carbon Monoxide Gravimetric	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• Bangladesh National Ambient Air Quality Standards – Environmental Conservation Rules – Schedule 2 (Amended in 2005) by S.R.O. No: 220-Law/2005. Refer to Annex G.

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
						• 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.			
			Community Grievance Records	As received.	CNTIC	Not applicable	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• ADB Safeguards 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	• Bangladesh Environmental Conservation Rules, 1997. • WBG General EHS Guidelines for Construction

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
								Report for ADB	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.
			Noise monitoring of LAeq, one 1 hour noise levels by third party consultant.	Once per month for a 24 hour period.	CNTIC	• 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	Noise quality is being measured instantly on the site by CEM Sound level meter (Model DT8850. Continuous monitoring observed at each location.	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	• Bangladesh Standard for Sound – Environmental Conservation Rules – Schedule 4. Refer to Annex G. • WBG General EHS Guidelines for Construction and Decommission

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
						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.			ing, 2007.
			Community Grievance Records	As received.	CNTIC	Not applicable	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	• ADB Safeguards Policy Statement: Environmental Safeguards, 2009.
3	Terrestrial Biodiversity	Site Clearance - Vegetation	Implementation of mitigation measures and	Daily	CNTIC	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring Report for	• ADB Safeguard Policy

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
		removal and Habitat disturbance.	assessment of performance indicators.					APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB	Statement: Environmental Safeguards, 2009.
			Monitoring and supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	• ADB Safeguard Policy Statement: Environmental Safeguards, 2009.
4	Soils and Groundwater	Site clearance, excavation and disposal of material, exposure of potentially contaminated soils, spillage or leakage of substances	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 supervision to ensure the	Weekly	APSCL	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and	• WBG General EHS Guidelines for Construction

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
		on land, movement of equipment and vehicles on site.	implementation of the mitigation measures.					DOE. • APSCL Semi-Annual Environmental Report for ADB.	and Decommissioning, 2007.
			Groundwater monitoring for Groundwater level, pH, TDS, Ammonia, Nitrate, Phosphate, Arsenic (As), Iron (Fe), Manganese (Mn) and Coliforms by third party consultant.	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° 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	pH – pH meter; TDS – TDS meter Ammonia – Photometric. Nitrate – Potentiometric. Phosphate – Photometric. As – Atomic Absorption Spectroscopy. Fe – Spectrophotometer. Mn – Atomic Absorption Spectroscopy.	• 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
							Coliforms – Membrane Filter Techniques.		
			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 9071 B (Oil & Grease) in soil.	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental Report for ADB.	
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 constructio	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	• 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 supervision to ensure the implementatio	Weekly during dredging and in river works.	APSCL	Dredging area and in river works.	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE.	• WBG General EHS Guidelines for Construction and

Mitigation No. Ref.	Environmental and Social Parameter	Aspect	Monitoring Activities	Duration and Frequency	Responsibility	Monitoring Locations	Methods	Reporting	Applicable Standards
		n of the intake structure and water discharge structure.	n of the mitigation measures.					• APSCL Semi-Annual Environmental Report for ADB.	Decommissioning, 2007.
			River water sampling during dredging and in river works 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.	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 of Project area and near Ashuganj Chor Sonarampur (Downstream) 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
		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.	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 supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	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.
			River water sampling for Temperature, pH, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand 5	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	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	• 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
			(BOD5), Dissolved Oxygen (DO), oil & grease, Chromium (Cr), Cadmium (Cd) and Lead (Pb) by third party consultant.			Sonarampur (Downstream) 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	Absorption Spectroscopy Cd- Atomic Absorption Spectroscopy Lead - Atomic Absorption Spectroscopy		
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	• 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 supervision to ensure the implementation of the mitigation	Weekly	APSCL	Construction Site	Visual observation	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual	• 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
			measures.					Environmental Report for ADB.	
8, 9, 10	Community Health and Safety	Construction Traffic; Health and safety impacts due influx of workers; Health and safety impacts due to unauthorized persons accessing the site.	Implementation of mitigation measures and assessment of performance indicators.	Daily	CNTIC	Construction Site and Offsite	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 supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	Construction Site and Offsite	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..
11	Cultural Heritage and Archaeology	Chance finds of archaeological remains.	Implementation of mitigation measures and assessment of performance indicators if archaeological	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	• 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
			remains discovered.					Environmental Report for ADB	
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 supervision to ensure the implementation of the mitigation measures.	Weekly	APSCL	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.
			Drinking water sampling for pH, Ammonia, Nitrate, Phosphate, Arsenic (As), Iron (Fe), Manganese	Monthly	CNTIC	Drinking water stations of the Project	pH – pH Meter; Ammonia – Photometric; Nitrate – Potentiometric; Phosphate – Photometric; As - Atomic	• CNTIC Monthly HSE Monitoring Report for APSCL and DOE. • APSCL Semi-Annual Environmental	• 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
			(Mn) and Coliforms by third party consultant.				Absorption Spectroscopy; Fe – Spectrophotometer; Mn - Atomic Absorption Spectroscopy; Coliforms - Membrane Filter Technique.	Report for ADB.	Refer to Annex G.
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.

CHAPTER 5

SEMIANNUALLY ASSESSMENT OF CONSTRUCTION IMPACT ON ENVIRONMENT

5. SEMIANNUALLY ASSESSMENT OF CONSTRUCTION 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.

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.

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.

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.

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.

Table-11: 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.	Ambient air Quality	PM10, PM2.5 SPM, SOx, NOx, CO, CO2.	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	√			
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- 12: 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/m^3	75 µg/m3	39.96	28.22	47.29	32.31	51.01	39.76
PM 10	150 µg/m^3	150 µg/m3	133.45	104.4	96.18	118.66	143.33	119.21
SPM	200 µg/m^3	NF	181.27	143.2	150.73	153.42	196.71	165.1
SO_2	365 µg/m^3	125 µg/m^3	14.39	11.73	21.18	9.22	21.13	15.53
NOx	NF	200 µg/m^3	24.66	20.03	24.62	19.08	44.17	26.51
CO	9 ppm	NF	0	2	4	0	2	1.6
Comments 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.								

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/m^3	75 µg/m3	33.07	38.31	31.26	38.72	38.52	35.98
PM 10	150 µg/m^3	150 µg/m3	102.55	119.18	101.32	107.54	144.2	114.97
SPM	200 µg/m^3	NF	143.73	167.16	142.63	151.47	180.3	157.07
SO_2	365 µg/m^3	125 µg/m^3	9.18	14.13	16.37	16.26	13.06	13.8
NOx	NF	200 µg/m^3	18.06	22.41	20.17	19.58	28.44	21.73
CO	9 ppm	NF	2	8	0	0	8	3.6

Comments

From the result, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.

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/m^3	75 µg/m3	30.31	37.14	33.15	29.46	42.17	34.45
PM 10	150 µg/m^3	150 µg/m3	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
NOx	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

Comments

From the result, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.

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/m3	28.12	33.36	41.16	29.63	33.71	33.2
PM 10	150 µg/m^3	150 µg/m3	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
NOx	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

Comments

From the analysis, it is observed that the concentrations of all these parameters are within the allowable limit of DoE, Bangladesh & IFC Standard.

Key Note: Due to COVID-19 Pandemic, Monitoring of Ambient Air Quality didn't perform for the Month of April and May-2020.

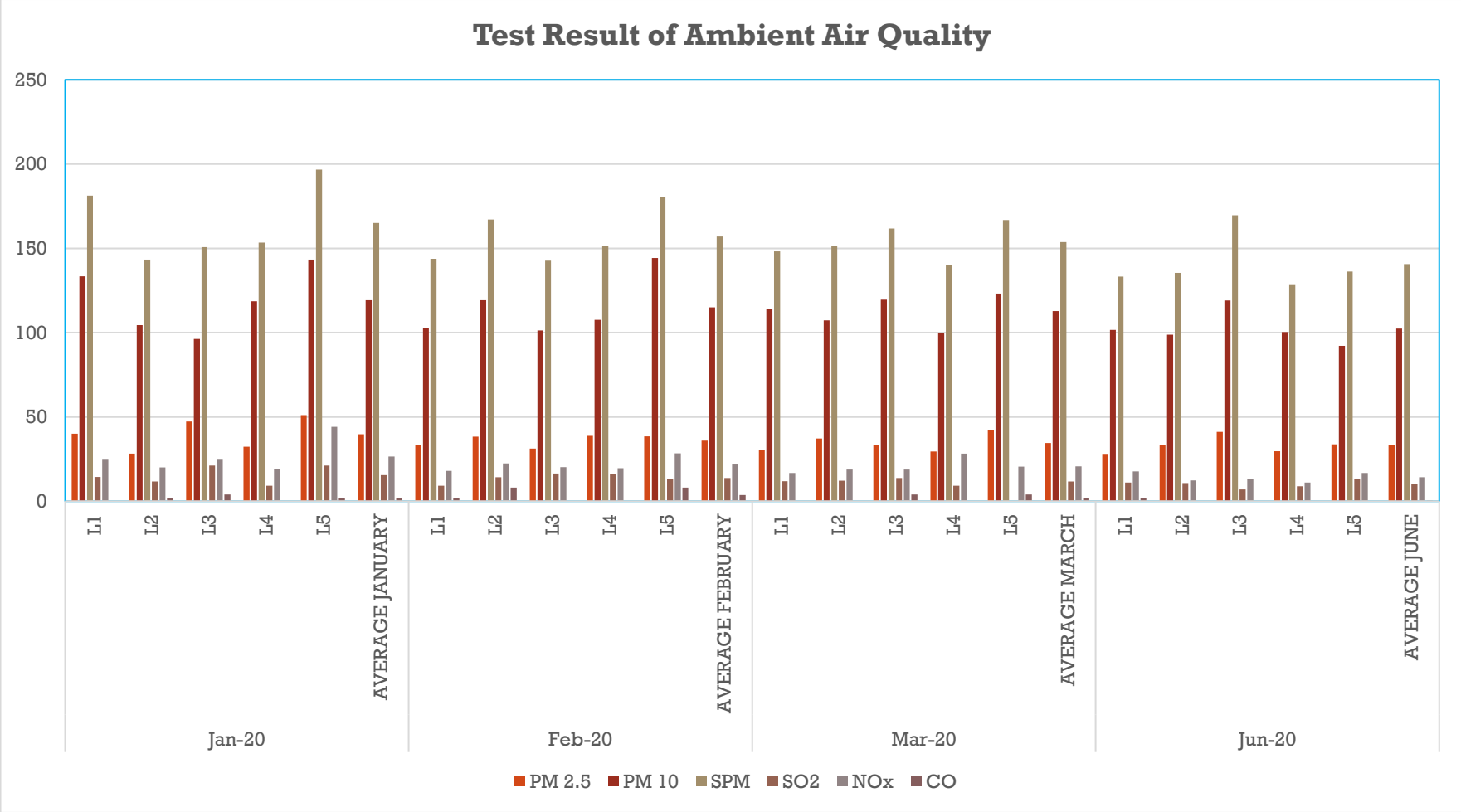


Fig- 5: Ambient Air Quality Test Result

Table-13: 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
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**		**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

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.

Key Note: Due to COVID-19 Pandemic, Monitoring of Ambient Noise Quality didn't perform for the Month of April and May-2020.

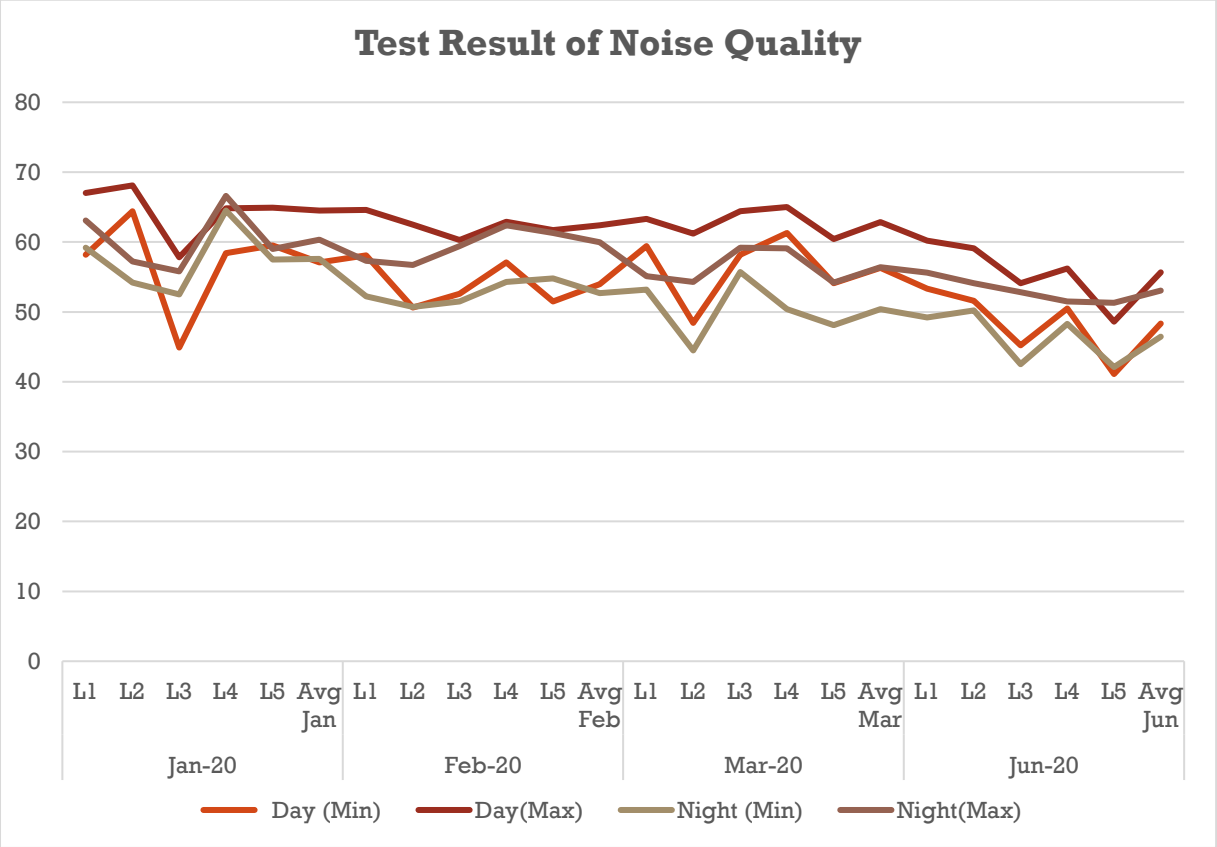


Fig- 6: Ambient Noise Quality Test Result

Table-14: 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

Comments

From the above analysis result, it is found that all the parameters are within allowable limit.

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

Comments

From the above analysis result it is found that, all the parameters are within allowable limit.

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

Comments

From the above analysis result, it is found that all the parameters are within allowable limit.

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

Comments

From the above analysis result it is discernible that, all the parameters conform to the given standards.

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

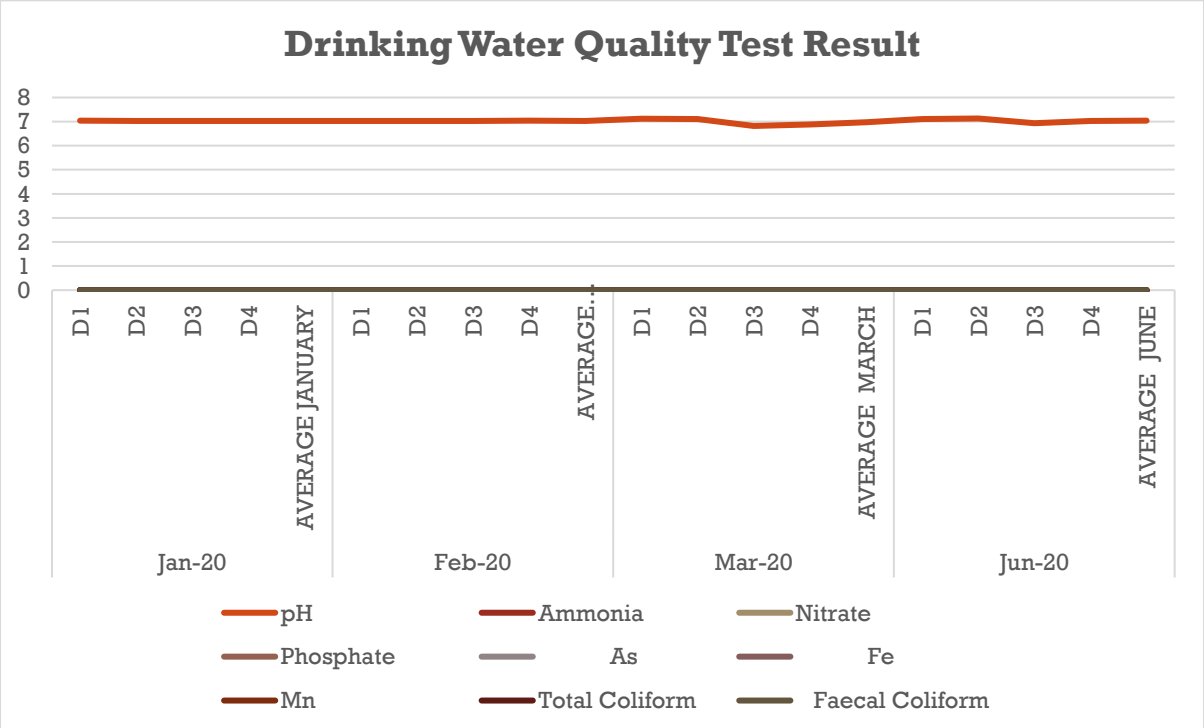


Fig- 7: Drinking Water Quality Test Result

Table-15: 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

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**		**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

Comments

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.

N.B: Due to COVID19 Pandemic Monitoring of River Water Quality didn't perform for the Month of April and May-2020.

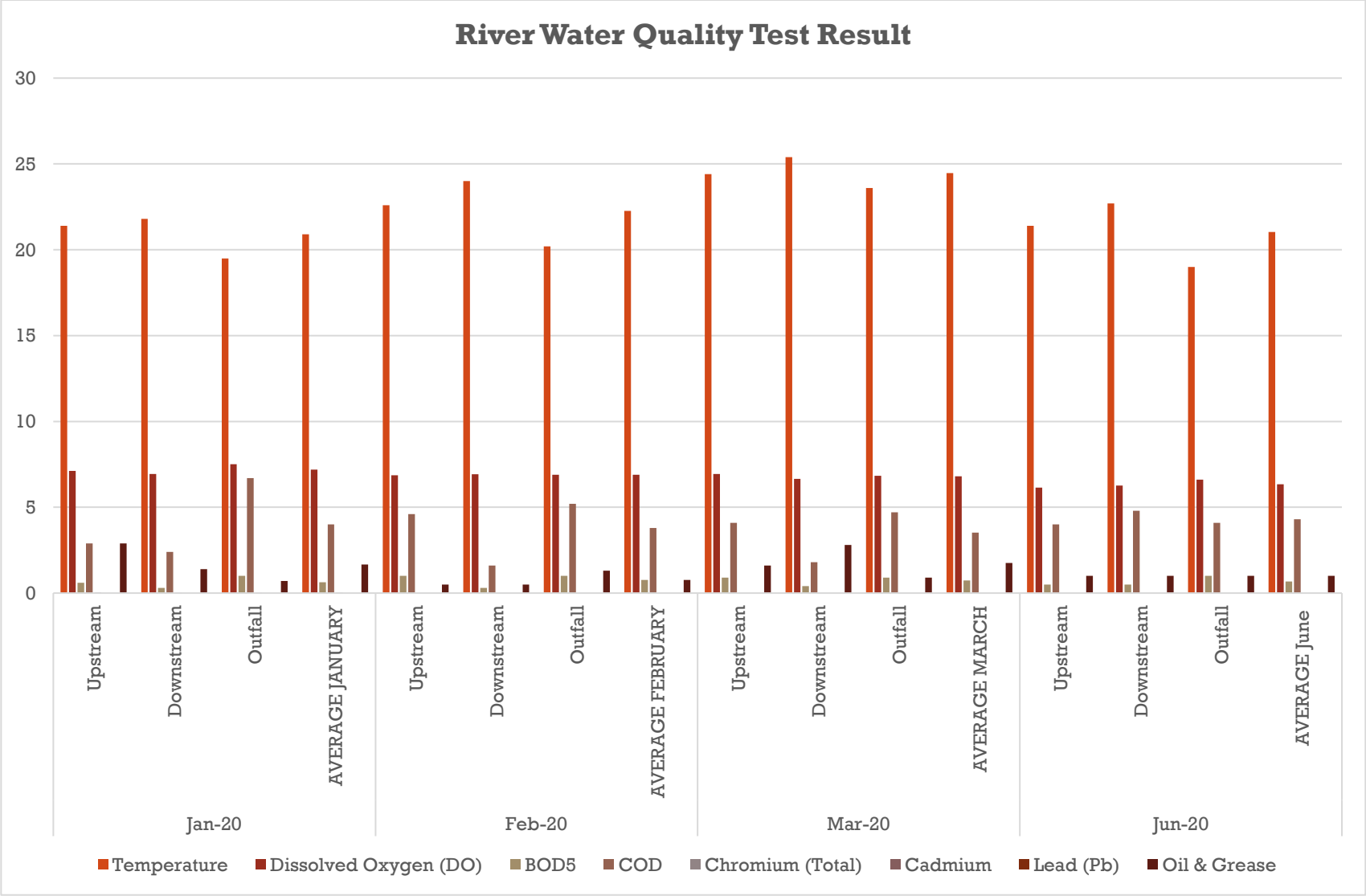


Fig- 8: River Water Quality Test Result

Table-16: 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.

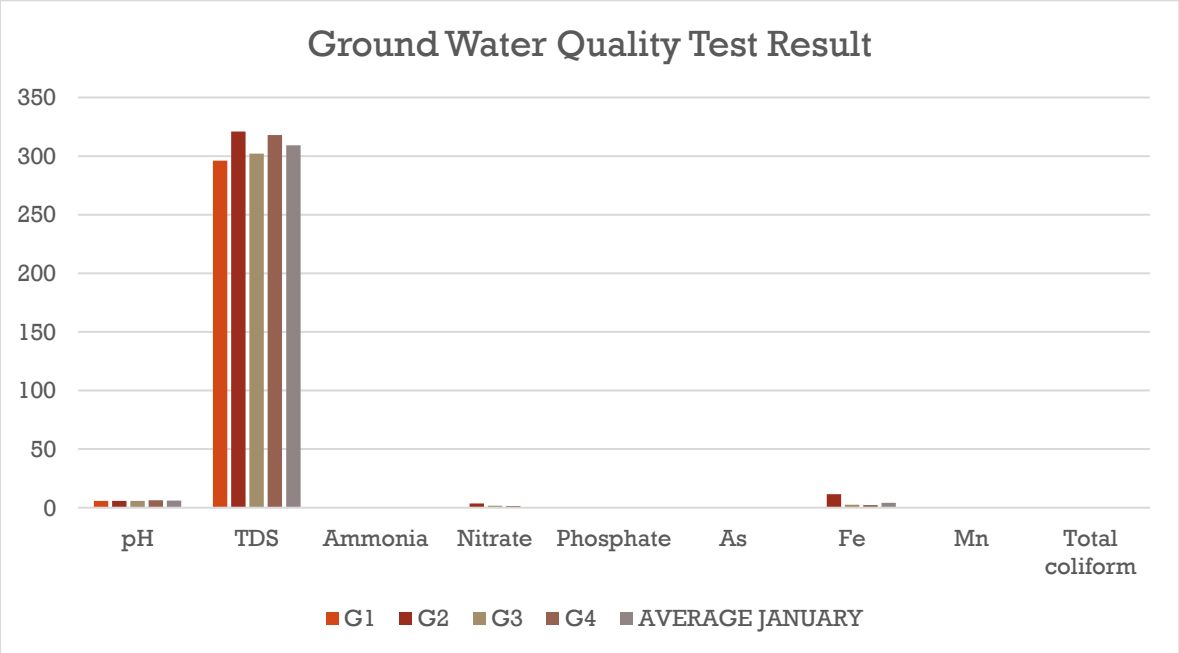


Fig-9: Ground Water Quality Test Result

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-17 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 5.4 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 5.4.

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-17 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 -17: 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-18: 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 No.	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-19: 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- 20: 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: At the Construction Works, Workers were Found with Proper Apron, Helmet, and Hand Gloves Etc.

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. 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- 21: 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 deposited in open space and disposed with

municipal solid waste and remaining non-biodegradable waste will be sold to secondary vendors. The disposal location has been shown in **figure-13**.

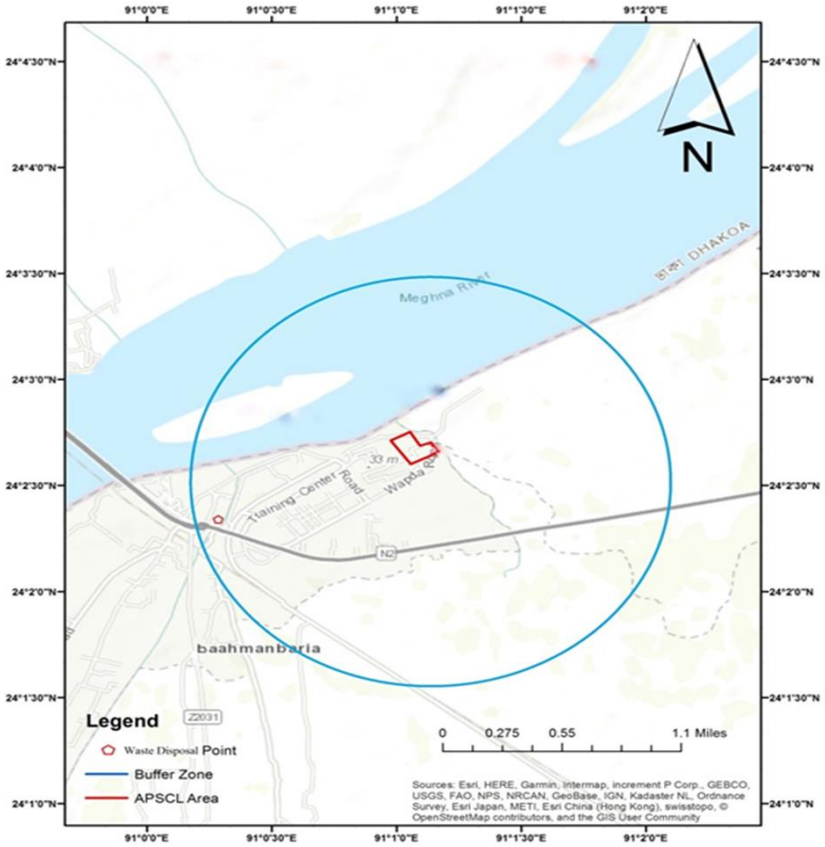


Figure-13: Solid Waste Disposal Location

5.6 Worker's Health

The CNTIC-CCOEC consortium will provide all kinds of treatment facilities and pay compensation according to Bangladesh Labor Law 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.

Figure-14: Photograph of Ambulance and first aid box

5.7 Grievance Redress Mechanism

CNTIC-CCOEC consortium assured that they already established mechanism for grievance redress. Its suggested that complain from neighbours must be duly recorded & adequate 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 have to 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 has not yet constructed. As pilling work is going on, rainy water is stored in a pilling spoils water reservoir. After completion of pilling works, necessary 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 rain water 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.

Figure -20: Water is spraying for dust 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. 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.

6.3 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.

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 $PM_{2.5}$, PM_{10} 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 $PM_{2.5}$, PM_{10} 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 BOD_5, 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 nos.
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 nos.
4. Deputy Manager (Chemical) For ETP, WTP, etc. - 1 no's.
5. Operator – 3 Nos.
6. Environmental Specialist – 1 nos.

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-22: 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

Engr. Khaled Mahmud, Chairman of Ashuganj Power Station Company Ltd. (APSCL) has visited the project site in the date of 14th February 2020 to inaugurate the Circulating Water Pump house sinking works. In this visit he mentioned some issues regarding environmental safety and as well as health safety.

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. Few pictures have attached in the Annex-I.

CHAPTER 7

SAFEGUARD MONITORING RESULTS AND UNANTICIPATED IMPACTS

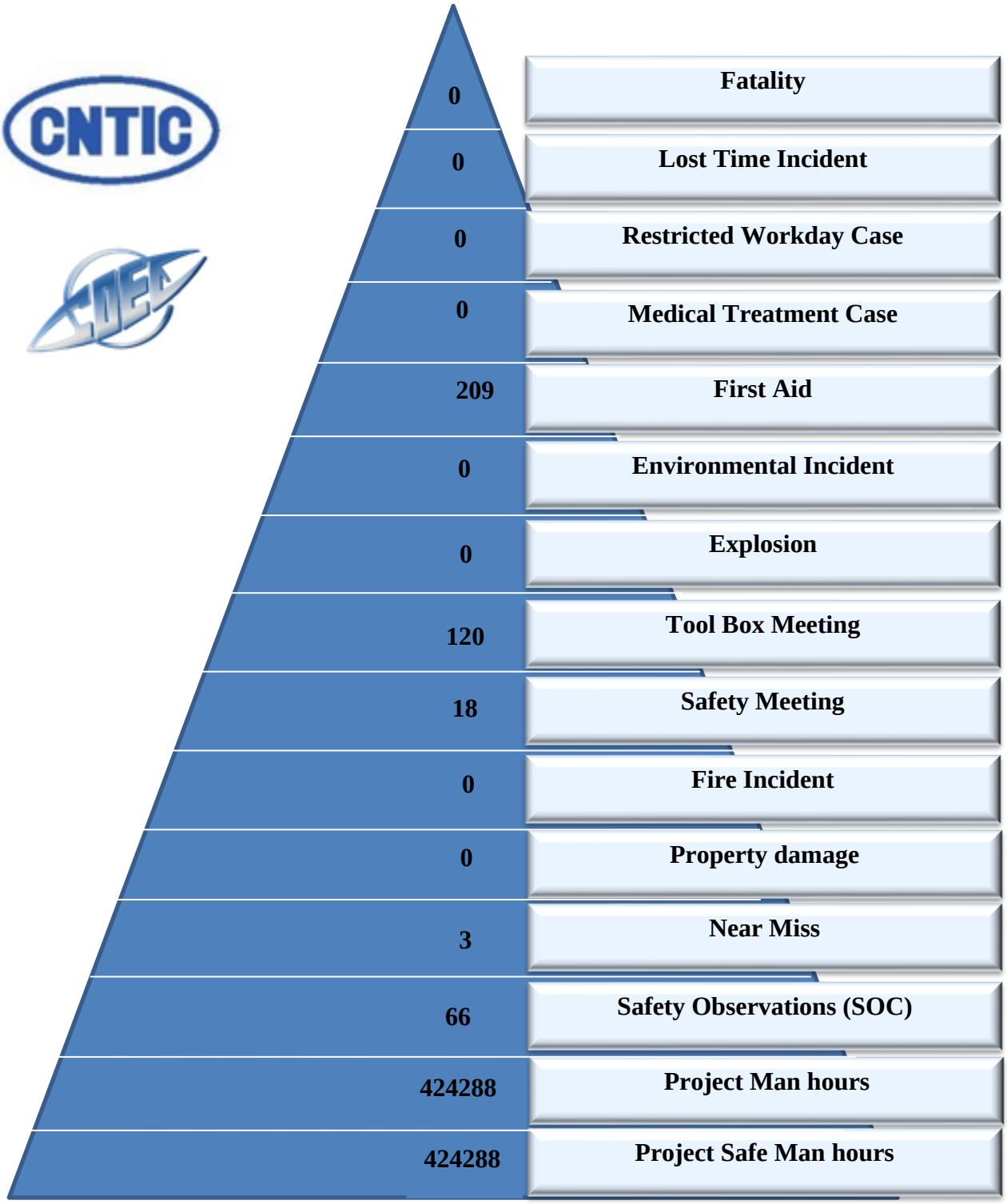
7.SAFEGUARD MONITORING RESULTS AND UNANTICIPATED IMPACTS

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

CONCLUSION AND RECOMMENDATION

8.0 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. SOx and CO are not a problem of the construction period of the power plant. But SPM, $PM_{2.5}$, PM_{10} 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 CO_2 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 CO_2 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 CO_2 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: PHOTO APPENDIX

Fig: Photograph of Superstructure Construction of HRSG and Exhaust Stack

Fig: Photograph of Super structure construction of Main Building

Fig: Construction of Central Control Building (CCB)

Fig: Construction of Main Building

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 tamk

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

Inauguration of CW pump house by Chairman of APSCL

Inauguration of CW pump house by Chairman of APSCL

Site visit by the Secretary of Power Division

Site visit by the Secretary of Power Division

Annex-II: 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, PM_{10} 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.

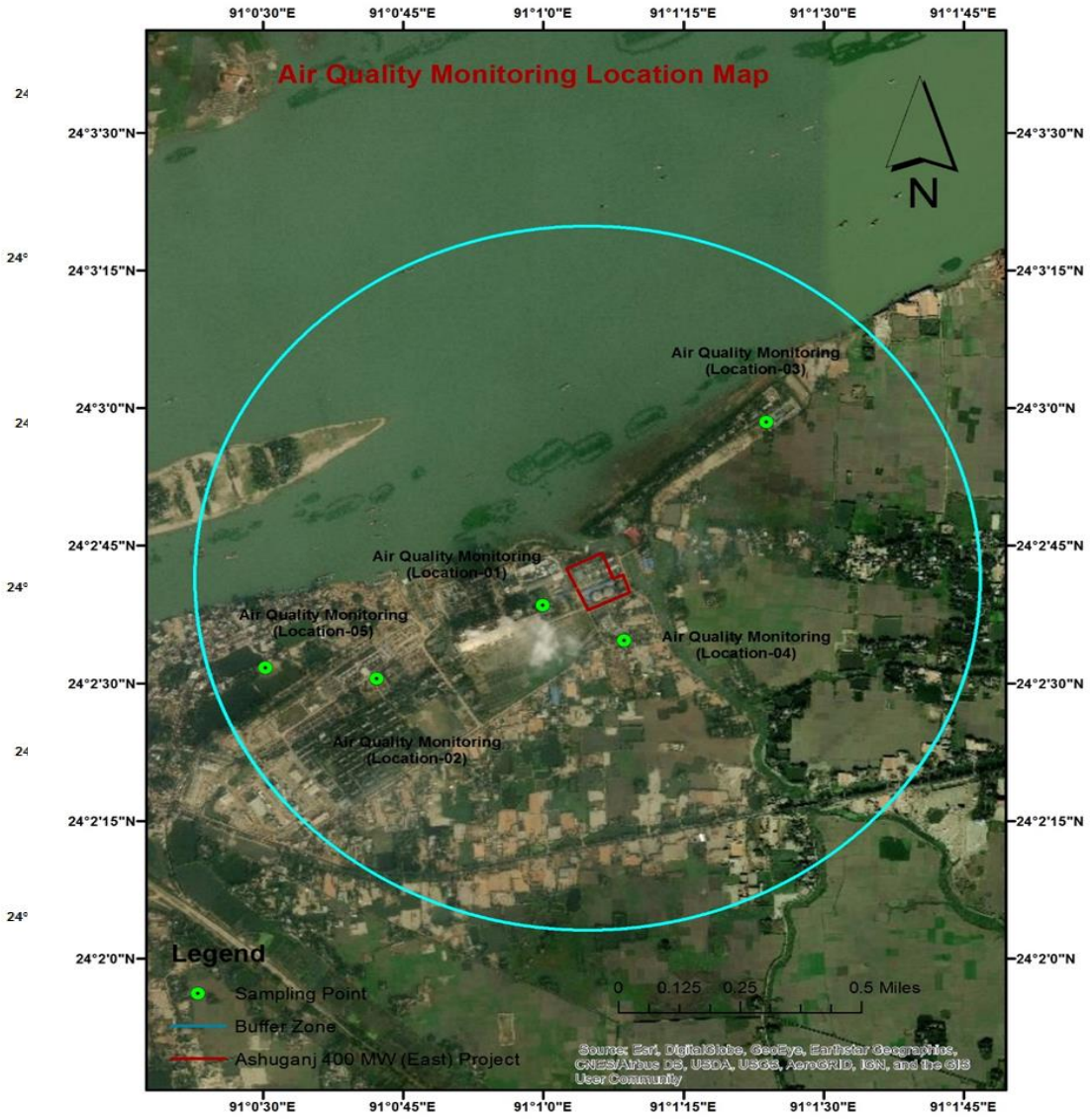


Figure 1: Sampling Points for Ambient Air Quality Measurement

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.

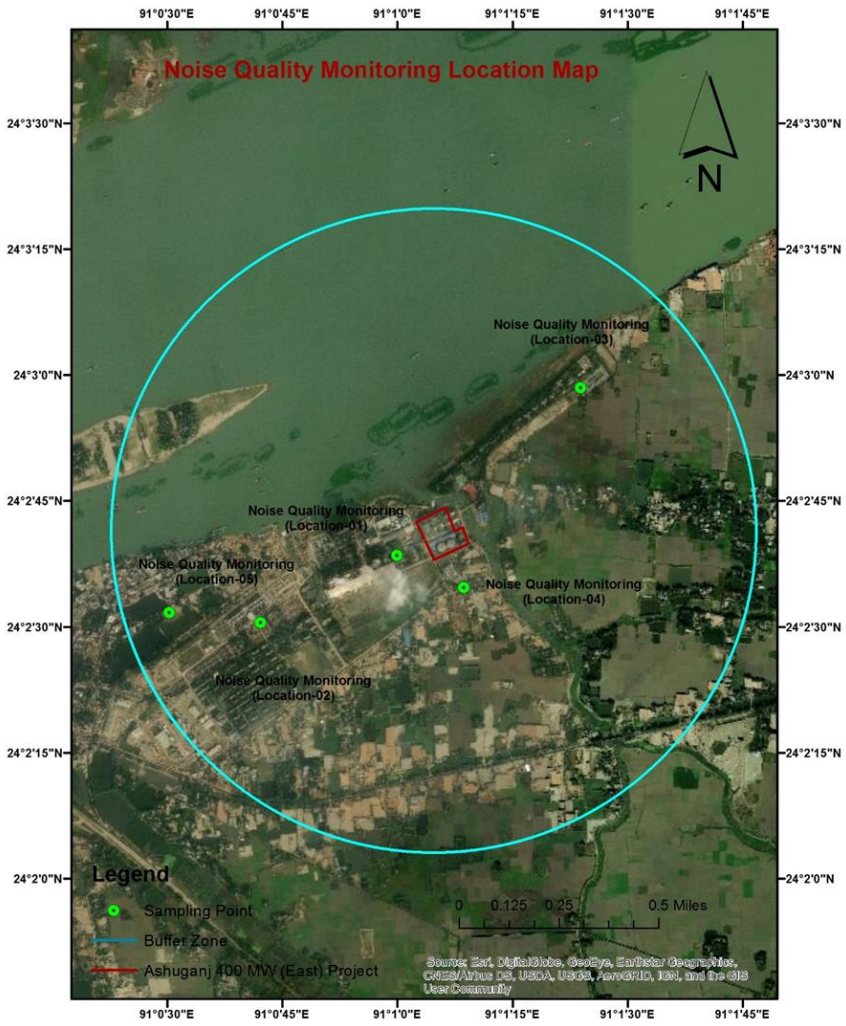


Figure 2: Noise Measuring Points in Project Area

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

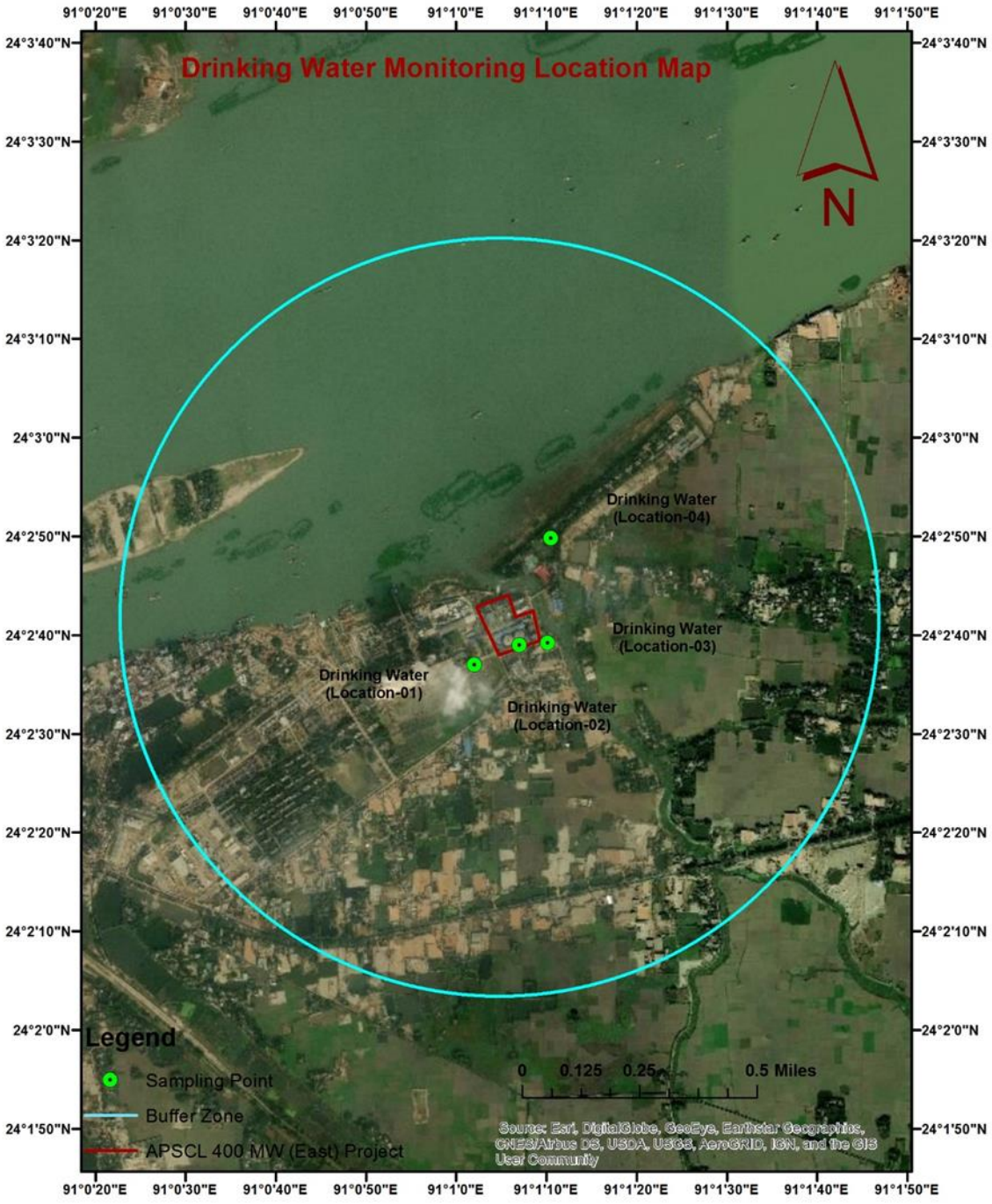


Figure 3: Drinking water Measuring Points in Project Area

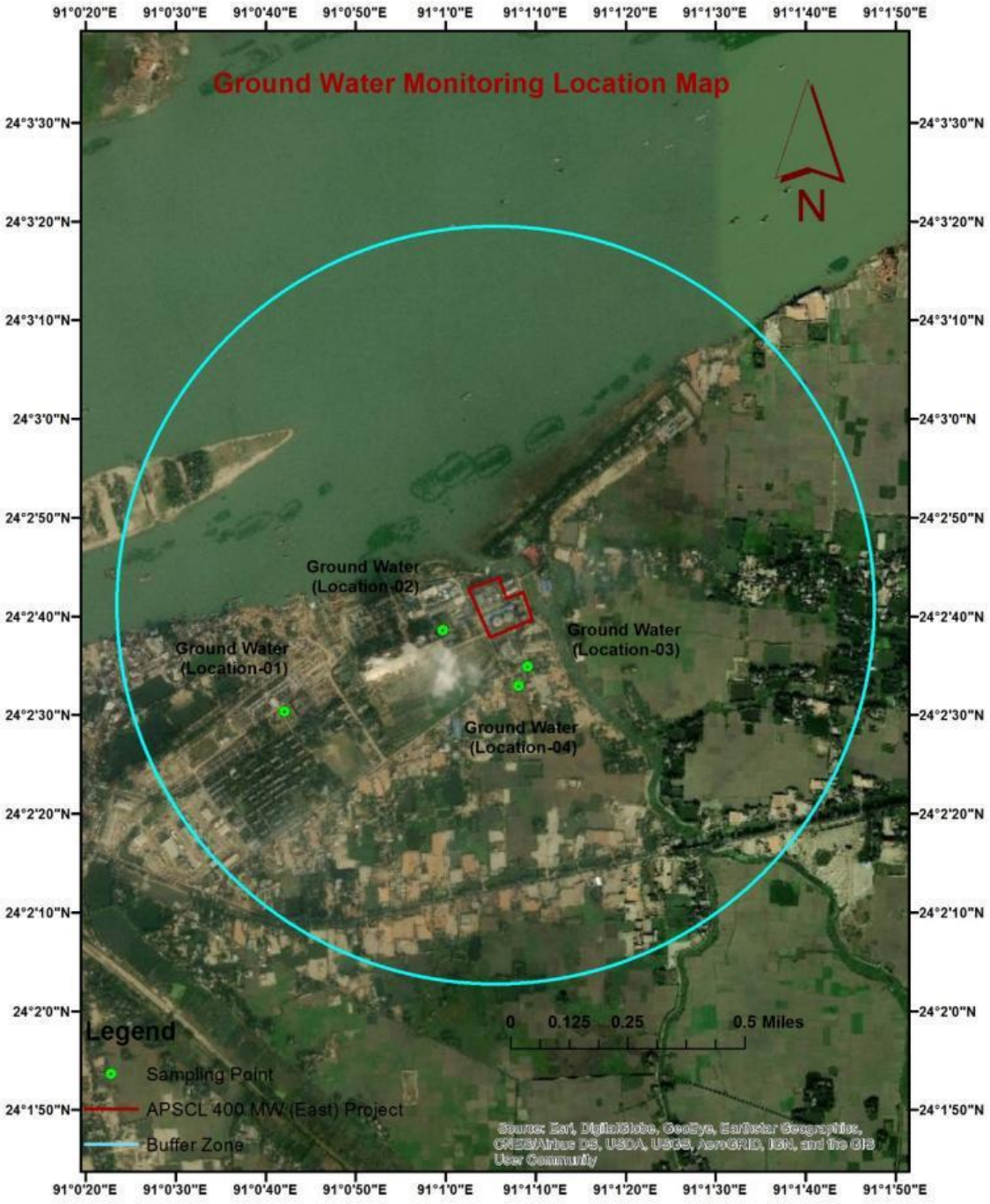


Figure 4: Groundwater Measuring Points in Project Area

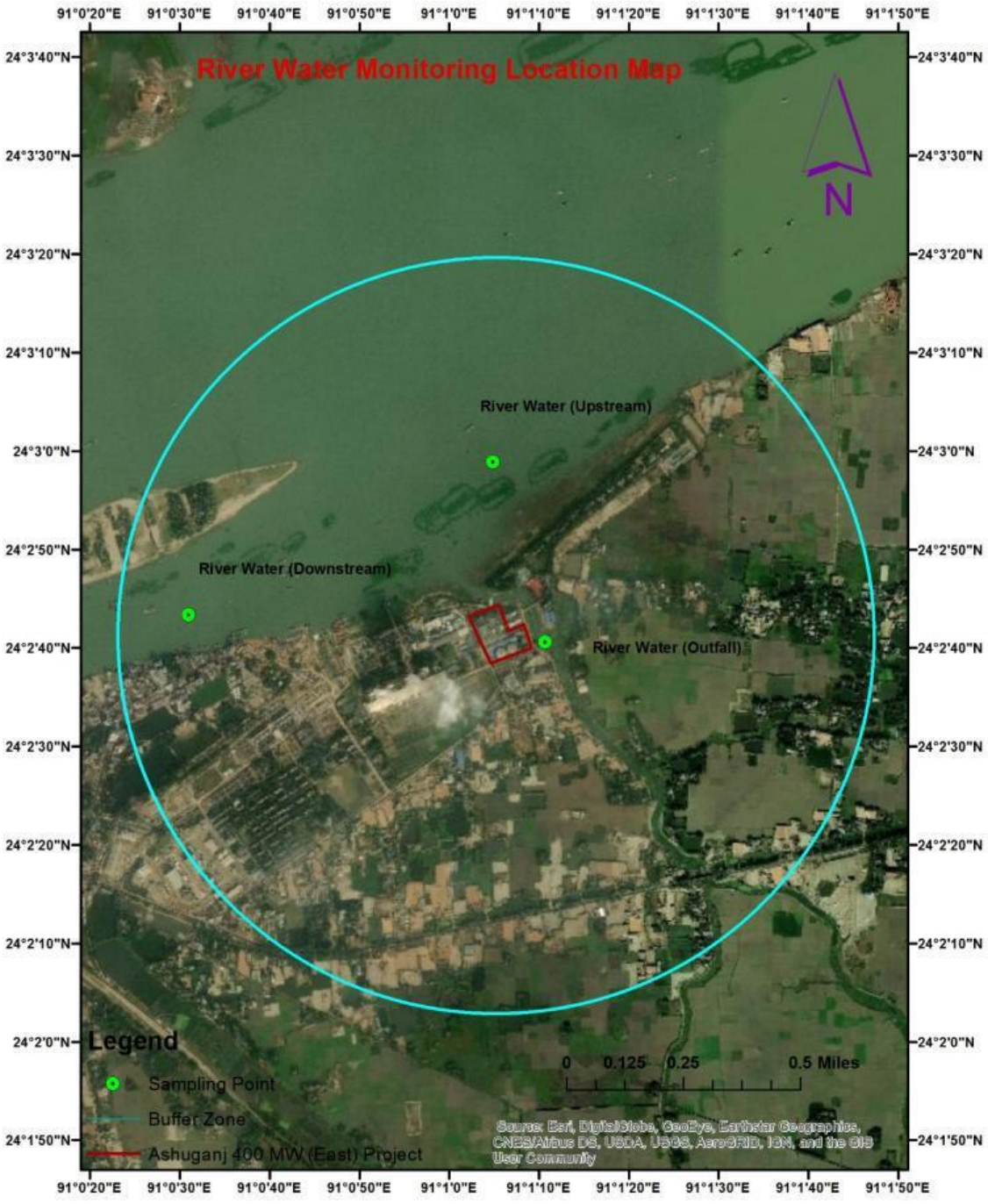


Figure 5: River Water Measuring Points in Project Area

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

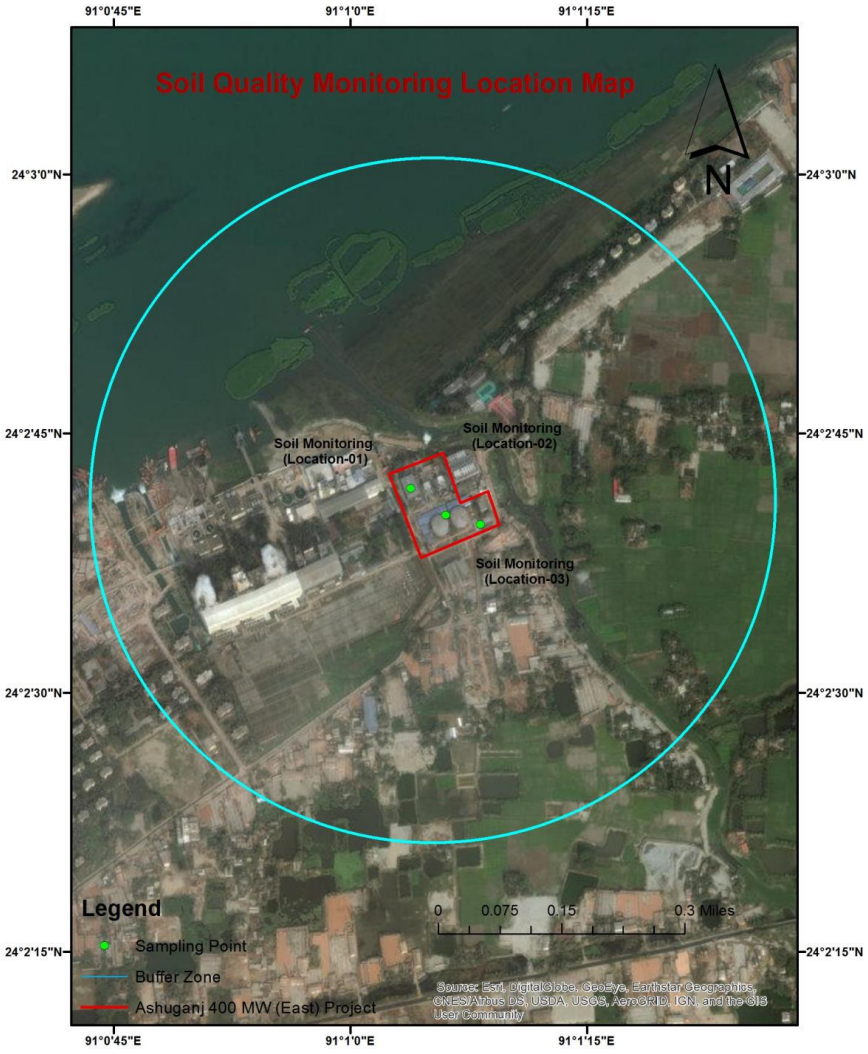


Figure 6: Soil Quality Measuring Points in Project Area

ANNEX-III: 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 repot 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 destructed.
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-IV: 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

Methodology

Sl	Description		Sl	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%					

Calculation

Sl	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**	**tCO_2/yr**
Sl	**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**	**tCO_2/yr**
	Emission Reduction from the Project (Tentative)	**754,150**	**tCO_2/yr**

ANNEX-V: Aide Memoire

Aide Memoire of Midterm Review Mission

Loan 3350-BAN: Power System Expansion and Efficiency Improvement investment Program, Tranche-3 (19-30 April 2020)

I. INTRODUCTION

1. A Midterm Loan Review Mission[1] from the Asian Development Bank (ADB) was fielded from 19-30 April 2020 to review the implementation progress of Loan 3350-BAN: Power System Expansion and Efficiency Improvement Investment Program, Tranche-3 (the Project). Due to the COVID-19 Pandemic in Bangladesh and all over the world the Mission proposed to conduct all meeting with Executing agencies (EA) online, as explained in the mission clearance request letter. Economic Relation Division, Power Division and three EAs of this project agreed with the modality of meeting and issued no objection to the mission clearance letter. The Mission had online meeting with officials of Power Division, Ashuganj Power Station Company Ltd. (APSCL), Power Grid Company of Bangladesh Ltd. (PGCB) and Bangladesh Rural Electrification Board (BREB). The Mission reviewed the overall progress of the Project, particularly (i) component-wise implementation status and achievements considering the remaining project period (ii) status of disbursement against annual targets, (iii) compliance with loan covenants, (iv) environmental and social safeguard compliance status, and (v) implementation issues. This Aide Memoire summarizes the key discussions, findings and agreements reached during the Mission and reflects the understanding of the wrap up meeting held at the Power Division on 1 May 2020, chaired by the Secretary of Power Division. A list of persons met by the Mission is attached in Appendix 1. The contents of this Aide Memoir are subject to review and approval of Government and Management of ADB.

II. BACKGROUND

2. **Project Approval, Signing and Effectiveness.** The framework financing agreement for Power System Expansion and Efficiency Improvement Investment Program was signed between the Asian Development Bank (ADB) and the Government of Bangladesh (GoB) on 7 October 2012. Subsequently on 28 November 2012, ADB's Board of Directors approved the provision of a multi-tranche financing facility (MFF) to Bangladesh, with an aggregate facility amount of up to $700 million. Three loans have been approved under MFF as Tranche-1 (Loan 2966, 2012-2018) for $185 million; Tranche-2 (Loan 3087, 2013-2019) for $310 million; and Tranche-3 (Loan 3350,2015-2021) for $205 million (The Project). Tranche-3, ADB Loan 3350 was approved on 8 December 2015, effective on 5 January 2016 and will be closed on 30 June 2021. Ashuganj Power Station Company Ltd (APSCL), Power Grid Company Ltd (PGCB) and Bangladesh Rural Electrification Board (BREB) are the Executing Agencies for this Loan.

2. Impact and Outcome. The expected impact of Tranche-3 is better access to reliable electricity supply in Bangladesh and the outcome is increased efficiency and capacity of power system in Bangladesh.

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[1] The mission comprised of Ms. Nazmun Nahar, Senior Project Officer (Energy)/ Mission leader; Mr. Tika Limbu, Senior Portfolio Management Specialist; Ms. Farhat Jahan Chowdhury, Senior Project Officer (Environment); Ms. Kazi Akhmila, Associate Project Officer (Resettlement); Md. Shohidul Alam, Financial Control Analyst; Ms. Nadia Tasnim, Associate Project Analyst; Md. Minhajur Rahman Khan, Associate Safeguard Analyst, and Ms. Lino Prue, Operations Assistant

recommends improving the EMR by incorporating data on (i) occupation health and safety (ii) environmental quality data, (iii) corrective action plan in case of exceedance, (iv) compensatory tree plantation, (v) compliance status of EMP, etc. The mission also recommends that (i) an assessment of underground cable trenching to identify the possible environmental impact must be completed by adopting appropriate mitigation measures, if necessary, and (ii) prepare a list of trees were cut due to the project and implement compensatory tree plantation including landscaping at the substation premise.

28. **Social safeguards.** The project has been categorized B for involuntary resettlement and C for impact on Indigenous People (IP). One combined Resettlement Plan (RP) has been prepared and disclosed in 2015 based on draft initial engineering proposal. The RP anticipated land acquisition impacts for Hajiganj substation and temporary economic impacts for 65 km line work and 7 km new transmission line. During implementation, 2.02 hectares land has been acquired for PGCB substation in Hajiganj, Chadpur. Land acquisition and compensation to 38 persons have been handed over in May 2018. A major part of involuntary resettlement has been avoided by utilizing the existing RoW for the 65 km transmission line. The 7 km underground transmission line also plans to minimize resettlement impacts.

29. The project has been submitting social safeguards monitoring reports on a regular basis. For further improvement in contents, a sample report has been shared with the project team to be used as a templet from upcoming reporting period. The project has been keeping grievance records through grievance boxes with contact numbers placed in substation construction sites at visible location and comment register book is being maintained. The project has also engaged 303 unskilled and 20 skilled persons from the locals to enhance economic opportunities. The RP has been updated and shared with ADB in January 2020. As discussed with PMU during mission, the updated final RP will be disclosed once all the impacts are identified according to the detailed design.

V. FOLLOWUP ACTION

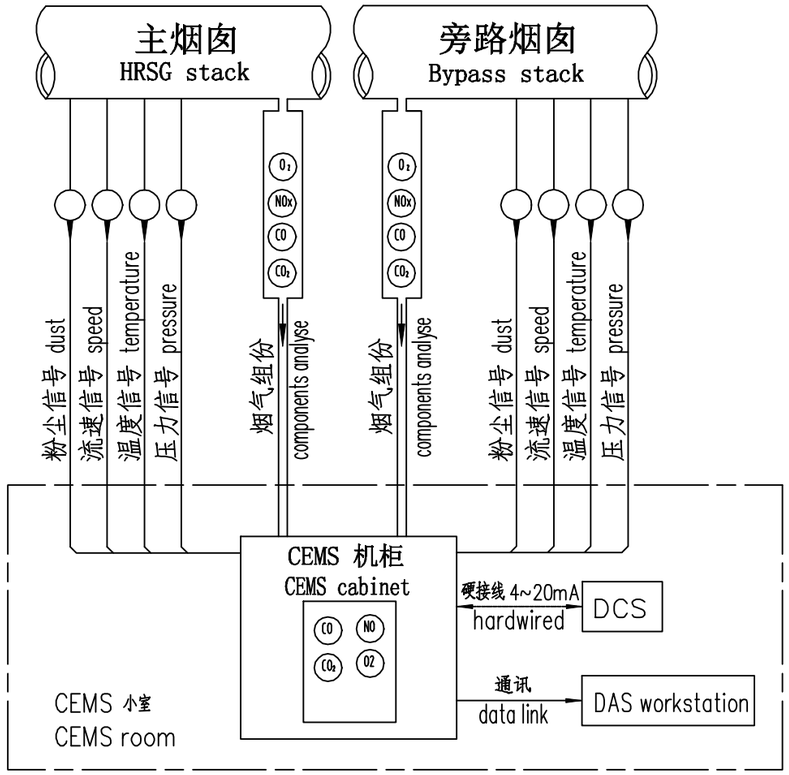
30. For successful implementation of the Project in time, the Mission advised to take immediate steps on the agreed time-bound actions as listed below:

Table-7: Agreed time-bound action plans

Sl. No.	Action	Responsible Agency	Deadline
1	Medical Facilities with immediate appointment of qualified doctor.	APSCL	30 June 2020
2	Translate all safety signage in Bangla	APSCL	15 June 2020
	Cumulative environmental impact analysis by APSCL for all of it's power plants	APSL	30 July 2020
3	Submit improved EMR with quality acceptable to ADB	APSCL, PGCB	30 June 2020
4	Engagement of PGCB EHS team in period monitoring of two sub-stations at Kachua, Chandpur and Cumilla	PGCB	Continuous
5	Initiate compensatory tree plantation	PGCB	30 June 2020
6	Complete an assessment on affected people from the revised route of underground cable trenching.	PGCB	30 June 2020

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

工程建设图纸
专用章
甲级 A135003685



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.

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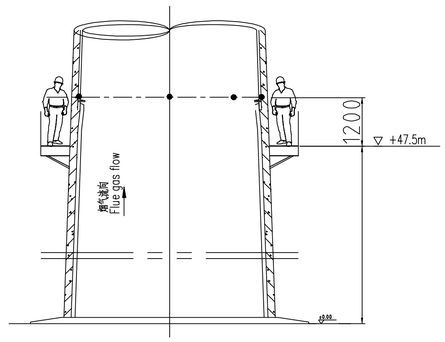
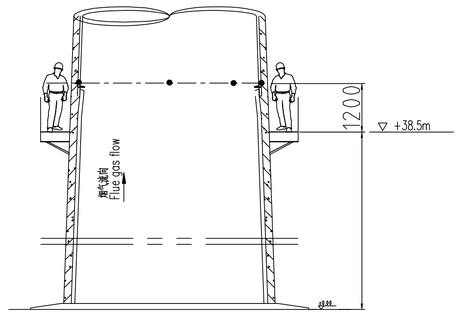
中国电建集团福建省电力勘测设计院有限公司 POWERCHINA FUJIAN ELECTRIC POWER SURVEY & DESIGN INSTITUTE CO.,LTD.				孟加拉国阿苏甘杰东400MW联合循环燃机电站工程 Ashuganj 400MW CCPP (East) Project	施工图 Detail / 设计阶段 Design phase
批准 APPR.		校 核 CHECKER		CEMS系统总图 CEMS system diagram	
审 核 REVIEWER		设计 DESIGN	陈、宇	图 号 DRAWING NO.	35-F403S-K0602-02
比例 SCALE		日期 DATE	2019.07		

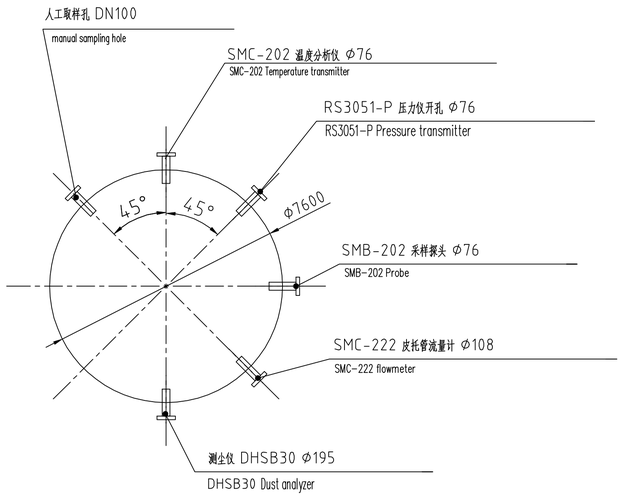
工程建设图纸
专 用 章
甲级 A135003685

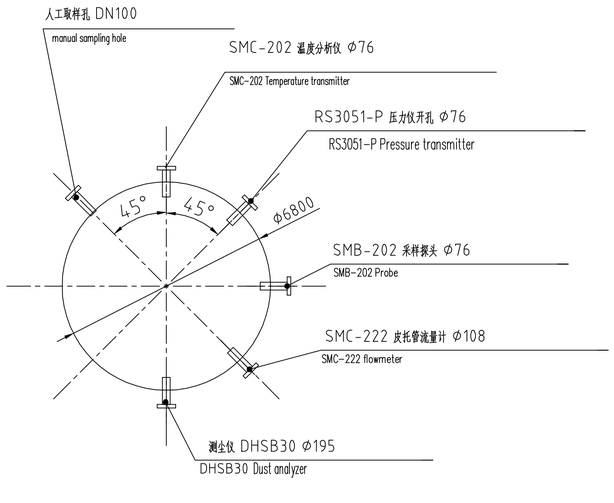
余热锅炉烟囱
HRSG stack



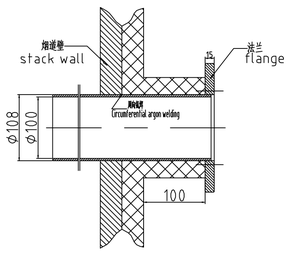
旁路烟囱
Bypass stack



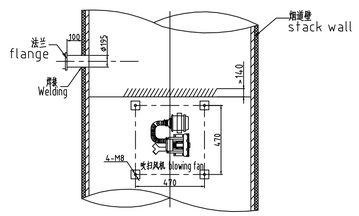




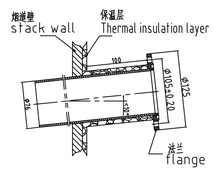
SMC-222 流量计 安装孔接口详图
Dimensional Drawing: Mounting of SMC-222 flowmeter



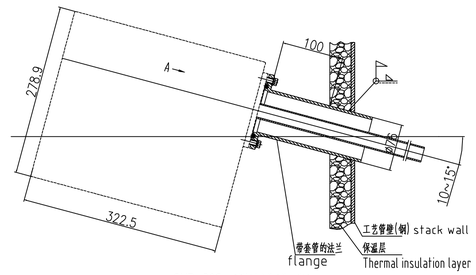
DHSB30 测尘仪 安装孔接口详图
Dimensional Drawing: Mounting of DHSB30 Dust analyzer



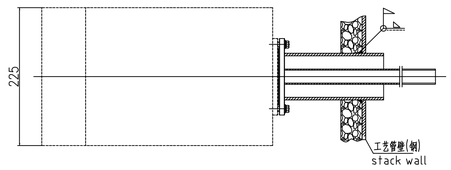
SMB-202 采样探头/SMC-202 温度变送器
RS3051-P 压力变送器 安装孔接口详图
Dimensional Drawing: Mounting of SMB-202 Probe/SMC-202 Temperature transmitter/ RS3051-P Pressure transmitter



适用于主烟囱
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

适用于旁路烟囱
Bypass stack

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、测定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.

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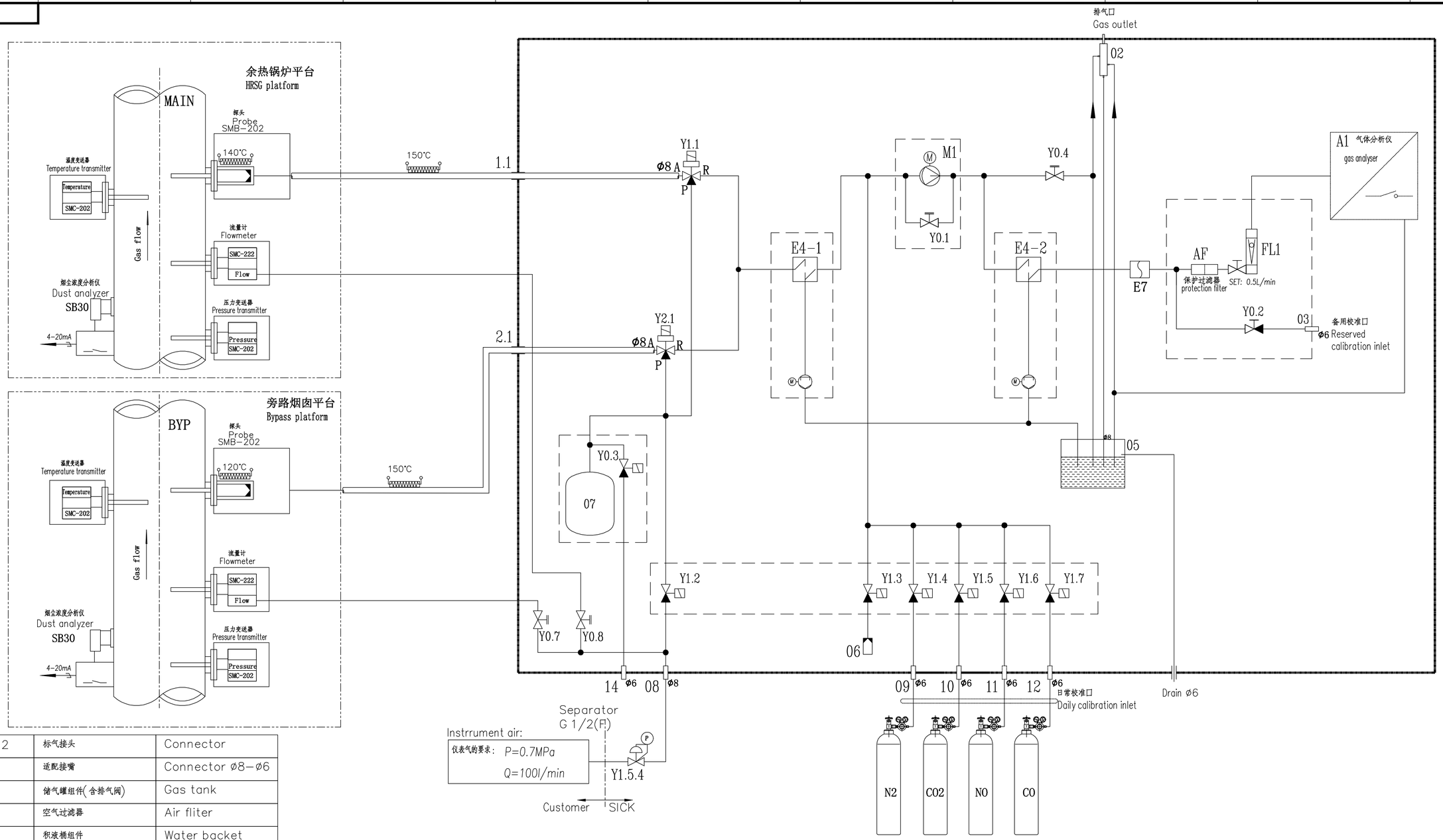
孟加拉国阿苏甘杰苏400MW联合循环燃机电站工程
Ashuganj 400MW CCPP (East) Project

施工图 Detail 设计Design 阶段phase

批准APPR.		CEMS仪表开孔图 CEMS instrument arrangement diagram
审 核 REVIEWED		
校 核 CHECKED		
设计DESIGN	陈、宁	
日期 DATE 2019.07	比例Scale	图 号 DRAWING NO. 35-F403S-K0602-04



NO	标识符 identifier	物料名称	Part Name
18	09~12	标气接头	Connector
17	08	适配接嘴	Connector ø8-ø6
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 backet
13	03	穿板接头	Connector ø6-ø6
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

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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Ashuganj 400MW CCPP (East) Project

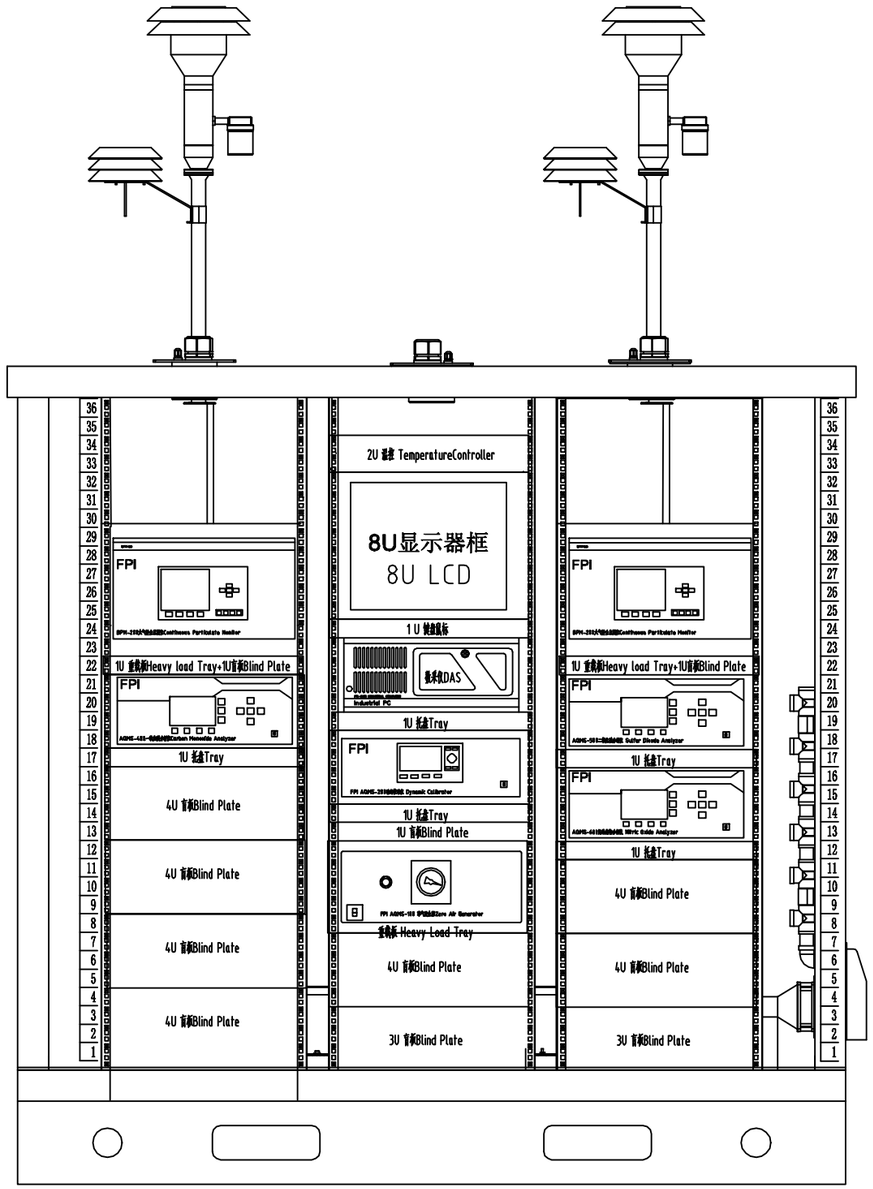
施工图 Detail 设计阶段 Design phase

批准APPR.	
审核 REVIEWED	
校核 CHECKED	
设计DESIGN	陈、宇
日期 DATE	2019.07
比例Scale	

CEMS气路流程图
CEMS flue gas analyse system diagram

图号 DRAWING NO. 35-F403S-K0602-05

工程建设图纸
专用章
甲级 A135003685



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Ashuganj 400MW CCPP (East) Project

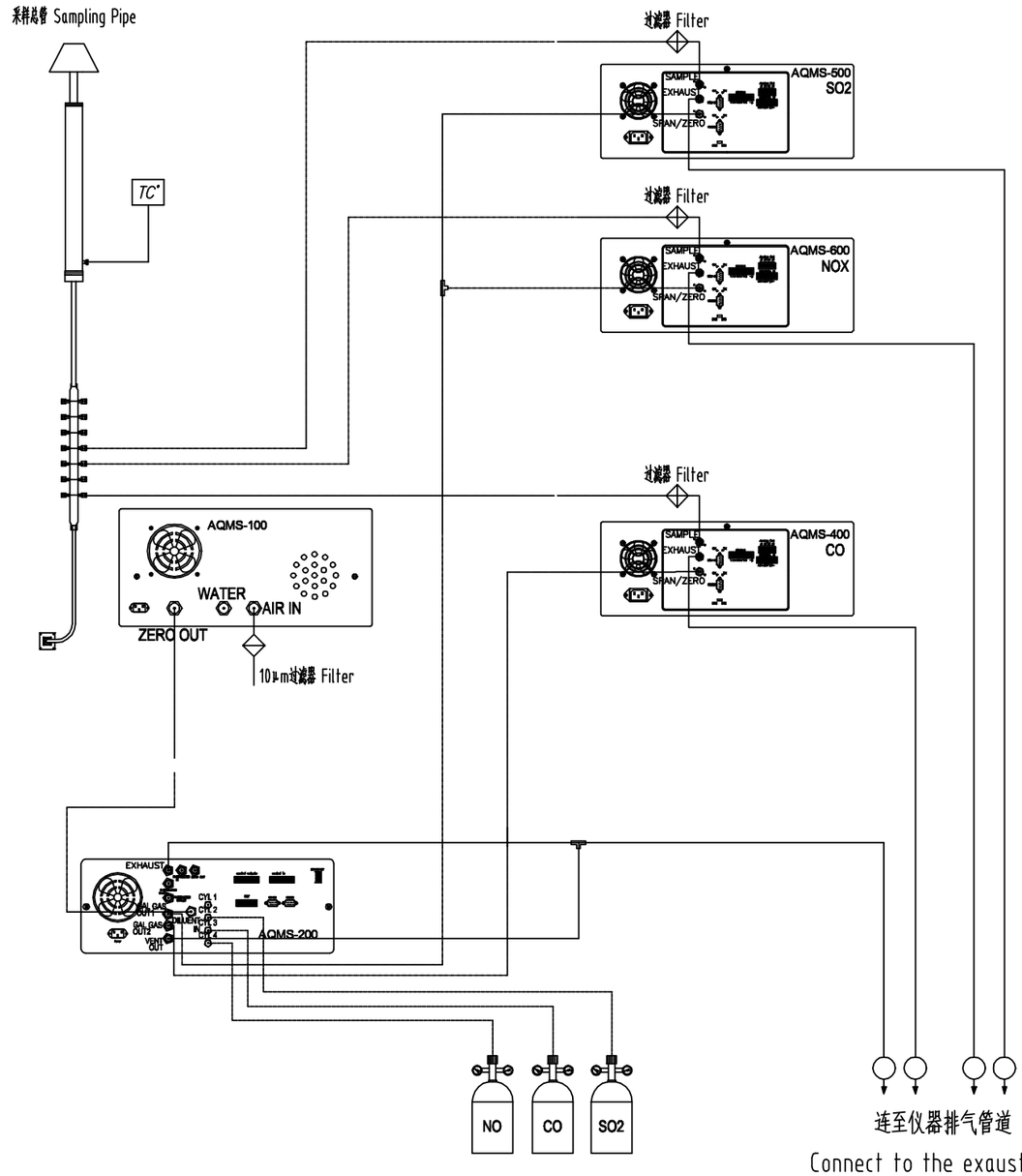
施工图 Detailed 设计阶段 Design phase

批准 APPR.		校 核 CHECKER	
审 核 REVIEWER		设计 DESIGN	林锋
比例 SCALE		日期 DATE	2019.10

空气质量检测站布置图
Layout drawing of atmosphere quality inspection station

图 号 DRAWING NO. 35-F403S-K0605-02

工程建设图纸
专用章
甲级 A135003685



说明 Note:

——————— 中心线表示¼" PTEF管 —— 品红
Center line for ¼" PTEF tube, Pink

- - - - - - - 虚线表示⅛" PTFE管 —— 红色
Dashed line for ⅛" PTFE tube, Red

— · — · — · 点划线表示¼"不锈钢管 —— 青色
Dot dash line for ¼" for stainless steel tube, Cyan

— · · — · · — 单点双划线表示⅛"不锈钢管 —— 绿色
Dot double dash line for ⅛" stainless steel tube, Green

——————— 实线表示¼"PVC管 —— 蓝色
Continous line for ¼" PVC tube, Blue

备注 Remark:

BPM-200 (PM10、PM2.5) 单独采样

BPM-200 (PM10, PM2.5) has individual sampling system.

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Ashuganj 400MW CCPP (East) Project

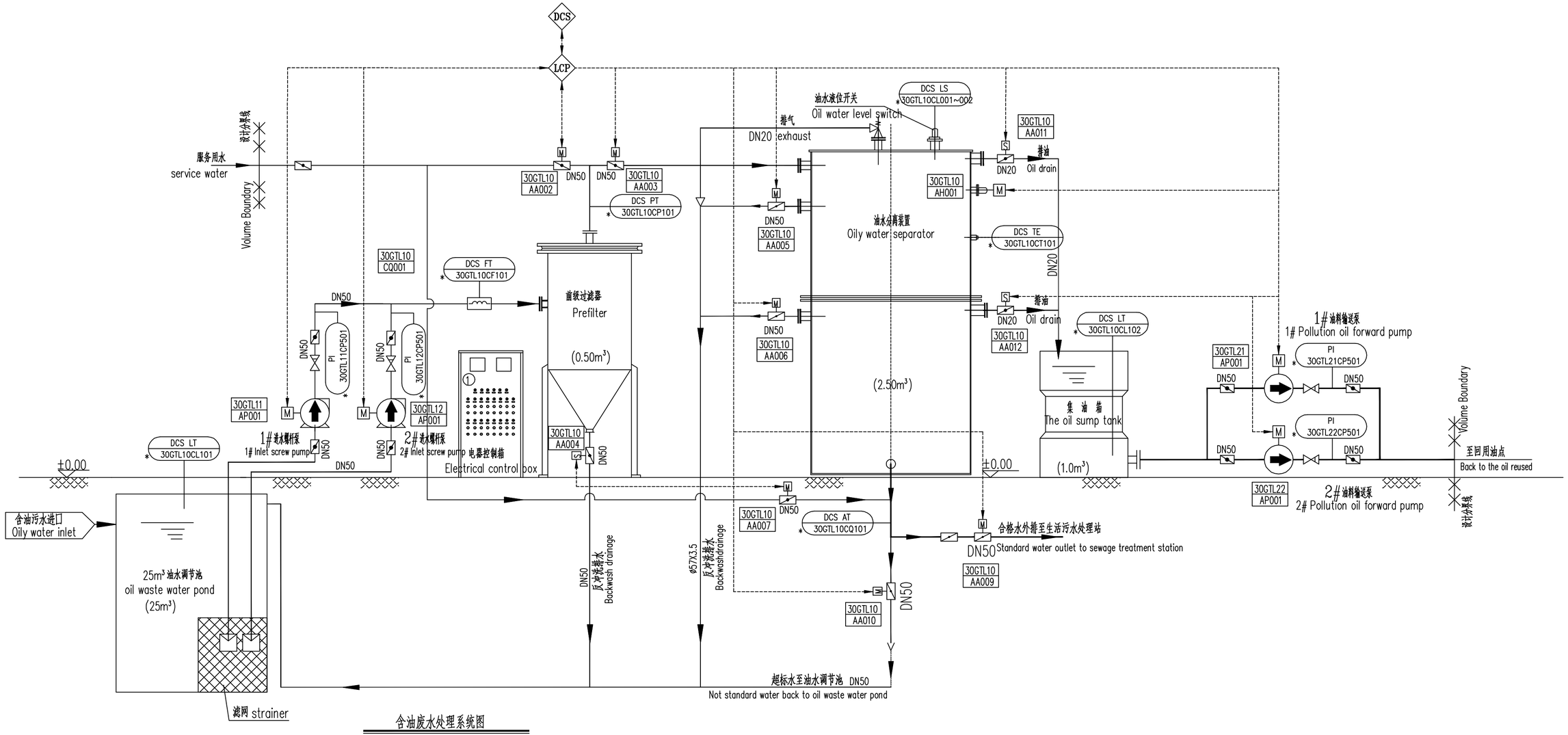
施工图 设计阶段 Detailed Design phase

空气质量检测站气路图
Gas flow drawing of atmosphere quality inspection station

批准 APPR.		校 核 CHECKER	
审 核 REVIEWER		设计 DESIGN	林铎
比例 SCALE		日期 DATE	2019.10

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.

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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 Detailed 设计阶段 Design phase

专业	签名	签名日期
水工工艺		

批准APPR.		校 核 CHECKER	
审 核 REVIEWER		设计DESIGN	
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

工程建设图纸
专用章
甲级 A135003685