Bangladesh – India Friendship Power Company (Pvt.) Limited

(A Joint Venture of NTPC Ltd. and BPDB)

Monitoring of Environment Parameters and
Implementation of Environmental Management Plan
along with Engineering Activities of 2x660 MW MSTPP for the Operation Phase

47th Quarter Monitoring Report

Monitoring Period: November 2025 – January 2026





August 2026

CEGIS

Safeguarding Environment for Future

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Implementation of Environmental Management Plan
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Abbreviations and Acronyms

AAS	Atomic Absorption Spectrophotometer
AECL	Adroit Environment Consultants Ltd.
As, Pb, Hg	Arsenic, Lead and Mercury
BCSIR	Bangladesh Council of Scientific and Industrial Research
BIFPCL	Bangladesh-India Friendship Power Company (Pvt.) Limited
BOD	Biochemical Oxygen Demand
BPDB	Bangladesh Power Development Board
CEGIS	Center for Environmental and Geographic Information Services
COD	Chemical Oxygen Demand
CPUE	Catch per Unit Effort
CSR	Corporate Social Responsibility
dBH	Diameter at Breast Height
DO	Dissolved Oxygen
DoE	Department of Environment
DPHE	Department of Public Health Engineering
EC	Electrical Conductivity
ECR	Environment Conservation Rules
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPC	Engineering Procurement Construction
ESP	Exchangeable Sodium Percentage
ESP	Electrostatic Precipitator
FGD	Focus Group Discussion
FGD	Flue Gas Desulfurization
FSR	Fisheries Species Richness
GIS	Geographic Information System
GoB	Government of Bangladesh
GW	Groundwater
HS	Household Survey
IFC	International Finance Corporation
IGA	Income Generation Activities

IUCN	International Union for Conservation of Nature
Kg	Kilogram
KII	Key Informant Interview
MoPEMR	Ministry of Power, Energy and Mineral Resources
MW	Mega Watt
MSDS	Materials Safety Data Sheet
NTPC	National Thermal Power Corporation, India
PCU	Passenger Car Unit
PMU	Project Management Unit
QMR	Quarterly Monitoring Report
RRA	Rapid Rural Appraisal
SAR	Sodium Absorption Ratio
SRDI	Soil Resources Development Institute
SRF	Sundarbans Reserve Forest
TDS	Total Dissolved Solid
TH	Total Hardness
ToR	Terms of References
TSS	Total Suspended Solid
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

Units

dB	Decibel	mg	Milligram
hr	Hour	MW	Mega Watt
Kg	Kilogram	Nm	Normal Meter
Km	Kilometre	ppm	parts per million
KV	Kilo Volt	ppt	parts per trillion
KW	Killo Watt	ton/year	Ton Per Year
m	Meter	s	Seconds

Units Conversion

General Units

1°C = 274.15 K=33.8° F

1 hectare = 10-2 km2 = 2.471 acres

1 kilogram = 2.20 pound

1 kilometre = 0.62137 mile

1 liter = 0.001 cubic meter

1 meter = 3.2808 feet

1 metric ton = 1000 kg

1 mg/l ≈1 g/m3≈1 ppm (w/w)

1 mg/m3 = 1 µg /L

1 pascal = 1 N/m2= 0.01 millibar

1 square mile = 640 acre = 2.590 km2

Energy Units

1 GWyr = 8.76 x 109 kW

1 horsepower = 746 W

1 KWh = 3412 Btu

1 kWh = 859.85 kcal

1 KWh = 3.6 x 106 J

1MW=1000KW=106W

Glossary

Aman:	Group of rice varieties grown in the monsoon season and harvested in the post-monsoon season. This is generally transplanted at the beginning of monsoon from July-August and harvested in November-Dec. Mostly rain-fed, supplemental irrigation is needed in places during dry spells.
Aus:	Group of rice varieties sown in the pre-monsoon season and harvested in the monsoon season. These are broadcasted/transplanted during March-April and harvested during June-July. Generally, rain-fed, irrigation is needed for HYVT. (High yield variety) Aus.
B Aus:	Broadcast Aus
Bazar:	Market
Beel:	A saucer-shaped natural depression, that generally retains water throughout the year and in some cases seasonally connected to the river system.
Boro:	A group of rice varieties sown and transplanted in winter and harvested at the end of the pre-monsoon season. These are mostly HYV and fully irrigated, planted in December-January, and harvested before the onset of monsoon in April- May.
Haat:	A marketplace where market exchanges are carried out either once, twice, or thrice a week, however not every day.
Gear/Jaal:	Different types of fishing nets to catch fish from the water bodies.
Kutcha:	A house made of locally available materials with an earthen floor, commonly used in rural areas.
Khal:	A drainage channel usually small, sometimes man-made through which the water flows. These may or may not be perennial.
Kharif:	Pre-monsoon and monsoon growing season. Cropping season is linked to monsoon between March-October, often divided into kharif-1 (March-June) and kharif-2 (July-October).
Perennial Khal:	Water is available in the khal all year-round.
Pacca:	Well-constructed building using modern masonry materials.
Rabi:	Dry agricultural crop growing season; mainly used for the cool winter season between November and February.
Seasonal Khal:	Water is not available in the khal all year-round.
T. *Aman*:	Transplanted Aman
Upazila:	Upazila is an administrative subdivision of a District.

Executive Summary

This 47th QMR (Quarterly Monitoring Report) covers the status of EMP (Environmental Management Plan) implementation as per the recommendation of the EIA (Environmental Impact Assessment) Report of the Power Plant, vide Memo No: DoE/Clearance/5062/2011 dt. 05/08/2013, and the EIA Report of corresponding Coal Transportation, vide Memo No: DoE/Clearance/5532/2016 dt. 31/01/2018. This quarterly monitoring, covering the monitoring aspects of the operation phase as indicated in the ToR (Terms of Reference) and the approval conditions of DoE along with valuable suggestions and recommendations from various national and international organizations, has been conducted in January-February 2026. In other words, the aspects can briefly be addressed as monitoring of the Environmental Compliances and monitoring of the selected environmental parameters such as ambient air quality, noise level, water quality, land resources, traffic management status, water resources management status, agricultural resources monitoring, fisheries resources, socio-economic monitoring, aquatic & terrestrial ecosystem monitoring, and the Sundarbans Reserve Forest (SRF) health monitoring.

Environmental Compliance Monitoring

The Environmental Compliance Report (47th Quarter) presents the compliance status of Maitree Super Thermal Power Plant (MSTPP) of Bangladesh-India Friendship Power Company (Pvt.) Ltd. (BIFPCL) during it's operation phase with respect to commitments outlined in the Environmental Management Plan (EMP), the conditions stipulated in the Environmental Clearance Certificate (ECC), applicable national environmental regulations, relevant international standards, and the Plant's environmental and social policies. The assessment is based on the quarterly routine monitoring conducted by the Independent Monitoring Agency (IMA) from 24 to 27 February 2026, while environment, health and safety, and social aspects were assessed and evaluated through site inspections, stakeholder consultations, document reviews, and field observations.

A comprehensive theme-based compliance checklist comprising predefined monitoring parameters was applied to assess compliance across key areas, such as the Environmental and Social Management System (ESMS), labor and working conditions, community health and safety, plantation and biodiversity conservation, waste management, and pollution prevention and control measures.

Overall, the findings demonstrate that the Plant remains substantially compliant with the Environmental Management Plan (EMP) and the conditions stipulated in the ECC issued by the Department of Environment (DoE). The environmental pollution control and management facilities, including the Flue Gas Desulphurization (FGD) system, FGD Wastewater Treatment Plant, Electrostatic Precipitator (ESP), Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), and Solid Waste Management Plant (SWMP) installed to the fulfilment of the requirements of EMP and ECC, were found to be fully operational and functioning effectively. Although, a few minor non-critical issues were identified during the monitoring, these are being closely observed and appropriate recommendations have been provided to further strengthen environmental performance, enhance occupational health and safety practices, and ensure continual improvement in regulatory compliance.

Air Quality Monitoring

This air quality assessment demonstrates strong overall compliance with the APCR (2022) limits, showcasing exceptionally low levels of gaseous pollutants (SO_2, NO_2, CO, and O_3) well within safe national standards. While 13 out of 14 stations met the $PM_{2.5}$ standard, station AQ-08 in the Khulna city area recorded a minor 3.8 % regulatory excursion (67.52 μg/m^3) and consistently peaked across almost all parameters due to dense traffic and heavy industrial activity. Conversely, stations AQ-01 (Stack point) and AQ-14 recorded the lowest overall concentrations, representing a highly compliant environmental standard. Spatial cluster analysis confirms a sharp divide between this heavily influenced, localized pollution zone (AQ-04, AQ-05, AQ-06, AQ-08) and a clean, shared regional background airshed. Because emissions from the industrial zone remain geographically restricted and do not mix into the cleaner areas, these findings provide a clear, data-driven roadmap for targeted emission control strategies at the Khulna city (AQ-08) hotspot.

Noise Level Monitoring

The level of noise at within 100 meters from the plant (Industrial area) located to the north-west direction of the chimney location was recorded as 62.04 dB whereas its standard level is 75 dB. Levels of noise were recorded as at Immediate outside of the project boundary situated just near the power plant main gate (an industrial area located at north-west corner of the project area), at Northern (49.23 dB) & at Eastern (45.26) located at 1km the north-west & the north-east direction from the chimney location and at Southern (50.60) & at Western (42.09) at 1 km the south-east & the south-west corner of the project area. The recorded noise levels did not exceed their corresponding standard limit. On the other hand, noise levels at the Nearest points of Sundarbans (Dhangmari, Sutarkhali and Karamjol (silent zone) were recorded as 43.65 dB, 37.33 dB, and 43.25 dB respectively that denotes, the levels of noise didn't cross their corresponding standard value (50 dB) in these locations. Harbaria (45.76 dB), Besides Shibsha (Akram Point) (37.69 dB) and Hiron point (40.68 dB) were found to comply with the standard limit of noise level (std. 50 dB).

Water Quality Monitoring

The monitoring data reflects a healthy, highly dynamic estuarine ecosystem heavily influenced by tidal phases and geographic positioning relative to the Bay of Bengal. The Tidal Influence on DO represents that the Dissolved Oxygen (DO) levels consistently met national Environmental Conservation Rules (ECR, 2023) standards. Interestingly, the ebb tide exhibited notably higher DO concentrations than the flood tide. This is a classic indicator of colder, well-oxygenated freshwater influx combined with strong atmospheric aeration triggered by outgoing water movements. On the other hand, the Spatial Salinity & TDS Gradients stating a clear geographic gradient in the river water. Inland stations like Sharankhola (Bhola River) experience heavy freshwater dilution from rainfall, runoff, and upstream river networks, keeping salinity low. Conversely, seaward stations like Hiron Point and Akram Point act as direct ocean interfaces, showcasing elevated salinity and Total Dissolved Solids due to the heavy influx of marine ions. Moreover, Hardness and Mineral Accumulation exhibiting that the Hiron Point (SW-15) stood out with maximum values for Total Hardness and Sulfate. This area acts as a hydrodynamic confluence zone. Slower water flow and weaker tidal flushing create a "trap" where local runoff, sediment-water interactions, and decaying mangrove litter accumulate, concentrating dissolved minerals may increase organic matters in this area. Furthermore, the heavy metal profile presents a low risk to local ecology. Lead and Mercury remain safely below standard limits. Arsenic concentrations are marginally sitting at the edge of the permissible threshold which is largely attributed to natural geogenic processes arsenic release from deltaic sediments in oxygen-poor environments) rather than industrial contamination.

A comprehensive groundwater quality assessment up to the 47th quarterly monitoring period (Jan–Feb 2026) indicates that the majority of physicochemical parameters, including pH, temperature, DO, TDS, Nitrate, Sulphate, and Phosphate, comply with the permissible limits as per the Environment Conservation Rules (ECR 2023) for drinking water. Heavy metals such as Lead (Pb) and Mercury (Hg) also remain within permissible limits. Despite the Plant authority does not extract groundwater for any kind use, groundwater quality is being monitored as a part of regular monitoring. The environmental control measures implemented in the project does not allow infiltration of contaminated water into the groundwater aquifer. Although, the Plant is not responsible, the monitoring program considered some parameters, the concentrations of which are critical and need proper attention by the contributing agencies:

- TSS: Total Suspended Solids (TSS) concentrations (20–40 mg/l) consistently exceed the standards as per ECR 2023 (10 mg/l) across all locations due to dredging along the river materialized by the Mongla Port Authority, localized particulate, silt, and micro-colloid suspension.
- Trace Metal: Arsenic (As) concentrations spiked at 0.056 mg/l, slightly breaching the 0.05 mg/l regulatory ceiling, likely driven by water table fluctuations and mineral reduction processes.

Salinity & Hardness Vectors: A steady, long-term increase in salinity (up to 0.4 ppt) and high Total Hardness (TH up to 330 mg/l, specifically at Kapashdanga and Rajnagar) points toward active saline intrusion and large scale groundwater abstraction.

Land and Agricultural Resources Monitoring

The wet-season soil monitoring results indicate that soil quality was mainly influenced by erosion, washout, leaching, inundation and changes in soil chemical balance. Organic matter decreased in Baranpara, Chunkuri-2, Kapalirmet, Chakgona and Basherhula, while it is increased in Bidyarbon. The decline, particularly in Baranpara, where organic matter dropped to almost half the previous wet-season value, may be related to the washout of organic-matter-rich topsoil. Nitrogen generally followed the same pattern. Phosphorus increased in Baranpara, Chunkuri-2, Kapalirmet and Bidyarbon, but decreased in Chakgona and Basherhula, possibly due to erosion and nutrient loss. Sulfur decreased in all plots, mainly due to leaching and wet-season runoff. Soil pH increased in most plots, indicating the influence of inundation and prolonged wet soil conditions.

Salinity, as measured by EC and TSS, generally decreased due to dilution and leaching. However, SAR and ESP increased in several plots due to higher sodium influence. Sodium and magnesium increased in most plots, while calcium showed mixed behavior. Boron decreased mostly, while zinc, iron, and manganese showed variable trends due to changes in pH and redox conditions. Lead and cadmium remained within permissible limits in all plots, indicating no immediate heavy metal contamination concern. Agricultural and livestock data were not collected during this monitoring field visit, as required by the TOR. The next survey will be conducted in April 2026, and the report will be incorporated accordingly.

Traffic Volume and Status Monitoring

This traffic assessment reveals a clear structural divide between the high-volume N7 Highway corridors and low-volume local access roads. The N7 points function as intense economic arteries, with significant bottlenecks at Foyla Bazar (838.0 PCU) and Khudir Bot Tola (835.90 PCU) during peak evening rushes. Highway traffic is heavily dictated by macro-logistics and mass transit, creating a high-friction mix of heavy industrial Medium Trucks and light commuter vehicles. Conversely, the access roads serve as localized commuter funnels rarely exceeding 200 PCU, with traffic sharply

concentrated during morning or evening spikes. These minor roads are consistently dominated by lighter transport modes, primarily motorcycles, passenger cars, and regional auto vans. Notably, erratic port schedules or specialized freight windows at Katakhali and the Mongla Port Area cause higher single-hour traffic surges during off-peak cycles than during designated peak hours. Ultimately, these distinct behavioral profiles offer a data-driven framework for targeted highway capacity expansion and localized traffic management.

Fisheries Resources Monitoring

Monitoring of 47-quarter for fisheries resources have been conducted at 13 sampling sites which were set at the inception stage. Out of these sites, effective samplings were done at 08 sites as fishing in other sites in the river were not observed. Amongst the effective sites, five (05) were in the river and three (03) were in the countryside (shrimp farms). The followings are the key findings of the 47th quarter monitoring in the fiscal year of 2025-26. Changes in habitat uses were observed in every past fiscal year along with the current one (as compared to the fiscal year of 2014-2015, 2015-2016, 2016-17, 2017-2018, 2018-2019, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 and 2024-25 caused mainly due to biophysical changes like tidal effect, forest erosion and vegetation coverage, seasonal variability, food availability and also fisheries management practices.

Moreover, through analyzing the type of habitat uses by different age group of fish species (based on the length-based community structure model) two types of habitats were found i.e. i) Nursery Ground, and ii) Spawning Ground. Shannon-Weiner diversity index has also been observed to vary between 47-quarter with that of all previous quarters. Highest Shannon-Weiner index was found at Maidara (0.65) indicating high evenly distributed fish species. On the contrary, lowest evenness was found at Haldikhali (0.30). However, maximum FSR was obtained at Harbaria (E) and Chandpai (F) sites (n=18), while very low FSR was recorded at Haldikhali (n=5). Among the habitats in the up-stream of the river, Chandpai was rich assemblage of Golda, Chamua, Harina and Chaka Chingri, Maidara was rich of Chaka, Amadi, Chamua and Harina Chingri, Chalna was rich assemblage of Golda, Harina and Chaka Chaka Chingri.

Fish species like Golda, Amadi, Bagda and Paissa attain the maximum abundance among the migratory fish species. Moreover, among the migratory species Poma was observed to migrate long distance. In this monitoring, the highest productivity was found at Harbaria, followed by Chandpai and Haldikhali. The present study revealed that the highest catch susceptibility was also found in case of Charpata Jal (7.75 kg/haul).

Ecological Monitoring

The 47th ecological monitoring program around the Rampal Power Plant was conducted during February 2026 to assess the condition of terrestrial and aquatic ecosystems, including vegetation, canopy cover, roadside plantations, avifauna, bat colonies, and dolphin populations.

Vegetation monitoring recorded 62 plant species from 30 families across five homestead sites, showing an increase in species richness and diversity compared to the previous monitoring cycle. Overall plant health remained stable, with only localized signs of stress attributed mainly to natural factors and site-specific land-use practices. Canopy cover also showed gradual improvement, ranging from 23% to 25% across most sites, indicating continued vegetation growth and ecosystem resilience.

Roadside plantation assessment in and around the project site revealed good productivity of fruiting trees including coconut trees, although reduced production was observed in Chalna, which is far from the site on the other side of the Passur River. Date palms showed signs of decline at several locations, requiring further investigation. Mango production remained moderate across the study area.

Avifaunal surveys indicated considerable variation in bird diversity among monitoring locations. Maidara and Shaheder Abad supported the highest bird diversity. Bird and bat colony observations confirmed the continued ecological importance of surrounding wetlands, homestead vegetation, and water bodies.

Aquatic monitoring recorded dolphin populations in all surveyed waterways. Bhadra Khal remained the most important dolphin habitat, supporting the highest encounter rates of Irrawaddy and Ganges River dolphins. Dhangmari Khal also provided suitable habitat, while lower dolphin occurrence in the Passur and Shella rivers was associated with vessel traffic, fishing pressure, habitat disturbance, and reduced prey availability.

Overall, the monitoring results indicate that ecological conditions in the broader study area remain generally stable, with evidence of improving vegetation diversity and canopy development. Continued monitoring and management of localized disturbances will be important to maintain ecosystem health and biodiversity conservation in the vicinity of the Rampal Power Plant.

Sundarbans Reserve Forest Health Monitoring

The 47th forest ecosystem monitoring in the Sundarbans indicates that overall forest health and ecological functioning remain stable across the monitored sites. Canopy cover remained exceptionally high (93–99%), reflecting the continued structural integrity of the mangrove forest. Strong natural regeneration was observed in most locations, particularly in Sutarkhali, Koromjol, and Harbaria, demonstrating sustained recruitment of mangrove species.

Pneumatophore and crab-hole densities remained substantial, indicating healthy root-zone functioning, soil aeration, and nutrient cycling processes. Wildlife activity was prominent throughout the monitoring area, including evidence of tiger, deer, otter, Bengal monitor, and diverse bird populations, highlighting the ecological importance of these habitats.

Although localized stress factors such as Sundori top-dying, leaf-folding symptoms, sediment accumulation, and limited tree mortality were observed at Akram Point and Hiron Point, no widespread forest degradation was detected. Overall, the monitoring results suggest that the surveyed Sundarbans forests continue to maintain good ecological condition and resilience, while requiring continued monitoring of disease symptoms, sedimentation dynamics, and site-specific disturbances.

Socio-economic Monitoring

Aim of social monitoring is to identify the shortfall in the project implementation regarding social issues, and to suggest necessary recommendation for its proper implementation following necessary standards. Livelihood, health and safety, working environment, grievance mechanism, and CSR are the major indicators under the social context.

In the livelihood context, at present, 94% of the core staff are from Bangladesh and 6% are Indian from the NTPC end. Some posts are found to be vacant; those are under process of recruitment where scope of engagement of Bangladeshi skill workers might be generated. The authority constructed 34 shops in the market complex in which 25% are allocated for the PAPs. In total 28 shops are allotted in which 9 are operated and rest are not opened yet. The working environment is quite good in the premises and the authority arranged accommodation and transport facilities for their staffs. A strict security system is maintained in both main the entry gates in the project premises so that any unauthorized person cannot get access inside the premises. Also, waste management, dredged spoil management, and tree plantation processes are ongoing to keep the environment friendly.

In community development aspect, the MSTPP authority involves themselves in some voluntary and social activities in the villages around the project site. The activities include but not limited to medical services, installation of ROs for safe drinking water in nine (09) villages, diversified training to the local community to build their capacity and skill, etc.). As a part of building nation, the authority has established an English Version School with the support Edison International Collegiate School of Dhaka keeping unfettered accessibility of the local community subject to qualify in the admission test.

1. Introduction

1.1 Background

The Maitree Super Thermal Power Plant (MSTPP), with an installed capacity of 1,320 MW (2 × 660 MW), is a coal-fired power plant developed using modern power generation technology, located on the left bank of the Passur River at Rampal Upazila of Bagerhat District. Unit 1 achieved commercial operation on 23 December 2022, followed by Unit 2 on 12 March 2024. The Plant is located approximately 14 km northwest, in a straight-line distance, from the nearest boundary of the Sundarbans Reserve Forest (SRF).

The Sundarbans is a globally significant mangrove ecosystem characterized by an ecologically sensitive estuarine environment where freshwater and saline water interact, supporting rich biodiversity and ecological processes. Recognizing the ecological importance and vulnerability of this ecosystem, the Government of Bangladesh designated a 10 km buffer around the SRF as an Ecologically Critical Area (ECA) to strengthen environmental protection. Furthermore, the global significance of the Sundarbans is reflected in two UNESCO World Heritage Sites in Bangladesh part located at least 65 km from the MSTPP, both recognized for their Outstanding Universal Value (OUV). In view of its responsibility to conserve this internationally important mangrove ecosystem, the Government of Bangladesh has undertaken regulatory and enforcement measures, through the Department of Environment (DoE) and other relevant agencies, to control and mitigate pollution risks associated with industrial activities, port operations, navigation and power generation in the region.

In this context, as part of the environmental approval process for the Maitree Super Thermal Power Plant (MSTPP), the Department of Environment (DoE) in 5 August 2013, through the relevant approval conditions associated with the Environmental Impact Assessment (EIA), Site Clearance Certificate (SCC) and Environmental Clearance Certificate (ECC), prescribed environmental and social monitoring from the pre-construction stage through the operational phase. The monitoring programme was designed to assess changes in environmental and socio-economic conditions over time, including potential impacts on the Sundarbans Reserve Forest (SRF). Drawing on the findings of the EIA, stakeholder consultations and public appraisal, as well as its technical assessment, the DoE defined the Scope of Works (SoWs) for monitoring environmental components, social indicators and the implementation status of the Environmental Management Plan (EMP) throughout the pre-construction, construction and operational phases of the project. In 2014, Bangladesh-India Friendship Power Company (Pvt.) Limited (BIFPCL), the company responsible for implementing the MSTPP project, entrusted the Center for Environmental and Geographic Information Services (CEGIS) with conducting the monitoring programme in accordance with the SoWs specified in the applicable Terms of Reference (ToR).

The MSTPP site extends between latitudes 22° 37’ 0’’ N and 22° 34’ 30’’ N, and longitudes 89° 32’ 0’’ E and 89° 34’ 5’’ E. The Plant is located approximately 23 km south of Khulna City and approximately 14 km north-west of the nearest tip of the SRF in aerial distance (considering the chimney location). Administratively, the Plant is situated in Sapmari Mouza, with Katakhali, and Kaigar Daskati Mauzas of Rajnagar Union in Rampal Upazila, Bagerhat District, in the surrounding area. The geographical location of the Plant, the study corridor/area and surrounding area and the distances of the relevant World Heritage Sites (WHSs) from the Plant are presented in Error! Reference source not found..

The study corridor/area comprises: i) an area within a 10 km radius of the Plant chimney, and ii) a corridor extending along the Passur River from Chalna, passing the Plant site, to Hiron Point, with a 5 km buffer on either bank of the river (Error! Reference source not found.). In accordance with the ToR,

the monitoring program has been designed on a quarter basis and thus, findings of the monitoring are documented and reports are being submitted to BIFPCL on a regular basis in required copies to disseminate the reports to concerned regulatory and government agencies, including DoE and Bangladesh Forest Department (BFD).

In this connection, monitoring of the environmental and social parameters along with collection of other relevant data is underway, considering spatial and temporal (seasonal) variations. Under its contract as the Independent Monitoring Agency (IMA), the Center for Environmental and Geographic Information Services (CEGIS) completed the 47th Quarterly Monitoring Programme during January-February, 2026, covering all preselected monitoring parameters in accordance with the applicable Terms of Reference (ToR).

1.1.1 Objectives

The prime objectives of the study are:

- To monitor the important environmental and socio-economic parameters during the operation phase of the Power Plant as specified in the EIA monitoring plan and
- To monitor environmental and social compliances regarding the conditions of ECC and EMP implementation during the power plant operation and its associated activities.

1.1.2 Criteria for Selection of Monitoring Sites/Locations

The monitoring sites have been selected considering the sensitivity and the ambiance of the surroundings likely to be impacted by the Project-related activities, which include:

- Wind speed, direction, and sensitive receptors in and around the project site were considered for monitoring the ambient air quality. Potential areas were also identified and selected for noise level monitoring likely to be impacted by the project activities. Similarly, sites for water quality monitoring were selected considering the water resources likely to be impacted by the project activities.
- Potential locations for monitoring fisheries' resources were selected, considering the fish habitats, biodiversity, migration, and production zones likely to be impacted by the project activities.
- Monitoring locations for ecosystem and biodiversity, Soil, and land resources were selected considering the induced impacts of the Project-related activities on the project's surrounding areas.
- Monitoring of socio-economic conditions of the PAPs (Project Affected Peoples) and project surrounding communities was carried out on the basis of their circumstances likely to be transformed and /or altered by the project activities.
- Locations for Sundarbans Reserve Forest (SRF) Health Monitoring were selected considering the coal transportation routes through the Sundarbans Reserve Forest area and associated activities for different phases of the power plant development and operation, which might have significant effects on Sundarbans's flora and fauna.
- Monitoring aspects for Environmental compliance regarding EMP implementation status in and around the project area have been set as per suggestions made in the EIA reports and approval conditions from the DoE of both the Power Plant and Coal transportation studies, respectively, to ensure environmental sustainability and social acceptability.

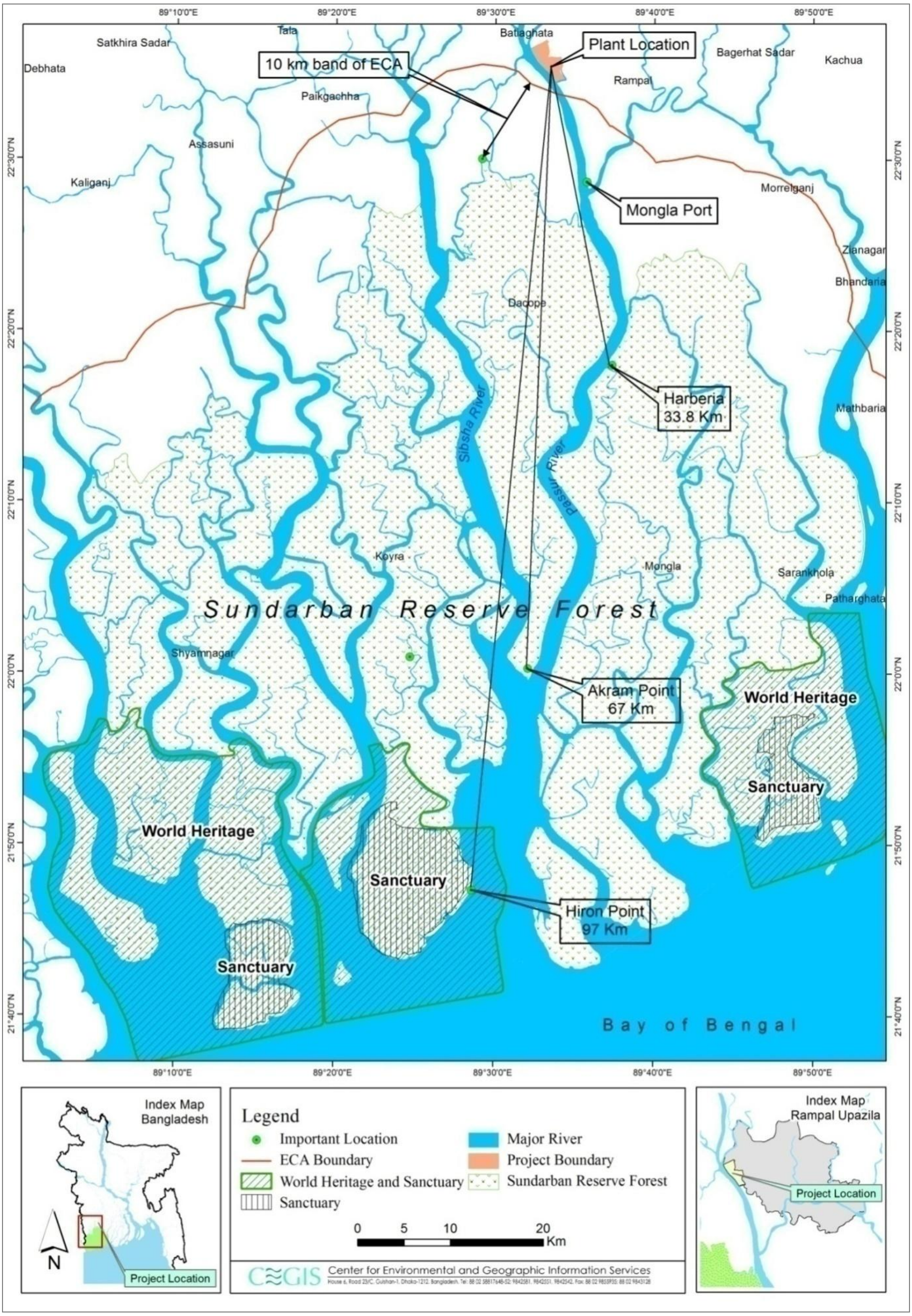

Figure 1.1: Map Showing Points of Interest in the Study Corridor

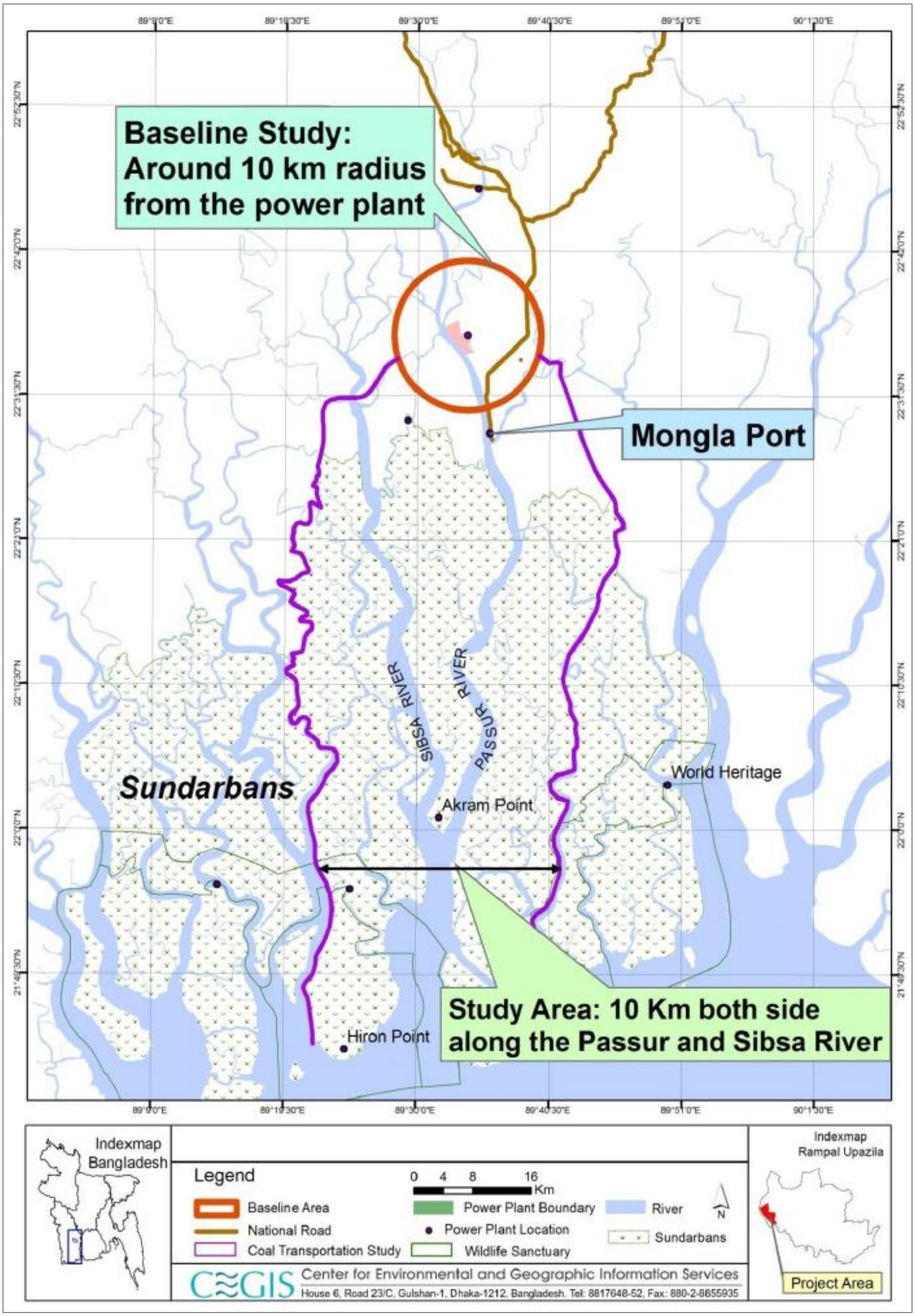

Figure 1.2: Study corridor/Area of Environmental and Socio-economic Monitoring

1.1.3 ***Main Stakeholders***

Forest Department

Monitoring of the Sundarbans Reserve Forest area needs to be addressed as per the conditions set out by the DoE. Hence, permission from the Forest Department is essential to carry out the said activities. The Forest Department has been providing consent under certain conditions, i.e., keeping close communication with the Forest Department, submission of the monitoring reports to the Forest Department, along with the following activities:

- Inclusion of a Soil Scientist and a Botanist in the monitoring team,
- Monitoring of regeneration in growths (seedlings), diseases, and pests (if necessary, to carry out laboratory analysis),
- Monitoring of soil nutrients (macro, micro) and heavy metals,
- Monitoring of floral diversity, species richness, and dominancy,
- Measurement of carbon content both above and below the ground level,
- Assessment of impact on canopy cover, leaf phenology, flower behaviour, pneumatophore, and crab hole conditions.

However, BIFPCL forwards each copy of the earlier quarterly monitoring reports to the Chief Conservator of Forest, Bangladesh Forest Department, Agargaon, Dhaka, and the Conservator of Forest, Khulna Circle, Boyra, Khulna. Similarly, the 47th quarterly monitoring report will also be forwarded to the same officials of the corresponding Departments.

Department of Environment (DoE)

The monitoring plans, indicators, parameters, and location have been selected and arranged by incorporating the suggestions and approval conditions from both the Power Plant EIA study and the Coal Transportation EIA study. The monitoring reports are also presented to the DoE and, a representative from the local DoE office is involved in each monitoring visit to accompany the monitoring team.

Bangladesh India Friendship Power Company (Pvt.) Limited (BIFPCL)

Bangladesh India Friendship Power Company (Pvt.) Limited (BIFPCL) is the Project Proponent of the Power Project. BIFPCL's officials have assisted the study team since the beginning of the study. Furthermore, BIFPCL is currently implementing the Environmental Management Plan (EMP), ensuring environmental and social safeguarding of the Project surroundings.

Local Community

Each social environment-monitoring program includes Project Affected Peoples (PAPs). The changes in important socio-economic indicators are examined through Focus Group Discussions (FGDs), Key informant interviews (s), and other informal discussions with the local people in different locations of the project-influenced area.

1.1.4 Major Component of Monitoring Study

The physical, biological, and social aspects are monitored regularly, and this quarterly monitoring report is furnished with the following subsequent chapters-

- Physical environment covers monitoring of air quality, noise level, water resources and water quality, Soil and land resources, traffic management, and the morphological study;
- Biological environment covers monitoring of fisheries resources, ecological resources, and the Sundarbans Reserve Forest (SRF) health conditions;
- Socio-economic environment covers compensation, resettlement/rehabilitation, project-related employment generation, labour and working conditions, community health, security, safety, and corporate social responsibilities.
- Environmental compliance monitoring includes monitoring the implementation of the Environmental and Social Management System Action Plan, labour and working conditions, community health, safety, and security, and biodiversity and sustainable management of living natural resources in and around the project area, etc.

2. Physical Environment

2.1 Air Quality

The monitoring activities were carried out at the designated locations in line with the EIA monitoring plans, expert recommendations, standard procedures, and guidelines to evaluate and compare the air quality status in and around the project area, including the Sundarbans Reserve Forest (SRF) along the coal transportation route.

2.1.1 Methodology

As per the EIA study, it was determined to monitor the criteria pollutants at the different phases of the power plant: pre-construction, construction, and operation. On the other hand, the monitoring framework was developed based on several identical factors like receptor sensitivity, project activities (e.g., coal vessel movement, coal trans-shipment, power generation), and atmospheric conditions such as wind patterns, deposition, and stability classes. Accordingly, Criteria pollutants i.e. particulate matters (i.e., $PM_{2.5}$, PM_{10}, and SPM), SO_2, NO_2, CO, and O_3 were considered for air quality monitoring in accordance with the monitoring plan of EIA study. In this connection, the Continuous Ambient Air Quality Micro-Monitoring Station (caaqMMS- AirSENCE) was used to collect the ambient air quality data during the monitoring period, measuring gaseous pollutants (NO_2, CO, O_3, SO_2) and particulate matter (PM_{10} and $PM_{2.5}$) at the selected locations.

2.1.2 Pollution Sources in the Sundarbans

The Significant contributors to air pollution in the study area consist of Port activities at Mongla Sea Port area which involve ship loading-unloading & cargo handling, operation and other activities within the MSTPP area, emissions from cement factories, petrochemical plants, other industrial activities engaged in material processing, clinker handling, vehicular movements, massive construction activities, and vessel (regulated and non- regulated) movements along the Passur river from Chalna to Hiron point. These sources contribute significant quantities of air pollutants, including particulate matter ($PM_{2.5}$, $PM_{10,}$ and SPM), SO_2, NO_2, and greenhouse gases (GHGs) to the airshed of the region. An inventory of the existing emission types and sources for the study area is provided in **Table A2** of **Appendix IV**.

2.1.3 Monitoring Locations

Air quality monitoring sites were selected based on receptor sensitivity, project activities (e.g., coal vessel movement, coal trans-shipment, power generation), and atmospheric conditions such as wind patterns, deposition, and stability classes. The selection criteria also considered the DoE guidelines, pollution sources, and expert judgment to ensure representative coverage of the study area. **Table 2.1** provides details on each site, including coordinates, frequency, and monitoring methods. The field monitoring activities are shown in **Figures 2.1** and the locations of monitoring sites within the study area are shown in **Figure 2.2**, respectively.

Table 2.1: Air Quality Monitoring Plan

Sl. No.	Monitoring Indicators	Location ID	Locations	Coordinates	Frequency	Methods/Tools/ Techniques
1	Particulate Matter (PM2.5, PM10, and SPM) SO2, NO2, CO and O3.	AQ-01	Stack point	89°33'36.62"E; 22°35'31.00"N	Each Quarter of the year	Continuous Ambient Air Quality Micro-Monitoring Station (caaqMMS). AirSENCE provides Concentrations for gaseous pollutants including NO, NO2, CO, O3, SO2, VOC, H2S, and CO2 in addition to all particulate matter fractions such as PM10, PM2.5, and PM1. Local weather and environmental data, such as wind speed and direction, noise, rainfall, and light.
2		AQ-02	1 km towards windward direction (Maidara for winter)	89°34'0.34"E; 22°35'11.33"N		
3		AQ-03	2 km towards windward direction	89°34'9.82"E; 22°34'33.40"N		
4		AQ-04	4 km towards windward direction	89°34'45.72"E; 22°33'37.64"N		
5		AQ-05	Coal stockyard	89°33'26.13"E; 22°35'17.08"N		
6		AQ-06	Ash Disposal point	89°33'21.42"E; 22°35'2.00"N		
7		AQ-07	Mongla port area	89°35'36.95"E; 22°29'22.97"N		
8		AQ-08	Khulna City	89°33'15.93"E: 22°48'5.51"N		
9		AQ-09	Nearest point of Sundarbans_1 (Sutarkhali)	89°29'25.34"E: 22°29'52.52"N		
10		AQ-10	Nearest point of Sundarbans_2 (Dhangmari)	89°34'57.79"E; 22°27'2.79"N		
11		AQ-11	Harbaria	89°36'47.70"E; 22°17'55.91"N		
12		AQ-12	Akram Point	89°30'40.28"E:22° 0'51.24"N		
13		AQ-13	Koyra	89°17'7.56"E: 22°20'57.32"N		
14		AQ-14	Sarankhola	89°48'36.71"E: 22°12'47.15"N		





Source: Field Survey, January-February, 2026

Figure 2.1: Acquisition of Ambient Air Quality Monitoring

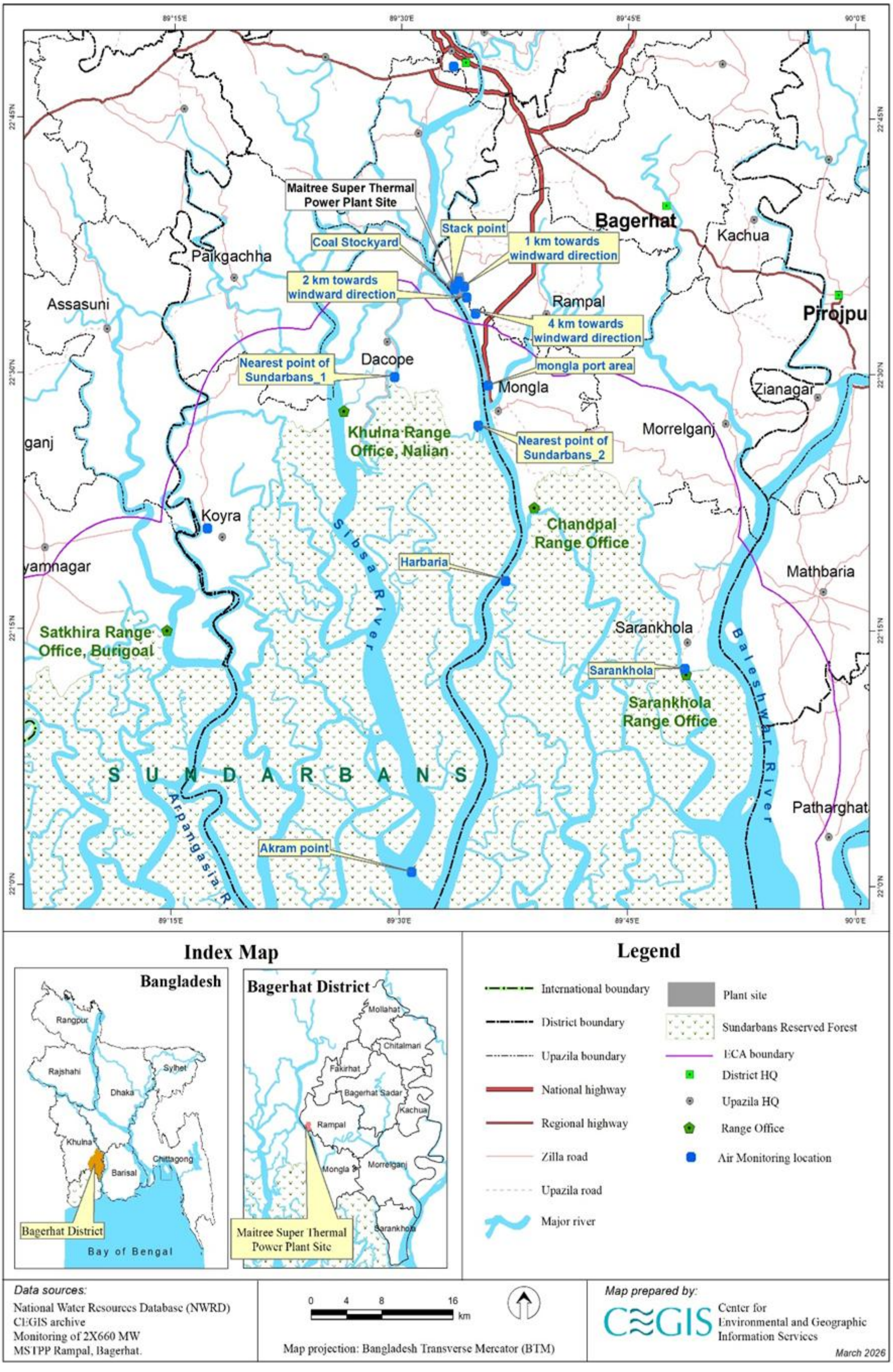

Figure 2.2: Air Quality Monitoring Locations

2.1.4 Status of Air Quality

Thirteen out of fourteen monitoring stations $PM_{2.5}$ successfully complied with the APCR, 2022 limit. The lowest concentrations were recorded at AQ-01 (21.7 µg/m³). Notably, Station AQ-08 (Khulna city area) recorded an excursion at 67.52 µg/m³, exceeding the regulatory standard by approximately by 3.8% indicated that the site confronted localized fugitive emissions or specific wind-induced concentrations. On the other hand, the measured values of PM_{10} range from a clean 31.47 µg/m³ (AQ-01) to a maximum of 87.32 µg/m³ (AQ-08), maintaining a comfortable safety buffer below the threshold. The Suspended Particulate Matter (SPM) showed the highest recorded value was 54.84 µg/m³ at AQ-08, while the lowest was 53.17 µg/m³ at AQ-01 which completely complied with the ECR, 1997 limit of 200 µg/m³.

Sulfur Dioxide (SO_2) levels were found exceptionally low across all points, ranging from 2.68 µg/m³ (AQ-14) to13.12 µg/m³ (AQ-10). These figures sit far below the maximum allowable standard of 80 µg/m³ verifying that the project's impact regarding ambient sulfur loading is minimal. Similarly, Nitrogen Dioxide (NO_2) follows a safe profile similar to SO_2. The values range between 4.35 µg/m³ (AQ-10) and 15.48 µg/m³ (AQ-08), representing less than 20\% of the national 24-hour standard of 80 µg/m³. Carbon Monoxide (CO) concentrations were also recorded to be negligible, hovering between a minimum of 0.2 mg/m³ (AQ-12/AQ-13) and a maximum of 0.523 mg/m³ (AQ-08). Likewise, the observed 8-hour concentrations of Ozone O3 varied between 9.86 µg/m³ (AQ-14) and 26.62 µg/m³ (AQ-06), well within the safe boundary of the 100 µg/m³ standard.

During the 47th monitoring program, the Particulate Matter distribution showed a notable spatial variation across the monitoring network, reflecting localized micro-meteorological and anthropogenic influences. Station AQ-08 (Khulna city area) consistently recorded the highest concentrations for almost all parameters. This indicates that it sits in a pollution zone with heavy industrial, and traffic movement activities. Conversely, AQ-01 and AQ-14 represented a highly compliant areas, reflecting minimal environmental loadings. Following **Table 2.2** outlined the 4th quarterly monitoring results.

Table 2.2: Air Quality Monitoring Parameters and Observed Data (47th Quarterly Program)

Location	Parameters						
	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	SPM (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)	CO (mg/m³)	O_3 (µg/m³)
AQ-01	21.7	31.47	53.17	3.1	6.38	0.21	22.76
AQ-02	33.64	44.68	78.31	4.24	6.35	0.3	12.62
AQ-03	41.47	55.09	96.55	3.76	8.1	0.26	22.66
AQ-04	61.09	79.51	140.6	5.96	9.31	0.41	21.31
AQ-05	62.92	81.93	144.85	4.66	8.66	0.44	24.22
AQ-06	59.26	76.75	136.02	4.35	8.51	0.34	26.62
AQ-07	25.27	36.99	62.26	3.41	7.62	0.31	16.97
AQ-08	**67.52**	87.32	154.84	6.62	15.48	0.523	23.01
AQ-09	36.15	48.63	84.78	3.25	8.8	0.24	13.64
AQ-10	30.88	40.66	71.54	13.12	4.35	0.36	18.43
AQ-11	42.27	54.76	97.03	6.87	8.01	0.29	16.33
AQ-12	43.82	56.11	99.93	6.15	6.84	0.2	10.88
AQ-13	37.41	47.13	84.55	4.1	7.23	0.2	15.61
AQ-14	35.89	45.71	81.6	2.68	5.78	0.36	9.86
Standard * (APCR, 2022)	**65 (24 hrs)**	**150 (24 hrs)**	**200 (ECR'97)**	**80 (24 hrs)**	**80 (24 hrs)**	**5 (8 hrs)**	**100 (8 hrs)**

Source: Field survey; January-February 2026; Standard- Air Pollution (Control) Rules, 2022*

Cluster Analysis

The dendrogram reveals two distinct macro-atmospheric environments separated at a high linkage distance (~78), cleanly dividing a heavily influenced or localized pollution zone on the right from a broader regional baseline airshed on the left. The highly isolated right cluster (AQ-04, AQ-05, AQ-06, AQ-08) likely represents monitoring stations positioned near intense, localized emission sources such as industrial stacks, brick kilns, or dense traffic corridors, where pollutant concentrations fundamentally differ from the rest of the study area. Conversely, the massive left cluster indicates a shared regional background air quality, where stations within close sub-clusters such as the tightly paired AQ-09/AQ-13 and AQ-02/AQ-14 (linking < 5) experience nearly identical particulate matter or gaseous profiles, pointing to high spatial correlation and potential redundancy in the monitoring network.

Meanwhile, stations AQ-01 and AQ-07 form an isolated pair within this baseline group, signaling a unique shared micro-environment or a specific upwind point-source impact that sets them apart around a distance of 37. Minor internal branching among intermediate stations like AQ-03, AQ-11, and AQ-12 captures subtle gradients in dispersion, likely driven by localized wind patterns, seasonal variations, or topography. Ultimately, this spatial clustering proves that emissions from the industrial-heavy right zone remain relatively contained or geographically restricted from mixing into the cleaner regional airshed on the left, offering a clear data-driven roadmap for targeted emission control strategies and air quality monitoring network optimization (**Figure 2.3**).

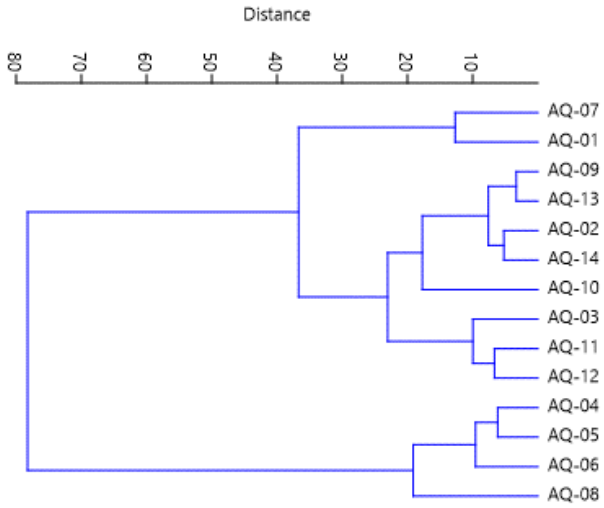

Figure 2.3: Dendrogram of the Monitoring Stations using Euclidean Distance

2.2 Noise Quality

Noise is the that is not wanted by the perceiver, because it is unpleasant, loud, or interferes with hearing. In general point of view, noise is the chaotic feeling of sound where many sound waves are mixed and difficult to distinguish a single signal. Noise is described by a weighted sound intensity (or level), and is measured in units called decibels (dBA).

2.2.1 Methodology

The noise level monitoring activities are shown in **Figure 2.4**. Each time, noise levels were recorded using noise level meter for fifteen minutes of time span and the noise level machine was properly set up and calibrated following the instruction manual. On the other hand, the monitoring locations were selected considering the sensitivity of the nearest receptors and accordingly, 07 (seven) sites were

selected in and around the Project area, 05 (five) sites were designated inside the Sundarbans Reserve Forest Area (**Figure 2.5**). The description of the monitoring locations is mentioned in **Table 2.3**.



Figure 2.4: Ambient Noise Acquisition in Study Area

Table 2.3: Noise level monitoring locations

Sl. No.	Monitoring locations	GPS points	Method
1	Within 100 meters of the plant	89°33'47.20"E; 22°35'32.44"N	Noise levels were recorded with KANOMAX-4431 equipped with highly sensitive electret condenser microphone
2	Immediate outside of the project boundary	89°33'47.67"E; 22°35'17.26"N	
3	1 km Northern	89°33'10.15"E; 22°35'59.31"N	
4	1 km Southern	89°34'7.40"E; 22°35'8.37"N	
5	1 km Eastern	89°33'54.75"E; 22°36'6.29"N	
6	1 km Western	89°33'23.93"E; 22°35'8.32"N	
7	Nearest point-2 (Dhangmari)	89°34'58.71"E; 22°27'11.12"N	
8	Nearest point-1 (Sutarkhali)	89°29'22.11"E; 22°29'48.58"N	
9	Nearest point (Karamjal)	89°35'30.94"E; 22°25'41.53"N	
10	Beside sibsa (Akram Point)	89°26'54.28"E; 22°24'26.15"N	
11	Harbaria, Sundarbans	89°35'34.2"E 22°17'43.1"N	
12	Hiron Point, Sundarbans	89°27'53.2"E21°46'27.60"N	

Noise sources in the Study Area

Among the sources of noise generation, engine boats, trawlers, small barges, ships plying along the waterways, birds' chirping, stormy wind, falling leaves from the trees, and the wave breaking sound were the primary sources of noise generation, in and around the Sundarbans. On the other hand, construction activities, the urban and rural vehicles, i.e., buses, trucks, local human haulers, auto-rickshaws, motorized vans, motorbikes, etc., were much more noticeable around the project area.

2.2.2 Status of Noise

In order to provide an overview, the noise levels for the respective locations have been appended in **Table 2.4** for ready reference; but the detailed chronological noise level data have been attached in **Table C1, C2, C3**, **C4, C6, C7, C8, C9, C10, C11, and C12** respectively in **Appendix IV**. According to Bangladesh Noise Pollution Control Rules (2025), the twelve monitored locations fall under different classified area like residential, commercial, mixed, silent and industrial class.

The level of noise at within 100 meters from the plant (Industrial area) located to the north-west direction of the chimney location was recorded as 62.04 dB whereas its standard level is 75 dB (**Table: 2.4**). Levels of noise were recorded as at Immediate outside of the project boundary situated just near the power plant main gate (an industrial area located at north-west corner of the project area), at Northern (49.23 dB) & at Eastern (45.26) located at 1km the north-west & the north-east direction from the chimney location and at Southern (50.60) & at Western (42.09) at 1 km the south-east & the south-west corner of the project area. The recorded noise levels did not exceed their corresponding standard limit. On the other hand, noise levels at the Nearest points of Sundarbans (Dhangmari, Sutarkhali and Karamjol (silent zone) were recorded as 43.65 dB, 37.33 dB, and 43.25 dB respectively that denotes, the levels of noise didn't cross their corresponding standard value (50 dB) in these location (**Table: 2.4**). Harbaria (45.76 dB), Besides Shibsha (Akram Point) (37.69 dB) and Hiron point (40.68 dB) were found to comply with the standard limit of noise level (std. 50 dB). The variations in observed noise levels at the selected locations are shown in **Figure 2.5**.

Table 2.4: Noise levels for the respective locations

Sl. No.	Location ID	Location	QM-47 (Jan-26)	Std* (dB)
1	ML-1	Within 100 meters of the plant	62.04	**75**
2	ML-2	Immediate outside of the project boundary	51.56	**75**
3	ML-3	1 KM Northern (Shapmari)	49.23	**60**
4	ML-4	1 KM Southern	50.60	**75**
5	ML-5	1 KM Eastern	45.26	**55**
6	ML-6	1 KM Western	42.09	**75**
7	ML-7	Nearest point-2 (Dhangmari)	43.65	**50**
8	ML-8	Nearest point-1 (Sutarkhali)	37.33	**50**
9	ML-9	Nearest point-3 (Karamjal)	43.25	**50**
10	ML-10	Beside Sibsa (Akram Point)	37.69	**50**
11	ML-11	Harbaria, Sundarbans	45.76	**50**
12	ML-12	Hiron Point, Sundarbans	40.68	**50**

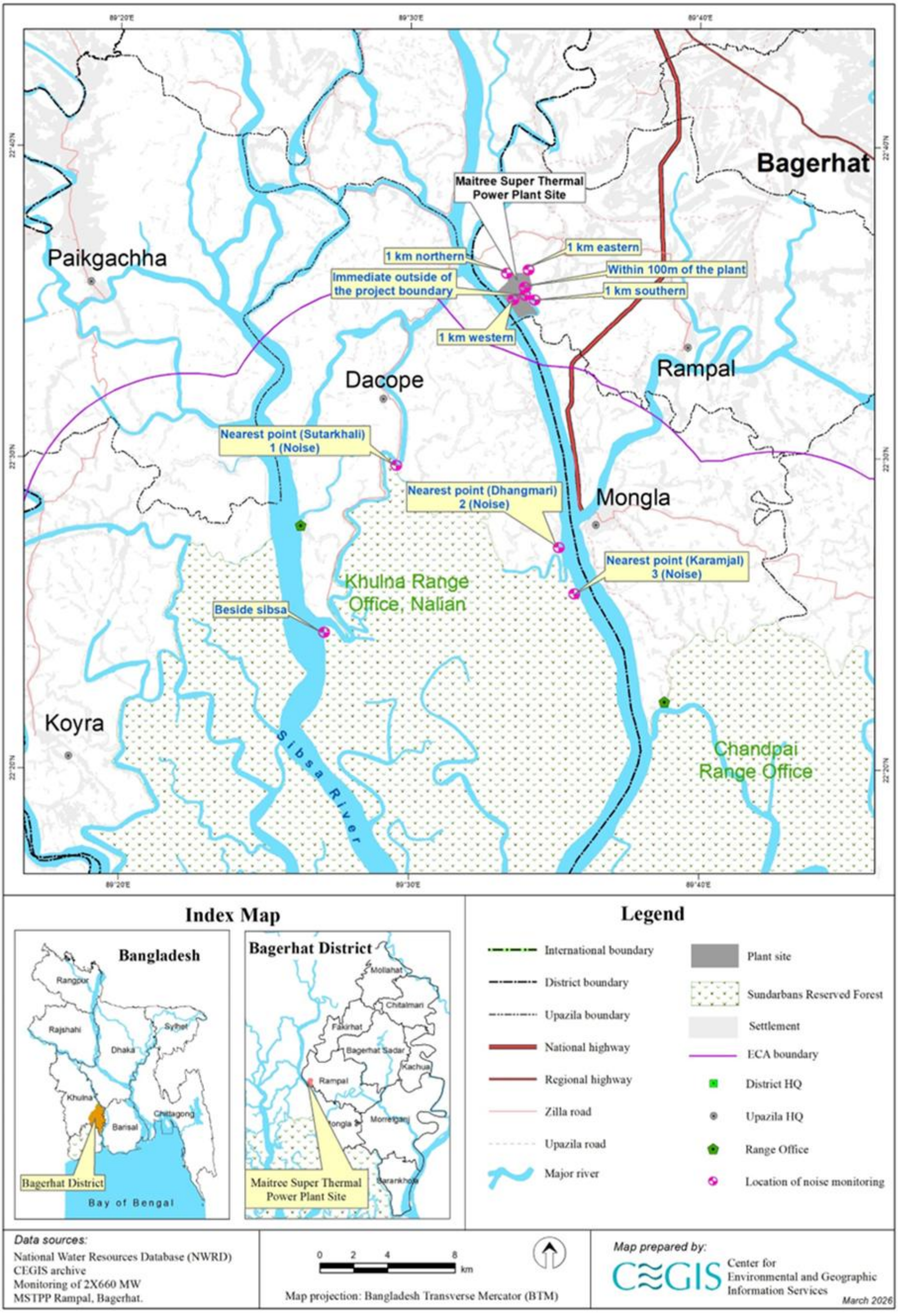

Figure 2.5: Noise Level Monitoring Locations



Figure 2.6: Observed Noise Level at different monitoring locations

2.3 Water Quality

This section provides a cross-sectional assessment of surface water quality of Passur, Sibsa, and Bhola river concerning significantly the MSTPP & it's adjacent area, Mongla port area, and Sundarbans Reserve Forest area during both the Ebb tide and Flood tide. Additionally, the report evaluates groundwater quality within the Project site and nearby areas too. Water quality monitoring data, including chemical analyses from the 46th quarterly monitoring conducted in October-November 2025, are reported, along with the in-situ and physical sampling results from the 47th Quarterly monitoring carried out in January-February 2026. The water quality parameters (Surface water and Groundwater) are being assessed to understand the water suitability for community consumption, aquatic lives, and the Sundarbans Forest Health ecosystem.

2.3.1 Methodology

The sampling locations were selected to effectively determine their impact on the surrounding ecosystems related to land development, construction, and the operation of MSTPP. In this context, water quality parameters, sampling frequency, and evaluation criteria have been established according to the conditions set by DoE and the guidance as per ECR, 2023. The selected water quality monitoring locations for both surface and groundwater are shown in **Figure 2.6**. Details of the monitoring plan, including sampling locations, geographical coordinates, frequency, and analysis techniques for surface and groundwater, are outlined in **Tables 2.5** and **Table 2.6** respectively.

Table 2.5: Groundwater Quality Monitoring Plan

Sl. No.	Monitoring Parameters	Locations	Coordinates		Frequency	Methods/Monitoring Indicators/ Techniques
			Latitude	Longitude		
1	pH, Temperature, Salinity, DO, TDS, TH, TSS, COD, Nitrate, Sulphate, Phosphate, Arsenic, Lead, Mercury	Project Site	22°35'53.84"N	89°33'44.37"E	Quarterly	Horiba U-50 multimeter were used for in-situ testing of physical water quality parameters. For inorganic, non-metallic, aggregate organic, and metal quality, sample preservation and laboratory analysis were done at BCSIR.
2		Rajnagar	22°36'51.45"N	89°34'37.63"E		
3		Kapasdanga	22°37'19.99"N	89°33'42.11"E		
4		Kalekharber	22°35'56.08"N	89°35'9.92"E		

Table 2.6: Surface Water Quality Monitoring Plan

Sl. No.	Monitoring Parameters	Sampling Locations	Coordinates		Frequency	Methods/Tools/ Techniques
			Latitude	Longitude		
1	pH, Temperature, Salinity, DO, TDS, TH, TSS, COD, Nitrate, Sulphate, Phosphate, Arsenic, Lead, Mercury, Oil & Grease	Left bank of the Passur River at 500m U/S from the effluent discharge point	22°35'7.31"N	89°33'6.36"E	Quarterly	Horiba U-50 multimeter were used for in-situ testing of physical water quality parameters. For inorganic, non-metallic, aggregate organic, and metal quality, sample preservation and laboratory analysis were done at BCSIR
2		Middle of the Passur River at 500 m U/S of the from the effluent discharge point	22°35'1.63"N	89°32'56.55"E		
3		Right bank of the Passur River at 500m U/S from the effluent discharge point	22°34'55.72"N	89°32'46.38"E		
4		Left bank of the Passur River at 500m D/S from the effluent discharge point	22°34'41.95"N	89°33'28.07"E		
5		Middle of the Passur River at 500m D/S from the effluent discharge point	22°34'35.92"N	89°33'17.64"E		
6		Right bank of the Passur River at 500m D/S from the effluent discharge point	22°34'29.39"N	89°33'8.12"E		
7		Left bank of the Passur River at 100m u/s from the project plant	22°35'26.75"N	89°32'47.54"E		
8		Middle of the Passur River at 100 m u/s from the projet plant	22°35'21.54"N	89°32'38.23"E		
9		Right bank of the Passur River at 100m u/s from the project plant	22°35'13.90"N	89°32'28.21"E		
10		Left bank of the Passur river at 100m d/s from the project plant	22°34'55.15"N	89°33'18.01"E		

Sl. No.	Monitoring Parameters	Sampling Locations	Coordinates		Frequency	Methods/Tools/ Techniques
			Latitude	Longitude		
11		Middle of Passur River at 100m d/s from the project plant	22°34'48.83"N	89°33'8.78"E		
12		Right bank of Passur river at 100m d/s from the project plant	22°34'41.89"N	89°32'57.20"E		
13		Left bank of Passur River at Maidara river area	22°34'30.23"N	89°33'33.91"E		
14		Middle of Passur River at Maidara river area	22°34'24.09"N	89°33'24.97"E		
15		Right bank of Passur River at Maidara river area	22°34'17.67"N	89°33'15.99"E		
16		Left bank of Passur River at Mongla port	22°29'19.80"N	89°35'24.63"E		
17		Middler of Passur River at Mongla port	22°29'19.92"N	89°35'10.59"E		
18		Right bank of Passur River at Mongla port	22°29'19.85"N	89°34'58.35"E		
19		Left bank of Passur River at Karamjal area	22°25'57.77"N	89°36'28.29"E		
20		MIddle of Passur River at Karamjal area	22°25'48.97"N	89°36'0.70"E		
21		Right bank of Passur River ar Karamjal area	22°25'44.74"N	89°35'36.32"E		
22		Left bank of Passur River at Harbaria area	22°17'55.50"N	89°36'46.20"E		
23		Middle of Passur River at Harbaria area	22°18'4.86"N	89°36'31.23"E		
24		Right bank of Passur River at Harbaria area	22°18'16.14"N	89°36'12.11"E		
25		Left bank of Sibsa river relatively middle of Sundarbans	22° 5'42.55"N	89°31'27.68"E		
26		Middle of Sibsa river relatively middle of Sundarbans	22° 5'27.86"N	89°30'57.61"E		
27		Right bank of Sibsa river relatively of inside Sundarbans	22° 5'18.91"N	89°30'30.22"E		
28		Left bank of Passur River at Confluence point of Sibsa at Akram Point	22° 1'0.37"N	89°30'31.60"E		
29		Middle of Passur River at Confluence point of Sibsa at Akram Point	22° 1'18.40"N	89°30'6.65"E		
30		Right bank of Passur River at Confluence points of Sibsa at Akram Point	22° 1'43.31"N	89°29'44.27"E		
31		Left bank of Passur and Sibsa river confluence at Akram point	21°59'0.55"N	89°33'4.22"E		
32		Middle of Passur and Sibsa river confluence at Akram point	21°59'4.33"N	89°31'25.74"E		
33		Right bank of Passur and Sibsa river confluence at Akram point	21°59'4.97"N	89°29'33.43"E		
34		Left bank of Passur River Hiron point	21°49'0.70"N	89°31'48.91"E		

Sl. No.	Monitoring Parameters	Sampling Locations	Coordinates		Frequency	Methods/Tools/ Techniques
			Latitude	Longitude		
35		Middle of Passur river Hiron point	21°48'58.94"N	89°30'15.69"E		
36		Right bank of Passur river Hiron point	21°48'56.49"N	89°28'24.68"E		
37		Left bank at Confluence point of Deluti, Habarkhali river to Sibsha	22°30'20.09"N	89°25'28.12"E		
38		Middle at Confluence point of Deluti, Habarkhali river to Sibsha	22°30'15.30"N	89°25'3.27"E		
39		Right bank at Confluence points of Deluti, Habarkhali river to Sibsha	22°30'8.16"N	89°24'38.41"E		
40		Left bank of Bhola River at Sharankhola area	22°12'31.52"N	89°48'36.14"E		
41		Middle of Bhola River at Sharankhola area	22°12'31.00"N	89°48'32.65"E		
42		Right bank of Bhola River at Sharankhola area	22°12'30.61"N	89°48'28.56"E		

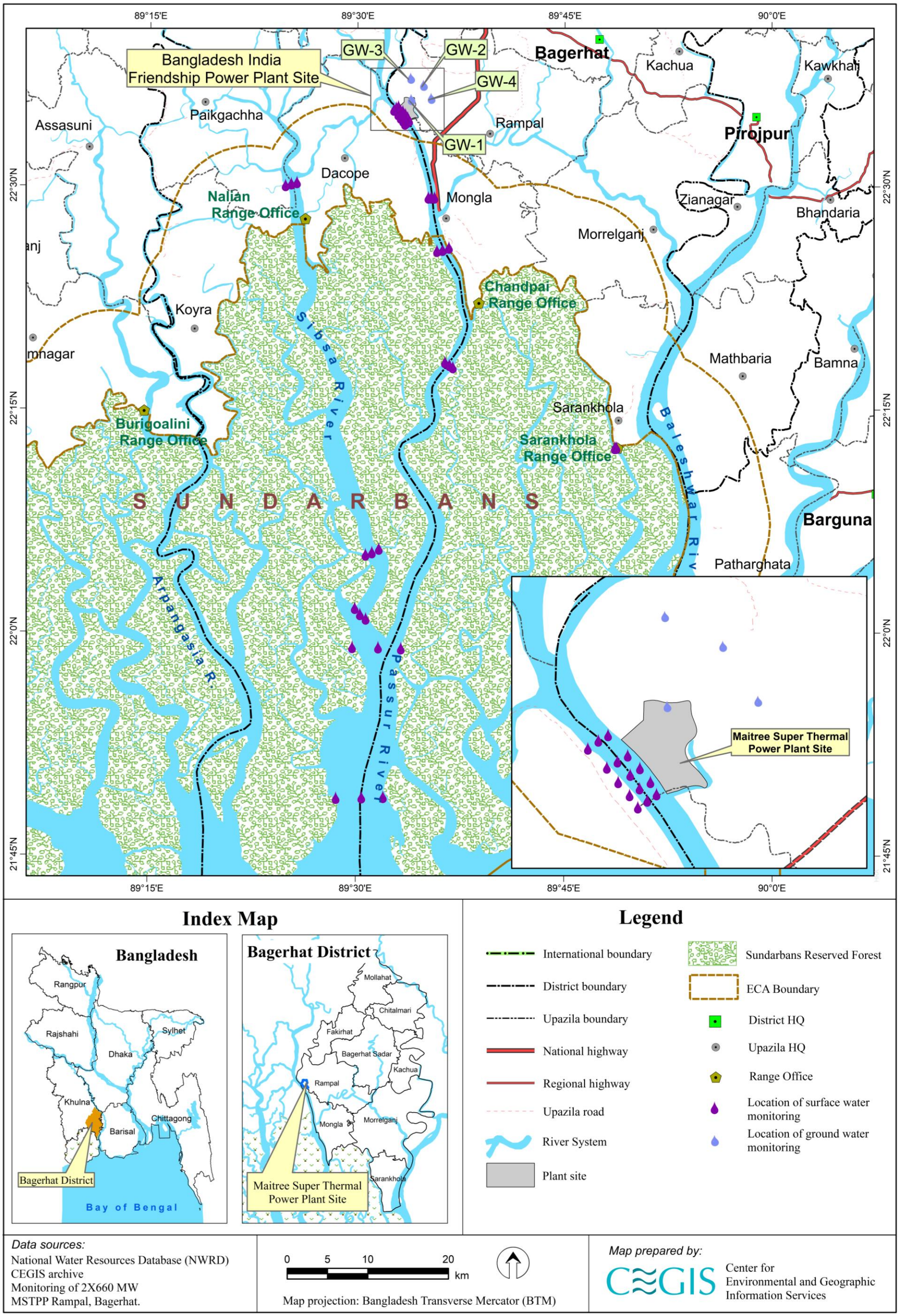

Figure 2.7: Surface Water and Groundwater Quality Monitoring Location

2.3.2 Water Quality Parameter Analysis Techniques/Methods

Water quality parameters were analyzed according to the American Public Health Association (APHA) procedure and standard as Practiced in Laboratory. The analytical methods for different parameters and standards are given in **Table 2.7.**

Table 2.7: Testing Methodology and Standards of Water Quality Parameter

Parameters	Methods/Measuring Tools	Unit	ECR, 2023 (Surface water)	ECR, 2023 (Groundwater)
Temperature	Horiba U-50 multi-meter	^{0}C	N/A	20-30
pH	Horiba U-50 multi-meter	-	6.5-8.5 (Natural area) 6.5-9.0 (Industrial area)	6.5-8.5
TDS	Horiba U-50 multi-meter	ppm or mg/L	N/A	1000
TSS	Horiba U-50 multi-meter	ppm or mg/L	25 (Natural area), 100 (Industrial area)	10
Salinity	Horiba U-50 multi-meter	ppt	N/A	N/A
DO	Horiba U-50 multi-meter	ppm or mg/L	≥5 (Natural area), ≥4 (Industrial area)	N/A
COD	Closed Reflux Method	ppm or mg/L	8 (Natural area), 5(Industrial area)	N/A
Total Hardness (as $CaCO_3$)	Titrimetric	ppm or mg/L	N/A	500
BOD	Closed Reflux Method	ppm or mg/L	N/A	N/A
Nitrate (NO_3^-)	UV-VIS Spectrophotometers	ppm or mg/L	0.3 (Natural area), 1.0 (Industrial area)	45
Arsenic (As)	Atomic Absorption Spectrophotometers–Hydride Vapor Generating (AAS-HVG)	ppm or mg/L	0.001(Natural area), 0.003 (Industrial area)	0.05
Lead (Pb)	Atomic Absorption Spectrophotometers–Graphite Furnace (AAS-GF)	ppm or mg/L	0.05 (Natural area)	0.01
Mercury (Hg)	Mercury Analyzer	ppm or mg/L	0.0001(Natural area), 0.0001(Industrial area)	0.001

Surface Water Quality Parameters

The selected surface water quality parameters include Temperature, pH, Dissolved Oxygen (DO), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Hardness, Salinity, Nitrate (NO_3^-), Heavy Metals (As, Pb, Hg. The parameters are categorized into four (04) groups:

- Physical and aggregate properties, i.e., pH, Temperature, Salinity, Hardness, TDS, TSS;
- Inorganic non-metallic constituents i.e., DO, NO_3^-, $^-$;
- Aggregate organic constituents, i.e., COD;
- Heavy metals, i.e., As, Pb, and Hg.

Groundwater quality parameters

The selected groundwater quality parameters for monitoring include pH, Temperature, Dissolved Oxygen (DO), Total dissolved solids (TDS), Total Hardness (TH), Chemical Oxygen Demand (COD), Salinity, Nitrate (NO_3^-), and Heavy Metals (As, Pb, Hg).

2.3.3 Sampling Procedure

As per the monitoring plan of EIA during operation phase, the samples were collected from 42 locations instead of 15 locations collected during the construction phase of the project. Tidal variations highly influence the surface water sampling locations in the study area. Hence, temporal and spatial variations of tides were considered during surface water sampling. The surface water samples were collected 30-50m away from both the riverbank and in the middle of the river to collect 3 samples during the ebb tides and 3 samples during the flood tides at each location to ensure the cross-sectional assessment of water quality of river water of a certain site. On the other hand, groundwater samples were collected from 4 locations after 8-10 minutes of pumping. The water sample collection and in-situ testing of water quality parameters are shown in **Figure 2.8**. However, all samples were preserved according to the standard protocol.



Source: Field Survey, January-February 2026.

Figure 2.8: Monitoring activities of water quality parameters

2.3.4 Water Quality Reporting Arrangement

The water quality status of the adjacent water bodies of MSTPP and the tip to the end of the Sundarbans Reserve Forest (SRF) has been observed since April 2014. During the operation phase the water quality of two more River system has been included i.e. Sibsa and Bhola River. To do so, all sampling points has been clustered in 7 different sampling regim, considering the sampling points' homogeneous characteristics and the type of ecosystem touching the sample points. The monitoring sites and the explanation of the clusters are presented in the following T**able 2.8.**

Table 2.8: Monitoring Sites and Characteristics

Sl. No.	Monitoring Sites	Site Characteristics
(a)	Power plant & adjacent areas	In these monitoring areas, 15 surface water sampling points were selected, and the values were averaged to represent the water quality status of the power plant's adjacent surface water bodies i.e the Passur River. These 15 sampling points are situated beside the MSTPP boundary in the Passur exhibiting similar characteristics, which is also supported by previous monitoring results indicating the same water chemistry. Therefore, this study presents the clusters in a more explainable and understandable way to reflect the water quality status of the areas.
(b)	Mongla port area	This monitoring site is located around11 km downstream from the MSTPP discharge point. This area is highly influenced by the Mongla port activities which includes pilotage (navigating ships through difficult waters), tugboat assistance, dredging shipping channels, managing vessel traffic, and securing berths, ship-to-shore cranes to move containers & bulk materials, Warehousing & Storage, refuelling ships, providing fresh water, managing waste disposal, and performing necessary ship repairs while docked. .
(c)	Harbaria	The Harbaria site is located about 33 km downstream from the Project site-, within the Sundarbans Reserve Forest. It functions as a designated lightering point for mother vessels transporting clinker, coal, LPG gas and other goods.
(d)	Akram point	Akram Point is located about 35 km downstream from Harbaria Point. It sits on the bank of the Sibsa River, just before it joins the Passur River at Sibsa Point. The area is entirely dominated by a deep forest and estuarine ecosystem.
(e)	Hiron Point	Hiron Point is the most distant point in this surface water monitoring scheme, located 25 km downstream from Akram Point. The site is completely exposed to the Bay of Bengal and features dense forests as well as marine habitats.
(f)	Sibsa River at Deluti confluence area, relatively middle of Sundarbans area, and confluence point at Akram point area	The Sibsa River water runs (through these sites) roughly parallel to the Passur River, situated to its west. It is deeply integrated into the same macro-tidal ecosystem and is linked to the Passur through an intricate system of cross-channels and tidal creeks.
(g)	Bhola River at Sharankhola area	The Project site is located roughly 50 km northwest of Sharankhola on the Passur River, the internal tidal networks of the Sundarbans link these systems. The Passur and the Bhola/Baleswar systems interact via cross-connecting channels (khals) and shared tidal surges from the Bay of Bengal.

2.3.5 Monitoring Results

Status of Surface Water Quality

Parameters Tested In-situ

This section presents the in-situ tested results of water quality parameters obtained during the 47th monitoring program (January-February 2026).

The pH value is an indicator of water quality parameters because it affects the biological and chemical processes in the water. The pH of the monitoring sites during high and low tides ranged from 6.91-8.3 in flood tide and 6.4-8.4 in ebb tide (**Figure 2.9**). The highest and lowest pH was obtained in Right bank of Bhola River at Sharankhola area (SW-42) and middle of Passur River at Karamjal area (SW-20) at ebb tide respectively. On the other hand, temperature ranged from 26.3^{0}C to 21.7^{0}C during flood tide and 27.3^{0}C to 21.1^{0}C during ebb tide (**Figure 2.10**). The highest temperature was observed at the Left bank of Sibsa river relatively middle of inside Sundarbans area (SW-25) during the ebb tide (27.3 ^{0}C). There is no significant difference in that temperature values due to the same weather condition during the measurement time. Generally, many factors such as sampling time, location, and weather conditions influence the rise or decline of temperature by which its role impacts the dissolved oxygen and other parameters in water but the biggest source of surface water heating comes from solar radiation[1]. Therefore, the high temperature might be obtained as the measurement was conducted in the daytime when the intensity of sunlight was high. All observed dataset has been appended in **Table B.5 of Appendix- IV**

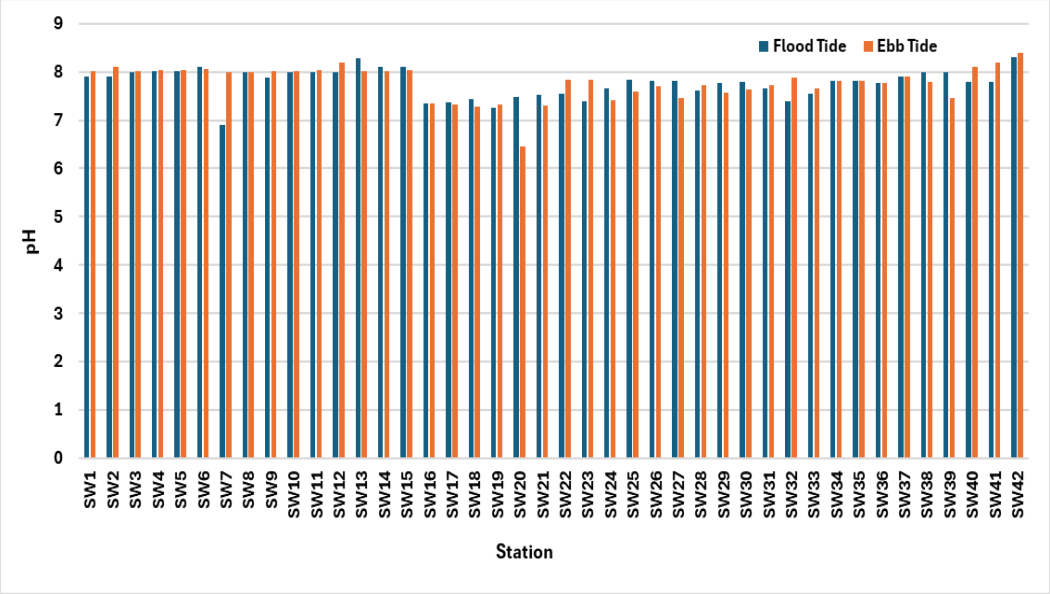

Figure 2.9: Variations in pH among the sites

[1] Boyd, C. E. (2020). Solar radiation and water temperature. In *Water Quality* (pp. 21–39).

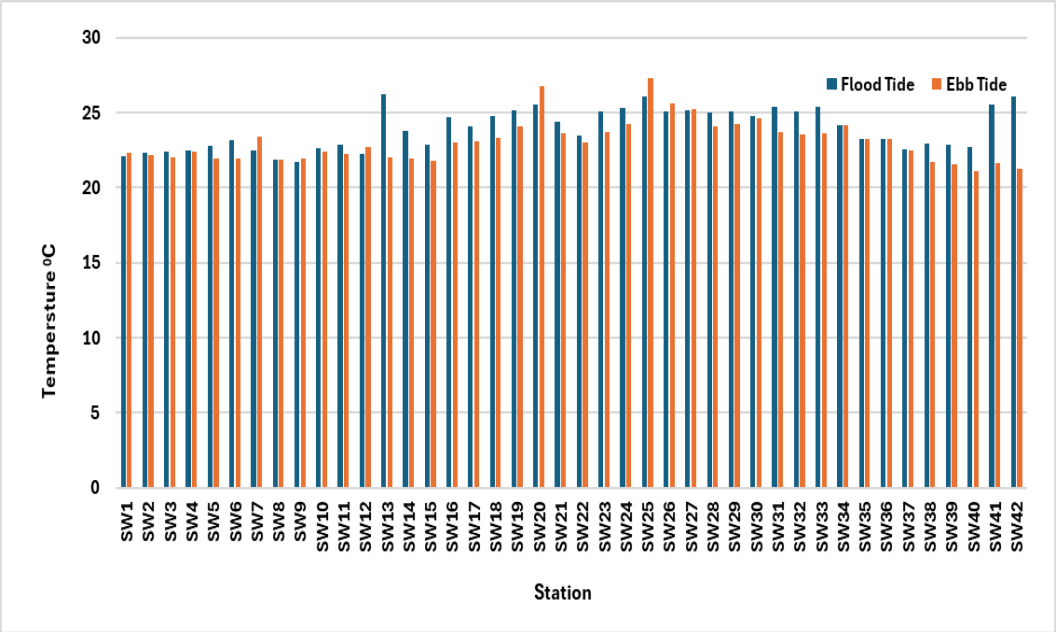

Figure 2.10: Variations in Temperature among the sites

The DO in the monitoring sites during flood and ebb tides are presented in **Figure 2.11**. DO values ranged from 4.3-8.8 mg/l and 4.9-10.2 mg/l during the flood and ebb tides respectively. However, the DO value was found higher in ebb tide than flood tide which might be the reason of colder freshwater influx, stronger atmospheric aeration from outgoing water movement[1]. However, the DO concentration in the monitoring site almost meets the national water quality standards ECR, 2023. Similarly, the salinity ranged from 0.3-10.5 ppt at flood tide and 0.5-10.5 at ebb tide (**Figure 2.12**). The highest salinity was found at Left bank of Passur River at Hiron point (SW34) during the monitoring period. The lowest salinity was observed in Middle and Right bank of Bhola River at Sharankhola area during flood tide and ebb tide. The reason behind the lowest salinity might be influenced by more inland freshwater input from upstream, and rainfall. Weaker tidal intrusion and narrower channels limit seawater entry, keeping salinity low in this River. The highest salinity was recorded at Hiron point because this site is closer to the Bay of Bengal comparing the other sites, where strong tidal action, and upsurged saline seawater is predominant. All observed dataset has been appended in **Table B.5 of Appendix- IV**

[1] Rouf, M. A., Islam, M. J., Roknuzzaman, M., Siddique, M. N., & Golder, M. R. (2022). Vertical profile of dissolved oxygen and associated water variables in the Pasur-Rupsha estuary of Bangladesh. *Heliyon*, *8*(10), e10935

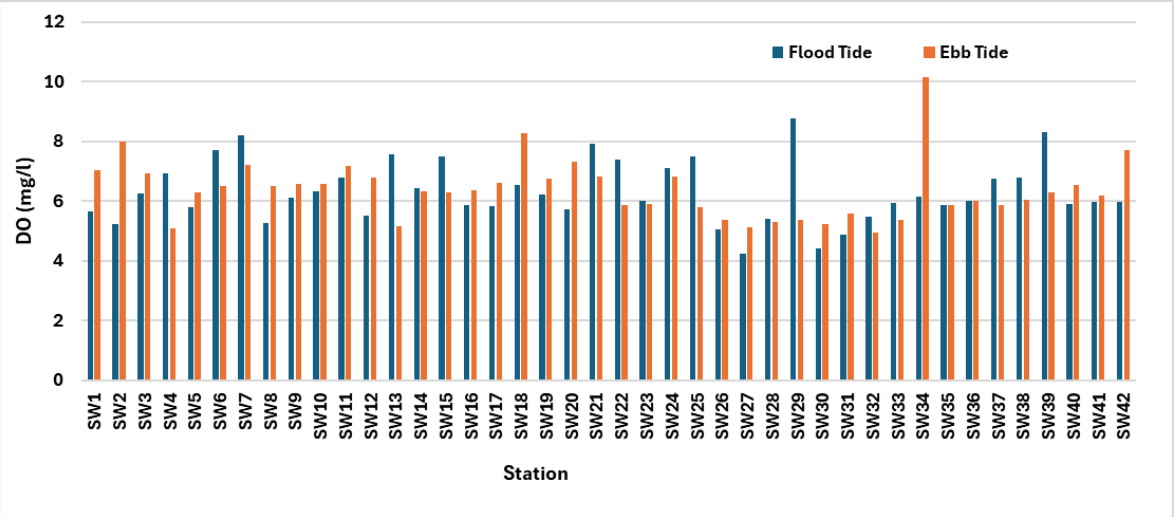

Figure 2.11: Variations in DO among the sites

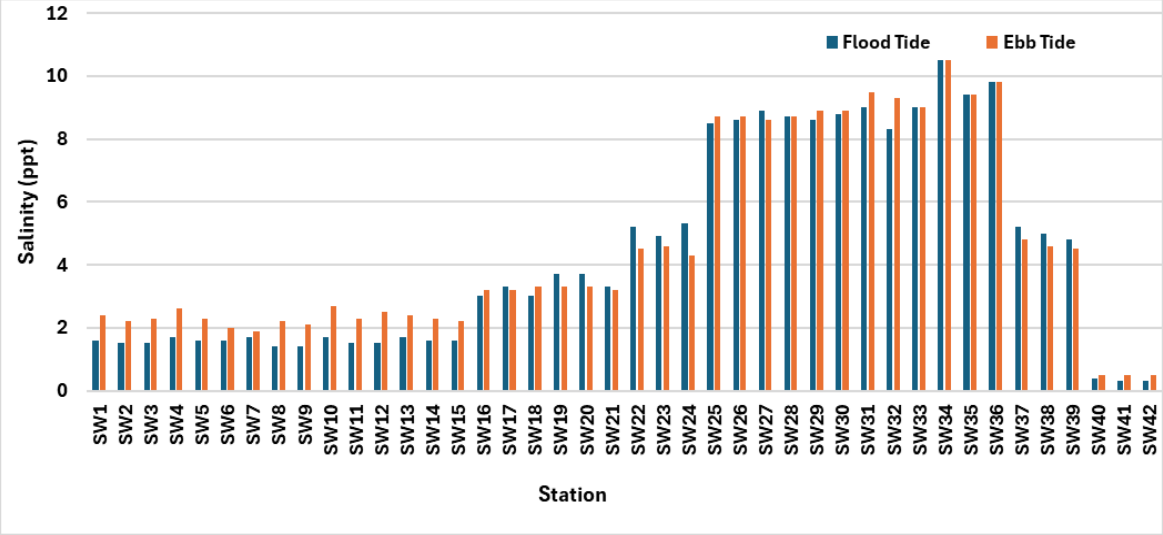

Figure 2.12: Variations in Salinity among the sites

Parameters Tested in Laboratory

This section presents the laboratory-tested results for water quality parameters obtained during the 46th monitoring program (October-November 2025).

The TDS values at the monitoring locations ranged from 170-9500 mg/l during this monitoring period. The highest concentration of TDS was observed at Hiron Point (SW-15) whereas the lowest was recorded at SW-4 (Adjacent to the PP area). The concentration of TDS at Hiron Point is high, mainly due to its proximity to the Bay of Bengal, where saline seawater strongly influences water chemistry. Seawater intrusion during tides brings high concentrations of dissolved salts (Ca^{2+}, Mg^{2+}, Na^{+}, Cl^{-}), increasing both TDS and hardness, while lower freshwater input limits dilution[1]. The concentrations of Total Dissolved Solids (TDS) across five different locations from 2014 to 2025 reveal the distinct

[1]Bekkour, F., Amharref, M., Acharki, S., Es Saouini, H., & Bernoussi, A. S. (2025). Assessing the progression of seawater intrusion in the Dradère-Souière coastal aquifer (Northwest Morocco): A hydrogeological, hydrochemical, and geophysical investigation. *Scientific African*, *30*, e03058

spatial trends and episodic variations rather than a uniform annual progression. Spatially, there is a consistent geographic gradient where TDS concentrations sharply increased downstream towards the sea, while consistently maintained very low concentrations of TDS (typically under 1,000 mg/l) at the locations closer to the project site ("PP & adjacent area" and "Passur-Mongla confluence"). On the contrary, the locations deeper in the Sundarbans ("Akram point" and especially "Hiron point") exhibit substantially higher salinity, with Hiron point frequently surpassing 4,000 to 6,000 mg/l. During this tenure (2023–2025) of the Operation Phase, TDS concentrations at the outer stations appear to be stabilizing back upward toward their historical baseline, fluctuating between 4,000 mg/l and 9,500 mg/l, while the upstream stations remain consistently low and unaffected by the project's operational transition (**Figure 2.13**). The observed dataset has been appended in **Table B.5 of Appendix- IV**

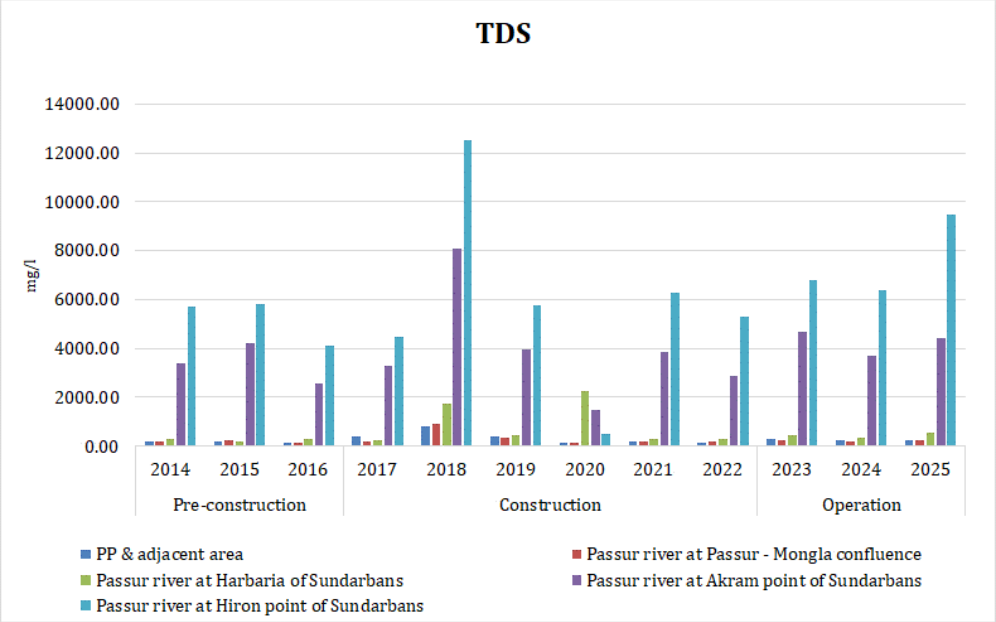

Figure 2.13: Seasonal variations in TDS concentrations

Meanwhile, the concentrations of Total Suspended Solids (TSS) at the monitoring locations are ranged from 100 to 648 mg/l. The highest value was recorded at Harbaria (SW13), while the lowest was observed at the PP area (SW-8). TSS concentrations ranged from 100 mg/l to 648 mg/l among the monitoring locations and found exceeding the national standard (ECR, 2023). The elevated TSS at Harbaria may be due to moderate tidal currents and large-scale shipping/navigation activities and maneuvering that resuspend fine sediments, along with inputs from nearby creeks carrying silt and organic debris. In the Pre-construction Phase, TSS concentrations were found relatively high in 2014 with a major peak at "Harbaria Point of the Sundarbans" on the Passur River reaching nearly 870 mg/l before experiencing a steady downward trajectory through 2015 and 2016. Following this initial decline, the entire Construction Phase (2017–2022) and the beginning of the Operation Phase (2023–2024) are characterized by exceptionally low and remarkably stable baseline trends, with concentrations across all five locations remaining consistently low, generally under 50 mg/l.

However, this stable baseline situation is suddenly changed in 2025, while the Operation Phase is undergone. It was observed across almost all monitoring locations. It got peak at Harbaria Point at approximately 650 mg/l, closely followed by substantial increases at the Passur-Mongla confluence, Hiron Point, and Akram point, while the "PP & adjacent area" shows a moderate concentration but more than that of Construction Phase (**Figure 2.14**). The probable main reasons are: (i) a continuous dredging of the Passur River by the Mongla Port Authority to keep the river navigable and (ii)

maintenance dredging for keeping operable the MSTPP Jetty Harbor. All observed dataset has been appended in **Table B.5 of Appendix- IV**

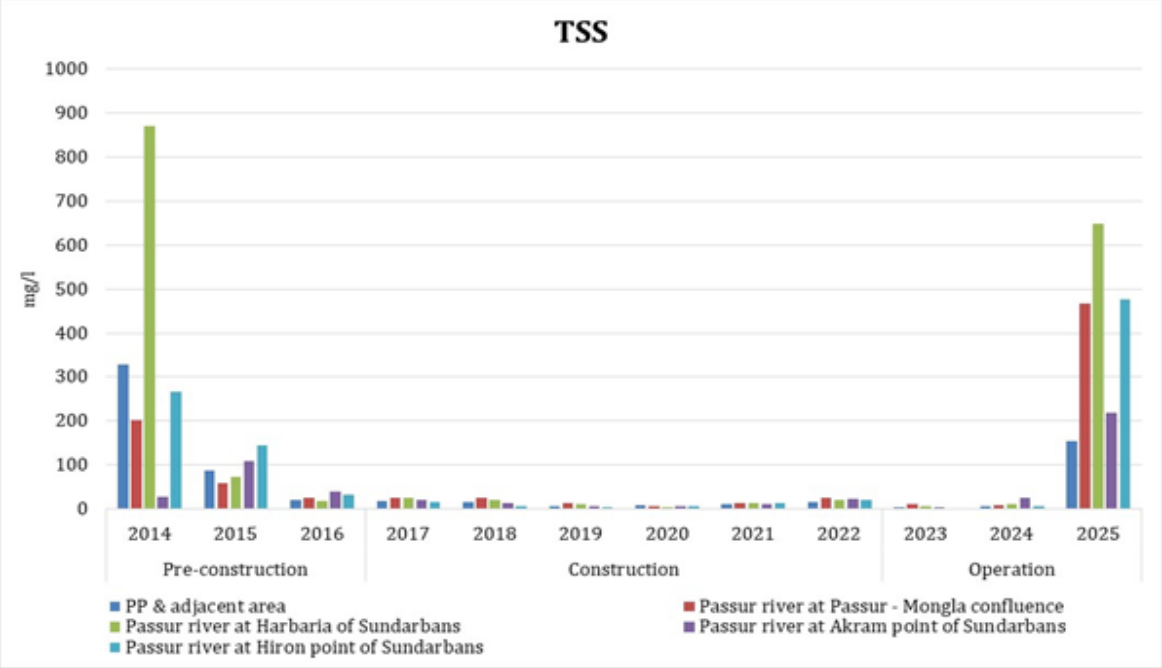

Figure 2.14: Seasonal variations in TDS concentrations

The Total Hardness (TH) value in the study area ranged from 120-1200 mg/l during the monitoring period. The highest concentrations of total hardness were found in SW-15 (Hiron Point), whereas the lowest was in SW-2. Higher total hardness is likely due to its position as a confluence/mixing zone, where water from multiple channels brings and accumulates local runoff, sediment–water interaction, organic matter, wastes, and dissolved minerals. TH concentrations remain consistently very low (typically below 500 mg/l) at the upstream stations namely "PP & adjacent area," "Passur river at Passur - Mongla confluence," and usually "Passur river at Harbaria of Sundarbans." Conversely, values progressively increase downstream toward the sea, with "Passur river at Akram point of Sundarbans" and "Passur river at Hiron point of Sundarbans" routinely exhibiting the highest hardness levels. Moving into the Operation phase (2023–2025), TH levels at the highest-exposure downstream sites show a gradual downward or stabilizing trend with Hiron point steadily decreasing from 1,600 mg/l in 2023 to around 600 mg/l in 2025 while the upstream locations continue to maintain their stable, baseline low concentrations (**Figure 2.15**). All observed dataset has been appended in **Table B.5 of Appendix- IV**

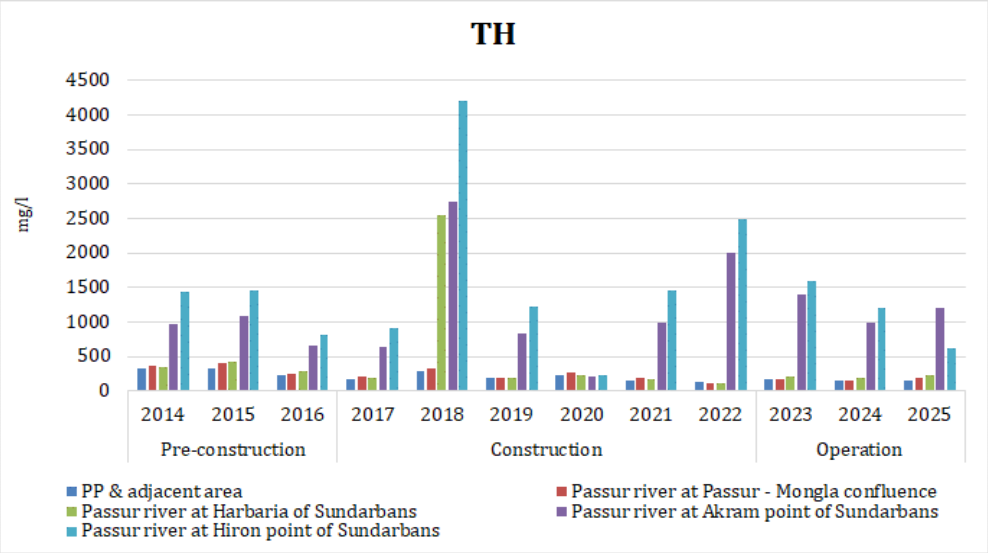

Figure 2.15: Seasonal variations in TH concentrations

Likewise, COD values ranged from 4 mg/l to 148 mg/l and the increased concentration of COD might be the slower flow and weaker flushing allow decomposition of mangrove litter (raising COD) and concentration of dissolved ions like Ca^{2+} and Mg^{2+} (increasing hardness) compared to the other Sundarbans**.** "The Passur River at Akram Point of Sundarbans" and "The Passur River at Hiron Point of the Sundarbans" frequently record the highest concentrations, while the upstream locations nearer to the project site ("PP & adjacent area" and "Passur-Mongla confluence") generally maintain lower, more stable levels. During the recent Operation phase, after a brief stabilization period in 2023 and 2024, the year 2025 shows a significant, widespread escalation in organic load across multiple stations, with Hiron point and Harbaria point sharply rising to approximately 150 mg/l and 120 mg/l, respectively (**Figure 2.16**). All observed dataset has been appended in **Table B.5 of Appendix- IV**

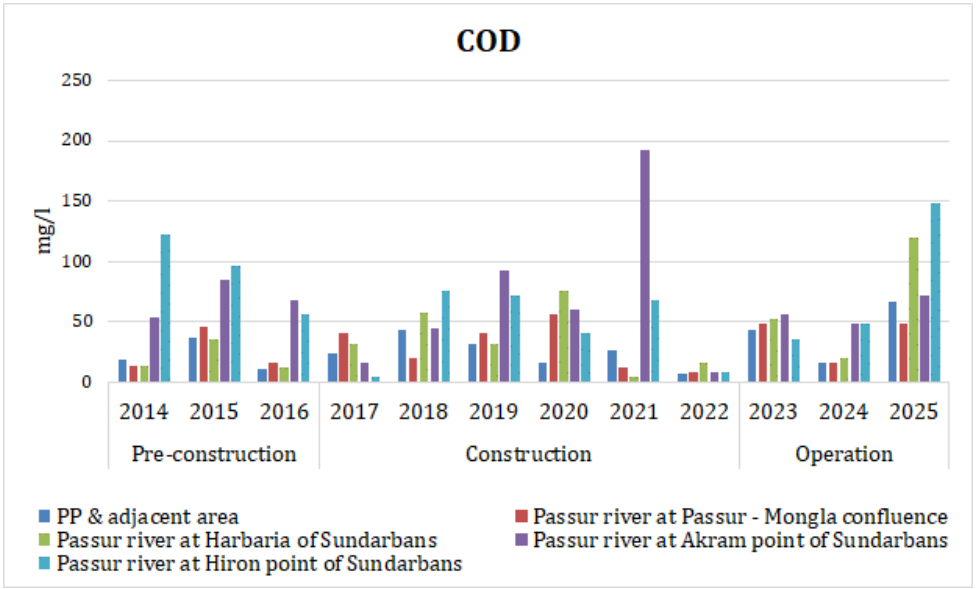

Figure 2.16: Seasonal variations in COD concentrations

On the other hand, the concentration of nitrates (NO_3^-) ranged from 0.1 to 16.3 mg/l. The highest concentration (16.3 mg/l) was observed at the Left Bank of Passur River at 100m u/s of North West corner from the Project boundary, while the lowest was recorded at Hiron Point of Sundarbans. Nitrate levels near the project area exceeded the ECR, 2023 coastal surface water standard for industry and others (1 mg/l) under Schedule 2, Ka (2) which might be due to the synthetic nitrogen fertilizers and animal manure coming from the nearby farmlands or Untreated & Poorly Treated Sewage coming from municipal wastewater and overflowing septic systems [1,2]. Nitrate levels show significant variability, with a notable peak at Hiron Point in 2015 and elevated levels across multiple locations in 2022. During the operation phase (2023–2025), concentrations generally appear lower and more stable compared to the sporadic spikes observed during the preceding years. These data suggest that while nitrate levels have fluctuated, there is no consistent, long-term upward trend directly linked to project progressionSeasonal variations is shown in **Figure 2.17** and all observed dataset has been appended in **Table B.5 of Appendix- IV.**

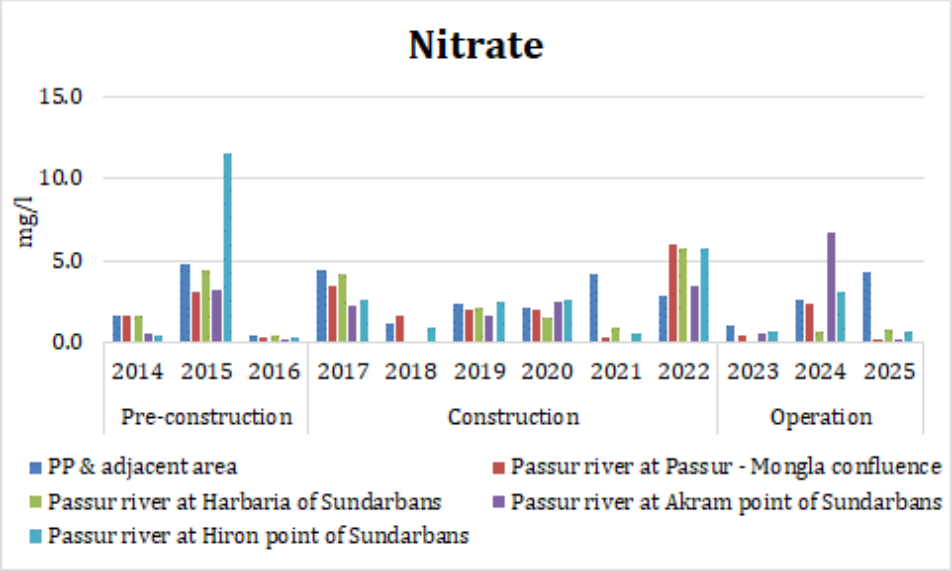

Figure 2.17: Seasonal variations in Nitrate concentrations

On the other hand, the highest SO_4^{2-} concentration was observed at Hiron point (SW-15) and Akram Point (SW-14), while the lowest was recorded at SW-3 (10 mg/l). Overall, sulfate concentrations across the monitoring sites ranged from 10 mg/l to 233 mg/l. The pre-construction phase highlights an extreme, isolated spike in 2014 at Akram Point and Hiron Point, reaching nearly 2400 mg/l, followed by smaller periodic elevations at these downstream stations during construction. Conversely, locations closer to the project footprint (PP & adjacent area, and Mongla confluence) maintained consistently low baseline concentrations throughout the study timeline. The operation phase (2023–2025) demonstrates a stabilization of sulphate levels, with uniform and relatively low concentrations across all monitored stations (**Figure 2.18**). All observed dataset is provided in **Table B.5 of Appendix- IV.**

[1] European Commission (n.d.) *Nitrates: Protecting waters against pollution caused by nitrates from agricultural sources*, *European Commission website*.

[2] Zhang, J., Jiang, H., Li, W., Li, Y., Zhang, W., & Pan, K. (2025). Understanding nitrate dynamics in urbanized and forested river ecosystems: A study integrating natural-abundance and paired isotopes. *Journal of Environmental Management*, *380*, 125073.

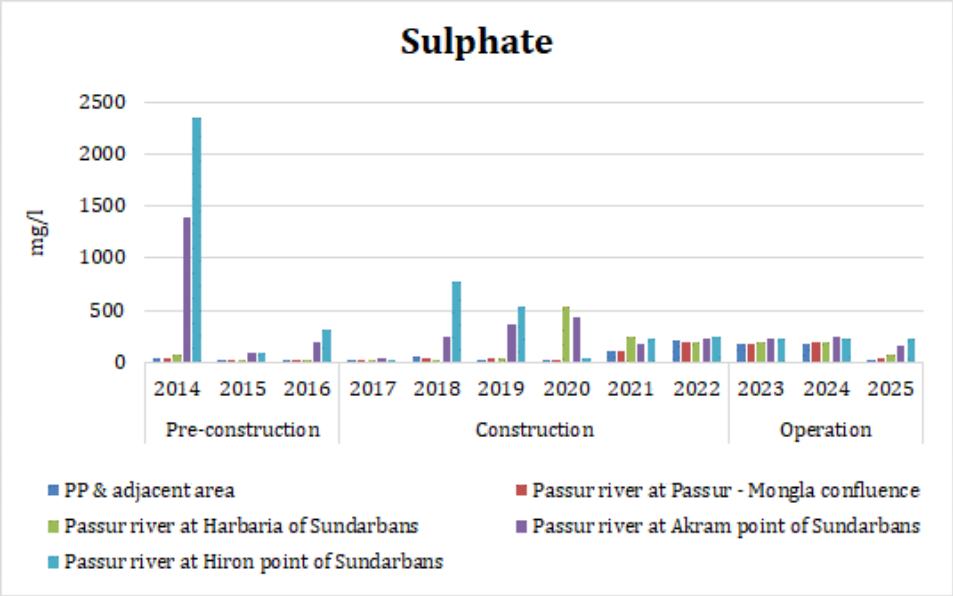

Figure 2.18: Seasonal variations in Sulphate concentrations

However, PO_4^{3-} concentrations ranged from 0.001 to 0.1 mg/L, with the highest value recorded at the project site (SW-1) and the lowest at SW-8. All measured concentrations complied with the national standard of ECR, 2023. **Figure 2.19** reveals a significant, isolated spike occurred in 2016 during the pre-construction phase, particularly at Akram and Hiron points, before levels subsided. Throughout the construction period (2017–2022), phosphate concentrations remained relatively low and stable across all monitoring stations. Since entering the operation phase (2023–2025), concentrations have remained consistently negligible, indicating a long-term decline and stabilization of phosphate levels in the area. All observed dataset is provided in **Table B.5 of Appendix- IV.**

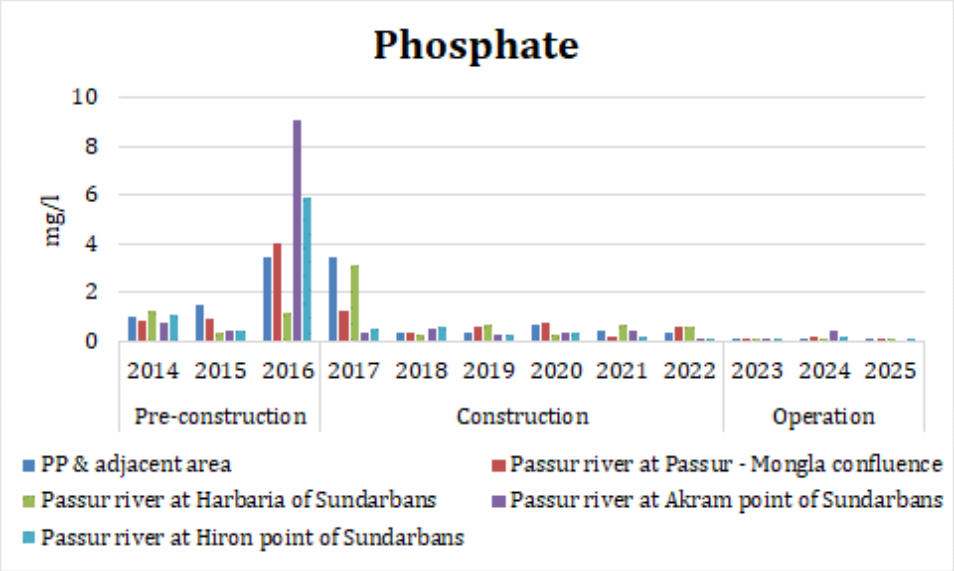

Figure 2.19: Seasonal variations in Phosphate concentrations

The arsenic (As) level in the study area ranged from 0.002 to 0.003 mg/l. In the study area, the highest amount of 0.003 mg/l As level was recorded in five stations, namely SW10, SW11, SW12, SW13, and SW15. On the contrary, the lowest amount was 0.002 mg/l in all other stations. Except SW11-SW15,

all As levels in the study area, from the monitoring stations complied with the national standard ECR, 2023-Schedule 2 Ka (2) coastal surface water standard (Industry and others 0.003 mg/l). Arsenic comes from natural deltaic sediments via geological processes where arsenic is liberated in an oxygen-free environment, while tidal mixing, sedimentation, sluggishness, and anthropogenic activity play little role in it. Throughout the timeline, arsenic levels consistently remain very low, generally fluctuating between 0.001 and 0.004 mg/l across all locations. A single, isolated peak of 0.009 mg/l is visible at Hiron Point in 2020 during the construction phase, but levels quickly normalized. During the operation phase (2023–2025), concentrations stabilized into a highly uniform pattern across the stations. Overall, the data demonstrates that arsenic levels have remained well-controlled and within a tight, baseline range over the years (**Figure 2.20**). All observed dataset is provided in **Table B.5 of Appendix- IV.**

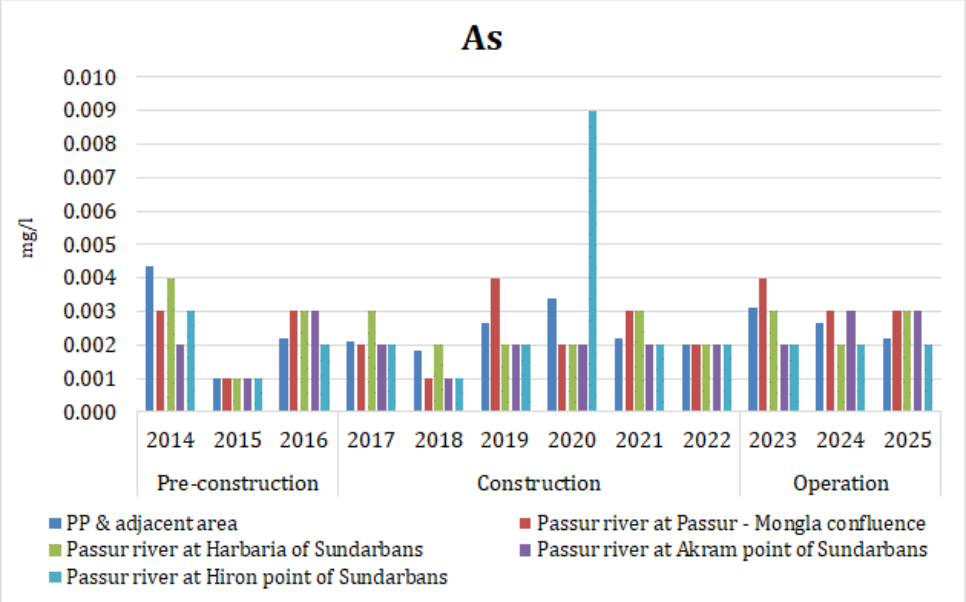

Figure 2.20: Seasonal variations in Arsenic concentrations

Conversely, the concentrations of Pb and Hg at the study area were below 0.01 mg/L and 0.0001 mg/l, respectively, which are within the permissible limits set by ECR, 2023)**.**

The concentration of oil and grease was found to be less than 2.0 mg/l at all monitoring sites. The concentrations at all sampling sites complied with the ECR, 2023 Schedule 2 Ka (2) coastal surface water standard for industry and others (5 mg/l). However, when considering the ECR, 2023 Schedule 2 Ka (2) natural area conservation standard, the values at SW11–SW15 exceeded the permissible limit. The increase in both regulated and non-regulated mechanized vessels used for cargo and passenger transport may contribute to higher levels of oil and grease. In addition, the uncontrolled discharge of bilge water (oil and grease-contaminated water) from non-regulated boats, especially during seasonal fishing, also adds to river pollution.

Remarks

The monitoring data reflects a healthy, highly dynamic estuarine ecosystem heavily influenced by tidal phases and geographic positioning relative to the Bay of Bengal. The Tidal Influence on DO represents that the Dissolved Oxygen (DO) levels consistently met national Environmental Conservation Rules (ECR, 2023) standards. Interestingly, the ebb tide exhibited notably higher DO concentrations than the flood tide. This is a classic indicator of colder, well-oxygenated freshwater influx combined with strong atmospheric aeration triggered by outgoing water movements. On the other hand, the Spatial

Salinity & TDS Gradients stating a clear geographic gradient in the river water. Inland stations like Sharankhola (Bhola River) experience heavy freshwater dilution from rainfall, runoff, and upstream river networks, keeping salinity low. Conversely, seaward stations like Hiron Point and Akram Point act as direct ocean interfaces, showcasing elevated salinity and Total Dissolved Solids due to the heavy influx of marine ions. Moreover, Hardness and Mineral Accumulation exhibiting that the Hiron Point (SW-15) stood out with maximum values for Total Hardness and Sulfate. This area acts as a hydrodynamic confluence zone. Slower water flow and weaker tidal flushing create a "trap" where local runoff, sediment-water interactions, and decaying mangrove litter accumulate, concentrating dissolved minerals may increase organic matters in this area. Furthermore, the heavy metal profile presents a low risk to local ecology. Lead and Mercury remain safely below standard limits. Arsenic concentrations are marginally sitting at the edge of the permissible threshold which is largely attributed to natural geogenic processes arsenic release from deltaic sediments in oxygen-poor environments) rather than industrial contamination.

Status of the Groundwater Quality

In-situ tested parameters

The in-situ test results obtained up to the 47th quarterly monitoring period (January-February 2026) are described below:

pH and Temperature

The pH and temperature values of groundwater at the monitoring sites were found to meet the drinking water quality standards set by ECR 2023 (6.5-8.5 for pH and 20-30°C for temperature). During the 47th monitoring period, pH values ranged from 7.82 to 8.2, while temperatures were recorded between 27°C and 30°C. No significant differences were observed compared to previous results from the same seasons. The temperature remained relatively consistent with data from past seasons of the same quarter. The seasonal variations in pH and temperature, as observed up to the 47th monitoring periods, are shown in **Figure 2.21** and **Figure 2.22**, and the datasets are available in **Table B.17** of the **Appendix IV**.

Salinity and Dissolved Oxygen (DO)

Over time, groundwater salinity steadily increased. High groundwater extraction, salinity intrusion, and the percolation of saline water are likely key factors contributing to the rising salinity levels in the groundwater. During the monitoring period, salinity ranged from 0.1 ppt to 0.4 ppt. In contrast, the DO level ranged between 4.2 mg/l and 5.1 mg/l during the 47th quarterly assessment. Slightly low DO concentrations in drinking water may only affect taste, but higher DO levels can improve water taste and cause corrosion of supply pipes. Seasonal variations in DO and salinity concentrations are shown in **Figure 2.23** & **Figure 2.24**, and all monitoring results of salinity and DO at the selected sites are included in **Table B.18** of **Appendix-IV**.

Laboratory tested parameters

The laboratory-tested results obtained up to the 46th monitoring period (October-November 2025) are described as follows:

TDS, TSS, and TH

During the monitoring quarter, the highest TDS value was recorded near Kapashdanga (700 mg/l), followed by the Rajnagar site (390 mg/l), which was found to be within the permissible limit as per ECR 2023 (1,000 mg/l). Conversely, the TSS concentrations ranged from 20 mg/l to 40 g/l at all

monitoring locations, which exceeds the allowable limit for Drinking Water in Bangladesh (TSS: 10 mg/l, ECR 2023). Which might be due to the organic and inorganic particulate matter like silt, sediment, and micro-colloids in groundwater (Adjovu et al., 2023)[1]. Additionally, the TH concentrations at the three monitoring sites varied from 155 mg/l to 330 mg/l, with the maximum value found at Kapashdanga site followed by the Rajnagar. This higher concentration of TH might be due to groundwater salinity intrusion and weathering of Ca^{2+} bearing minerals in the aquifer. The seasonal variation of TDS, TSS, and TH are shown in **Figure 2.25**, **Figure 2.26** & **Figure 2.27**, and the observed datasets are attached in **Tables B17**, **B.19**, and **B.20** of the **Appendix IV**.

Chemical Oxygen Demand, Nitrate, Sulphate, and Phosphate

During the last monitoring period (monsoon) the COD values were found to range from 12 mg/l to 24 mg/l. The primary cause of the increasing COD during the post-monsoon in the monitoring areas might be the rise of organic or inorganic compounds or ions in the groundwater, like domestic sewage and industrial discharge (Elumalai et al., 2020[2], Sehar et. al., 2011[3]). Conversely, the Nitrate (NO_3^-) values ranged from 0.6 mg/l to 9.0 mg/l during the last post-monsoon period. The maximum value (9.0 mg/l) was recorded at Rajnagar but found within the permissible limit as per ECR 2023 (45 mg/l) during the monitoring period. Similarly, SO_4^{2-} concentrations also complied with the Bangladesh Standard for Drinking Water Quality standard e.g., 250 mg/l as the observed results ranged from 1.55mg/l to 8.88 mg/l in the monitoring sites. The concentrations in the monitoring wells never exceeded the limits during any of the monitoring periods. On the other hand, PO_4^{3-} concentrations varied between 0.4 mg/l and 1.12 mg/l during the last monitoring period. However, the PO_4^{3-} concentrations displayed minor spatial and temporal variations. The seasonal variations in the Nitrate, Sulphate, and Phosphate are depicted in **Figure 2.28**, **Figure 2.29**, **Figure 2.30** and **Figure 2.32**. The observed datasets are attached in **Table B.2**2 of **Appendix IV**.

Arsenic (As), Lead (Pb), and Mercury (Hg)

According to Bangladesh Standard (ECR 2023), the maximum acceptable concentration of Arsenic (As) in groundwater is 0.05 mg/l. During the last post- monsoon season, the concentrations among all monitoring locations ranged between 0.001 mg/l and 0.056 mg/l. The exceedance in As concentration might be due to two different mechanisms: oxidation of arsenic-rich pyrite by atmospheric oxygen introduced into groundwater due to lowering the water table (Das et al., 1996)[4], and the reduction of iron oxyhydroxide by organic matter (**Figure 2.31**). Lead (Pb) and Mercury (Hg) concentrations were also measured, and the values (Pb:<0.01 at all sites and Hg: <0.0001 at all sites) were found within the permissible limit specified in ECR 2023 (0.01 mg/l for Pb and 0.001 mg/l for Hg). The observed datasets are attached in **Table B.2**2 of **Appendix IV**

[1] Adjovu, G. E., Stephen, H., James, D., & Ahmad, S. (2023). Measurement of Total Dissolved Solids and Total Suspended Solids in Water Systems: A Review of the Issues, Conventional, and Remote Sensing Techniques. *Remote Sensing*, *15*(14), 3534

[2] Elumalai, Dr & Natarajan, Rajmohan & Anbazhagan, Siddan. (2020). Monsoon impact on groundwater chemistry and geochemical processes in the shallow hard rock aquifer. CATENA. 195. 104766. 10.1016/j.catena.2020.104766.

[3] Sehar, Shama & Naz, Iffat & Ali, Muhammad & Ahmed, Safia. (2011). Monitoring of Physico-Chemical and Microbiological Analysis of Under Ground Water Samples of District Kallar Syedan, Rawalpindi-Pakistan. Research Journal of Chemical Sciences. 1. 24-30.

[4] Das, D., Samanta, G., Mandal, B. K., Roy Chowdhury, T., Chanda, C. R., Chowdhury, P. P., Basu, G. K., & Chakraborti, D. (1996). Arsenic in groundwater in six districts of West Bengal, India. *Environmental Geochemistry and Health*, *18*(1), 5–15

Remarks

A comprehensive groundwater quality assessment up to the 47th quarterly monitoring period (Jan–Feb 2026) indicates that the majority of physicochemical parameters, including pH, temperature, DO, TDS, Nitrate, Sulphate, and Phosphate, comply safely with the Environment Conservation Rules (ECR 2023) standards for drinking water. Heavy metals such as Lead (Pb) and Mercury (Hg) also remain within the permissible limits. However, some parameters, which are not critical pollutants in terms of the power plant's contribution, need attention from the contributors rather than the MSTPP may include:

- TSS: Total Suspended Solids (TSS) concentrations (20–40 mg/l) consistently exceed the national ECR 2023 limit (10 mg/l) across all monitoring locations due to dredging along the river, upstream sediment flow, localized silt, and micro-colloid suspension.
- Trace Metal: Arsenic (As) concentration spiked at 0.056 mg/l, slightly breaching the 0.05 mg/l regulatory ceiling, likely driven by water table fluctuations and mineral reduction processes.
- Salinity & Hardness Vectors: A steady, long-term increase in salinity (up to 0.4 ppt) and high Total Hardness (TH up to 330 mg/l, specifically at Kapashdanga and Rajnagar) points toward active saline intrusion and heavy groundwater abstraction.

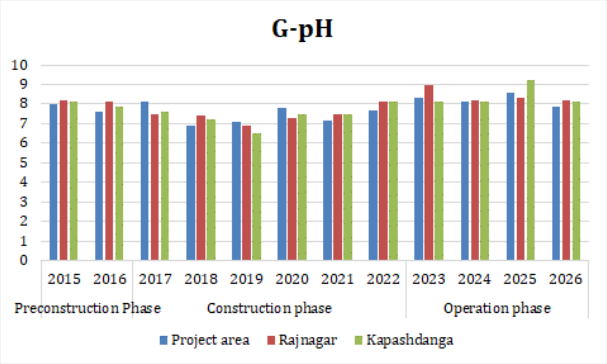

Figure 2.21: Seasonal variations in G-pH concentrations

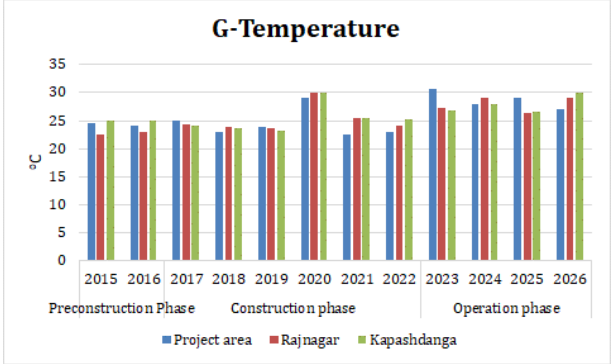

Figure 2.22: Seasonal variations in G-Temperature

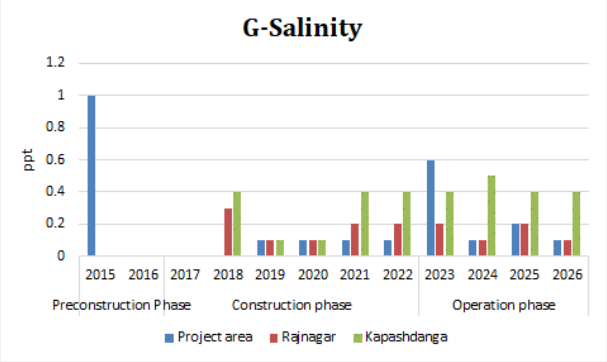

Figure 2.23: Seasonal variations in G-Salinity concentrations

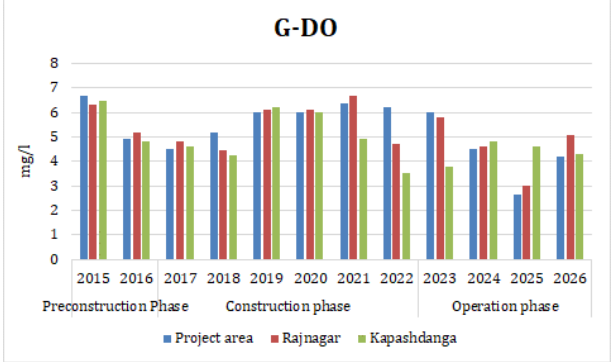

Figure 2.24: Seasonal variations in G-DO concentrations

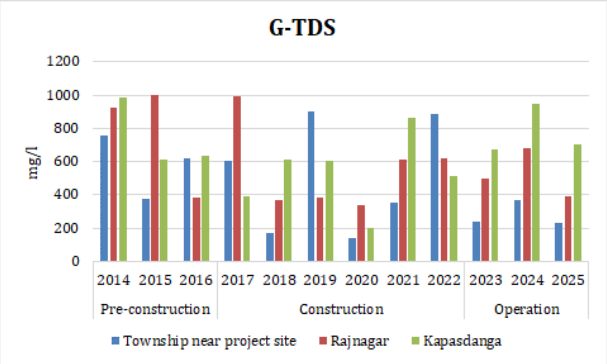

Figure 2.25: Seasonal variations in G-TDS concentrations

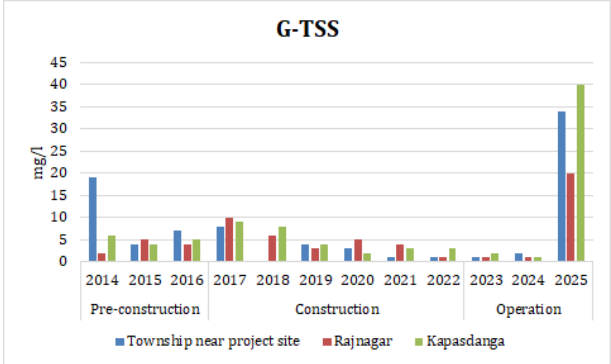

Figure 2.26: Seasonal variations in G-TSS concentrations

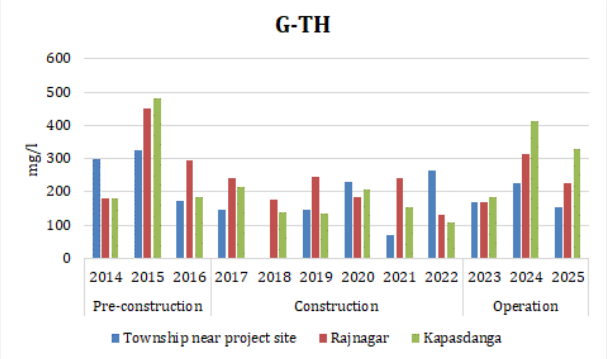

Figure 2.27: Seasonal variations in G-TH concentrations

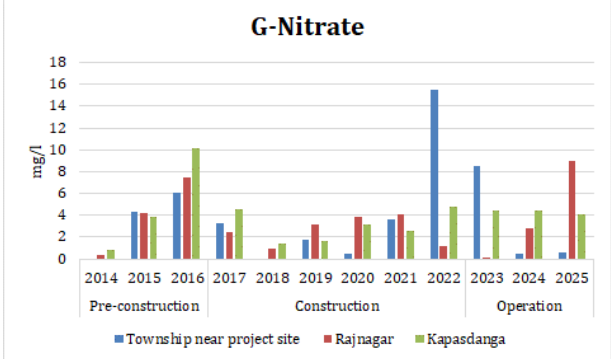

Figure 2.28: Seasonal variations in G-Nitrate concentrations

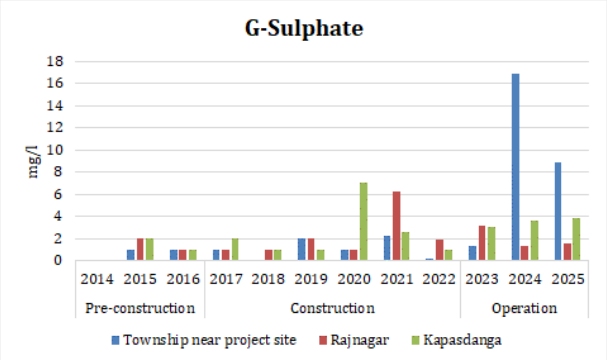

Figure 2.29: Seasonal variations in G-Sulphate concentrations

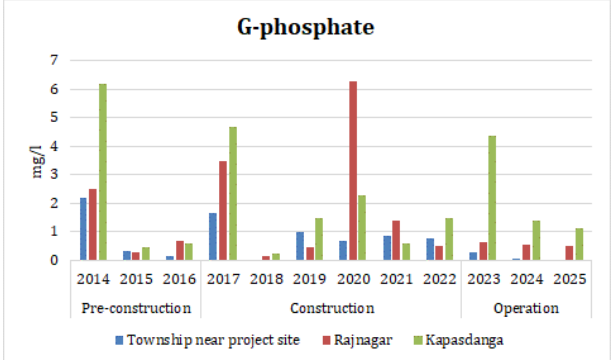

Figure 2.30: Seasonal variations in G-Phosphate concentrations

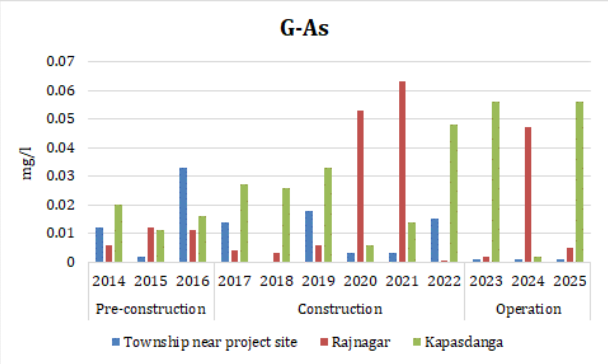

Figure 2.31: Seasonal variations in G-Arsenic concentrations

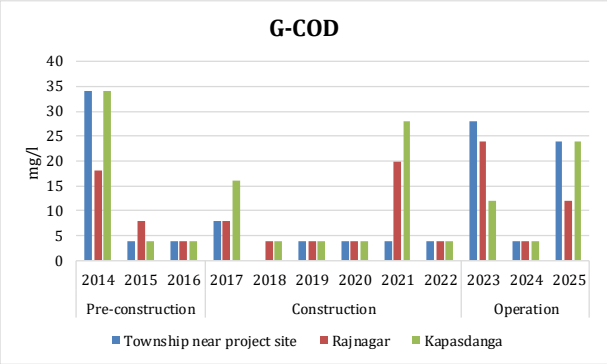

Figure 2.32: Seasonal variations in G-COD concentrations

2.4 Monitoring of Tidal Inundation and Penetration

Monitoring water levels in the Maidara Khal and Ichamati River is essential to the smooth continuation of the project. As there are no existing water level gauges in the above-mentioned rivers, water level gauges have been installed at selected locations. The gauges have been strategically positioned in rivers that drain the largest contributing areas, ensuring that the recorded data adequately represent the overall hydrological response of the system. The locations of the water-level monitoring stations are shown in **Figure 2.33**, and **Table 9** provides details of the corresponding information gauge stations. Gauges have been installed to accommodate this combination, so that water level data can be collected during both flooding and ebbing. Basically, two gauges have been installed at a section to measure water level data at both high and low water levels. It is noted that during the zero correction of the installed gauge, a Temporary Bench Mark (TBM) has been set at the nearest permanent location for use during further action. The nearest Bench Mark (BM) value has been used to apply a zero correction to the gauge at the installed positions. The zero values for each gauge are provided in **Table 9**. The pictures of the work are shown in Figure 2 and Figure 3 for the Maidara Khal and Ichamati River, respectively. Figure 4 depicts the gauge installation pictures for the Maidara Khal, and Figure 5 shows them for the Ichamati River. The Gauge installation activities are shown in photo Album of **Appendix II.**

Table 2.9: Locations of the installed gauges along with zero value

SL	Name of Gauge Location	Name of the River/Khal	Zero Value of Gauge (MSL)	X-coordinate	Y-coordinate
1	Maidara Gauge (High Water)	Maidara	0.48	89°33'53.05"E	22°35'16.52"N
2	Maidara Gauge (Low Water)	Maidara	-2.09		
3	Ichamati Gauge (High Water)	Ichamati	0.287	89°35'18.22"E	22°34'43.59"N
4	Ichamati Gauge (Low Water)	Ichamati	-1.763		

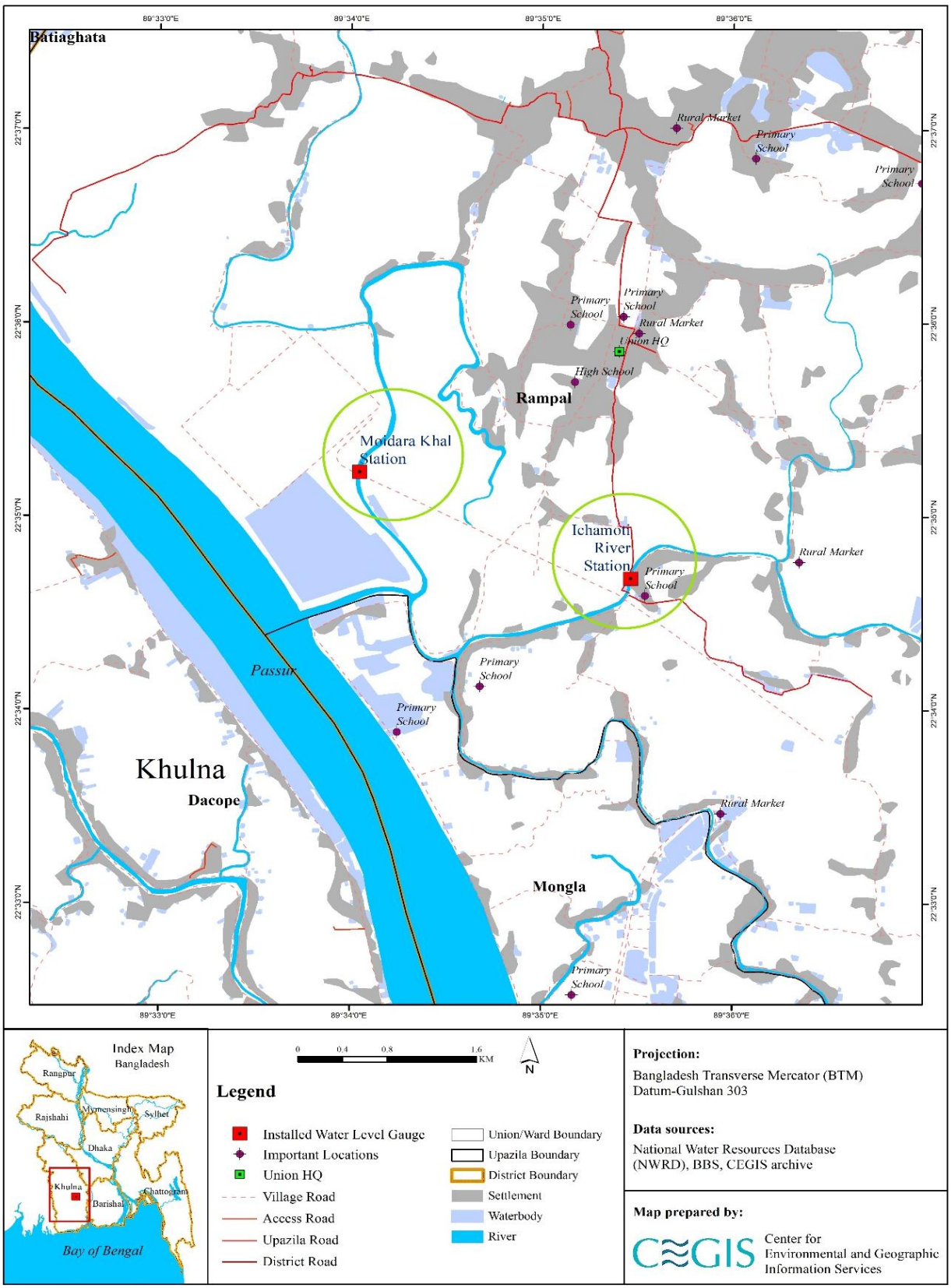

Figure 2.33: Location of Water level gauges in the Maidara Khal and Ichamati River

2.4.1 Measurement of Water Level

Water level data have been collected from the installed gauges at three-hour intervals since March 2026. The three-hourly tidal water level variations for Maidara Khal and Ichamati River are presented from **Figure 2.34** to **Figure 2.35**, respectively. Water level data were measured from 3 March 2026 to 31 May 2026. The maximum recorded water levels were 2.36m, 0.86m, and 2.78m for March, April, and May, respectively, at the Maidara Khal station. On the other hand, the maximum recorded water levels are 0.51m, 2.50m, and 2.57m for March, April, and May, respectively, at the Ichamati River station.

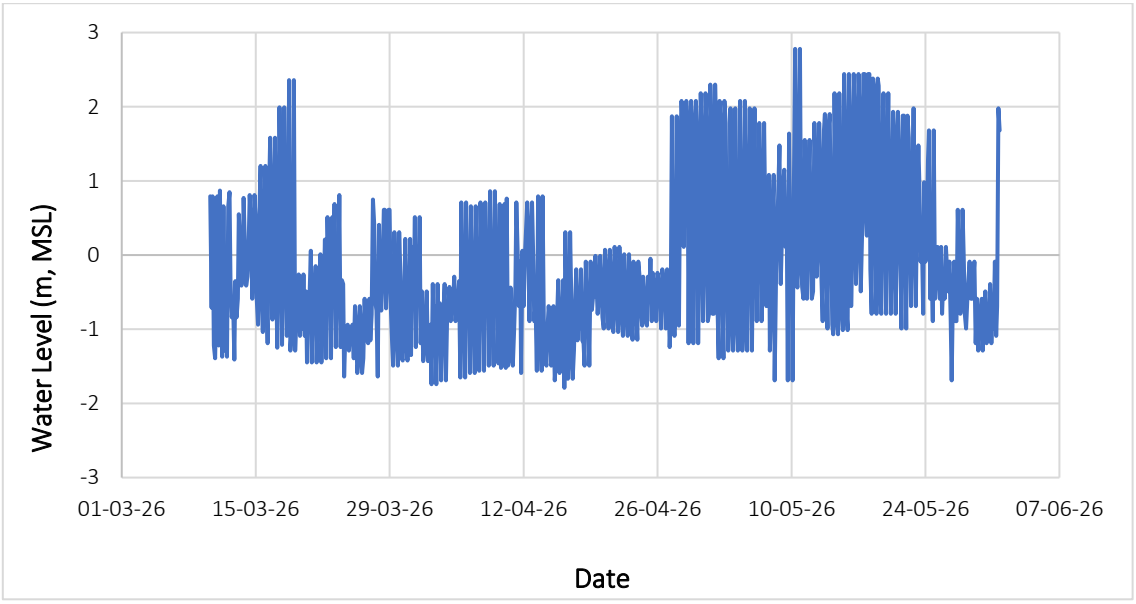

Figure 2.34: Water level Data in the Maidara Khal

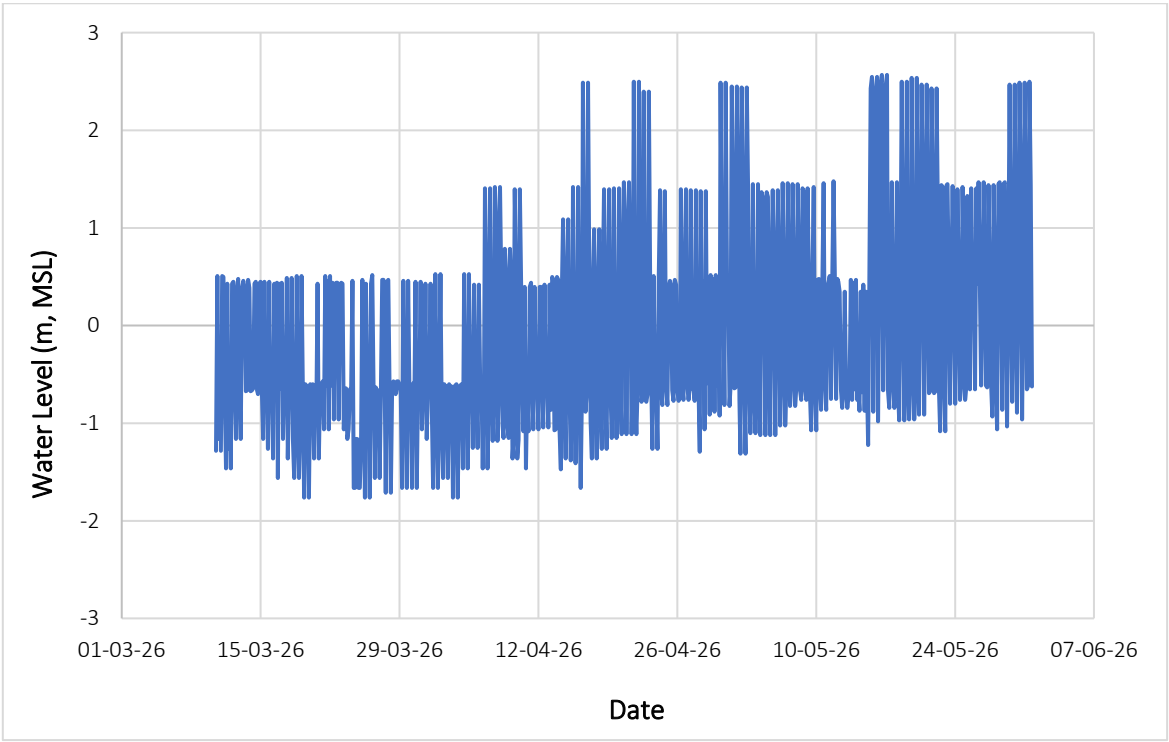

Figure 2.35: Water level Data in the Ichamati River

2.5 River Morphology

2.5.1 Introduction

Bangladesh is a riverine country. Rivers in different hydrological regions have different characteristics. Rivers in the northern part have fluvial characteristics while it is tidal in the south. The Passur River is one of the major dynamic rivers in southern Bangladesh. The Rampal power plant is being constructed along the left bank of the Passur River (**Figure 2.36**). It is always important to monitor the river's morphological characteristics at regular intervals to assess its dynamics in the event of any development works. Monitoring river dynamics such as erosion, accretion, and bankline shifting in the Passur River on a quarterly basis may facilitate proper planning and management of development work.

2.5.2 Methods to Assess the Riverbank Erosion and Accretion of the Passur River

For the assessment of the riverbank erosion and accretion, time-series satellite images were used. The images were processed and analyzed before the assessment, and the locations of erosion and accretion were identified, as well as the shifting of the bankline. The steps of image processing and analysis are briefly explained below.

Collection and Processing of Images

Sentinel-1 Radarsat satellite images having 10m resolution covering the Passur River from Chalna to Hiron Point for the period from November 2025 to February 2026 were collected. After that, satellite images were geo-referenced to have the same projection system. Then, it was found that one image differed from another. Under these circumstances, images were co-registered to avoid distortion within each image.

Delineation of Banklines

After image collection and processing, banklines were delineated for the specified period using the ArcGIS tool. Then, banklines were analyzed and superimposed to assess erosion, accretion, and river shifting during the period from November 2025 to February 2026.

2.5.3 Monitoring of Erosion & Accretion and Shifting of the Backlines

For monitoring the erosion and accretion in the Power Plant area, Mongla, Harbaria, and Akram Point areas, banklines of the Passur River were superimposed. It was found that the river is stable and there is no riverbank erosion or accretion as the river has not shifted from November 2025 to February 2026 (**Figure 2.36**).

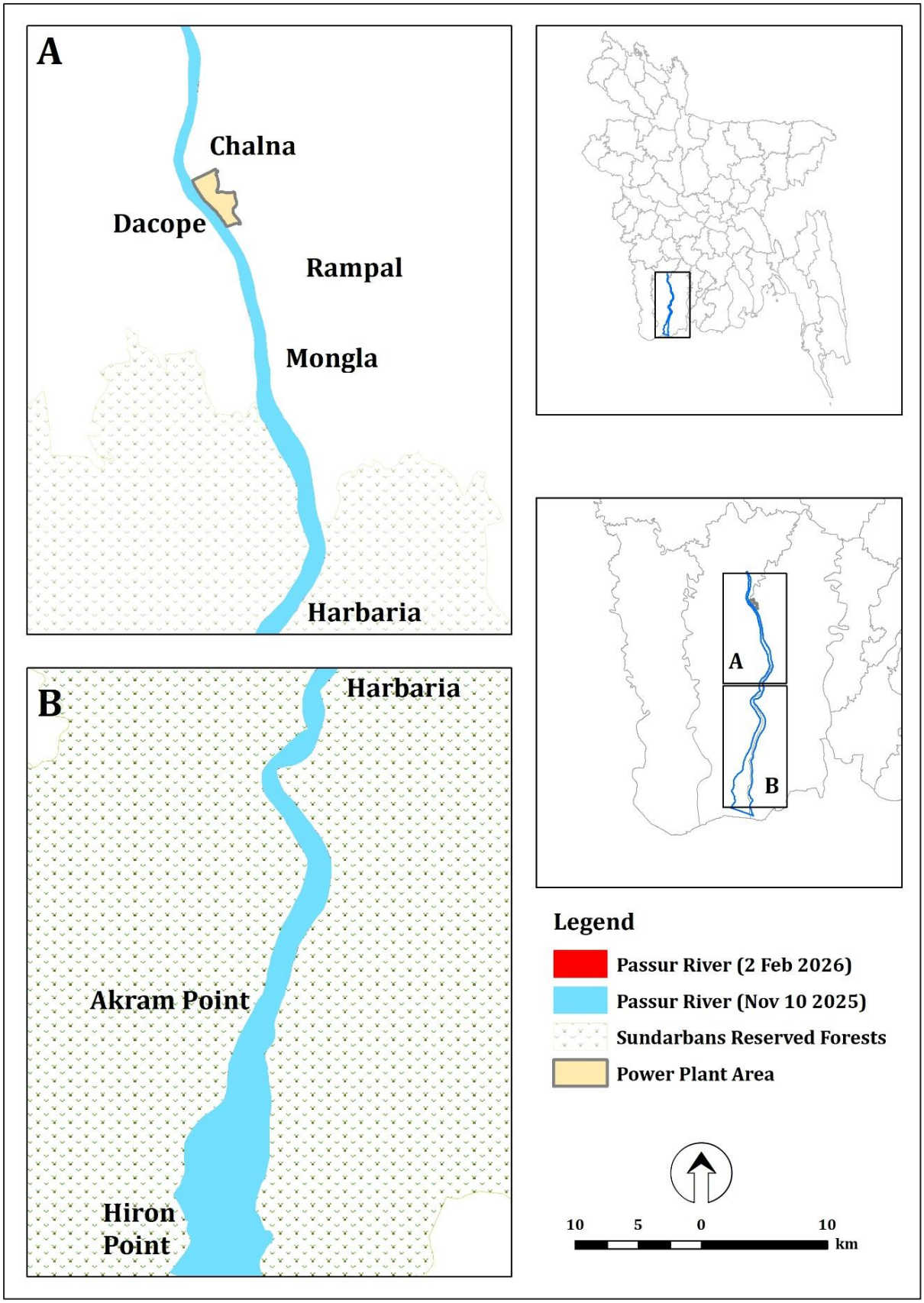

Figure 2.36: Riverbank erosion and accretion of the Passur River from November 2025 to February 2026

2.6 Transportation Monitoring

The traffic survey for this 47th monitoring was conducted between February and March, 2026, on weekends (representing off-peak conditions) and one weekday (representing peak conditions) across pre-selected locations around the project site, where raw classified traffic counts were enumerated on-site and converted into hourly Passenger Car Units (PCU/hr) to standardize the heterogeneous traffic stream. As part of the quarterly monitoring and compliance activities, traffic volume survey was conducted in the National Highway N7 (Dauladia-Faridpur (Goalchamot)-Magura-Jhenaidah-Jessore-Khulna-Mongla (Digraj) Road) and the Access Road stemming from this National Highway to the Rampal Ppower Plant Site. The survey points are enlisted below and shown in following **Figure 2.37**.

Table 2.10: List of Survey points with the location

Survey Points on N7 Highway	Survey Points on Access Road
Khudir Bot Tola	Site 01 (Zero Point)
Katakhali	Site 02 (Cyclone Shelter)
Foyla Bazar	Site 03 (Gol Ghor Bot Tola)
Digraj Bazar	
Mongla Port Area	

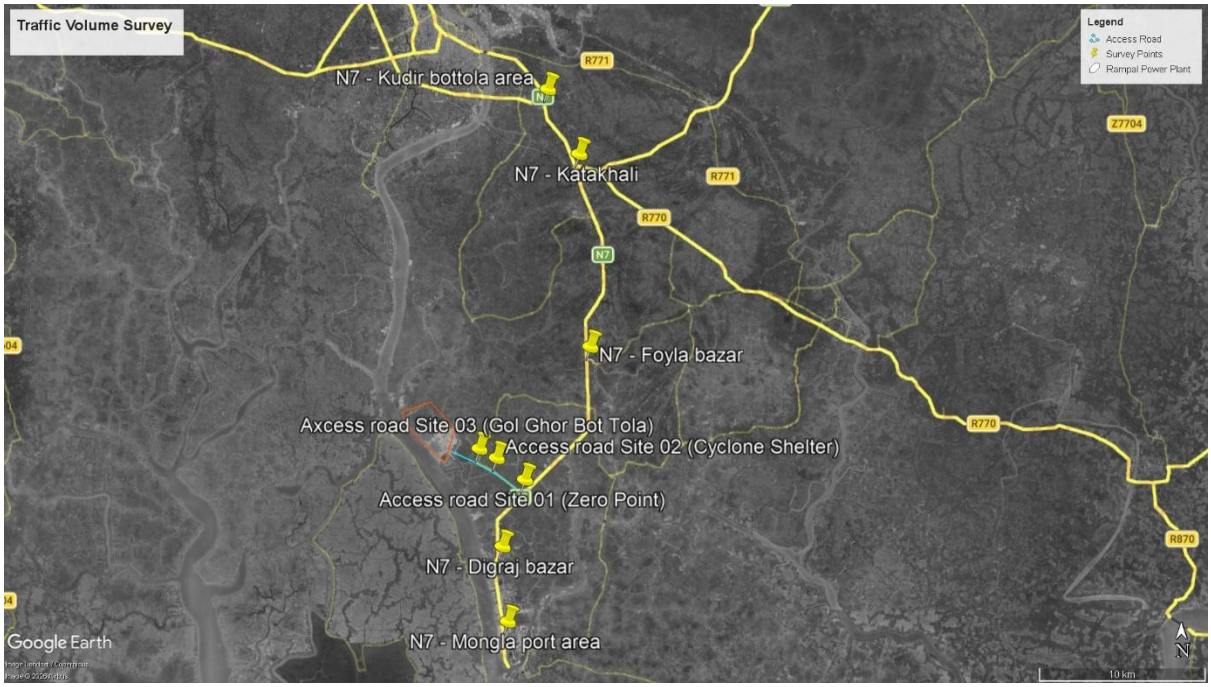

Figure 2.37: Traffic Survey Locations

Survey Point at N7 -Khudir Bot Tola

- **Off-Peak Profile:** Sustains massive traffic volumes throughout the day that rarely drop below 360 PCU. Volume steadily gains momentum through the afternoon, culminating in a late evening bottleneck of 776.65 PCU between 06:00 PM and 07:00 PM.
- **Peak Profile:** Shows intense infrastructure loading across two distinct peaks. A major morning wave hits between 08:00 AM and 09:00 AM (617.15 PCU), which is ultimately surpassed by an aggressive evening commuter and freight surge between 05:00 PM and 06:00 PM, maxing out at 835.90 PCU.

- **Primary Mode of Transport:** Heavily dominated by macro-logistics and mass passenger transport. On off-peak days, industrial Medium Trucks take the lead (858.00 PCU), while peak-day operations see high-density passenger Cars rise to the primary mode (1,042.00 PCU), running neck-and-neck with regional Buses.

Survey Point at N7 - Katakhali

- **Off-Peak Profile:** Sits on a high-volume baseline that experiences a massive evening compounding effect. While daytime traffic hovers around 300 PCU, volumes climb to a substantial daily maximum of 668.50 PCU between 06:00 PM and 07:00 PM.
- **Peak Profile:** Functions as a relentless, continuous-volume artery. It plateaus early and hits its absolute capacity at midday (12:00 PM to 01:00 PM at 560.75 PCU), The traffic volume has been observed to show gradual decline in the evening, from 5PM onwards.
- **Primary Mode of Transport:** Industrial logistics dictate peak operations, making Medium Trucks the leading mode at 849.00 PCU. On off-peak days, local paratransit takes precedence, shifting the primary mode to Auto Vans (508.50 PCU).

Survey Point at N7 - Foyla Bazar

- **Off-Peak Profile:** Exhibits high baseline consistency during the first half of the day. The corridor anchors near 500 PCU all morning before building to a midday rise of 750.50 PCU between 12:00 PM and 01:00 PM.
- **Peak Profile:** Shows intense infrastructure strain with a double-crested trend. The road experiences a heavy midday surge (814.75 PCU) followed by an even more severe evening rush between 06:00 PM and 07:00 PM, maxing out at 838.00 PCU.
- **Primary Mode of Transport:** Heavily congested by mixed traffic. Medium Trucks act as the primary mode off-peak (975.00 PCU), while Motorcycles narrow out the top spot during peak days (659.25 PCU), forcing a difficult mix of heavy cargo and light commuters during rush hours.

Survey Point at N7 - Digraj Bazar

- **Off-Peak Profile:** Characterized by a centralized, midday layout. Volume experiences steady, controlled growth from a morning baseline of 205.00 PCU, to a rise between 01:00 PM and 02:00 PM at 380.25 PCU before a steady decline from 5 PM onwards.
- **Peak Profile:** Traffic expands linearly with every passing hour, building up a compounding volume effect that peaks late in the afternoon from 05:00 PM to 06:00 PM at 513.00 PCU.
- **Primary Mode of Transport:** Highly consistent hierarchy across both day types. Motorcycles serve as the primary mode (423.75 PCU Peak / 399.00 PCU Off-Peak), foillwoed by occupancy of Auto Vans and Medium Trucks as preferred choice of transport for passengers and freight.

Survey Point at N7 - Mongla Port Area

- **Off-Peak Profile:** Reveals quiet morning conditions (dropping to a bare minimum of 30.25 PCU). Between 05:00 PM and 06:00 PM, traffic increases to an isolated peak of 339.50 PCU.

- **Peak Profile:** In this survey point, a well-rounded distribution of traffic volume is observed throughout the day, peaking moderately during the evening commute at 180.50 PCU.
- **Primary Mode of Transport:** Motorcycles lead total counts (221.25 PCU Peak / 217.50 PCU Off-Peak). Due to port infrastructure, mass transit plays a vital role here, locking regional Buses firmly into the second-highest volume slot across both cycles.

Access Road Site 01- Zero Point

- **Off-Peak Profile:** Features a distinct morning concentration, peaking sharply between 08:00 AM and 09:00 AM at 131.50 PCU. Traffic falls off drastically by midday to a daily low of 27.25 PCU before a modest afternoon return.
- **Peak Profile:** The rhythm reverses entirely into an evening-heavy model. The morning remains low (~22–26 PCU), while an intense closing rush bottlenecks the station between 05:00 PM and 06:00 PM at 127.25 PCU.
- **Primary Mode of Transport:** Driven consistently by light personal travel and paratransit. Motorcycles hold the highest share (147.00 PCU Peak / 158.25 PCU Off-Peak), heavily supported by Auto Vans.

Access Road Site 02 – Cyclone Shelter

- **Off-Peak Profile:** Exhibits a pronounced back-loaded evening trend. Morning and midday intervals remain low to moderate, but traffic builds late in the day, reaching its absolute daily maximum of 124.95 PCU between 06:00 PM and 07:00 PM**.**
- **Peak Profile:** Volume escalates rapidly to an acute early peak of 156.85 PCU between 08:00 AM and 09:00 AM before tapering off through the afternoon.
- **Primary Mode of Transport:** Characterized primarily by passenger vehicles and paratransit. Cars hold the leading share across both cycles (292.00 PCU Peak / 201.00 PCU Off-Peak), with regional Auto Vans acting as the second most frequent mode.

Access Road Site 03 – Gol Ghor Bot Tola

- **Off-Peak Profile:** Follows a back-loaded layout. The morning and midday windows remain highly subdued (below 70 PCU) until a sudden late afternoon influx pushes traffic to its daily maximum of 130.50 PCU between 05:00 PM and 06:00 PM.
- **Peak Profile:** Converts into a single-purpose morning transit funnel. Volume climbs to an aggressive, isolated peak of 199.50 PCU between 08:00 AM and 09:00 AM. The overall traffic volume remains relatively low for the rest of the day.
- **Primary Mode of Transport:** Strongly dominated by two-wheeled vehicles. Motorcycles command the grid (239.25 PCU Peak / 170.25 PCU Off-Peak), with local Bicycles (Cycles) capturing the third-highest modal share across both cycles.

2.6.1 Traffic Volume Analysis – Survey Location-wise

National Highway N7 (Dauladia-Faridpur (Goalchamot)-Magura-Jhenaidah-Jessore-Khulna-Mongla (Digraj) Road)

N7 – Khudir Bot Tola

Khudir Bot Tola functions as a vital, high-capacity arterial connection that experiences heavy traffic demand even during off-peak periods. The corridor shows moderate traffic early in the day at 361.20 PCU (07:00-08:00 Am) and steadily escalating across the afternoon. A minor post-lunch surge reaches 604.15 PCU, but the true operational strain hits right at nightfall. Between 06:00 PM and 07:00 PM, traffic volumes escalate dramatically to an off-peak maximum of 776.65 PCU, showing that the corridor remains heavily burdened outside of standard business hours. The commercial and regional transport demands of this route are clearly reflected in its vehicle breakdown, where Medium Trucks emerge as the primary mode of transport with a volume of 858.00 PCU. High-occupancy passenger Cars trail closely behind at 836.00 PCU, while regional mass transit Buses anchor the third slot at 678.00 PCU.

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N7 - Katakhali

On peak days, Katakhali sheds its local character and functions as a relentless, heavy-duty logistics corridor. Volume climbs early and stays high, maintaining a prolonged, high-pressure plateau all afternoon. The absolute peak lands right at midday (12:00 PM to 01:00 PM at 560.75 PCU), and the road refuses to drop below the 400 PCU threshold until late into the evening. The primary mode of transport completely shifts to accommodate macro-logistics, dominated by Medium Trucks at an incredible 849.00 PCU. Localized vehicles like Motorcycles (504.00 PCU) and Auto Vans (501.00 PCU) are squeezed into the remaining space. This heavy cargo dominance underlines Katakhali's strategic role as a primary commercial trade route during peak economic windows.

Katakhali is a high-volume artery that rarely gets a break, even on off-peak days. The morning maintains a steady baseline around 300 PCU, followed by a post-lunch lull. However, the true bottleneck hits under the cover of darkness: between 06:00 PM and 07:00 PM, traffic swells aggressively to a massive 668.50 PCU, indicating that nightfall triggers a wave of heavy transit. Interestingly, during these off-peak hours, localized economic movement takes up the most space, establishing the paratransit Auto Van as the primary mode of transport (508.50 PCU), with Motorcycles (440.25 PCU) following closely. Yet, the industrial nature of the road is still obvious, as Medium Trucks (357.00 PCU) secure a firm third place, waiting for the evening hours to move freight.

N7 - Foyla Bazar

Peak-day operations expose intense infrastructure strain, resulting in a highly volatile, double-crested traffic pattern. The road experiences two massive waves of congestion: a midday surge (814.75 PCU) and an even larger evening peak between 06:00 PM and 07:00 PM, which maxes out at 838.00 PCU. The primary mode of transport shifts slightly by volume to Motorcycles (659.25 PCU), but it runs neck-and-neck with Medium Trucks (576.00 PCU) and Auto Vans (536.25 PCU). This layout creates a highly problematic traffic mix, where heavy, slow-moving cargo trucks and thousands of light commuter motorcycles are forced to fight for identical road space during the exact same peak hours

Foyla Bazar behaves less like a transit point and more like an active, working marketplace. On off-peak days, it handles sustained, heavy volumes all morning, staying anchored near 500 PCU before climbing to a midday maximum of 750.50 PCU between 12:00 PM and 01:00 PM. Supply chain logistics heavily dictate this grid. Medium Trucks serve as the clear primary mode of transport, contributing a dominant 975.00 PCU. Smaller vehicles like Motorcycles (641.25 PCU) and Auto Vans (579.75 PCU) swarm the road alongside the freight, painting a picture of an active commercial hub where heavy supply lines directly intersect with local retail and wholesale market hours.

N7 - Digraj Bazar

On peak days, the traffic volume in afternoon shows a steady, escalatory climb that builds pressure as the day ages. Starting at a modest 169.75 PCU, the traffic expands linearly with every passing hour. This steady accumulation points to an compounding volume effect, peaking late in the afternoon between 05:00 PM and 06:00 PM at 513.00 PCU. The vehicle hierarchy mirrors the off-peak day but at a larger scale. Motorcycles remain the primary mode of transport at 423.75 PCU, while Auto Vans (322.50 PCU) and Medium Trucks (294.00 PCU) split the remaining share. The progressive climb into the late afternoon highlights a classic closing-hour surge typical of a bustling marketplace district.

Digraj Bazar exhibits a highly centralized, afternoon-heavy traffic pattern during off-peak periods. The morning begins at a moderate 205.00 PCU and experiences steady, controlled growth. The road reaches its maximum capacity of 380.25 PCU right after lunch (01:00 PM to 02:00 PM). The modal split favors everyday personal transit, securing the Motorcycle as the primary mode of transport (399.00 PCU). However, commercial operations run right alongside them, keeping Medium Trucks (336.00 PCU) and regional Auto Vans (270.75 PCU) highly active, signalling steady, mid-day commercial distribution.

N7 - Mongla Port Area

On peak days, traffic volume shows a steady, moderate distribution. The road experiences a rise to 173.00 PCU and a late afternoon peak of 180.50 PCU (05:00 PM to 06:00 PM). The modal distribution is led by Motorcycles (221.25 PCU) and heavily supported by Buses (177.00 PCU) and Auto Vans (161.25 PCU). The fact that bus volumes remain high and steady regardless of the day type confirms a fixed, non-negotiable mass transit infrastructure operating to service the port workforce, maintaining regional connectivity independent of daily traffic fluctuations

The off-peak data for the Mongla Port Area reveals a striking anomaly: a massive, isolated evening explosion. The morning is almost entirely dead, dropping to an absolute baseline low of 30.25 PCU. However, between 05:00 PM and 06:00 PM, the road experiences a violent influx of traffic, blasting to a peak of 339.50 PCU—which is significantly higher than any single hour recorded on the peak day. While Motorcycles constitute the primary mode of transport (217.50 PCU), the unique economic purpose of this gateway is revealed by its second-highest contributor: regional Buses (165.00 PCU). This massive evening spike suggests a highly synchronized shift-change or a scheduled release of port worker transport at the end of a major industrial cycle.

Access Road

Site 01- Zero Point

The traffic volume during a typical peak day shows increase in the late afternoon and evening, where volumes hover at a sluggish 22 to 26 PCU. Instead, the pressure builds late, culminating in a sharp, concentrated evening bottleneck between 05:00 PM and 06:00 PM at 127.25 PCU.

While Motorcycles (147.00 PCU) and Auto Vans (122.25 PCU) remain the primary mode of transport, a telling shift occurs in the background: Pedestrian counts surge to the third highest slot (37.00 PCU). This evening spike, coupled with heightened foot traffic, points to a highly synchronized, work-to-home community exodus at the end of the business day.

During off-peak periods, Zero Point behaves like a standard local artery waking up early. The road experiences a heavy rush right at the start of the day, with traffic peaking immediately between 08:00 AM and 09:00 AM at 131.50 PCU. Once this morning movement settles, the road empties out almost entirely by lunchtime, dropping to a minor fraction of its capacity (27.25 PCU) before seeing a small, steady evening return.

The primary mode of transport keeping this area moving is the Motorcycle (158.25 PCU), heavily supported by informal local transit like Auto Vans (114.75 PCU). This heavy lean toward nimble, low-occupancy vehicles indicates that off-peak days are defined by decentralized, individual errands and short-distance local travel.

Site 02-Cyclone Shelter

On Peak days, Traffic Volume at Site 02 shows early travel starting at 07:00 AM is already substantial at 106.95 PCU, and it continues to increase between 08:00 AM and 09:00 AM, reaching 156.85 PCU. Once this morning migration clears, traffic drops significantly and remains evenly bound below 100 PCU for the remainder of the afternoon and evening.

Passenger Cars strengthen their position as the absolute primary mode of transport, climbing to a dominant 292.00 PCU. Localized public transport via Auto Vans follows closely behind at 133.50 PCU, with Pedestrian flows holding steady at 58.00 PCU. This early morning spike points directly to structured, institutional commuting patterns—such as localized workplace-bound traffic navigating the access road.

On off-peak days, Traffic Volume in this site shows low-pressure profile throughout the morning and early afternoon, typically fluctuating between 41.60 PCU and 73.65 PCU. However, the road experiences a notable late-day shift as dusk approaches; traffic counts expand steadily after 05:00 PM, culminating in a clear daily peak of 124.95 PCU between 06:00 PM and 07:00 PM.

The primary mode of transport supporting this localized footprint is the passenger Car, which contributes an aggregate volume of 201.00 PCU across the observed timeframe. Intermediate paratransit via Auto Vans serves as the critical secondary framework at 123.00 PCU, while Pedestrians make up a notable third-tier share at 57.00 PCU. This specific composition suggests that off-peak travel is dominated by personal utility trips, neighborhood socialization, and community-level commerce in the evening.

Site 03 -Gol Ghor Bot Tola

On peak days, Traffic Volume at Bot Tola shows an isolated spike between 08:00 AM and 09:00 AM, hitting 199.50 PCU—the highest single hour recorded at this location across either day. Once this hour passes, the traffic drops off a cliff, decompressing instantly to 53.75 PCU and remaining flat for the rest of the day.

Motorcycles act as the absolute primary mode of transport, racking up a massive 239.25 PCU in a short window. Because the spike is so narrow and intense, it bears all the hallmarks of an institutional commute—likely a heavy morning migration of students and professionals heading into a nearby urban core or institutional center.

Traffic volume at Bot Tola shows a steady pattern all morning and afternoon. This peace breaks sharply during the evening commute between 05:00 PM and 06:00 PM, where a sudden influx of travellers pushes volumes to their daily maximum of 130.50 PCU.

2.7 Land and Agricultural Resources Monitoring

On peak days, Traffic Volume at Bot Tola shows an isolated spike between 08:00 AM and 09:00 AM, hitting 199.50 PCU—the highest single hour recorded at this location across either day. Once this hour passes, the traffic drops off a cliff, decompressing instantly to 53.75 PCU and remaining flat for the rest of the day.

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Traffic volume at Bot Tola shows a steady pattern all morning and afternoon. This peace breaks sharply during the evening commute between 05:00 PM and 06:00 PM, where a sudden influx of travellers pushes volumes to their daily maximum of 130.50 PCU.

The primary mode of transport here is overwhelmingly two-wheeled, led by Motorcycles (170.25 PCU) and backed by a distinct presence of Bicycles (57.50 PCU), alongside regional Auto Vans (97.50 PCU). The high concentration of bikes and cycles suggests that off-peak traffic is largely driven by local residents making home-bound trips.

2.7.1 Methodology

Monitoring of selected indicators is very crucial for better management of land resources in the study area. Plot/land use, soil fertility/nutrient status, soil contamination with heavy metals, and soil salinity have been considered major indicators for land resource monitoring.

Sampling Frequency

The frequency of monitoring for land resources data collection has been considered twice a year. Accordingly, the soil samples were collected during the 46th monitoring field visit (October-November, 2025) and sent immediately to the laboratory for analysis. The analysis data have been incorporated into this monitoring report.

Monitoring Indicators

Continuous monitoring made an opportunity to observe seasonal changes, along with spatial changes, in selected indicators across sampling plots. The selected indicators are soil reaction (pH), Soil Salinity (EC), Organic Matter (OM), base cations-Ca, Mg, K and Na, the status of macronutrients (N, P and S), status of micro nutrients (B, Fe, Mn and Zn) and presence of heavy metals (Pb and Cd). Sodium Absorption Ratio (SAR), Exchangeable Sodium Percentage (ESP) can be calculated from the analyzed data. It may also be mentioned that the structural change of soils in the sampling plots can also be identified from these data. The formula to calculate SAR is given below, with concentration expressed in milli equivalents per liter (meq/L) analyzed from a saturated paste soil extract.

$$SAR = \frac{[Na^+]}{\sqrt{½\,([Ca^+]+[Mg^+])}}$$

ESP is the sodium absorbed on soil particles as a percentage of the Cation Exchange Capacity (CEC). It is calculated as:

$$ESP = \frac{[Na^+]}{CEC} X\,100$$

CEC is often estimated as the major exchangeable cations, including hydrogen. Both cation and CEC are expressed as meq/100g. ESP can also be calculated as:

$$ESP = \frac{[Na^+]}{[Ca^{2+}+Mg^{2+}+Na^+ +K^+]} X\,100$$

ESP is used to characterize the sodicity of soils only, whereas SAR is applicable to both soil and soil solution or irrigation water.

Location

The selected mauzas are Baranpara of Batiaghata Upazila, Chunkuri-2 of Dacope Upazila, Kapalirmet of Mongla Upazila, Chakgona of Rampal Upazila and Basherhula Rampal Upazila under Khulna and Bagerhat Districts. However, a new sampling location of Mongla Upazila was included with the previous ones for monitoring as per TOR. The sampling locations are stated in **Table 2.8**. Locations of collected soil samples are presented in **Figure 2.38.**

Table 2.11: Land Resources Monitoring Plan

Site No.	Monitoring indicators	Location	GPS (Decimal Degree)		Sampling Frequency	Methods/Tools/ Techniques
			Northing	Easting		
1	Plot use, Soil fertility and nutrient, Chemical properties of soil (pH, Pb, Cd), Crop production and damage	Mouza: Baranpara,	N-22°37′57.0″	E-89°30′59.1″	Bi-yearly (April and October)	In situ field sampling and Laboratory Testing in SRDI
2		Mauza: Chunkuri-2,	N-22°34′51.0″	E-89°32′20.0″		
3		Mouza: Kapalirmet/Buridmial	N-22°32′18.9″	E-89°36′8.8″		
4		Mouza: Chakgona,	N-22°34′18.3″	E-89°34′25.3″		
5		Mouza: Basherhula,	N-22°36′14.0″	E-89°34′25.0″		
6		Mouza: Bidyarbon,	N-22° 33′ 42.0″	E-89° 34′ 40.0″		

2.7.2 Process of Soil Sample Collection

Plot Selection

Monitoring plots were selected at the very beginning of this study. The expert's judgement, along with the plot owner's opinion, was taken into consideration for this selection. Upazila Agriculture Officers of Batiaghata and Dacope of Khulna District, Rampal and Mongla of Bagerhat District and the Senior Scientific Officer of Soil Resource Development Institute (SRDI) of Khulna were contacted to collect expert's judgement. Wind speed and wind direction were considered potential local factors for monitoring purposes. All the selected plots were characterized as medium-high land (F1), which are normally flooded in the range of 30-90 cm and remain inundated for more than two weeks to a few months during the flood period.

Soil Samples Collection

Standard procedure was maintained during the collection of soil samples. In every plot, a minimum of three pits were dug through augur to collect composite samples. Each plot had three composite samples: topsoil (0-15 cm), subsoil (15-30 cm) and substratum (30-45 cm). Soil samples were preserved in an air-tight plastic bag for laboratory analysis.

Laboratory Analysis

Collected soil samples were handed to the SRDI, Dhaka, for laboratory analysis. The analysis data and report have been incorporated into this monitoring report.

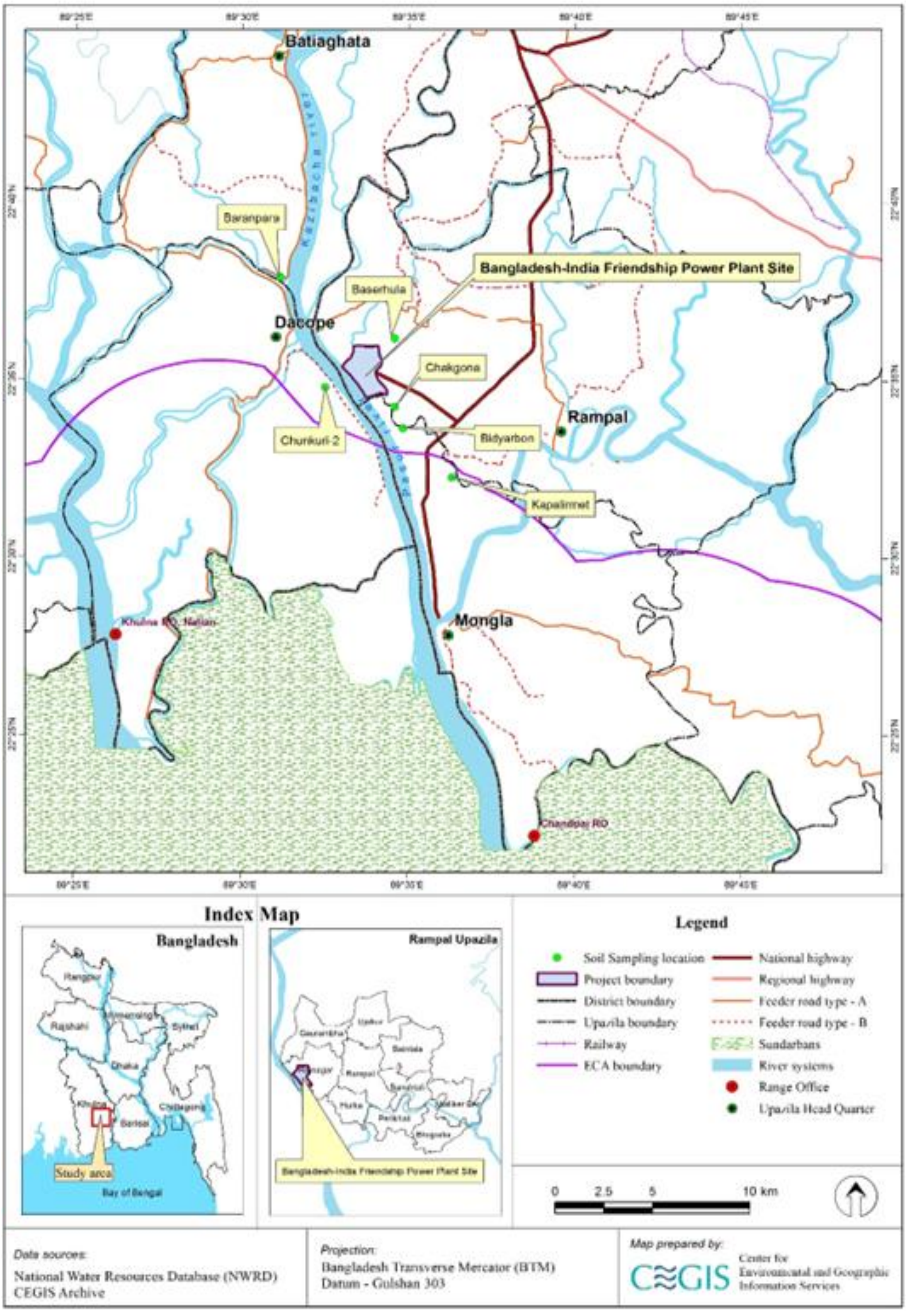


Figure 2.38: Land Resources Monitoring Locations

2.7.3 Status of soil quality of monitoring plots

The soil quality (wet season) of the monitoring plots is given below:

Monitoring Plot-1 (Baranpara)

The soil of Baranpara shows a clear change during this monitoring period. For the last three years, topsoil organic matter had been increasing. However, this year it dropped sharply and became almost half of the previous wet-season value. This sudden fall may indicate erosion or washout of the organic matter-rich topsoil during the wet season. Nitrogen followed the same pattern, which is expected because nitrogen is closely linked with soil organic matter. Sulfur also continued to decline for the third consecutive year and dropped to nearly one-third of the previous wet-season value. In contrast, phosphorus increased after the decline recorded last year.

The soil reaction also changed gradually. Soil pH increased for the second consecutive year, while electrical conductivity (EC) slightly decreased after last year's increase. However, the salinity-related indicators did not move in the same direction. Sodium adsorption ratio (SAR) and exchangeable sodium percentage (ESP) increased, whereas total soluble salts (TSS) decreased. Sodium, potassium and magnesium concentrations increased, while calcium decreased compared to the previous year. Sodium has now increased for four consecutive years, and potassium has increased for three consecutive years.

The micronutrients also showed mixed behavior. Boron and zinc decreased, and zinc continued to decline for the fourth consecutive year. On the other hand, iron and manganese increased after last year's decline. Iron became almost two times higher, and manganese became almost three times higher than the previous wet-season values.

Lead concentration increased slightly compared to the previous wet season. However, it remained within the permissible limit of 85 ppm. Cadmium showed a sharp decline and became almost one-eighth of the previous monitoring-year value. Cadmium has now declined for the second consecutive year and remained within the permissible limit of 0.8 ppm

Monitoring Plot-2 (Chunkuri-2)

The soil of Chunkuri-2 also showed a decline in organic matter after three years of increase. Nitrogen and sulfur also decreased. This indicates that the upper soil layer may have been affected by erosion or washout during the wet season, especially under heavy rainfall. Phosphorus, however, increased after the increase observed in the previous year.

Soil pH increased after the decline recorded last year. This change may indicate the influence of inundation. Last year, the soil was more acidic, but this year it returned close to a neutral condition. EC continued to decrease for the second consecutive year. TSS and ESP also followed a decreasing trend. However, SAR increased. This may be due to the higher sodium concentration, along with increases in potassium, calcium and magnesium compared to the previous year.

Micronutrients generally decreased after last year's increase. This may be linked with the rise in soil pH, because increasing pH can reduce the availability of some micronutrients in soil.

Lead concentration increased slightly compared to the previous wet season but remained within the permissible limit of 85 ppm. Cadmium decreased sharply and became almost one-ninth of the previous monitoring-year value. Cadmium has now decreased for the third consecutive year and remained within the permissible soil limit of 0.8 ppm.

Monitoring Plot-3 (Kapalirmet)

This plot is utilized for fish farming during pre- and post-monsoon periods and remains submerged during the monsoon. Historically, decreasing salinity was typical due to leaching and lentic conditions. The situation still prevails the same. The salinity level (EC) remains almost similar than the previous monitoring wet season. All related Salinity parameters (SAR, ESP and TSS) showed the similar pattern. Among the base cations, potassium and magnesium concentration have increased while sodium and calcium concentration decreased than previous wet season concentration. pH is continuing to increase for third consecutive year which is also an impact of continuous submergence. Soil pH is rising, possibly due to prolonged submergence.

Organic matter, nitrogen, and sulfur concentrations have all declined. Notably, phosphorus concentrations have increased after last year drop. Manganese and Zinc concentration slightly increased after last year drop. While Boron and Iron concentration continues to decrease for three and two consecutive years respectively. Both Pb and Cd concentrations have decreased and remain within permissible limits.

Monitoring Plot-4 (Chakgona)

Organic matter and nitrogen concentrations have declined, along with phosphorus and sulfur concentrations, phosphorus being reduced to half compared to the previous wet season, possibly due to soil erosion. Salinity has decreased for the third consecutive year, as shown by reductions in EC and TSS. But SAR and ESP is increased as all cations (K, Na, Ca and Mg) have shown the increasing trend. Soil pH has increased for third consecutive year.

Zinc and Boron continues to decline while Manganese and Iron is increased after last year drop. Both Lead and cadmium concentration has declined sharply to almost one-seventh and one-ninth than the previous monitoring season respectively. Both of the elements remain within the permissible limit.

Monitoring Plot-5 (Basherhula)

Part of this plot is exposed to the river, making it vulnerable to soil erosion and salinity intrusion, especially during monsoons and storm surges. Organic matter, nitrogen, phosphorus, and sulfur concentrations have all declined, among them Phosphorus and sulfur has declined to one-seventh and one-third to the previous monitoring season, likely due to erosion.

Overall salinity EC has slightly decreased. But TSS, ESP, SAR have increased slightly, potentially due to increase of all cations (sodium, potassium and magnesium) except calcium concentrations. pH remains mostly unchanged. Among micronutrients, boron concentration has decreased, while iron, manganese, and zinc concentrations have increased. Pb and Cd concentrations have declined than the previous monitoring season, one-third and one-twelve respectively and are within permissible limits.

Monitoring Plot-6 (Bidyarbon)

Organic matter, nitrogen, and phosphorus concentrations have increased, while sulfur concentration has decreased, possibly due to reduced salinity. EC has declined for second consecutive year. Although TSS mirrors this trend, ESP and SAR have slightly increased, possibly due to rising sodium, potassium and magnesium concentrations. Calcium concentration has remained stable. Soil pH has shown an upward trend for third consecutive year.

Zinc and iron has increased after last year drop while manganese and Boron has decreased. Pb and Cd concentrations have declined than the previous monitoring season, one-third and one-tenth respectively and are within permissible limits.

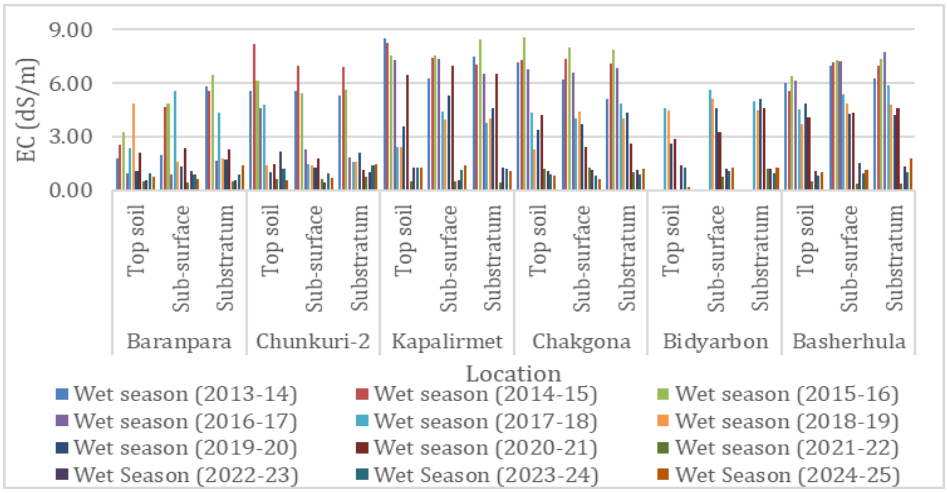


Figure 2.39: Changes of EC (ds/m) in wet seasons in sampling locations throughout the monitoring period

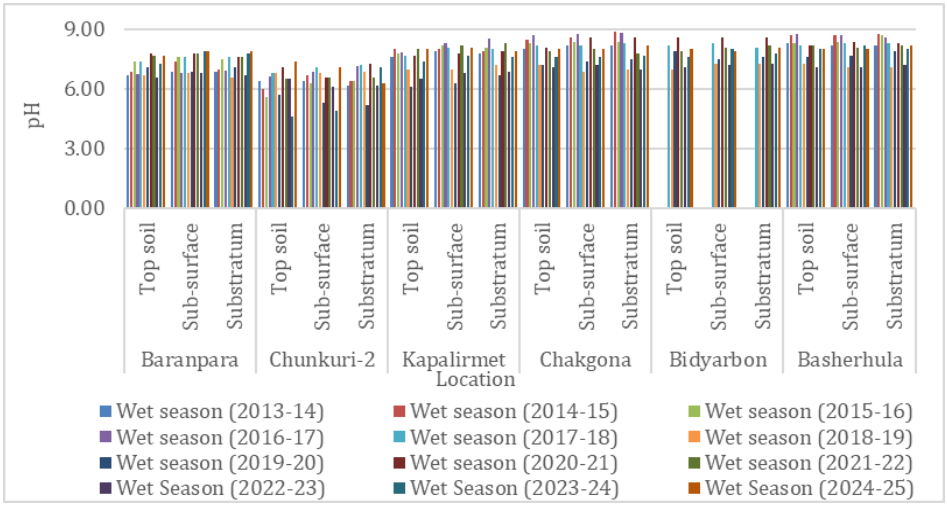


Figure 2.40: Changes of pH in wet seasons in sampling locations throughout the monitoring period

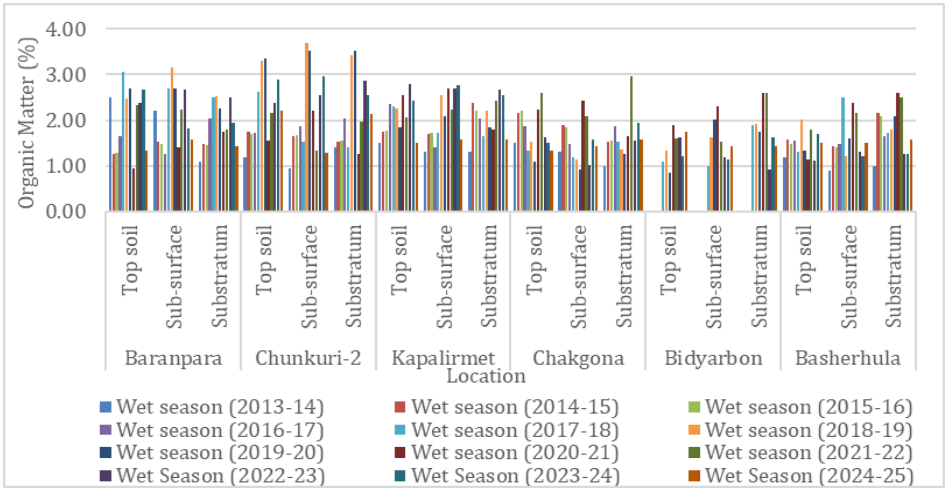


Figure 2.41: Changes of Organic matter (%) in wet seasons in sampling locations throughout the monitoring period

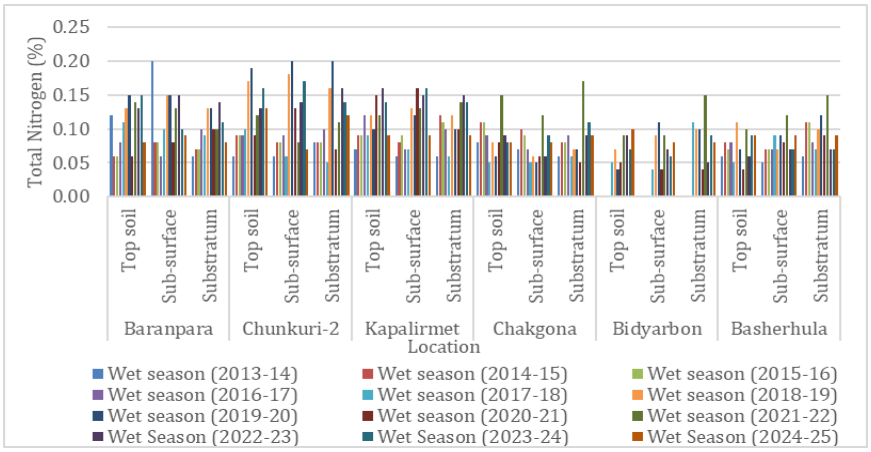


Figure 2.42: Changes of Nitrogen (%) in wet seasons in sampling locations throughout the monitoring period

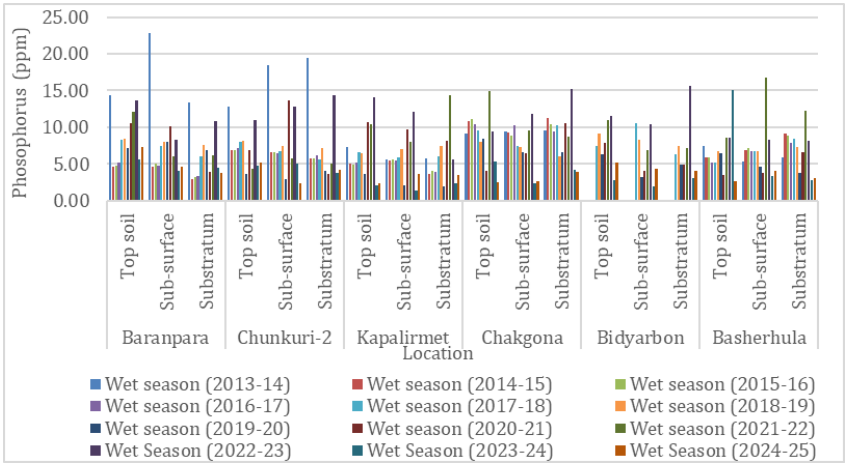


Figure 2.43: Changes of Phosphorus (ppm) in wet seasons in sampling locations throughout the monitoring period

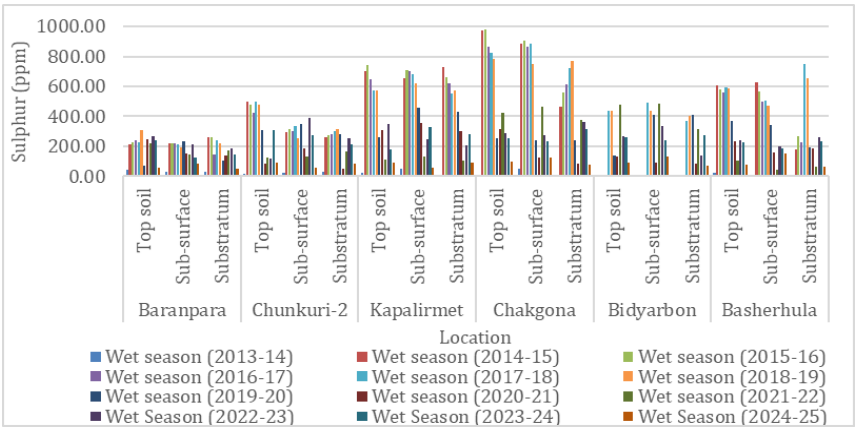


Figure 2.44: Changes of Sulfur (ppm) in wet seasons in sampling locations throughout the monitoring period

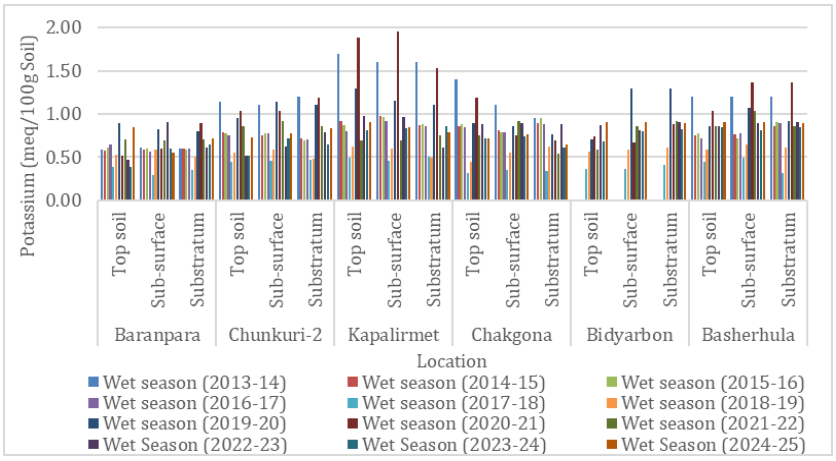


Figure 2.45: Changes of Potassium (meq/100g) in wet seasons in sampling locations throughout the monitoring period

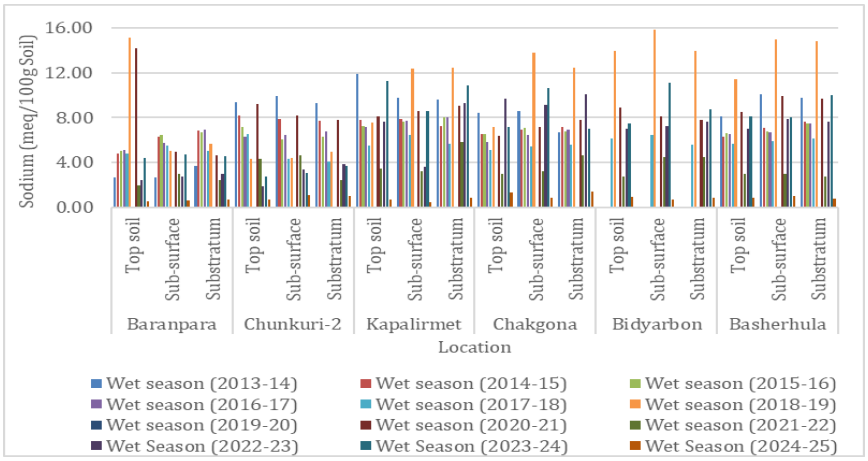


Figure 2.46: Changes of Sodium (meq/100g) in wet seasons in sampling locations throughout the monitoring period

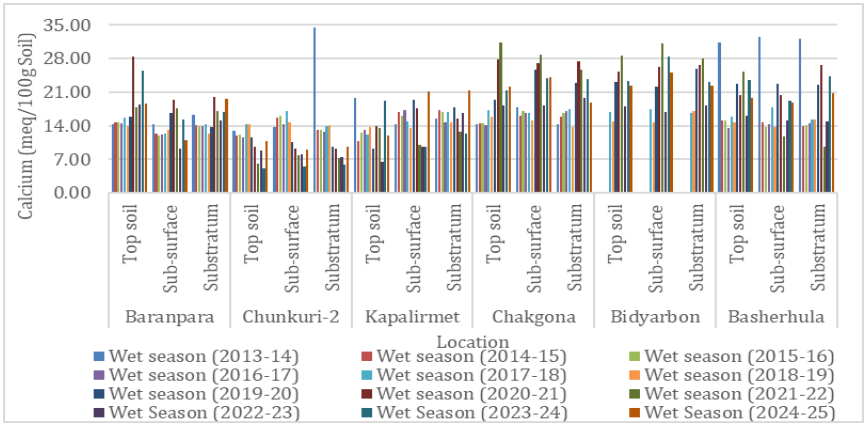


Figure 2.47: Changes of Calcium (meq/100g) in wet seasons in sampling locations throughout the monitoring period

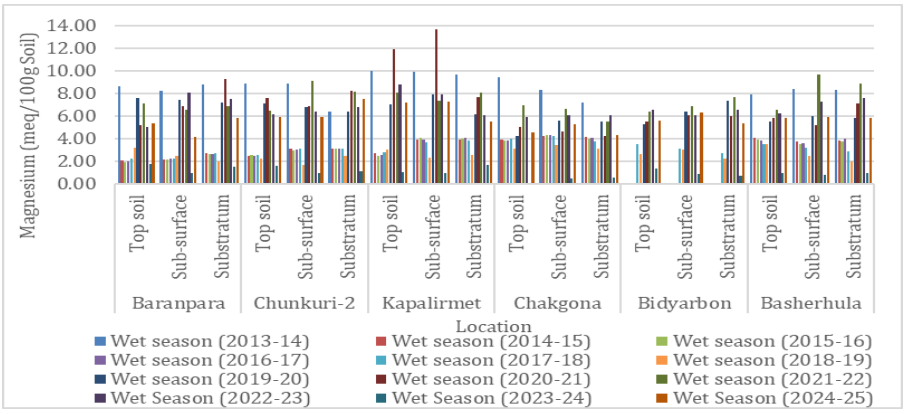


Figure 2.48: Changes of Magnesium (meq/100g) in wet seasons in sampling locations throughout the monitoring period

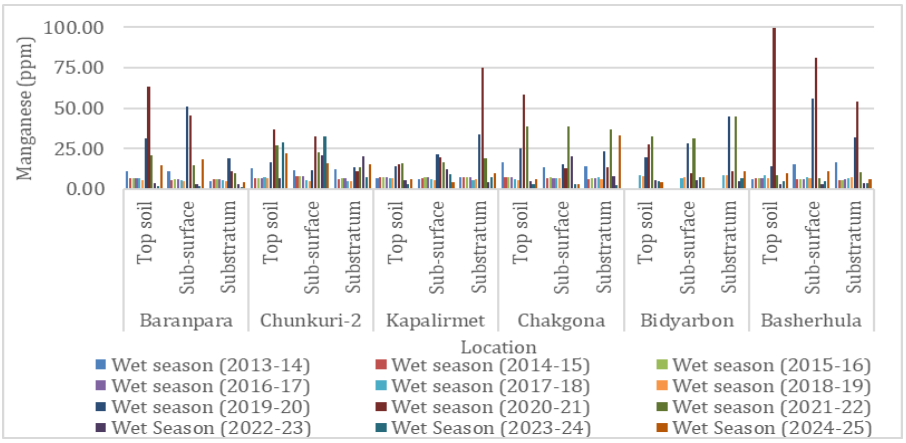


Figure 2.49: Changes of Manganese (ppm) in wet seasons in sampling locations throughout the monitoring period

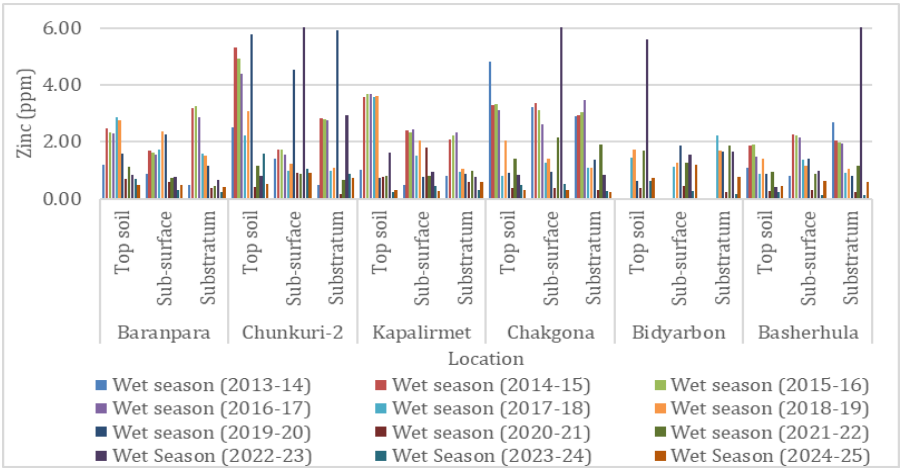


Figure 2.50: Changes of Zinc (ppm) in wet seasons in sampling locations throughout the monitoring period

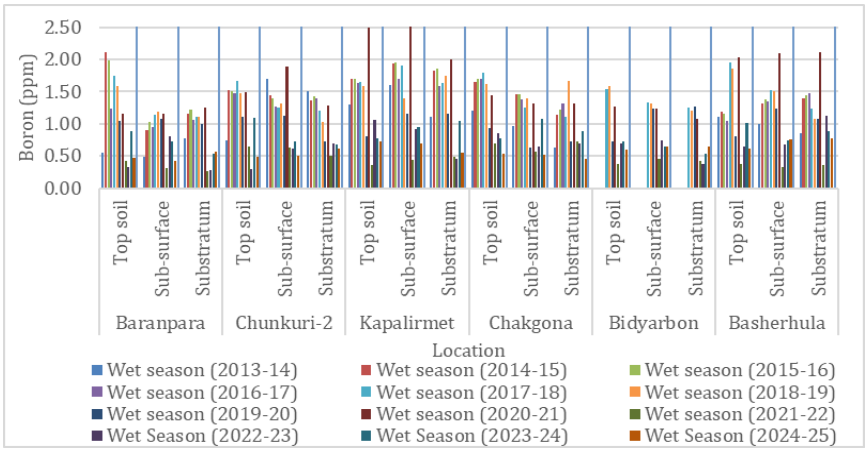


Figure 2.51: Changes of Boron (ppm) in wet seasons in sampling locations throughout the monitoring period

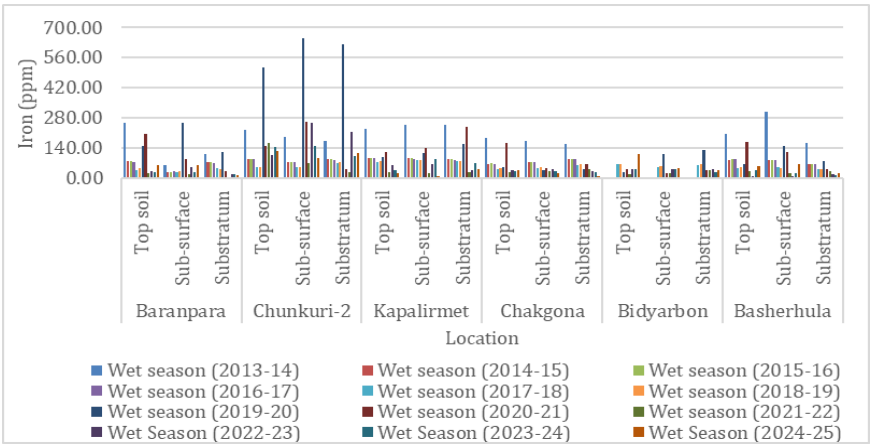


Figure 2.52: Changes of Iron (ppm) in wet seasons in sampling locations throughout the monitoring period

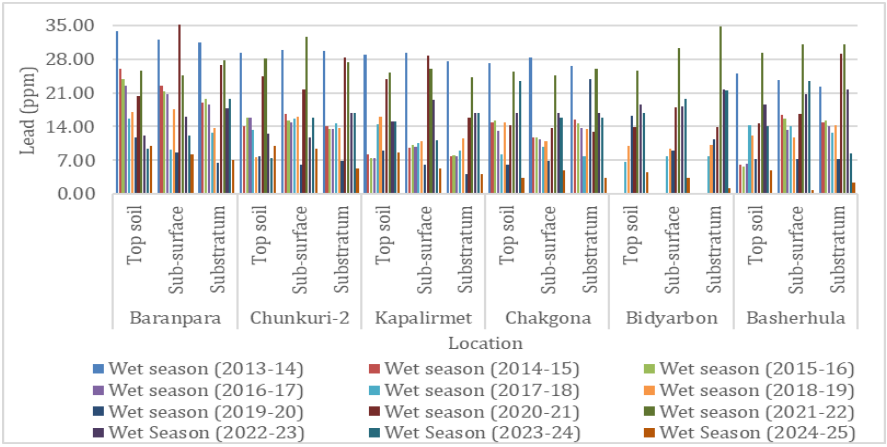


Figure 2.53: Changes of Lead (ppm) in wet seasons in sampling locations throughout the monitoring period

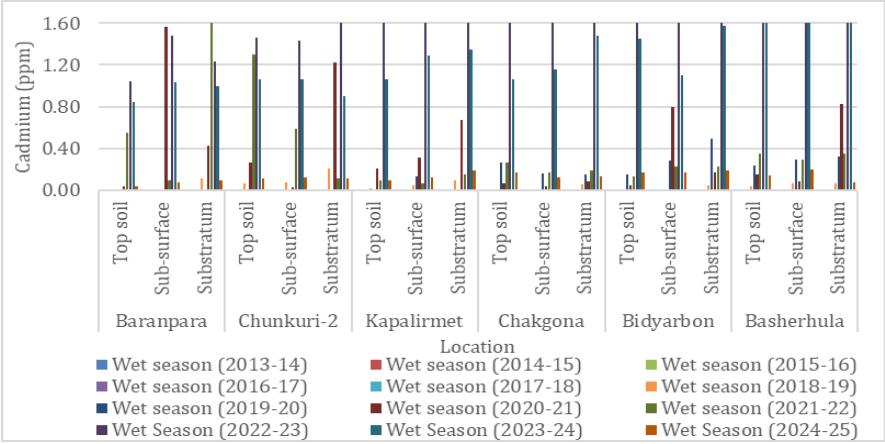


Figure 2.54: Changes of Cadmium (ppm) in wet seasons in sampling locations throughout the monitoring period

2.7.4 Agriculture Resources Monitoring

Monitoring of agriculture resources has been scheduled twice a year (April and October) as per the monitoring plan in the ToR. The next survey will be conducted in April 2026, and the report will be incorporated accordingly.

2.7.5 Livestock Resources Monitoring

The frequency of monitoring for livestock resource data collection has been considered twice a year (April and October). The next survey will be conducted in April 2026, and the report will be incorporated accordingly.

3. Biological Environment

Biological resources include all living organisms within an ecosystem that interact with one another as well as with the concerned physical environment. The biological resources have been categorized into three major types e.g., fisheries resources, ecological resources, and Sundarbans Reserve Forest (SRF), and are being monitored in every quarter of the year to understand the changes in the functionality of the ecosystem in and around the project area as well as in the Sundarbans Reserve Forest area.

3.1 Fisheries Resources

Developing a fine monitoring plan, assessing the impacts of the project on fisheries resources, the impact on fish production and fish biodiversity during the project implementation, as well as suggesting possible mitigation and enhancement measures for increasing benefits of the positive impacts, are the prominent considerations for the fisheries resources monitoring. The monitoring activities as well as results of the previously conducted 46 nos. of quarters for the sessions of 2014-15, 2015-16, 2016-17, 2017-18, 2018-2019, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24 as well as of 2024-25 was completed and reported earlier. This chapter contains the findings of the 47-quarter and a comparison with the earlier 46 quarters.

3.1.1 Methodology

Location of Monitoring Sites

During the period, the monitoring activities were carried out in the 13 pre-selected locations, among which 10 locations were selected for capture fish habitat, and the remaining three (03) sites were selected for shrimp/fish farms (culture fish habitat). Sampling sites for capture fishery were selected based on the available fishing grounds upstream, midstream, and downstream of the Passur River system. Sampling sites for culture fishery (shrimp/fish farms) were selected considering the project influence area. The fisheries resource monitoring locations are provided in **Table 3.1** and also shown in **Figure 3.1**.

Table 3.1: The Sampling Locations for Monitoring of Fisheries Resources

Sampling Site	Capture Habitat Location	Sampling Site	Capture Habitat Location
A	Akram Point	F	Chandpai
B	Haldikhali	G	Jongra
C	Charaputia	H	Mongla Port
D	Bhodra	I	Maidara
E	Harbaria	J	Chalna Point, Batiaghata
Sl. No.	**Culture Habitat Location**	**Sl. No.**	**Culture Habitat Location**
1	Bhekatkhali Khal, Rajnagar	3	Chunkuri-2
2	Kapasdanga-Muralia		

Selection of Parameters

According to ToR, five major components were selected for fisheries resources monitoring, such as fish habitat status, fish migration, fish diversity, shrimp/fish farm practices, and fish production. Fish habitat status was monitored by investigating habitat classification based on length frequencies of different fish species, the sensitivity of fish diversity, and survival success of different life stages of fish. Fish migration status was monitored by assessing migratory fish species diversity, migration

pattern, migration purpose, period and extent of migration, etc. Species evenness, species richness, and community structure were investigated for monitoring fish diversity. Shrimp/fish farm practice was monitored by viewing stocking patterns, growth rate, and mortality rate. Fish production monitoring was divided into capture and shrimp/fish farm production.

Fish Habitat Status

Fish habitat status was monitored by applying a numerical habitat model based on the habitat classification and sensitivity of fish diversity and survival success of different life stages to abiotic and biotic factors. Fish habitat classification was analyzed by calculating Euclidean Distance among sampling sites. Moreover, the similarities in species composition among the sites were analyzed using the Jaccard Index (JI) to estimate the extent of similarity between pairs of data sets.

Fish Migration

Migratory species were identified from the sampling sites by analyzing the common species found in the catch assessment survey and based on the IUCN list.

Fish Diversity

Fish diversity was surveyed by the Catch Per Unit Effort (CPUE) method. The fish individuals were counted according to the length of each species from the samples. Diversity was estimated by analyzing the Shannon-Weiner Index ranges from 0 to 1. Fish species richness (FSR) was analyzed using the Simpson's Index which generates two types of values. The first one includes values from 0 to 1 expressing normalization scores for species richness status, and the second one includes values from one (01) to values equal to the total number of species found in the sample, which suggests how many species are dominant in this fish community. Fish community structure has also been analyzed by counting the length-wise fish individuals.

Fish-Shrimp Culture Practice

Three shrimp farms in close proximity to the MSTPP are being surveyed to monitor the production changes of the farms and also looked into if MSTPP is responsible for the adverse change. The farm owners, farm laborers and the local people are being engaged to collect appropriate information on changes in shrimp production. From the inception of the monitoring to till the monitoring quarter, no claim was made by the stakeholders that the MSTPP is responsible for the fluctuations of shrimp production of the monitoring farms. The major reasons of changes in shrimp production identified through consultations include stocking pattern of the shrimp/fish farm and stocking of post larvae collected from the wild source, infestation of virus, stocking of weak or affected hatchery produced post larvae, etc.

Fish Production

Riverine fish production was surveyed through CPUE. Information on the species-wise production of shrimp/fish farms was collected from the selected farms for the last catch.

3.1.2 Status of Monitoring

Followed by the quarter monitoring of the 2014-15, 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24, and 2024-25 (up to 46th quarter monitoring), 47th quarter monitoring of session 2025-26 was conducted during January-February 2026. No fishing activities were observed at Akram point (A), Charaputia (C), Bhadra (D), Jongra (G) and Mongla (H) point during the field visit in this quarter monitoring.

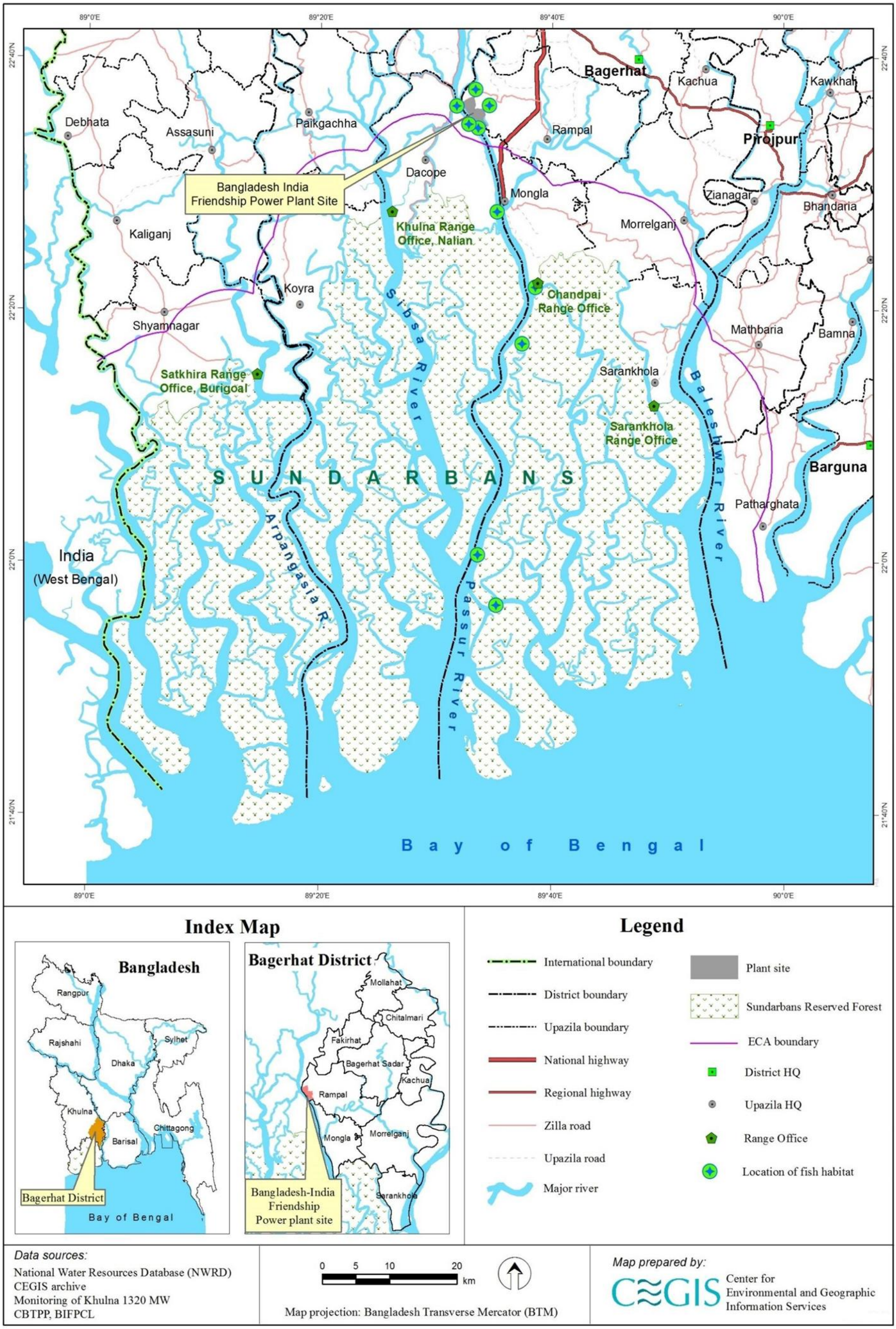


Figure 3.1: Fisheries Resources Monitoring Locations

Fish Habitat Status

Fish habitat status has also varied in the view of habitat classification and habitat use patterns of different life stages of fish species.

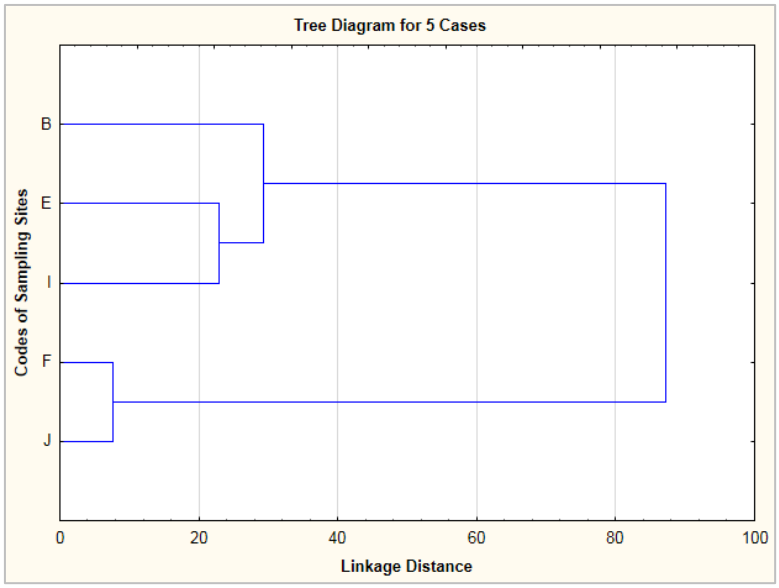
Habitat classification

Habitat classification was analyzed by using the length-wise distribution of different fish species in the sampling sites. The length of different life stages of fish species was identified and evaluated from the literature review. Linkage distance was calculated with the similarity in distribution. The entire stretch of the Passur River System consists of three significant behavioral habitats. The sampling sites were classified based on the abundance of different life stages of fish species in those habitats. Habitat classification of the seven (07) sampling sites for 1st to 15th quarter monitoring and ten (10) sampling sites from the 16th to 46th quarter monitoring according to the ToR with respect to habitat uses for previous quarters of fisheries monitoring shown in **Table E1 of Appendix-IV**.

The sampling sites were divided into two major classes- a) Nursery Ground, and b) Spawning Ground. The classification of functional habitat based on different life stages of fishes is shown in **Figure 3.2**. The classification of the functional habitats from 2014-15 to 2024-25 is attached in (**Figure E2 of Appendix-IV).**

a) Nursery Ground: The sampling sites, Haldikhali (B), Harbaria (E) and Maidara (I) were found to support primarily the length groups of 2-3cm and 3-5cm of available fish species. The sampling sites reveal to be used as nursery ground of available fish species.

b) Spawning Ground: The sampling sites Chandpai (F) and Chalna (J) were found mostly to length group of <2cm of available fish species, indicating spawning ground of the age-group fishes.



(Note: Life stages are identified through length measurement of the fish individuals)

Figure 3.2: Habitat Classification based on Different Life Stages of Fish Species

The dendrogram indicated the Euclidean distances among the JI (Jaccard Coefficient Index) indices, which are opposite the JI values. It was found that the length-wise distribution relationship varied with the seasons and the year-to-year. The high Jaccard Coefficient between Harbaria (E) and Chandpai (F) (**Figure 3.3**) indicates that these two fishing grounds currently support the most similar fish species composition, suggesting comparable habitat conditions and ecological connectivity. Seasonal and interannual variation in similarity among sites reflects the dynamic nature of the estuarine ecosystem, emphasizing the need for continued long-term monitoring to detect ecological changes and guide adaptive management. It also reveals that MSTPP does not exhibit any countable adverse impacts on the riverine fishery. Jaccard Coefficient of similarity of the habitats from 2014-15 to 2024-25 is shown in (**Figure E3 of Appendix IV**).

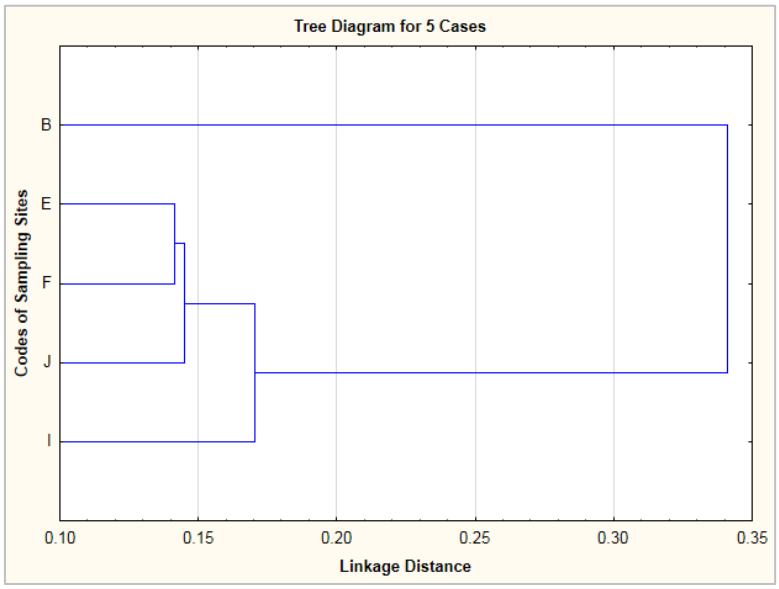


Figure 3.3: Dendrogram Showing Similarity in Binary Species Composition in Seven Sampling Sites

Fish Diversity

Shannon-Weiner Index

In this monitoring year of 2025-26, species evenness also varies among the sampling sites. The highest Shannon-Weiner index was found at Maidara Point (0.65), indicating the most evenly distributed fish species. On the contrary, the lowest evenness was found at Haldikhali (0.30) shown in **Table 3.2**. It has also been found that both the number of fish species found in in-situ catch and the evenness of their distribution within the sampling sites show high variation with the changing seasonal and yearly bio-physical conditions and even fishing effort. The Shannon-Weiner Index of the earlier quarters from 2014-15 to 2024-25 is shown in **Table E7: Appendix IV.**

Fish Species Richness (FSR)

Fish species richness was identified through Simpson's Index[1]. Considerable differences are noticed in the fish species richness (FSR) in different habitat classes (**Table 3.3** and **Figure 3.4**). In this monitoring phase, species richness varies with the sampling sites. Maximum FSR was obtained at

[1]Simpson's index is a method to calculate the community characteristics of fish in a particular habitat. It is mainly used to know about the species richness of a particular habitat to tell how many species are rich in their abundance. The value of this index ranges from 0 to 1. There is other kind of value which is described in the methodology section. The second value is mainly used to measure the species richness in the sampling sites.

Harbaria (E) and Chandpai (F) site (n=18), while very low FSR was recorded at Haldikhali (B) (n=5). Rich species number in the earlier quarters from 2014-15 to 2024-25 is shown in **Table E8 of Appendix IV**.

Among the habitats in the upstream of the Passur River system, Chandpai was rich assemblage of Golda, Chamua, Harina and Chaka Chingri, Maidara was rich of Chaka, Amadi, Chamua and Harina Chingri, Chalna was rich assemblage of Golda, Harina and Chaka Chaka Chingri. The occurrence of fish species from 2014-15 to 2024-25 is shown in **Table E10 of Appendix IV.**

Table 3.2: Site Wise Species Diversity using Shannon-Weiner Index

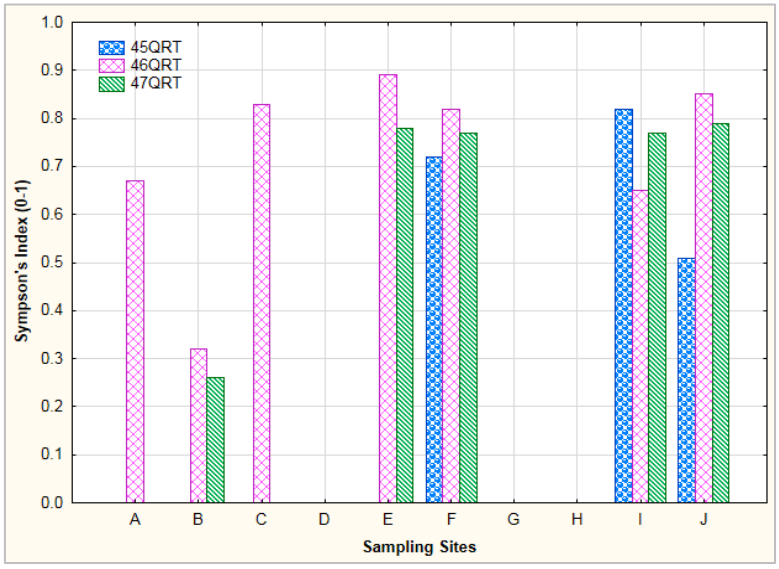
Sampling Site	Species Number	Shannon-Weiner Index	Sampling Site	Species Number	Shannon-Weiner Index
A	-	-	F	18	0.60
B	5	0.3	G	-	-
C	-	-	H	-	-
D	-	-	I	13	0.65
E	18	0.61	J	17	0.63

**According to Shannon-Weiner Index, 0-0.30: Low diversity/equally distribution (VH); 0.31-0.50: Moderate Diversity (M); 0.51-0.80: High Diversity (HD) and 0.80-1.0: Very High Diversity (VHD).*

Table 3.3: Site Wise Rich Species Number

Sampling Site	No. of Rich Species	Sampling Site	No. of Rich Species
A	-	F	4
B	1	G	-
C	-	H	-
D	-	I	4
E	5	J	5

Source: Field Survey, January-February 2026



(FSR is identified through Simpson's Index)

Figure 3.4: Site-wise Fish Species Richness (FSR) in the Passur River System

Fish Community Structure

The fish community structure was analyzed by counting the length-wise fish individuals (**Figure 3.5**). The following **Figure 3.5** shows that larva dominants at Chandpai and Chalna sites. Fry are observed at Haldikhali, Harbaria and Maidara Point. The length-wise distribution of fish species in this quarter is shown in **Table D.6 in Appendix IV**. The length-wise fish individuals in different sampling sites from 2014-15 to 2024-25 are shown in **Figure E11 of Appendix IV.**

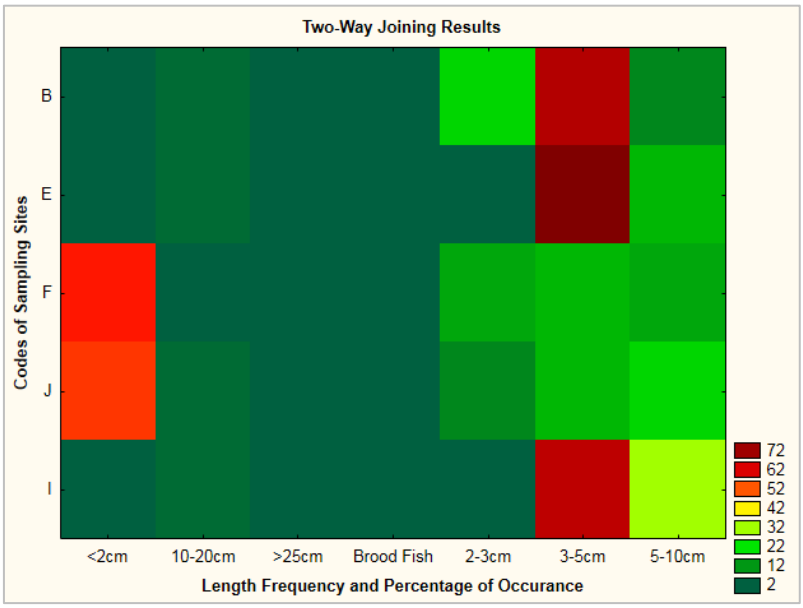


Figure 3.5: Habitat Distribution of Different Life Stages of Fish Species

Note: N.B.: Colour ranges from deepest green to deepest red. 0-4.99% Occurrence signifies Deepest Green; 5-9.99%-Shaded Green; 11-14.99%-Normal Green; 15-19.99%-Light Green; 20-24.99%; 25-29.99%-Lightest Green; 30-34.99%; 35-39.99%; 40-44.99; 45-49.99; 50-54.99-Light Magenta; 55-59.99-Deep Magenta; 60-64.99%; 65-69.99%; 70-74.99%; 75-79.99%-Light Red; 80-84.99%-Deep Red; 85-89.99%; 90-94.99%; 95-100%-Deepest Red.

Fish Migration

Migratory Species Diversity

Migratory species were identified by analyzing the common species available in regular catch from the sampling sites. Fish species like Golda, Amadi, Bagda and Paissa attain the maximum abundance among the migratory fish species observed during the 47th quarter monitoring period. The relative abundance of the migratory species is given below in **Figure 3.6**.

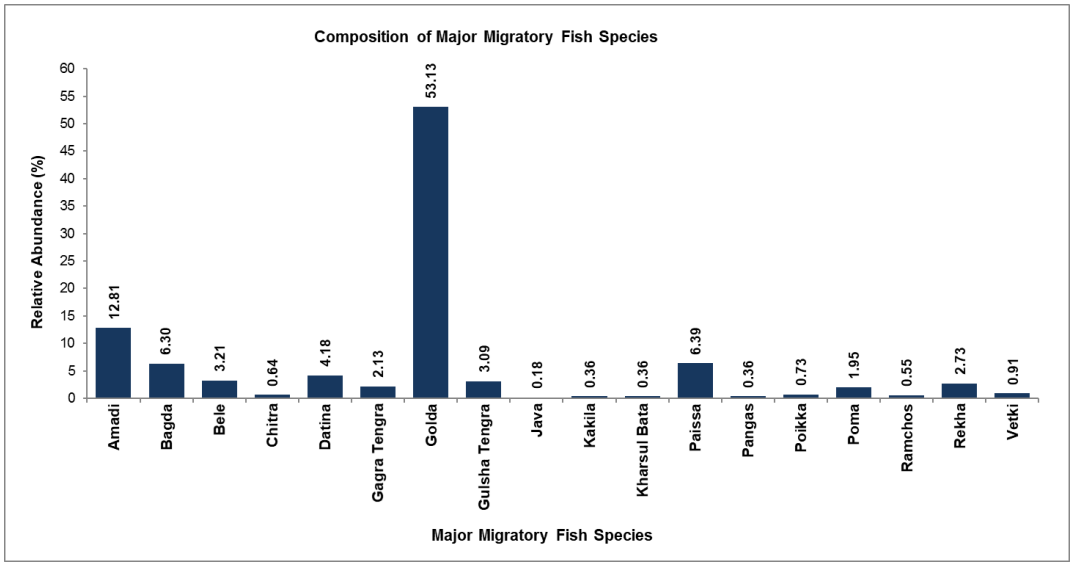


Figure 3.6: Relative Abundance of Major Migratory Fish Species in Sampling Sites

Migration Extent, Time and Purpose

In-situ catch showed interesting patterns in fish migration for different purposes, all along the sampling sites. Among the migratory species, Poma was supposed to migrate long distances (**Figure 3.7**). The purpose, timing, and extent of migration for migratory fish species from 2014-15 to 2024-25 is shown in **Table E12 of Appendix IV.**

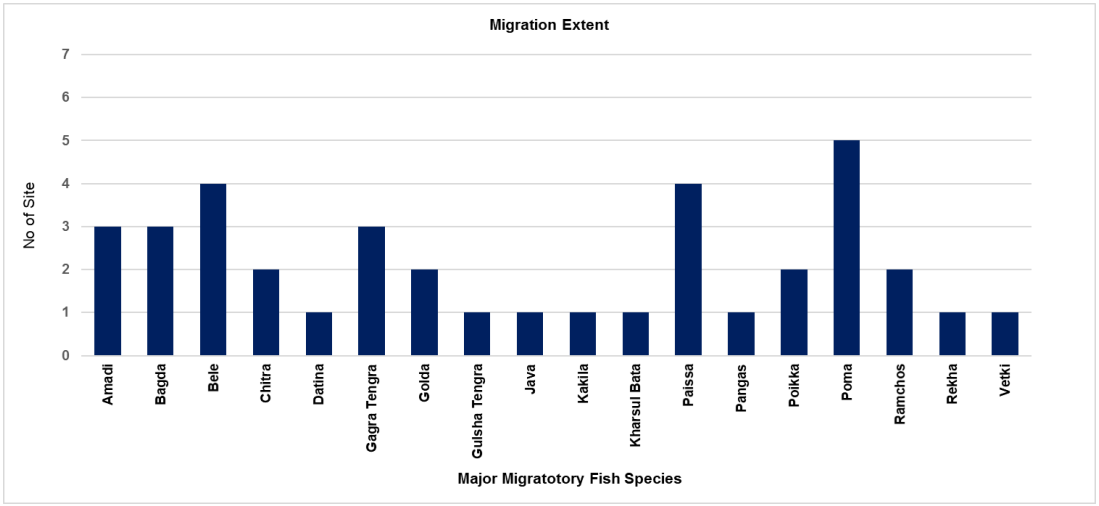


Figure 3.7: Migration Extent of Major Migratory Fish Species in Sampling Sites

Shrimp/Fish firm

Three farms located around the MSTPP area have been surveying to monitor shrimp and or fish aquaculture. Stocking pattern of the shrimp/fish farm is one of the main determinant factors of production gain and loss. Stocking of post larvae from the wild source like the Passur River indicates low mortality with a high productivity, which ensures higher economic gain. However, infestation of virus and pollutants from any kind of sources may contaminate the farm and may create havoc by a drastically reduced production. However, interviewing the farm owners, laborers and local people, it was learnt that no such contamination came from the MSTPP though a very small section of people has the reverse perception. If the farm production decline through a virus infestation, they though that the power plant is responsible for that whereas this problem persisted before the plant established.

In this backdrop, stocking patterns, growth rates, mortality rates, and their causes have been surveying intensively to find out the root cause of shocking production of the farms and the misconception of local people.

Stocking Pattern

It is reported by the farmers of the shrimp farms that maximum stocking in case of *Bagda* was found at Kapashdanga gher followed by Chunkuri-2 and Rajnagar gher. In case *Harina*, the stocking density was highest at Rajnagar followed by Chunkuri-2. Stocking pattern of different fish/shrimp species the farms is shown in **Table 3.4**.

Table 3.4: Stocking Pattern of Fish/Shrimp Farm

Name of shrimp farm	Name of species	Stocking Density (No/ha)	Stocking Period
Rajnagar (42.09 ha)	Bagda	2,376	January to February, 2026
	Paissa	5940	
	Datina	238	
	Horina	9503	
Kapashdanga-Muralia (115.7ha)	Bagda	4322	
Chunkuri-2 (6.07ha)	Bagda	2,471	
	Harina	824	
	Paissa	1,647	
	Motka	3,295	
	Tilapia	49	

Source: CEGIS Field Survey, January-February 2026

Shrimp/Fish Growth and Mortality Rate

During the 47th quarterly monitoring period, the maximum mortality rate was observed in Chunkuri-2 (**Table 3.5**)**.** Growth rate mortality rate from 2014-15 to 2025-26 is shown in **Table D.8 of Appendix IV**.

Table 3.5: Growth Rate and Mortality of Fish/Shrimp

Gher No.	Name of Shrimp Farm	Growth Rate (cm/day)	Mortality (%)
1	Rajnagar Gher	0.17	6
2	Kapashdanga-Muralia	0.18	8
3	Chunkuri-2	0.13	15

Fish Production

Capture Fish Production

The present study found the highest catch susceptibility for Behundi Jal (8.35 kg/haul), as shown **in Table 3.6**. The highest production was observed at Harbaria, followed by Chandpai and Haldikhali, as shown in **Table 3.7**. Fish production in the earlier quarters is shown in **Table E9 in Appendix IV.**

Table 3.6: Total Catch in Different Gears in the Sampling Sites

Site	Habitat	Gear Name/Type	Fishing Duration (hr)	No of Haul	Catch (Kg/haul)
A	Passur-Shibsa Confluence	-	-	-	-
B	Haldekhali Khal	Ber Jal	2.0	1	7.5
C	Charaputia Khal	-	-	-	-
D	Bhodra Khal	-	-	-	-
E	Passur River	Borshi	3.0	3	0.83
		Charpata Jal	12.0	1	7.75
F	Shela River	Behundi Jal	2.0	4	0.19
		Khepla Jal	1.5	15	0.06
		Behundi Jal	1.0	3	0.2
		Behundi Jal	2.25	4	0.21
		Net Jal	0.5	4	0.13
		Net Jal	0.45	5	0.13
		Borshi	2.0	3	1.17
G	Jongra Khal	-	-	-	-
H	Passur River	-	-	-	-
I	Passur River	Khepla Jal	2.5	22	0.08
		Khepla Jal	2.0	16	0.06
J	Passur River	Behundi Jal	3.5	8	0.38
		Behundi Jal	3.0	9	0.18
		Khepla Jal	2.0	20	0.06

*Source: Catch assessment survey, CEGIS; January-February 2026; * Weight of Fry is not considered for catch assessment*

Table 3.7: Total Catch in the Sampling Sites

Sampling Site	Total Catch (kg)	Sampling Site	Total Catch (kg)
A	-	F	7.73
B	7.5	G	-
C	-	H	-
D	-	I	2.75
E	10.25	J	5.9

**Average Weight 0.15kg/mud crab and average weight 0.6 kg/mud eel ** Weight of Fry is not considered for catch assessment*

Culture Fish Production

During the 47th quarter monitoring phase, fish production from the shrimp/fish farms was not observed as this monitoring period was stocking phase**.** Shrimp/fish production in the previous monitoring quarters (2014-15 to 2024-25) is shown in **Table E13 and E14 of Appendix-IV**.

3.2 Ecological monitoring

3.2.1 Indicator Framework

The monitoring framework for the operation phase has been kept the same ecological indicators used during the construction stage to maintain data consistency and trend comparability. Vegetation structure, species composition, and canopy cover were having been considered as primary indicators to understand the terrestrial ecosystem condition, productivity, stability, and human disturbance. Monitoring of bird colonies is another important sensitive indicator to assess the habitat quality of bird. Resident bird presence reflects local nesting and resource availability, while migratory species indicate broader landscape suitability and seasonal habitat integrity. For the aquatic system, dolphin

occurrence remained the key indicator of river health. Changes in dolphin presence or migration pattern provide early signals of water quality deterioration, siltation, or habitat disruption.

3.2.2 Rationale for Monitoring Location Selection

Terrestrial monitoring sites are concentrated to the north of the project boundary, aligned with prevailing south-to-north wind patterns that increase the likelihood of project-related influence in this zone. The southern side of the project was excluded, as the Sundarban Reserve Forest located approximately 14 km south is already subject to separate, long-term ecological monitoring.

Homestead ecosystem and roadside plantation survey were conducted in areas adjacent to the surrounding region of the Maitree Power Plant. The monitoring sites are located along the nearby village roads and homesteads to observe roadside vegetation conditions and bird diversity. These sites represent typical rural landscapes consisting of homestead plantations, roadside trees, ghers, and small water bodies that provide suitable habitats for various bird and other species. The **Figure 3.8** shows the location of different survey in land ecosystem within the study area.

3.2.3 Monitoring Site Description

Kalekarber Homestead

Kalekarber homestead is located approximately 1.8 km to the eastern side from the Power Plant area. The site is relatively elevated compared to surrounding landscapes and remains largely free from seasonal flooding. Due to its stable topography and well-drained soil conditions, the area supports consistent vegetation growth throughout the year. The homestead vegetation mainly consists of planted tree species and household gardens, providing a suitable environment for monitoring plant health and productivity.

Chalkghona Homestead

Chalkghona homestead lies at about 0.5 km south from the southeast boundary of the project area. The location is situated between the Maidara River on the northern side and extensive saline shrimp farms on the southern side. Several peripheral ditches and shallow water bodies surround the homestead, which create conditions favorable for salt-tolerant plant species. The site provides an opportunity to observe ecological variation influenced by salinity and waterlogging conditions in the surrounding environment.

Borni Homestead

Borni homestead is situated approximately 3.0 km to northern side from the northeast boundary of the project and is located near the central part of the village. Vegetation in this area is primarily dominated by planted tree species commonly found in rural homesteads. The soil characteristics of this site are similar to those observed in Rajnagar, making it suitable for comparative analysis between monitoring locations. The relatively stable land use and vegetation pattern support long-term ecological observation.

Chalna Homestead

Chalna homestead is located in Char Chalna village, approximately 4.6 km from the Rampal Power Plant. The site represents a typical rural homestead environment where vegetation is mainly composed of planted tree species. The surrounding landscape includes agricultural fields and scattered homestead gardens, providing an important location for monitoring vegetation growth and productivity in relation to local environmental conditions.

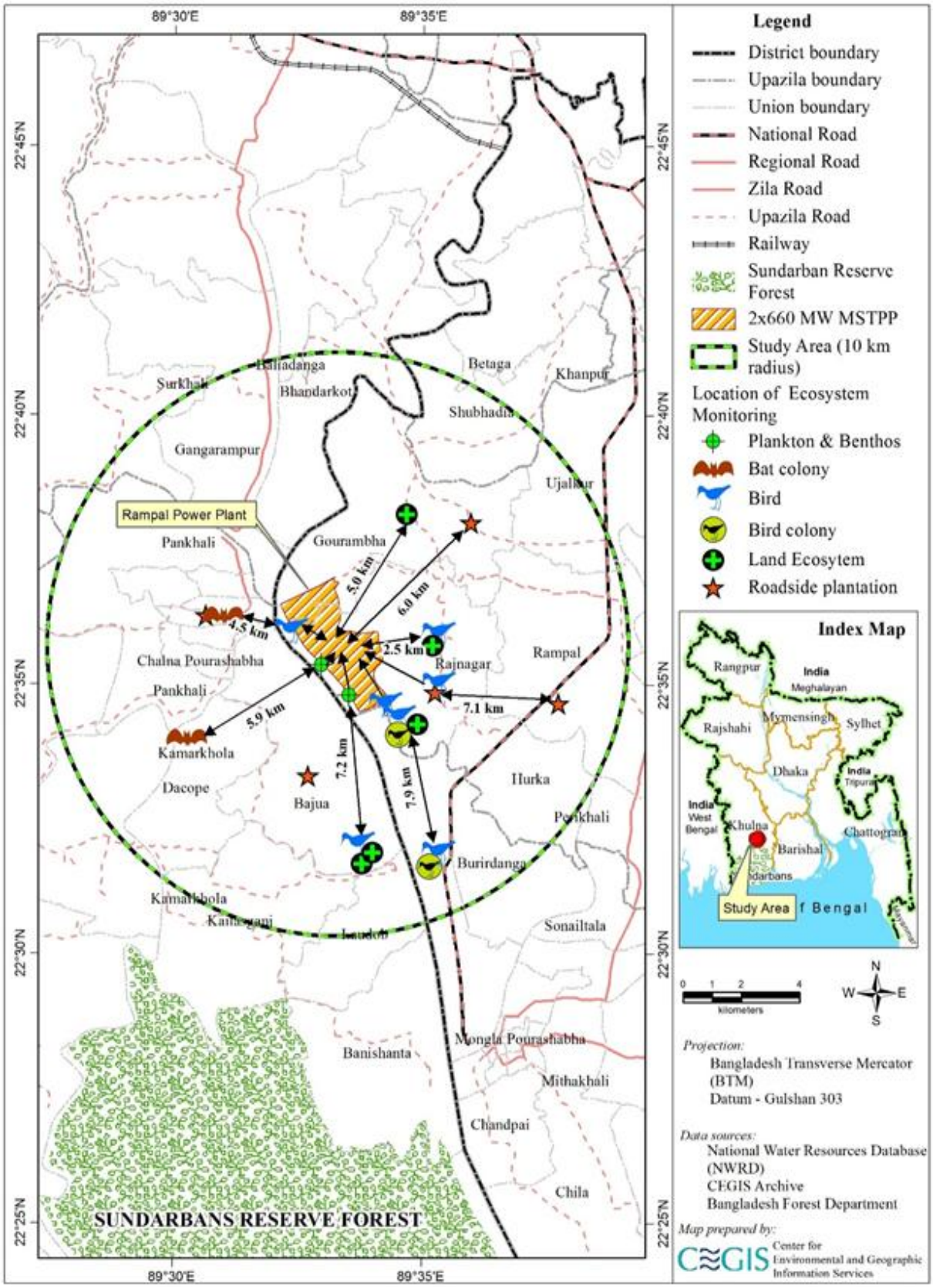


Figure 3.8: Land ecosystem survey location

Bajua Homestead

Bajua homestead is located in Bajua village, approximately 6 km away from the Rampal Power Plant. The area is characterized by mixed homestead vegetation including fruit-bearing trees, palms, and Shade trees. The site is relatively distant from the project boundary compared to other monitoring sites and therefore serves as a useful reference location for observing vegetation conditions and potential environmental variations within the wider study area.

3.2.4 Plant diversity

A total of 62 plant species belonging to 30 families across five study sites, reflecting an overall improvement in floristic composition compared to the previous monitoring period. The overall Shannon–Wiener Diversity Index was 3.12, indicating a notable increase in plant diversity within the study area. This increase may be attributed to enhanced sampling coverage, natural regeneration, and continued enrichment planting practices in homestead and roadside areas. The exclusion of highly disturbed sites such as Rajnagar has also allowed for a more accurate reflection of ecological conditions in relatively stable habitats

This monitoring incorporated additional sampling plots in Bajua and Chalna, while the Rajnagar site has been excluded due to significant anthropogenic disturbances and land-use modifications observed in earlier assessments. The inclusion of new plots has contributed to a more representative and accurate assessment of vegetation diversity across the monitoring landscape.

Site-wise variation remains evident. Chalna exhibited the highest diversity index ($H' = 2.63$) and species richness (29 species), suggesting favorable habitat conditions and effective natural regeneration or plantation practices. Bajua and Chalkghona both supported 21 species, with Bajua showing relatively higher diversity ($H' = 2.42$), indicating improved species distribution. Borni recorded 18 species ($H' = 2.36$), maintaining moderate diversity, while Kalekarber showed comparatively lower richness with 16 species ($H' = 2.20$), though still within a stable diversity range with number. The vegetation diversity indes has been appended in **Table F1** of **Appendix IV**.

3.2.5 Homestead Plant Health

Plant health monitoring in the 47th QM focuses on five locations, excluding Rajnagar, which was not surveyed during this period. The assessment compares plant condition between February 2025 and February 2026, highlighting unhealthy individuals, emerging stress patterns, and site-specific disturbance factors. Overall, vegetation across the monitored sites remains largely stable, with only localized instances of plant stress.

Site-wise Observations

Borni

Borni shows slight variability compared to the previous cycle. While most species remain healthy, a few unhealthy individuals were recorded in coconut, mango, and sapota. A noticeable increase in unhealthy individuals of Syzygium cumini suggests localized stress, potentially linked to site-specific conditions such as waterlogging or soil compaction. Despite these minor concerns, overall vegetation health remains stable without any large-scale disturbance.

Kalekarber Dighi

Kalekarber Dighi continues to maintain generally good plant health, though a small increase in unhealthy individuals is evident. Coconut, date palm, and mango show isolated cases of decline. These are scattered and do not indicate any systematic issue, suggesting natural factors such as aging, minor

pest incidence, or seasonal stress. The site remains relatively undisturbed.

Chalkgona

Chalkgona shows a continued presence of plant stress, with unhealthy individuals observed in coconut, date palm, and keora. The pattern indicates ongoing localized disturbance, likely associated with nearby land-use practices such as gher management and vegetation clearing. Compared to earlier monitoring periods, the stress appears dispersed rather than resulting in significant plant loss, but the pressure remains persistent.

Bajua

Bajua exhibits stable and healthy vegetation conditions with no recorded unhealthy individuals across all species. Mango, mahogany, and other planted species show good survival and growth. The absence of visible stress suggests favorable environmental conditions and minimal disturbance during this monitoring period.

Chalna

Chalna remains largely stable, with only a few unhealthy coconut individuals recorded. Other species—including areca nut, mahogany, mango, and amloki—show good condition and consistent growth. The minor decline in coconut appears isolated and is likely related to natural or site-specific factors rather than broader disturbance.

Across the five monitored locations, vegetation health remains stable with minor, localized increases in plant stress. No widespread or systematic decline is evident. Observed changes are primarily associated with natural factors and localized land-use activities rather than broader environmental impacts. Continuous monitoring would be helpful to determine whether these patterns persist or intensify over time.

3.2.6 Monitoring of Roadside Plantation

Field survey was conducted to assess the condition and productivity of roadside plantations within a 10 km radius of the Power Plant. The survey aimed to evaluate fruit production from common roadside trees and to understand potential environmental influences on their productivity. Sampling was carried out along the selected road segments, where 500 m stretches of roadside plantation were methodically observed and recorded. The survey primarily focused on commonly planted species in the area, including coconut (*Cocos nucifera*), palm (*Borassus flabellifer*), date palm (*Phoenix sylvestris*), areca palm (*Areca catechu*) and mango (*Mangifera indica*). The current survey represents the primary monitoring of fruit production and provides a baseline for future assessments. Subsequent monitoring at regular intervals will be conducted to evaluate the production trend.

During field observations, the production status of each tree was visually assessed and categorized into three levels: good production, moderate production, and poor or no production. For coconut (*Cocos nucifera*), trees bearing four or more green coconuts were classified as having good production, those with two to three green coconuts as moderate production, and those with one or no green coconut as poor production. For palmyra palm (*Borassus flabellifer*), trees producing more than 50 fruits were considered good, 30–50 fruits as moderate, and fewer than 30 fruits as poor. In the case of date palm (Phoenix sylvestris), trees with three or more fruit-bearing branches were categorized as good, two fruit-bearing branches as moderate, and one or no fruit-bearing branch as poor. For areca palm (Areca catechu), more than 42 fruits per bunch indicated good production, 22–42 fruits per bunch indicated moderate production, and 21 or fewer fruits per bunch indicated poor production. Similarly, for medium-sized mango (Mangifera indica) trees, more than 150 fruits per tree were

considered good production, 51–149 fruits represented moderate production, and 50 or fewer fruits were classified as poor production. The criteria used to classify production status were formulated using information obtained from local key informants and field observations. The selected production categories represent the normal production trends of the respective tree species within the study area and provide a practical basis for rapid field assessment. The number of trees falling into each production category was recorded for each species. Observations were conducted through direct visual inspection and consultation with local residents where necessary to understand seasonal production patterns.

To better understand the production dynamics of fruit-bearing tree species, repeated monitoring will be conducted at different time intervals to determine whether production is increasing, decreasing, or remaining stable over time.. This continuous monitoring approach helped identify the actual production scenario of roadside plantations and allowed for the documentation of possible factors affecting productivity. In addition to production status, potential influencing factors such as tree health, age, pruning condition, surrounding land use, water availability, soil condition, and possible environmental stressors were noted during field visits. These observations were used to interpret the productivity status and to identify potential impacts associated with environmental changes in the study area. The collected data were compiled and analyzed to evaluate overall production trends and the condition of roadside plantations within the study area. This assessment provides an indication of vegetation health and potential environmental influences in the vicinity of the Rampal Power Plant.

Result

At most sites, coconut trees show good fruit production, except in the Chalna area, where a noticeable decline has been observed. Local people suggest that this may be due to the presence of mobile towers or possible diseases, though this requires further investigation. In the case of date palm, a relatively higher number of trees are in poor condition, with drying of the top section being a common issue. This also needs detailed assessment to determine the underlying causes. Mango production appears to be at an average level across all sites, as observed visually, although flowering is influenced by multiple factors. Palm and areca palm trees did not exhibit any fruiting during the monitoring period.

3.2.7 Vegetation Canopy Status

Canopy cover was measured using densitometer readings from four portions (north, south, east, west) within homestead vegetation plots, allowing consistent comparison with earlier datasets while improving spatial accuracy.

Borni continues to show a steady and mature canopy profile. From 21% in 2023, canopy cover gradually increased to 25% in 2026, indicating sustained vegetation growth with minimal disturbance. The consistency suggests a well-established system where regeneration and usage remain in balance. On the other hand, Kalekarber remains one of the most structurally stable sites. Canopy cover has slightly improved to 25%, maintaining its position as a relatively undisturbed and mature vegetation zone. The uniform trend across years reflects limited extraction pressure and healthy stand development. Similarly, Chalkghona presents a more dynamic situation. After a slight decline in 2025, canopy cover increased to 23% in 2026, largely due to better representation from surrounding vegetation. However, field observations confirm ongoing pressure from firewood collection and fisheries-related pruning, particularly along gher boundaries. While the overall canopy percentage appears moderate, localized thinning is evident, indicating that human dependency on woody biomass continues to shape vegetation structure.

Moreover, the inclusion of new plots in Bajua reveals a well-developed canopy condition (25%), which was not captured in earlier monitoring. These areas exhibit comparatively dense homestead

vegetation with mixed species composition, suggesting favorable management and lower immediate disturbance. This addition significantly strengthens the overall canopy assessment. Similarly, Chalna shows a strong canopy presence (25%) in the newly established plots. The vegetation appears relatively intact, with good crown cover and species layering. The improved sampling approach highlights those parts of Chalna support healthier canopy conditions than previously documented.

The 47th monitoring indicates a positive shift in canopy condition across the study area, with most sites now reaching around 23–25% canopy cover. This improvement is partly driven by natural vegetation growth and localized management practices. At the same time, site-specific pressures remain visible. Chalkghona reflects continued dependency on vegetation for fuelwood and aquaculture management, which may limit long-term canopy expansion if not managed carefully. In contrast, Borni, Kalekarber, Bajua, and Chalna demonstrate stable to improving canopy conditions, suggesting relatively balanced human–vegetation interactions. Overall, the vegetation canopy across the monitoring sites appears resilient and gradually improving, though targeted management especially in resource-dependent areas will be important to sustain. Canopy status during the operation stage is shown in **Figure 3.9**.

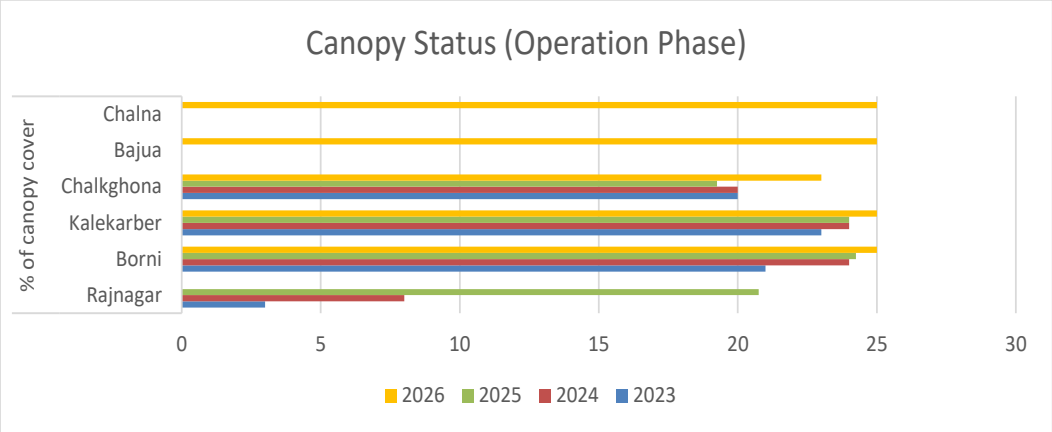


Figure 3.9: Site wise canopy cover percentage within study area

3.2.8 Avifaunal and Bat Colony Survey

Bird surveys were conducted to assess ecological conditions and detect potential environmental impacts because they are relatively easy to observe, widely distributed across habitats, and respond sensitively to environmental changes. The survey focused particularly on colonial wetland birds, including species such as herons, egrets, and cormorants. These species typically form breeding colonies in wetlands, mangroves, or large trees near water bodies. Colony sites were identified through field observations and consultation with local communities. At each colony location, the number of nests, active breeding pairs, and overall bird abundance were recorded using binoculars and visual counts. Observations were conducted during the early morning and late afternoon when bird activity is typically highest.

In addition to wetland bird colonies, bat colonies were also considered for the monitoring purpose during the survey due to their ecological importance and sensitivity to habitat disturbance. Potential roosting sites such as large trees, abandoned structures, and dense vegetation were inspected in this regard. The survey also included observations of resident bird species across different habitat types, including wetlands, agricultural lands, settlements, and vegetation patches surrounding the project area. Recording resident bird presence and activity helps evaluate long-term ecosystem stability because these species are closely associated with local habitat conditions. The description of the avifaunal and bat colony survey is depicted in the following **Table 3.8**.

Table 3.8: Description of the avifaunal & bat colony survey

Location	Feature	Long.	Lati.
Gouromva	Colony	22°37'47.01"N	89°36'19.00"E
Jhalmal Dighi	Bat Colony	22°32'42.69"N	89°37'34.82"E
DFRI	Resident Bird	22°31'40.66"N	89°34'59.74"E
Saheder abad	Resident Bird	22°34'3.59"N	89°30'6.90"E
Maidara	Wetland bird/mangrove habitat	22°34'40.36"N	89°34'10.12"E
Powerplant	Wetland bird/mangrove habitat	22°36'2.49"N	89°32'16.41"E
Kalekhar dighi	Resident Bird	22°35'58.79"N	89°35'14.34"E
new sight	Wetland bird/colony	22°35'3.27"N	89°35'14.28"E
Calkgona	Bird colony	22°34'25.85"N	89°34'26.47"E
Bajua	Resident Bird	22°31'55.06"N	89°33'51.52"E
Chalna	Bat colony	22°36'19.76"N	89°30'50.54"E

Standard field equipment such as binoculars, cameras, and GPS devices were used to document species presence, colony locations, and habitat characteristics. All observations were recorded systematically in field datasheets. Species identification was conducted following standard regional bird identification guides.

By combining data on colonial wetland birds, bat colonies, and resident bird assemblages, the survey provides a reliable basis for evaluating ecological conditions and detecting potential environmental impacts associated with the Rampal Power Plant. Bird activity and colony dynamics were therefore considered key indicators for monitoring ecosystem health in the study area.

Avifaunal Diversity Assessment and Comparison

The bird survey across different locations reveals clear variation in species diversity and distribution, as reflected by the Shannon Diversity Index. Among all surveyed sites, Maidara and Shaheder Abad recorded the highest diversity (H = 2.8), indicating relatively stable and heterogeneous habitats supporting a wide range of bird species. In contrast, the Power Plant area showed the lowest diversity (H = 1.07), suggesting habitat disturbance and reduced ecological suitability for avifauna.

Maidara, located near the power plant, despite its proximity to industrial activity, exhibited high species richness. A total of notable bird species was recorded, including commonly observed species such as Indian Pond Heron, Purple Sunbird, and Ashy Wood swallow. The presence of nesting activity of the Purple Sunbird further indicates suitable breeding habitat conditions. Importantly, the occurrence of the relatively uncommon Mangrove Whistler highlights the ecological significance of this site, suggesting the presence of semi-natural or mangrove-associated vegetation patches (**Figure 3.10**).



Figure 3.10: Biodiversity Index at ten birding location

Other locations such as Barni (H = 2.46), Chalkgona (H = 2.44), and Kalekharber (H = 2.34) also demonstrated comparatively high diversity, indicating moderately healthy habitats with diverse vegetation structure. Jholmolia Dighi (H = 2.25) and DFRI (H = 1.92) showed moderate diversity, likely reflecting a mix of aquatic and terrestrial habitat features. On the lower end, Bajua (H = 1.36) and Chalna (H = 1.61) exhibited reduced diversity, possibly due to higher human disturbance, habitat simplification, or limited vegetation cover. The Power Plant site, with the lowest index, clearly reflects the impact of industrial activity, reduced canopy cover, and habitat fragmentation on bird assemblages. It is also important to note that temporal variation during the survey influenced bird counts across locations, as differences in survey timing can affect detectability and activity patterns of species.



Eurisian Hoopoe at Chalkgona



Streak brested Woodpeacker at Shaeder abad



Indian Pond Heron at Powerplant site



Wood swallow at DFRI



Pied starling nest at Barni



Purple rumped sunbird nest at Maidara

CEGIS field visit, January-February 2026

Overall, the comparative analysis suggests that areas with diverse vegetation, water bodies, and lower disturbance (e.g., Maidara, Shaheder Abad) support higher avifaunal diversity, while heavily modified or industrial zones show significantly reduced bird diversity.

3.2.9 Dolphin occurrences in the river systems

Dolphin occurrences monitoring was conducted along the Passur river from chalna to digraj, Bhadra, Akram point, Shella and Dhangmari. Among them, Bhadra khal and Dhangmari khal are two designated sanctuaries, connected to the Sundarbans, play a crucial role in sustaining dolphin populations, particularly species like the Irrawaddy dolphin (*Orcaella brevirostris*), and Ganges River dolphin (*Platanista gangetica*). Moreover, the Passur River and Shella River, major waterways of the Sundarbans, face pressures from vessel traffic (especially near Mongla Port), industrial pollution, dredging and habitat modification, which is a threat for dolphin movement.

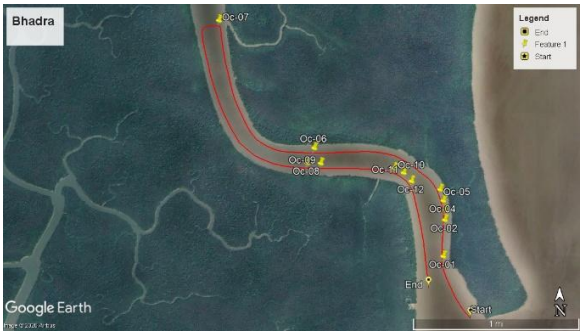


Figure 3.11: Dolphin sighting at Bhadra



Figure 3.12: Dolphin sighting at Dhangmari

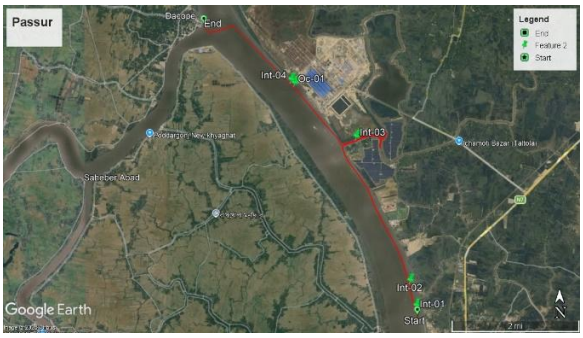


Figure 3.13: Dolphin sighting at Passur



Figure 3.14: Dolphin sighting at Chadpai

Encounter Trend

The encounter data from February 2023 to February 2026 depicts a distinct spatial variation and location-specific pattern in dolphin habitat use. This monitoring tier recorded a total of 32 dolphins within 8.49 km from start point at Bhadra Forest office to end the same point of the survey route. The encounter rate was about 5.80 dolphins per km per hour, indicating relatively active use of this channel by dolphins. These observations confirm that Bhadra Khal is a dolphin hotspot, especially for species like Ganges River Dolphin and Irrawaddy Dolphin. Dolphins tend to prefer narrow tidal channels and the areas with adequate fish availability and moderate salinity.

The observation of 10 dolphins in Dhangmari Khal, despite a relatively low encounter rate (0.36 dolphins/km/hour), can be explained by the ecological characteristics of this tidal channel. Dhangmari Khal likely functions as a localized aggregation site, where dolphins temporarily concentrate due to favorable feeding conditions rather than continuous use along the entire stretch. The presence of fish-rich waters, influenced by tidal exchange and nutrient inflow, may attract dolphins to specific pockets within the khal. Additionally, channel morphology such as bends, deeper pools, and confluence zones, can create suitable habitats for foraging and short-term residency. The comparatively low encounter rate suggests that human disturbances, such as tourist boat movement and illegal fishing activity, limit their broader distribution, causing them to remain in safer or resource-rich sections.

Bhadra Khal and Dhangmari Khal are rich in fish, shrimp, and other aquatic organisms due to nutrient inflow from tidal exchange. This makes them ideal feeding hotspots for dolphins, supporting their energy needs.

Only 2 individuals were recorded (encounter rate: 0.08 dolphins/km/hour) between Digraj Ghat and Chalna Ghat, can be attributed to several ecological and anthropogenic factors. Firstly, the Passur River is a wide and highly busy channel for navigation, which makes barrier to dolphins. High levels

of vessel traffic, industrial movement, and noise disturbance (especially near Mongla Port) discourage dolphin presence or push them toward quieter tributaries. Secondly, dolphins tend to aggregate in areas where fish density is higher, such as confluences or smaller channels. Additionally, fishing activities and gear (e.g., nets) further limit dolphin distribution by increasing disturbance and risk, causing them to avoid heavily used sections of the river.

In Chadpai, the survey was started from the Forest ghat of Sella River and only 5 dolphins were recorded with an encounter rate of 0.52 per km per hour. The low number of dolphin sightings in the Shella River is strongly linked to intensive shrimp larvae harvesting activities in the area. This practice typically involves the use of fine-mesh nets, which not only remove shrimp larvae but also indiscriminately capture and destroy a wide range of juvenile fish and planktonic organisms. As a result, the natural prey base of dolphins is significantly reduced, making the habitat less suitable for feeding. Human disturbance, including boat traffic and fishing activity, also contributed to reduced sightings by displacing dolphins or altering their behavior, making them less visible. The following **Table 3.9** shows the ebcounter rate of Dolphin observed during the 47th quarterly program.

Table 3.9: Dolphin Encounter Rate (km/hr)

River/Canal	February 23	February 24	February 25	February 26
Bhadra	6.37	0	1.39	5.80
Dhangmari	0.52	0.37	0.74	0.36
Passur	0.34	0.12	0.12	0.08
Shella	0.91	0.55	0.87	0.52

The encounter rate data show clear spatial and temporal variation in dolphin presence across the surveyed waterways. “Bhadra Khal” exhibits the highest variability, with very high encounter rates on some days (6.37 and 5.80), indicating high, cluster-based dolphin use. “Dhangmari Khal” shows relatively stable but low encounter rates, suggesting regular yet moderate use by small groups. In contrast, the Passur River consistently records the lowest values, reflecting poor habitat suitability or disturbance-driven avoidance. The Shella River demonstrates moderate encounter rates with slight fluctuations, indicating intermittent use with some favorable conditions. Overall, the pattern suggests that dolphins prefer smaller, less disturbed khals like Bhadra and Dhangmari, while larger, more impacted rivers like Passur support fewer individuals.

3.2.10 Background of the Green Belt Development at MSTPP

Green belt development was incorporated into the Environmental Impact Assessment (EIA) of the MSTPP as an important environmental mitigation measure to offset potential impacts associated with power plant development and operation. The plantation program was designed to enhance air quality, reduce noise, restore vegetative cover and dependent ecosystem, improve local microclimatic conditions, and strengthen ecological resilience in the surrounding mangrove-influenced landscape. Since plantation activities have been implemented in multiple phases over several years, periodic monitoring is necessary to evaluate plantation success, species suitability, species composition, survival status, and compliance with environmental commitments. Accordingly, a field verification survey was conducted to assess the current condition and ecological suitability of the developed green belt. In this quarterly monitoring, primary visit to the greenbelt was done for site selection. One plot has been finalized and species composition in the plot was observed.

3.2.11 Field Methodology

Sampling Design

A field verification survey was conducted within the established green belt area of the MSTPP to assess plantation composition, species diversity, and ecological suitability of the planted vegetation. A representative sample plot measuring 12.5 m × 12.5 m (156.25 m^2) was considered following a quadrat-based sampling approach. The plot was systematically subdivided into four equal quadrats to facilitate detailed observation, enumeration, and recording of plant species. This subdivision enabled a structured assessment of species distribution, regeneration status, and plantation condition across the sampled area while minimizing observational bias. Plot dimensions and layout are presented in **Figure 3.15**.

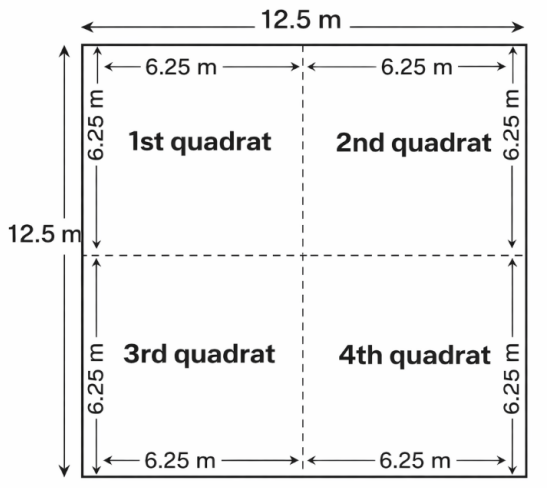


Figure 3.15: Plot measurement for tree species survey

3.2.12 Field Data Collection

Within each quadrat, all observable plant species were identified using their local and scientific names where possible. The number of established trees, saplings, and naturally regenerated seedlings was recorded to evaluate species composition and regeneration potential. Particular attention was given to mangrove-associated species because of the project's location within a mangrove-influenced coastal landscape. For each species encountered, visual observations were made regarding growth performance, plant vigor, crown condition, and overall health status. Evidence of successful establishment, such as natural regeneration, seedling recruitment, and development of characteristic mangrove features (e.g., pneumatophores), was also documented (**Table 3.10**). The following species were recorded within the sample plot:

- Hargoja (Acanthus ilicifolius)
- Gewa (Excoecaria agallocha)
- Keora (Sonneratia apetala)
- Golpata (Nypa fruticans)
- Koroch (Pongamia pinnata)
- Baen (Avicennia officinalis)
- Amoor (Aglaia cucullata)
- Bola (Hibiscus tiliaceus)

Table 3.10: The species composition

Quadrat	Species	Tree	Sapling
1	Gewa (*Excoecaria agallocha*)	x	4
	Baen *(Avicennia officinalis)*	2	x
	Hargoja (*Acanthus ilicifolius*)	8	x
	Amoor (*Aglaia cucullata)*	x	1
2	Gewa (*Excoecaria agallocha*)	4	35
	Golpata (*Nypa fruticans*)	10	x
	Hargoja (*Acanthus ilicifolius*)	10	x
	Keora (*Sonneratia apetala*)	1	x
	Bola *(Hibiscus tiliaceus)*	2	x
3	Baen *(Avicennia officinalis)*	4	x
	Keora (*Sonneratia apetala*)	2	x
	Amoor (*Aglaia cucullata)*	5	6
	Golpata (*Nypa fruticans*)	2	x
	Hargoja (*Acanthus ilicifolius*)	4	x
4	Gewa (*Excoecaria agallocha*)	1	5
	Keora (*Sonneratia apetala*)	1	x
	Baen *(Avicennia officinalis)*	x	1
	Golpata (*Nypa fruticans*)	2	x
	Amoor (*Aglaia cucullata)*	5	x
	Hargoja (*Acanthus ilicifolius*)	4	x



Morinda citrifolia



Acanthus ilicifolius



Hibiscus tiliaceus



Bruguiera sexangula



Azadirachta indica



Nypa fruticans



Albizia odoratissima



Pneumatophores

Figure 3.16: Species Composition in a representative plot inside greenbelt established by MSTPP

3.3 River bed pollution monitoring

3.3.1 Methodology

Sediment is considered an important environmental indicator for metal pollution in any natural ecosystem. The investigation of heavy metals in water and sediments can be used to assess the anthropogenic impacts and risks posed by waste discharges to the riverine ecosystems. Therefore, sediment quality assessment has been done during environmental monitoring of this project.

Sampling Frequency

The frequency of monitoring for sediment quality has been considered quarterly in a year. Accordingly, the sediment sampling has been done in 47th monitoring (January, 2026). The sediment quality assessment will be incorporated in 48th monitoring report.

Monitoring Indicators

The main objective of sediment quality monitoring is to find out the heavy metal accumulation in sediments due to anthropogenic activities (e.g., power plant activity and coal transportation). To find out the answers, a biannual sediment monitoring has been done in different sampling points. The major indicators for monitoring are heavy metals (As, Pb and Hg), Oil and Grease. The selected heavy metals are mainly found in coal and assumed to pollute the sediment and water system during operation stage of power plant.

Location

The sampling locations are selected in both near places of project area and inside the Sundarbans. The sampling locations are stated in **Table 3.11**. Locations of collected samples are presented in **Figure 3.17**.

Table 3.11: Location and Sediment Monitoring Plan

Site No	Monitoring Indicators	Location	GPS (Decimal Degree)		Sampling Frequency	Methods/Tools /Techniques
			Northing	Easting		
1	Heavy metals (Arsenic-As, Mercury-Hg, Lead-Pb); Oil and Grease	500 m U/S from the effluent discharge point	22°35'6.91"N	89°33'6.57"E	Quarterly	In situ field sampling and Laboratory Testing at BCSIR
2		500 m D/S from the effluent discharge point	22°34'41.61"N	89°33'27.85"E		
3		Sutarkhali	22°29'51.62"N	89°29'20.48"E		
4		Akram point	22° 1'4.80"N	89°30'38.63"E		
5		Hiron point	21°49'3.12"N	89°28'8.35"E		

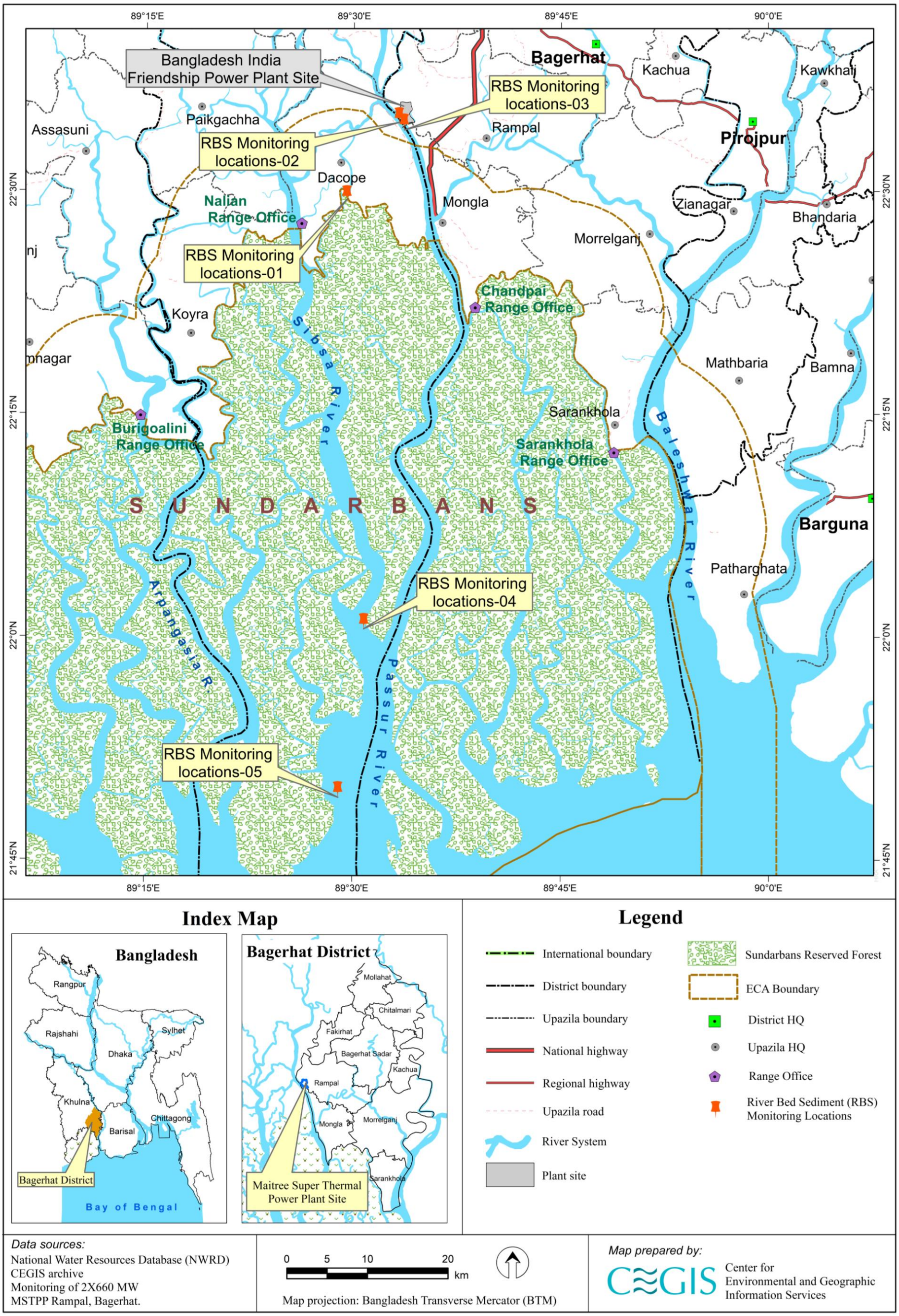


Figure 3.17: Location of River bed sediment collection

3.3.2 Process of Sediment Sample Collection

Plot Selection

The sampling points were selected on the basis of TOR which resembles the potential route of coal transportation and transhipment sites. Two monitoring sites are situated beside the power plant (500 m U/S and D/S from the effluent discharge point) where the coal transshipment is being carried out, while Akram point, and Hiron point are inside the Sundarbans area where the coal transportation is being carried out. On the other hand, Sutarkhali site has been considered as a control plot among the monitoring sites.

Sediment Samples Collection

Standard procedure was maintained during the collection of sediment samples. At least three replications were taken to ensure composite samples. Sediment samples were preserved in air-tight plastic bag for laboratory analysis.

3.3.3 Laboratory Analysis

Collected sediment samples from the site have been produced to BCSIR, Dhaka for laboratory analysis immediately after 47th monitoring. After the completion of the required analysis, the data will be incorporated in the 48th quarterly monitoring report.

3.4 Sundarbans Forest Health Monitoring

Monitoring of the forest health parameters provide an integrated understanding of mangrove forest health, linking below-ground processes, regeneration potential, and above-ground structure. A robust, long-term forest health monitoring program is therefore not optional but necessary to safeguard the ecological integrity, resilience, and World Heritage value of the Sundarbans under increasing industrial pressure.

3.4.1 Methodology

Monitoring Framework and Rationale

Forest health monitoring in the Sundarbans was designed as a long-term, indicator-based assessment to detect early ecological changes associated with natural processes and potential anthropogenic stressors. The methodology emphasizes repeatability, spatial comparability, and sensitivity to gradual structural and functional changes in mangrove ecosystems. Permanent Sample Plots (PSPs) were therefore adopted as the core monitoring unit to enable consistent data collection across monitoring periods (**Figure 3.18**).

Selection of Bio-Indicators

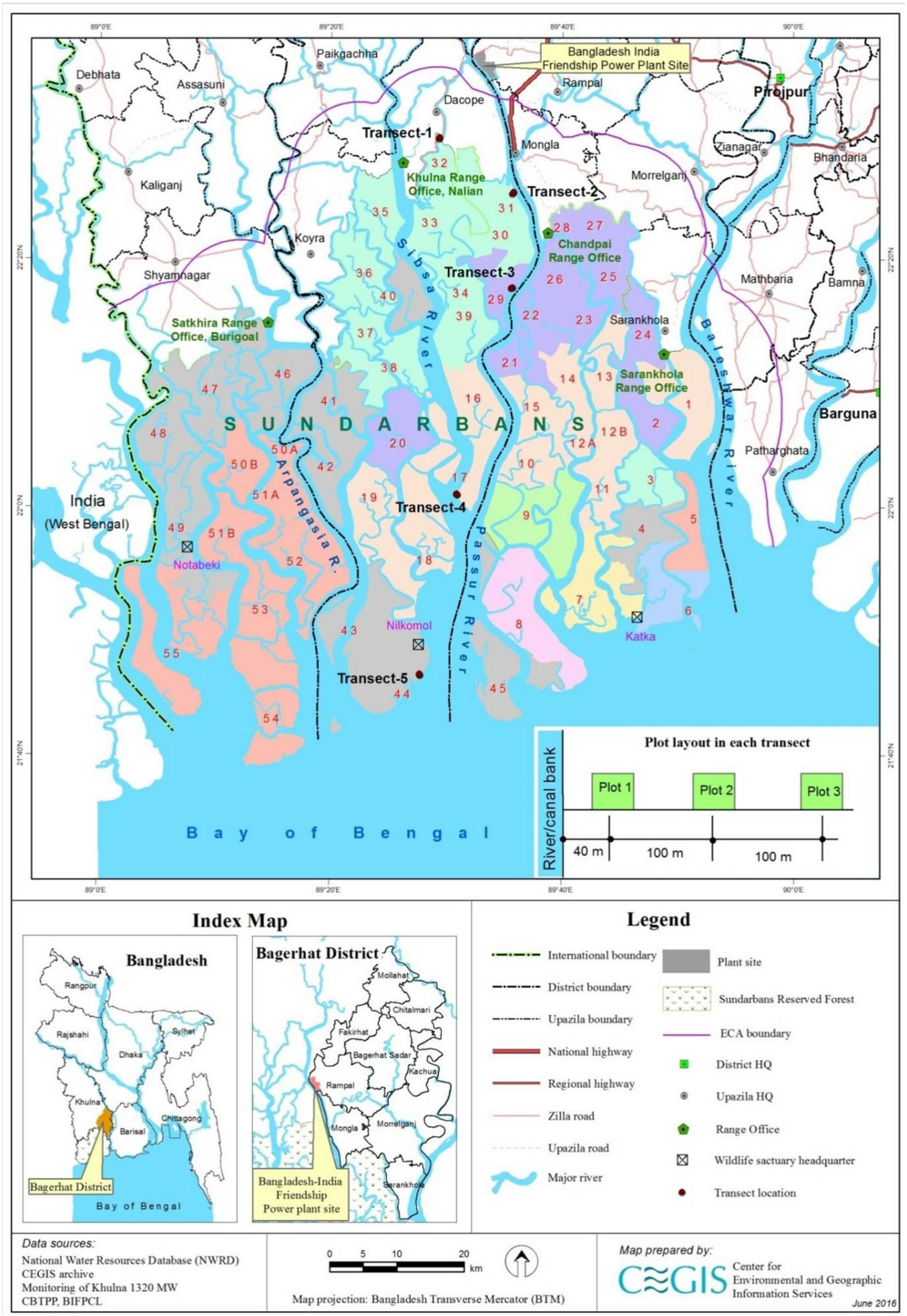
A suite of bio-indicators was selected to represent key components of mangrove ecosystem structure, function, and regenerative capacity. The choice of indicators was guided by their ecological relevance, sensitivity to environmental stress, and feasibility of repeated field measurement within available time and resource constraints. Monitoring frequency for each indicator was determined based on cost, logistical practicality, and their expected rate of ecological response. The indicators assessed under this monitoring tier include seedling regeneration, pneumatophore density, crab hole density, canopy cover, leaf area index (LAI), above-ground carbon stock, and leaf phenology and phenological behavior.

3.4.2 Measurement Consistency and Long-Term Monitoring

All PSPs and subplots were permanently marked to ensure precise relocation during subsequent monitoring visits. Standardized measurement protocols were applied across all sites and indicators to maintain data comparability over time. General Description of Permanent Sampling Plots (PSPs) are mentioned in the following **Table 3.12**.

Table 3.12: General Description of Permanent Sampling Plots (PSPs)

Location	Subplot	Range	Latitude (N)	Longitude (E)	Soil type	Distance from River bank
Sutar khali	1	Khulna	22.4981	89.4875	Hard Clay	40m SW from Sutar Khali Canal
	2	Khulna	22.4973	89.4871	Hard Clay	140m SW from Sutar Khali Canal
	3	Khulna	22.4965	89.4866	Hard Clay	240m SW from Sutar Khali Canal
Karamjal	1	Chandpai	22.4253	89.5943	Hard Clay	40m west from Passur River
	2	Chandpai	22.4252	89.5934	Hard Clay	140m west of Passur River
	3	Chandpai	22.4226	89.5925	Hard Clay	240m west of Passur River
Herbaria	1	Chandpai	22.2061	89.5924	Hard Clay	40m west of Passur River
	2	Chandpai	22.2962	89.5917	Hard Clay	140m west of Passur River
	3	Chandpai	22.2962	89.5908	Muddy	240m west of Passur River
Akram Point	1	Khulna	22.0187	89.5134	Hard Clay	40m east of Shibsha River
	2	Khulna	22.0180	89.5140	Clay	140m east of Shibsha River
	3	Khulna	22.0168	89.5145	Hard Clay	240m east of Shibsha River
Hiron Point	1	Khulna	21.9166	89.2333	Sandy	350m east from Gogari Canal
	2	Khulna	22.1833	89.5000	Sandy	40m north of the Bay of Bengal
	3	Khulna	21.7775	89.4598	Hard Clay	648m southeast of Shibsha River



Data sources:
National Water Resources Database (NWRD)
CEGIS archive
Monitoring of Khulna 1320 MW
CBTPP, BIFPCL

0 5 10 20 km

Map projection: Bangladesh Transverse Mercator (BTM)

Map prepared by:
CEGIS Center for Environmental and Geographic Information Services
June 2016

Figure 3.18: Location Map of Sundarbans Forest Health Monitoring Plots (PSP)

3.4.3 Sampling Design and Permanent Sample Plot Layout

At each selected study site, a transect line was established perpendicular to the adjacent river or canal bank to capture vegetation gradients from the riverine edge toward the interior forest. This orientation reflects the dominant hydrological and sedimentation gradients influencing mangrove distribution in the Sundarbans. Along each transect, three circular nested Permanent Sample Plots were established at fixed intervals, positioned progressively inland to represent river-fringe, intermediate, and upper mangrove zones (**Figure 3.19**).

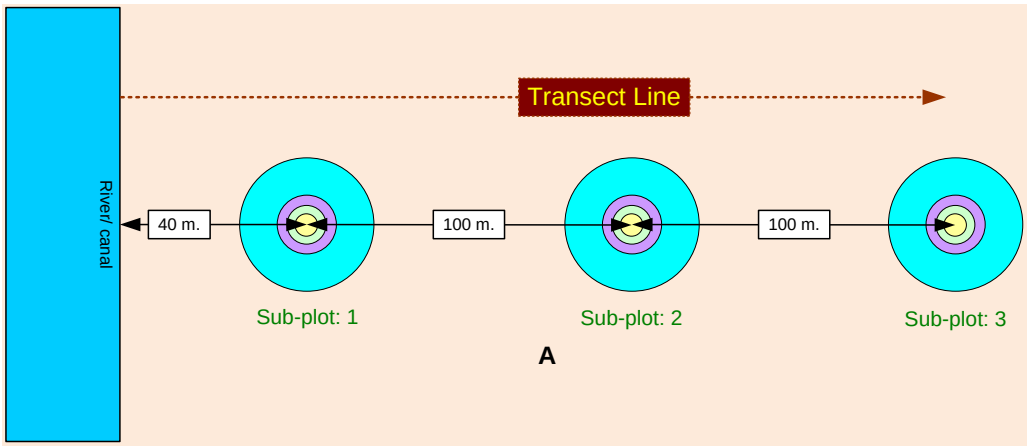


Figure 3.19: Layout of the subplots and transect line perpendicular from ecotone (river or canal bank)

Each circular plot had a radius of 12.62 meters providing an area sufficient to capture tree species diversity and stand structure while remaining practical for repeated field measurements. Within each main plot, four smaller quadrats (**Figure 3.20**). were delineated to facilitate detailed assessment of tree density, seedling regeneration, pneumatophore abundance, and other fine-scale structural attributes. This nested design allows data collection at multiple spatial scales within the same sampling unit.

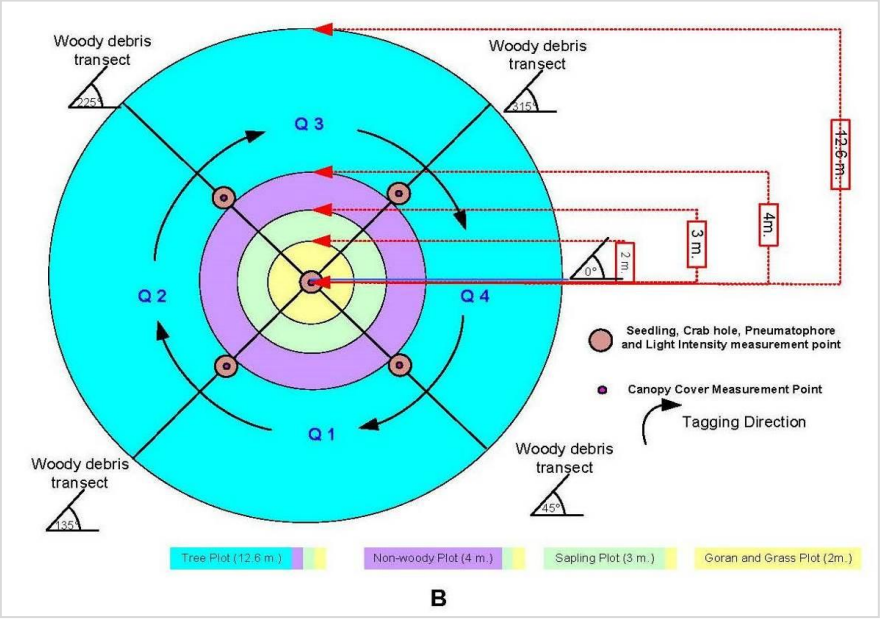


Figure 3.20: Layout of the survey activities in each subplot

3.4.4 Monitoring Parameters

Tree Growth

Tree growth monitoring was conducted at all the established Permanent Sample Plots (PSPs) to assess changes in stand structure and growth performance over time. During each monitoring monitoring period, all living trees with a diameter at breast height (DBH) greater than 5 cm were measured and recorded. DBH was measured at 1.3 m above ground level using a diameter measuring tape, while total tree height was determined using a laser range finder (**Figure 3.21**). To ensure consistency with previous monitoring assessments, individual trees previously recorded within the PSPs were remeasured during the current survey. Changes in DBH and height were used to evaluate tree growth and stand development across monitoring periods. In addition, saplings that attained the minimum DBH threshold of 5 cm since the previous monitoring event were incorporated into the tree inventory as new recruits. These individuals were measured following the same standardized procedures applied to established trees. The use of permanent plots and consistent measurement techniques enables reliable tracking of tree growth, recruitment, and stand dynamics over time, thereby contributing to the long-term assessment of forest health and productivity within the Sundarbans.



Figure 3.21: Mangrove structure monitoring by team members by DBH and Height measurements and recording

Seedling

Regeneration and understory vegetation were evaluated within each Permanent Sample Plot using standardized micro-sampling units. Seedlings, defined as woody individuals with a height not exceeding 1.37 m, along with associated herbs and climbers, were assessed inside circular plots with a 1-meter radius. Within each subplot, observations were conducted at five fixed sampling points to ensure spatial consistency. One sampling point was located at the subplot centre, while four additional points were positioned at the midpoints of woody debris transects oriented along 45°, 135°, 225°, and 315° bearings. At each point, all live individuals within the sampling circle were identified, counted, and assessed for general condition. This approach provides a quantitative measure of regeneration potential and captures variation in understorey composition across the forest gradient.

Pneumatophores

Pneumatophore abundance was quantified using the same spatial framework applied for regeneration assessment. Counts of live pneumatophores were conducted within 1-meter radius circular plots established at the five fixed sampling points within each subplot. The central point and the four transect-based points allowed consistent measurement of pneumatophore distribution under

varying micro-topographic and hydrological conditions. Pneumatophore density was used as an indicator of soil aeration status and below-ground environmental conditions.

Crab Hole

Crab activity was assessed through counts of crab burrows, which serve as a proxy for bioturbation intensity and soil ecological functioning. Burrows were enumerated within 1-meter radius circular plots located at the centre of each subplot and at the midpoints of the four woody debris transects. The consistent placement of sampling units across plots enables comparison of crab activity among sites and monitoring periods.

Canopy Cover

Canopy cover was estimated using a spherical densitometer, a gridded convex mirror that provides rapid field estimates of overhead canopy closure. Measurements were taken by holding the instrument at elbow height, approximately 30–40 cm away from the observer, ensuring that the observer's head was not visible in the mirror (**Figure 3.22**). After leveling the densitometer using the built-in bubble, the number of grid points not obstructed by canopy was recorded.

Within each subplot, readings were taken at four directions north, south, east, and west and canopy cover was calculated as the mean of these measurements. This method captures directional variability and improves the reliability of canopy closure estimates.



Figure 3.22: Canopy cover and Sapling DBH count inside the Hiron point plot

Leaf Area Index

Leaf Area Index (LAI) was assessed as an indicator of canopy density and light interception capacity. LAI measurements were derived from light intensity readings collected using a digital light meter. For each subplot, open-canopy light intensity (Io) and under-canopy light intensity (I) were recorded. These values were applied to the standard LAI equation:

$$LAI = \ln(I/Io) / -K$$

where K represents the canopy light extinction coefficient, assumed to be 0.5. LAI values theoretically range from 0, indicating absence of canopy, to approximately 10 under very dense forest cover. This light-based approach provides a reliable and repeatable estimate of canopy structure across monitoring plots (Bioscience, 2016).

Biomass and carbon stock estimation

Above-ground biomass (AGB) of trees and saplings was estimated using the allometric equations developed by Chave et al. (2005), while below-ground biomass (BGB) was calculated following Komiyama et al. (2008). The equations applied were:

$$AGB\ (kg) = \rho \times \exp\left[-1.349 + 1.980 \ln(DBH) + 0.207 (\ln(DBH))^2 - 0.0281 (\ln(DBH))^3\right]$$

$$BGB\ (kg) = 0.199 \times \rho\text{^}0.899 \times DBH\text{^}2.22$$

where ρ represents wood density and DBH is the diameter at breast height. Total carbon stock was derived by assuming that carbon constitutes 50 percent of dry woody biomass, following the approach proposed by Brown (1997).

Leaf phenology and phonological behaviour

Phenological processes, including leaf flushing, leaf fall, flowering, fruiting, and propagule release, were monitored as part of the forest health assessment. These events are known to respond sensitively to environmental stressors such as air pollution and climatic variability. During each field visit, phenological stages were systematically observed and recorded through direct visual assessment within all Permanent Sample Plots. Temporal changes in phenological patterns were used as qualitative indicators of ecosystem condition and physiological stress.

3.4.5 Monitoring Result and discussion of SRF Health

Plot descriptions

<u>*Sutarkhali*</u>

The Sutarkhali plot maintained an overall stable forest condition during the monitoring period. Sedimentation was comparatively lower than that recorded during the previous assessment, although approximately half an inch of fresh sediment deposition was observed in the third subplot, indicating ongoing but reduced geomorphological activity. A substantial amount of litterfall from Passur trees was recorded across the plot, contributing to forest floor organic matter accumulation. Moderate crab activity and high bird presence suggest continued ecological functioning of the site, while leaf flushing in Kakra trees indicates active vegetative growth. Signs of human disturbance were observed in the first subplot, where wildlife footprints were absent despite suitable habitat conditions. In contrast, deer and otter tracks recorded in the second subplot demonstrate continued use of the area by wildlife. Disease symptoms were most evident in Sundari and Kakra individuals, warranting continued observation in future monitoring monitoring periods. Overall, the plot remains structurally stable, although the combined effects of disease occurrence and localized human interference should be closely monitored.

<u>*Karamjal*</u>

Karamjal was the comparatively driest site among all monitored plots during the survey period. The forest floor was dominated by litterfall from Baen and Kakra, indicating their substantial contribution to nutrient cycling and organic matter dynamics. Wildlife activity was notable, with evidence of deer and Bengal monitor lizard presence recorded in the first subplot. High levels of bird activity, including nesting behavior, reflected favorable habitat conditions and a biologically active environment.

The relatively dry conditions may have contributed to improved accessibility and habitat suitability for terrestrial fauna. No major signs of ecological stress were observed during the assessment, and the plot continues to exhibit characteristics of a healthy and functioning mangrove ecosystem with active wildlife utilization and ongoing litter production.

Harbaria

The Harbaria plot exhibited relatively dry site conditions compared to previous monitoring periods. Wildlife activity was significant, with both male and female tiger pugmarks recorded within the plot area, indicating continued use of the habitat by apex predators. Additional evidence of faunal activity included the presence of a mouse burrow in the second subplot, reflecting utilization of the forest floor by smaller mammals. Although the first and second subplots remained comparatively dry, localized waterlogging was observed in the third subplot, demonstrating spatial variation in hydrological conditions within the site. Overall, the combination of predator presence and diverse faunal signs suggests that the plot continues to support important ecological functions and wildlife habitat values.

Akram Point

Akram Point remained comparatively dry throughout much of the monitoring period, although localized waterlogging occurred in low-lying areas during high tides. Flowering of Goran trees was observed, indicating normal reproductive activity within the stand. However, signs of top-dying and mortality of Sundari individuals were noted around the first subplot. In addition, leaf-folding symptoms in Goran and drying of Sundari leaves were observed, suggesting the presence of physiological stress or disease-related impacts.

Encouragingly, Sundari individuals that previously exhibited top-dying symptoms in the second and third subplots showed signs of recovery during the current assessment. Bird activity was high across the plot, indicating continued habitat suitability for avifauna. While the plot remains ecologically functional, the occurrence of disease symptoms and Sundari decline highlights the need for continued monitoring of tree health and stand dynamics.

Hiron Point

Hiron Point displayed relatively lower levels of waterlogging compared with previous monitoring periods. Fresh sediment deposition was observed in several locations, and sediment accumulation appeared to contribute to the mortality of some Sundari individuals. Goran abundance was comparatively lower within the monitored area, while leaf-folding symptoms were recorded in Gewa trees, potentially indicating environmental stress or pest-related impacts.

Wildlife activity remained prominent, with evidence of tiger movement observed near the monitoring plots. The continued presence of large predators highlights the ecological importance of the area and the maintenance of habitat connectivity within the forest. Despite localized tree mortality and disease symptoms, the plot continues to support active ecological processes and diverse wildlife use.



Figure 3.23: Presence of mouse nest and Pugmark in PSP during field visit

Monitoring parameters

Pneumatophore Density

The 47th quarterly monitoring results indicate that pneumatophore abundance remains relatively stable across most monitoring sites, suggesting the continued functionality of below-ground aeration processes within the Sundarbans mangrove ecosystem. Variations among sites appear to be primarily influenced by local sedimentation patterns, hydrological conditions, and stand composition rather than any widespread ecological deterioration.

Karamjal recorded the highest pneumatophore density (381,547), followed by Sutarkhali (354,809), Hiron Point (321,280), and Harbaria (297,937). The high densities observed at Karamjal and Sutarkhali reflect the dominance of mature mangrove stands and favorable substrate conditions that support aerial root development. Although pneumatophore numbers at Sutarkhali were slightly lower than the previous monitoring monitoring period, the observed reduction in sediment deposition compared with earlier assessments may have reduced the need for additional aerial root production. Deer, otter, and bird activities observed within the plot further suggest that ecological functions remain intact.

Hiron Point maintained a relatively high pneumatophore density despite evidence of localized sediment accumulation and mortality of some Sundari trees. Harbaria exhibited moderate pneumatophore abundance under comparatively drier site conditions. Akram Point recorded the lowest density (79,789), consistent with its more open stand structure, localized Sundari mortality, and recurring environmental stress associated with erosion and disease symptoms. Nevertheless, the persistence of substantial pneumatophore populations across all sites indicates that root-zone functioning remains generally healthy throughout the monitoring area.

Crab-Hole Density

Crab burrow abundance remained substantial across the monitored plots, indicating continued soil bioturbation and nutrient cycling within the mangrove ecosystem. Crab activities contribute significantly to sediment aeration, organic matter decomposition, and nutrient redistribution, making them important indicators of ecosystem functioning. Sutarkhali recorded the highest crab-hole density (101,010 burrows), corresponding with moderate crab activity observed during field surveys. Harbaria (93,583) and Karamjal (92,946) also supported abundant crab populations, reflecting favorable substrate conditions and active forest floor processes. The relatively high crab densities in these sites suggest that soil ecological functions remain well maintained.

Hiron Point recorded a moderate density of 65,147 burrows despite localized sedimentation and reduced waterlogging conditions, indicating that benthic communities continue to persist under changing site conditions. Akram Point exhibited the lowest crab-hole density (19,183), which may be associated with comparatively dry conditions and localized environmental stress affecting habitat suitability. Overall, crab populations remain widespread throughout the monitoring sites, supporting the continued ecological integrity of the forest floor environment.

Canopy Cover

Canopy cover remained exceptionally high across all monitoring locations, ranging from 93% to 99%, indicating that the structural integrity of the forest canopy remains largely intact. The consistently high canopy closure suggests that the monitored mangrove stands continue to function as mature forests with limited large-scale disturbance.

Sutarkhali, Karamjal, and Harbaria each maintained canopy cover of 99%, reflecting dense crown development and healthy stand structure. High canopy closure at these sites is consistent with the abundant litterfall, active wildlife use, and ongoing vegetative growth observed during field assessments. Hiron Point also exhibited a high canopy cover of 98%, indicating minimal canopy disruption despite localized tree mortality and sediment-related impacts.

Akram Point recorded the lowest canopy cover (93%), although this still falls within the range typically associated with healthy mangrove forests. The slightly lower value may be attributable to Sundari decline, top-dying symptoms, and localized tree mortality observed within the plot. Nevertheless, the overall canopy condition across all sites demonstrates that no widespread canopy degradation is currently evident.

Light Intensity

Under-canopy light intensity remained low to moderate across all sites, reflecting the dense canopy conditions characteristic of mature Sundarbans mangrove forests. The observed light regime appears suitable for maintaining both forest productivity and natural regeneration processes.

Karamjal recorded the highest light intensity (8.38%), followed by Harbaria (5.50%), suggesting the presence of small canopy openings or vertical stratification that allow greater light penetration to the forest floor.

These conditions may contribute to seedling establishment and understorey development. Sutarkhali exhibited moderate light availability (3.20%), consistent with its dense canopy and abundant Passur litterfall.

Hiron Point (2.56%) and Akram Point (1.20%) recorded comparatively lower light levels. In Akram Point, the low light intensity reflects continued canopy dominance despite localized tree mortality and disease symptoms. Across all sites, the relationship between canopy cover and light penetration remains consistent, indicating stable forest structure and functioning microclimatic conditions.

Seedling Dynamics

Seedling abundance continued to demonstrate the regenerative capacity of the monitored mangrove stands, although notable differences were observed among sites. The highest seedling densities were recorded at Sutarkhali (214,682), Karamjal (180,517), and Harbaria (151,480), indicating sustained regeneration and successful establishment of young plants.

At Sutarkhali, abundant regeneration occurred despite signs of disease in Sundari and Kakra trees, suggesting that current stress levels have not significantly impaired recruitment processes. Karamjal maintained strong seedling recruitment under comparatively dry conditions, supported by high wildlife activity and extensive litter production from Baen and Kakra. Harbaria also exhibited robust regeneration, indicating favorable environmental conditions despite localized waterlogging in the third subplot.

In contrast, Akram Point (43,874) and Hiron Point (15,080) recorded substantially lower seedling densities. At Akram Point, reduced regeneration may be linked to Sundari decline, disease symptoms, and environmental stress associated with hydrological variability.

Hiron Point exhibited the lowest seedling abundance, potentially reflecting the influence of sediment accumulation, localized tree mortality, and changing site conditions. Nevertheless, the presence of regeneration across all sites indicates that natural recruitment processes remain active throughout the monitored forest areas.

3.4.6 Time series analysis

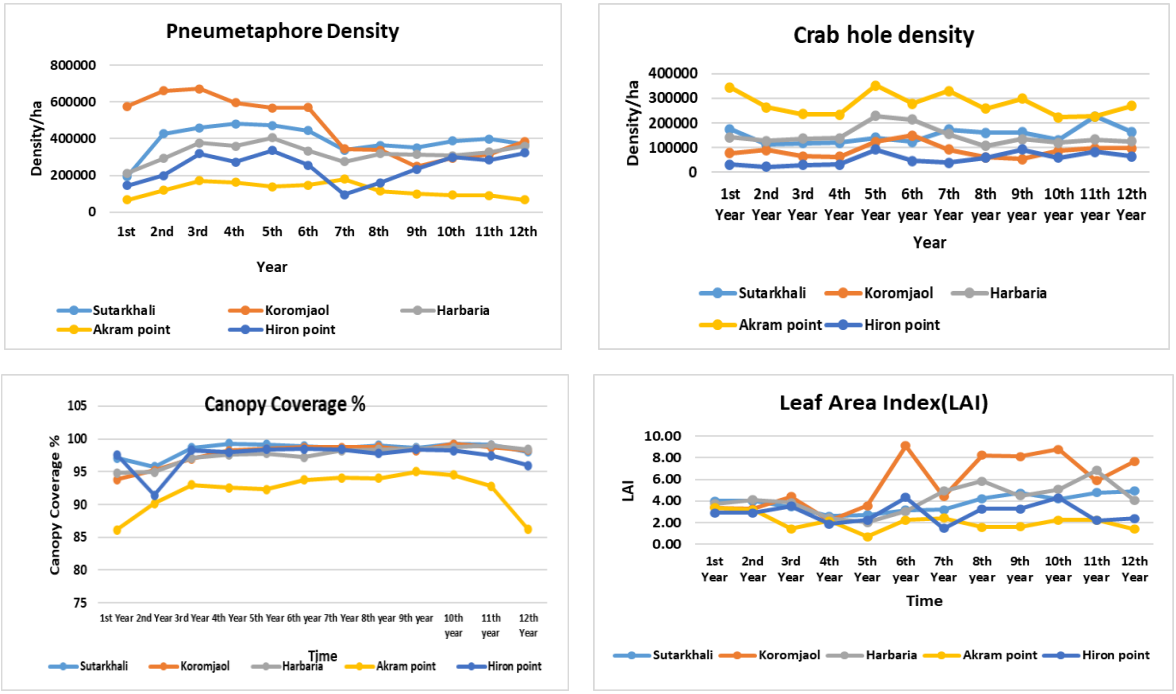


Figure 3.24: Time series analysis of pneumatophore, crabhole density, and canopy coverage, light intensity among 5 monitoring plots

Carbon density:

The carbon stock estimates obtained from the five monitoring sites—Sutarkhali, Karamjal, Harbaria, Akram Point, and Hiron Point—indicate that above-ground biomass and associated carbon storage remain generally stable during the current monitoring period. The observed variations among monitoring periods are relatively small and fall within the range expected from natural stand development, regeneration processes, and local environmental dynamics.

Sutarkhali, Karamjal, and Harbaria continued to exhibit stable carbon stocks, reflecting the persistence of mature forest structure and ongoing recruitment within these stands. Although a small number of mature trees were lost during the monitoring period, their contribution to total stand biomass was largely offset by growth of surviving trees and the continued establishment of younger cohorts. Consequently, no meaningful reduction in site-level carbon storage was detected.

At Akram Point and Hiron Point, carbon stock patterns were influenced by localized geomorphological processes, including bank erosion, sediment deposition, and tidal disturbances. These factors affected individual trees and, in some cases, necessitated the relocation of monitoring plots following physical damage to the original sampling areas. Carbon estimates from the replacement plots were comparatively lower, primarily because they contained younger and less structurally developed vegetation. This difference reflects variation in stand age and development stage rather than a decline in ecosystem productivity or carbon sequestration capacity.

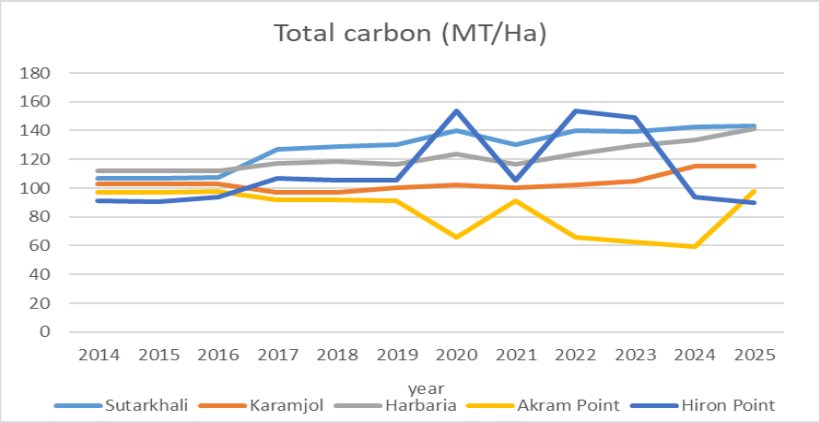


Figure 3.25: Time series carbon stock in five plots

Overall, the 47th monitoring results suggest that the monitored Sundarbans stands continue to maintain healthy canopy structure, active soil ecological processes, and ongoing regeneration. While localized concerns such as disease symptoms, Sundari mortality, sediment accumulation, and reduced regeneration at some sites warrant continued observation, the overall indicators do not suggest widespread forest decline and instead reflect the dynamic yet resilient nature of the mangrove ecosystem.

Phenological Behaviour:

The phenological cycles i.e. flowering, fruiting, and leafing of Sundarbans mangroves are tightly synchronized with seasonal shifts in salinity, temperature, and rainfall. Major canopy species like *Heritiera fomes* (Sundari) and *Excoecaria agallocha* (Gewa) predominantly flower between March and June as temperatures rise while the fruit maturation and seed drop are strategically timed to peak during the heavy monsoon months of July and August. The sudden influx of freshwater during early rains acts as a primary trigger for rapid vegetative leaf flushing across the forest. Tracking these precise phenological shifts serves as an essential early-warning metric for evaluating the overall health of the Sundarbans ecosystem. Phenological behavior of Major Mangrove Species in the PSPs show the same behavior from the last monitoring during December 2024. Details on the Phenological behaviors of SRF trees has been attached in **Table F2** of **Appendix-IV**.



Figure 3.26: Phonological behaviour (Goran & Amoor) observed during this monitoring period

4. Social Environment

4.1 Introduction

Social safeguards refer to the measures intended to mitigate unexpected negative impacts of the development projects. This safeguard monitoring is a follow-up study that conducted following the impose condition of DoE, and the measures of Environmental Management Plan (EMP), suggested in the Environmental Impact Assessment (EIA) Report.

The objective of the social safeguard monitoring is to ensure compliance during the project's operation phases. At this stage, the compliance status of the working environment, community safety and security, project support and impact on livelihoods, and status of Corporate Social Responsibility (CSR) has been checked/assessed. Additionally, the recommendation has been suggested in addressing the non-compliance or partial compliance issues based on the findings of the safeguard monitoring.

4.1.1 Methodology

This monitoring was conducted using basic social data collection methods i.e., informal or formal consultation, key informant interviews, group discussions and physical observation applied to collect data from the study area as well as from the project office. A format of checklist was used to collect necessary data from this survey/interviews. The local stakeholders, LGIs representatives, onsite project workers, MSTPP officers took part in the consultations/discussion and provided their necessary feedback in response to the issues of the checklists. The group discussion, informal interviews and physical observation were held within the project area and at different location near to the project area i.e., Zero Point, Kapasdanga, Barni, Kalikharber, Chalkgona, and Shidamkhali villages (**Figure 4.1**).

4.1.2 Findings of Social Safeguard Monitoring

Employments in the MSTPP

During this quarter, 227 employees are working in MSTPP office at Rampal, of which about 94% are Bangladeshi and only about 6% are Indians. Among the Bangladeshi, about 8% are deputed from BPDB while the remaining about 86% are the regular staff of MSTPP. Of the regular staff, 195 are directly under the company payroll and remainders are under the long-term contract. The Indians are deputed from NTPC, India.

The regular staff in the project office were recruited based on their education, skill and capacity. It is worth mentioning here that a section of staff was recruited from the adjoining areas of the MSTPP, like Mongla and Rampal upazilas.

This phenomenon implies that a large-scale financial mobilization has been occurred around the project site while the livelihoods of local people are being boosted up directly and indirectly.

In this quarter, vacancies were recorded against 14 posts of Indians whom are being deputed from NTPC, India, while four (04) officers were deputed from BPDB. This is to be mentioned here that for the lower-level positions like laborers, guards, etc. a good number of third-party contractual employees recruited from Bangladesh was engaged in different potential activities in the project site. Beside this manpower in the project site, , a good number of people are employed in BIFPCL Head Office in Dhaka from both Bangladesh and India.

Table 4.1: Employment Distribution of MSTPP Office at Rampal

Employee Status	NTPC (Indian)	BPDB Bangladeshi	BIFPCL permanent (Bangladeshi)
Male	13	19	191
Female	0	0	4
Total	**13**	**19**	**195**

Source: MSTPP Office, January-February 2026.

During consultation, the local people reported that they have a very limited scope to be employed directly in the project activities as support staff in the positions of laborer, gardener, driver, peon, cook, cleaner, etc. It is also reported that the support staff in the MSTPP are recruited through the third parties. The contractors usually appoint the staff for support services considering only their benefits while overlooking the local people in the most cases. At this outset, they have no idea how to get employed themselves in the project despite they have the potentiality.

Commercial Facilities

There is a market complex in the township area having 34 shops of which 28 has already been allotted. Among the allotted shops, 9 are currently operational, while the remaining 19 have yet to commence operations. The operational shops include a super shop, grocery store, tea stall, saloon, vegetable shop, and ATM booth. It is noted that approximately 25% of the allotted shops were prioritized for allocation to the Project-Affected Persons (PAPs) who lost their land and dependent livelihood due to the MSTPP project. The allotees followed the government procedure and by-laws of the MSTPP in achieving the allotments of the shops and in this regard, they had to open BIN accounts, which are to renew yearly. It becomes burden to the allotees who are not operating the shops as they anticipated that they could not make good return, experiencing from the operating shops over there. Status of allotted shops in the market complex is given in the following table.

Table 4.2: Status of Shops near BIFPCL Market Complex

Types	Nos.
No. of allotted shops	28
No. of operated shops	9
No. of unoperated shops	19

Source: BIFPCL Office, February 2026.

Associated Facilities

People engaged in different support services focused on the MSTPP (i.e., non-motorized vehicle operator, food and beverage supply, mobile recharge operator, vegetable/fish/meat supplier) are satisfied with their way of earnings due to the project. The MSTPP authority stated that they are willing to support the local community in skill development under the CSR. There may have some administrative negotiation about allocation and arrangement of CSR, however according to the arrangement of the fund they are committed to do for the betterment of the community. In this regard, they expect comprehensive and participatory approach in design and module finalization of the skill development program, so that the outcome of the training can be functionalWorking Environment.

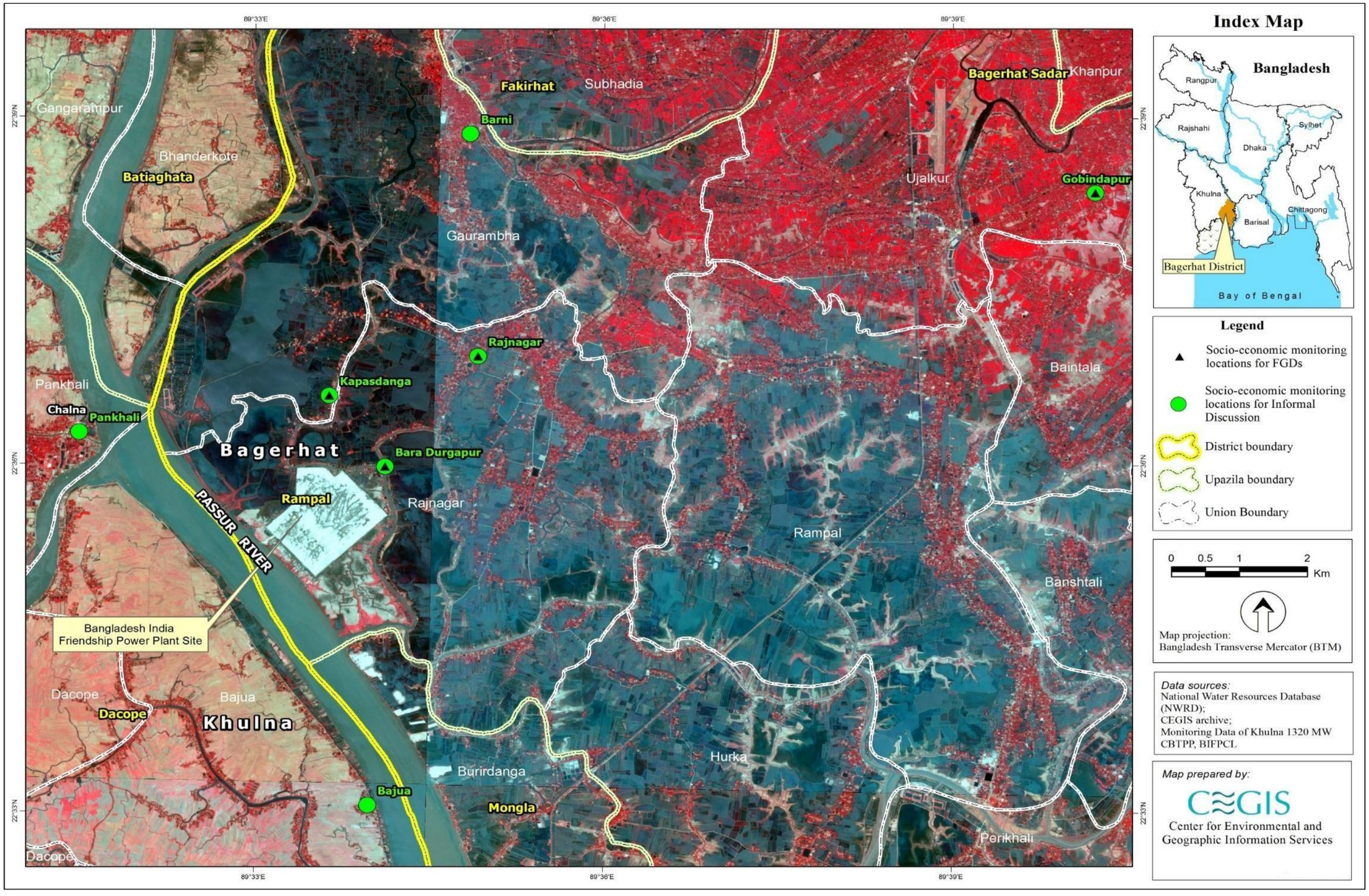


Figure 4.1: location of Socio-economic monitoring

Residential Facilities

There is a residential facility with required furnished quarters for the regular officers of MSTPP. However, among the employees some are resided in the Khulna City and Mongla area, because of education and few of them are local inhabitants. The MSTPP authority has arranged a regular transport support for the employees resided outside the premises.

Safety and Security

The PMU regularly monitors the safety issues for maintaining good and enabling working environment in the project premises. A strict security system with CCTV facilities has been maintaining at all of the gates of the project to restrict trespassers or unauthorized access to the the plant and entire premises.

Employee Training

In this monitoring quarter, two (02) induction trainings were arranged for the newly appointed officers and eight (08) diverse training programs were arranged for the internal officials as per the professional requirements.

Initial medical check-up is usually done before confirming the recruitment of the new employees to avoid unwanted medical related issues.

People's Well-being

The MSTPP authority, as a part of employee's well-being, provides affordable medical services to the employees, which include medicines, doctor's consultation, ward/cabin charges, and ambulance services with free of cost. In addition to these facilities, medical tests and ICU services are provided at discounted rates but rare and costly medicines are usually purchased by the patients externally.

Likewise, the MSTPP employees, same medical services are being ensured for the surrounding communities by the authority. To support employee's families and community people, the authority has established a school that commenced its journey from January 2026 with 130 students in January month. Additionally, a super shop named "Daily Shopping" is being operated within the market complex to facilitate convenient shopping for the employees.

In case of handling any unavoidable circumstances, emergency firefighting system has been set up in the BIFPCL premises including 2 fire fighter trucks, rescue team consisting 36 officials, rescue vehicles, designated 11 assemble points etc. The BIFPCL authority also developed a recreational near to the jetty site, some pictorial views of that site are given below.

Business Model Development

The authority supplies fly ash to the surrounding industries that are used as the raw material for cement factories. Reputed company – Basundhara Group is the main customer of the fly ash of MSTPP. The project authority also supply plastic for recycle use. They sourced this plastic from the solid wastes and sort it for recycle use. Remaining solid wastes are treated for making compost fertilizer that has been used by the project authority for nurturing their planted trees.

Grievance Redress Mechanism

The MSTPP authority assigned the same GRM committee, who are responsible for addressing the grievances of the employees, to address the grievances (if any) of the local communities. In this connection, a grievance box has been installed at the main gate to facilitate dropping of the grievance,

if any, by the local community. During the last monitoring quarter, not a single grievance was received from the local community through the grievance box.



Figure 4.2: Community Grievance Box Installed Outside the Main Gate of MSTPP

Liquid and Solid Waste Management

Liquid and solid wastes generated from the project premises are being managed scientifically to avoid unwanted air and water contamination. The solid wastes are being managed in the Solid Waste Management System (SWMS) installed in the MSTPP premises, whereby except non-perishable items like plastic, iron/steel, etc., perishable solid wastes (i.e., kitchen waste coming from plant and township) are processed to make compost. In this quarter (November 2025 to January 2026), the MSTPP authority collected 27,615 kg of solid waste from their premises and obtained 2,600 kg of compost through the waste management process. The leachate generated from this processing is sent to the leachate treatment system before discharging to the scientifically made leachate pond.

The ETP and STP are in operation and functioning properly and no plant water is being discharged into the river without checking standards of the water quality parameters as applicable by the ECR 2023.

For ensuring cleanliness of the plant premises, 12 new dustbins have been added in this quarter before assessing the requirements. Henceforth, a total of 162 colored dustbins are operated in the premises to manage the generated wastes in the project premises through aa segregation approach.

Plantation

Plantation is a regular phenomenon and Bangladesh Forest Department (Bagerhat) has been giving support to the MSTPP authority through a MoU. Under this effort, more than two (02) lac seedlings have already been planted in the project premises by 2025. In addition, the authority also plants trees in special occasions at different locations of the project premises through their own arrangements and thusabout 25,000 trees have been planted in this quarter.

Coal, Coal Dust and Fly Ash Management

Coal leakage observed during coal handling and loading to the conveyor belt at the jetty area in the previous quarter that has been significantly reduced in the current monitoring period due to the modification of the grabber and changes in operation protocol. Similarly, dispersion of coal dust during transferring from ship to ship to facilitate coal unloading is reduced largely due to installation of fine-meshed side neeting to contain dust inside. However, the coal delivery chute is suggested to elongate for further efficiency but due to technical reason, it cannot be done.

Fly ash loading to the barge is suggested to handle with due care to avoid unwanted ash dispersion. The authority continues to explore more effective technologies and practices for its safe and efficient management. The community did not raise any project induced health issues during this phase.

Corporate Social Responsibility (CSR)

The CSR activity induced on the basis of the profit of project operation. In previous, the MSTPP authority initiated some social welfare activities from the pre-construction phase to till now. At present, the authority formed a CSR committee consisting 5 members following the guideline of BPDB. One (1) member form LGIs, 1 member from local administration and 3 from the BIFPCL will include in the CSR committee. This committee will design and implement the CSR activities in this operation phase, subject to the scope, and CSR fund allocation under the negotiation between BIFPCL and BPDB.

So far, the authority arranged some activities considering their responsibility towards the surrounding community, those are:

- Mobile services for the workers and people living around the project premises;
- Installed 11 water supply system for ensuring safe drinking water in the surrounding communities; and
- Enrolled students in the first batch of the Maitree School (School run by Edison International Collegiate School, Dhaka) both for the MSTPP staff and surrounding communities;

RO/Safe Water Supply Facilities

At the pre-construction phase of the MSTPP project, acute safe water scarcity was observed in the project surrounding unions. Therefore, the project authority, initiated effort to supply safe water for the villagers of the project surrounding. In this regard, 11 ROs/safe water supply system have been constructed, and 9 of those are subsequently operated from few years ago.

Two (02) ROs at Shidamkhali village are currently non-functional due to technical issues, while limited community interest in the RO water supply has been observed at Proshadnagar village. The BIFPCL is responsible for the maintenance for a designated period (approximately four years), while operational costs are generally managed by the users. To address the sustainability of the RO facilities, the project authority has already started exploring alternative approaches that would minimize or eliminate the need for communities to bear operational costs. The authority will continue assessing suitable options to ensure the sustainable operation and maintenance of the RO facilities, including addressing technical issues and exploring a cost-effective water supply mechanism for the beneficiary communities.

School

The authority started a school after the name ‘Maitree School” with the support of Edison International Collegiate School, Dhaka, an English Version School (named Edison) in the MSTPP premises, in this quarter. The school is open for both MSTPP and local community. First batch started with 130 students, who have been admitted in the play group to class -V. About 72% of the newly admitted students are from local community and remaining are from MSTPP staff.

Table 4.3: Number of enrolled students in different class

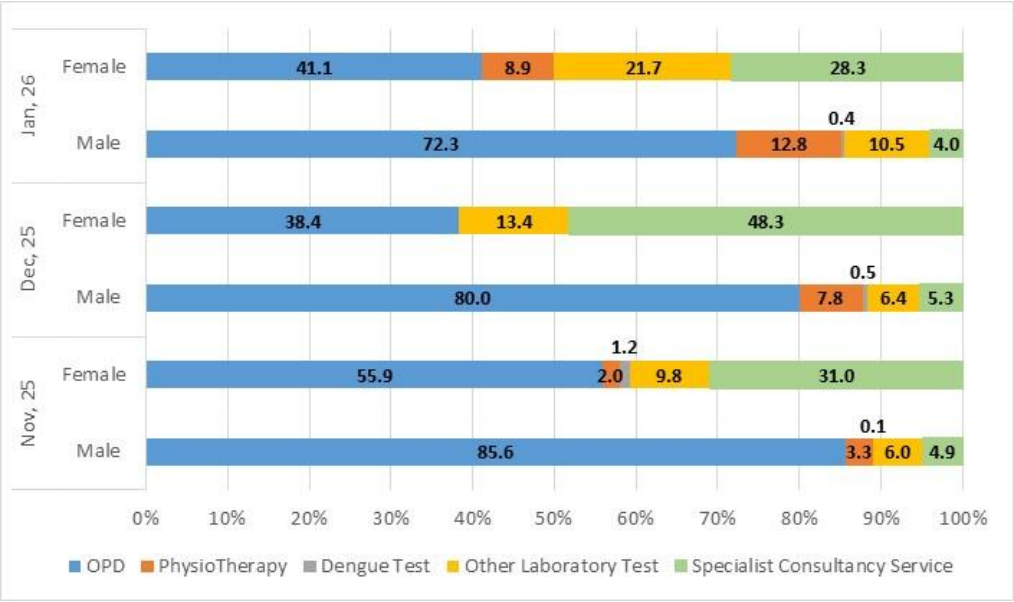
Classes and Types	No of enrolled students
Play Group to Nursery	
MSTPP Officials Kids	25
Local Community Kids	55
Class One to Class Five	
MSTPP Officials Kids	12
Local Community Kids	38
Total	
MSTPP Officials Kids	37
Local Community Kids	93

Source: MSTPP Office, February 2026

Medical Facilities

The MSTPP authority provided medical support though their own medical center named Maitree Hospital. OPD, physiotherapy service, specialist consultancy service, and laboratory tests including dengue test are being provided by the Maitree Hospital. The MSTPP staff and community people are eligible to receive all these services with same terms and condition applicable for the MSTPP employees. The free medical camp services were reinitiated from April, 2025 after a break of months, however in this quarter this camp was not initiated due to some technical reasons. The hospital also provides free ambulance service and general surgical activities for all.

According to the database of the Maitree Hospital for the last three months since January, 2026, in total, 2,958 patients have received medical services, in which the highest 2,100 patients received services for the OPD followed by 366 consultancy service, and laboratory tests. Details of the gender specific service receiver distribution is depicted in Figure 43.



Source: Maitree Hospital, January-February 2026

Figure 4.3: Medical Services from November 25 to January 2026

Autonomous Development

The autonomous development except the MSTPP activities for the community has not been observed in this quarter around the project premises.

Recommendations

- Recruitment of workers through outsourcing by a third party should have a clause in the contract to select more or less 25% of the candidate workers from the surrounding community.
- Arrange capacity building programs for the local community aligning with the requirements of the MSTPP.
- The communication liaison officer of MSTPP should engage local people and organize a monthly meeting in a cyclicl manner from one village to another village to disseminate their activities planned and performed so far.
- The households resettled at Foyla Shelter Home may be given preferrence in different training and support service programs organized by MSTPP authority.
- The authority should play more effective role in ensuring safe drinking water to the community by already implemented RO system. Based on the lesson learnt from this activity, further expansion program RO system may be undertaken to ensure the maximum benefits out of it.

5. Environmental Compliance

5.1 Introduction

The purpose of this environmental compliance report is to present the actual and potential measures undertaken by Bangladesh-India Friendship Power Company (Pvt.) Ltd. (BIFPCL) during the operation stage to ensure compliance with the standards, guidelines, and mitigation measures stipulated in the Environmental Management Plan (EMP) of the EIA Report. This report will highlight the current level of compliance with the DoE conditions and the EMP's requirements outlined in the EIA Report, through an operational interpretation of applicable local laws, international standards, and company policies.

An Environmental Health and Safety (EH&S) team of Independent Monitoring Agency (IMA) comprising of diversified expertise paid a routine visit to the Plant site from 24 to 27 February, 2026 to collect necessary compliance related information. This information includes bio-physical (i.e., plantation and ecosystem health, status of ETP, STP, FGD Waste Water Treatment Plant, Solid Waste Management Plant, etc.), environmental health and safety, manpower and other relevant information. This was done through a thorough walk-in visit, meetings with Plant officials and general laborers, and physical observation of the ongoing activities at the Plant premises.

A set of theme-based comprehensive and detailed checklist was prepared to collect information on environmental and social compliance issues. The checklists have been prepared by reflecting the issues/indicators/parameters embedded in the following aspects e.g., Environmental and Social Management System (ESMS) and Action Plan; Labour and Working Conditions; Community Health, Safety, and Security; Biodiversity and Sustainable Management of Living Natural Resources, waste management etc. The major findings during the 47th field visit are as follows:

a) Maintenance dredging is being conducted using a dredger with a capacity of 500 cubic meters per hour to maintain the required draft for the navigability of coal ships and barges transporting coal to the Plant's jetty. The dredged materials are disposed of in a 200-acre designated pond located at the southeast corner of the Plant's premises. The accompanying water from the dredged slurry is carefully managed to ensure that only silt-free water is discharged into the river, thereby preventing sedimentation and minimizing environmental impacts.

b) The Coal Supplier, under the strict directives of the Project Proponent, has implemented corrective measures given by the IMA includes net-fencing of the receiving ship/barge to control coal dust dispersion during ship-to-ship coal transfer operations at the jetty area. However, elongating the existing flexible coal chute to ensure more controlled and contained coal transfer has also been recommended to further minimize dust emissions to protect the local aquatic ecosystem.

c) The existing coal grabbers have already been modified and enclosed to the extent possible to minimize coal droppings during unloading operations. Since, the modified grabbers were installed after the visit of this monitoring quarter, so physical observation on coal droppings is remote. The authority continues to explore more effective technologies and practices for its safe and efficient management.



d) The previously raised issue during the 46th QMR regarding sand and/or earth piles kept uncovered at some places inside the plant premises, in the 47th QMR it is mostly removed. A few numbers of piles are observed, which are usually required to carry out the regular or day-to-day maintenance works. Though minor, still this issue should be taken care properly due to health concern of the staff, workers and officials.

e) The Proponent has successfully achieved the target of planting two (02) lakh saplings by 2025. In total 2,01,496 saplings have been planted so far out of 300,000 saplings under this plantation program. During this quarter (November to January, 2026) 5,000 Golpata and 20,000 flower plant saplings have been planted inside the plant premises.

f) The environmental control measures like Flue Gas Desulphurization (FGD), FGD Waste Water Treatment Plant, Electrostatic Precipitator (ESP), Effluent Treatment Plant (ETP), Sewage Treatment Plant (STP), Solid Waste Management Plant (SWMP), etc. are in operation and fully functional.

g) The Proponent has installed a community grievance box outside the main entrance of the plant premises so that the affected community (if any) can easily drop their grievances in the box to be accounted and resolved the issues by the authority.



In general, the aim of this compliance checklists is to check the implementation and effectiveness of mitigation measures as stated in the EMP of EIA. The checklists are developed as a Compliance Data Sheet that contains both quantitative and qualitative data. The findings of the environmental compliance monitoring are summarized and presented in the following **Tables (Table 5.1, 5.2, 5.3** and **5.4)**.

Table 5.1: Monitoring of Environmental and Social Management System Action Plan Implementation (Operation Phase)

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
1	Generation of Noise within the MSTPP premises during operation	• Switch off / throttle down the site machinery, vehicles, water vessels, and generator when not in use. • Regular overhauling of the machinery and equipment. • Install door and window sealing rubber to cut or dampen noise amplitude in the office rooms, control rooms, laboratories, etc. • Limit vehicle speed and monitor it at every suitable point. • Noise insulation should be properly maintained around the turbine and generator casings. • Noise dampers/insulators installed and operational around conveyor belt casings to control mechanical noise. • The officers/engineers/technicians/workers should wear relevant PPEs like ear	• Continuous noise monitoring is being conducted at designated sensitive receptors (e.g., plant boundary, nearby communities, and occupational areas) through both internal systems and periodic monitoring by an Independent Monitoring Agency (IMA). The noise monitoring results of the IMA demonstrated that there was no exceedance of noise level as per the Noise Pollution (Control) Rules, 2025. • Major noise-generating equipment (e.g., turbines, generators, and conveyor systems) are equipped with proper acoustic enclosures, insulation, and noise dampers, which are regularly maintained and functioning effectively. • Operational controls are in place to minimize noise, including restricting unnecessary operation of machinery, maintaining optimal operating conditions, and ensuring that standby equipment is only used when required. • Vehicle movement within the plant premises is regulated, with speed limits enforced to reduce noise levels. • Door and window sealing rubbers were observed at most of the rooms to dampen noise amplitude inside.	Complied	Strengthen noise monitoring and maintenance of control systems, enforce operational controls (equipment use and vehicle speed), upgrade mitigation measures where required, and ensure proper use of hearing protection along with regular review and stakeholder engagement for effective noise management during operation.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
2	Air pollution control during operational activities.	• Ensure the levels of air quality criteria pollutants under the permissible limits as per the Air Pollution (Control) Rules 2022 and WBG Guidelines i.e., IFC's General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality. • Dust particle generated from access road must be controlled by spraying water during dry season. • The plant equipment must be performance tested during commissioning phase to ensure standard has been maintained • Regular inspection and maintenance of Boilers, FD & ID fans, ash separation and handling systems, ESP, FGD etc. are operational and regularly maintained • Dust suppression applied at coal and ash handling areas, with enclosed conveyors in use and satisfactory housekeeping maintained • Maintain coal quality of low Sulphur content as stipulated in project description • Properly use of flue gas desulphurization scrubbing systems to remove Sulphur dioxide through lime and steam injection method to reduce the NOx emission	• Continuous and periodic ambient air quality monitoring is being conducted within the plant premises and at surrounding sensitive locations through internal systems and Independent Monitoring Agency (IMA), and results are found to be within the limits of Air pollution (Control) Rules 2022 and applicable standards. • All major air pollution control systems, including Electrostatic Precipitators (ESP), Flue Gas Desulphurization (FGD) units, and ash handling systems, are installed, fully operational, and regularly inspected and maintained to ensure optimal performance. • Stack emission monitoring is carried out on a regular basis, with emissions maintained within permissible limits of ECR 2023. The monitoring data are well recorded and maintained systematically. • Dust suppression measures are effectively implemented at coal and ash handling areas, including the use of enclosed conveyor systems, water spraying, and proper housekeeping practices. • Coal of specified quality (low sulphur content) is being used as per project design to minimize SO_2 and NO_2 emissions, supported by efficient operation of FGD systems. • Internal roads and operational areas are maintained with regular water spraying and vehicle speed is being controlled to minimize fugitive dust emissions.	Being Complied	• Good housekeeping is strongly recommended. • Particular attention should be given to optimizing the air–fuel ratio, reducing excess air and dry flue gas losses, and preventing clinker formation. • The authority is advised to conduct routine inspection, cleaning, and maintenance of the boiler to retain its efficiency.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Stack emission monitoring conducted, emissions within ECR 2023 limits, and emission data properly recorded • Remote monitoring and control of total production process. • Vehicle speed restriction must be enforced to control dust generation. • Automatic monitoring process and presenting on the real time Web-Pages should be implemented.	• Centralized/remote monitoring and control systems are in place for real-time operational management of plant processes, contributing to efficient emission control. • Good operational practices are followed, including proper covering of materials during transport and storage, and maintaining adequate freeboard in transport vehicles to prevent spillage and dust generation.		
	Water quality	• Regularly maintaining the rain water harvesting process. • Increase the efficiency of water use followed by reuse and recycling strategy. • Implement a comprehensive water conservation plan at a broader operational scale. • Strictly prohibit directly discharge of untreated or harmful effluents and wastes from the power plant. • Ensure installation of closed-loop systems and a fully functional Effluent Treatment Plant (ETP) with adequate standby/load-handling capacity for emergency conditions. • Conduct regular monitoring of surface and groundwater quality and levels at designated locations and intervals. • Prevent contamination of groundwater through proper sealing and maintenance	• Rainwater harvesting systems are in place and are being regularly maintained to support water conservation and sustainable site water management. • The ash pond, originally constructed for the disposal of fly ash, is not being used for its intended purpose as the generated ash is fully sold to designated vendors. At present, the pond has been using as a rainwater harvesting reservoir, with a provision for utilizing the stored water for various purposes including service water, gardening, car washing, etc. • Water reuse and recycling practices have been implemented to improve overall water use efficiency within the plant operation systems. • A comprehensive water conservation plan is in operation, promoting optimized water use across all functional areas of the plant. • Discharge of untreated or harmful effluents is strictly prohibited, and all wastewater is treated	Being complied	It is suggested to use the ash pond water (as not being used for ash disposal) as maximum as possible until ashes are disposed of into the pond.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		of oil, chemical, coal, ash, and waste storage/handling facilities to avoid leakage, seepage or overtop. • Maintain paved/sealed storage and disposal areas to avoid leachate infiltration into soil and groundwater. • Establish regular stakeholder consultation mechanisms between local communities and project personnel to support surface water quality management. • Provide training and awareness programs for workers and staff on groundwater protection and contamination monitoring practices. • Introduce incentive mechanisms for conservation of local wetlands. • Ensure good housekeeping practices across all operational and construction (if any) areas.	prior to discharge in accordance with applicable environmental standards. • A fully functional Effluent Treatment Plant (ETP), along with closed-loop systems, is operational with adequate capacity to manage routine and emergency load conditions. Also, the sewage is being managed in the STP, and no contaminated discharge is allowed outside disposal. So, the chance of deteriorating the surface water of the nearby waterbody is remote from MSTPP. • Regular monitoring of surface water and groundwater quality and levels is being conducted at designated locations, and results are maintained and conserved for compliance verification. • Protective measures implemented to prevent groundwater contamination are: proper sealing of abandoned wells and good housekeeping for maintenance of oil, chemical, coal, ash, and waste handling and storage facilities. • Paved and sealed storage/disposal areas are maintained to prevent leachate infiltration into soil and groundwater. • Good housekeeping practices are consistently maintained across operational areas to minimize environmental risks and ensure cleanliness. • Training and awareness programs are conducted for workers and staff on water conservation and groundwater protection practices. • Stakeholder engagement mechanisms with local communities are in place to address surface water-		

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
			related concerns and ensure transparency in environmental management.		
	Controlling impacts of drainage congestion and water logging	• Kaigar Daskati tidal creeks should be kept and maintained in a manner free from any kind of interferences. • Regular maintenance of depth and flow of the existing creeks/channels and the river. • Should practice integrated water resources management plan for reducing the water logging problem. • Proper set back rules and regulations in connection with river system management would be strongly followed in Operation & Maintenance period. • Keep rivers free from any encroachment and obstructions of power plant. • Stakeholder consultation must be arranged for such kind of problem.	• Regular monitoring is being conducted through the IMA to oversee the drainage conditions at and around the MSTPP area. • Community engagement activities are being carried out to understand the prevailing field conditions and local concerns. • MSTPP has been undertaking maintenance dredging activities to maintain the harbor, which in turn facilitates the drainage system of the surrounding area. • Dredged materials are being stored at designated disposal sites in a manner that prevents the materials from sliding back into adjacent waterbodies. This practice should be continued.	Being complied	In the case of inadequate space for the disposal of dredged materials, the MSTPP authority is recommended to engage a designated vendor through a formal agreement for the removal and off-site disposal of the dredged matrial.
	Erosion and accretion	• Bank protection measure like hard structure, mangrove plantation on the bank. • Maintain the green belt development areas regularly • Scientifically justified for any kind of dredging in a particular place • Monitoring the vessel speed, river flow and erosion and accretion prone areas	• The bank protection work for the jetty covers a major portion of the length of the Passur River along the riverside boundary of the MSTPP. • A mangrove green belt has been developed along the riverside boundary slope under tidal influence. The plantation includes species such as gewa (Excoecaria agallocha), baien (Avicennia officinalis), keora (Sonneratia apetala), goran (Ceriops decandra), and golpata (Nypa fruticans). • Regular monitoring of the green belt is being conducted, and necessary security measures have	Being complied	▪ The authority is suggested to replace the felled/dead trees once they are identified. ▪ The authority is suggested to organize a meeting with vessel operators to motivate them in doing unlawful activities

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
			been implemented to prevent illegal felling of trees and theft by poachers. • Over time, the green belt area has developed into a jungle-like habitat, facilitating the natural growth of various herbs, shrubs, and climbers, including hargoza (Acanthus ilicifolius). • Maintenance dredging activities are being carried out based on periodic surveys of the dredging areas to assess cross-sectional conditions and maintain the required navigational draft. • Vessel crews are advised prior to approaching the jetty area to maintain controlled speed in order to minimize unexpected riverbank erosion.		and maintaining rules and regulations.
4	Waste Generation	• Provide color-coded waste bins for segregation (recyclable, reusable, biodegradable, hazardous, etc.) at roadsides, parking areas, offices, eco-parks, and other operational/public areas within the plant site. • Ensure the waste management unit is fully operational with adequate resources, infrastructure, and manpower. • Incorporate green building principles in residential facilities to minimize waste generation and effluent discharge during operation. • Conduct regular awareness and training programs for staff on proper waste management practices.	• A waste segregation system is in operation with the provision of color-coded bins at key operational areas (offices, plant areas, and public/utility areas) to support segregation of different waste streams properly. • The solid waste management unit is fully operational with required manpower, equipment, and infrastructure for collection, handling, treatment, and disposal of generated solid wastes. • Green building principles have been incorporated in the residential building of the township area and auxiliary facilities to reduce waste generation and improve resource efficiency during operation. • Regular awareness and training programs on waste segregation, handling, and disposal practices are conducted for employees and relevant staff.	Being Complied	Maintaining the prevailing good housekeeping within the plant premises is strongly recommended.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Designate and maintain spoil/stockpile areas in secure locations, adequately protected from wind dispersion and rainwater runoff. • Prohibit disposal or storage of spoil/waste along riverbanks or slopes to prevent environmental contamination. • Strictly restrict open burning of any waste materials within the plant premises. • Maintain high standards of housekeeping through routine inspection, monitoring, and corrective actions across all operational areas.	• Designated and secured spoil/stockpile areas are being maintained, with measures (i.e., covered with tarpaulin/plastic) in place to prevent wind dispersion and runoff impacts during storage. • Strict operational control is enforced to prevent disposal or storage of waste along riverbanks, slopes, or environmentally sensitive locations. • Open burning of waste is strictly prohibited within the plant premises, and compliance is ensured through regular supervision and monitoring. • Routine housekeeping inspections and monitoring are conducted across the plant to maintain cleanliness and ensure timely corrective actions where required.		
	Heavy Metal pollution	• Monitoring results properly recorded and maintained • Surrounding areas regularly monitored for environmental impact.	• Regular monitoring of heavy metals particularly Mercury (Hg) and Lead (Pb) in the river substrate is being done by IMA and reporting those quarterly.	Being complied	-
	EMP for the ash management generated from the power plant	• Advanced technique like ESP, ash silo and ash pond have to be maintained regularly for ash management. • Fly ash (dry form) generated from the plant should be separated after burning of coal through ESP and commercially utilized to maximum extent possible. • Unutilized fly ash must be transferred from the silo in wet form and stored in the ash pond until suitable users are identified.	• Ash management systems, including Electrostatic Precipitators (ESP), ash silos, ash handling systems, and ash pond/dyke facilities are in operation and regularly maintained to ensure safe ash management. • Fly ash generated from coal combustion is effectively captured through ESPs in dry form and is being sold to the vendors approaching mainly from cement factories. • Generated Fly ash and Gypsum are being sold by the proponent to the following different vendors: **Fly Ash:**		The Plant authority is suggested to handle ash loading to barges more efficiently.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Bottom ash should be collected in wet form and must be stored in the ash dyke until suitable users are identified. • Increase the facilities of ash marketing through infrastructure development, creating awareness and formulating policies.	✓ Bashundhara Ready-mix 60% ✓ RNPG Alliance 40% **Gypsum:** ✓ Premier Cement Mills Ltd 50% ✓ RNPG Alliance 25% ✓ Bhuiyan Logistics 25% • Ash handling and disposal infrastructure is continuously maintained, and initiatives are in place to strengthen ash utilization and marketing through improved logistics, stakeholder engagement, and awareness programs with potential users.		
	EMP in case of maintenance dredging for river navigation	• Scientifically justified for any kind of dredging work in the river • Stakeholder consultation is necessary for site selection for dredging spoil disposal • Regular monitoring is necessary during maintenance dredging • Monitoring the site of spoil disposal and its associated social and ecological issues regularly	• For maintaining draft of the jetty harbor area maintenance dredging is being continued with due bathymetric survey and monitoring. • Dredged materials are being disposed in a designated place applying a chamber method to avoid unexpected sliding back of the materials to adjacent Maidara River and in turn protecting social interest and ecological elements from harm.	Being complied	The authority is suggested to maintain the present practice and side by side search vendors to take away the soil to create more room for dredged material disposal.
5	Compensation and Resettlement	• Proper resettlement action plan (RAP) and compensation plan if the Project needs any land acquisition addressing compensation, livelihood restoration, living standards etc. in assessing the socio-economic status of the PAPs. • Resettlement of the PAPs.	• The proponent has been conducting the community development activities regularly, where the target beneficiaries are the affected people. • They have been planning to expand the community development activities in larger extent to involve active and passive stakeholders living around the power plant. The plan also involves rigorous community development activities so that	• Resettlement issue is settled by BPDB; BIFPCL is the lessee only. • Being complied	• It is recommended that MSTPP should continue its ongoing livelihood enhancement initiatives as part of its social responsibility efforts.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Cash Compensation under Law (CCL) before resettlement formal agreement with the affected people prior to migration/resettlement • Sufficient standing crop compensation • Compensation for movable structures • Retention of salvageable materials • Compensation for loss of trading income one-time moving assistance grant to cover loss of regular wage income • Has a resettlement plan been developed which includes compensation, livelihood restoration, living standards etc. based on proper socio-economic studies? • Provision of monitoring the compensation and resettlement process Provision of monitoring the compensation and resettlement process • Human provide/take extra care/caution for the disadvantaged/vulnerable groups (women, children, ethnic minorities, indigenous people etc.)	manpower is generated in the area to be eligible to work at the greater horizon of the employment market home and abroad. In this regard, they have formed a committee involving local administration and LGIs. • BIFPCL prioritizes the directly affected local people for employment in the MSTPP and trains them to make them eligible and adaptable to the working environment. • The power plant induced marginal level employment generated in this area includes- o Movement of about 300 motorized vehicles using the approach road of the MSTPP daily. o Evolvement of dry market related small trading like tea stalls, mobile recharge services, mobile banking services, food and beverages, restaurants, etc. at and around the power plant. o Evolvement of wet market related small trading like vegetable selling shops, fish markets, butcher/meat shops, etc. at and around the power plant. • BIFPCL has established a market complex within the plant premises consisting of 34 shops. Out of these, 28 shops have been allocated, of which 79% of shops (≈22 shops) are distributed among the local villagers. Of the allocated shops, 9 are currently in operation, while the remaining 19 shops are yet to commence operations.		• The households/people around the power plant who are passively affected, should be included under community development.
6	Livelihood and living condition	• The labor recruitment policy must be formulated in such a way that the local	• BIFPCL is recruiting local people who were the PAPs with the cooperation of the local government (UP Chairman and Members).	Mostly complied	• Campaigning within the local community should be continued to

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		laborers can easily get the chance of employment in the project work force. • Govt./NGOs need to provide support the skill development program and income generation activities to local people; • For the increased movement of people and heavy vehicles, the road networks must be developed. • Keep provision of sanitary toilet, one toilet for 10 persons.	• At present, a sum of 227 employees is engaged in MSTPP, of which 214 are Bangladeshi and 13 are Indians. In addition to this, required day-laborers are involved from the nearby community. • The wage of the labor was found compatible with the national standard. • The Khulna-Mongla Road and the approach road seem well-developed. Roads inside the plant premises are paved with concrete. • The toilet facilities in the labor shed seems sufficient to the remaining laborers to maintain cleanliness and hygienic conditions.		let them informed for any job opportunities created by the plant. • Capacity building program should be continued and expanded to involve more active and passive stakeholders living around the power plant to facilitate them to explore a wide horizon of employment market.
7	Green House Gas Controlling Measures	• Restriction of any kind of solid waste disposal • Approved pollution control devices to be fitted in equipment and machinery. • Transport vehicles must not be overloaded. • Avoid queuing of vehicles in areas adjacent to site, particularly near sensitive receptors including housing. • Switch off / throttle down all site vehicles, water vessels, generator and machinery when not in use. • Regular maintenance of water vessels, vehicles, generator and machinery in	• The facility is operating with modern, energy-efficient equipment and vehicles to minimize greenhouse gas (GHG) emissions as part of ongoing operational compliance and environmental due diligence. • All operational equipment, generators, and transport vehicles are routinely switched off or maintained at idle control levels during non-operational periods to reduce unnecessary fuel consumption and emissions. • Transportation management practices are enforced to ensure that vehicles operate within approved load limits, thereby preventing excess fuel use and associated GHG emissions. • A functional Solid Waste Management Plant (SWMP) is in operation, ensuring systematic	Being Complied	Maintenance of the site vehicles, dump vehicles, etc. should be conducted regularly.

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		accordance with manufacturer's guidelines.	collection, segregation, and treatment of waste, contributing to the reduction of methane and other GHG emissions. • Preventive maintenance schedules for machinery, generators, water vessels, and vehicles are actively implemented in accordance with manufacturer guidelines to ensure optimal combustion efficiency and reduced emissions. • Traffic and logistics planning are in place to minimize vehicle queuing within the plant facility, particularly near sensitive receptors, that reduce the local emissions.		

Table 5.2: Monitoring of Labor and Working Condition

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
1	Working Conditions and Management of Worker Relationship	• Preparation of Human Resources Policies and Procedures for Direct workers; • Defined Working condition and Terms of Employment for direct worker; • Sustainably equivalent terms and condition for migrant workers; • Compliance to national law of forming workers' organization; • No discrimination and equal opportunity for all.	• BIFPCL maintains the HR policies for the recruitment of new manpower as per their requirements. • No discrimination to the workers was recorded in terms of gender, equal opportunity, laborer level (local and migrated), etc. • The proponent has ensured minimum wage and working hours for the laborer as per GoB rules and regulations. • GRM procedure is being followed for the project workers and officials.	Complied	There should be a mechanism of record keeping if any GRM is applied.
2	Protecting Work Force	• The client will not employ children in any manner that is economically	• BIFPCL is complying with the Bangladesh Labour Act 2006 (as amended) during the operation phase,	Complied	This should be continued

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child health or physical, mental, spiritual, moral, or social development. • No Forced Labor	ensuring that no child or forced labor is employed in any plant activities. • Site inspections conducted by the IMA across the plant and observed, no child is engaged in any kind of operational or maintenance works. • No instances of forced labor have been identified during routine monitoring and compliance assessments by the monitoring team. • Proper worker documentation and contractual agreements are maintained, including details on age verification, working hours, wages, job responsibilities, and employee benefits.		throughout the project life cycle.
3	Safety at site	• Use of Personnel Protective Equipment's (i.e., safety vest, safety goggles, ear plug, safety shoes, gloves, dust mask, etc.); • Training to the professionals regularly (i.e., fire control, working at height, working in heat, first aid etc.); • Practice of Tool box meeting, safety talks; • Safe Storage of Hazardous Chemicals (e.g., fuel, flammable chemical, toxic chemicals, etc.); • Maintaining Material Safety Data Sheet (MSDS); • Provision of Health care facilities such as doctor, hospital etc. available at/nearby the Plant site; • Availability of First Aid at work place; • Preparation and Follow of Emergency Response Plan (ERP);	• The Laborers and Project personnel have been maintaining safety protocol by wearing safety shoes, safety vest, helmet and other appropriate PPEs, like face masks, ear plug, etc. while they are in the plant visit. • Fire-fighting system installed in the project premises to combat the fire related unwanted situation. Altogether, 1048 different types of fire extinguishers (CO_2 and Foam type) are available at site whereas 700 are in pipeline for procurement. In addition to the above, there are two (02) firefighting vehicles, and an ambulance with doctors available at the site. They are usually used as salvage/rescue vehicle during emergencies. • Hazardous chemicals (e.g., fuel, flammable chemical, toxic chemicals, etc.) are stored under shed and in a containment area and record as a document of Maintaining Material Safety Data Sheet (MSDS); • Induction training and awareness programs have been providing batch by batch to the employees at regular	Being complied	The authority is suggested to continue this practice throughout the entire project life cycle.

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		• Adequate fire precautions in place (e. g., fire extinguishers, escape routes etc.); • Documentation and reporting of occupational accidents, diseases, and incidents; • Policies and procedures for managing and monitoring the performance of third-party employers in relation to OHS.	intervals as recruitments are the recurrent phenomena. • During this quarter the following accidents/incidents happened: o **November 25:** Events occurred at the level of 02 first aid and 01 near miss; no major and minor accidents/incidents were recorded. Loss Time Injury (LTI) was zero (0). o **December:** 01 no. of near miss happened during this quarter whereas, no first aid, major or minor accidents/incidents were recorded. o **January:** 01 First aid and 02 near miss occurred while no major and minor accidents/incidents were recorded; • Regular safety talks and safety trainings are usually organized in the classrooms at the site. The following safety trainings were recorded during this quarter: o **November:** Safety trainings were attended by a sum of **615** participants of which 30 were rewarded. Tool-box training/PEP talk were given to 538 workers. o **December:** Trainings were given to 507 participants of which 30 were given reward; Tool-box training was given to 275 workers. o **January 26:** Trainings were given to 311 participants of which 30 were given reward; Tool-box training was given to 287 workers. • Along with the training, mock drills were conducted during this quarter on various topics like fire drill (Suction), fire extinguisher for the lady/female inhabitants of the township area.		

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			• Emergency contact details have been displayed on the board at the site to take prompt action in the event of sudden incident. In addition, various awareness posters have been placed at different locations within the site premises to promote safety awareness. • Warning signs, speed limit, and convex mirror are installed at the site to avoid accidental events.		
4	Occupational Health and Safety procedure	• Provision of complete EHS division in the Human Resources Planning/ Organogram. • Preparation of Safety Policy to be adopted during Plant operation.	• A dedicated Environment, Health and Safety (EHS) Division has been established within the organizational structure, with defined roles and responsibilities to oversee the OHS issue. • . MSTPP Authority has adopted a Safety Policy for plant operation in compliance with national and international standards. Key measures include an HSE management system, mandatory PPE, SOP-based operations, and regular safety training. Fire protection systems, emergency response plans, and incident reporting mechanisms are in place to ensure safe operations.	Being Complied	The authority is suggested to continue and maintain OHS records to address the events immediately to avoid Loss Time Injury (LTI).
5	Workers Well Being	• Provision of Welfare facilities for Worker/Labor such as, timely bonuses, wages, overtime, sick leaves, vacations etc.; • Routine medical check-up and emergency medical care for the sick and injured; • Introduction of health insurance for the employees. • Regular consultation meeting must be introduced between locals and project personnel to exchange the knowledge.	• Workers expressed their satisfaction with the residential facilities, sick leave provisions, overtime arrangements, wages, timely payment, and bonuses provided by the Proponent, and no instances of dissatisfaction were observed and recorded. The Proponent has ensured the benevolent grant developed by the Contractor for the victim's family, as per the Government's rule. • Basic Medical care with free medicine and counseling is being provided to workers on a regular basis.	Being complied	The authority is suggested to maintain regularity of the benefits eligible and GRM should be kept functional.

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			• Grievance Redress Mechanism (GRM) is available for workers by which whatever minor complaints they have, are usually addressed.		

Table 5.3: Monitoring of Community Health, Safety and Security

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
1	Disturbance to nearby community due to dust from any kind of operational activities	• Dust suppression system should be installed through water spraying system to control dusts on the roads, coal yards, etc.; • Conduct dust monitoring and visual inspection around the site boundary; • Adopt a comprehensive dust management plan to avoid dust related health issues to the community living around the site and complaints invite chaotic situation.	• A combined dust suppression system is in operation by integrating water-only sprinkler (spray) system and dry fog dust suppression to control fugitive emissions at the coal yard. • Some loose materials were found uncovered on the roadside that barely a concern for the local communities. • No significant complaints were recorded from the communities in connection with dust and noise while visiting them during monitoring. Air quality around the project site is being monitored regularly including dust particles and presented in the report. No exceedance was observed.	Being complied	Complaints are addressed immediately and recorded accordingly in the register.
2	Grievance of local people	• Hang grievance box at the place accessible to the local community to drop complaints if any. • Grievance Redress Mechanism should be kept functional with a required protocol; • Maintain an open communication channel with the local community.	• The Proponent has installed a community grievance box at the main entrance of the plant premises so that the affected community members (if any) can easily drop their grievances. • Primarily community people have the scope to submit their grievances through the community grievance box that is placed at the main gate. In addition, they may put their grievances through CLO, Union parishad and the IMA.	Being complied	The authority is advised to address the grievances of one to all.

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			• A Community Liaison Officer (CLO) has been working for maintaining open relation with the local communities. • The MSTPP authority/BIFPCL displays the regular development through their website (https://www.bifpcl.com/).		
3	Risk of breaching Community Safety	• Practice Risk Assessment and Evaluation Process; • Practice safe management for hazardous materials which may pose threat to the community; • Make available and operational of Emergency Response Plan (ERP); • Maintain open communication channel with the local community; • Provide training and instruction to the security personnel about their behavior and communication with the local people; • Aware the security personnel about the right of the community people.	• The whole plant premises are bounded with a 2.5m height boundary wall, which act as barriers for dust and noise. Plantation over 2 lac trees like greenbelt along the project boundary also support as barrier and ensure good environmental health in the surroundings. • Environmental control measures are in operation to protect outgoing dust and other pollutants from the Project site. • The Project authority has been maintaining the exit and entry strictly even for the employees. If required, the entry pass is checked by the security guard to enter the project site area. • No conflict has been noticed between local communities and project authorities or workers. • Project Security personnel is well trained and instructed by the authority to demonstrate a decent behavior and attitude to the local communities. • Though MSTPP authority receives grievances from the local community through local government institutes (LGIs), such as the Union Parishad Chairman or Local Administration, the Proponent has also hung a community grievance box at the main entrance of the plant premises so that the	Being complied	▪ The authority is suggested to keep operational appropriately the environmental control measures. ▪ The grievance box should be checked regularly and attend the complaints as soon as possible with solutions.

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			affected community members (if any) can easily drop their grievances.		
4	Community Health and Risk	• Provision of providing health service facilities to community if the Project poses any health risk like sexually transmitted disease, contract disease, vector-borne diseases; • Implement all pollution mitigation measures to ensure safeguarding to community.	• A complete set of medical facilities after the name of 'Maitree Hospital' (consisting of medical officer, medical assistant, office assistant) at Plant site for providing medical services to the officers, staff, workers, and communities is in operation. • Out Patient Department (OPD), laboratory test, physiotherapy service and medical check-up services are found to be continued in this quarter. • Pollution control measures like FGD, ESP, ETP, STP, SWMP and other facilities are now in operation and functioning properly. Routine water sprinkler is being conducted to suppress dust. • Adequate training is being provided to the laborers to prevent transmission of vector borne diseases, HIV positives and any kind of pandemic to the local community.	Complied	• BIFPCL is advised to conduct awareness program for STD and other transmitted diseases from workers to the community. • The authority is suggested to keep operational the environmental control measures.
6	Public Communication, Consultation and Awareness	• Arrange public communication / consultation meeting; • Share Project information with local people; • Organize environmental and social awareness programs /meetings.	• A Social Liaison Officer has been assigned to work continuously to develop relations with local communities and inform them about the project activities and environmental protection measures. • A social expert from IMA also used to visit the nearby community quarterly to obtain their opinions and collect necessary information. Regular consultation meetings are being carried out with the local government and administration. The proponent regularly displays the progress (through Video) of the development through their website (https://www.bifpcl.com/) and disclosure meetings at the local government. The local people	Being Complied	• The authority is suggested to maintain regularity in communicating the local community. In this regard, a schedule with a complete plan should follow. • BIFPCL may use local print media, social media, and digital media to

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
			are aware of the project activities through multiple sources, such as public communication, consultation with the monitoring team, display board, website, etc.		disclose and spread the updated project information.
7	Employment opportunities	• The local laborers should be recruited permanently and temporarily in both technical and non-technical posts. Some posts should be reserved for the local workers. This recruitment may help to reduce the poverty status of the whole study area. • At least 10% of the jobs (non-hazardous) in the power plant must be reserved for women.	• A section of local people has been employed at different positions like laborers, gardeners, cooks, technicians, watchmen and security based on their skill. • Women employment is ensured in the MSTPP in two ways: i. Regular employee in MSTPP: There are five women involved in different positions, out of which three (03) engineers; one (01) MBBS doctor and one (01) receptionist. ii. Outsourcing: A variable number of women are outsourced, who are involved as school teacher, security personnel, nurse in the hospital, etc.	Mostly complied	• The authority is suggested to increase women participation as employees. • During fixing the organogram of MSTPP, this issue should be considered.
9	Induced infrastructural development, rural and regional development	• Concerned government department like Khulna Development Authority, Bagerhat District Parishad, Rampal Upazila Parishad, LGED, RHD, MPA, Rail Way Department, etc. must guide the induced development. The existing development plans, Master plans might be improved in harmony with the project.	• This area is developing and already some LPG industries and others are established after construction of the MSTPP project. Also, some industries have purchased land in the project surroundings for future development.	Being complied	• Need to meet with the local governmental agencies to get know whether they have any plan to monitor the induced infrastructural development in this area.
9	Rural Electrification	• Development of electric transmission and distribution line, priority of local and	• Entire community are found under electricity coverage. The area is mostly depending on fish	Mostly complied	Advised to monitor this issue strictly

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		displaced people in providing electricity, priority in providing electricity for irrigation water pump for local people.	ponding therefore requirement of electricity for irrigation is not significant. • The plant is currently supporting the electricity supply to regional and national level. The daily average electricity generation during this monitoring quarter was 1,200 MW.		
10	Poverty reduction	• Integrated planning • Priority of local people in employment opportunity • Extension of social safety nets for affected people and people under exposure of plant possessed risk • Monitoring NGO's activities	• The MSTPP authority has already initiated some skill development and livelihood generating training for the community people. They have planned further capacity building programs for the community people. In all these trainings, the PAPs are given priority. • The authority arranged blanket distribution, wheel chair distribution, school kits distribution for the vulnerable people including the PAPs in the surrounding communities under a community development activity.	Mostly complied	Need to discuss with the local NGOs to know whether they are working on poverty reduction at the local level.
11	Outbreak of Pneumonia from contaminated Cooling tower	• Regular inspection and cleaning of cooling towers and associated water systems. • Drift eliminators should be used to control water loss from a cooling tower by limiting the amount of circulating water droplets that are emitted with the exhaust air of the tower. • Use biocides to prevent bacterial contamination as cooling towers can provide favorable conditions for *Legionella pneumophila* growth. When contaminated water is dispersed as fine droplets (aerosols), people nearby may inhale the bacteria and may got affected. • Maintenance of cooling tower as per Manufacturer guideline	• The cooling tower is being operated maintaining world standard and limiting cooling tower drift using drift eliminators. • Effective water treatment and biocide or chlorine dosing, with verification that the treatment system is functioning correctly to prevent bacterial contamination. • Manufacturer guidelines are being followed to maintain the cooling tower functionality. • No pneumonia affected patients are reported at the Maitree Hospital in this quarter.	Mostly complied	Suggested to commence data-sharing protocols beyond Maitree Hospital to include other local clinics and public health centers within the 10 km radius to ensure comprehensive tracking of community respiratory health.

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		• Strong monitoring of bacterial contamination in cooling tower • Community health monitoring within 10 km radius of cooling tower • Establish communication with nearby hospital to keep record of pneumonia affected patient to monitor outbreak of Pneumonia			
12	High land price	• Both the land acquisition and economic development of the area for the project implementation may cause the higher price of land. If the displaced people are not provided with compensation properly the poor displaced people will not be able to purchase land in compliance with the market price of land. Their land compensation must be equivalent to the market price. They also deserve additional resettlement support for their income restoration.	• The land compensation has already been paid following the national law.	Complied	

Table 5.4: Monitoring of Biodiversity and Sustainable Management of Living Natural Resources

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
1	Rainfall runoff from the plant site would cause deterioration of aquatic ecosystem.	• Installation of proper runoff drains; • Construct sediment traps or basins to arrest sediment carried by the overland run-offal.	• A well-designed runoff drainage system including a couple of sediment traps in the plant premises has been developed and in operation. • These silt traps are used to settle sediments coming along with the stormwater and discharges and ensured sediment-free stormwater from the traps in the open environment without hampering the ecosystem. • Maintenance excavation of the traps is a regular phenomenon to maintain the water room.	Being complied	The drainage channel along with the traps should be cleaned regularly to avoid unexpected drainage congestion in the plant premises.
2	Disturbance to nearby ecosystem due to different operational activities	• Implementation of onsite waste and air quality management plan; • Limiting the use of night light; • Using shade (directed downwards) around the outdoor lights; • Initiate Green plantation to restore the degraded habitats during construction; • No plantation of non-native species; • Retaining top soil for future habitat restoration; • No degradation of sensitive habitat.	• , A plantation program is being implemented with native mangrove and terrestrial species, contributing to habitat restoration, enhancement of local biodiversity, and the gradual development of a supportive ecosystem for wildlife. • The Proponent has successfully achieved the target of planting two (02) lakh saplings by 2025. In total 2,01,496 saplings have been planted so far out of 300,000 saplings under this plantation program. During this quarter (November to January, 2026) 5,000 Golpata and 20,000 flower plant saplings have been planted inside the plant premises. • The species of the plantation program along the rivers (the Passur and the Maidara) are dominated by the mangrove plant species, such as Keora (Sonneratia apetala), Gewa (Excoecaria agallocha), Golpata (Nypa fruticans) and Baen (Avicennia spp.). The highland of the plant premises is planted with various fruit-bearing plants like coconut (Cocos nucifera), mango (Mangifera indica), etc. and the medicinal plants like Bahera (Terminalia bellirica), Horitaki (Terminalia chebula),	Being Complied	• It is strongly recommended to accomplish the plantation program within a limited time frame. • It is also advised to monitor regularly to reduce the mortality rate at the sapling stages. • Topsoil management should be strictly followed. • Limiting street light at night and set downward direction to avoid disturbances to the nocturnal animals.

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
			Tulsi (Ocimum tenuiflorum), Arjun (Terminalia arjuna), Neem (Azadirachta indica), . • Top soils are being maintained while digging soil for different reasons to facilitate plant grow up. • Employees are aware of rescuing of species if any of them got injured and harming to wildlife.		
	Impact on ecosystem habitat quality and ecosystem health due to accidental fly ash deposition.	• Implement Air quality Management Plan; • Dust suppression (water spraying/stabilizers) applied and surface moisture maintained; • Regular monitoring of soil and water with corrective actions implemented;	• Maintenance and overhauling of ESP is a regular phenomenon to limit the failure of the device to avoid accidental ash dispersion and deposition. • Loading of ash from the ash silo to the barges a pneumatic system is being followed to avoid ash dispersion. This is to be mentioned that ashes are not deposited in the ash pond due to overwhelming demand of ash by the vendors. • The receiving barges are also made specially to contain ash and transport to the destination port without dispersing ash to the open environment. • Bottom ashes are suppressed by spraying mist during loading to receiving truck to take away by the vendors. • Visual monitoring of ash deposition on soil and water is being carried out as lab checking in Bangladesh is remote.	Being complied	It is suggested to maintain a log book of maintenance and overhauling of ESP and sharing with the IMA.
3	Disturbance to river, inter-tidal areas and wet lands	• No encroachment of inter-tidal flood plain area; • No disturbance to Dolphin community; • Monitoring of Ecosystem Health and Monitoring of Sundarbans Forest Health; • If required, embankment should be constructed considering a setback distance from river/canal bank;	• Continuous monitoring of ecosystem health of the Sundarbans and surrounding project area is being carried out as part of the operational environmental monitoring program. • Slope protection works along the Maidara River, including areas near the jetty and township, are maintained regularly to prevent erosion and ensure riverbank stability. • Routine ecological monitoring is ongoing, and no significant disturbance to inter-tidal areas, wetlands, or	Being complied	Monitoring needs to be continued throughout the entire operation stage.

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Slope protection work along the Maidara River should be maintained at a regular basis as and when required, and; • MSTPP may undertake dredging/excavation of silted up sections of the Maidara River for fisheries resource management and to restore and maintain natural tidal flow.	overall ecosystem integrity has been observed during plant operation. • No adverse impact on the dolphin community has been recorded; periodic monitoring confirms their presence and normal behavioral patterns in the vicinity. • No encroachment into inter-tidal floodplain areas has occurred during operation; all facilities remain within designated boundaries. • River flow characteristics are being monitored, and maintenance dredging is undertaken as required to support fisheries resources and sustain natural tidal flow.		

Table 5.5: Status of Compliance to the Conditions of DoE

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
1	This EIA Report is approved only for 1320 MW Khulna Coal Based Power Plant. Any expansion or extension of this Power Plant will require obtaining further Environmental Clearance with additional EIA Study.	The proponent does not have any plan to expand or extend the 2x660 MW Maitree Super Thermal Power Plant.	Complied.
2	The Coal Specification and Power Plant technology should be maintained as per EIA report. In case of any change in design, the proponent must obtain consent from DoE.	▪ The Coal Specification is being maintained as per EIA report. ▪ The Power Plant has been built by maintaining the technology mentioned in the EIA Report and assessment of impacts is accordingly done, and this is under operation.	Complied.
3	Project Proponent may undertake activities for land development and infrastructural development of the Project.	Land development and infrastructural development of the power plant has already completed. Both units are in operating condition. Commercialization started for Unit -1 on 23 December 2022 and Unit-2 on 12 March 2024.	Complied.
4	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.	The Proponent opened L/C and imported the required machineries including waste treatment plants and other pollution control devices. Civil structures for all of these facilities have already completed and under operation.	Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
5	The activity under Proposed Khulna 1320 MW Coal based Thermal Power Plant **operation** shall not release any pollutant that affect human health or will have damaging impact on the environment or natural resources.	• The Proponent has implemented the environmental control measures suggested in the EIA and overseen by DoE to outweigh or limit the pollutants/contaminants and emissions from the Plant to avoid human and environmental health. The environmental control measures include ETP, STP, ESP, FGD, SWMP, FGD Waste Water Treatment Plant etc. have been installed and operationalized. Furthermore, an online air quality monitoring system has already been installed by DoE to monitor the air quality separately. The Proponent also set up a air quality monitoring system by installing four (04) machines to monitor air quality at the plant premises individually. The air quality monitoring parameters include $PM_{2.5}$, PM_{10}, SO_x, CO, NO_x, O_3, etc. CEGIS, a third-party monitoring agency, has also been conducting quarterly environmental and social impact monitoring along with compliance monitoring as per EMP since 2014. No significant impact during operation stage were recorded on the surrounding environment or on the natural resources.	Being complied.
6	Proper and adequate mitigation measures shall be ensured throughout the **operation** period of the proposed Khulna 1320 MW Coal based Thermal Power Plant Project activities.	• MSTPP has taken appropriate mitigation measures conforming EMP and technical specification of main Plant at each of the stages of Project operation. • Proper safeguard measures for the safety of the project officials and general workers found very satisfactory.	Complied.
7	Any heritage sight, ecologically critical area, and other environmentally, religious and archaeologically sensitive places shall be kept protected during Project **operation** phase.	In the monitoring corridor, there is no religious and archaeological sites. However, the Southeast Sundarbans World Heritage Site (WHS) and the Sundarbans Ecologically Critical Area (ECA) are fallen in this corridor. Considering the sensitivity of these environmentally and ecologically important areas, a regular quarterly monitoring is being done at the close proximity of the WHS and ECA	Complied
8	Environment friendly operation practices shall be followed that minimize loss of habitats and fish breeding, feeding & nursery sites.	Environmentally sound operational practices are in place, with no observed impact on aquatic habitats or fish breeding, feeding, and nursery areas. Monitoring results indicate that the ecosystem integrity is being maintained to ensure the regulatory compliance.	Being complied.
9	Construction works shall be restricted to daytime hours so as to avoid/mitigate the disturbance of local lives as	As construction work is over and during construction phase the condition was observed so at this stage of operation this report highlights the measures are being taken to avoid or mitigate disturbances to the local people during	Being complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
	well as implementation schedules of the works shall be notified in advance to nearby residents.	whatsoever repairing or minor construction works undergoes. In this connection, the authority has appointed one social liaison officer who is working closely for developing relation with the local communities. Quarterly community visit is also being conducted by a IMA's social expert. Regular consultation meetings are carried out with the local government and administration in order to receive and realize the grievances and accordingly to redress those. There are no grievances related to the noise effect registered yet from the nearby communities.	
10	Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed Project period.	Most of the labor shed has been demolished as the construction phase is over. Adequate toilet facilities are there for the maintenance workers or workers for minor construction works, who are staying presently	Being complied
11	In order to control noise pollution, vehicles & equipment shall undergo regular maintenance; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.	All operational vehicles and equipment are maintained regularly in accordance with the maintenance schedules and valid registrations. Noise-generating activities during sensitive hours (e.g., nighttime) are minimized and only undertaken when absolutely necessary with appropriate controls. Additionally, high-noise machinery is strategically located and operated away from sensitive receptors such as residential areas, mosque etc. to avoid noise induced impact.	Being complied
12	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.	• Burning of waste materials is strictly prohibited inside the project boundary. • Solid Waste Management Plant (SWMP) is under operation where the solid waste is being managed properly and compost is being prepared. This compost is used in the horticulture and gardens located in the plant premises. In the process of compost preparation from the solid waste, leachate is generated which is being managed by depositing in the scientifically made leachate pond to avoid unexpected water contamination.	Being complied
13	Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be endangered or destructed.	Quarterly monitoring activities are being carried out to examine the potential impacts on habitat of flora and fauna. As construction works have been finished, no detectable impacts on flora and fauna are observed.	Being complied
14	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.	The proponent is giving top priorities and trying to follow mitigation measures against the impacts on environmental and social segments including occupational and community health and safety issues. To keep the environment and the plant	Being complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		safe, plenty of precautionary measures has observed during the physical visit by the IMA. • Mitigation measures for the impacts on environmental quality (Air, Water and Noise) and biodiversity/ecosystem are being implemented and monitored by the IMA. • Required safeguard equipment like ETP, STP, FGD, FGD wastewater treatment plant, SWMP etc. are in place to protect the environment. • In case of medical emergency, the Proponent has signed a contract with a private hospital (GAZI medical, Khulna) for emergency services for both MSTPP officials and staff, and also the daily or contracted workers. Also, an ICU rich hospital after the name of 'Maitree Hospital' with an experienced medical team and ambulance has kept ready to provide the instant and emergency services; • Emergency fire exit, assembling point, fire extinguisher, fire alarm has been observed available and well-functioning. • As a part of emergency response plan, plenty of laminated posters of emergency contact numbers were noticed hung inside the plant premises.	
15	To control dust, spraying of water over the earthen materials should be carried out from time to time.	Quarterly air quality monitoring in and around the project sites is being conducted and recorded data checked with the Air Pollution (Control) Rules 2022 standards where no significant exceedance has been recorded so far. Additionally, the water sprinkling is still continuing at the designated places for suppressing dust.	Being complied
16	Storage area for soils and other construction materials shall be carefully selected to avoid disturbance of the natural drainage.	• Construction residuals (e.g., scraps) and waste materials (e.g., carton, Styrofoam, etc.) are being managed and stored at designated areas, such as the backyard of the ETP and labour camp areas, to avoid disturbance to the natural drainage system.. • The removal process is currently underway. The auction process for selecting a suitable vendor who will be responsibile for collecting and removing the scrap materials themselves. As the process involves some inevitable formalities, the overall removal activity is expected to take place within a short period of time.	Being complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		• Construction materials and sand are being stored temporarily in designated locations for ongoing repair and maintenance that do not obstruct or adversely affect the natural drainage system.	
17	Adequate considerations should be given to facilitate drainage system for runoff water from rain/tidal surge.	A permanent drainage system is in place and fully functional to effectively manage and discharge the stormwater run-off water generated from rainfall and tidal surges within the Plant area. Regular maintenance and monitoring are being carried out to ensure its efficiency during the operational phase.	Being complied.
18	Adequate facilities should be ensured for silt trap to avoid clogging of drain/canal/water bodies	There are two (02) silt traps at the Plant site to settle sediments coming with the storm water and discharges sediment-free storm water in the open environment.	Being complied.
19	The entire coal handling system should be designed as an enclosed (and not only covered) conveyor system. There should be integrated dust control system with dust extraction and bag filters at unloading areas and at each transfer points on the conveyor system.	Entire coal handling system is designed and constructed as an enclosed conveyor system as per DoE requirement. Integrated dust control system with dust extraction system/bag filter and dust suppression system at crusher house, unloading points, transfer points are being maintained as stated in the contract package. Due to the technical reason 25 m of the conveyor system at the jetty site was kept uncovered. This facilitates the Ship Unloader (SUL) movement and loading of coal into the belt.	Being complied
20	Coal Plant should have high-efficiency bag filter for arresting dust emissions.	Integrated dust control system with dust extraction system/bag filter and dust suppression system has installed as per the technical specification. In addition, high-efficient ESP (with 99.99% efficiency) for both units are now under operation that will control the coal dust and fly ash.	Being complied
21	Coal should be stored in a covered storage yard.	The Plant possesses four (04) nos. of covered coal yards (coal shed), out of which two (02) is in operation and rest two (02) are standby and ready to be operated as and when required.	Being complied
22	The entire coal stockyard should be covered with water sprinkler provided with automated moisture sensor to control self-combustion.	The entire coal stockyard is fully covered and automated moisture sensor has been provisioned to protect coal self-combustion and avoid coal dust dispersion.	Being complied
23	100% utilization of fly ash and bottom ash should be planned and implemented throughout the operation of the Plant. There should only be a provision of small ash dyke that will not exceed 25 (twenty-five) acres of land to store residual ash.	• Fly ash and Gypsum that are being generated in the Plant, sold by the proponent to the following different vendors: **Fly Ash:** ✓ Bashundhara Ready-mix 60% ✓ RNPG Alliance 40%	Being complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		Gypsum: ✓ Premier Cement Mills Ltd 50% ✓ RNPG Alliance 25% ✓ Bhuiyan Logistics 25% • Ash handling and disposal infrastructure is continuously maintained, and initiatives are in place to strengthen ash utilization and marketing. Fly ash is being evacuated in an environment friendly way from the Plant.	
24	Integrated dry ash handling, loading, unloading and transportation system should be established.	Integrated dry ash handling, loading, unloading and transportation system are being followed in order to transport the dry ash through ships/cargo.	Being complied
25	There should be adequate and properly sized and designed dry ash silo with appropriate conveyor system.	Three (03) adequately sized and properly designed fly ash silos with proper conveyor system are now under operation. In addition, there are other two (02) silos of which one (01) bottom ash silo and one (01) gypsum silo for the management of byproducts like gypsum and bottom ash.	Being complied
26	Bottom ash should be extracted, crashed and stored in silos for utilization with proper collection and conveyor system.	• Bottom Ash Intermediate Silo is under operation. • The pneumatic technology of fly ash (FA) collection using pipeline and transferring to the hoody and confined vessels for a take away was observed functioning well.	Being complied
27	Resettlement and rehabilitation of the displaced population (including those who do not own land) should be done properly.	N/A for the operational phase	N/A
28	Resettlement plan should be properly implemented and people should be adequately compensated.	N/A for the operational phase	N/A
29	Construction material should be properly disposed-off after construction work is over.	N/A for the operational phase	N/A
30	As described in the report environmental monitoring should be strictly followed and monitoring report should be shared with DoE to ensure the environmental management properly.	The Proponent has engaged CEGIS as an IMA for conducting environmental and social monitoring on a quarterly basis in February 2014. Accordingly, the quarterly monitoring reports are being prepared with utmost efforts bearing risks from river current and turbulence, rough weather, wildlife, etc. and submitted and shared with DoE, which are also available at BIFPCL web site.	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
31	All operational activities should be implemented according to EMP clearly listed in the EIA report.	The preconstruction and construction stages are over and environmental and social monitoring was conducted in accordance with ECC condition and monitoring findings are conserved as baseline to compare the parameters considered in operation stage monitoring. The proponent has adopted the EMP suggestions applicable at operation stage. Considering the appropriate actions based on EMP monitoring, the proponent regularly updates the EMP and OHAS which assist to reduce further the risk of accidental events. From the preconstruction stage till now BIFPCL has been following the guidelines of EMP stated in the EIA Report and we have suggested to follow the EMP strictly through the entire lifecycle of the Plant.	Being Complied
32	A third party/independent monitoring bodies excluding JVC/BPDB should be engaged immediately for monitoring of all activities during operation phases as per monitoring plan of EIA report and monitoring report must be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	An Independent Monitoring Agency (IMA) has been conducting environmental and social monitoring on a quarterly basis since February 2014. The quarterly monitoring reports generated under this assignment are being submitted to BIFPCL. BIFPCL subsequently submits the report to the DoE, Bagerhat District Office, Khulna Divisional Office, headquarters of the Department of Environment (DoE) and Forest Department to fulfil the compliance…	Being Complied
33	Regular monitoring of the susceptible places of Sundarbans for protecting ecosystem, biodiversity and forest coverage should be made using latest high-resolution image for keeping ambient environment.	The Monitoring activities of IMA includes monitoring of the susceptible places of the Sundarbans. The monitoring report contains analysis of biodiversity and forest coverage. However, in addition to this, Forest Department has also suggested some survey & analysis which are being monitored and reported by CEGIS through the quarterly monitoring report and submitted to the concerned authorities.	Being Complied.
34	Air, water, soil, biological and social data should be monitored regularly with a network monitoring system with a view to assess the natural quality of the Sundarbans and other fragile ecosystem and report of monitoring results should be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	Air, water, soil and biological components are regularly monitored as per the EMP. Each of the monitored environmental data has been incorporated in the Monitoring report and displayed on the BIFPCL website.	Being complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
35	There should be regularly disclosure of the report through workshops and websites and responses should be taken care accordingly.	All the monitoring reports are available on the website of BIFPCL (www.bifpcl.com)	Being complied.
36	Online air and water quality monitoring system should be made functional throughout the life of the Plant.	Water quality analysis system has already been developed. As a part of air quality monitoring system, DoE has already installed an online air quality monitoring system at the project site (Padma Abashan area), which is in operation and BIFPCL/MSTPP has installed four (04) air quality monitoring devices around the plant premises, where $PM_{2.5}$, PM_{10}, SO_2, CO, NO_2, O_3 etc. are being monitored.	Being complied
37	Management Information System (MIS) is to be developed for this coal-based Power Plant. The scope of MIS services will obviously include representing the real time monitored data especially environmental parameters displaying at Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment, BPDB and other concerned agencies/Ministries. The MIS should be web based for accessing every individual to show the real time monitored records.	▪ Real-time ambient air quality monitoring data are being displayed at Gate No. 02 of MSTPP for mass people's information on the environment quality issues. In addition, development of the Management Information System (MIS) is currently underway, which, upon completion, will fully address the relevant DoE condition.. ▪ DoE has set up an AAQMS placed at the Project Site (Padma Abashan area) and real time monitoring data of environmental parameters displaying at the Department of Environment. ▪ Water quality monitoring data are portraying in the Quarterly Monitoring Report (QMR) on a regular basis.	Being complied
38	JVC should provide all sort of logistics support to DoE and other relevant agencies for monitoring environment related items/events.	The Proponent is providing all sorts of logistic support to DoE as and when required along with other relevant agencies for monitoring the Plant operational activities and environmental items/events maintain the health and safety protocol of the Plant site.	Being complied
39	No ground water should be allowed to use for plant purposes.	There is no provision of withdrawing ground water for any purposes of the Plant, However, there is a deep tube-well installed for construction purposes, which is being pertained purely for testing.	Being complied
40	Conduct stakeholder meetings on regular basis for better performance of the Project as a whole.	A Community Liaison Officer (CLO) is assigned to work continuously to develop relations with local communities and inform them about the project activities and environmental protection measures, Besides an IMA is also carrying out consultation with the local people on a regular basis for better performance of the Project as a whole.	Being complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
41	Additional Environmental baseline data to be collected as suggested in the EIA report and conveyed to DoE and other concern authorities.	All quarterly monitoring reports containing the contemporary data are being collected as suggested in the EIA study and are disseminating to DoE and other concerned authorities as instructed. The baseline data refer to the information collected during the pre-construction phase of the project.	Being complied
42	The Environmental Management Plan under the EIA study shall strictly be implemented and kept functioning on a continuous basis.	BIFPCL has been implementing all the EMP measures realistically phase by phase as suggested in the EIA Report and DoE conditions. The status of EMP implementation is also regularly monitored. Based on the monitoring, Proponent updates the site specific EMP to manage the potential impacts.	Being complied
43	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 Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	BIFPCL is committed to follow this practice of submitting the detailed work plan to the prescribed offices of DoE, seven (7) days before starting any development activities (if there is any) in future.	Being complied
44	Environmental Monitoring Reports according to specific format specified in the EIA Report shall be made available simultaneously to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters on a monthly basis during the construction period of the Project.	Environmental Monitoring Reports as per specific format provided in the EIA Report made available by BIFPCL and submitted to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters accordingly.	Being complied
45	The following records must be kept in respect if any samples required to be collected for the purpose of environmental monitoring activities: • The date(s) on which the sample was taken; • The time(s) at which the sample was collected; • The point at which the sample was taken; and • The name of the person who collected the sample.	The Monitoring report keeps all the records as suggested.	Being complied
46	The results of any monitoring, required to be conducted under this EIA report must be recorded.	BIFPCL has been collecting all the monitoring data and submitting with proper documentation and accordingly sharing with DoE on regular basis.	Being complied
47	In case of any emergency, the following information shall be immediately reported to Bagerhat District Office, Khulna Divisional Office and Headquarters of the	A formal emergency communication protocol is actively implemented during Plant operation, ensuring immediate and simultaneous reporting of any incident to the Bagerhat District Office, Khulna Divisional Office, and Headquarters of the	Being complied

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
	Department of Environment (DoE) simultaneously. Nature of incident (oil spill, fire, accident. Collision, land slide, etc.). Personnel affected (injured, missing, fatalities, etc.). Emergency support available and its location (standby transport, medical facilities, etc.). Weather conditions Current operations (abandoning the site, firefighting, etc.)	Department of Environment (DoE). Relevant details such as nature of the incident, affected personnel, available emergency support, weather conditions, and ongoing response actions are systematically communicated.	
48	The Project authority or its employees must notify the department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	BIFPCL has established a proper mechanism for recording such incident as suggested and notify the department of Environment regarding incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	Being complied
49	All pollution incidents shall be reported immediately and simultaneously to the Bagerhat District Office, Khulna Divisional Office and Headquarters of DoE.	BIFPCL has established a proper mechanism for recording such incident as suggested in the ERP.	Being complied
50	Appropriate permission would require to be obtained from the Forest Department in favor of cutting/felling on any plant/tree/sapling forested by any individual or government before doing such type of activity.	There is no need of cutting/felling down of any trees outside the project boundary. However, in future, if any such case arises, BIFPCL is committed to obtain appropriate permission from the Bangladesh Forest Department (BFD).	Being complied
51	Re-vegetation and re-plantation under green belt activities shall be undertaken in consultation with the Forest Department according to those mentioned in the EIA report.	The Proponent has successfully achieved the target of planting two (02) lakh of saplings by 2025. In total 2,01,496 saplings have been planted so far out of 300,000 saplings under this plantation program. During this quarter (November to January, 26) 5,000 Golpata and 20,000 flower saplings have been planted inside the plant premises.	Being Complied
52	Climate Change impacts and maximum storm surge height shall have to consider at the design and construction phase.	The design level (elevation) of the land and earthen embankment has designed and constructed considering the climate change impact and maximum storm surge height.	Complied
53	A separate EIA/morphological study shall have to be conducted for coal transportation and river dredging to develop sound environmental management plan towards conservation of ecosystem and biodiversity.	Coal transportation activities are done through the existing maritime route, which is controlled by Mongla Port Authority (MPA). MPA has already conducted the EIA study for the dredging activity and received DoE approval. A separate EIA study	Being Complied.

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
		for Coal Transportation was also conducted by BIFPCL and received approval from DoE.	
54	A full-fledged institutional setup for EHS and CSR must be put in place before operation of the Power Plant.	• A full-fledged institutional framework for Environment, Health & Safety (EHS) has been established and is currently operational at the power plant. Standard Operating Procedures (SOPs), reporting mechanisms, and regular monitoring systems are being effectively implemented to ensure adherence to regulatory requirements and corporate commitments during the operation phase. The proponent has been conducting community development activities regularly, where the target beneficiaries are the affected people along with other destitute people. • They have been planning to expand the community development activities in larger extent to involve active and passive stakeholders living around the power plant. The plan also involves rigorous community development activities so that manpower is generated in the area to be eligible to work at the greater horizon of the employment market home and abroad.	Being complied
55	The Project authority shall extend active cooperation to DoE officials to facilitate their visit to the site as and when necessary.	BIFPCL is extending its all-out cooperation to DoE.	Being complied
56	Violation of any of the above conditions shall render this approval void.	Noted by BIFPCL	Being complied
57	Any injunction on this Project from the Honorable Supreme Court/High Court Division shall render this approval void.	Noted by BIFPCL	Being complied
58	Without installation of 275 Meter Height Chimney, Effluent Treatment Plant (ETP), Waste Water Treatment Plant (WWTP), Settling Pond, Desalinization Plant, API Oil Water Separator, High Efficiency Electro Static Precipitator (ESP), 'closed-loop' Flue Gas Desulfurization (FGD), Low NOx Burner, online air and water quality monitoring system and other pollution control equipment and obtaining Environmental Clearance	**Current status:** • Chimney: Under operation. • DM water plant: Under operation. • Effluent Treatment Plant (ETP): ETP is under operation • API Oil Water Separator: This is a part of ETP which is under operation. • The Sewage Treatment Plant (STP): Under Operation • Electro Static Precipitator (ESP): Both units are Under operation	Compliance action initiated

Sl. No	Condition of DoE	Status Narratives/Descriptions	Compliance Status
	Certificate, the proponent shall not start operation of the Project.	• Flue Gas Desulfurization (FGD): Both units are under operation. • Solid Waste Management Plant (SWMP): Under operation • Desalinization plant: Under operation • Low NOx burner: Under operation • **Online air and water quality monitoring system:** A water quality analysis system has already been installed and is operational. For air quality monitoring, the Department of Environment (DoE) has installed an online air quality monitoring device at the project area (Padma Abashan), while BIFPCL has installed four (04) Ambient Air Quality Monitoring System (AAQMS) devices around the plant premises, all of which are fully functional. In addition, a stack emission monitoring system has been installed at the chimney and is currently operational. • Settling pond: Two (02) settling ponds have already been constructed to allow silt to settle prior to discharge into the river.	
59	This EIA Approval has been issued with the approval of the appropriate authority.	BPDB and BIFPCL are thankful to DoE.	Complied

EMP Measures for Coal Transportation and vessel monitoring

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
Increase of Particulate Matter (PM) in local airquality	• Adoption of dust suppression system in ship's hold, ship's unloader, coal terminal and conveyor system, stock yard • The vessel to be engaged shall have to be complied with international and national standard e.g., IMO conventions, MARPORL, HNS, etc. • Adopt enclose system for coal unloading and transportation (Through conveyor belt).	• During the monitoring, the IMA found the ships are at the Jetty were IMO regulated and Mercantile Marine certified named MV BASHUNDHARA LOGISTICS-39 (IMO 9876476), MV BASHUNDHARA LOGISTICS-40 (IMO 9876488) and other dedicated coal carrying water barges which are engaged in coal transportation were IMO certified. • Dust suppression systems, such as water spray/mist systems, are used during loading and unloading operations.	Mostly complied	Regular operation of dust suppression measure is strongly recommended.

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
Noise generation	• Restrict blowing of whistle within the Sundarbans Territory. • Switch off / throttle down of all equipment and Machinery when not in use. • Introduce speed limitation for vessel during Sundarbans Territory. • Anchorage should be allowed at particular location within the Environmental Critical Areas like Sundarbans, Beach, Sea-Shore, Sonadia Island, etc. • Enforce Forest Protection Acts. • Limiting dropping of coal and escapee during unloading to feeder vessel/lighter vessel.	• No abnormal sound was recorded during inspection of the main engine and generator. • No excessive vibration from loose fittings was detected. • Vessel operators were observed complying with restrictions on whistle blowing within the Sundarbans territory, with minimal use for safety requirements only. • Equipment and onboard machinery (including generators and auxiliary systems) were found to be switched off to minimize noise and emissions. • Speed limits for coal-carrying vessels were being maintained while navigating through the Sundarbans. • Designated anchorage points within environmentally sensitive areas (e.g., Sundarbans, coastal and island zones) were being followed, avoiding random or unauthorized anchoring. • Relevant provisions of Forest Protection Acts were being enforced; no unauthorized entry or activities were noted within restricted forest zones. • Measures to control coal spillage during loading/unloading to feeder/lighter vessels were in place, including careful handling practices, use of protective barriers, and immediate cleanup of any observed spillage.	Being complied	MSTPP authority is suggested to keep pressure on the shipping company to maintain regulation of IMO.
Deterioration of river water quality	• Ensure zero dumping of ballast water, zero oil spillage, zero discharge of waste water, zero waste dumping. • Clean Ship Concept might be adopted in carrying coal. • Practice of dust suppression should be “to moist the coal not to wet the coal”.	• As the coal-carrying lighterage vessels operate within the inland waters of Bangladesh, compliance shall be governed by Sections 60A and 60B of the Inland Shipping Ordinance, 1976. Accordingly, the provisions of the Inland Shipping Ordinance, 1976 shall prevail over the provisions of MARPOL, except to the extent that MARPOL has been expressly incorporated into or adopted under the applicable laws and regulations of Bangladesh.	Being complied	The lighter vessels engaged in coal transportation should: • Maintain a Ballast Water Record Book. • Maintain Bilge Disposal Record Book.

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
		• It is reported by the vessel crews that they usually contain the bilge water generated in the vessel in the container(s) and sell it to the vendors. They also reported that they collect the solid waste in the polythene and disposed in the suitable place. However, they have no documentary evidence or onboard records to verify the compliance. On the other hand, being inland vessel, ballast water issue is remotely important. • The deck areas and jetties were observed to be neat and clean. No visible floating coal particles were found around the vessels. Hence, water quality deterioration through this activity is remote. • Accordingly, the likelihood of water quality deterioration arising from the operations of the coal-carrying vessels could not be conclusively determined, as no documentary evidence or onboard records were available to verify compliance with the prohibition of ballast water discharge, oil spills, wastewater discharge, and solid waste disposal into the water.		• Adequate waste bins and garbage bags shall be provided and maintained at all times for the proper segregation and disposal of dry waste. • Vessels should carry updated "Pollution Prevention Certificate" at all times.
Wave erosion	• Plant mangrove forest along the bank of rivers, and sea shores • Plant and conserve native mangrove plants along the river bank and sea shore of coal transportation route • Introduce speed limit of coal transportation vessel • Reduce speed of the vessel at erosion vulnerable areas • Regular monitoring of erosion	• Due to depth limitations in the channel, vessels are required to restrict their speed to ensure safe navigation. • Plantation of mangrove species along with terrestrial plant species have been done across the` selected riverbanks adjacent to the coal transportation route, with ongoing efforts to expand coverage in erosion-prone areas. • Native mangrove species are being planted and maintained in coordination with local forestry guidelines. • Speed limits for coal transportation vessels have been formally established for vessel operators through operational guidelines and awareness briefings.	Being complied	Plantation with native species should be continued and where possible with mangrove species.

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
		• Riverbank erosion is regularly monitored through field inspections and reporting. Additional mitigation actions will be imposed if any vulnerable areas identified.		
Increase river traffic accident	• Proper training for vessel crews, traffic inspectors, in charges, and another concerned professional • All vessel should be provided with GPS, radar and other electronic navigation systems to prevent grounding or collisions, such as depth sounder, radar and radio equipment for communication • All vessel should be complied with rules and regulation of IMO, Port authority, BIWTA and national laws of safety, and environmental conservations • Ensure port/coal terminal inspector, environment and safety manager are enforced	• No training programs for vessel operators and crew members were conducted on board. However, according to the crew's statements, frequent firefighting drills are carried out for emergency preparedness. • GPS receiver, echosounder, VHF communication system, radar is active on lighter vessels. • Out of the vessels, some possess updated charts, tide tables and local notices, some do not. • Crew are found aware of emergency maneuver procedure (grounding/collision). • During this monitoring period, the on-boarded lighter vessels MV BASHUNDHARA LOGISTICS-35 (IMO 9669457) and other dedicated coal carrying water barges which are engaged in coal transportation were IMO certified. • No dedicated environment and safety manager was available during the visit. • Other smaller vessels engaged in fly ash transportation are not IMO-registered but hold the required local certifications for operating within the inland waterways of Bangladesh.	Being complied	MSTPP authority is suggested to keep pressure on the shipping company to maintain regulation of IMO.
Impact on Fish resources	• Awareness growing for fishers and facilitate the fisher to use nets/boats provided with signals and marking • Reduce speed if net is seen • Ensure no dumping of ballast water, no oil spillage, no discharge of waste water, no waste dumping	• Awareness initiatives for local fishers were observed, including guidance on the use of marked nets and boats with visible signals. • Vessel operators were seen exercising caution by reducing speed upon sighting fishing nets or fishing boats, thereby minimizing the risk of net damage and ensuring safety of local fishing activities. • Oil Record Book (ORB), sludge disposal receipts, and bilge water management logbooks are not maintained on board the lighter vessels and barges.	Being complied	• MSTPP authority is suggested to keep pressure on the shipping company to maintain regulation of IMO. • Build communication with the Mongla Prt Authority (MPA) to dispose the oil-mixed

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
		• Though the lighter vessels possess IMO numbers, they operate solely within the inland waterways of Bangladesh. For this reason, requirement of ballast water issue is remote and thus holding a Ballast Water Management Certificate (BWMC) has no importance.. • According to the crew's statements, sludge and bilge are disposed of through recycling agencies. These agencies collect sludge and bilge in drums on a monthly, quarterly, or as-required basis.		water to the reception facilities created by MPA.
Impact on Sundarbans Ecosystem and wildlife, Sea ShoreEcosystem and Wild life of Maheshkhali	• Ensure enforcement of ECA, 1995 and ECR, 2023, Forest Protection Act, and other rules, regulation and treaties for conserving Sundarbans and Ecological Critical Areas • Ensure zero dumping of ballast water, zero oil spillage, zero discharge of waste water, zero waste dumping • Restrict outside lighting of the water vessel during navigation across the Sundarbans • Restrict the beaming of searchlight on Forest area /Sea Shores / Protected Beach / Protected Areas • Use low beam of searchlight during navigation across the Sundarbans/Sonadia Island / Bird Colony • Limiting dropping of coal and escapee during unloading to feeder vessel/ lighter vessel	• The project authority has demonstrated adherence to applicable environmental laws, including ECA 1995 and ECR 2023, through routine monitoring and coordination with relevant regulatory agencies during coal transportation activities. • Navigation practices within environmentally sensitive areas such as the Sundarbans and Ecologically Critical Areas (ECAs) are being carefully managed. External lighting of vessels is minimized, and the use of searchlights is restricted to low-beam mode across the Sundarbans/Sonadia Island/Bird Colony to avoid disturbance to birds and wildlife. • Adequate measures are in place to minimize coal spillage during unloading operations to feeder and lighter vessels. Handling systems are being operated with caution to reduce coal dropping and fugitive losses. • Noise control measures are being practiced, including restrictions on whistle blowing within the Sundarbans territory and Ecological Critical Areas of Maheshkhali. • Environmental conservation initiatives such as dolphin, marine ecosystem, turtle, and shorebird protection programs have been formally adopted and are in the early stages of implementation. • Monitoring of foreign vessels involved in coal transportation is conducted through established mechanisms, supported by check posts and control points at strategic locations to regulate activities and	Being complied	MSTPP authority is suggested to keep pressure on the shipping company to maintain regulation of IMO.

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
	• Restrict blowing of whistle within Sundarbans Territory and Ecological Critical Area of Maheshkhali. • Introduce speed limitation for vessel in Sundarbans Territory and Ecological Critical Area of Maheshkhali. • Anchorage might be allowed at particular location within the Sundarbans area and Ecological Critical Area of Maheshkhali. • Anchorage of water vessel only in designated sites • Adoption of Dolphin Conservation Program Adoption of Marine Environment Protection Program • Adoption of Turtle Conservation Program • Adoption of Shore Bird Conservation Program • Monitoring activities of the foreign ships during coal transportation • Establish check post for monitoring activities of foreign ships during coal transportation	ensure adherence to environmental and navigational guidelines. •		

Compliance to the conditions of DoE (EIA study of Coal Transportation)

With reference to the EIA approval of coal transportation for 2x660 MWMSTPP with memo no: DoE/clearance/5532 /2016/50, dated 31/01/2018, Department of Environment has set some specific conditions to be followed as a fulfillment of the condition no. 53 of the EIA approval letter of 2x660 MWMSTPP.

Table 5.6: Compliance conditions of DoE (EIA study of Coal transportation)

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
1	This EIA Report is approved only for Coal Transportation for the Proposed 2x660 MW Maitree Super Thermal Power Plant Project. Any modification of this project as well as Coal Transportation will require further EIA approval with additional EIA Study.	BIFPCL will notify to DoE prior to initiation of any modification, expansion or extension of the Power Plant and the alteration of coal transportation route.	Suggested to comply as and when required.
2	The route of coal Transportation should be maintained as per EIA Report. In case of any changes the proponent must obtain consent from DoE.	The route of coal Transportation is maintained as stated in the EIA report. In case of any changes in the transportation route, the proponent shall obtain consent from DoE.	Suggested to comply as and when required.
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 plant and other pollution control devices.	All the Power Plant related equipment and machineries including the waste management treatment plant and other pollution control devices have already been imported and installed in the MSTPP premises.	Complied.
4	The activity under Coal Transportation for the Proposed 2x660 MW Maitree Super Thermal Power Plant Project shall not release any pollutant that affect human health or will have damaging impact on the environment or natural resources.	• Though the lighter vessels possess IMO numbers, they operate solely within the inland waterways of Bangladesh. For this reason, requirement of ballast water issue is remote and thus holding a Ballast Water Management Certificate (BWMC) has no importance. • According to the crew's statements, solid waste and garbage are not discharged into rivers or the sea; instead, they are generally disposed of offshore.	Suggested to use IMO regulated vessels or maintain the specifications of lighterage stringently. It is advised to set tarpaulin at the joining area of vessel and jetty.
5	Proper and adequate mitigation measures shall be ensured throughout the operation period of the Project	The project proponent has included all the mitigation measures in the BID document of Coal Transportation as suggested in the EIA study. In this regard, MSTPP authority has set up an Environment and Fire & Safety Wing to ensure the EMP implementation for the project life span.	Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
6	Any heritage site, ecologically critical areas, and other environmentally, religious and archaeologically sensitive places shall be kept protected during project operation.	In the monitoring corridor, there is no religious and archaeological sites. However, the Southeast Sundarbans World Heritage Site (WHS) and the Sundarbans Ecologically Critical Area (ECA) are fallen in this corridor. Considering the sensitivity of these environmentally and ecologically important areas, a regular quarterly monitoring is being done at the close proximity of the WHS and ECA. The changes in environmental quality if any will be apparent in the quarterly monitoring data, which in turn will support in undertaking corrective measures in protecting the WHS and ECA in future during the operation of coal transportation.	Being complied.
7	Environment friendly operation and development practices shall be followed that minimize loss of habitats and fish breeding, feeding and nursery sites.	The installations related to the coal transportation system were the site slope protection and jetty at the project site. The site slope protection is considered for protecting sliding of land. During the installation of jetty, the authority followed the best practices, EMPs of EIA of Coal Transportation Report, national and international rules and guidelines. Since, the environmental monitoring indicators did not show any visualized anomalies, it can be concluded that the construction work was accomplished in an environment friendly manner.	Complied
8	Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project period.	The sanitation facilities in the laborer Shed have been meeting the sanitation requirements adequately.	Complied
9	Proper and adequate on-site precautionary Measures and safety measures shall be ensured so that no habitat of any flora and fauna would be endangered or destructed.	• All the completed construction works including the Jetty has conducted in accordance with the EMP guidelines stated in the EIA report. As a part of the on-site precautionary measures, scraps were kept organized without hampering any floral and faunal biodiversity at the jetty site. However, it is under a clearing process. • The removal process is currently underway. The auction process for selecting a suitable vendor who will be responsible for collecting and	Being Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
		removing the scrap materials themselves. As the process involves some inevitable formalities, the overall removal activity is expected to take place within a short period of time.	
10	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.	The mitigation measures for environment health and safety are being followed according to the EMP recommendations stated in the EIA Report. An Emergency Response Plan (ERP) prepared under this project is being implemented.	Being complied
11	To control dust, spraying of water over the earthen materials should be carried out from time to time	An external company has been engaged to spray water to suppress fugitive dust from the earthen materials at the jetty site along with the whole plant premises. A quarterly air quality monitoring in and around the project sites including the jetty site is being conducted and compared with standards as per Air Pollution (Control) Rules, 2022.	Being Complied
12	The entire coal handling system should be designed as an enclosed (and not only covered) conveyor system. There should be integrated dust control system with dust extraction and bag filters at unloading areas and at each transfer points on the conveyor system.	The entire coal handling system is designed and constructed as an enclosed conveyor system as per the guidance of the EMP and DoE requirements. Integrated dust control system with dust extraction system/bag filter and dust suppression system at crusher house, unloading points, transfer points are being maintained as stated in the contract package. The Proponent is committed to suggest the vessel owner to abstain from ship-to-ship transfer without taking proper measures for arresting fugitive dust. Among the potential measures, the important ones are: • Fringe: The coal delivery pipe of the conveyor belt when transship coal from one barge to another should be equipped with fringe. • Netting: Fine-meshed netting around the conveyor belt at the dump barge should be installed covering the sides to the extent possible so that no or limited dust is dispersed outside. • Water spraying: Dust suppression mechanism should be installed at	Among the measures suggested by the proponent, the netting around the conveyor belt at the dump barge has already installed. Being complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
		the beginning of the conveyor belt to limit the dispersion of the coal dust in the open environment.	
13	Coal should be stored in a covered storage yard.	There are four (04) coal stockyards for storing coal having Coal Stacker and Reclaimer facilities.	Complied
14	The entire coal stockyard should be Covered with water sprinkler provided with automated moisture sensor to control self-combustion.	The entire coal stockyard is fully covered and automated moisture sensor has been provisioned to protect coal self-combustion, which is under operation.	Complied
15	Construction material should be properly disposed of after the construction work is over.	N/A for the operational phase	N/A
16	As described in the report environmental monitoring should be strictly followed and monitoring report should be shared with DOE to ensure the environmental management properly.	The Plant Authority engaged an Independent Monitoring Agency (IMA) as per the suggestion of EIA Report to conduct environmental and social monitoring from February 2014. For ensuring the environmental management properly, the Department of Environment (DoE) has been kept informed by sharing quarterly monitoring report, which is also available at BIFPCL's website.	Being Complied.
17	A third party / independent monitoring bodies excluding BIFPCL should be engaged immediately for monitoring of all the activities during the operation phases as per monitoring plan of EIA report and monitoring report must be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The Proponent has engaged an IMA from February 2014 for covering all phases of the project. From then on, Consultant has been conducting the monitoring programs quarterly and producing monitoring reports on regular basis which are submitted to BIFPCL for onward submission to the Bagerhat District Office, Khulna Divisional Office and Headquarters of DoE as directed.	Being Complied
18	Regular monitoring of the susceptible places of the Sundarbans for protecting ecosystem, biodiversity and forest coverage should be made using latest high-resolution image for keeping ambient environment.	The monitoring team has been conducting analysis of ecosystem, habitat, and biodiversity and forest coverage at the susceptible sites of the Sundarbans in connection with the project. The habitat and forest coverage analyses have been conducting using high resolution (10m) Sentinel satellite image. This analysis will help in understanding the forest coverage condition and taking necessary measures for keeping up the ambient environment of the forest. In	Being Complied.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
		addition to this, Forest Department has also suggested some survey & analysis of Sundarbans ecosystem along with the quarterly compliance monitoring report.	
19	Air, water, soil, biological and social data should be monitored regularly with a network monitoring system with a view to assess the natural quality of the Sundarbans and other fragile ecosystem and report of monitoring results should be submitted to Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The IMA has been conducting quarterly monitoring involving environmental quality (i.e., air, water, noise and soil), biological and social resources with a view to assess the natural quality of the Sundarbans and other associated fragile ecosystem. As a part of air monitoring system, DoE has already installed one device to monitor the online air quality data at the project site (Padma Abashan) area which is now functional and four (04) other devices has installed by the Proponent around the plant premises where $PM_{2.5}$, PM_{10}, SO_2, CO, NO_2, O_3 etc. are being monitored. The quarterly environmental and social monitoring reports are shared with Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously. The reports are also available on the BIFPCL website.	Being Complied.
20	There should be regular disclosure of the report through workshops and websites and responses should be taken care accordingly.	The quarterly environmental monitoring reports are disclosed to a wider group people by making available on the website of BIFPCL (www.bifpcl.com). The IMA and BIFPCL are regularly carrying out public consultations at local level severally to get the responses of the community.	Being Complied.
21	BIFPCL should provide all sorts of logistics support to DOE and other relevant agencies for monitoring environment related items / events.	The proponent through IMA has been facilitating DoE and other relevant agencies quarterly by providing logistics support to monitor the coal transportation route along with the susceptibility and fragility of the Sundarbans. The Proponent is committed to provide any kind of relevant support to DoE as and when required.	Being complied.
22	In order to control noise pollution, vessels and equipment shall undergo regular maintenance; working during sensitive hours and locating machinery close to	• No abnormal sound was observed during inspection of the main engine and generator. • No excessive vibration from loose fittings was detected.	Being complied.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
	sensitive receptor shall be avoided.	• Crew members were found to be reluctant in using hearing protection (earplugs/earmuffs).	
23	Vessels of this project should follow the MPA guidelines and protocol to ensure no hindrance to other vessels.	• It is found that the lighter vessels are registered with the IMO and following the MPA guidelines. According to the crew statements, they possess valid Certificates of Registry (CoR), Certificates of Survey (CoS), and Bay Crossing Permissions issued by the appropriate authorities. The barges engaged in coal transportation for the power plant also possess the necessary certificates and registrations required for inland water transportation. • All the project related vessels and coal carrying ships are abiding by the MPA protocols and thus no issues so far raised regarding hindrance to other regular vessels.	Being complied.
24	The vessels used for this project should maintain IMO criteria to enable identification of substances harmful to the marine environment.	Being the IMO regulated vessels, they usually identify and sort out the substances harmful to the marine environment and manage them maintaining the guidelines of IMO.	Being complied
25	All the vessels should follow applicable MARPOL Convention, Appendix V on the prevention of pollution by garbage from ships.	• According to the crew's statements, solid waste and garbage are not discharged into rivers or the sea; instead, they are generally disposed of ashore. • Crews are more or less aware of MARPOL waste management regulations and procedures. However, further training may improve their capacity in maintaining MARPOL Convention.	Being complied.
26	Additional Environmental baseline data to be collected as suggested in the EIA report and conveyed to DoE and other concern authorities.	The data collected during the quarterly monitoring held in the preconstruction period are considered as the additional environmental baseline data. The collected data were analyzed, standardized and conveyed to DoE quarterly.	Complied
27	The Environmental Management Plan under the EIA study shall strictly be implemented and kept functioning on a continuous basis.	The Proponent has so far been implementing the EMP measures in phases as suggested in the EIA Report and conditions imposed by DoE. The status of EMP implementation is also	Being Complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
		regularly monitored by CEGIS as the IMA so that it can be maintained strictly.	
28	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 Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously.	The Project Authority has been sharing the detailed work plan with time schedule of development activities as per the suggested timeline before starting of any construction activities to the Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment simultaneously. This is to be noted that, all of the installed facilities are in operation now.	Being complied
29	Environmental Monitoring Reports According to specific format specified in the EIA Report shall be made available simultaneously to DOE Bagerhat District Office, Khulna Divisional Office and Headquarters on a quarterly basis during the project period.	Environmental Monitoring Reports are being generated as per the specific format suggested in the EIA from the beginning till now. The contents of the reports are disclosed by the Proponent at their website regularly and submitted to DoE Bagerhat District Office, Khulna Divisional Office and Headquarters as well.	Complied
30	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.	The IMA has been maintaining all the records as suggested.	Being Complied
31	The results of any monitoring required to be conducted under this EIA report must be recorded.	The IMA has been maintaining a database for preserving all monitoring data and analysis results and submitting to the Proponent through proper documentations.	Being Complied
32	In case of any emergency, the following information shall immediately be reported to Bagerhat District Office, Khulna Divisional office and Headquarters of the Department of Environment (DOE) simultaneously:	The incidents, as mentioned in the conditions if happen, are addressed in the Quarterly Monitoring Report. The concerned authorities are usually informed about the incidents once reports are submitted to them.	Being complied

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
	a. Nature of incident (oil spill, fire, accident, collision, land slide 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, firefighting, etc.)		
33	National Oil Spill Contingency Plan (NOSCOP) should be followed to establish an organizational structure to combat marine pollution	The Proponent is much aware about NOSCOP and committed to follow the plan strictly to protect the marine pollution.	Being complied
34	The project authority or its employees must notify the Department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.	The proponent has formed an E&S Wing to strengthen the mechanism to notify DoE regarding incidents causing or threatening material harm to the environment as soon as possible once the concerned person(s) becomes aware of the incident. As mentioned above, the IMA also flags the incident if happen in the quarterly monitoring report.	Being complied
35	All pollution incidents shall be reported immediately and simultaneously to the Bagerhat District Office, Khulna Divisional Office and Headquarters of the Department of Environment (DOE) in Dhaka.	As above.	Being complied.
36	Climate Change impacts and maximum storm surge height shall have to consider at the design and construction phase of the jetty.	N/A for the operational phase	Complied
37	The transshipment point Faraway Buoy at the Bay should be used from November to March, and Mazhar point should be used from April to October every year for transporting coal which has been mentioned in the EIA Report.	The Proponent is abiding by the guidance of the EIA Report except for transshipping at Harbaria and sometimes at Kutubdia (in rough weather) instead of Mazhar Point. However, since the Passur River Route is under the jurisdiction of the Mongla Port Authority, so coal transshipment should be conducted with their guidance.	Mostly complied.

Sl. No.	Conditions	Status Narratives/Descriptions	Compliance Status
38	Violation of any of the above conditions shall render this approval void.	The Proponent is much aware about the conditions.	--
39	Any injunction on this project from the Honorable Supreme Court/High Court Division shall render this approval void.	Noted by the Proponent.	--
40	This EIA approval is valid for one year from the date of issuance and the project authority shall apply for renewal to the Bagerhat District Office of DoE at Bagerhat with a copy to Head Office of DOE in Dhaka.	The authority is maintaining the renewal process as suggested.	Being complied

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Appendices

Appendix I: Checklist of Monitoring Environmental Compliances

Table A: Monitoring of Environmental and Social Management System Action Plan Implementation (Operation Phase)

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
1	Generation of Noise within the MSTPP premises during operation	• Switch off / throttle down the site machinery, vehicles, water vessels, and generator when not in use. • Regular overhauling of the machinery and equipment. • Install door and window sealing rubber to cut or dampen noise amplitude in the office rooms, control rooms, laboratories, etc. • Limit vehicle speed and monitor it at every suitable point. • Noise insulation should be properly maintained around the turbine and generator casings. • Noise dampers/insulators installed and operational around conveyor belt casings to control mechanical noise. • The officers/engineers/technicians/workers should wear relevant PPEs like ear			
2	Air pollution control during operational activities.	• Ensure the levels of air quality criteria pollutants under the permissible limits as per the Air Pollution (Control) Rules 2022 and WBG Guidelines i.e., IFC's General EHS Guidelines: Environmental Air Emissions and Ambient Air Quality. • Dust particle generated from access road must be controlled by spraying water during dry season. • The plant equipment must be performance tested during commissioning phase to ensure standard has been maintained • Regular inspection and maintenance of Boilers, FD & ID fans, ash separation and handling systems, ESP, FGD etc. are operational and regularly maintained • Dust suppression applied at coal and ash handling areas, with enclosed conveyors in use and satisfactory housekeeping maintained • Maintain coal quality of low Sulphur content as stipulated in project description • Properly use of flue gas desulphurization scrubbing systems to remove Sulphur dioxide through lime and steam injection method to reduce the NOx emission • Stack emission monitoring conducted, emissions within ECR 2023 limits, and emission data properly recorded • Remote monitoring and control of total production process.			

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
		• Vehicle speed restriction must be enforced to control dust generation. • Automatic monitoring process and presenting on the real time Web-Pages should be implemented.			
	Water quality	• Regularly maintaining the rain water harvesting process. • Increase the efficiency of water use followed by reuse and recycling strategy. • Implement a comprehensive water conservation plan at a broader operational scale. • Strictly prohibit directly discharge of untreated or harmful effluents and wastes from the power plant. • Ensure installation of closed-loop systems and a fully functional Effluent Treatment Plant (ETP) with adequate standby/load-handling capacity for emergency conditions. • Conduct regular monitoring of surface and groundwater quality and levels at designated locations and intervals. • Prevent contamination of groundwater through proper sealing and maintenance of oil, chemical, coal, ash, and waste storage/handling facilities to avoid leakage, seepage or overtop. • Maintain paved/sealed storage and disposal areas to avoid leachate infiltration into soil and groundwater. • Establish regular stakeholder consultation mechanisms between local communities and project personnel to support surface water quality management. • Provide training and awareness programs for workers and staff on groundwater protection and contamination monitoring practices. • Introduce incentive mechanisms for conservation of local wetlands. • Ensure good housekeeping practices across all operational and construction (if any) areas.			
	Controlling impacts of drainage congestion and water logging	• Kaigar Daskati tidal creeks should be kept and maintained in a manner free from any kind of interferences. • Regular maintenance of depth and flow of the existing creeks/channels and the river. • Should practice integrated water resources management plan for reducing the water logging problem. • Proper set back rules and regulations in connection with river system management would be strongly followed in Operation & Maintenance period. • Keep rivers free from any encroachment and obstructions of power plant. • Stakeholder consultation must be arranged for such kind of problem.			

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
	EMP for erosion and accretion	• Bank protection measure like hard structure, mangrove plantation on the bank. • Maintain the green belt development areas regularly • Scientifically justified for any kind of dredging in a particular place • Monitoring the vessel speed, river flow and erosion and accretion prone areas			
4	Waste Generation	• Provide color-coded waste bins for segregation (recyclable, reusable, biodegradable, hazardous, etc.) at roadsides, parking areas, offices, eco-parks, and other operational/public areas within the plant site. • Ensure the waste management unit is fully operational with adequate resources, infrastructure, and manpower. • Incorporate green building principles in residential facilities to minimize waste generation and effluent discharge during operation. • Conduct regular awareness and training programs for staff on proper waste management practices. • Designate and maintain spoil/stockpile areas in secure locations, adequately protected from wind dispersion and rainwater runoff. • Prohibit disposal or storage of spoil/waste along riverbanks or slopes to prevent environmental contamination. • Strictly restrict open burning of any waste materials within the plant premises. • Maintain high standards of housekeeping through routine inspection, monitoring, and corrective actions across all operational areas.			
	Heavy Metal pollution	• Coal tested for heavy metal content with filtration systems operational • Monitoring results properly recorded and maintained • Surrounding areas regularly monitored for environmental impact.			
	EMP for the ash management generated from the power plant	• Advanced technique like ESP, ash silo and ash pond have to be maintained regularly for ash management. • Fly ash (dry form) generated from the plant should be separated after burning of coal through ESP and commercially utilized to maximum extent possible. • Unutilized fly ash must be transferred from the silo in wet form and stored in the ash pond until suitable users are identified. • Bottom ash should be collected in wet form and must be stored in the ash dyke until suitable users are identified. • Increase the facilities of ash marketing through infrastructure development, creating awareness and formulating policies.			

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
	EMP in case of maintenance dredging for river navigation	• Scientifically justified for any kind of dredging work in the river • Stakeholder consultation is necessary for site selection for dredging spoil disposal • Regular monitoring is necessary during maintenance dredging • Monitoring the site of spoil disposal and its associated social and ecological issues regularly			
5	Compensation and Resettlement	• Proper resettlement action plan (RAP) and compensation plan if the Project needs any land acquisition addressing compensation, livelihood restoration, living standards etc. in assessing the socio-economic status of the PAPs. • Resettlement of the PAPs. • Cash Compensation under Law (CCL) before resettlement formal agreement with the affected people prior to migration/resettlement • Sufficient standing crop compensation • Compensation for movable structures • Retention of salvageable materials • Compensation for loss of trading income one-time moving assistance grant to cover loss of regular wage income • Has a resettlement plan been developed which includes compensation, livelihood restoration, living standards etc. based on proper socio-economic studies? • Provision of monitoring the compensation and resettlement process Provision of monitoring the compensation and resettlement process			
		• Human provide/take extra care/caution for the disadvantaged/vulnerable groups (women, children, ethnic minorities, indigenous people etc.)			
6	Livelihood and living condition	• The labor recruitment policy must be formulated in such a way that the local laborers can easily get the chance of employment in the project work force. • Govt./NGOs need to provide support the skill development program and income generation activities to local people; • For the increased movement of people and heavy vehicles, the road networks must be developed. • Keep provision of sanitary toilet, one toilet for 10 persons.			

Sl. No.	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
7	Green House Gas Controlling Measures	• Restriction of any kind of solid waste disposal • Approved pollution control devices to be fitted in equipment and machinery. • Transport vehicles must not be overloaded. • Avoid queuing of vehicles in areas adjacent to site, particularly near sensitive receptors including housing. • Switch off / throttle down all site vehicles, water vessels, generator and machinery when not in use. • Regular maintenance of water vessels, vehicles, generator and machinery in accordance with manufacturer's guidelines.			

Table B: Monitoring of Labor and Working Condition

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
1	Working Conditions and Management of Worker Relationship	• Preparation of Human Resources Policies and Procedures for Direct workers; • Defined Working condition and Terms of Employment for direct worker; • Sustainably equivalent terms and condition for migrant workers; • Compliance to national law of forming workers' organization; • No discrimination and equal opportunity for all.			
2	Protecting Work Force	• The client will not employ children in any manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child health or physical, mental, spiritual, moral, or social development. • No Forced Labor			

Sl. No	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
3	Safety at site	• Use of Personnel Protective Equipment's (i.e., safety vest, safety goggles, ear plug, safety shoes, gloves, dust mask, etc.); • Training to the professionals regularly (i.e., fire control, working at height, working in heat, first aid etc.); • Practice of Tool box meeting, safety talks; • Safe Storage of Hazardous Chemicals (e.g., fuel, flammable chemical, toxic chemicals, etc.); • Maintaining Material Safety Data Sheet (MSDS); • Provision of Health care facilities such as doctor, hospital etc. available at/nearby the Plant site; • Availability of First Aid at work place; • Preparation and Follow of Emergency Response Plan (ERP); • Adequate fire precautions in place (e. g., fire extinguishers, escape routes etc.); • Documentation and reporting of occupational accidents, diseases, and incidents; • Policies and procedures for managing and monitoring the performance of third-party employers in relation to OHS.			
4	Occupational Health and Safety procedure	• Provision of complete EHS division in the Human Resources Planning/ Organogram. • Preparation of Safety Policy to be adopted during Plant operation.			
5	Workers Well Being	• Provision of Welfare facilities for Worker/Labor such as, timely bonuses, wages, overtime, sick leaves, vacations etc.; • Routine medical check-up and emergency medical care for the sick and injured; • Introduction of health insurance for the employees. • Regular consultation meeting must be introduced between locals and project personnel to exchange the knowledge.			

Table C: Monitoring of Community Health, Safety and Security

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
1	Disturbance to nearby community due to dust from any kind of operational activities	• Dust suppression system should be installed through water spraying system to control dusts on the roads, coal yards, etc.; • Conduct dust monitoring and visual inspection around the site boundary; • Adopt a comprehensive dust management plan to avoid dust related health issues to the community living around the site and complaints invite chaotic situation.			
2	Grievance of local people	• Hang grievance box at the place accessible to the local community to drop complaints if any. • Grievance Redress Mechanism should be kept functional with a required protocol; • Maintain an open communication channel with the local community.			
3	Risk of breaching Community Safety	• Practice Risk Assessment and Evaluation Process; • Practice safe management for hazardous materials which may pose threat to the community; • Make available and operational of Emergency Response Plan (ERP); • Maintain open communication channel with the local community; • Provide training and instruction to the security personnel about their behavior and communication with the local people; • Aware the security personnel about the right of the community people.			
4	Community Health and Risk	• Provision of providing health service facilities to community if the Project poses any health risk like sexually transmitted disease, contract disease, vector-borne diseases; • Implement all pollution mitigation measures to ensure safeguarding to community.			
5	Public Communication, Consultation and Awareness	• Arrange public communication / consultation meeting; • Share Project information with local people; • Organize environmental and social awareness programs /meetings.			
6	Employment opportunities	• The local laborers should be recruited permanently and temporarily in both technical and non-technical posts. Some posts should be reserved for the local			

Sl. no	Potential Impacts	EMP measures as proposed in the EIA	Actual measures already Implemented	Compliance Status	Recommended Action
		workers. This recruitment may help to reduce the poverty status of the whole study area. • At least 10% of the jobs (non-hazardous) in the power plant must be reserved for women.			
7	Induced infrastructural development, rural and regional development	• Concerned government department like Khulna Development Authority, Bagerhat District Parishad, Rampal Upazila Parishad, LGED, RHD, MPA, Rail Way Department, etc. must guide the induced development. The existing development plans, Master plans might be improved in harmony with the project.			
8	Rural Electrification	• Development of electric transmission and distribution line, priority of local and displaced people in providing electricity, priority in providing electricity for irrigation water pump for local people.			
9	Poverty reduction	• Integrated planning • Priority of local people in employment opportunity • Extension of social safety nets for affected people and people under exposure of plant possessed risk • Monitoring NGO's activities			
10	Outbreak of Pneumonia from contaminated Cooling tower	• Limiting cooling tower drift using eliminator as per world standard • Use biocides to prevent bacterial contamination • Maintenance of cooling tower as per Manufacturer guideline • Strong monitoring of bacterial contamination in cooling tower • Community health monitoring within 10 km radius of cooling tower • Establish communication with nearby hospital to keep record of pneumonia affected patient to monitor outbreak of Pneumonia			
11	High land price	• Both the land acquisition and economic development of the area for the project implementation may cause the higher price of land. If the displaced people are not provided with compensation properly the poor displaced people will not be able to purchase land in compliance with the market price of land. Their land compensation must be equivalent to the market price. They also deserve additional resettlement support for their income restoration.			

Table D: Monitoring of Biodiversity and Sustainable Management of Living Natural Resources

Sl No	Potential Impacts	EMP measures as proposed in the EIA	Actual condition/ Measures already Implemented	Compliance Status	Recommended Action
1	Rainfall runoff from the plant site would cause deterioration of aquatic ecosystem.	• Installation of proper runoff drains; • Construct sediment traps or basins to arrest sediment carried by the overland run-off.			
2	Disturbance to nearby ecosystem due to different operational activities	• Implementation of onsite waste and air quality management plan; • Limiting the use of night light; • Using shade (directed downwards) around the outdoor lights; • Initiate Green plantation to restore the degraded habitats during construction; • No plantation of non-native species; • Retaining top soil for future habitat restoration; • No degradation of sensitive habitat.			
3	Impact on ecosystem habitat quality and ecosystem health due to accidental fly ash deposition.	• Implement Air quality Management Plan; • Dust suppression (water spraying/stabilizers) applied and surface moisture maintained; • Regular monitoring of soil and water with corrective actions implemented;			
4	Disturbance to river, inter-tidal areas and wet lands	• No encroachment of inter-tidal flood plain area; • No disturbance to Dolphin community; • Monitoring of Ecosystem Health and Monitoring of Sundarbans Forest Health; • If required, embankment should be constructed considering a setback distance from river/canal bank; • Slope protection work along the Maidara River should be maintained at a regular basis as and when required, and; • MSTPP may undertake dredging/excavation of silted up sections of the Maidara River for fisheries resource management and to restore and maintain natural tidal flow.			

Table E: EMP Measures for Coal Transportation

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
Increase of Particulate Matter (PM) in local air quality	• Adoption of dust suppression system in ship's hold, ship's unloader, coal terminal and conveyor system, stock yard • The vessel to be engaged shall have to be complied with international and national standard e.g., IMO conventions, MARPORL, HNS, etc. • Adopt enclose system for coal unloading and transportation (Through conveyor belt).			
Noise generation	• Restrict blowing of whistle within the Sundarbans Territory. • Switch off / throttle down of all equipment and Machinery when not in use. • Introduce speed limitation for vessel during Sundarbans Territory. • Anchorage should be allowed at particular location within the Environmental Critical Areas like Sundarbans, Beach, Sea-Shore, Sonadia Island, etc. • Enforce Forest Protection Acts. • Limiting dropping of coal and escapee during unloading to feeder vessel/lighter vessel.			
Deterioration of river water quality	• Ensure zero dumping of ballast water, zero oil spillage, zero discharge of waste water, zero waste dumping. • Clean Ship Concept might be adopted in carrying coal. • Practice of dust suppression should be "to moist the coal not to wet the coal".			
Wave erosion	• Plant mangrove forest along the bank of rivers, and sea shores • Plant and conserve native mangrove plants along the river bank and sea shore of coal transportation route • Introduce speed limit of coal transportation vessel • Reduce speed of the vessel at erosion vulnerable areas • Regular monitoring of erosion			
Increase river traffic accident	• Proper training for vessel crews, traffic inspectors, in charges, and another concerned professional			

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
	• All vessel should be provided with GPS, radar and other electronic navigation systems to prevent grounding or collisions, such as depth sounder, radar and radio equipment for communication • All vessel should be complied with rules and regulation of IMO, Port authority, BIWTA and national laws of safety, and environmental conservations • Ensure port/coal terminal inspector, environment and safety manager are enforced			
Impact on Fish resources	• Awareness growing for fishers and facilitate the fisher to use nets/boats provided with signals and marking • Reduce speed if net is seen • Ensure no dumping of ballast water, no oil spillage, no discharge of waste water, no waste dumping			
Impact on Sundarbans Ecosystem and wildlife, Sea Shore Ecosystem and Wild life of Maheshkhali	• Ensure enforcement of ECA, 1995 and ECR, 2023, Forest Protection Act, and other rules, regulation and treaties for conserving Sundarbans and Ecological Critical Areas • Ensure zero dumping of ballast water, zero oil spillage, zero discharge of waste water, zero waste dumping • Restrict outside lighting of the water vessel during navigation across the Sundarbans • Restrict the beaming of searchlight on Forest area /Sea Shores / Protected Beach / Protected Areas • Use low beam of searchlight during navigation across the Sundarbans/Sonadia Island / Bird Colony • Limiting dropping of coal and escapee during unloading to feeder vessel/ lighter vessel • Restrict blowing of whistle within Sundarbans Territory and Ecological Critical Area of Maheshkhali. • Introduce speed limitation for vessel in Sundarbans Territory and Ecological Critical Area of Maheshkhali.			

Impact	Compliance Monitoring Checklist	Current Action	Compliance status	Remarks
	• Anchorage might be allowed at particular location within the Sundarbans area and Ecological Critical Area of Maheshkhali. • Anchorage of water vessel only in designated sites • Adoption of Dolphin Conservation Program Adoption of Marine Environment Protection Program • Adoption of Turtle Conservation Program • Adoption of Shore Bird Conservation Program • Monitoring activities of the foreign ships during coal transportation • Establish check post for monitoring activities of foreign ships during coal transportation			

Appendix II: Photo Album

Environmental and Socio-economic Monitoring of Khulna 2×660 MW Power Plant for 47th Monitoring Program (January-February, 2025)



Monitoring Team



Compliance Meeting at plant Site



In-situ Water Quality monitoring



Conducting Noise level monitoring



Conducting Air Quality monitoring



Compliance Monitoring Team



Solid waste management plant area



Collection of ecological data from the homestead



Carrying out traffic survey





Collection of vegetation gowth data inside project area



leachate collection pond and treatment area



Discharge point

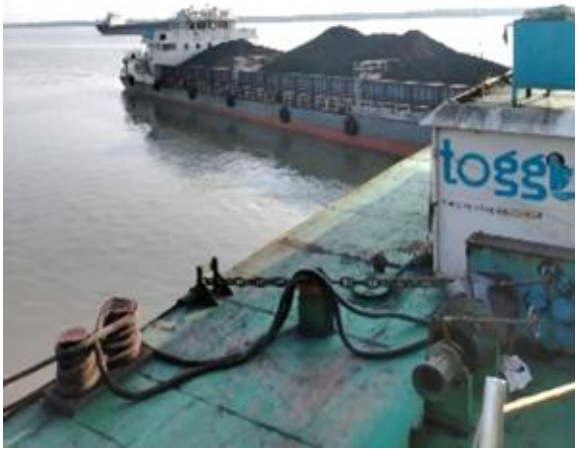




Lighter Vessels-1: MV BASHUNDHARA LOGISTICS-39 (IMO 9876476)




Lighter Vessels-2: MV BASHUNDHARA LOGISTICS-40 (IMO 9876488)




Pontoons and Coal Carrying Berges








Zero correction from the nearest BM position for Maidara Khal Gauges






Zero correction from the nearest BM position for Ichamati River Gauges



Installation of gauges at the Maidara Khal



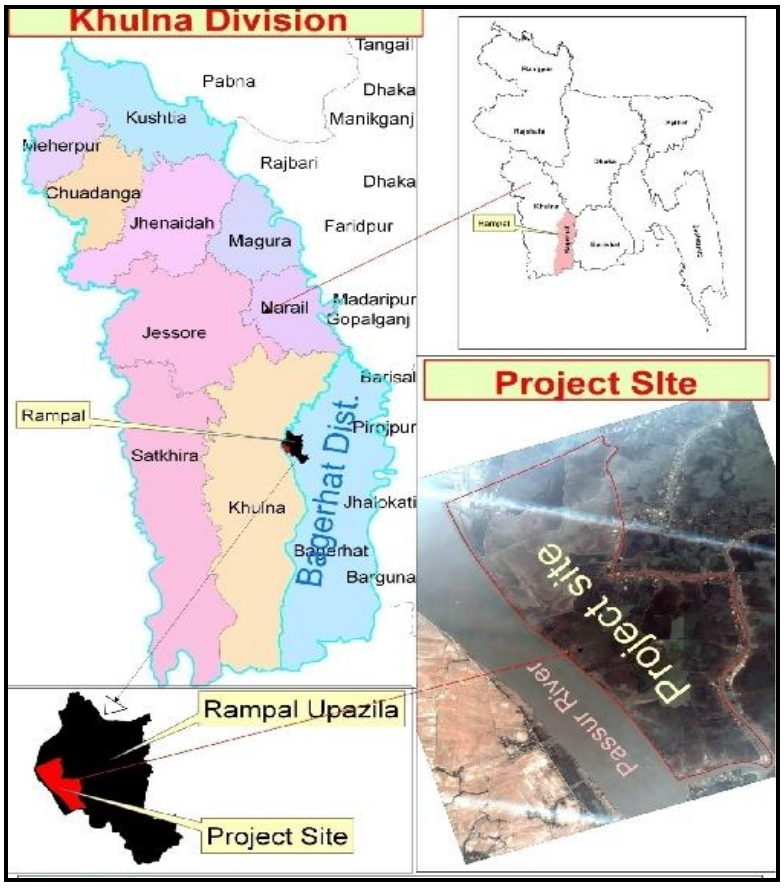
Installation of gauges at the Ichamati River

Appendix III: Terms of References (ToR)

Background

Bangladesh India Friendship Power company Limited (BIFPCL) is a 50:50 Joint Venture Company of Bangladesh Power Development Board (BPDB) of Bangladesh & NTPC Limited of India, established a coal-based thermal power plant named 2X660 MW Maitree Super Thermal Power Project at Rampal in Bagerghat District of Khulna Division of Bangladesh. The plant is run on super-critical technology and operated as Base Load Plant. The fuel is imported coal.

General Description of 2X660 MW Maitree Super Thermal Power Plant Project

Project Location:	Upazila: Rampal, District: Bagerhat Site is located at 23 kms Southward of Khulna City and 14 kms. North-Eastward from Mongla Port. 
Project Capacity:	1320 MW (2x660 MW), based on Ultra Super-critical Technology
Mode of Operation:	Base Load
Fuel:	Imported Coal

Fuel Transportation:	Imported coal from Indonesia is being transported through mother vessel up to trans-shipment point (Kutubdia and fairway buoy, from where the coal is being transported through barges to the coal unloading jetty at the plant end. From jetty to the power plant coal is being transported through coal conveyor system.

Broad Scope of Works

The study covers quarterly monitoring of different environmental and social parameters, and implementation of EMP (Environment Management Plan) during operation phases as per DoE approval/requirement. The monitoring locations were selected based on physical activities, wind direction, sensitive receptors, etc. and were finalized through the consultation with DoE, Department of Fisheries (DoF), MPA and Forest Department (FD).

The Broad objectives of independent monitoring cover the following activities

- Monitoring implementation of EMP and environmental compliance;
- Monitoring of ambient air quality, noise level and water quality;
- Monitoring of cropping pattern and soil quality;
- Monitoring of fisheries resources covering fish habitats, biodiversity, migration and production;
- Monitoring of ecosystem and biodiversity;
- Monitoring of the Sundarbans Forest Health; and
- Monitoring of socio-economic condition and livelihoods.
- To evaluate the project environmental performance activities.



Bangladesh-India Friendship Power Company (Pvt.) Limited

Corporate Office: Level-17; Unique Heights; 117; Kazi Nazrul Islam Avenue; Eskaton Garden; Dhaka-1000; Bangladesh

Project office: 2x660 MW Maitree Super Thermal Power Project, Rampal, Bagerhat

T E N D E R D O C U M E N T

FOR SERVICES

Contracts of Technical Services for Monitoring of Environment Parameters and Implementation of Environmental Management Plan along with Engineering Activities for the Operation Phase

Invitation for Tender No: BIFPCL/Site C&M/CS/2026/652 Date: 25.01.2026

SECTION-4: SCOPE OF WORK AND SPECIAL TERMS & CONDITIONS

for

Contracts of Technical Services for Monitoring of Environment Parameters and Implementation of Environmental Management Plan along with Engineering Activities for the Operation Phase

Invitation for Tender No: BIFPCL/Site C&M/CS/2026/652 Date: 25.01.2026

Environmental Monitoring Plan for Operation phase is as below:

Indicator	Location	Frequency of data Collection
*1. **Physical Environment Monitoring Plan***		
a) **Air quality – concentration of SOx, NOx, Heavy Metals(Pb, Hg), $PM_{2.5}$, and PM_{10}**	• Stack Point • 1 km, 2 km and 4 km distance from the stack point to the windward direction • Coal stockyard • Mongla Port Area • Khulna City • Coal Transfer Point (Akram point) • Ash disposal pond • Two (02) nearest point at Sundarbans of the project • Harbaria • Akram Point • Koyra • Sharankhola	Quarterly
b) **Monitoring of Noise level**	c) Within 100 m of the plant d) Immediate outside of the project boundary. e) 1 km away towards different direction from four different side of the project. f) One Station besides Sibsha River in Sundarbans g) Three (03) stations at Sundarbans nearest to the project	Quarterly
c) **Waste Generation** • **Plant** • **Domestic**	Project area	Quarterly

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d) Implementation of Air Quality Management Plan, Noise Management Plan, Waste Management Plan	Within project area	Daily Monitoring and Quarterly Reporting
2. Water Resources Monitoring Plan		
a) Tidal penetration and inundation	• Maidara river • Ichamoti river	Monthly
b) Erosion	• Passur river • Akram point site • Mongla port site • Project site	Quarterly
c) Sedimentation	• Passur river • Akram point site • Mongla port site • Project site • Maidara river: River reach	Twice in a Year (wet and dry season)
d) Internal drainage work	All creeks of the project area	Twice in a Year (wet and dry season)
e) Surface water pollution monitoring: (DO, BOD, COD, Heavy Metals (As, Pb, Hg), pH, Salinity, Total Hardness, Nitrate, TDS, TS Temperature etc.)	1. Effluent discharge point • 500 m u / s and d / s from the effluent disposal point • 100 m u / s and d / s from the project plant 2. Maidara river 3. Mongla Port 4. Sundarbans area • Base Creek • Karamjal • Akram Point • Hiron Point 5. Confluence point of Sibsha 6. Sibsha river inside (relatively middle) of Sundarban 7. Confluence point of Deluti, Habarkhali river to Sibsha 8. Sharankhola All samples should be collected from three points (left, middle and right bank) along the cross section of the river at suggested locations during both ebb and flood tide	Quarterly
f) Ground Water Table	1. One (01) point from the project site 2. Five (05) points of the study area	Twice in a year (wet and dry season)

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g) Ground water Pollution monitoring (BOD, COD, Heavy metals, pH salinity, Total Hardness, Nitrate etc)	1. One (01) point from project site 2. Three (03) points from study area	Quarterly
3. **Transportation Monitoring plan**		
a) Traffic management system	1. Five (05) points in Khulna to Mongla road 2. Three points in access road	Monthly
b) Physical status of the road	Overall study area	Twice in a year during operation phase
c) Navigability	Only Passur river from Akram point to Project jetty	Twice in a year during operation phase
4. **Land & Agriculture Monitoring Plan**		
a) Land Use	Inside and outside the project	3 (Three) Months
b) Soil fertility / Nutrient status of soil / Contamination of the heavy metal / Fly ash of burned coal	Inside and outside the project	Yearly
c) Crop production	Inside and outside the project	4 (four) months
d) Crop damage	Inside and outside the project	4 (four) months
e) Feed, Fodder & diseases of livestock	Inside and outside the project	Monthly
f) Implementation of land & agricultural management plan	Inside and outside the project	Regular Monitoring with Quarterly Reporting
5. **Fisheries Monitoring Plan**		
a) Fish habitat status (Selected sites within 10 km radius of the project)	Selected sites within 10 km radius of the project	Quarterly
b) Fish bio diversity, specification	Selected sites within 10 km radius of the project	3 times/year (pre/monsoon/post-monsoon)
c) Fish migration (Indicative species)	Migration channels within the study area of the project especially Maidara river and Passur river adjacent to project area	Quarterly
d) Fish-Shrimp culture practice	Selected sites within 10 km radius of the project	Biannually
e) Fish production	Around the discharge point	Continuously



f) Monitoring implementation of Fisheries Management Plan	Project area	Regular Monitoring with Quarterly Reporting
6. Eco System Monitoring Plan		
a) Bird colony, feeding & nesting ground	Within 10 km radius of the project	Quarterly
b) Benthos Community (At least 15'' of the bottom sediments of the river are to be collected)	1. Adjacent to the project area: 500 m u / s and d / s from the effluent disposal point 2. Sundarbans area: Nearest point of Sundarbans, Akram point, Heron point	At least 15'' of the bottom sediments of the river are to be collected quarterly in a year
c) River Bed Pollution Monitoring Coal dust, Heavy metals (As, Pb, Hg), Oil & Grease, (Top 15'' of the river bottom sediments are to be analyzed)	1. Adjacent to the project area: 500 m u / s and d / s from the effluent disposal point 2. Sundarbans area: Nearest point of Sundarbans, Akram point, Heron point	Top 15'' of the river bottom sediments are to be analyzed quarterly in a year
d) Ecosystem health of the surrounding: • Fly ash deposition on plant leaves • Plant health • Productivity of fruiting plants	1. 5 samples from homestead eco system (at least 2 at down wind direction) within 5 km redius 2. 5 samples from roadside plantation including 2 at down wind direction within 5 km radius 3. 5 samples from each of the following locations of Sundarbans: • Base Creek (Harbaria) • Karamjal • Akram point • Heron point • Sutarkhali	Quarterly
e) Monitoring activities of water vessels (Ballast water dumping, oil spillage, waste dumping, beaming of searchlight, noise generation etc) engaged in coal transportation	1. Heron point 2. Akram point 3. Monkey point 4. Karamjal 5. Mongla port 6. Jetty location of the project site	Regular Monitoring
7. Socio-Economic Environment Monitoring Plan		
a) **How many displaced households relocated and built their new structure at new location?**	• Villages at new location	Twice in a year

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b) **How many people are recruited for construction & other activities under the project**	• Project area	During and After Construction
c) **Whether the people or workers suffer from health risk**	• Project site and the surrounding area	Quarterly
d) **Ground water level and salinity intrusion**	• Surrounding the Project Area	Twice in a year
8. Sundarbans Forest Health Monitoring (out of the EIA of operation phase)		
a) Forest Biodiversity • Species Diversity, Species Richness, Dominancy • Regeneration, Recruitment, Seedling Survival • Canopy Cover, Tree Heights, Diameter, Pneumatophore and Biomass. • Diseases and damages (timber, branch, leaves)	• Base Creek (Harbaria) • Karamjal • Akram point • Heron point • Sutarkhali	Quarterly
b) **Soil Quality:** (Sundarban Reserve Forest) (pH, OM, N, EC, P, Bulk Density)	• Base Creek (Harbaria) • Karamjal • Akram point • Heron point • Sutarkhali	Half-Yearly
c) Dolphin occurrences in the River systems Dolphin occurrences, Migration routes and Activities	• Harbaria, • Chandpai to Jhogra, • Akram point, • Maidhara, • Passur River from Chalna to Mongla • Vodra	Quarterly

Reporting Requirements

As it is proposed to carry out the monitoring program for two quarters and the proposed deliverables are scheduled below:

SL	Name	No. of copies
1	Monitoring Report after each monitoring mission (each in one quarter) with complete data, analysis, lab. Results, discussion etc. as intended in the scope of work.	15
2	CD-ROM in respect of documents/datasheets	2

Appendix IV: Monitoring Data

(A) Air Quality Data

Table A1: Ambient Air Quality Monitoring Results

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
1st QM Apr, 2014	$PM_{2.5}$ (µg/m³)	33	39	37	39	35	47	47	19	17	15	54	NM	NM	65(24hr)
	PM_{10} (µg/m³)	78	814.6	67	103	77	119	139	41	39	44	139			150(24hr)
	SPM(µg/m³)	207	2156	234	233	117	297	288	111	114	101	301			200(8hr-ECR, 1997)
	SO_2(µg/m³)	21	19	19	21	19	28	27	9	7	8	33			80(24hr)
	NO_2(µg/m³)	26	29	23	25	23	41	44	19	17	18	49			80(24hr)
	CO (mg/m³)	120	165	110	175	190	230	230	65	49	52	330			5000 (8hr)
	O_3(µg/m³)	27	33	25	26	27	49	57	13	11	14	59			100(8hr)
2nd QM, Jul 2014	$PM_{2.5}$ (µg/m³)	37	48	44	47	39	49	55	22	19	23	39	NM	NM	65(24hr)
	PM_{10} (µg/m³)	77	90	78	122	86	127	174	39	44	38	117			150(24hr)
	SPM(µg/m³)	239	263	217	244	113	266	303	117	133	119	287			200(8hr-ECR, 1997)
	SO_2(µg/m³)	24	28	22	23	24	31	28	10	9	7	29			80(24hr)
	NO_2(µg/m³)	29	39	28	28	26	39	39	22	19	18	41			80(24hr)
	CO (mg/m³)	188	210	178	210	205	217	320	58	60	62	370			5000 (8hr)
	O_3(µg/m³)	26	26	19	29	24	38	52	12	14	13	67			100(8hr)
3rd QM, Oct 2014	$PM_{2.5}$ (µg/m³)	25	48	19	57	46	57	39	33	23	19	52	NM	NM	65(24hr)
	PM_{10} (µg/m³)	53	74	56	67	69	139	77	59	32	34	91			150(24hr)
	SPM(µg/m³)	190	217	157	183	162	254	197	129	97	107	239			200(8hr-ECR, 1997)
	SO_2(µg/m³)	19	22	18	17	21	31	26	14	12	13	33			80(24hr)
	NO_2(µg/m³)	27	27	22	22	27	36	33	27	22	19	39			80(24hr)
	CO (mg/m³)	140	230	110	190	170	250	220	70	50	65	330			5000 (8hr)
	O_3(µg/m³)	19	26	17	22	18	36	37	13	9	11	57			100(8hr)
	$PM_{2.5}$ (µg/m³)	33	39	42	39	37	41	41	27	18	17	42	NM	NM	65(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
4th QM, Jan 2015	PM_{10} (µg/m³)	79	102	98	97	68	101	82	56	39	41	84			150(24hr)
	SPM(µg/m³)	200	274	310	277	183	208	217	139	88	97	219			200(8hr-ECR, 1997)
	SO_2(µg/m³)	23	21	27	22	18	24	24	12	13	14	28			80(24hr)
	NO_2(µg/m³)	31	26	32	26	24	26	27	18	17	22	36			80(24hr)
	CO (mg/m³)	190	164	210	150	170	188	211	64	46	60	296			5000 (8hr)
	O_3(µg/m³)	22	23	36	19	22	27	26	11	10	9	39			100(8hr)
5th QM, Apr 2015	$PM_{2.5}$ (µg/m³)	47	34	59	41	33	39	26	24	49	28	55	NM	NM	65(24hr)
	PM_{10} (µg/m³)	83	97	91	82	61	105	35	49	77	60	75			150(24hr)
	SPM(µg/m³)	177	266	244	236	188	299	214	109	102	110	222			200(8hr-ECR, 1997)
	SO_2(µg/m³)	15	22	21	25	11	30	14	16	21	15	31			80(24hr)
	NO_2(µg/m³)	29	24	39	27	18	27	17	22	27	20	33			80(24hr)
	CO (mg/m³)	144	136	140	196	33	177	24	56	163	60	101			5000 (8hr)
	O_3(µg/m³)	26	21	44	15	41	11	9	14	27	23	21			100(8hr)
6th QM, Jul2015	$PM_{2.5}$ (µg/m³)	25	18	28	34	35	34	33	27	NO	NO	46	NM	NM	65(24hr)
	PM_{10} (µg/m³)	35	31	96	65	109	144	52	42	NO	NO	89			150(24hr)
	SPM(µg/m³)	42	47	321	79	175	339	118	70	NO	NO	181			200(8hr-ECR, 1997)
	SO_2(µg/m³)	52	58	56	41	55	58	45	51	NO	NO	59			80(24hr)
	NO_2(µg/m³)	35	46	43	44	49	47	40	34	NO	NO	38			80(24hr)
	CO (mg/m³)	146	127	133	96	133	125	110	112	NO	NO	89			5000 (8hr)
	O_3(µg/m³)	12	16	11	9	21	13	15	12	NO	NO	7			100(8hr)
7th QM, Oct 2015	$PM_{2.5}$ (µg/m³)	22	17	19	11	28	25	19	24	25	27	19	NM	NM	65(24hr)
	PM_{10} (µg/m³)	52	48	29	26	49	62	33	50	32	45	49			150(24hr)
	SPM(µg/m³)	91	79	66	112	94	183	65	73	51	88	101			200(8hr-ECR, 1997)
	SO_2(µg/m³)	35	27	32	31	33	36	36	34	27	28	28			80(24hr)
	NO_2(µg/m³)	29	25	21	32	23	23	20	22	19	23	26			80(24hr)
	CO (mg/m³)	88	102	87	96	75	105	84	81	92	93	94			5000 (8hr)
	O_3(µg/m³)	5	1	8	6	2	5	8	4	8	2	4			100(8hr)
8th QM, Jan 2016	$PM_{2.5}$ (µg/m³)	34	35	24	29	31	47	34	26	18	NO	35	NM	NM	65(24hr)
	PM_{10} (µg/m³)	135	116	125	97	98	128	132	82	77	NO	112			150(24hr)
	SPM(µg/m³)	175	192	187	176	167	198	189	159	128	NO	181			200(8hr-ECR, 1997)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	SO_2(µg/m³)	14	13	13	16	21	18	16	15	14	NO	16			80(24hr)
	NO_2(µg/m³)	18	16	18	21	16	15	13	14	15	NO	16			80(24hr)
	CO (mg/m³)	74	77	77	81	70	101	71	62	64	NO	98			5000 (8hr)
	O_3(µg/m³)	4	1	2	4	1	2	3	2	1	NO	2			100(8hr)
9th QM, Apr 2016	$PM_{2.5}$ (µg/m³)	19	25	11	23	25	15	21	13	9	17	11			65(24hr)
	PM_{10} (µg/m³)	117	44	29	82	60	46	45	42	31	40	69			150(24hr)
	SPM(µg/m³)	332	187	115	268	167	114	144	91	46	132	112			200(8hr-ECR, 1997)
	SO_2(µg/m³)	18	11	17	20	13	9	10	11	9	15	11	NM	NM	80(24hr)
	NO_2(µg/m³)	18	22	16	16	25	19	14	16	10	19	15			80(24hr)
	CO (mg/m³)	57	22	38	73	33	55	29	47	21	40	68			5000 (8hr)
	O_3(µg/m³)	1	1	0	0	1	2	1	2	0	0	1			100(8hr)
10th QM, Jul 2016	$PM_{2.5}$ (µg/m³)	5	3	3	9	7	8	9	6	4	NO	16			65(24hr)
	PM_{10} (µg/m³)	32	11	24	45	23	42	29	20	15	NO	68			150(24hr)
	SPM(µg/m³)	51	27	31	69	31	78	50	43	23	NO	107			200(8hr-ECR, 1997)
	SO_2(µg/m³)	9	4	4	10	7	8	8	6	4	NO	10	NM	NM	80(24hr)
	NO_2(µg/m³)	12	6	5	12	10	9	10	8	5	NO	15			80(24hr)
	CO (mg/m³)	35	31	47	41	38	29	31	32	37	NO	36			5000 (8hr)
	O_3(µg/m³)	1	0	1	0	0	0	2	0	0	NO	0			100(8hr)
11th QM, Oct 2016	$PM_{2.5}$ (µg/m³)	9	8	10	10	5	10	11	10	4	9	9			65(24hr)
	PM_{10} (µg/m³)	22	11	14	13	20	18	15	14	14	14	24			150(24hr)
	SPM(µg/m³)	53	23	35	30	48	34	6	44	27	26	64			200(8hr-ECR, 1997)
	SO_2(µg/m³)	8	6	8	7	9	8	7	7	6	9	10	NM	NM	80(24hr)
	NO_2(µg/m³)	10	8	11	9	8	9	8	10	6	9	14			80(24hr)
	CO (mg/m³)	119	108	127	98	79	112	97	110	101	121	104			5000 (8hr)
	O_3(µg/m³)	1	0	1	3	2	0	1	1	2	0	2			100(8hr)
12th QM, Jan 2017	$PM_{2.5}$ (µg/m³)	24.8	25	29	21.7	25.2	38.7	25.7	19.2	14.3	21.7	34.6			65(24hr)
	PM_{10} (µg/m³)	79	99.5	108.7	105.4	74.4	141.6	119.3	85.2	85.5	104.5	145.9			150(24hr)
	SPM(µg/m³)	115.7	154.2	168	167.8	162	194.6	172.3	93.5	90.9	111.4	189.7	NM	NM	200(8hr-ECR, 1997)
	SO_2(µg/m³)	9.5	12.9	12.2	12.2	18.9	16.1	16.8	11.9	8.4	13.5	17.1			80(24hr)
	NO_2(µg/m³)	11.3	15.7	14.7	19.3	18	19	15.3	13	12.7	15.9	18.6			80(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	CO (mg/m^3)	59	66	31	63	36	48	44	67	58	43	66			5000 (8hr)
	O_3($\mu g/m^3$)	5	1	3	5	2	3	4	4	3	4	3			100(8hr)
13th QM, April, 2017	$PM_{2.5}$ ($\mu g/m^3$)	8.12	14.6	10.3	7.9	8.7	15.8	22.6	10.5	13.2	No	23.1	NM	NM	65(24hr)
	PM_{10} ($\mu g/m^3$)	43.8	56.9	31.3	30.5	44.4	105	93.6	36.7	96	NO	99.5			150(24hr)
	SPM($\mu g/m^3$)	122.4	136.7	91.7	95.6	110.6	179	196	103.7	137	NO	187.2			200(8hr-ECR, 1997)
	SO_2($\mu g/m^3$)	9	10	5.8	5.5	8.2	12.9	10.5	5.7	6	NO	7.2			80(24hr)
	NO_2($\mu g/m^3$)	10.7	11.8	7.1	9.8	11.2	18.7	15.1	7.7	10.1	NO	11.7			80(24hr)
	CO (mg/m^3)	91	78	74	85	94	83	72	73	79	NO	79			5000 (8hr)
	O_3($\mu g/m^3$)	3	8	5	8	3	6	4	8	0	NO	7			100(8hr)
14th QM, Jul, 2017	$PM_{2.5}$ ($\mu g/m^3$)	28.2	8.5	15.2	13.8	17.3	17	33.2	28.3	7.5	17	19.5	NM	NM	65(24hr)
	PM_{10} ($\mu g/m^3$)	73.6	40.4	49.9	30.2	100.2	63.4	97	89.9	37.8	92.1	39.6			150(24hr)
	SPM($\mu g/m^3$)	169.4	45.3	63.9	57.2	127.8	87.5	187.2	107	41.8	102	127.9			200(8hr-ECR, 1997)
	SO_2($\mu g/m^3$)	7.2	4.3	7.5	4.1	7.9	8	8.2	7.6	5.8	6	7.1			80(24hr)
	NO_2($\mu g/m^3$)	7.5	6	9.2	5	8.4	10.2	10.7	9.3	5.9	7.8	8.8			80(24hr)
	CO (mg/m^3)	73	79	80	77	69	87	79	84	69	72	81			5000 (8hr)
	O_3($\mu g/m^3$)	10	25	10	6	5	0	9	0	0	0	7			100(8hr)
15th QM Jan, 2018	$PM_{2.5}$ ($\mu g/m^3$)	32.9	31.5	40.7	52.3	33.4	72.3	70.1	43.5	35.4	40.5	78.7	NM	NM	65(24hr)
	PM_{10} ($\mu g/m^3$)	133	147.8	136.3	140	157.1	208.9	209.1	152.4	150.6	149.8	213.9			150(24hr)
	SPM($\mu g/m^3$)	145.6	181.4	161.7	171.9	200	223.9	242	189.9	175.1	173.7	243.4			200(8hr-ECR, 1997)
	SO_2($\mu g/m^3$)	14.3	15	9.6	13.8	19	16.3	15.5	13.2	14	15.8	21			80(24hr)
	NO_2($\mu g/m^3$)	17.7	18.6	11.7	16.7	20.7	17.7	18.4	15.2	15.1	18.1	25			80(24hr)
	CO (mg/m^3)	61	69	45	59	58	49	52	57	52	71	69			5000 (8hr)
	O_3($\mu g/m^3$)	3	4	5	4	5	6	2	2	3	4	9			100(8hr)
16th QM April, 2018	$PM_{2.5}$ ($\mu g/m^3$)	28.4	26.7	27.7	18	11.4	15.9	23.2	11.6	13.7	NO	12.4	29.1	33.1	65(24hr)
	PM_{10} ($\mu g/m^3$)	70	52	100.1	30.5	40.6	74.3	89.9	29.1	36.4	NO	38.8	70.3	118.1	150(24hr)
	SPM($\mu g/m^3$)	121.5	138.7	116.2	90.6	108	154.1	144.7	72.4	90.3	NO	78.9	120.6	142.5	200(8hr-ECR, 1997)
	SO_2($\mu g/m^3$)	11.4	9.6	13.2	6.1	10.4	12.2	11.8	7.9	8.3	NO	7.5	13.1	12.2	80(24hr)
	NO_2($\mu g/m^3$)	12.8	10.2	14.3	7.3	11.6	13.7	13.2	8.3	9.9	NO	8.4	14	14.8	80(24hr)
	CO (mg/m^3)	32	27	43	24	42	34	29	31	21	NO	36	46	38	5000 (8hr)
	O_3($\mu g/m^3$)	9	4	7	6	2	6	3	2	3	NO	9	9	5	100(8hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
17th QM, Jul 2018	$PM_{2.5}$ (µg/m³)	15.2	15.8	12.9	11.9	10.2	11.1	13.2	11.4	14	NO	12.5	13.7	20.9	65(24hr)
	PM_{10} (µg/m³)	15.8	64.4	44.3	20.5	30.6	58.4	47.5	24.3	41.6	NO	45.4	60.8	83.7	150(24hr)
	SPM(µg/m³)	12.9	113.4	76.3	5.2	78.6	98.4	73.7	47.6	58	NO	69.9	98.1	106.2	200(8hr-ECR, 1997)
	SO_2(µg/m³)	11.9	10.8	5.8	6.1	7.5	9.4	6.5	4.9	6.3	NO	7.5	8.4	10.9	80(24hr)
	NO_2(µg/m³)	10.2	13.1	5.9	7.4	8.4	12.1	7.2	5.4	9.3	NO	11.1	9	13.4	80(24hr)
	CO (mg/m³)	11.1	25	21	20	23	29	20	20	25	NO	28	32	34	5000 (8hr)
	O_3(µg/m³)	13.2	8	6	6	4	8	1	6	4	NO	7	4	7	100(8hr)
18th QM, Nov, 2018	$PM_{2.5}$ (µg/m³)	31.1	35.7	32.3	15.4	26.8	24.8	30.3	20.6	29.1	23.4	21.3	28.6	40.9	65(24hr)
	PM_{10} (µg/m³)	106	109.9	117.4	50.1	105.9	92	103.7	80.5	100.2	86.7	57.9	111.7	128.3	150(24hr)
	SPM(µg/m³)	137.4	143.9	156.2	113.5	128.5	139	161.9	90.3	121.4	107.9	102.9	144.6	177.8	200(8hr-ECR, 1997)
	SO_2(µg/m³)	12.7	12.2	13.4	9.5	12.1	10.4	12	11.6	10.8	10.6	8.7	10.2	13.4	80(24hr)
	NO_2(µg/m³)	14.8	13.6	15	10.7	14	13.4	16.8	13	11.7	12.5	9.7	11.6	15	80(24hr)
	CO (mg/m³)	28	30	32	20	27	30	33	20	28	22	121	30	32	5000 (8hr)
	O_3(µg/m³)	7	6	8	2	5	8	9	4	5	6	4	9	9	100(8hr)
19th QM, Feb, 2019	$PM_{2.5}$ (µg/m³)	27.3	30.6	20.3	19.3	22.8	28.6	26.6	15.4	16.2	18.2	20.8	21.2	26.9	65(24hr)
	PM_{10} (µg/m³)	105.4	126.3	93.6	102	126.7	125.8	109.3	92.6	93.2	96.1	91.3	88.7	112.9	150(24hr)
	SPM(µg/m³)	151.6	168	125.5	127.5	146.6	178.2	157.1	118.3	117.8	127.8	158	129.4	168.2	200(8hr-ECR, 1997)
	SO_2(µg/m³)	11.6	12.3	10.7	11.5	12.4	13.3	10.8	9.5	10.1	10.7	10.4	11.3	12.5	80(24hr)
	NO_2(µg/m³)	12.4	13.8	11.3	13.8	13.8	14.9	12.6	10.1	11.3	10.9	11.1	12.1	13	80(24hr)
	CO (mg/m³)	15	21	20	17	25	14	28	25	17	21	19	18	23	5000 (8hr)
	O_3(µg/m³)	9	4	1	3	9	8	7	3	3	6	5	1	6	100(8hr)
20th QM, Apr, 2019	$PM_{2.5}$ (µg/m³)	21.7	18.9	14.2	19.7	15	15.8	35	14.2	13	NO	33	17.2	36.1	65(24hr)
	PM_{10} (µg/m³)	98.2	106.1	58.7	69.9	72.7	92.7	131	63.9	51.9	NO	125.9	61.6	137	150(24hr)
	SPM(µg/m³)	128.6	150.8	119.2	92.2	117.6	141.1	183.1	90.9	71.1	NO	173.4	102.5	163.2	200(8hr-ECR, 1997)
	SO_2(µg/m³)	13.9	12.1	11.6	12.6	11.2	10.4	16.8	11.6	8.9	NO	15.3	7.9	15.7	80(24hr)
	NO_2(µg/m³)	16	13.9	13.5	13.8	13.7	11.7	17.8	13	9.4	NO	17.1	11.9	17.6	80(24hr)
	CO (mg/m³)	18	20	16	18	20	14	17	16	14	NO	23	21	21	5000 (8hr)
	O_3(µg/m³)	6	1	5	4	8	3	3	5	1	NO	6	5	7	100(8hr)
21st QM, Jul, 2019	$PM_{2.5}$ (µg/m³)	37.76	50.24	37.27	57.51	19.46	24.03	56.67	28.03	19.68	NO	38.59	21.24	39.65	65(24hr)
	PM_{10} (µg/m³)	67.15	63.94	42.99	33.25	46.37	56.56	119	21.85	43	NO	47.05	96.71	142.8	150(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	SPM(µg/m³)	109.3	123.6	60.45	75.13	80.31	93.5	192.2	48.09	83.9	NO	101	127.8	171.2	200(8hr-ECR, 1997)
	SO_2(µg/m³)	56.5	31.53	60.26	54.02	45.81	59.41	59.33	49.72	57.24	NO	35.42	9.32	17.37	80(24hr)
	NO_2(µg/m³)	55.08	24.97	58.39	43.45	44.92	51.09	57.02	41.91	46.58	NO	40.09	15.63	21.32	80(24hr)
	CO (mg/m³)	4	4	7	6	10	9	15	16	38	NO	11	9	8	5000 (8hr)
	O_3(µg/m³)	25	34	18	7	2	22	5	8	9	NO	6	19	6	100(8hr)
22nd QM, Jul, 2019	$PM_{2.5}$ (µg/m³)	51.32	19.34	33.2	31.28	33.74	24.03	39.69	39.69	36.67	27.76	18.65	29.64	14.65	65(24hr)
	PM_{10} (µg/m³)	127.6	82.27	1119.3	69.32	78.27	119.3	64.12	64.12	87.15	67.89	59.19	98.15	79.92	150(24hr)
	SPM(µg/m³)	183.6	120.5	175.13	102.2	101	101	83.9	83.9	122.6	90.31	78.09	127.8	109.3	200(8hr-ECR, 1997)
	SO_2(µg/m³)	31.53	60.26	54.02	59.33	35.42	44.29	57.24	57.24	35.23	45.81	49.72	19.32	56.5	80(24hr)
	NO_2(µg/m³)	24.97	58.39	43.45	57.02	40.09	17.72	46.58	46.58	31.26	44.92	41.91	15.63	55.08	80(24hr)
	CO (mg/m³)	16	11	0	0	0	0	48	48	24	2	24	0	0	5000 (8hr)
	O_3(µg/m³)	10	22	2	52	38	26	40	40	90	16	18	11	6	100(8hr)
23rd QM, Feb, 2020	$PM_{2.5}$ (µg/m³)	27.12	19.14	21.61	26.66	39.44	33.26	38.92	17.81	23.04	17.39	40.22	44.26	26.26	65(24hr)
	PM_{10} (µg/m³)	68.1	83.22	77.69	61.11	100.1	127.5	119.6	63.27	82.91	72.45	116.2	122.7	91.39	150(24hr)
	SPM(µg/m³)	108.4	106.3	100.04	98.74	146.7	160	173.4	87.51	121.7	94.28	157.3	171.3	126.1	200(8hr-ECR, 1997)
	SO_2(µg/m³)	18.35	27.41	19.68	18.88	36.14	30.89	31.33	16.47	24.21	13.33	28.31	34.12	16.16	80(24hr)
	NO_2(µg/m³)	12.12	18.77	17.53	11.58	20.04	19.02	13.34	9.9	16.74	8.65	24.14	21.72	9.04	80(24hr)
	CO (mg/m³)	28	44	30	32	18	11	29	30	20	36	32	18	22	5000 (8hr)
	O_3(µg/m³)	8	9	9	12	22	2	4	12	2	7	10	4	6	100(8hr)
25th QM, July, 2020	$PM_{2.5}$ (µg/m³)	18.71	20.35	21.93	18.04	18.22	16.63	41.33	20.11	13.16	NO	46.73	22.08	20.16	65(24hr)
	PM_{10} (µg/m³)	80.28	71.06	76.76	59.02	59.91	55.78	126.1	62.24	58.82	NO	119.1	86.26	78.69	150(24hr)
	SPM(µg/m³)	98.26	95.24	101.33	82.02	146.7	70.23	166.2	87.71	78.8	NO	167.2	111.7	102	200(8hr-ECR, 1997)
	SO_2(µg/m³)	19.91	17.44	16.21	24.29	18.74	16.73	22.04	13.31	15.06	NO	30.73	20.61	18.82	80(24hr)
	NO_2(µg/m³)	8.82	10.17	10.55	10.62	10.19	10.52	11.29	8.13	10.47	NO	24.24	11.17	9.22	80(24hr)
	CO (mg/m³)	0	4	2	0	10	0	24	8	14	NO	18	2	0	5000 (8hr)
	O_3(µg/m³)	8	6	8	8	8	2	2	22	4	NO	4	2	8	100(8hr)
26th QM, Oct 2020	$PM_{2.5}$ (µg/m³)	44.18	29.17	46.73	38.69	43.91	33.32	40.75	34.42	22.74	28.15	48.32	41.29	38.72	65(24hr)
	PM_{10} (µg/m³)	107.2	84.3	110.43	91.79	88.93	74.83	114.6	79.38	56.74	59.31	109.6	97.16	93.48	150(24hr)
	SPM(µg/m³)	149.7	119.2	160.3	128.5	139	112	152.8	122.9	80.31	91.06	157.4	142.4	136.7	200(8hr-ECR, 1997)
	SO_2(µg/m³)	26.63	14.15	25.82	20.17	29.94	21.39	20.06	19.74	12.74	11.36	29.58	21.73	18.11	80(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	NO_2(µg/m³)	16.62	14.18	18.91	14.47	18.32	12.12	9.69	10.16	6.64	9.74	20.44	13.36	9.92	80(24hr)
	CO (mg/m³)	2	0.013	0.012	0	0	0	0	0	0	0	0.7	0	0	5000 (8hr)
	O_3(µg/m³)	8	2	8	0	0	4	1	3	6	1	0	0	2	100(8hr)
27th QM, Jan, 2021	$PM_{2.5}$ (µg/m³)	55.35	52.74	68.26	61.29	59.18	66.31	74.19	53.28	48.2	55.71	88.71	166.7	94.23	65(24hr)
	PM_{10} (µg/m³)	106.1	112	131.84	93.36	117.4	102.7	118.7	100.1	90.12	99.64	159.2	234.4	188.6	150(24hr)
	SPM(µg/m³)	163.5	170.3	180.43	159.8	188.3	156.6	201.2	146.2	145	155.4	240.2	347.4	269.3	200(8hr-ECR, 1997)
	SO_2(µg/m³)	14.74	18.32	16.19	16.47	16.45	16.16	12.26	14.66	15.05	16.2	18.8	18.61	20.23	80(24hr)
	NO_2(µg/m³)	37.16	29.9	34.1	21.18	26.14	28.54	19.25	21.44	20.6	23.53	34.2	33.48	26.3	80(24hr)
	CO (mg/m³)	0	0	0	0	0.1	1	2	0	0.2	0	2	3	0.8	5000 (8hr)
	O_3(µg/m³)	9	6	12	6	23	20	66	6	8	11	80	212	68	100(8hr)
28th QM, April, 2021	$PM_{2.5}$ (µg/m³)	49.13	48.64	58.81	62.29	53.36	42.62	65.37	46.13	41.33	NO	71.2	67.82	64.73	65(24hr)
	PM_{10} (µg/m³)	103.9	83.1	97.61	103.4	86.44	73.29	129.7	82.83	84.16	NO	120.4	108.2	119.7	150(24hr)
	SPM(µg/m³)	155.1	139.3	161.8	154.4	128.4	116.7	180.2	133.1	131.5	NO	193.6	170.4	173.9	200(8hr-ECR, 1997)
	SO_2(µg/m³)	16.26	14.06	16.58	13.52	19.66	13.1	18.91	16.58	17.44	NO	20.64	23.72	19.16	80(24hr)
	NO_2(µg/m³)	22.31	21.65	27.42	19.37	24.21	17.18	30.2	0	23.5	NO	28.35	34.49	23.74	80(24hr)
	CO (mg/m³)	0	0	0.2	0	0.1	0	0.9	3	0	NO	3	1	0.2	5000 (8hr)
	O_3(µg/m³)	16	9	14	2	28	2	91	46.13	8	NO	63	108	46	100(8hr)
29th QM, Aug, 2021	$PM_{2.5}$ (µg/m³)	38.25	41.2	22.66	21.8	33.27	32.45	22.54	34.94	39.16	25.3	29.47	59.2	52.2	65(24hr)
	PM_{10} (µg/m³)	59.17	64.28	48.19	50.26	61.9	74.89	64.44	61.53	76.18	59.7	64.44	94.6	96.1	150(24hr)
	SPM(µg/m³)	99.44	116.5	77.149	83.2	104.3	118.4	85.2	108.7	123.6	94.7	101.9	158	151	200(8hr-ECR, 1997)
	SO_2(µg/m³)	14.49	11.77	13.58	14.44	15.98	14.61	10.28	14.75	16.55	13.92	12.73	19.7	13.3	80(24hr)
	NO_2(µg/m³)	19.87	21.39	20.49	19.48	18.66	20.27	19.73	23.28	21.28	20.06	20.45	27.3	20.1	80(24hr)
	CO (mg/m³)	1	1	1	0	0.8	1	2	1	2	0	4	1	2	5000 (8hr)
	O_3(µg/m³)	42	28	17	19	11	10	23	9	11	14	21	92	16	100(8hr)
30th QM, Nov, 2021	$PM_{2.5}$ (µg/m³)	56.83	44.65	41.98	58.34	29.61	42.59	51.83	31.2	23.6	38.51	65.66	79.64	55.31	65(24hr)
	PM_{10} (µg/m³)	83.46	71.35	61.48	73.17	44.28	64.71	72.4	49.07	51.88	49.27	124.6	102.3	69.4	150(24hr)
	SPM(µg/m³)	144.5	118.5	104.73	134.6	77.88	107.3	128.3	83.16	79.47	89.36	195.2	193.4	129.5	200(8hr-ECR, 1997)
	SO_2(µg/m³)	16.28	14.55	12.19	21.39	10.59	12.8	17.44	12.68	15.89	14.33	26.18	16.92	20.76	80(24hr)
	NO_2(µg/m³)	21.64	20.85	18.39	38.46	17.21	19.33	29.16	22.27	21.39	16.27	38.58	48.41	31.69	80(24hr)
	CO (mg/m³)	0	1.1	1.4	0	1	1.1	2.4	1	1	0	4.9	1	1	5000 (8hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	O_3(µg/m^3)	11	41	34	28	9	19	43	11	8	22	59	68	29	100(8hr)
31st QM, Jan, 2022	$PM_{2.5}$ (µg/m^3)	46.83	39.86	42.81	29.22	45.3	47.51	26.39	41.58	29.65	36.88	61.57	56.26	57.29	65(24hr)
	PM_{10} (µg/m^3)	91.25	58.29	73.42	43.88	66.54	81.84	61.63	58.92	53.69	58.45	100.3	104.7	69.89	150(24hr)
	SPM(µg/m^3)	159.5	128.3	123.76	92.38	134.7	148.9	100.5	118.8	98.47	106.9	198.2	178.6	137.5	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	21.54	14.48	11.79	14.36	12.84	21.4	12.54	22	15.53	12.76	28.52	38.36	16.93	80(24hr)
	NO_2(µg/m^3)	39.5	20.44	20.25	21.92	16.73	38.27	18.43	27.2	19.38	19.66	41.59	44.77	21.62	80(24hr)
	CO (mg/m^3)	1	1	1	0.1	1	2.8	2	1	1.4	0.3	1.4	3.3	1	5000 (8hr)
	O_3(µg/m^3)	12	49	12	6	8	48	20	41	16	22	53	93	72	100(8hr)
32nd QM, May, 2022	$PM_{2.5}$ (µg/m^3)	41.78	36.71	54.16	31.43	48.94	42.57	28.19	43.27	58.43	39.62	67.33	69.23	31.28	65(24hr)
	PM_{10} (µg/m^3)	74.32	68.79	63.26	46.29	86.48	71.22	51.66	51.04	77.69	48.81	92.36	94.28	59.15	150(24hr)
	SPM(µg/m^3)	139.4	158.1	132.77	98.15	165.6	129	92	110.3	141.4	96.23	178.3	181.9	98.74	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	15.22	13.96	10.47	18.42	14.82	19.71	20.33	13.76	21.81	15.38	19.29	27.45	19.3	80(24hr)
	NO_2(µg/m^3)	22.49	20.47	23.96	40.28	26.42	29.44	31.63	39.23	38.3	39.72	37.91	39.56	33.62	80(24hr)
	CO (mg/m^3)	1	1	0.6	1	1	2	0.2	1	0.3	0.7	0.2	4	1	5000 (8hr)
	O_3(µg/m^3)	18	8	8	10	13	39	13	24	41	38	36	59	31	100(8hr)
33rd QM, July, 2022	$PM_{2.5}$ (µg/m^3)	34.84	41.2	39.36	27.55	38.48	42.85	43.8	49.15	30.22	NO	69.28	51.29	28.43	65(24hr)
	PM_{10} (µg/m^3)	56.18	64.29	58.03	51.98	53.19	69.02	62.53	74.7	60.21	NO	100.3	69.28	53.42	150(24hr)
	SPM(µg/m^3)	106.3	118.6	108.2	93.44	103.7	127.4	120.3	141.5	103.5	NO	189.4	134.3	89.45	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	11.04	12.58	13.29	10.57	11.08	12.71	14.55	14.9	12.59	NO	23.66	14.56	11.39	80(24hr)
	NO_2(µg/m^3)	23.18	18.4	20.63	16.4	21.94	23.16	22.3	20.82	19.69	NO	39.12	20.23	20.47	80(24hr)
	CO (mg/m^3)	0.3	1	0.4	0.8	0.2	0.4	0.1	0.4	0.9	NO	2.1	1.3	2	5000 (8hr)
	O_3(µg/m^3)	12	16	11	14	29	37	29	31	24	NO	66	38	23	100(8hr)
34th QM, Oct, 2022	$PM_{2.5}$ (µg/m^3)	39.63	49.63	46.32	41.59	30.22	48.3	58.46	53.98	35.35	57.2	63.57	61.47	42.84	65(24hr)
	PM_{10} (µg/m^3)	57.26	58.48	64.18	64.71	39.66	74.05	93.43	76.18	50.14	89.22	92.2	84.89	71.49	150(24hr)
	SPM(µg/m^3)	109.3	123.6	139.24	111.4	77.36	138.5	170.3	142.1	99.42	164.2	169.5	158.3	127.8	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	10.18	16.71	14.66	13.88	10.52	15.42	21.41	12.37	11.06	16.82	21.71	23.49	13.27	80(24hr)
	NO_2(µg/m^3)	17.64	25.45	21.43	20.31	18.03	22.14	34	20.41	18.2	27.87	36.56	39.35	20.63	80(24hr)
	CO (mg/m^3)	0.6	0.4	0.2	0.1	0.1	0.6	1.9	0.3	1	0.5	1.6	1	1.1	5000 (8hr)
	O_3(µg/m^3)	19	14	13	33	14	24	59	41	19	28	64	49	14	100(8hr)
	$PM_{2.5}$ (µg/m^3)	56.81	43.95	55.86	37.86	57.36	50.11	53.71	35.19	54.94	47.31	51.17	59.24	40.29	65(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
35th QM, Jan, 2022	PM_{10} (µg/m³)	81.45	58.71	81.08	57.94	96.94	74.37	69.26	42.07	97.62	70.5	64.49	91.3	74.81	150(24hr)
	SPM(µg/m³)	144.2	111.6	146.79	102.3	161.5	133.7	130.5	85.63	159.4	124.5	124.9	155.9	121.2	200(8hr-ECR, 1997)
	SO_2(µg/m³)	19.56	17.48	19.51	12.69	26.24	16.42	12.51	13.27	25.7	14.26	17.32	16.26	11.09	80(24hr)
	NO_2(µg/m³)	18.61	15.72	29.29	15.78	31.89	23.94	18.59	20.18	27.24	21.67	23.09	31.49	23.25	80(24hr)
	CO (mg/m³)	0.8	0.8	0.7	0.7	0.9	0.5	0.2	0.3	0.8	0.1	0.3	0.8	0.8	5000 (8hr)
	O_3(µg/m³)	20	21	25	16	56	37	14	11	63	35	12	38	17	100(8hr)
36th QM, May, 2023	$PM_{2.5}$ (µg/m³)	44.72	53.16	52.33	39.81	58.71	58.35	51.81	39.51	47.74	NO	53.57	57.73	42.34	65(24hr)
	PM_{10} (µg/m³)	66.62	80.42	70.84	59.5	79.6	92.53	72.55	58.55	71.27	NO	70.49	95.63	78.77	150(24hr)
	SPM(µg/m³)	112.8	142.8	140.73	107.1	147.8	169.5	138	109.9	137.6	NO	134.7	160.3	126.6	200(8hr-ECR, 1997)
	SO_2(µg/m³)	18.62	16.51	18.19	13.91	18.22	24.74	14.74	15.36	17.2	NO	14.05	18.34	15.88	80(24hr)
	NO_2(µg/m³)	13.32	27.41	24.64	14.18	19.01	28.77	19.99	24.22	23.83	NO	21.89	32.53	22.67	80(24hr)
	CO (mg/m³)	0.7	0.9	0.8	0.6	0.6	0.7	0.3	0.4	0.2	NO	0.4	0.7	0.5	5000 (8hr)
	O_3(µg/m³)	22	28	34	19	25	61	12	13	32	NO	15	36	18	100(8hr)
37th QM, Aug, 2023	$PM_{2.5}$ (µg/m³)	53.38	44.65	46.66	52.33	59.21	45.44	49.15	13.93	2.63	2.28	86.08	25.7	28.36	65(24hr)
	PM_{10} (µg/m³)	67.47	54.76	58.91	65.17	73.88	54.87	74.7	15.28	3.07	2.61	99.54	28.3	33.23	150(24hr)
	SPM(µg/m³)	52.28	43.17	45.76	50.75	57.88	43.77	47.16	13.43	2.59	2.26	81.37	24.23	27.24	200(8hr-ECR, 1997)
	SO_2(µg/m³)	3.04	7.21	6.6	8.82	19.42	12.22	14.9	7.7	1.08	1.27	22.14	7.57	4.64	80(24hr)
	NO_2(µg/m³)	30.46	33	41.6	34.68	38.37	28.75	20.8	35.17	17.88	17.53	34.49	30.51	26.49	80(24hr)
	CO (mg/m³)	0.438	0.282	0.234	0.22	0.442	0.37	0.4	0.614	0.204	0.138	0.57	0.162	0.213	5000 (8hr)
	O_3(µg/m³)	21.77	21.83	20.39	22.45	22.38	18.41	21.85	17.73	8.32	9.17	22.91	18.58	18.65	100(8hr)
38th QM, Oct, 2023	$PM_{2.5}$ (µg/m³)	44.24	44.52	49.92	52.21	42.24	42.01	59.68	70.29	87.94	73.6	50.49	26.24	28.84	65(24hr)
	PM_{10} (µg/m³)	55.03	55.74	59.62	61.03	51.93	51.57	66.93	76.43	96.99	79.96	58.75	30.67	33.53	150(24hr)
	SPM(µg/m³)	58.69	58.85	64.79	67.19	55.81	55.55	76.21	87.85	108.3	91.21	64.35	77.4	84.84	200(8hr-ECR, 1997)
	SO_2(µg/m³)	16.17	10.16	9.9	4.41	19.56	23.14	12.79	9.17	4.67	2.87	8.1	24.35	18.54	80(24hr)
	NO_2(µg/m³)	28.11	30.16	27.13	26.83	27.38	29.58	28.35	26.33	21.64	15.8	30.13	25.52	25.56	80(24hr)
	CO (mg/m³)	0.21	0.5	0.17	0.37	0.36	0.519	0.35	0.39	0.47	0.16	0.17	0.175	0.522	5000 (8hr)
	O_3(µg/m³)	22.53	25.87	24.96	25.83	25.23	24.85	24.88	20.56	26.81	12.23	23.4	16.95	18.85	100(8hr)
39th QM, Feb 2024	$PM_{2.5}$ (µg/m³)	203.6	87.2	90.71	62.03	97.4	102.5	63.62	91.28	70.5	65.11	69.09	184.5	121	65(24hr)
	PM_{10} (µg/m³)	233.7	109.3	106.2	73.22	112.2	115.9	77.71	104.7	85.8	75.76	82.9	246.2	135	150(24hr)
	SPM(µg/m³)	362.3	196	174	113.2	185	178.3	123.5	156.2	134.2	122.6	129.7	358	209.2	200(8hr-ECR, 1997)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	SO_2(µg/m³)	36.39	9.97	10.78	5.2	19.81	10.17	9.57	6.61	0.85	2.9	8.67	52.47	32.43	80(24hr)
	NO_2(µg/m³)	17.38	21.77	34.75	22.49	27.23	28.04	18.96	17.63	18.9	18.49	19.27	19.59	16.61	80(24hr)
	CO (mg/m³)	1.1	0.38	0.44	0.32	0.81	0.48	0.3	0.25	0.28	0.11	0.34	1.15	0.22	5000 (8hr)
	O_3(µg/m³)	19.91	25.75	27.05	22.8	22.62	28.12	22.14	19.27	19.4	10.23	24.06	18.28	20.74	100(8hr)
40th QM, May, 2024	$PM_{2.5}$ (µg/m³)	29.95	16.27	24.2	21.84	27.12	32.59	38.82	40.28	45.66	45.66	35.53	23.74	51.28	65(24hr)
	PM_{10} (µg/m³)	31.73	17.25	25.71	23.75	29.1	36.28	44.75	52.71	55.85	38.3	39.56	21.63	42.88	150(24hr)
	SPM(µg/m³)	49.18	27.6	37.28	39.18	43.65	58.04	71.6	76.43	83.77	50.65	62.1	33.23	73.84)	200(8hr-ECR, 1997)
	SO_2(µg/m³)	1.97	1.11	6.94	5.02	5.24	5.93	11.06	9.61	10.2	73.2	2.45	0.501	0.036	80(24hr)
	NO_2(µg/m³)	16.28	17.03	18.57	19.67	17.16	17.13	16.38	18.73	16.52	8.5	16.78	7	6.79	80(24hr)
	CO (mg/m³)	0.11	0.188	0.18	0.215	0.253	0.219	0.254	0.54	0.4	17.2	0.432	18.19	17.53	5000 (8hr)
	O_3(µg/m³)	22.95	24.63	26.9	23.05	24.55	20.58	19.81	20.27	21	0.435	20.76	20.18	24.66	100(8hr)
41st QM, July, 2024	$PM_{2.5}$ (µg/m³)	4.87	5.4	14.82	6.4	12.06	8.13	6	12.11	16.85	NO	14.48	5.79	2.86	65(24hr)
	PM_{10} (µg/m³)	8.13	9.82	21.18	8.53	15.07	13.69	10	26.92	28.09	NO	29.53	7.18	4.4	150(24hr)
	SPM(µg/m³)	13	15.22	36.01	14.92	27.13	21.22	16	39.03	44.94	NO	44.29	11.22	7.26	200(8hr-ECR, 1997)
	SO_2(µg/m³)	6.08	13.76	3.5	9.01	16.15	13.79	7.39	8.43	3.16	NO	5.23	15.81	8.18	80(24hr)
	NO_2(µg/m³)	13.12	13.12	6.78	13.06	11.47	12.71	12.98	13.73	6.87	NO	10.92	9.81	14.24	80(24hr)
	CO (mg/m³)	0.44	0.21	0.22	0.23	0.22	0.22	0.16	0.9	0.16	NO	0.21	0.49	0.22	5000 (8hr)
	O_3(µg/m³)	18.53	19.05	8.75	19.3	15.24	18.06	16.56	16.5	8.97	NO	13.01	22.4	20.27	100(8hr)
42nd QM, Oct, 2024	$PM_{2.5}$ (µg/m³)	12.77	15.45	69.76	30.33	22.62	27.32	43.93	35.97	56.73	63.16	89.65	41.88	22.74	65(24hr)
	PM_{10} (µg/m³)	15.5	19.32	86.82	41.88	30.42	37.88	54.94	48.14	70.43	77.79	112.8	55.95	30.77	150(24hr)
	SPM(µg/m³)	28.27	34.78	156.58	72.21	53.04	65.2	98.87	84.11	127.2	141	202.5	97.82	53.07	200(8hr-ECR, 1997)
	SO_2(µg/m³)	9.88	9.95	52.84	14.65	156	27.57	11.73	8.82	11.65	10.82	40.75	17.04	5.52	80(24hr)
	NO_2(µg/m³)	1.29	0.9	2.78	2.41	4.37	2.69	2.01	1.96	2.12	1.73	3.82	3.44	0.86	80(24hr)
	CO (mg/m³)	1.09	1.14	1.26	1.25	1.2	1.56	1.18	1.07	1.16	1.13	1.63	1.1	1.04	5000 (8hr)
	O_3(µg/m³)	18.05	22.81	30.73	24.35	25.62	18.03	21.35	11.22	13.18	19.81	30.85	19.25	20.21	100(8hr)
43rd QM, Jan, 2025	$PM_{2.5}$ (µg/m³)	46.73	46.7	41.3	47.95	44.94	89.19	68.39	37.91	63.69	47.3	68.56	119	35.94	65(24hr)
	PM_{10} (µg/m³)	52.96	52.61	50.8	55.38	50.88	97.12	74.45	47.74	7.56	55.41	75.25	132.4	45.11	150(24hr)
	SPM(µg/m³)	99.69	99.31	92.1	103.3	95.81	186.3	142.8	85.66	134.2	102.7	143.8	251.4	81.06	200(8hr-ECR, 1997)
	SO_2(µg/m³)	8.34	8.31	9.59	14.8	10.26	9.91	27.13	12.42	9.87	15.42	14.58	21.3	10.73	80(24hr)
	NO_2(µg/m³)	1.44	1.43	1.33	1.8	1.07	0.85	2.66	2.42	1.99	1.98	1.99	3.81	1.5	80(24hr)

Preconstruction and Construction stage														
Quarters	**Parameters**	**Monitoring locations**												**Standard (Air pollution control Rules, 2022)**
		ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	
	CO (mg/m^3)	1.08	1.1	1.14	1.27	1.02	1.16	1.47	1	1.23	1.11	1.19	1.47	1.15	5000 (8hr)
	O_3(µg/m^3)	28.34	26.88	33.95	18.86	20.02	19.48	17.17	14.33	14.42	6.5	18.35	19.2	28.31	100(8hr)
44th QM, May 2025	$PM_{2.5}$ (µg/m^3)	18.42	15.45	10.51	14.01	15.64	13.21	16.79	6.04	5.44	5.71	17.74	24.24	25.05	65(24hr)
	PM_{10} (µg/m^3)	25.89	20.72	12.81	17.78	20.92	16.77	22.45	7.97	7.47	7.72	25.33	34.35	17.89	150(24hr)
	SPM(µg/m^3)	44.32	36.16	23.32	31.79	36.56	29.98	39.24	14.01	12.91	13.42	43.07	58.59	42.94	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	6.02	6.4	5.05	5.18	6.29	5.53	8.58	6.52	5.72	6.09	7.79	11.2	4.35	80(24hr)
	NO_2(µg/m^3)	1.99	1.39	1.71	1.7	1.01	1.72	2.96	2.68	1.6	1.98	0.87	2.01	1.6	80(24hr)
	CO (mg/m^3)	0.18	0.2	0.13	0.16	0..205	0.15	0.25	0.22	0.2	0.22	0.2	0.226	0.12	5000 (8hr)
	O_3(µg/m^3)	8.39	8.64	8.29	6.99	6.91	5.98	3.65	5.15	5.95	6.49	3.42	4.98	3.8	100(8hr)
45th QM, July 2025	$PM_{2.5}$ (µg/m^3)	15.48	12.32	13.73	18.2	11.34	21.52	20.61	1.44	1.72	0.93	21.69	5.2	10.12	65(24hr)
	PM_{10} (µg/m^3)	21.2	16.32	17.92	24.49	14.76	35.08	29.06	2.04	3.39	1.22	31.55	6.77	13.12	150(24hr)
	SPM(µg/m^3)	36.67	28.64	31.65	42.69	26.1	56.6	49.67	3.48	5.11	2.15	53.24	11.97	23.23	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	2.36	0.68	2.02	3.77	1.91	2.63	3.26	1.91	6.72	7.01	2.19	3.65	2.54	80(24hr)
	NO_2(µg/m^3)	5.21	4.31	4.79	4.83	4.01	4.63	5.46	4.37	2.47	3.7	5.98	7.24	5.21	80(24hr)
	CO (mg/m^3)	0.15	0.21	0.13	0.24	0.15	0.21	0.22	0.11	0.58	0.65	0.27	0.11	0.12	5000 (8hr)
	O_3(µg/m^3)	8.03	8.35	5.47	7.43	5.75	7.8	6.11	2.5	2.42	2.93	6.9	4.16	5.02	100(8hr)
46th QM	$PM_{2.5}$ (µg/m^3)	7.14	4.05	12.05	17.45	10.07	19.76	12.69	2.02	2.24	2.1	22.98	5.15	4.05	65(24hr)
	PM_{10} (µg/m^3)	9.15	6.51	15.56	24.47	13.2	27.64	16.12	2.78	3.04	2.87	33.63	6.94	5.23	150(24hr)
	SPM(µg/m^3)	16.29	10.56	27.61	41.91	23.28	47.41	28.81	4.8	5.28	4.97	56.61	12.09	9.28	200(8hr-ECR, 1997)
	SO_2(µg/m^3)	8.51	9.46	4.07	3.14	2.07	2.35	8.48	2.51	3.13	2.53	2.66	10.23	8.28	80(24hr)
	NO_2(µg/m^3)	9.39	7.34	4.68	5.94	2.83	4.73	7.23	5.12	4.99	5.15	6.26	11.47	7.93	80(24hr)
	CO (mg/m^3)	0.18	0.17	0.15	0.24	0.11	0.18	0.2	0.12	0.21	0.12	0.29	0.16	0.17	5000 (8hr)
	O_3(µg/m^3)	16.35	13.38	5.05	7.33	2.51	7.53	11.52	3.69	3.62	3.77	6.63	12	13.97	100(8hr)

Source: CEGIS field survey from April 2014 to October-November 2025.

Operation Phase															
Parameters	**Monitoring locations**														
	ML-1	**ML-2**	**ML-3**	**ML-4**	**ML-5**	**ML-6**	**ML-7**	**ML-8**	**ML-9**	**ML-10**	**ML-11**	**ML-12**	**ML-13**	**ML-14**	**Standard (Air pollution control Rules, 2022)**
$PM_{2.5}$ (µg/m³)	21.7	33.64	41.47	61.09	62.92	59.26	25.27	36.15	30.88	42.27	43.82	37.41	35.89	67.52	65(24hr)
PM_{10} (µg/m³)	31.47	44.68	55.09	79.51	81.93	76.75	36.99	48.63	40.66	54.76	56.11	47.13	45.71	87.32	150(24hr)
SPM(µg/m³)	53.17	78.31	96.55	140.6	144.85	136.02	62.26	84.78	71.54	97.03	99.93	84.55	81.6	154.84	200(8hr-ECR, 1997)
SO_2(µg/m³)	3.1	4.24	3.76	5.96	4.66	4.35	3.41	3.25	13.12	6.87	6.15	4.1	2.68	6.62	80(24hr)
NO_2(µg/m³)	6.38	6.35	8.1	9.31	8.66	8.51	7.62	8.8	4.35	8.01	6.84	7.23	5.78	15.48	80(24hr)
CO (mg/m³)	210	300	260	410	440	340	310	240	360	290	200	200	360	523	5000 (8hr)
O_3 (µg/m³)	22.76	12.62	22.66	21.31	24.22	26.62	16.97	13.64	18.43	16.33	10.88	15.61	9.86	23.01	100(8hr)

Source: CEGIS field survey, January-February 2026.

Table A.2: Emission of different infrastructures and sources

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction	Residential sources
Stack point	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	√	√	X	X	X	X	X	X
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GHGs	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1 km towards windward direction	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 km towards windward direction	PM	√	X	X	X	√	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction	Residential sources
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 km towards windward direction	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√	√
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
Coal stockyard	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	√	√	X	X	X	X	X	X
	SOx	X	X	X	X	√	X	X	X	X	X	X	√	√	√	√	√	√	X	X	X	X	X	X
	NOx	X	X	X	X	√	X	X	X	X	X	X	√	√	√	√	√	√	X	X	X	X	X	X
	GHGs	X	X	X	X	√	X	X	X	X	X	X	√	√	√	√	√	√	X	X	X	X	X	X
Ash Disposal point	PM	√	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	√	X	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mongla port area	PM	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	X	X	√
	SOx	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	X	√	√
	NOx	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	X	X	√
	GHGs	√	√	√	X	√	√	√	√	√	√	√	√	√	√	√	√	X	X	√	√	X	X	√
Nearest point of Sundarbans_1 (Sutarkhali	PM	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	SOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nearest point of Sundarbans_2 (Dhangmari)	PM	√	√	√	X	√	√	√	√	√	√	√	X	X	X	X	X	X	X	√	X	X	X	√
	SOx	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	√	X	X	√	√
	NOx	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	√	X	X	X	√
	GHGs	X	√	X	X	√	√	√	√	√	√	X	X	X	X	X	X	X	X	√	X	X	X	√
Harbaria	PM	X	X	X	X	X	√	√	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	√
	SOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√

Sampling Locations	Criteria Pollutant	Cement Industry	Condensate	LPG Bottling Plant	Brick Field	Road Traffic	Small vessels, engine boat	Inland Water Cargo vessel	Sea going Mother Vessel (MV)	Fly ash Carrier	Clinkers Carrier	Clinker, Fly Ash Handling	Coal Carrier (MV)	Coal Ash Carrier (MV)	Coal Carrier (Lighter Vessel)	Coal Ash Carrier	Coal Loading and Unloading	Coal Handling (Stock Yard, Conveyor belt, etc)	Other Coal Based PP	Other Fuel Based PP	Dredging and Land Filling	Earth excavation	Other Construction	Residential sources
	NOx	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Akram Point	PM	X	X	X	X	X	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	√	√
	SOx	X	X	X	X	X	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	X	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	X	√
	GHGs	X	X	X	X	X	√	√	√	√	√	√	√	√	√	√	X	X	X	X	X	X	X	√
Koyra Forest office	PM	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√	√	√	√
	SOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	√
	NOx	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√	√	X	√
	GHGs	X	X	X	X	√	√	√	X	X	X	X	X	X	X	X	X	X	X	X	√	√	√	√
Sharankhola range office	PM	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	SOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NOx	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GHGs	√	√	X	√	√	X	X	X	X	X	√	X	X	X	X	X	X	X	X	X	X	X	X
Khulna City	PM	√	X	X	√	√	√	√	X	√	√	√	√	√	√	√	√	X	X	√	√	√	√	√
	SOx	√	X	X	√	√	√	√	X	√	√	√	√	√	√	√	√	X	X	√	X	X	X	√
	NOx	√	X	X	√	√	√	√	X	√	√	√	√	√	√	√	√	X	X	√	X	X	X	√
	GHGs	√	√	X	√	√	√	√	X	√	√	√	√	√	√	√	√	X	X	√	√	√	√	√

Legend: X-Absence of source or no emission; √-Presence of source, emission of pollutant.

Water Quality Data

Surface Water Quality Monitoring Data

Table B.1: pH Values of Passur River Water

Monitoring period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	7.2	7.2	7.2	7.9	7.1	7.1	7.4	7.4	7.3	7.4	7.4	7.3	7.9	7.2	7.2
2nd QM	7	7	6.9	7.1	6.9	6.9	7	6.9	6.8	6.9	6.8	6.8	6.9	6.9	7
3rd QM	8.1	8.2	8	8.1	8.1	8.2	8.1	8	8	8.1	8.1	7.4	8	7.9	7
4th QM	7.9	8	8.1	7.9	7.9	7.9	7.6	7.5	7.8	7.7	7.3	8.2	8.1	8.1	8.1
5th QM	7.6	7.7	7.8	7.5	7.6	7.7	7.5	7.2	7.3	7.5	7.6	7.5	7.7	7.7	7.7
6th QM	7.8	7.9	7.8	7.9	8	8	8.1	8	8.1	8.1	6.9	7.9	7.9	NS	NS
7th QM	7.6	7.58	7.64	7.6	7.58	7.62	7.78	7.6	7.64	7.3	7.56	7.1	7.8	7.63	7.39
8th QM	7.1	7.3	7.3	7.1	7.5	7.6	8.1	8	7.9	7.3	7.1	7.4	8.2	8	NS
9th QM	7.5	7.8	7.2	7.4	7.8	7.4	7.6	7.1	7.2	7.1	7.4	7.3	7.3	7.9	7.8
10th QM	7.27	7.3	7.93	7.56	7.6	7.9	7.94	8.04	8.2	8.1	7.8	7.3	7.63	7.67	NS
11th QM	6.9	7	7.2	7.3	7	6.9	7.2	7.5	7.3	6.8	7.1	6.9	7.4	7.1	7.6
12th QM	7.6	7.5	7.8	8.2	8.5	8.7	8.1	8.6	8.9	8.1	7.6	7.2	7.8	8.2	8.5
13th QM	7.2	7.3	7.3	7.2	7.8	7.4	6.9	6.8	7.1	7.2	7.4	6.9	6.9	7.2	NS
14th QM	7.1	6.9	6.9	6.9	7.2	7.2	7.2	7.1	7	7.1	7	6.8	7.1	7.1	6.8
15th QM	8.28	8.25	8.17	8.2	8.21	8.2	8.39	8.15	8.16	8.4	7.92	7.48	8.19	8.22	8.2
16th QM	8.1	8.1	8.1	8.1	8.1	8.1	8	8.1	8.1	8.1	7.6	7.3	8.1	8.2	NS
17th QM	8.4	8.4	8.4	8.3	8.3	8.2	8.4	8.5	8.5	8.6	7.3	8.3	8.4	8.2	NS
18th QM	7.9	6.04	8.09	7.65	8.2	7.87	8.11	7.44	7.07	7.94	7.63	7.02	7.19	8	7.18
19th QM	8.18	8.03	8.06	7.78	7.97	8.04	7.89	7.85	8.06	8.05	7.8	8.65	7.71	7.77	7.79
20th QM	9	9.9	8.7	8.9	8.4	8.5	9.3	8.7	8.4	9.3	8.2	8.1	8.2	7.9	NS
21st QM	6.8	6.8	7.1	7.5	7.2	6.7	7.4	6.5	7.3	7.2	7	7	7.2	7.1	NS
22nd QM	7.9	7.8	7.8	7.5	7.4	7.4	7.3	7.2	7.2	7.4	7.3	8	8	7.8	7.8
23rd QM	8.4	8.3	8.8	8.3	8.3	8	8.6	8.2	8.3	8	7.9	8.3	8.4	8.2	8.2
25th QM	6.9	7	7.1	7	7.2	7.2	7.4	7.6	7.8	7.1	6.9	7.1	7.4	7.7	NS
26th QM	6.9	6.66	6.59	6.6	6.77	6.88	7.13	6.82	6.8	6.85	6.83	7.06	6.1	6.6	6.7
27th QM	8.5	7.8	8	7.7	7.7	7.8	7.8	8	7.8	7.4	7.5	7.8	8.2	7.7	7.6
28th QM	8.3	8.1	8	8.6	8	8.9	8.2	8.4	8.3	8	8.3	8.6	7.8	8.2	NS
29th QM	5.5	6.5	8.5	7.4	8.4	5.8	6.7	8.6	8.5	5.9	6.9	7.3	6.6	6	8

Monitoring period	Sampling Locations ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
30th QM	7.8	7.5	6.5	6.8	7.6	7.6	8.2	8.2	7.9	7.8	8.5	8.1	7.3	6.9	6.7
31st QM	8	7.6	7.7	8.1	7.7	7.8	7.9	7.8	7.7	8	7.7	7.9	7.7	7.6	7.5
32nd QM	7.77	7.8	7.7	7.63	7.72	7.81	7.63	7.64	7.8	7.61	7.5	7.9	7.7	7.69	NS
33rd QM	8.02	8	7.94	7.58	7.95	7.98	7.99	7.99	8.03	8.5	7.74	8.1	8.07	7.83	NS
34th QM	7.67	7.59	7.6	7.55	7.44	7.42	7.58	7.5	7.4	7.79	7.66	8.4	8.2	7.71	7.28
35th QM	8.3	8.25	8.2	8.24	8.23	8.18	8.2	8.27	8.2	8.3	8.35	8.01	8.13	7.2	8.1
36th QM	7.86	8.02	8.07	8.1	8.05	7.95	8.08	8.04	8.1	7.84	8.2	7.51	7.8	7.79	NS
37th QM	7.21	7.84	7.68	7.98	7.81	7.3	7.84	8.1	8.3	7.9	7.8	7.4	7.4	7.8	7.9
38th QM	7.78	7.83	7.81	7.62	7.63	7.61	7.67	7.69	7.62	7.5	8.02	8.27	7.9	7.6	7.86
39th QM	7.9	7.8	7.6	7.9	7.6	7.7	7.8	7.8.	7.9	7.6	7.4	7.6	8.2	8.1	7.9
40th QM	7.8	7.81	7.7	7.6	7.79	7.7	7.8	7.81	7.8	7.75	7.8	7.5	7.7	7.4	7.5
41st QM	7.89	8.08	8.1	8	7.9	8	8.19	7.9	7.8	8.1	8.1	7.79	8.66	8.1	NS
42nd QM	8.7	8.07	8.23	8.03	8.06	8.03	8.07	8.01	8.04	8.01	8.1	9.29	8.6	8.43	8.4
43rd QM	8.2	8.5	8.4	8.1	8.2	8.1	8.1	8.1	8.5	8.6	8.3	8.68	8.76	8.9	8.6
44th QM	7	7.4	7.5	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.4	7.6	7.8	7.7	8.1
45th QM	7.8	7.9	7.9	7.8	8.2	8.15	8.02	8.02	8	8	7.5	7.93	7.99	8.07	7.34
46th QM	7.26	7.2	7.18	6.83	6.7	6.88	7.2	6.96	6.91	6.92	7.6	7.37	7.42	7.09	7.1
Standard (ECR'2023)	**6.5 - 9.0 (Coastal Industrial and others)**												**6.5– 8.5 (Coastal Reserved Natural area)**		

Source: Field Survey; from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Monitoring quarters	pH at the monitoring locations																				
	Flood tide																				
47th QM	**L-1**	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	7.91	7.90	8.00	8.01	8.02	8.10	6.91	8.00	7.89	8.00	8.00	8.00	8.29	8.10	8.10	7.35	7.38	7.43	7.27	7.49	7.52
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	7.55	7.40	7.66	7.84	7.82	7.82	7.61	7.77	7.79	7.66	7.39	7.55	7.82	7.82	7.78	7.90	8.00	8.00	7.80	7.80	8.30
	Ebb tide																				
	L-1	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	8.02	8.1	8.02	8.04	8.04	8.06	8	8	8.01	8.02	8.05	8.2	8.01	8.02	8.05	7.34	7.32	7.28	7.33	6.45	7.3
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	7.83	7.85	7.41	7.59	7.7	7.47	7.72	7.57	7.63	7.73	7.88	7.65	7.82	7.82	7.78	7.9	7.8	7.47	8.1	8.2	8.4

Source: Field SurveyJanuary-February, 2026; Note: QM= Quarterly Monitoring, NS – Not Surveyed; L-Sampling location.

Table B.2: Surface Water Temperature (^{0}C) in Passur River

Monitoring period	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	31	31	31	31	30	30	31	31	31	30	30	29	30	29	29
2nd QM	33	33	33	33	32	32	32	31	31	31	32	30	30	29	30
3rd QM	31	31	30	31	31	31	30	29	29	28	27	32	27	30	29
4th QM	19	20	20	19	19	19	20	19	19	19	20	19	22	21	21
5th QM	30	30	30	31	30	30	31	30	31	30	30	30	30	30	30
6th QM	31.8	30.5	30.5	30.8	30.6	30.4	30.5	30.8	30.6	30.8	31.6	29.8	29	NS	NS
7th QM	31.2	31.8	30.9	31.3	31.6	31.1	30.3	30.5	30.8	31.8	31.2	30.7	30.8	30.2	30.4
8th QM	22	21	21	22	22	21	23	22	21	22	23	21	22	21	NS
9th QM	31.2	31.1	30.8	31.4	30.9	31	30.7	30.4	30.1	31.2	30.6	31.3	31.5	30.8	31.4
10th QM	29.6	29.1	29.4	30.1	30.5	30.5	30.7	29.8	29.8	30.4	30.7	30.7	30.9	30.4	NS
11th QM	30.1	30.8	30.4	30.1	31	31.1	30.4	30.2	31.1	31.1	31.2	30.38	29.9	30.4	31.3
12th QM	22.8	22.5	22.1	22.8	21.8	21.9	22.1	22	22.1	21.9	21.8	22.1	23.1	22.5	21.4
13th QM	30	30	29.8	31.3	30	30	29.9	29.8	30.1	30.3	30.1	30.2	30.2	30.8	NS
14th QM	29.8	30.1	30.2	30.1	29.8	29.9	30	30.1	30.1	29.9	30	30	29.8	29.9	29.4
15th QM	19.7	19.8	20.2	20.3	20.3	20.3	20.6	20.2	20.3	19.1	21.1	20.8	21	21.2	21.2
16th QM	30	30	31	28	29	28	28	28	28	28	31	30	30	32	NS
17th QM	30	30	30	30	30	31	31	31	31	31	31	29	29	30	NS
18th QM	28	26.9	27.5	28.4	28	28.1	27.9	28	28	27.62	30.2	26.82	27.62	27.21	28.66
19th QM	22	22	21.8	22.6	22.6	22.4	22.2	22.3	22.5	22.06	21	21.89	21.81	22.42	23.78
20th QM	31	31	31	31	31	31	33	31	32	33	32	31	31	31	NS
21st QM	30	30	30	30	31	30	30	30	30	30	30	30	31	31	NS
22nd QM	27	27	27	28	28	28	27	27	27	27	27	28	30	29	31
23rd QM	25	25	24	24	24	24	25	25	25	25	23	22	24	24	23
25th QM	30	30	31	30	30	30	30	30	30	30	30	30	31	31	NS
26th QM	27.7	27.7	27.7	27.8	27.8	27.7	28.4	27.9	27.8	28.67	28	28.07	28.35	29.48	29.02
27th QM	20	20	20	20	20	20	21	20	21	22	21	21	21	22	22
28th QM	31	30	30	30	30	30	30	30	30	31	31	29	30	30	NS
29th QM	30.3	30.5	30.5	30.6	30.4	30.5	30.4	30.5	30.5	30.39	30.5	30.15	29.6	29.75	30.66
30th QM	26	26	26	28	27	30	27	27	27	27	29	27	27	28	28
31st QM	22	22	22	21	22	22	23	22	22	23	22	22	24	21	22
32nd QM	30	30.2	30.2	30.1	30.3	30.2	30.1	30.2	30.2	30.45	29.2	31.63	30.13	31.36	NS
33rd QM	31.2	30.9	30.8	30.9	31	31.1	31.2	31	31.1	31.77	32.5	31.05	31.76	32.34	NS

Monitoring period	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	27.8	28	27.9	28.2	28.1	28.1	28.4	28.1	28.3	29.27	29.2	26.3	27.59	28.25	28.59
35th QM	25.29	24.3	23.6	24.2	23.86	24.4	24.8	23.95	24.57	26.54	28.1	21.91	25.38	22.28	23.6
36th QM	31.86	31.9	31.28	31.59	31.95	33.02	32.8	32.18	31.94	34.53	32.98	29.86	31.25	31.35	NS
37th QM	31.7	31.1	30.8	30.9	30.4	30.9	30.7	31	30.8	30.8	31.4	31.4	30.5	31.1	30.3
38th QM	28.0	28.3	28.5	28.0	28.5	28.0	28.4	28.5	28.6	28.2	29.3	30.6	31.1	29.5	29.4
39th QM	22	23	23	21	22	21	23	21	22	22	23	20	21	20	21
40th QM	34.2	33.41	33.2	33.5	33.65	33.7	33.9	34.1	33.06	34.89	30.58	31.39	30.37	32.07	31.72
41st QM	30	30	30	29.7	30	30.1	30.3	29.8	30	30.1	28.4	28.9	29.7	30	NS
42nd QM	30.6	29.97	29.55	30	30.06	29.72	29.2	29.87	29.5	29.31	28.41	30.55	31.1	29.25	30.34
43rd QM	23.9	23.4	23.8	24.1	23.6	23.2	23.9	23.6	23.8	24.5	25.1	23.25	23.6	22.52	24.5
44th QM	29.4	29.6	29.3	29.7	30.1	29.7	28.8	29.7	29.4	29.3	32.6	30.8	30.8	30.3	30.2
45th QM	30.4	30.6	30.9	30.4	30.3	30.4	30.4	30.4	30.5	30.4	30	28.9	28.9	30.3	31.3
46th QM	25.8	26	26	26.3	26.4	26.4	26.6	26.7	26.4	27.4	26.4	29.8	28.8	28.5	29.1
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Monitoring quarters	Temperature (^{0}C) at the monitoring locations																			
	Flood tide																			
47th QMR	**L-1**	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	22.12	22.3	22.42	22.45	22.76	23.16	22.5	21.9	21.7	22.67	22.87	22.25	26.26	23.79	22.9	24.7	24.12	24.76	25.16	25.51	24.41
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	23.44	25.06	25.33	26.1	25.11	25.19	24.98	25.11	24.78	25.37	25.06	25.39	24.19	23.26	23.22	22.58	22.91	22.9	22.71	25.53	26.08
	Ebb tide																			
	L-1	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	22.35	22.21	22	22.44	21.98	21.95	23.4	21.88	21.94	22.37	22.25	22.71	22.05	21.95	21.8	23.05	23.07	23.32	24.07	26.75	23.6
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	22.99	23.73	24.24	27.3	25.61	25.24	24.08	24.27	24.65	23.72	23.54	23.61	24.19	23.26	23.22	22.48	21.7	21.54	21.1	21.64	21.27

Source: Field SurveyJanuary-February, 2026; Note: QM= Quarterly Monitoring, NS – Not Surveyed; L-Sampling location.

Table B.3: Salinity (ppt.) in Passur River

Monitoring Periods	Sampling location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	11.5	11.5	11.5	12	12	12	9.5	9	10	10	9	10	12	19	23
2nd QM	2.5	0.3	0.2	2.2	0.3	0.5	4	0	2.5	0.5	4.5	9.5	10	15	19.5
3rd QM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
4th QM	4.5	4.1	4.5	4.7	5.1	5	5.2	5.2	5.1	5.2	4.5	5	6	16	23
5th QM	13	15	16	9	13	14	14	13	12	10	9	14	15	20	25
6th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS
7th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6.2
8th QM	4.1	4.3	4.3	4.4	5.1	5	5.2	4.9	5.5	3.8	2.5	4.8	5.3	11.3	NS
9th QM	8	7.4	7	6	6.2	9	8	7	6.8	7.1	6.3	6	8.9	9.4	14
10th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	NS
11th QM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5.8
12th QM	3.7	3.8	3.6	4	3.9	4.2	4.2	4.1	4.1	3.9	3.8	6.7	8.9	16.3	21.4
13th QM	6.3	5.9	6.2	6.8	6.9	6.1	6.5	7.1	7	7	6.9	10.4	10.4	16	NS
14th QM	0	0	0	0	0	0	0	0	0	0	0	1.2	2.3	3.6	5.1
15th QM	2	2	2	2.6	2.6	2.7	2.8	2.8	2.8	2.6	2.52	10.8	2.8	13.1	16.45
16th QM	11.5	11.5	11.5	12	12	12	9.5	9	10	10	9	10	12	19	23
17th QM	0.2	0.2	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.6	2.2	2.8	NS
18th QM	0.9	0.1	0.8	0.9	0.8	0.8	1	0.2	0.3	0.9	0.02	1	1.8	9.1	13.9
19th QM	11.1	11.1	10.6	10.8	10.8	11	9.9	11.5	11.1	11.3	9.9	7.9	11.9	16.7	22.7
20th QM	16.6	16.2	16.5	16.6	16.9	16.9	12	16.7	16.9	16.5	8	14.9	15.6	22.9	NS
21st QM	0.5	0.2	0.3	0.2	0.2	1.2	0.3	0.2	0.3	0.3	1	0.4	0.3	0.9	NS
22nd QM	0.4	0.3	0.3	0.5	0.3	0.3	2.1	0.1	0.4	0.3	0.3	0.5	0.7	6.6	9.2
23rd QM	3.8	3.9	4	3.8	3.9	3.9	3.7	0.1	3.5	4	4	3.6	3.7	8.9	11
25th QM	0.2	0.3	0.2	0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.5	0.4	1.5	4	NS
26th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	2	0.2	0.2	1.6	2.6
27th QM	2.4	2.7	2.7	2.5	2.7	2.4	2.6	2.5	2.7	2.5	2.5	1.8	2.6	7.1	8.2
28th QM	7.1	7.5	7.2	7.2	7.3	7.3	7	7.3	7.4	7	6.5	6.9	7	10.9	NS
29th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8	0.1	0.1	1	0.9
30th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.2	2.2	2.6
31st QM	0.8	0.7	0.7	0.7	0.8	0.8	1	0.9	0.9	0.9	0.2	0.9	2.1	6.4	8
32nd QM	2.6	2.5	2.3	2.6	2.3	2.1	2.6	2.7	2.4	2.7	2.5	4	6.3	8.3	NS
33rd QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.6	0.3	0.6	3.2	NS

Monitoring Periods	Sampling location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.7	2.9
35th QM	3.2	3.7	3.7	3.5	3.9	4	3.8	4.2	4	3.5	3.3	2.9	3	8.4	9.5
36th QM	8.8	9.1	9.2	8.9	9	9	8.9	9	9.1	8.8	9.2	8.8	8.6	10.8	NS
37th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.19	0.11	1.14	0.3	0.9	1.5	2.8
38th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	2.5	3.5
39th QM	3.8	4.1	3.9	4	3.9	4	4.1	4	3.9	4.1	4.1	6.8	8.9	9.1	10.8
40th QM	8.5	8.1	8.6	8.5	8.5	8.5	8.7	8.8	8.7	8.5	8.8	8.7	7.5	10.6	11.7
41st QM	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.9	0.3	0.9	NS
42nd QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	2	3.4
43rd QM	6.1	8.2	5.5	6.1	8	6.9	5.9	8	8.1	8.2	8.1	6.62	6.36	5.48	6.93
44th QM	7.7	7.8	8	8.5	8.6	8.3	8.3	8.6	8.4	8.5	6.7	7.8	8.3	11.1	12.2
45th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.2	0.1	0.2	1.4	2.5
46th QM	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.3	2.5	5.4
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Monitoring quarters	Salinity (ppt) at the monitoring locations																				
	Flood Tide																				
47th QMR	**L-1**	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	1.6	1.5	1.5	1.7	1.6	1.6	1.7	1.4	1.4	1.7	1.5	1.5	1.7	1.6	1.6	3	3.3	3	3.7	3.7	3.3
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	5.2	4.9	5.3	8.5	8.6	8.9	8.7	8.6	8.8	9	8.3	9	10.5	9.4	9.8	5.2	5	4.8	0.4	0.3	0.3
	Ebb Tde																				
	L-1	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	2.4	2.2	2.3	2.6	2.3	2	1.9	2.2	2.1	2.7	2.3	2.5	2.4	2.3	2.2	3.2	3.2	3.3	3.3	3.3	3.2
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	4.5	4.6	4.3	8.7	8.7	8.6	8.7	8.9	8.9	9.5	9.3	9	10.5	9.4	9.8	4.8	4.6	4.5	0.5	0.5	0.5

Source: Field SurveyJanuary-February, 2026; Note: QM= Quarterly Monitoring, NS – Not Surveyed; L-Sampling location.

Table B.4: Dissolve Oxygen (DO) in Passur River

Monitoring Period	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	5.9	4.9	5.2	5.7	5.9	5.8	6.6	6.5	6.5	6	6.7	5.3	5.4	7.9	7.5
2nd QM	6.1	6.8	6.7	6.8	6.9	6.6	7.3	7.1	7.2	6.5	6.8	6.2	5.9	6.4	6.5
3rd QM	5.6	7.7	7.7	7.6	7.2	8	5.6	5.6	5.8	8	8	7	7	7.7	7.8
4th QM	5.5	6.6	6.7	5.8	5.9	6.8	6.1	6.9	6.6	6	6.2	6.5	6.6	6.7	6.5
5th QM	6.2	6.4	6.2	6.2	6.6	6.4	6.3	6.5	6.4	6.2	6.5	6.3	5.8	6	5.8
6th QM	5.3	5	5	6.7	6.6	6	7.5	7.4	7.3	6	6.4	7	7.5	NS	NS
7th QM	6.8	6.4	7.1	6.8	7.2	7.6	6.4	6.1	6.3	7.1	7.1	6.6	7.1	7.3	7
8th QM	5.1	5.1	6.2	5.9	5.3	5.4	6	6.1	5.8	4.1	5.2	5.4	5.2	6.2	NS
9th QM	7.1	6.4	6.9	5.8	6.1	6.6	6.9	7.1	6.8	6.4	5.9	5.8	6.4	6.1	7.1
10th QM	6.2	5.7	5.6	6.1	6.3	5.8	6.3	6.4	5.6	5.2	5.4	5.4	5.4	6.2	6.8
11th QM	6	6.1	6	6.3	5.9	6.1	5.9	6	6	6.1	6.4	5.6	5.8	6.7	6.9
12th QM	6.1	5.9	6.1	6.2	5.9	5.9	6.3	6.4	6.4	6.7	6.7	5.9	6.1	6.5	6.8
13th QM	7.1	7.2	6.8	6.9	7.4	7.5	6.4	7.2	6.8	6.8	7.1	6.4	6.4	7.2	NS
14th QM	6.3	6.4	6.5	6.3	6.3	6.5	6.5	7.1	6.5	6.3	6.2	6.4	6.2	6.8	7.3
15th QM	5.19	5.03	5.06	5.1	5.03	4.9	5	4.98	5.11	5.17	5.11	5.23	5.03	5.4	5.4
16th QM	6.575	6.225	6.275	6.15	6.5	6.575	6.55	6.825	6.625	6.35	6.7	5.95	5.8	6	NS
17th QM	6	6.2	6.1	5.5	6	6.5	6.8	6.2	6	6.7	6.3	5.8	6.9	6.8	NS
18th QM	6.4	6.2	6.3	6	6.2	6	6.1	6.3	6.2	5.8	6	6	8.21	6.9	7.2
19th QM	8.7	7.9	7.3	8.7	7.3	7.4	7.8	7.1	6.9	7.5	6	6.9	7.5	7.7	8
20th QM	5.9	6.5	6.3	6.1	6.5	6	6.1	6.5	6.1	6.3	6.2	6.5	6.9	7	NS
21st QM	6	6	6.1	6.5	6.3	6.4	6.2	6.2	6.3	6.4	6	6.2	6	6.6	NS
22nd QM	7.7	7.8	7.8	8.6	8	8.2	9.9	10	10.5	7.1	7.7	7.9	8.4	7.7	8.6
23rd QM	8.4	8.6	7.6	8.1	8.2	7	6.9	7.2	7.8	9.7	7.5	8.6	6.9	9.7	6.7
25th QM	6.1	6.1	6	6	6.4	6.2	6.6	6.5	6.3	6.4	6.1	6	6.1	6.5	NS
26th QM	6.4	7.64	6.3	8.2	8.89	7.8	9.7	9.76	9.76	9.7		8.14	7.65	6.61	8.2
27th QM	9.2	9.6	7.8	9	8.9	9.3	9.6	7	6.4	8.1	8	9.2	7.6	7.2	9
28th QM	6.5	6	6.8	8.4	8	8.5	5.4	6.3	5.9	7.5	7	5.9	5.5	6.8	NS
29th QM	5.8	6	6.3	6.6	6.2	6.8	7.2	6.2	6.7	6.8	5.5	6.2	6.6	6.1	6.2
30th QM	7.8	7.5	6.5	6.7	5.6	6.5	6.7	6.5	6.1	6.7	6.2	5.8	6.8	6.5	6.9
31st QM	6.5	6.7	6.5	7.1	5.5	6.7	6.4	6.6	6.5	6.5	6.5	6.9	5.9	6.2	6.2
32nd QM	7.3	7.8	7.5	7.5	6	5	6.2	7.2	6.7	6.1	7	6.8	7.8	7.1	NS
33rd QM	8.1	8.5	7.8	7.5	8.8	8.1	7.5	8	8.1	8.5	7.6	7.1	7.6	7.6	NS

Monitoring Period	Sampling Locations ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	6.2	8.4	8.5	7.7	5.7	5.8	7.5	8.2	5.9	5.7	7.5	8.1	8.4	8.2	7.5
35th QM	6.1	6.2	5.9	5.8	5.8	6.2	6	6.1	6.7	5.9	5.8	7.2	6.5	7.6	6.6
36th QM	5.3	6	5.2	4.9	5.4	5.6	5	5.3	5.2	5.75	6.1	6.7	5.8	6.8	NS
37th QM	6.7	6.8	6.7	6.4	6.6	6.7	6.6	6.8	6.7	6.3	7.2	7.4	7.8	7.6	7.9
38th QM	6.3	5.9	5.6	6.3	6.5	7	7	7.2	5.9	7.8	6.79	7.36	7.9	7.6	7.8
39th QM	6.9	7.1	7.2	7.2	7.1	6.9	7.3	7.3	7.4	7.1	7.2	7.4	7.5	7.7	8.0
40th QM	5.42	5.64	5.64	5.39	5.54	5.75	5.2	5.63	5.63	5.85	8.7	6.34	6.06	5.69	7.2
41st QM	5.96	5.43	5.16	5.62	5.49	6.5	5.66	5.82	5.51	6.2	8.1	8.78	7.1	5.9	NS
42nd QM	6.6	5.98	6.3	5.88	5.95	5.83	5.77	6.36	5.82	8.38	9.1	8.29	8.2	8.43	7.2
43rd QM	6.1	8.2	5.5	6.1	8	6.9	5.9	8	8.1	8.2	8.1	6.6	6.4	5.5	6.9
44th QM	5.3	5.9	5.8	6.8	7	6.1	5.7	5.4	5	4.6	8.1	8.2	7.5	6.3	7.4
45th QM	5.53	5.44	8.6	5.53	5.83	6.7	6.7	5.80	5.70	7.10	6.30	6.3	6.96	6.91	6.57
46th QM	6.8	7	5.99	6.15	6.00	6.67	7.88	6.08	8.2	7.51	6.4	7	6.52	4.75	7.6
Standard (ECR*2023)	**≥4 (Coastal Industrial and others)**												**≥ 5 mg/l (Coastal Reserved Natural area)**		

Source: Field Survey from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Monitoring quarters	DO (mg/l) at the monitoring locations																			
	Flood tide																			
47th QMR	**L-1**	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	5.67	5.24	6.25	6.92	5.8	7.7	8.22	5.27	6.11	6.32	6.8	5.52	7.57	6.42	7.51	5.87	5.83	6.53	6.22	5.72	7.93
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	7.38	6	7.11	7.5	5.04	4.25	5.42	8.78	4.43	4.89	5.47	5.94	6.15	5.88	6.01	6.74	6.8	8.3	5.89	5.99	5.98
	Ebb tide																			
	L-1	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	7.04	8	6.92	5.1	6.29	6.52	7.22	6.5	6.57	6.58	7.17	6.8	5.15	6.33	6.3	6.37	6.61	8026	6.75	7.33	6.83
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	5.86	5.89	6.84	5.8	5.36	5.14	5.31	5.38	5.22	5.6	4.96	5.36	10.15	5.88	6.01	5.88	6.04	6.28	6.55	6.2	7.7

Source: Field Survey January-February, 2026; Note: QM= Quarterly Monitoring, NS – Not Surveyed; L-Sampling location.

Table B.5: COD (mg/l) of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	288	284	328	376	400	364	364	400	408	276	284	408	372	536	540
2nd QM	24	20	56	28	60	496	108	40	120	32	96	172	216	520	416
3rd QM	6	30	14	18	14	18	10	22	10	10	26	14	14	54	122
4th QM	128	68	92	84	116	108	104	16	100	116	84	96	96	316	472
5th QM	87	58	132	102	110	88	96	18	106	88	94	92	102	302	470
6th QM	42	43	18	26	21	24	32	25	25	51	36	30	26	NS	NS
7th QM	32	36	28	36	36	40	42	28	48	40	42	46	36	84	96
8th QM	124	100	96	100	108	80	100	100	124	100	108	88	100	96	NS
9th QM	220	240	280	280	240	260	240	180	200	160	210	220	140	156	160
10th QM	8	8	8	8	12	8	12	8	12	8	30	12	16	4	NS
11th QM	12	8	8	12	16	12	8	8	12	8	8	16	12	68	56
12th QM	56	40	44	48	52	42	56	52	44	36	48	40	40	56	196
13th QM	52	48	56	40	36	48	42	36	52	44	40	64	216	240	NS
14th QM	24	8	40	32	40	16	48	8	4	16	32	40	32	16	4
15th QM	48	28	40	36	32	28	40	44	36	40	32	48	40	72	88
16th QM	276	240	230	232	254	252	212	218	230	180	252	260	280	296	NS
17th QM	20	24	12	30	16	12	10	24	16	40	20	10	16	110	NS
18th QM	56	44	48	60	36	42	48	32	28	36	42	20	58	44	76
19th QM	72	60	48	44	56	64	88	36	68	72	68	32	56	180	140
20th QM	188	180	176	192	180	172	200	160	180	160	172	178	184	160	NS
21st QM	36	24	32	20	28	24	28	20	32	24	20	24	32	220	NS
22nd QM	56	40	26	40	28	24	20	32	20	24	36	40	32	92	72
23rd QM	24	28	32	24	40	24	26	20	28	44	36	36	40	56	64
25th QM	32	36	28	24	36	40	48	36	42	32	48	72	80	108	NS
26th QM	16	12	8	28	16	20	8	12	20	12	28	56	76	60	40
27th QM	56	32	20	48	20	56	48	56	8	12	24	32	12	28	NS
28th QM	508	404	400	304	412	390	408	424	448	400	380	472	424	392	NS
29th QM	4	4	4	4	4	12	8	8	12	16	48	32	16	80	32
30th QM	44	52	40	20	40	4	4	24	4	48	4	12	4	192	180
31st QM	24	12	8	40	32	12	16	36	12	12	32	16	60	36	40
32nd QM	24	28	48	36	24	20	24	48	52	56	96	96	240	36	NS
33rd QM	4	12	4	8	36	20	4	36	48	4	12	0.03	4	84	NS

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	4	8	4	12	4	4	8	8	4	8	12	8	16	8	8
35th QM	144	256	148	212	188	264	220	144	192	112	144	148	188	112	120
36th QM	436	236	248	288	412	296	416	412	496	348	480	248	236	436	NS
37th QM	36	48	20	52	56	4	12	4	20	16	16	12	8	20	124
38th QM	36	24	48	36	20	28	48	36	48	92	56	48	52	56	36
39th QM	164	148	156	96	200	24	200	164	248	164	216	248	324	112	148
40th QM	464	412	484	436	436	416	480	424	400	480	400	416	420	400	448
41st QM	12	4	8	8	4	8	4	12	24	8	12	16	40	12	NS
42nd QM	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
43rd QM	56	80	40	48	96	72	96	48	36	80	40	96	112	480	96
44th QM	428	412	464	448	400	400	428	460	428	400	392	400	316	212	368
45th QM	16	16	20	24	12	20	24	16	4	20	24	12	8	12	8
46th QM	120	112	96	4	64	48	96	32	48	4	112	48	120	72	148
Standard (ECR*2023)	**5 mg/l (Coastal Industrial and others)**												**8 mg/l (Coastal Reserved Natural area)**		

Source: Field Survey; from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.6: Oil and Grease (mg/l) Concentration of Passur River System

Monitoring periods	Sampling Location ID				
	SL-7	**SL-12**	**SL-13**	**SL-14**	**SL-15**
1st QM	<5	<5	<5	<5	<5
2nd QM	<5	<5	6.3	<5	<5
3rd QM	<5	<5	<5	<5	<5
4th QM	>15	>15	>20	>20	>20
5th QM	16.9	13	39.1	<5	<5
6th QM	9	7.63	10.1	NS	NS
7th QM	<5	9.87	<5	10.8	9.73
8th QM	39	21	14	ND	36
9th QM	61	30.3	26	31	82
10th QM	5	13.5	5.73	NS	5.87
11th QM	<5	<5	<5	10.1	<5
12th QM	9.2	15.6	<5	13.8	14.2
13th QM	*5.73*	<5	<5	7.71	ND
14th QM	<5	<5	<5	<5	<5
15th QM	16.6	<5	<5	<5	<5

Monitoring periods	Sampling Location ID				
	SL-7	**SL-12**	**SL-13**	**SL-14**	**SL-15**
16th QM	<5	<5	<5	<5	<5
17th QM	<1	<5	<1	NS	<1
18th QM	<2.0	<2.0	<2.0	<2.0	<2.0
19th QM	<2.0	<2.0	<2.0	<2.0	<2.0
20th QM	<2.0	<2.0	<2.0	<2.0	<2.0
21st QM	<2.0	<2.0	<2.0	<2.0	<2.0
22nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
23rd QM	2.3	<2.0	<2.0	4.4	2.3
25th QM	<2.0	<2.0	<2.0	<2.0	<2.0
26th QM	<2.0	<2.0	<2.0	<2.0	<2.0
27th QM	2.93	<2.0	<2.0	<2.0	NS
28th QM	<2.0	<2.0	<2.0	<2.0	3.2
29th QM	<2.0	<2.0	<2.0	<2.0	<2.0
30th QM	<2.0	<2.0	<2.0	<2.0	<2.0
31st QM	<2.0	<2.0	<2.0	<2.0	<2.0
32nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
33rd QM	<2.0	<2.0	<2.0	<2.0	NS
34th QM	<2.0	<2.0	<2.0	<2.0	<2.0
35th QM	<2.0	<2.0	<2.0	<2.0	<2.0
36th QM	<2.0	<2.0	<2.0	<2.0	<2.0
37th QM	<2.0	<2.0	<2.0	<2.0	<2.0
38th QM	<2.0	<2.0	<2.0	<2.0	<2.0
39th QM	<2.0	<2.0	<2.0	<2.0	<2.0
40th QM	<2.0	<2.0	<2.0	<2.0	<2.0
41st QM	<2.0	<2.0	<2.0	<2.0	<2.0
42nd QM	<2.0	<2.0	<2.0	<2.0	<2.0
43rd QM	<2.0	<2.0	<2.0	<2.0	<2.0
44th QM	<2.0	<2.0	<2.0	<2.0	<2.0
45th QM	<2.0	<2.0	<2.0	<2.0	<2.0
46th QM	<2.0	<2.0	<2.0	<2.0	<2.0
Standard (ECR*2023)	**5 mg/l (Coastal Industrial and others)**		**0.01 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.7: TDS (mg/l) of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
1st QM	13060	12630	12900	13190	13330	13380	13180	13390	13240	12400	10970	12800	12280	21500	21500
2nd QM	251	246	383	445	353	402	655	587	916	455	2510	6410	9360	15960	14050
3rd QM	176	162	153	169	156	152	162	153	154	214	257	209	285	3400	5720
4th QM	4360	3950	4330	4750	4920	4870	5040	5050	5130	5050	4390	5130	4780	12350	17900
5th QM	14400	14700	14900	14600	14500	14200	14500	14600	14250	14000	13900	14050	13900	13600	25300
6th QM	937	941	127	175	132	156	336	158	160	2320	355	298	683	NS	NS
7th QM	158	169	152	172	162	160	192	164	164	183	176	227	205	4220	5830
8th QM	5570	5910	5490	5720	5850	5480	5650	5740	5650	5450	4420	4540	4940	13330	NS
9th QM	13400	13280	13560	12830	13100	13460	12820	12960	13590	13340	11700	11330	13580	20720	25500
10th QM	179	112	125	162	185	143	205	195	140	165	5170	893	1321	7330	NS
11th QM	138	106	108	147	110	112	113	108	146	196	238	162	301	2550	4120
12th QM	3100	3140	3330	3630	3600	3520	3470	3790	3770	2920	3960	3370	3370	3580	12210
13th QM	13400	13480	13400	13560	13490	13330	13640	13680	13360	13490	13110	12340	13600	19370	NS
14th QM	496	122	123	172	125	125	160	126	127	1616	1200	204	245	3270	4450
15th QM	1913	1919	1915	2500	2520	2500	2840	2710	2720	2500	2970	2570	2690	11390	14190
16th QM	14500	14420	14650	14300	14450	14540	14400	14500	14610	14160	14450	14500	15350	20600	NS
17th QM	315	224	232	328	235	208	205	286	296	265	340	580	2190	7680	NS
18th QM	855	733	722	824	716	732	945	784	786	992	827	940	1715	8100	12500
19th QM	9940	9950	9730	9860	9980	9800	10190	10280	10080	10040	8860	8350	10950	17200	21110
20th QM	15800	15600	15500	15700	16000	16100	15640	16000	15800	15700	15100	15722	15400	14800	NS
21st QM	290	150	152	205	142	150	208	145	154	940	365	172	560	12500	NS
22nd QM	480	175	170	190	175	174	325	180	172	1405	875	350	474	3950	5750
23rd QM	6800	6950	7300	6760	6760	6900	6740	6450	6700	7250	5800	6240	6430	16300	20400
25th QM	134	114	116	221	125	132	195	128	114	229	2893	740	489	4188	NS
26th QM	122	96	94	102	179	105	181	98	92	206	164	148	2260	1472	490
27th QM	3770	4410	4390	4150	4170	4060	4100	4210	4450	4170	2320	3010	4060	11400	14600
28th QM	12500	12700	12300	12800	13100	13200	13100	13300	13200	12500	11800	12100	12400	18500	NS
29th QM	58	105	106	74	97	110	158	110	100	216	1270	180	240	1700	1610
30th QM	160	150	147	158	150	153	155	153	156	160	780	203	275	3850	6300
31st QM	1380	1300	1210	1230	1510	1380	1850	1680	1650	1540	1350	1580	3850	11600	15500
32nd QM	4870	4800	4350	5250	4920	4060	5150	5070	4750	5100	8900	7820	12200	16400	NS
33rd QM	190	125	122	140	115	135	150	127	125	134	2850	460	1020	6200	

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
34th QM	155	150	136	158	135	133	235	136	132	210	140	210	315	2890	5300
35th QM	5700	6900	6850	6300	7400	7500	6800	7700	7600	5500	5600	5300	6100	15300	18100
36th QM	16900	17500	18000	17400	17800	17900	17600	17500	17800	17600	15200	16700	16800	21000	NS
37th QM	146	132	146	109	136	135	160	132	142	218	297	320	675	4200	5800
38th QM	280	195	190	210	192	190	525	215	192	950	350	226	430	4700	6800
39th QM	4100	4170	4200	5800	5300	5350	5500	5680	560	4150	5200	4900	6500	16100	14000
40th QM	16700	15800	16800	17100	16900	17000	16900	17300	17200	16800	17000	16800	14300	21100	22800
41st QM	507	230	165	168	164	157	215	153	148	870	446	1415	520	1610	507
42nd QM	100	163	160	167	164.00	173	203	170	166	200	870	205	344	3700	6400
43rd QM	3900	4100	4800	5000	5100	5050	4700	4900	4950	5100	4200	3800	7100	14100	17000
44th QM	14600	14400	15500	16100	16500	16000	15600	16400	16100	16150	12900	15000	15700	21400	23700
45th QM	150	250	220	240	170	170	170	160	160	190	2320	190	360	2570	4650
46th QM	250	190	175	170	200	170	180	175	170	195	900	230	550	4400	9500
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Monitoring quarters	TDS (mg/l) at the monitoring locations																				
	Flood tide																				
47th QMR	**L-1**	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	1520	1480	1510	1550	1528	1530	1710	1420	1370	1730	1500	1530	1900	1810	1600	3500	3790	3480	4260	4310	3790
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	5790	5510	5980	9070	9150	9450	9300	8150	9370	9620	8000	9570	11000	9950	10400	4950	5000	5000	410	420	400
	Ebb tide																				
	L-1	**L-2**	**L-3**	**L-4**	**L-5**	**L-6**	**L-7**	**L-8**	**L-9**	**L-10**	**L-11**	**L-12**	**L-13**	**L-14**	**L-15**	**L-16**	**L-17**	**L-18**	**L-19**	**L-20**	**L-21**
	2500	2100	2200	2900	2400	2000	1900	2200	2000	2500	2250	2400	2310	2200	2270	3710	3700	3810	3780	3800	2500
	L-22	**L-23**	**L-24**	**L-25**	**L-26**	**L-27**	**L-28**	**L-29**	**L-30**	**L-31**	**L-32**	**L-33**	**L-34**	**L-35**	**L-36**	**L-37**	**L-38**	**L-39**	**L-40**	**L-41**	**L-42**
	4650	5000	750	8000	8200	8100	8000	8800	8440	9100	8200	8100	11000	9950	10400	5250	5200	5000	525	518	518

Source: Field Survey January-February, 2026; Note: QM= Quarterly Monitoring, NS – Not Surveyed; L-Sampling location.

Table B.8: TH (mg/l) Passur River System

Monitoring ID	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	2900	2500	2650	2550	2600	2625	2550	2800	2500	2500	2400	3150	2625	4500	4850
2nd QM	250	180	170	175	275	350	325	350	475	450	725	1400	2150	3625	3050
3rd QM	216	218	335	390	340	355	330	345	325	350	330	377	345	980	1440
4th QM	930	870	870	940	990	970	1045	1125	975	980	970	1000	970	2380	2690
5th QM	3000	3050	3250	3450	3250	3200	3600	3670	3540	3260	3190	3210	3080	3420	3640
6th QM	245	110	105	118	103	105	153	105	165	470	130	135	200	NS	NS
7th QM	250	330	360	365	355	350	345	390	445	183	340	410	430	1090	1460
8th QM	1270	1380	1240	1220	1300	1260	1370	1340	1270	950	1075	1090	1100	2850	NS
9th QM	3130	3090	3140	3010	3070	3100	3060	3130	3110	3180	3080	3060	3050	4520	5050
10th QM	240	205	205	220	232	218	235	242	224	220	875	405	415	1750	NS
11th QM	255	250	190	265	237	242	205	217	238	250	240	245	282	670	810
12th QM	1090	980	1030	1020	915	1070	935	1100	1110	1040	1170	1070	1070	1130	2870
13th QM	3640	3420	3300	3400	3440	3380	3540	3480	3600	1960	2300	2450	3560	4300	NS
14th QM	200	150	155	160	145	140	150	155	175	165	320	220	200	640	905
15th QM	430	510	498	570	590	480	505	530	512	505	478	1070	610	1475	1740
16th QM	3100	1040	1030	1060	1040	1085	1080	1110	1100	1300	1120	1410	1330	1440	NS
17th QM	210	205	185	200	210	215	205	212	205	210	220	245	530	2030	NS
18th QM	335	310	313	285	255	275	295	265	325	295	315	325	2550	2750	4200
19th QM	2050	3900	4100	4600	4200	4400	4400	4300	4600	4000	4100	4000	4500	5900	6900
20th QM	3000	5000	5000	5200	5000	4800	4400	5100	4900	5200	5000	4782	4500	4500	NS
21st QM	2100	1950	1900	1850	2500	2550	1700	1850	2000	2000	2200	1800	1400	4300	NS
22nd QM	215	125	190	175	178	155	175	150	115	350	285	200	185	830	1225
23rd QM	1540	1485	1530	1580	1560	1490	1530	1560	1485	1460	1440	1510	1390	3470	3850
25th QM	205	200	187	217	215	202	195	210	207	310	742	250	280	1000	NS
26th QM	272	195	225	210	235	200	240	235	243	198	217	265	225	210	230
27th QM	2800	2700	2750	3000	3100	2500	2550	3200	2800	1400	1200	2850	2870	5050	5600
28th QM	4500	4200	4300	4100	4500	4000	4400	4100	4400	4200	4100	4200	4400	4300	NS
29th QM	140	200	180	200	175	175	140	130	100	145	400	150	160	480	470
30th QM	145	125	130	175	140	145	160	170	155	165	265	190	170	1000	1450
31st QM	370	385	310	375	325	340	375	420	430	380	435	500	680	6500	5300
32nd QM	2500	2400	2250	2500	2350	2100	2550	2400	2460	2450	3100	2300	4000	5000	NS
33rd QM	140	110	115	120	110	120	125	120	130	140	1000	215	930	2500	NS
34th QM	190	140	150	130	125	115	152	140	130	155	140	115	110	2000	2500
35th QM	2600	2800	2800	2900	3100	3200	3100	3300	3500	2500	2500	2600	2800	4500	5000
36th QM	4700	4800	4700	4500	4650	4750	4600	4850	4800	4550	4400	4600	4650	5250	NS
37th QM	110	120	125	90	120	110	125	110	125	170	185	190	800	1500	1900

Monitoring ID	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
38th QM	185	145	160	190	170	160	190	140	120	315	225	165	210	1400	1600
39th QM	2550	2600	3250	3300	2850	2950	3350	3200	2900	3000	3100	2200	3300	5450	4950
40th QM	4500	4400	4500	4600	4600	4600	4700	4700	4500	4600	4500	4500	3800	5500	5950
41st QM	415	190	110	130	135	125	160	135	125	430	220	1300	300	1400	NS
42nd QM	140	125	135	125	130	140	150	150	140	145	215	160	185	1000	1200
43rd QM	2500	2450	2900	3000	2800	2800	2400	2900	3100	3300	2400	2300	3300	4900	5400
44th QM	4300	4200	4400	4500	4500	4500	4100	4300	4400	4400	3600	4100	4100	5500	5600
45th QM	140	150	140	150	150	150	145	150	150	135	140	145	145	150	140
46th QM	150	120	140	135	140	135	125	145	130	145	300	185	230	1200	620
Standard (ECR*2023)	**N/A**														

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.9: TSS (mg/l) Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
1st QM	598	45	53	54	60	55	24	27	67	7	9	50	65	115	91
2nd QM	126	92	112	99	100	105	116	112	37	65	24	310	90	99	72
3rd QM	234	193	174	227	232	186	185	536	459	798	389	203	869	28	267
4th QM	180	210	230	450	250	200	300	530	450	280	206	280	400	103	200
5th QM	160	167	170	160	165	155	150	147	155	148	160	165	160	150	180
6th QM	26	25	127	30	27	40	32	40	44	36	28	24	42	NS	NS
7th QM	76	80	65	92	85	97	104	90	82	96	92	60	74	110	144
8th QM	14	12	14	17	18	22	20	7	18	11	10	15	22	16	NS
9th QM	8	7	10	10	8	7	12	10	11	7	6	13	18	23	15
10th QM	61	48	56	62	45	49	51	43	39	42	11	47	31	16	NS
11th QM	20	18	16	20	24	19	20	18	16	24	30	27	18	41	33
12th QM	46	52	48	42	54	46	61	58	63	55	66	61	**61**	34	49
13th QM	51	42	48	52	43	38	32	44	40	37	49	38	33	28	NS
14th QM	18	15	22	16	20	17	15	16	14	26	30	**25**	27	22	16
15th QM	14	15	14	13	13	14	15	17	12	14	15	13	17	14	13
16th QM	18	17	22	20	19	21	17	19	18	23	32	14	15	18	NS
17th QM	17	16	15	18	16	15	16	14	20	13	12	17	13	14	NS
18th QM	14	11	15	11	13	12	14	13	15	11	42	27	22	15	6
19th QM	15	12	14	12	13	15	16	13	14	14	8	15	12	11	9
20th QM	12	14	13	11	12	15	12	11	13	14	12	13	11	10	NS
21st QM	14	11	13	12	13	14	13	12	13	15	12	13	12	7	NS
22nd QM	8	7	6	8	7	6	7	6	5	9	7	15	11	7	5

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
23rd QM	11	8	7	8	9	6	7	8	6	13	12	14	11	10	10
25th QM	14	6	11	12	9	12	14	13	8	11	5	9	17	18	NS
26th QM	7	11	8	7	6	9	15	8	6	8	7	8	5	8	6
27th QM	11	6	7	7	6	8	7	6	6	7	8	6	8	11	6
28th QM	15	23	20	13	12	16	14	15	13	17	12	3	14	11	NS
29th QM	12	14	9	12	11	8	12	9	15	13	3	7	9	16	13
30th QM	13	12	10	14	9	13	17	4	15	11	8	13	15	12	13
31st QM	15	14	17	12	13	11	14	12	15	13	13	14	15	16	13
32nd QM	7	10	11	12	9	11	18	13	12	19	16	15	13	17	NS
33rd QM	27	23	24	31	27	26	29	26	24	30	15	64	21	32	NS
34th QM	16	15	19	18	14	16	21	18	14	15	18	25	20	23	21
35th QM	11	14	12	11	8	13	12	7	11	8	7	8	6	7	9
36th QM	25	20	16	18	12	13	10	7	6	8	6	7	6	11	NS
37th QM	15	12	17	14	12	13	11	12	9	13	16	14	10	13	9
38th QM	5	4	5	4	5	3	6	4	3	7	13	11	7	4	3
39th QM	3	3	6	4	3	3	4	4	4	5	4	13	3	3	3
40th QM	3	4	3	3	4	7	5	3	4	9	8	12	5	3	3
41st QM	8	3	4	7	8	6	8	9	7	8	12	22	7	15	NS
42nd QM	11	8	9	7	6	8	12	5	6	8	6	9	12	27	8
43rd QM	4	5	4	3	7	5	6	4	3	4	4	13	6	18	5
44th QM	133	26	135	146	27	95	31	35	212	225	16	43	38	70	82
45th QM	148	288	282	298	228	228	628	720	720	430	254	310	344	278	342
46th QM	156	212	124	148	130	106	168	100	118	192	258	468	648	218	476
Standard (ECR'2023)	**100 mg/l (Coastal Industrial and others)**												**25 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.10: Nitrate (NO_3^{2-}) (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	0.9	0.7	0.1	1.3	1.4	1.1	0.75	1.1	1.2	0.3	0.5	0.6	1.4	2.7	0.8
2nd QM	2.89	2.4	3.2	0.76	2.69	2.98	2.13	2.43	2.05	2.18	0.88	1.52	1.75	3.32	2.84
3rd QM	0.32	1.57	1.84	1.64	1.42	1.33	1.85	2.09	2.21	2.26	1.98	1.64	1.67	0.59	0.4
4th QM	3	1.5	4.3	3.1	2.2	8.5	2.7	1.8	1.9	6	4	4.5	2.7	1.5	2
5th QM	33	13	39	48	69	8	87	48	128	62	48	29	18	25	28
6th QM	9.1	7.5	6.2	6.6	6.1	6.6	14.9	4	4.9	7	3.1	7.8	4.4	NS	NS
7th QM	4	7.1	5	5.7	3.3	4.7	4.4	6.2	4.4	4.9	2.9	3.1	4.4	3.2	11.5
8th QM	6.3	4.3	3.9	3.1	5.2	4.1	4.9	3.7	4.4	5.6	3.9	3.7	5.1	4.9	NS
9th QM	3	2.9	2.5	2	3.1	3.6	2.6	2.9	2.6	2.7	3.1	3	3.4	2.9	3.5
10th QM	3.9	6.2	4.3	5.1	2.7	3.9	3.6	5.1	4.9	5.2	5.3	5.2	5.1	5.4	NS
11th QM	0.25	0.39	0.42	0.76	0.52	0.31	0.2	0.41	0.63	0.4	0.32	0.27	0.39	0.25	0.38
12th QM	3.62	2.89	1.87	2.25	2.46	3.01	3.64	1.93	2.17	2.46	3.1	2.78	2.78	3.08	2.28
13th QM	4.35	5.05	4.55	6.11	3.4	3.16	3.14	3.34	2	3.61	1.6	2.49	2.46	3.69	NS
14th QM	5.8	6.8	4.5	7.1	3.1	5	4.1	3.4	3.1	2.3	3.2	3.5	4.2	2.2	2.6
15th QM	3	4.2	3.6	3	4.7	7.6	8.8	8.5	2.8	1.6	3.4	4.5	4.6	1.8	6.1
16th QM	6.8	4.9	5.1	2.8	5.2	5.5	2.6	4.5	5.3	5.9	3.9	4.7	5.2	5.5	NS
17th QM	0.8	1.7	2.1	2.8	1.8	3.2	4	3.7	3.8	4.4	3.1	2.4	2.7	4.2	NS
18th QM	2.8	0.1	0.11	1.7	0.9	0.1	0.1	3.4	0.7	2.3	0.12	1.6	0.1	0.1	0.9
19th QM	3.5	2.6	1.9	2.1	2.2	3.5	4.2	3	3.1	2.1	1.3	3.7	4.7	1.8	2.6
20th QM	0.3	0.3	3.7	3	1.2	4.8	0.5	3.4	4.1	5	2.9	2.7	4.4	2.7	NS
21st QM	0.1	1.1	1.2	1.5	1.5	2.1	1.5	1.7	0.5	3.1	2.5	1.8	1.7	1.3	NS
22nd QM	3.5	2.7	3.4	3	1.7	2.1	2	1.3	2.2	2.9	1.6	2	2.1	1.6	2.5
23rd QM	1.3	1.7	3.2	4.5	2.7	5.1	7.4	3.9	4.1	4.7	4.9	3.3	3.2	2.6	4.1
25th QM	3	3.3	9.5	2.9	1.9	1.8	1	1.5	1.3	3.9	2.1	1.5	5.7	4	NS
26th QM	3.2	1.3	4.7	2.5	2.6	1	0.5	2.1	3	1.5	1.3	2.6	2.6	2.6	2.6
27th QM	4.3	2.2	1.2	0.7	3.1	2.7	1.8	3	1.9	3	4.9	0.5	0.5	2.9	3.9
28th QM	3.3	2.1	1.3	2.1	3	1.5	1.7	2	2.3	4.2	1	1.7	2.6	2.8	NS
29th QM	2.1	2.2	1.3	1.4	1.6	1.4	1.9	2.1	2.5	3.1	2.1	3.8	3.9	4.1	3.2
30th QM	3.5	3.8	6.7	12.6	0.3	7.4	0.7	9.2	1.7	0.5	0.1	0.4	1	0	0.5
31st QM	2.06	1.43	2	15.9	1.5	6.8	1.1	ND	1.5	16.2	5.7	9.4	4.06	24.7	1.8
32nd QM	8.41	13.52	12.75	10.8	8.71	9.39	11.15	8.5	11	14.42	6.41	8.05	15.35	10.85	NS
33rd QM	3.85	6.47	10.43	8.83	13.06	12.26	8.2	8.18	11.82	11.52	13.14	15.7	15.96	11.29	NS
34th QM	0.03	0.09	0.23	3.79	2.06	3.6	5.18	5.01	4.71	5.74	1.62	5.97	5.72	3.49	5.76
35th QM	1.13	1.45	2.06	1.3	1.7	1.7	1.8	1.3	2.4	2.2	2.2	1.3	2.2	2.7	2.1
36th QM	2.27	1.94	0.68	2.44	1.1	4.19	2	4.44	5.32	3.57	1.2	13.96	1.53	0.52	NS
37th QM	ND	0.276	0.128	ND	0.654	0.843	0.591	1.243	0.675	1.117	7.1	1.916	3.640	1.117	4.187

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
38th QM	1.54	1.39	0.93	1.41	0.42	0.61	0.99	0.13	0.1	3.98	0.11	0.42	0.1	0.51	0.72
39th QM	2.9	3.38	2.75	1.51	1.32	3.34	2.35	1.57	0.45	2.17	2.11	0.97	2.01	2.87	1.61
40th QM	5.2	4.9	4.9	3.7	4.8	5.1	3.4	2.5	3.5	4.7	2.6	4.7	5.3	5.4	5.9
41st QM	3.9	4.1	3.8	2.9	2.7	4.50	5.9	6.5	9.6	2.8	6.2	15.2	7.3	9	NS
42nd QM	2	0.68	1.3	1.58	1.45	3.35	8.71	3.26	4.08	1.033	1.769	2.3758	0.7387	6.7534	3.0937
43rd QM	1.8	1.51	2.08	2.6	2	1.49	1.32	2.34	7.69	9.88	2.42	6.12	1.32	0.46	0.67
44th QM	3.2	2.6	3.5	4.1	3.5	2.8	2.9	3.1	3.4	4.3	2.42	7.3	3.5	2.8	4.8
45th QM	4.75	2.95	2.0	0.53	0.19	0.15	0.74	0.26	0.13	0.76	0.26	7.17	0.79	1.03	0.73
46th QM	16.3	10.5	8.3	1.62	2.13	4.5	0.84	1.5	0.26	0.68	0.7176	0.23	0.84	0.19	0.65
Standard (ECR'2023)	**1.0 mg/l (Coastal Industrial and others)**												**0.3 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location.

Table B.11: Sulphate (SO_4^{2-}) (mg/l) Concentration of Passur River System

Monitoring periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	1840	1320	1280	1360	1040	1320	1640	1520	1280	1120	1320	1360	1560	2600	2080
2nd QM	20	23	36	45	32	20	60	40	80	20	210	620	860	1400	1160
3rd QM	26	28	34	33	30	27	40	35	64	63	63	44	69	1390	2360
4th QM	580	450	480	550	520	540	630	560	620	570	460	630	590	850	1500
5th QM	1360	1260	1240	1240	1120	820	880	1180	900	1220	840	980	900	1540	1920
6th QM	67	11	9	26	6	8	9	19	12	72	27	39	51	NS	NS
7th QM	7	8	11	10	8	9	12	8	6	11	9	13	7	84	97
8th QM	570	590	560	550	580	565	640	560	550	96	480	482	500	760	NS
9th QM	1080	1040	1020	1060	980	1100	1060	1020	1080	1040	1020	1100	1080	1650	2100
10th QM	18	10	13	15	17	14	15	18	12	11	480	42	60	620	NS
11th QM	5	3	4	4	6	5	6	5	8	14	14	14	19	190	320
12th QM	230	210	200	230	280	230	230	231	250	160	200	220	220	230	1090
13th QM	422	460	1340	1380	1280	1400	880	1440	1340	1220	1340	1220	1300	1420	NS
14th QM	29	3	5	2	1	2	2	1	3	120	76	**5**	13	30	2
15th QM	630	370	410	310	310	490	700	340	340	270	350	280	220	760	510
16th QM	1400	1320	1440	1260	1200	1400	1300	1380	1240	1200	1250	1260	1300	1460	NS
17th QM	24	18	20	22	21	16	10	24	22	21	18	28	35	620	NS
18th QM	51	49	46	52	38	42	56	52	39	65	46	30	20	250	780
19th QM	760	756	764	748	760	762	768	760	770	758	760	765	756	764	769
20th QM	1460	1380	1420	1410	1440	1400	1500	1450	1460	1500	1490	1446	1500	1500	NS
21st QM	23	19	21	16	17	19	15	16	14	18	12	14	16	980	NS

Monitoring periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
22nd QM	37	6	6	5	4	8	25	9	6	71	55	33	38	370	540
23rd QM	490	510	560	530	640	490	520	470	510	490	565	580	470	410	445
25th QM	4	3	5	8	10	13	16	8	16	16	21	12	34	60	NS
26th QM	3	6	11	5	3	8	6	4	12	31	26	21	540	430	30
27th QM	270	420	460	410	420	430	450	440	450	420	190	260	410	580	1240
28th QM	1	5	2	1	3	2	3	1	2	3	15	13	5	5	NS
29th QM	21	20	24	18	15	18	19	13	14	17	39	39	41	410	598
30th QM	99.4	90.3	92.6	89.3	108.4	98	118.7	118	118.7	115	91.1	106.8	243.8	183.3	230.8
31st QM	185.5	188.6	197.8	198.1	186.2	180.8	191.3	189.4	185	199.7	218	212.37	227.53	245.62	985
32nd QM	36.32	33.65	46.92	41.55	22.28	29.53	37.16	45.68	52.04	36.65	158.9	111.28	200.6	517.86	NS
33rd QM	28.35	19.51	21.31	23.56	21.32	22.27	30.07	14.26	21.18	35.24	33.71	92.53	79.75	172.39	NS
34th QM	200.77	206.51	200.31	202.27	208.03	211.48	198.41	202.02	211.53	199.39	193.21	198.8	185.87	232.06	236.27
35th QM	240	244	243	244	241	246.5	245	246.1	238.7	247.5	243	247	246	248	246
36th QM	20.7	13.22	33.64	20.52	24.94	17.49	24.13	36.43	12	39.89	38.22	54.14	59.7	194.84	NS
37th QM	15.47	7.93	7.26	6.70	7.65	8.73	28.83	9.22	7.99	43.73	41.95	24.84	35.06	103.85	211.27
38th QM	136.6	174.08	148.8	189.5	191.5	197.3	195.8	199.1	159.1	154.1	172.4	177.4	197.2	224	219.1
39th QM	242.8	237.3	242.6	243.7	238	247.6	234.7	241.1	243.4	242.6	242.9	245.1	227.6	240.4	246
40th QM	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32	51.32
41st QM	50.9	39	36.7	33.1	37.1	40.4	33	22.2	33.3	69.6	59.6	191.7	60.8	130.3	NS
42nd QM	108.95	170.59	187.53	177.8	188.3	184.16	108.95	170.59	187.53	177.8	188.3	184.16	108.95	170.59	187.53
43rd QM	234.55	223.22	228.15	229.55	235.48	216.29	231	232.22	232.72	277.3	228.9	227.04	227.33	224.92	234.6
44th QM	280.12	247.31	258.38	265.36	248.37	270.84	264	244.39	249.96	289.61	287.6	227.14	229.35	221.3	258.34
45th QM	61.87	50.72	70.86	67.6	55.87	46.2	59.25	66.46	64.97	79.65	123.8	35.95	52.31	145.8	193.2
46th QM	31.93	28.175	10.563	16.093	17.729	15.164	15.046	10.844	16.126	16.565	47.437	32.824	71.661	167.13	233.21
Standard (ECR'2023)	N/A														

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.12: Phosphate (PO_4^{3-}) (mg/l) concentration of Passur River System

Monitoring periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
1st QM	0.52	0.5	1.1	2.1	2.2	2	0.57	1.2	1.5	0.55	1.1	1.3	1.1	1.3	7.51
2nd QM	2.23	1.99	2.55	0.45	2.13	2.42	1.25	1.51	1.1	2.1	0.53	0.35	0.56	0.29	0.29
3rd QM	0.67	1.12	0.95	0.92	1.11	0.99	1.18	1.25	1	1.27	1.04	0.86	1.22	0.8	1.09
4th QM	0.32	0.61	0.7	0.43	0.41	0.55	0.76	0.85	0.53	0.59	0.64	0.42	0.61	0.42	0.44
5th QM	0.86	0.53	0.72	0.49	0.68	0.61	0.65	0.53	0.6	0.7	0.55	0.71	0.59	0.61	0.47
6th QM	10	0.23	0.67	0.27	0.59	0.13	0.1	0.18	0.1	0.5	0.29	0.59	0.89	NS	NS

Monitoring periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
7th QM	1.27	1.97	1.94	2.53	1.3	1.32	0.99	1.02	1.39	1.27	1.28	0.95	0.35	0.43	0.45
8th QM	0.269	0.269	0.179	0.357	0.536	0.269	0.536	0.625	0.536	0.351	0.269	0.179	0.269	0.357	NS
9th QM	0.22	0.36	0.27	0.31	0.3	0.43	0.63	0.21	0.33	0.19	0.13	0.31	0.42	0.26	0.36
10th QM	1.14	1.76	1.77	2.31	0.98	1.01	0.87	0.96	1.123	1.06	1	0.78	0.53	0.47	NS
11th QM	3.39	4.11	4.58	2.76	3.2	2.48	4.16	2.76	2.71	2.836	5.23	4.01	1.16	9.08	5.9
12th QM	0.67	0.31	0.09	0.07	0.12	0.16	0.09	0.04	0.07	0.07	0.2	0.09	0.09	0.1	0.23
13th QM	1.31	1.72	2.73	2.77	0.66	0.62	0.65	0.37	0.45	0.61	0.47	0.18	0.21	0.19	NS
14th QM	0.49	2.5	2.8	3.3	3.9	3.9	4.6	0.41	0.63	0.51	15.3	1.3	3.15	0.36	0.55
15th QM	0.21	0.16	0.3	0.19	0.17	0.47	1.31	0.39	0.62	0.38	0.71	0.63	0.81	0.97	1.45
16th QM	0.38	0.25	0.29	0.38	0.34	0.27	0.29	0.29	0.42	0.24	0.28	0.37	0.26	0.2	NS
17th QM	1.03	0.83	0.76	0.88	1.07	0.67	1.16	0.86	1.03	0.83	1.2	0.86	0.5	0.67	NS
18th QM	0.25	0.3	0.22	0.24	0.4	0.53	0.32	0.43	0.57	0.27	0.22	0.33	0.25	0.5	0.61
19th QM	0.25	0.3	0.17	0.2	0.35	0.27	0.2	0.2	0.37	0.4	0.28	0.29	0.3	0.19	0.18
20th QM	0.25	0.32	0.4	0.3	0.27	0.25	0.41	0.35	0.27	0.28	0.3	0.31	0.52	0.63	NS
21st QM	10.1	0.6	0.5	0.6	0.6	0.9	11.1	0.8	0.8	0.5	0.8	0.6	0.6	0.5	NS
22nd QM	0.3	0.3	0.4	0.2	0.3	0.4	0.5	0.7	0.5	0.6	0.4	0.6	0.7	0.3	0.3
23rd QM	0.2	0.2	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.5	0.3	0.4	0.2	0.1	0.2
25th QM	0.25	0.27	0.3	0.35	0.29	0.36	0.4	0.43	0.52	0.25	0.56	0.53	0.4	0.37	NS
26th QM	0.5	0.5	0.5	0.7	0.5	0.8	0.7	0.4	1.3	1.2	0.7	0.8	0.3	0.4	0.4
27th QM	5.3	3.5	3.2	2.9	3	5.4	3	2.5	3.2	13.1	4.1	9.6	2.6	7.1	1.1
28th QM	4.9	2	1.9	2.3	5.7	4	1.2	2.4	6.3	8	0.76	0.79	0.6	3	NS
29th QM	4.2	0.6	0.54	4.5	2.1	3.4	5.4	3.7	2.7	3.4	0.2	0.27	1.9	0.87	0.5
30th QM	1.5	0.9	1.3	0	0	0	0.3	0.4	0.1	0.2	0.4	0.2	0.7	0.4	0.2
31st QM	0.19	0.33	0.13	0.46	0.1	0.4	0.04	0.03	0.14	0.59	0.35	0.3	0.48	0.45	1.03
32nd QM	0.048	0.025	0.069	0.051	0.02	0.021	0.02	0.061	0.008	0.006	0.003	0.0572	0.228	0.125	NS
33rd QM	1.02	0.67	1.2	1.74	0.49	0.4	0.44	0.3	0.5	0.71	0.68	2.53	1.7	1.04	NS
34th QM	2.14	1.2	0	0.08	0.04	0.07	0.07	0.13	0.11	0.08	0.08	0.61	0.6	0.02	0.03
35th QM	1.01	0.56	0.62	0.45	0.08	0.08	0.06	0.06	0.03	0.1	0.09	0.14	0.5	0.07	0.52
36th QM	0.97	1.42	1.25	2.53	0.01	0.09	0.002	0.0235	0.001	0.044	0.037	0.543	0.004	0.07	NS
37th QM	0.08	0.1046	0.1147	0.0285	0.1829	0.0964	0.0468	0.0838	0.0415	0.0733	0.9322	0.4559	0.4183	0.1134	0.2034
38th QM	0.12	0.06	0.04	0.08	0.09	0.07	0.09	0.08	0.78	0.05	0.02	0.08	0.05	0.08	0.1
39th QM	0.222	0.211	0.31	0.189	0.241	0.458	0.085	0.175	0.142	0.277	0.163	1.05	0.249	0.12	0.08
40th QM	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04

Monitoring periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
41st QM	0.50	2.10	1.10	0.60	0.20	0.30	0.20	0.05	0.10	0.05	0.50	1.50	0.20	0.95	NS
42nd QM	0.0847	0.0869	0.1115	0.12	0.01	0.18	0.01	0.05	UD	0.06	0.0746	0.221	0.1497	0.4423	0.1857
43rd QM	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
44th QM	0.2	0.2	0.2	0.1	0.1	0.2	0.14	0.1	0.1	0.14	0.19	0.2	0.087	0.09	0.074
45th QM	0.018	0.032	0.011	0.044	0.008	0.012	0.01	0.023	0.02	0.018	0.07	0.05	0.004	0.013	0.018
46th QM	0.11	0.002	UD	UD	0.0089	UD	0.003	0.0011	0.0023	UD	0.04	0.002	0.0162	UD	0.0695
Standard (ECR'2023)	0.1 mg/l (Coastal Industrial and others)												0.05 mg/l (Coastal Reserved area)		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location; UD-Undetectable.

Table B.13: Arsenic (As) (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	Sl-1	Sl-2	Sl-3	Sl-4	Sl-5	Sl-6	Sl-7	Sl-8	Sl-9	Sl-10	Sl-11	Sl-12	Sl-13	Sl-14	Sl-15
1st QM	0.002	0.002	0.001	0.002	0.002	0.002	<0.001	<0.002	0.002	<0.001	0.002	0.002	0.004	0.004	0.003
2nd QM	0.003	0.003	0.003	0.004	0.004	0.003	0.003	0.004	0.003	0.003	0.002	0.004	0.003	0.002	0.002
3rd QM	0.004	0.004	0.004	0.004	0.004	0.003	0.006	0.004	0.006	0.006	0.003	0.003	0.004	0.002	0.003
4th QM	0.003	0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.003	0.002
5th QM	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.002	0.002
6th QM	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	NS	NS
7th QM	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
8th QM	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.002	0.002	NS
9th QM	0.001	0.003	0.003	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.003	0.005	0.006	0.004
10th QM	0.002	0.003	0.005	0.004	0.002	0.002	0.003	0.003	0.004	0.005	0.002	0.004	0.002	0.001	NS
11th QM	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.003	0.002
12th QM	0.002	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.002	0.001	0.001	0.002	0.002	0.001	0.002
13th QM	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.001	0.002	NS
14th QM	0.002	0.001	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.003	0.001	0.002	0.003	0.002	0.002
15th QM	0.002	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.001
16th QM	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.001	0.002	0.001	0.002	0.001	0.002	NS
17th QM	0.004	0.005	0.004	0.005	0.003	0.002	0.005	0.003	0.004	0.004	0.003	0.003	0.003	0.002	NS
18th QM	0.003	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001
19th QM	0.002	0.001	0.003	0.001	0.001	0.002	0.003	0.001	0.001	0.002	0.005	0.007	0.001	0.002	0.001

Monitoring Periods	Sampling Location ID														
	Sl-1	**Sl-2**	**Sl-3**	**Sl-4**	**Sl-5**	**Sl-6**	**Sl-7**	**Sl-8**	**Sl-9**	**Sl-10**	**Sl-11**	**Sl-12**	**Sl-13**	**Sl-14**	**Sl-15**
20th QM	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	NS
21st QM	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.004	0.002	0.001	0.001	NS
22nd QM	0.002	0.003	0.002	0.003	0.003	0.002	0.003	0.002	0.002	0.003	0.004	0.004	0.002	0.002	0.002
23rd QM	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.002	0.002
25th QM	0.003	0.003	0.003	0.002	0.002	0.002	0.005	0.003	0.003	0.004	0.002	0.002	0.002	0.003	NS
26th QM	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.003	0.003	0.004	0.004	0.002	0.002	0.002	0.009
27th QM	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.003	0.002	0.002	0.002
28th QM	0.003	0.004	0.003	0.002	0.002	0.004	0.003	0.003	0.003	0.003	0.004	0.002	0.002	0.002	NS
29th QM	0.003	0.002	0.003	0.003	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003
30th QM	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.003	0.003	0.002
31st QM	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002
32nd QM	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.003	0.003	0.003	0.003	NS
33rd QM	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.003	0.002	0.003	0.002	0.002	0.003	NS
34th QM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
35th QM	0.003	0.003	0.004	0.003	0.003	0.003	0.004	0.003	0.003	0.004	0.001	0.002	0.002	0.002	0.002
36th QM	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.002	0.002	NS
37th QM	0.003	0.003	0.003	0.002	0.001	0.003	0.003	0.002	0.002	0.004	0.003	0.003	0.003	0.004	0.003
38th QM	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.002
39TH QM	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.001	0.003	0.002	0.002
40th QM	0.003	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002
41st QM	0.002	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.002	NS
42nd QM	0.002	0.003	0.002	0.003	0.002	0.003	0.004	0.002	0.002	0.002	0.004	0.003	0.002	0.003	0.002
43rd QM	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004	0.002	0.005	0.002
44th QM	0.005	0.003	0.004	0.005	0.003	0.003	0.003	0.004	0.006	0.004	0.003	0.003	0.003	0.003	0.004
45th QM	0.004	0.004	0.005	0.004	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.004	0.004	0.004
46th QM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.002
Standard (ECR'2023)	**0.003 mg/l (Coastal Industrial and others)**												**0.001 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.14: Pb (mg/l) concentration of Passur River System

Monitoring Periods	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	0.053	0.055	0.055	0.057	0.06	0.058	0.053	0.054	0.056	0.053	0.048	0.05	0.043	0.194	0.224
2nd QM	0.004	0.002	0.005	0.002	0.002	0.002	0.002	0.003	0.005	0.004	0.004	0.032	0.044	0.071	0.05
3rd QM	0.002	0.003	0.002	0.003	0.002	0.002	0.003	0.004	0.004	0.004	<0.002	<0.002	0.004	0.032	0.07
4th QM	0.104	0.104	0.111	0.154	0.139	0.138	0.16	0.153	0.139	0.143	0.133	0.141	0.137	0.309	0.309
5th QM	0.098	0.102	0.138	0.142	0.135	0.156	0.142	0.148	0.163	0.135	0.14	0.14	0.13	0.297	0.291
6th QM	0.0059	0.0038	0.0058	0.011	0.002	0.0021	0.0076	0.002	0.002	0.002	0.002	0.002	0.002	NS	NS
7th QM	0.007	0.006	0.008	0.01	0.009	0.007	0.01	0.011	0.009	0.07	0.008	0.009	0.012	0.084	0.073
8th QM	0.168	0.092	0.176	0.115	0.148	0.112	0.134	0.099	0.093	0.023	0.067	0.078	0.135	0.302	NS
9th QM	0.203	0.302	0.347	0.336	0.317	0.298	0.396	0.323	0.331	0.35	0.275	0.258	0.228	0.359	0.607
10th QM	0.01	0.009	0.017	0.014	0.006	0.01	0.007	0.006	0.012	0.008	0.015	0.098	0.02	0.142	NS
11th QM	0.009	0.007	0.01	0.007	0.006	0.005	0.006	0.007	0.007	0.008	0.007	0.011	0.01	0.126	0.151
12th QM	0.024	0.034	0.03	0.036	0.046	0.041	0.048	0.044	0.056	0.038	0.056	0.05	0.05	0.033	0.129
13th QM	0.002	0.001	0.003	0.001	0.003	0.002	0.003	0.009	0.003	<LOQ	0.001	0.0001	0.001	0.009	NS
14th QM	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.002	0.002	0.003	0.011	0.011	0.005	0.004	0.019
15th QM	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.003	0.169	0.175
16th QM	0.002	0.001	0.004	0.001	0.003	0.001	0.007	0.003	0.005	0.002	0.003	0.002	0.003	0.001	NS
17th QM	0.002	0.001	0.02	0.018	0.008	0.041	0.012	0.015	0.03	0.01	0.016	0.015	0.017	0..062	NS
18th QM	0.003	0.007	0.017	0.013	0.01	0.012	0.011	0.014	0.019	0.008	0.017	0.009	0.009	0.018	0.014
19th QM	0.004	0.005	0.007	0.005	0.003	0.007	0.003	0.004	0.006	0.004	0.005	0.007	0.015	0.013	0.017
20th QM	0.003	0.002	0.004	0.003	0.003	0.002	0.002	0.003	0.002	0.002	0.003	0.003	0.002	0.002	NS
21st QM	0.001	0.003	0.002	0.009	0.003	0.009	0.12	0.006	0.004	0.003	0.004	0.002	0.006	0.001	NS
22nd QM	0.001	0.002	0.001	0.001	0.001	0.003	0.001	0.002	0.001	0.002	0.003	0.002	0.014	0.019	0.008
23rd QM	0.008	0.007	0.009	0.008	0.006	0.004	0.006	0.008	0.007	0.008	0.006	0.005	0.007	0.043	0.056
25th QM	0.006	0.004	0.007	0.005	0.007	0.008	0.019	0.009	0.01	0.013	0.005	0.003	0.009	0.011	NS
26th QM	0.002	0.005	0.006	0.008	0.006	0.005	0.018	0.008	0.004	0.003	0.006	0.007	0.004	0.02	0.013
27th QM	0.016	0.017	0.018	0.015	0.017	0.019	0.019	0.017	0.022	0.019	0.007	0.015	0.002	0.001	0.001
28th QM	0.029	0.029	0.036	0.016	0.014	0.012	0.0140.	0.003	0.014	0.013	0.015	0.014	0.014	0.018	NS
29th QM	0.017	0.019	0.019	0.012	0.012	0.016	0.022	0.015	0.016	0.022	0.002	0.023	0.011	0.005	0.5
30th QM	0.009	0.019	0.002	0.003	0.002	0.002	0.003	0.004	0.005	0.004	0.005	0.008	0.019	0.004	0.005
31st QM	0.013	0.01	0.011	0.009	0.007	0.011	0.014	0.006	0.007	0.008	0.01	0.013	0.01	0.011	0.009
32nd QM	0.009	0.009	0.01	0.008	0.003	0.008	0.004	0.007	0.009	0.01	0.012	0.017	0.01	0.009	NS
33rd QM	0.006	0.005	0.006	0.007	0.009	0.007	0.007	0.006	0.008	0.003	0.002	0.006	0.001	0.001	NS

Monitoring Periods	Sampling Locations ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
34th QM	0.004	0.003	0.004	0.006	0.002	0.003	0.005	0.005	0.004	0.007	0.006	0.024	0.01	0.012	0.003
35th QM	0.006	0.007	0.007	0.006	0.007	0.005	0.007	0.008	0.006	0.004	0.006	0.005	0.006	0.008	0.007
36th QM	0.008	0.009	0.007	0.01	0.012	0.007	0.006	0.01	0.009	0.003	0.004	0.007	0.004	0.005	NS
37th QM	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
38th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
39th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
40th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
41st QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS
42nd QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
43rd QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
44th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
45th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
46th QM	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Standard (ECR'2023)	**N/A**												**0.05 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Table B.15: Hg (mg/l) Concentration of Passur River System

Monitoring Periods	Sampling Location ID														
	SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-9	SL-10	SL-11	SL-12	SL-13	SL-14	SL-15
1st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
2nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
3rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
4th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
5th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
6th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
7th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
8th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
9th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
10th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
11th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
12th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
13th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
14th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015

Monitoring Periods	Sampling Location ID														
	SL-1	**SL-2**	**SL-3**	**SL-4**	**SL-5**	**SL-6**	**SL-7**	**SL-8**	**SL-9**	**SL-10**	**SL-11**	**SL-12**	**SL-13**	**SL-14**	**SL-15**
15th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
16th QM	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	NS
17th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
18th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
19th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
20th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
21st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
22nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
23rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
25th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
26th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
27th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
28th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	NS
29th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
30th QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
31st QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
32nd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
33rd QM	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015	<0.00015
34th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
35th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
36th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
37th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
38th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
39th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
40th QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
41st QM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS
42nd QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
43rd QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
44th QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
45th QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
46th QM	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Standards (ECR'2023)	**0.0001 mg/l (Coastal Industrial and others)**												**0.0001 mg/l (Coastal Reserved area)**		

Source: Field Survey; from April 2014 up to October 2025; Note: QM= Quarterly Monitoring, NS – Not Surveyed; SL-Sampling location

Parameters for Ground Water Quality Monitoring

Table B.16: pH and Temperature (^{0}C) of Ground Water

pH					Temperature (^{0}C)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
1st QM	7.6	7.6	7.6	6.3	**1st QM**	27.3	29.6	29.2	27.5
2nd QM	7.7	7.8	7.7	6.5	**2nd QM**	28.5	29.9	28.9	28.7
3rd QM	7.9	8	8	NF	**3rd QM**	26	28	28	NF
4th QM	8	8.2	8.1	NF	**4th QM**	24.5	22.5	25.1	NF
5th QM	TC	7.8	7.9	NF	**5th QM**	TC	28.6	28.8	NF
6th QM	8.1	8.3	8.3	NF	**6th QM**	31	28	30	NF
7th QM	7.49	7.93	7.7	NF	**7th QM**	30	27.8	28.7	NF
8th QM	7.6	8.1	7.9	NF	**8th QM**	24	23	25	NF
9th QM	7.8	8.3	8.2	NF	**9th QM**	29.8	29.6	30.1	NF
10th QM	7.8	8.1	7.9	NF	**10th QM**	28.6	29.1	29.4	NF
11th QM	8.4	7.9	7.9	NF	**11th QM**	29.1	30.4	29.8	NF
12th QM	8.1	7.5	7.6	NF	**12th QM**	25.1	24.3	24	NF
13th QM	7.4	7.8	7.4	NF	**13th QM**	28.7	27.7	28.4	NF
14th QM	8.2	8.1	7.8	NF	**14th QM**	27.2	26.5	26.4	NF
15th QM	6.9	7.4	7.2	NF	**15th QM**	22.9	23.8	23.6	NF
16th QM	NF	6.9	7.2	NF	**16th QM**	NF	30.3	30.1	NF
17th QM	NF	7.9	7.6	NF	**17th QM**	NF	29.3	29.7	NF
18th QM	NF	7.3	7.6	NF	**18th QM**	NF	30	29	NF
19th QM	7.1	6.9	6.5	NF	**19th QM**	23.8	23.7	23.2	NF
20th QM	8.3	8.4	8.9	NF	**20th QM**	29	30	30	NF
21st QM	8.2	7.9	8.1	NF	**21st QM**	31.4	30	31.2	NF
22nd QM	7.2	7.6	7.4	NF	**22nd QM**	27	27	26	NF
23rd QM	7.8	7.3	7.5	NF	**23rd QM**	24	23	23	NF
25th QM	**8.1**	**8**	**8**	NF	**25th QM**	31	30	30	NF
26th QM	7.4	8	8	NF	**26th QM**	27	28	27	NF
27th QM	**7.2**	**7.5**	**7.5**	NF	**27th QM**	22	25	25	NF
28th QM	8	8.3	8.2	NF	**28th QM**	23	23	24	NF
29th QM	5.6	6.2	7.4	NF	**29th QM**	31.3	30.45	30.72	NF
30th QM	8	8.6	9.1	NF	**30th QM**	28.89	27.7	28.04	NF
31st QM	7.7	8.1	8.1	NF	**31st QM**	23	24	25	NF
32nd QM	7.7	7.4	8.2	NF	**32nd QM**	29	31.48	29.37	NF

pH					Temperature (^{0}C)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
33rd QM	7.26	7.8	7.7	NF	**33rd QM**	32	30	29	NF
34th QM	7.1	8.1	8	NF	**34th QM**	26	26.69	26	NF
35th QM	8.4	9.0	8.1	NF	**35th QM**	31	27.3	26.9	NF
36th QM	8.1	8.7	8.3	NF	**36th QM**	29	30	30.13	NF
37th QM	7.4	7.6	7.1	NF	**37th QM**	29	30	30.1	NF
38th QM	7.9	8.1	8.2	NF	**38th QM**	31.5	30.86	28.1	NF
39th QM	8.1	8.2	8.1	NF	**39th QM**	28	29	28	NF
40th QM	8.1	7.6	7.9	NF	**40th QM**	30	28.28	26.9	NF
41st QM	7.7	7.56	7.06	NF	**41st QM**	28	29	29	NF
42nd QM	7.7	7.56	7.06	NF	**42nd QM**	28	28.95	28.5	NF
43rd QM	8.6	8.33	9.2	NF	**43rd QM**	29.2	26.28	26.6	NF
44th QM	7.4	7.6	7.2	NF	**44th QM**	7.4	7.6	7.2	NF
45th QM	7.8	7.8	7.8	NF	**45th QM**	29.43	32.08	29.06	NF
46th QM	8.1	7.86	8	NF	**46th QM**	28	29	30	NF
47th QM	7.9	8.2	8.1	7.2	**47th QM**	27	29	30	28
Standard (ECR'2023)	**6.5-8.5**				**Standard (ECR'2023)**	**(20^{0}C-30^{0}C) mg/l**			

Source: Field Survey; from April 2014 up to January 2026; Note: QM=Quarterly Monitoring, NF=Not Functional.

Table B.17: Salinity (ppt.) and DO (mg/l) in Groundwater

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	0	0	0	0	**1st QM**	4.4	6	6.4	4.4
2nd QM	0	0	0	0	**2nd QM**	5.2	6.2	6.5	6
3rd QM	0	0	0	NF	**3rd QM**	6.5	7.7	6.1	NF
4th QM	1	0	0	NF	**4th QM**	6.7	6.3	6.5	NF
5th QM	TC	0	0	NF	**5th QM**	TC	6	6.6	NF
6th QM	0	0	0	NF	**6th QM**	6	5.9	6	NF
7th QM	0	0	0	NF	**7th QM**	5.4	6.1	5.6	NF
8th QM	0	0	0	NF	**8th QM**	4.9	5.2	4.8	NF
9th QM	0	0	0	NF	**9th QM**	6.1	5.8	5.6	NF
10th QM	0	0	0	NF	**10th QM**	5.8	6.1	5.7	NF

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
11th QM	0	0	0	NF	**11th QM**	6.3	5.8	6.1	NF
12th QM	0	0	0	NF	**12th QM**	4.5	4.8	4.6	NF
13th QM	0	0	0	NF	**13th QM**	5.1	5.3	5.7	NF
14th QM	0	0	0	NF	**14th QM**	6.2	5.8	6.2	NF
15th QM	0	0.3	0.4	NF	**15th QM**	5.2	4.47	4.26	NF
16th QM	NF	0.3	0.2	NF	**16th QM**	NF	6	5.4	NF
17th QM	NF	0.1	0.1	NF	**17th QM**	NF	6	5.9	NF
18th QM	NF	0.1	0.1	NF	**18th QM**	NF	5.9	6.1	NF
19th QM	0.1	0.1	0.1	NF	**19th QM**	6	6.1	6.2	NF
20th QM	0.1	0.5	0.7	NF	**20th QM**	6	6.5	6.2	NF
21st QM	0.1	0.1	0.1	NF	**21st QM**	6.1	6	6	NF
22nd QM	0	0	0	NF	**22nd QM**	6	6.2	6	NF
23rd QM	0.1	0.1	0.1	NF	**23rd QM**	6	6.1	6	NF
25th QM	0.1	0.1	0.1	NF	**25th QM**	6	6.1	6.1	NF
26th QM	0.18	0.1	0.1	NF	**26th QM**	6	6.2	6	NF
27th QM	0.1	0.2	0.4	NF	**27th QM**	6.4	6.7	4.9	NF
28th QM	0.1	0.3	0.3	NF	**28th QM**	6.4	6.3	6.3	NF
29th QM	0.1	0.2	0.4	NF	**29th QM**	6	6	5	NF
30th QM	0	0	0	NF	**30th QM**	6.5	7.7	6.1	NF
31st QM	0.1	0.2	0.4	NF	**31st QM**	6.2	4.7	3.5	NF
32nd QM	0.3	0.2	0.4	NF	**32nd QM**	4	2.99	3.8	NF
33rd QM	0.4	0.2	0.1	NF	**33rd QM**	2.6	5.9	6	NF
34th QM	0.2	0.2	0.4	NF	**34th QM**	3.2	5	3.8	NF
35th QM	0.6	0.2	0.4	NF	**35th QM**	5.99	5.8	3.8	NF
36th QM	0.6	0.2	0.4	NF	**36th QM**	3.1	2	2.2	NF
37th QM	0.2	0.1	0.4	NF	**37th QM**	4.1	4	3.8	NF
38th QM	0.1	0.2	0.4	NF	**38th QM**	5.15	4.8	3.6	NF
39th QM	0.1	0.1	0.5	NF	**39th QM**	4.5	4.6	4.8	NF
40th QM	0.6	0.2	0.4	NF	**40th QM**	3.91	7	2.5	NF
41st QM	0.1	0.2	0.4	NF	**41st QM**	6.2	3.19	3.5	NF

Salinity (ppt.)					DO (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
42nd QM	0.1	0.2	0.4	NF	**42nd QM**	6.2	3.19	3.5	NF
43rd QM	0.2	0.2	0.4	NF	**43rd QM**	2.65	3	4.6	NF
44th QM	0.2	0.2	0.4	NF	**44th QM**	5.1	2.8	2.8	NF
45th QM	0.2	0.4	0.2	NF	**45th QM**	4.66	4.66	4.66	NF
46th QM	0.1	0.2	0.4	NF	**46th QM**	5.72	5.58	2.5	NF
47th QM	0.1	0.1	0.4	0.2	**47th QM**	4.2	5.1	4.3	4.5
Standard (ECR'2023)	**N/A**				**Standard (ECR'2023)**	**N/A**			

Source: Field Survey; from April 2014, up to January 2026; Note: QM=Quarterly Monitoring, NF=Not Functional.

Table B.18: TDS (mg/l) and TSS (mg/l) in Groundwater

TDS (mg/l)					TSS (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	1113	4090	643	1055	**1st QM**	-	-	-	-
2nd QM	999	371	635	970	**2nd QM**	6	6	8	48
3rd QM	-	-	-	-	**3rd QM**	19	2	6	NF
4th QM	1021	378	600	NF	**4th QM**	40	28	32	NF
5th QM	NO	390	600	NF	**5th QM**	NF**	4	6	NF
6th QM	881	574	328	NF	**6th QM**	23	16	14	NF
7th QM	377	1007	611	NF	**7th QM**	4	5	4	NF
8th QM	447	491	284	NF	**8th QM**	31	46	41	NF
9th QM	1025	384	645	NF	**9th QM**	3	4	3	NF
10th QM	1000	408	607	NF	**10th QM**	5	4	4	NF
11th QM	617	382	636	NF	**11th QM**	7	4	5	NF
12th QM	623	401	998	NF	**12th QM**	32	28	25	NF
13th QM	395	617	558	NF	**13th QM**	4	10	9	NF
14th QM	602	996	390	NF	**14th QM**	8	10	9	NF
15th QM	405	602	994	NF	**15th QM**	12	6	7	NF
16th QM	NF	615	370	NF	**16th QM**	NF	12	5	NF
17th QM	NF	390	608	NF	**17th QM**	NF	2	3	NF
18th QM	NF	365	610	NF	**18th QM**	NF	6	8	NF
19th QM	1315	376	927	NF	**19th QM**	3	3	4	NF

TDS (mg/l)					TSS (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
20th QM	915	380	610	NF	**20th QM**	3	2	4	NF
21st QM	25	602	360	NF	**21st QM**	2	1	4	NF
22nd QM	900	385	603	NF	**22nd QM**	4	3	4	Nf
23rd QM	3080	660	370	NF	**23rd QM**	2	3	2	NF
25th QM	1196	701	316	NF	**25th QM**	1	3	1	NF
26th QM	139	335	202	NF	**26th QM**	3	5	2	NF
27th QM	200	350	610	NF	**27th QM**	1	2	5	NF
28th QM	810	450	570	NF	**28th QM**	1	1	1	NF
29th QM	890	360	610	NF	**29th QM**	1	1	2	NF
30th QM	350	615	860	NF	**30th QM**	1	4	3	NF
31st QM	0.86	350	620	NF	**31st QM**	1	1	1	NF
32nd QM	1150	360	620	NF	**32nd QM**	2	1	2	NS
33rd QM	350	620	900	NF	**33rd QM**	1	2	1	NF
34th QM	885	620	510	NF	**34th QM**	1	1	3	NF
35th QM	370	900	630	NF	**35th QM**	1	1	1	NF
36th QM	890	350	1300	NF	**36th QM**	1	1	3	NF
37th QM	272	392	650	NF	**37th QM**	1	1	2	NF
38th QM	240	500	670	NF	**38th QM**	1	1	2	NF
39th QM	960	615	370	NF	**39th QM**	1	2	1	NF
40th QM	940	410	620	NF	**40th QM**	1	1	2	NF
41st QM	190	365	650	NF	**41st QM**	1	1	2	NF
42nd QM	365	680	950	NF	**42nd QM**	2	1	1	NF
43rd QM	350	620	330	NF	**43rd QM**	1	1	1	NF
44th QM	400	400	400	NF	**44th QM**	1.7	1.3	1	NF
45th QM	320	410	690	NF	**45th QM**	1	4	7	NF
46th QM	230	390	700	NF	**46th QM**	34	20	40	NF
Standard (ECR'2023)	**1000**				**Standard (ECR'2023)**	**10 mg/l**			

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.19: TH (mg/l) and COD (mg/l) concentrations in Groundwater

TH (mg/l)					COD (mg/l)				
Monitoring periods	Sampling location ID				Monitoring periods	Sampling location ID			
	SL-1	SL-2	SL-3	SL-4		SL-1	SL-2	SL-3	SL-4
1st QM	425	220	190	780	**1st QM**	32	28	48	32
2nd QM	250	175	140	450	**2nd QM**	32	28	32	36
3rd QM	300	180	180	NF	**3rd QM**	34	18	34	NF
4th QM	235	110	125	NF	**4th QM**	20	16	20	NF
5th QM	NO	138	216	NF	**5th QM**	NO	14	18	NF
6th QM	225	125	115	NF	**6th QM**	12	10	14	NF
7th QM	325	450	480	NF	**7th QM**	4	8	4	NF
8th QM	295	195	225	NF	**8th QM**	4	4	4	NF
9th QM	305	263	163	NF	**9th QM**	4	4	4	NF
10th QM	320	248	28	NF	**10th QM**	4	4	2	NF
11th QM	175	295	183	NF	**11th QM**	4	4	4	NF
12th QM	550	510	620	NF	**12th QM**	4	4	4	NF
13th QM	720	420	654	NF	**13th QM**	4	4	4	NF
14th QM	145	240	215	NF	**14th QM**	8	8	16	NF
15th QM	NF	265	305	NF	**15th QM**	NF	4	4	NF
16th QM	NF	195	215	NF	**16th QM**	NF	4	4	NF
17th QM	NF	235	170	NF	**17th QM**	NF	4	4	NF
18th QM	NF	178	138	NF	**18th QM**	NF	4	4	NF
19th QM	355	215	270	NF	**19th QM**	4	3	4	NF
20th QM	235	182	167	NF	**20th QM**	352	4	4	NF
21st QM	97	167	212	NF	**21st QM**	4	4	4	NF
22nd QM	145	245	137	NF	**22nd QM**	4	4	4	NF
23rd QM	137	118	145	NF	**23rd QM**	4	4	4	NF
25th QM	625	210	237	NF	**25th QM**	4	4	4	NF
26th QM	232	185	207	NF	**26th QM**	4	4	4	NF
27th QM	160	145	130	NF	**27th QM**	4	4	4	NF
28th QM	1400	1600	1200	NF	**28th QM**	16	32	8	NF
29th QM	160	195	140	NF	**29th QM**	32	28	36	NF
30th QM	70	243	155	NF	**30th QM**	4	20	28	NF
31st QM	180	200	210	NF	**31st QM**	12	8	28	NF
32nd QM	320	165	275	NF	**32nd QM**	32	28	32	NF
33rd QM	225	415	515	NF	**33rd QM**	4	4	4	NF
34th QM	265	130	110	NF	**34th QM**	4	4	4	NF

TH (mg/l)					COD (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
35th QM	215	445	348	NF	**35th QM**	16	12	8	NF
36th QM	237	190	1200	NF	**36th QM**	32	28	36	NF
37th QM	160	185	190	NF	**37th QM**	4	20	12	NF
38th QM	170	170	185	NF	**38th QM**	28	24	12	NF
39th QM	1200	715	240	NF	**39th QM**	72	48	64	NF
40th QM	320	210	200	NF	**40th QM**	28	39	48	NF
41st QM	160	160	160	NF	**41st QM**	4	4	4	NF
42nd QM	225	315	415	NF	**42nd QM**	4	4	4	NF
43rd QM	250	550	270	NF	**43rd QM**	16	64	12	NF
44th QM	225	300	190	NF	**44th QM**	12	48	12	NF
45th QM	150	145	130	NF	**45th QM**	8	4	4	NF
46th QM	155	225	330	NF	**46th QM**	24	12	24	NF
Standard (ECR'2023)	**500**				**Standard (ECR'2023)**	**N/A**			

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.20: NO_3^- (mg/l) and SO_4^{2-} (mg/l) Concentrations in Groundwater

NO_3^- (mg/l)					SO_4^{2-} (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	0.2	0.6	0.8	0.4	**1st QM**	-	-	-	NF
2nd QM	0.48	0.68	0.4	0.56	**2nd QM**	3	2	10	3
3rd QM	<0.10	0.31	0.8	NF	**3rd QM**	-	-	-	NF
4th QM	28	26	13	NF	**4th QM**	-	-	-	-
5th QM	-	-	-	NF	**5th QM**	-	-	-	-
6th QM	7.6	2.2	4.7	NF	**6th QM**	-	-	-	-
7th QM	4.3	4.2	3.8	NF	**7th QM**	1	2	2	-
8th QM	2.1	1.9	2.8	NF	**8th QM**	5	6	2	NF
9th QM	1.7	2.3	1.9	NF	**9th QM**	1	2	8	NF
10th QM	3.8	3.3	3.7	NF	**10th QM**	1	1	1	NF
11th QM	6.1	7.51	10.16	NF	**11th QM**	1	1	1	NF
12th QM	4.65	7.02	4.65	NF	**12th QM**	1	1		NF
13th QM	9.32	14.7	10.2	NF	**13th QM**	5	1	3	NF
14th QM	3.3	2.5	4.6	NF	**14th QM**	1	1	2	NF
15th QM	5.9	7.2	1.7	NF	**15th QM**	8	2	6	NF

NO_3^- (mg/l)					SO_4^{2-} (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
16th QM	NF	5.3	5.7	NF	**16th QM**	NF	2	4	NF
17th QM	NF	8.6	7.8	NF	**17th QM**	NF	4	6	NF
18th QM	NF	0.9	1.4	NF	**18th QM**	NF	1	1	NF
19th QM	1.7	4.4	2.1	NF	**19th QM**	1	2	1	NF
20th QM	4.4	2.7	8.3	NF	**20th QM**	4	1	4	NF
21st QM	1.4	2.7	1.7	NF	**21st QM**	1	2	1	NF
22nd QM	1.8	3.1	1.6	NF	**22nd QM**	2	2	1	NF
23rd QM	1.9	1.4	2.7	NF	**23rd QM**	2	3	2	NF
25th QM	1.7	7.5	1.7	NF	**25th QM**	4	3	4	NF
26th QM	0.5	3.8	3.1	NF	**26th QM**	9	3	3	NF
27th QM	2.4	2.2	4.9	NF	**27th QM**	1	1	7	NF
28th QM	1	1	2	NF	**28th QM**	1	1	1	NF
29th QM	1.5	2.1	2.1	NF	**29th QM**	1	4	3	NF
30th QM	3.7	4.1	2.6	NF	**30th QM**	2.2	6.3	2.6	NF
31st QM	12.09	4.02	8.83	NF	**31st QM**	14.94	4.22	9.51	NF
32nd QM	4.331	12.304	1.9372	NF	**32nd QM**	2.1054	6.83	1.76	NF
33rd QM	4.88	0.801	4.33	NF	**33rd QM**	1.41	1.36	3.31	NF
34th QM	15.51	1.22	4.82	NF	**34th QM**	0.2	1.9	1.0	NF
35th QM	1.34	1.34	1.34	NF	**35th QM**	5.25	5.57	11	NF
36th QM	2.003	0.7807	6.31	NF	**36th QM**	14.7	0.89	3.94	NF
37th QM	ND	1.9	10.5	NF	**37th QM**	5.4	1.8	5.0	NF
38th QM	8.56	0.1	4	NF	**38th QM**	1.34	3.11	3.03	NF
39th QM	3.001	3.001	3.001	NF	**39th QM**	2.39	143	5.68	NF
40th QM	1	1	2	NF	**40th QM**	3.5	5.8	0.65	NF
41st QM	6	6	6	NF	**41st QM**	3.50	5.80	0.65	NF
42nd QM	0.4863	0.4863	0.4863	NF	**42nd QM**	16.92	1.29	3.64	NF
43rd QM	1.98	2.34	6.23	NF	**43rd QM**	0.49	2.59	3.58	NF
44th QM	1.1	1.4	1.1	NF	**44th QM**	3.1	2.9	3.0	NF
45th QM	4.1	1.7	0.3	NF	**45th QM**	2.95	0.48	14.90	NF
46th QM	0.6	9.0	4.1	NF	**46th QM**	8.88	8.88	8.88	NF
Standard (ECR'2023)	**45 mg/l**				**Standard (ECR'2023)**	**250 mg/l**			

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.21: PO_4^{3-} (mg/l) and As (mg/l) Concentrations in Groundwater

PO_4^{3-} (mg/l)					As (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	NF	-	-	NF	**1st QM**	0.013	0.006	0.036	0.376
2nd QM	2.2	2.5	6.2	1.2	**2nd QM**	0.02	0.009	0.033	0.407
3rd QM	-	-	-	NF	**3rd QM**	0.012	0.006	0.02	NF
4th QM	0.74	0.44	0.48	NF	**4th QM**	0.014	0.008	0.017	NF
5th QM	NO	1.98	4.54	NF	**5th QM**	NO	0.01	0.034	NF
6th QM	1.4	1.6	4.1	NF	**6th QM**	0.015	0.014	0.024	NF
7th QM	0.31	0.27	0.48	NF	**7th QM**	0.002	0.012	0.011	NF
8th QM	0.267	0.179	0.179	NF	**8th QM**	0.008	0.002	0.002	NF
9th QM	1.08	1.53	3.26	NF	**9th QM**	0.018	0.007	0.047	NF
10th QM	0.17	0.29	0.31	NF	**10th QM**	0.012	0.018	0.005	NF
11th QM	0.167	0.67	0.6	NF	**11th QM**	0.033	0.011	0.016	NF
12th QM	1.18	1.21	1.18	NF	**12th QM**	0.028	0.005	0.028	NF
13th QM	2.18	1.8	2.1	NF	**13th QM**	0.012	0.022	0.01	NF
14th QM	1.68	3.5	4.7	NF	**14th QM**	0.014	0.004	0.027	NF
15th QM	0.13	0.17	0.18	NF	**15th QM**	0.002	0.012	0.002	NF
16th QM	NF	4..5	0.27	NF	**16th QM**	0.001	0.022	0.001	NF
17th QM	NF	2.9	4.8	NF	**17th QM**	NF	0.012	0.004	NF
18th QM	NF	0.15	0.26	NF	**18th QM**	NF	0.007	0.05	NF
19th QM	2.1	1.3	3.6	NF	**19th QM**	0.014	0.003	0.004	NF
20th QM	2.3	2.5	3.2	NF	**20th QM**	0.012	0.012	0.012	NF
21st QM	0.3	4	2	NF	**21st QM**	0.014	0.006	0.022	NF
22nd QM	1	0.5	1.5	NF	**22nd QM**	0.001	0.027	0.001	NF
23rd QM	1.1	0.4	0.9	NF	**23rd QM**	0.018	0.006	0.033	NF
25th QM	0.3	1.5	1.7	NF	**25th QM**	0.02	0.068	0.003	NF
26th QM	0.7	6.3	2.3	NF	**26th QM**	0.022	0.045	0.004	NF
27th QM	2	1.8	2.3	NF	**27th QM**	0.003	0.053	0.006	NF
28th QM	1.4	0.98	4	NF	**28th QM**	0.002	0.004	0.049	NF
29th QM	1.7	1.2	5	NF	**29th QM**	0.002	0.003	0.008	NF
30th QM	0.9	1.4	0.6	NF	**30th QM**	0.012	0.003	0.061	NF
31st QM	1	0.6	1.4	NF	**31st QM**	0.003	0.063	0.014	NF
32nd QM	0.8	1.4	0.3	NF	**32nd QM**	0.016	0.003	0.048	NF
33rd QM	1.2	0.5	1.36	NF	**33rd QM**	0.008	0.003	0.064	NF
34th QM	0.7548	0.5	1.5	NF	**34th QM**	0.02	0.00	0.05	NF

PO_4^{3-} (mg/l)					As (mg/l)				
Monitoring periods	**Sampling location ID**				**Monitoring periods**	**Sampling location ID**			
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
35th QM	0.757	0.5	1.3	NF	**35th QM**	0.019	0.003	0.056	NF
36th QM	0.0	0.4	1.3	NF	**36th QM**	0.005	0.002	0.042	NF
37th QM	0.00	0.7	1.4	NF	**37th QM**	0.00	0.00	0.1	NF
38th QM	0	0.6	4.39	NF	**38th QM**	0.001	0.002	0.056	NF
39th QM	0.1	0.1	0.1	NF	**39th QM**	0.004	0.004	0.004	NF
40th QM	1.2	1.9	1.9	NF	**40th QM**	0.001	0.003	0.048	NF
41st QM	1.4	<0.0003	0.6	NF	**41st QM**	0.003	0.002	0.050	NF
42nd QM	0.0225	0.546	1.3771	NF	**42nd QM**	0.001	0.047	0.002	NF
43rd QM	0.02	0.02	0.02	NF	**43rd QM**	0.003	0.043	0.002	NF
44th QM	1.4	1.8	2.7	NF	**44th QM**	0.005	0.055	0.001	NF
45th QM	1.32	0.41	UD	NF	**45th QM**	0	0.005	0.053	NF
46th QM	UD	0.5	1.1244	NF	**46th QM**	0.001	0.005	0.056	NF
Standard (ECR'2023)	**N/A**				**Standard (ECR'2023)**	**0.05 mg/l**			

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NF-Not Functional; UD-Undetectable

Table B.22: Pb (mg/l) and Hg (mg/l) Concentrations in Groundwater

PB (mg/l)					Hg (mg/l)				
Monitoring Periods	**Sampling location ID**				**Monitoring Periods**		**Sampling Location ID**		
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
1st QM	0.002	<0.002	<0.002	0.002	**1st QM**	<0.00015	<0.00015	<0.00015	<0.00015
2nd QM	<0.002	<0.002	0.004	0.008	**2nd QM**	<0.00015	<0.00015	<0.00015	<0.00015
3rd QM	0.004	<0.002	<0.002	NF	**3rd QM**	<0.0005	<0.0005	<0.0005	NF
4th QM	0.023	0.016	0.013	NF	**4th QM**	<0.0005	<0.0005	<0.0005	NF
5th QM	NO	0.013	0.017	D	**5th QM**	<0.0005	<0.00015	<0.00015	NF
6th QM	0.002	0.0027	0.002	D	**6th QM**	0.00015	0.00015	0.00015	NF
7th QM	0.006	0.021	0.005	NF	**7th QM**	<0.00015	<0.00015	<0.00015	NF
8th QM	0.026	0.011	0.012	NF	**8th QM**	<0.00015	<0.00015	<0.00015	NF
9th QM	0.019	0.007	0.008	NF	**9th QM**	<0.00015	<0.00015	<0.00015	NF
10th QM	0.002	0.002	0.002	NF	**10th QM**	<0.00015	<0.00015	<0.00015	NF
11th QM	0.001	0.001	0.001	NF	**11th QM**	<0.00015	<0.00015	<0.00015	NF
12th QM	0.01	0.009	0.016	NF	**12th QM**	<0.00015	<0.00015	<0.00015	NF
13th QM	0.001	0.001	0.001	NF	**13th QM**	0.001	0.001	0.001	NF
14th QM	0.003	0.007	0.002	NF	**14th QM**	<0.0001	<0.0001	<0.0001	NF
15th QM	0.001	0.002	0.001	NF	**15th QM**	<0.001	<0.001	<0.001	NF

PB (mg/l)					Hg (mg/l)				
Monitoring Periods	**Sampling location ID**				**Monitoring Periods**		**Sampling Location ID**		
	SL-1	**SL-2**	**SL-3**	**SL-4**		**SL-1**	**SL-2**	**SL-3**	**SL-4**
16th QM	0.001	0.001	0.001	NF	**16th QM**	<0.001	<0.001		NF
17th QM	0.001	0.001	0.001	NF	**17th QM**	<0.001	<0.001	<0.001	NF
18th QM	NF	0.001	0.001	NF	**18th QM**	<0.001	<0.001	<0.001	NF
19th QM	NF	0.004	0.056	NF	**19th QM**	<0.001	<0.001	<0.001	NF
20th QM	0.008	0.003	0.004	NF	**20th QM**	<0.001	<0.001	<0.001	NF
21st QM	0.004	0.004	0.006	NF	**21st QM**	0.001	0.003	0.001	NF
22nd QM	0.018	0.002	0.001	NF	**22nd QM**	<0.001	<0.001	<0.001	NF
23rd QM	0.002	0.008	0.001	NF	**23rd QM**	<0.001	<0.001	<0.001	NF
25th QM	0.001	0.001	0.002	NF	**25th QM**	<0.001	<0.001	<0.001	NF
26th QM	0.001	0.001	0.001	NF	**26th QM**	<0.001	<0.001	NF	NF
27th QM	0.004	0.006	0.002	NF	**27th QM**	<0.001	<0.001	<0.001	NF
28th QM	0.048	0.016	0.056	NF	**28th QM**	<0.001	<0.001	<0.001	NF
29th QM	0.003	0.008	0.002	NF	**29th QM**	<0.001	<0.001	<0.001	NF
30th QM	0.009	0.002	0.001	NF	**30th QM**	<0.001	<0.001	<0.001	NF
31st QM	0.001	0.001	0.001	NF	**31st QM**	<0.001	<0.001	<0.001	NF
32nd QM	0.003	0.004	0.003	NF	**32nd QM**	<0.001	<0.001	<0.001	NF
33rd QM	0.8	1.4	0.3	NF	**33rd QM**	0.008	0.003	0.064	NF
34th QM	0.002	0.003	0.001	NF	**34th QM**	<0.001	<0.001	<0.001	NF
35th QM	0.002	0.002	0.003	NF	**35th QM**	<0.001	<0.001	<0.001	NF
36th QM	0.001	0.002	0.001	NF	**36th QM**	<0.001	<0.001	<0.001	NF
37th QM	<0.01	<0.02	<0.03	NF	**37th QM**	<0.001	<0.001	<0.001	NF
38th QM	<0.01	<0.01	<0.01	NF	**38th QM**	<0.001	<0.001	<0.001	NF
39th QM	<0.01	<0.01	<0.01	NF	**39th QM**	<0.001	<0.001	<0.001	NF
40th QM	<0.01	<0.01	<0.01	NF	**40th QM**	<0.001	<0.001	<0.001	NF
41st QM	<0.01	<0.01	<0.01	NF	**41st QM**	<0.001	<0.001	<0.001	NF
42nd QM	<0.01	<0.01	<0.01	NF	**42nd QM**	<0.0001	<0.0001	<0.0001	NF
43rd QM	<0.01	<0.01	<0.01	NF	**43rd QM**	<0.0001	<0.0001	<0.0001	NF
44th QM	<0.01	<0.01	<0.01	NF	**44th QM**	<0.0001	<0.0001	<0.0001	NF
45th QM	<0.01	<0.01	<0.01	NF	**45th QM**	<0.0001	<0.0001	<0.0001	NF
46th QM	<0.01	<0.01	<0.01	NF	**46th QM**	<0.0001	<0.0001	<0.0001	NF
Standard (ECR'2023)	**0.01 mg/l**				**Standard (ECR'2023)**	**0.001 mg/l**			

Source: Field Survey; from April 2014, up to October 2025; Note: QM= Quarterly Monitoring, NF-Not Functional.

Table B.23: PAH (mg/l) Concentrations of Monitored Locations

Date		Acenapthylene	Anthracene	Benzlol (A) Anthracene	Benzlol (A) Pyrene	Benzlol (B) Fluoranthene	Benzol (G, H, I) Perilene	Benzol (K) Fluoranthene	Chrysene	Dibenzol (A, H) Anthracene	Fluorene	Phenanthrene	Pyrene
17th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
19th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
21st QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
23rd QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
25th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
27th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
31st QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33rd QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
35th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
37th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Date		Acenapthylene	Anthracene	Benzlol (A) Anthracene	Benzlol (A) Pyrene	Benzlol (B) Fluoranthene	Benzol (G, H, I) Perilene	Benzol (K) Fluoranthene	Chrysene	Dibenzol (A, H) Anthracene	Fluorene	Phenanthrene	Pyrene
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
39th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
41st QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
43rd QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
45th QM	**Project Jetty**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Majhar point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Hiron point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Source: Field Survey; from April 2014, up to July 2025; Note: ND-not determined

Table B.24: TOC (mg/l) and TC (mg/l) Concentrations of Monitored Locations

Monitoring sites		Project jetty site	Majhar point	Hiron point
17th QM	Total Carbon	21.8	21.9	NM
	Total Organic Carbon	19.5	25.1	NM
19th QM	Total Carbon	20.7	24.8	6.8
	Total Organic Carbon	14.3	18.8	5.7
21st QM	Total Carbon	17.2	21.7	NM
	Total Organic Carbon	13.6	18.1	NM
23rd QM	Total Carbon	37.5	21.7	8.1
	Total Organic Carbon	26.4	18.1	6.7
25th QM	Total Carbon	152	200	NM
	Total Organic Carbon	9.17	9.48	NM
27th QM	Total Carbon	1302	1568	9241
	Total Organic Carbon	<5	<5	<5

Monitoring sites		Project jetty site	Majhar point	Hiron point
29th QM	Total Carbon	250	200	544
	Total Organic Carbon	<5	20.2	<5
31st QM	Total Carbon	218	686	2901
	Total Organic Carbon	21.2	19.7	15.2
33rd QM	Total Carbon	65	239	NM
	Total Organic Carbon	10.5	12.7	NM
35th QM	Total Carbon	1403	1058	3759
	Total Organic Carbon	5	5	5
37th QM	Total Carbon	61	47	134
	Total Organic Carbon	<5	<5	<5
39th QM	Total Carbon	Not Detectable	Not Detectable	Not Detectable
	Total Organic Carbon	9.38	5.1	5.38
41st QM	Total Carbon	3.43	2.33	NS
	Total Organic Carbon	2.17	2.53	NS
43rd QM	Total Carbon	2.11	1.28	2.17
	Total Organic Carbon	1.2	0.1	0.79
45th QM	Total Carbon	2.38	1.09	1.55
	Total Organic Carbon	4.2	5.28	9.99

Source: Field Survey; from April 2014 up to July 2025

(B) Noise Level monitoring data

Table C.1: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM1 (Noise Level in dB (A)) Mar-14				QM2 (Noise Level in dB (A)) Jul-14				QM3 (Noise Level in dB (A)) Oct-14				QM4 (Noise Level in dB (A)) Jan-15				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	80.32	60.86	63.22	68.13	52.71	55.62	50.27	52.87	53.37	53.52	57	54.63	51.92	53.7	54.21	53.28	70
2	NW Corner of the Project area	55.23	53	47.43	51.89	NM	NM	NM	NM	42.67	41.73	41.37	41.92	33.87	36.42	35.46	35.25	50
3	Chunkuri-2, Bajua	62.69	57.19	53.39	57.76	54.61	51.14	51.9	52.55	52.26	51.14	50.76	51.39	55.08	46.29	46.49	49.29	50
4	SW corner of the Project area	49.2	NM	NM	49.2	44.55	48.94	49.33	47.6	45.56	45.1	47.18	45.95	36.57	34.24	37.27	36.03	50
5	Township area, Project site	47.8	49.7	NM	48.75	46.15	47.21	NM	46.68	42.67	41.73	41.37	41.92	41.49	39.55	43.37	41.47	50
6	Barni, Gaurambha	64.95	50.93	60.65	58.84	48.73	50.37	50.75	49.95	50.18	50.89	48.27	49.78	43.36	38.56	48.86	43.6	50
7	Khan Jahan Ali Bridge, Khulna	76.12	66.72	72.25	71.7	55.97	64.68	61.75	60.8	72.24	58.3	68.3	66.28	61.34	63.4	60.41	61.72	70
8	Mongla Port area	69.38	54.55	59.79	61.24	54.75	54.2	52.58	53.84	66.8	55.2	59.5	60.5	40.26	35.04	40.76	38.69	75
9	Harbaria, Sundarbans	39.24	NM	42.51	40.88	59.25	60.52	48.62	56.13	54.08	56.51	NM	55.3	36.36	32.4	NM	34.38	45
10	Akram Point, Sundarbans	40.95	41.98	39.9	40.94	48.95	46.86	NM	47.9	45.27	42.69	NM	43.98	37.9	30.75	NM	34.32	45
11	Hiron Point, Sundarbans	35.99	40.75	39.16	38.63	51.29	NM	NM	51.29	47.98	39.42	NM	47.98	42.82	31.93	NM	37.37	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.2: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM 5(Noise Level in dB (A)) Apr-15				QM 6 (Noise Level in dB (A)) Jul-15				QM 7 (Noise Level in dB (A)) Oct-15				QM 8 (Noise Level in dB (A)) Jan-16				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	57.27	54.31	59.65	57.08	43.52	54.23	51.56	49.77	68.32	66.09	60.96	65.12	67.84	61.25	66.31	66.07	70
2	NW Corner of the Project area	45.05	42.15	46.8	44.67	37.58	40.91	46.18	41.56	41.51	39.58	44.74	41.94	53.91	49.02	49.95	50.96	50
3	Chunkuri-2, Bajua	45.9	48.19	NM	47.05	40.57	42.23	39.17	40.66	47.53	45.48	49.28	47.43	56.84	48.12	55.90	53.62	50
4	SW corner of the Project area	40.6	43.25	46.89	43.58	44.57	44.30	42.36	43.75	36.15	48.26	43.68	42.70	60.32	55.30	63.70	60.44	50
5	Township area, Project site	41.49	39.55	43.37	41.47	43.41	50.86	45.99	46.75	46.89	49.47	55.20	50.52	54.79	52.22	54.29	53.77	50
6	Barni, Gaurambha	58.23	50.11	NM	54.17	46.76	44.83	46.95	46.18	56.40	54.19	54.88	55.16	60.62	60.00	56.86	59.16	50
7	Khan Jahan Ali Bridge, Khulna	75.2	72.75	72.42	73.45	52.95	52.18	53.34	52.82	64.43	61.65	66.65	64.25	69.96	64.81	70.56	68.45	70
8	Mongla Port area	46.02	49.29	49.15	48.15	36.72	38.56	43.54	39.61	45.39	NM	48.63	47.01	54.15	51.82	52.14	52.70	75
9	Harbaria, Sundarbans	67.06	64.05	64.99	65.37	39.33	30.74	NM	35.03	54.97	46.54	NM	50.75	45.72	44.69	*NM*	45.20	45
10	Akram Point, Sundarbans	53.35	56.37	NM	54.86	NM	NM	NM	NM	45.28	53.92	NM	49.60	45.60	40.29	*NM*	42.95	45
11	Hiron Point, Sundarbans	47.48	48.2	NM	47.84	NM	NM	NM	NM	54.44	37.69	NM	46.06	NM	NM	NM	NM	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.3: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM9 (Noise Level in dB (A)) Apr-16				QM 10 (Noise Level in dB (A)) Jul-16				QM 11 (Noise Level in dB (A)) Oct-16				QM 12 (Noise Level in dB (A)) Jan-17				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	67.71	61.23	66.31	65.08	50.92	50.04	52.3	51.42	60.1	68.6	67.8	65.5	54.4	61	61.46	58.95	70
2	NW Corner of the Project area	53.81	48.66	49.90	50.79	54.40	53.19	50.36	52.65	54.7	54.8	57.0	55.5	44.52	44.52	NM	44.52	50
3	Chunkuri-2, Bajua	43.30	43.35	46.84	44.49	56.29	49.4	54.51	53.4	50.4	47.7	56.6	51.6	55.73	56.2	NM	55.31	50
4	SW corner of the Project area	56.81	54.73	51.97	54.50	67.38	74.12	54.61	65.37	47.8	49.0	50.8	49.2	44.41	45.96	NM	45.19	50
5	Proposed Township area, Project site	55.02	52.41	52.69	53.37	62.71	52.98	51.67	55.79	45.8	41.6	48.7	45.4	NM	43.4	41.85	42.63	50
6	Barni, Gaurambha	50.63	54.19	57.09	53.97	51.2	59.54	59.53	56.75	52.4	57.3	55.0	54.9	49.75	48.35	NM	49.05	50
7	Khan Jahan Ali Bridge, Khulna	66.40	64.82	66.34	65.85	63.52	62.15	65.73	63.80	61.9	59.6	61.3	60.9	51.69	60.05	54.97	55.57	70
8	Mongla Port area	49.89	48.67	51.07	49.88	53.87	52.04	52.7	52.87	49.5	50.0	50.2	49.9	47.82	48.67	50.33	48.94	75
9	Harbaria, Sundarbans	44.40	44.69	NM	44.55	53.87	53.04	52.79	52.9	57.2	53.5	49.3	53.3	41.13	38.4	37.98	39.17	45
10	Akram Point, Sundarbans	45.60	40.29	NM	42.95	47.16	46.48	50.24	47.96	40.5	43.0	42.5	42.0	38.74	38.45	37.06	38.08	45
11	Hiron Point, Sundarbans	48.53	37.69	NM	43.11	NM	NM	NM	NM	46.1	42,08	41.9	44.0	43.62	40.96	42.29	42.29	45

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.4: Ambient Noise Monitoring Status at the Monitored Locations

Sl No	Location	QM13 (Noise Level in dB (A)) Apr-17				QM 14 (Noise Level in dB (A)) Oct-17				QM 15 (Noise Level in dB (A)) Jan-18				QM 16 (Noise Level in dB (A)) April-18				Standard (Noise Control Rules 2006)
		Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	58.21	59.00	66.57	61.62	47.65	51.06	50.27	49.66	60.2	60.2	60.5	60.3	64.09	59.30	65.43	62.94	70
2	NW Corner of the Project area	44.97	49.30	47.31	47.19	47.65	45.12	46.65	46.47	47.8	48.1	49.2	48.37	47.92	54.32	61.14	54.46	55
3	Chunkuri-2, Bajua	45.60	52.29	53.42	50.44	39.82	45.60	41.73	42.38	51.1	51.2	52.1	51.47	44.77	46	63.14	51.30	55
4	SW corner of the Project area	39.62	42.64	47.48	43.25	60.80	64.08	62.52	62.47	43.5	43.5	45.7	44.23	64.45	63.49	66.63	64.85	55
5	Project site near Shapmari area	41.40	43.09	43.45	42.65	43.05	48.52	45.01	45.53	53.2	54	52.82	53.34	51.95	59.66	56.8	56.13	55
6	Barni, Gaurambha	43.05	46.45	45.01	44.83	45.60	52.29	53.42	50.44	56.5	54.2	56.1	55.6	55.6	51.80	51.39	52.93	60
7	Khan Jahan Ali Bridge, Khulna	54.01	57.50	58.66	56.72	40.60	42.64	46.55	43.26	60.2	62.1	62.2	61.5	49.4	45.25	47.98	47.54	70
8	Mongla Port area	47.78	47.45	45.25	47.61	41.40	44.68	45.71	43.93	60.2	60.2	58.4	59.6	50.84	48.33	53.25	50.80	75
9	Harbaria, Sundarbans	50.79	53.67	57.84	54.10	44.25	46.67	47.31	46.08	45.8	44.7	43.8	44.7	50.23	45.55	65.43	53.73	50
10	Akram Point, Sundarbans	43.41	45.60	43.89	44.30	58.21	58.59	58.70	58.50	39.4	40.5	41.1	40.3	58.31	60.93	64.87	61.37	50
11	Hiron Point, Sundarbans	NM	NM	NM	NM	39.92	39.79	33.5	37.74	37.2	39	38.4	38.2	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.5: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 17 (Noise Level in dB (A)) July-18				QM 18 (Noise Level in dB (A)) Nov-18				QM 19 (Noise Level in dB (A)) Feb-19				QM 20 (Noise Level in dB (A)) Apr-19				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	57.64	56.94	58.03	57.54	61.3	56.3	57.1	70	56.14	59.28	53.95	56.45	62.02	61.91	61.08	61.67	70
2	NW Corner of the Project area	42.80	47.51	46.57	45.63	56.5	60.1	59.85	55	45.15	54.11	53	50.75	53.70	58.92	57.92	56.85	55
3	Chunkuri-2, Bajua	46.23	49.02	47.34	47.53	45.8	48.9	51.3	55	50.19	49.35	51	50.18	49.66	54.02	51.35	51.68	55
4	SW corner of the Project area	58.84	48.00	51.03	52.63	64.5	60.6	60.2	55	53.50	58.01	55.88	55.79	58.08	54.79	55.27	56.05	55
5	Project site near Shapmari area	42.66	45.82	48.78	45.75	45.1	51.2	55.8	55	58.48	61.21	54.70	58.13	61.35	58.97	56.16	58.83	55
6	Barni, Gaurambha	42.67	47.95	45.90	45.51	58.3	50.6	50.2	60	54.32	57.65	45.75	52.57	58.58	51.05	49.92	53.18	60
7	Khan Jahan Ali Bridge, Khulna	64.1	64.06	61.90	63.35	64.6	60.9	60.9	70	65.72	69.04	66.03	66.93	67.95	63.09	69.82	66.95	70
8	Mongla Port area	63.12	59.00	60.77	60.96	55.8	53.1	59.0	75	64.33	63.37	70.85	66.18	64.12	62.41	65.45	63.99	75
9	Harbaria, Sundarbans	51.98	48.58	50.28	50.28	49.9	47.6	NM	50	51.43	47.90	NM	49.67	49.42	47.45	NM	48.43	50
10	Akram Point, Sundarbans	46.52	43.88	45.2	45.20	41.9	40.1	NM	50	47.35	45.55	NM	46.45	46.16	38.49	NM	42.33	50
11	Hiron Point, Sundarbans	NM	NM	NM	57.54	39.7	39.1	NM	50	33.8	44.62	NM	39.21	NM	NM	NM	-	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.6: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 21 (Noise Level in dB (A)) July-19				QM 22 (Noise Level in dB (A)) November-19				QM 23 (Noise Level in dB (A)) February 20				QM 25 (Noise Level in dB (A)) July, 20				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Day time	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	55.92	60.88	61.23	59.34	70	61.03	55.78	58.60	56.24	54.09	53.45	54.59	52.00	51.11	50.56	51.28	70
2	NW Corner of the Project area	56.44	53.21	55.88	55.18	55	53.45	50.97	51.11	40.96	43.33	51.98	45.42	43.9	42.95	43.26	43.37	55
3	Chunkuri-2, Bajua	56.15	63.34	58.60	59.36	55	52.92	54.51	55.27	59.78	51.59	54.96	55.44	49.42	48.52	48.32	48.75	55
4	SW corner of the Project area	66.94	58.41	65.65	63.66	55	49.98	42.05	46.57	56.35	54.05	56.40	55.60	49.91	49.78	50.85	50.18	55
5	Project site near Shapmari area	53.14	55.40	55.05	54.53	55	55.80	54.77	54.86	51.02	47.91	47.93	48.95	54.55	53.21	52.88	53.72	55
6	Barni, Gaurambha	51.36	57.98	NM	54.67	60	49.37	48.53	50.53	57.37	60.48	68.05	61.97	56.53	40.65	49.21	48.80	60
7	Khan Jahan Ali Bridge, Khulna	63.38	60.55	66.44	63.46	70	67.65	65.32	66.05	60.75	62.81	63.05	62.20	65.55	66.86	66.52	66.31	70
8	Mongla Port area	60.49	62.10	63.43	62.01	75	55.66	55.85	57.25	59.74	62.38	61.07	61.06	64.92	67.90	63.71	66.41	75
9	Harbaria, Sundarbans	47.62	42.18	NM	44.90	50	44.71	NM	44.10	45.59	42.29	41.35	43.94	47.80	52.15	41.2	49.97	50
10	Akram Point, Sundarbans	44.05	45.62	NM	44.84	50	42.60	NM	44.86	NM	36.59	40.46	36.59	51.04	45.11	43.1	51.04	50
11	Hiron Point, Sundarbans	NM	NM	NM	NM	50	41.34	NM	40.28	41.3	39.41	NM	40.34	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.7: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 26 (Noise Level in dB (A)) Oct, 2020				QM 27 (Noise Level in dB (A)) Jan, 2021				QM 28 (Noise Level in dB (A)) Apr, 2021				QM 29 (Noise Level in dB (A) Jul, 2021				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	65.91	51.62	56.93	58.15	58.33	NM	62.68	60.50	61.35	61.74	61.22	61.44	50.96	51.08	51.57	51.21	70
2	NW Corner of the Project area	47.82	50.15	47.45	48.48	45.00	52.75	56.51	51.42	50.65	48.34	NM	49.50	49.60	51.64	49.09	50.11	55
3	Chunkuri-2, Bajua	43.58	47.68	46.45	45.91	48.75	45.45	46.96	47.05	50.22	52.90	50.81	51.31	49.93	51.65	49.52	50.36	55
4	SW corner of the Project area	49.50	48.83	49.22	49.18	NM	50.88	53.84	52.36	55.41	54.85	55.45	55.24	49.82	54.82	51.07	51.90	55
5	Project site near Shapmari area	50.23	41.71	41.43	44.45	49.19	47.07	51.00	49.09	52.23	51.24	52.67	52.05	53.45	54.35	53.71	53.84	55
6	Barni, Gaurambha	67.71	51.76	55.51	58.33	51.69	51.99	55.60	53.09	54.16	51.69	51.15	52.34	52.73	NM	49.28	51.00	60
7	Khan Jahan Ali Bridge, Khulna	81.72	81.45	82.25	81.81	61.95	NM	61.93	61.94	56.08	54.09	53.79	54.65	52.78	51.29	53.05	52.38	70
8	Mongla Port area	74.72	75.67	80.37	76.92	55.16	56.85	57.53	56.52	54.01	52.41	54.48	53.63	55.26	55.54	55.68	54.49	75
9	Harbaria, Sundarbans	59.01	NM	50.06	54.54	46.98	41.82	NM	44.40	48.54	47.54	NM	48.04	NM	NM	NM	NM	50
10	Akram Point, Sundarbans	NM	42.23	NM	42.23	40.34	35.35	NM	37.85	45.95	40.89	NM	43.42	46.31	42.94	NM	44.62	50
11	Hiron Point, Sundarbans	52.40	49.01	NM	50.70	42.50	35.23	NM	38.85	NM	NM	NM	NM	49.70	51.2	NM	50.94	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.8: Ambient noise monitoring status at the monitored locations

Sl No	Location	QM 30 (Noise Level in Db (A)) Oct, 2021				QM 31 (Noise Level in dB (A)) Jan, 2022				QM 32(Noise Level in dB (A)) May, 2022				QM 33(Noise Level in dB (A)) Jul, 2022				Standard (Noise Control Rules 2006)
		Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	68.9	52.08	58.3	64.57	56	59.05	64.08	59.71	56	61.25	59.97	59.08	52.71	52.62	53.30	52.88	70
2	NW Corner of the Project area	47.99	51.61	48.17	49.59	49	48.90	48.56	48.82	48.63	48.64	48.64	48.60	46.55	44.82	45.44	45.60	55
3	Chunkuri-2, Bajua	45.31	48.07	46.8	46.87	49.85	47.48	49.70	49.01	48.32	48.72	49.70	48.91	48.00	45.61	47.75	47.12	55
4	SW corner of the Project area	49.66	49.49	48.95	49.37	63.74	49.95	50.25	54.65	50.31	50.05	51.24	50.53	54.00	48.07	46.06	49.38	55
5	Project site near Shapmari area	50.94	42.29	41.88	47.17	50.05	50.57	49.45	50.03	49.70	49.34	50.24	49.76	44.50	45.75	43.49	44.58	55
6	Barni, Gaurambha	68.37	51.5	56.61	63.96	47.60	49.57	49.51	48.89	47.60	45.05	49.04	47.23	50.06	45.93	46.40	47.46	60
7	Khan Jahan Ali Bridge, Khulna	77.75	80.58	81.43	80.18	61.04	63.52	62.44	62.33	56.46	56.93	62.42	58.60	55.75	NM	NM	55.75	70
8	Mongla Port area	73.94	75.15	79.45	76.86	NM	53.89	58.02	55.95	55.95	56.99	59.19	57.38	55.41	55.09	54.75	55.08	75
9	Harbaria, Sundarbans	59.51	50.62	NM	57.02	49.85	44.77	NM	47.31	52.31	46.44	NM	49.37	42.95	38.59	NM	40.77	50
10	Akram Point, Sundarbans	44.22	42.12	NM	43.29	38.66	36.15	NM	37.41	46.22	39.94	NM	43.08	41.97	NM	41.01	41.49	50
11	Hiron Point, Sundarbans	53.99	49.41	NM	52.27	39.5	33.08	NM	36.29	NM	NM	NM	NM	NM	NM	NM	NM	50

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.9: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 34(Noise Level in dB (A)) Oct, 2022				QM 35 (Noise Level in dB (A)) Jan, 2023				QM 36 (Noise Level in dB (A)) Apr, 2023				QM 37 (Noise Level in dB (A)) Apr, 2023				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	A. noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	78.1	72.2	76.2	75.5	69.5	67	62.7	66.4	62	55.2	57	58	57.69	55.83	57.87	57.13	**70**
2	NW Corner of the Project area	57	57.7	52.3	55.67	53.4	48.3	43.2	48.3	45.1	44.5	46	45.2	50.47	48.07	48.62	49.06	**55**
3	Chunkuri-2, Bajua	63.5	55.4	54.6	57.83	51.8	55.4	53.3	53.5	51.5	52.4	50.8	51.6	54.93	47.43	46.28	49.54	**55**
4	SW corner of the Project area	56.2	53.7	52.7	54.2	49.8	53.8	NM	51.8	58.7	49.7	50.9	54.2	50.55	55.53	53.87	53.32	**55**
5	Project site near Shapmari area	57.4	50.9	NM	54.15	56.3	53.8	46.4	52.2	46.7	46.4	51.2	48.1	47.07	45.4	47.54	46.67	**55**
6	Barni, Gaurambha	62.5	60.5	62.6	61.87	59.9	57	58.5	58.5	59.1	46.8	52.9	52.9	57.97	49.15	52.66	53.26	**60**
7	Khan Jahan Ali Bridge, Khulna	65.1	63.2	NM	64.15	70.2	68.9	75.9	71.7	65.9	62.1	NM	64	60.35	55.4	54.9	56.88	**70**
8	Mongla Port area	61.5	67.9	65.6	65	65.2	68.1	56.4	63.2	63.3	58.3	61.9	61.2	55.97	56.58	53.36	55.31	**75**
9	Harbaria, Sundarbans	49.6	50.4	NM	50	48.1	41.8	NM	44.9	48.7	51.4	NM	50	49.15	48.64	NM	48.89	**50**
10	Akram Point, Sundarbans	42.5	41.7	NM	42.1	42.9	37.6	NM	40.2	46.5	43.7	NM	45.1	40.49	55.69	NM	48.09	**50**
11	Hiron Point, Sundarbans	47.8	NM	NM	47.8	41.3	41.3	NM	41.3	NM	NM	NM	NM	55.8	52.51	NM	54.15	**50**

Source: CEGIS Field Survey; Note: NM-Not measured;

Table C.10: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 38(Noise Level in dB (A)) Oct, 2022				QM 39(Noise Level in dB (A)) Jan, 2023				QM 40 (Noise Level in dB (A)) May, 2024				QM 41(Noise Level in dB (A)) July, 2024				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	55.56	52.75	54.53	54.28	51.74	55.18	57.78	54.90	53.88	52.39	53.90	53.39	51.80	50.90	51.90	51.53	**70**
2	NW Corner of the Project area	48.92	45.19	50.22	48.11	49.15	42.96	46.73	46.28	43.41	60.26	52.09	51.92	52.40	53.80	49.70	51.97	**55**
3	Chunkuri-2, Bajua	57.15	57.35	53.24	55.91	50.09	52.87	54.18	52.36	52.86	44.24	47.59	48.23	47.90	48.10	47.10	47.70	**55**
4	SW corner of the Project area	53.93	58.77	61.45	58.05	49.69	54.55	50.58	51.61	49.55	55.10	48.25	50.97	51.80	51.20	49.20	50.73	**55**
5	Project site near Shapmari area	45.91	44.70	44.98	45.20	57.42	58.04	58.79	58.08	48.68	47.25	47.09	47.68	48.90	47.10	48.30	48.10	**55**
6	Barni, Gaurambha	56.59	54.05	60.79	57.14	54.77	58.06	66.85	59.90	60.16	53.38	58.09	57.21	59.70	58.40	59.60	59.23	**60**
7	Khan Jahan Ali Bridge, Khulna	67.89	62.10	65.13	65.04	61.93	61.14	64.05	62.37	64.96	58.36	65.02	62.78	59.20	57.50	60.70	59.13	**70**
8	Mongla Port area	53.95	50.79	56.02	53.59	61.33	57.55	59.56	59.48	58.60	54.00	59.13	57.24	61.40	57.10	57.80	58.77	**75**
9	Harbaria, Sundarbans	49.46	49.74	NM	49.60	41.17	32.40	NM	36.79	51.44	46.31	NM	48.87	42.30	41.50	45.20	43.00	**50**
10	Akram Point, Sundarbans	40.68	37.45	NM	39.07	33.10	38.36	NM	35.73	37.96	37.99	NM	37.98	41.60	42.50	40.90	41.67	**50**
11	Hiron Point, Sundarbans	40.90	39.75	NM	40.34	35.40	35.59	NM	35.49	41.20	43.78	NM	42.47	NM	NM	NM	NM	**50**

Source: CEGIS Field Survey; Note: NM-Not measured

Table C.11: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 42 (Noise Level in dB (A)) October, 2024				QM 43 (Noise Level in dB (A)) January, 2025				QM 44 (Noise Level in dB (A)) April, 2025				QM 45 (Noise Level in dB (A)) July, 2025				QM 46 (Noise Level in dB (A)) October, 2025				Standard (Noise Control Rules 2006)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	
1	Chalna, Dacope	52.45	48.82	53.06	51.44	50.60	50.67	52.08	51.12	49.46	59.58	54.71	54.58	52.95	50.39	54.01	52.45	46.76	44.69	48.59	46.68	**70**
2	NW Corner of the Project area	51.04	48.72	50.61	50.12	48.11	44.37	55.67	49.38	46.33	44.54	49.86	46.91	55.43	51.95	55.84	54.41	52.91	51.01	54.01	52.64	**55**
3	Chunkuri-2, Bajua	61.95	59.77	62.75	61.49	58.12	47.10	51.48	52.23	62.45	55.68	66.94	61.69	48.44	47.70	59.34	51.83	47.85	47.14	48.59	47.86	**55**
4	SW corner of the Project area	44.87	44.50	46.42	45.26	48.65	44.50	47.51	46.89	45.80	44.50	54.16	48.15	45.80	44.50	47.50	45.93	45.80	44.50	45.70	45.33	**55**
5	Project site near Shapmari area	47.45	48.32	46.88	47.25	50.33	45.09	47.64	47.68	49.85	44.98	47.04	47.29	49.85	47.45	47.68	48.33	44.95	44.11	45.44	44.83	**55**
6	Barni, Gaurambha	59.23	57.13	63.56	59.97	57.35	55.65	50.28	54.42	62.10	49.70	59.72	57.14	54.03	49.09	61.57	54.90	48.62	51.20	60.09	53.30	**60**
7	Khan Jahan Ali Bridge, Khulna	62.58	57.89	61.50	60.66	62.18	60.35	61.27	61.27	66.73	63.50	64.23	64.82	65.03	65.29	65.56	65.29	61.38	60.40	60.80	60.86	**70**
8	Mongla Port area	61.00	56.28	59.68	58.99	55.05	58.10	61.70	58.28	60.04	56.33	56.61	57.66	60.18	57.96	59.65	59.26	60.18	57.96	59.65	59.26	**75**
9	Harbaria, Sundarbans	52.45	48.82	53.06	51.44	50.60	50.67	52.08	51.12	49.46	59.58	54.71	54.58	48.94	46.99	NM	47.96	46.02	41.14	NM	43.58	**50**
10	Akram Point, Sundarbans	51.04	48.72	50.61	50.12	48.11	44.37	55.67	49.38	46.33	44.54	49.86	46.91	46.64	44.35	NM	45.50	36.44	36.19	NM	36.31	**50**
11	Hiron Point, Sundarbans	61.95	59.77	62.75	61.49	58.12	47.10	51.48	52.23	62.45	55.68	66.94	61.69	47.77	50.37	NM	49.07	40.12	41.29	NM	40.70	**50**

Source: CEGIS Field Survey; Note: NM-Not measured

Table C.12: Ambient noise monitoring status at the monitored locations

Sl. No	Location	QM 47 (Noise Level in dB (A)) January-February, 2025				Standard (Noise Control Rules, 2025)
		Morning (9:00)	Noon (13:00)	Evening (18:00)	Day time AVG	
1	Within 100 meters of the plant	61.95	62.33	61.83	62.04	75
2	Immediate outside of the project boundary	51.06	53.41	50.21	51.56	75
3	1 KM Northern (Shapmari)	44.43	54.21	49.06	49.23	60
4	1 KM Southern	53.84	52.28	45.69	50.60	75
5	1 KM Eastern	43.29	43.85	48.65	45.26	55
6	1 KM Western	44.46	35.58	46.24	42.09	75
7	Nearest point (Dhangmari) 2 (Noise)	43.99	42.70	44.28	43.65	50
8	Nearest point (Sutarkhali) 1 (Noise)	39.61	35.04	NM	37.33	50
9	Nearest point (Karamjal) 3 (Noise)	43.81	42.70	NM	43.25	50
10	Beside sibsa (Akram Point)	39.94	35.44	NM	37.69	50
11	Harbaria, Sundarbans	46.20	45.31	NM	45.76	50
12	Hiron Point, Sundarbans	40.56	40.79	NM	40.68	50

Source: CEGIS Field Survey January-February 2026; Note: NM-Not measured

(D) Traffic volume analysis

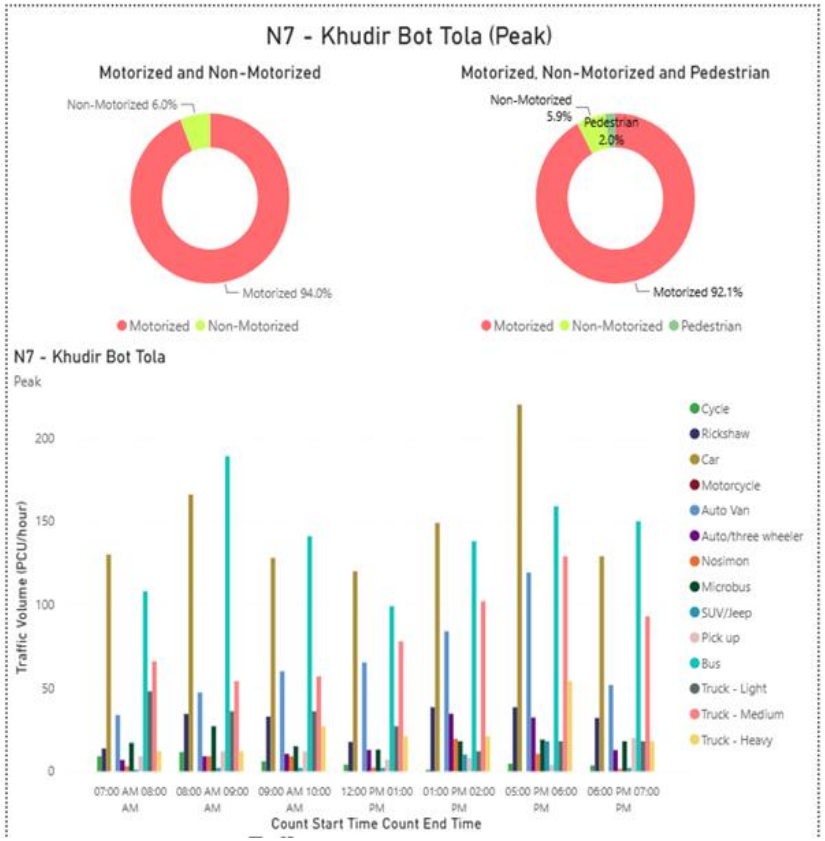


Figure 1: Traffic Volume Analysis: N7 – Khudir Bot Tola (Peak Day)

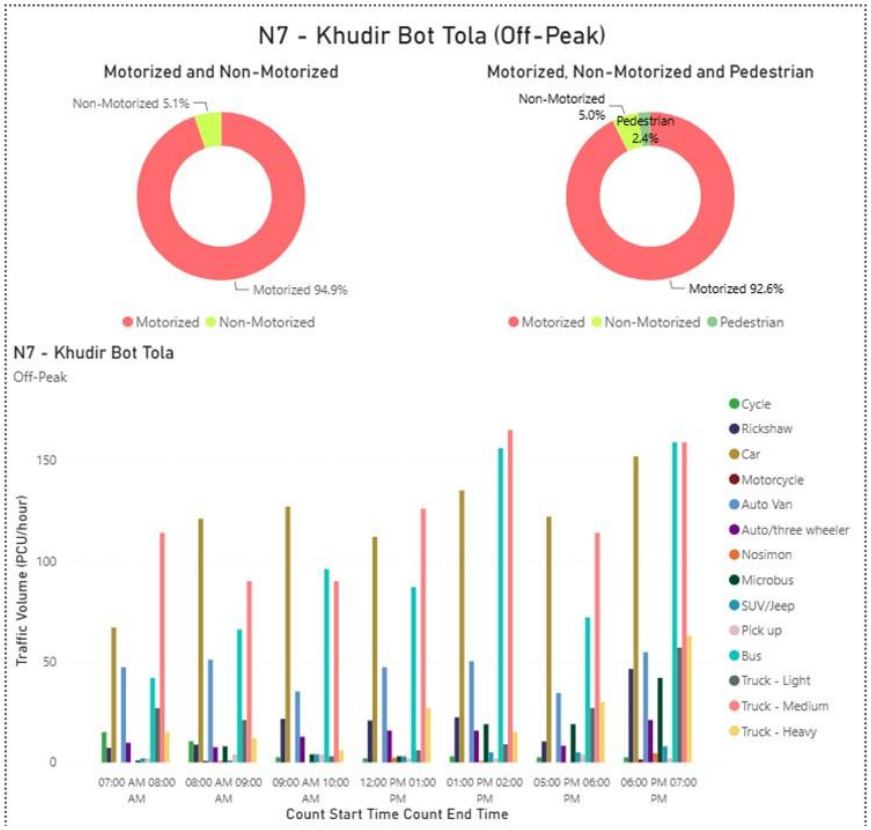


Figure 2: Traffic Volume Analysis: N7 – Khudir Bot Tola (Off-Peak Day)

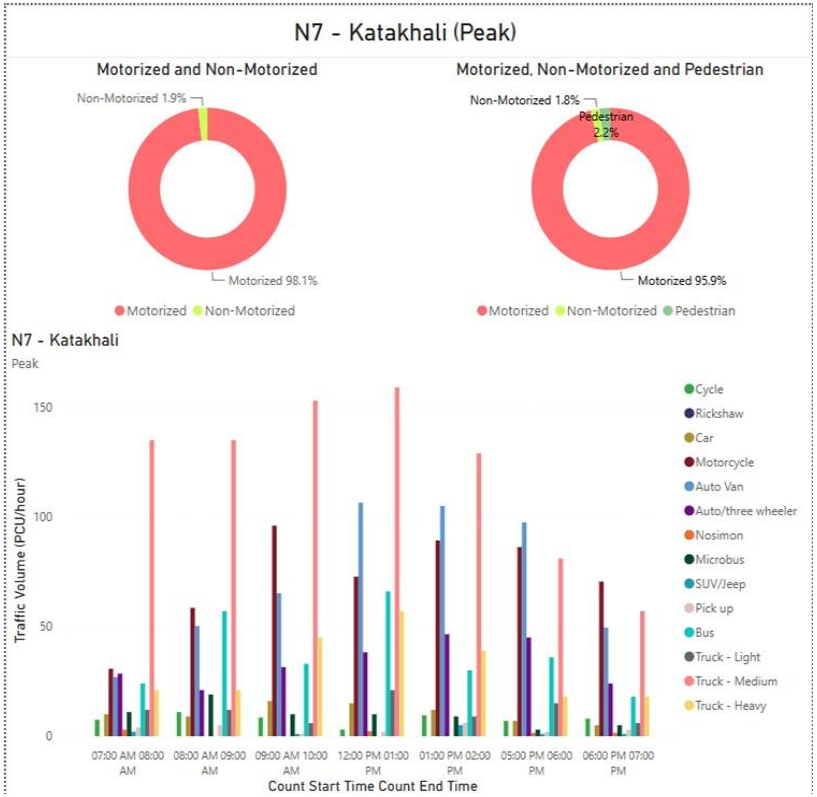


Figure 3: Traffic Volume Analysis: N7 – Katakhali (Peak Day)

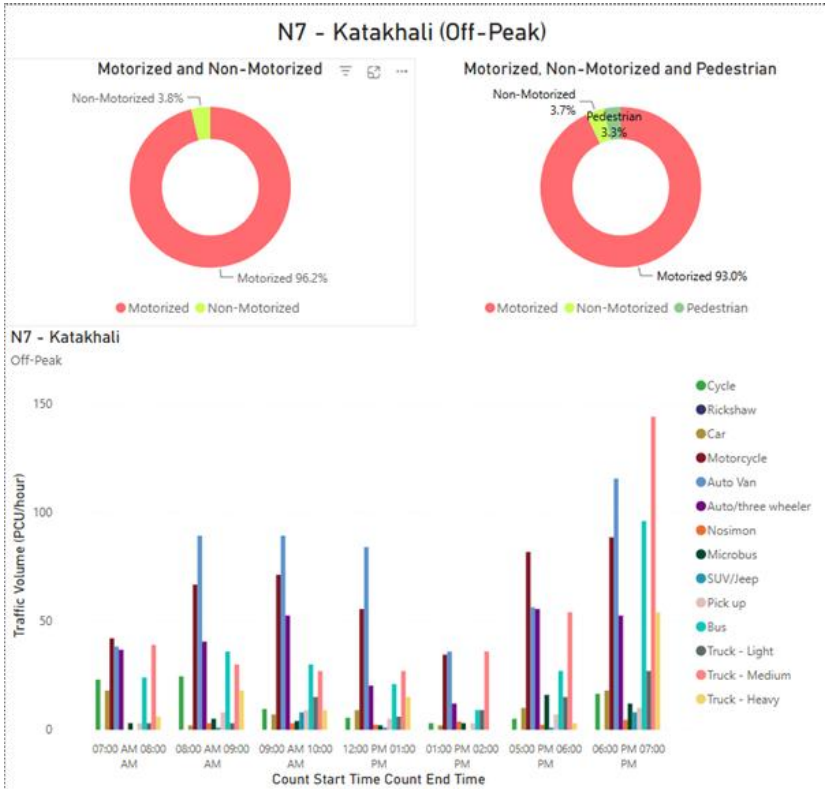


Figure 4: Traffic Volume Analysis: N7 – Katakhali (Off-Peak Day)

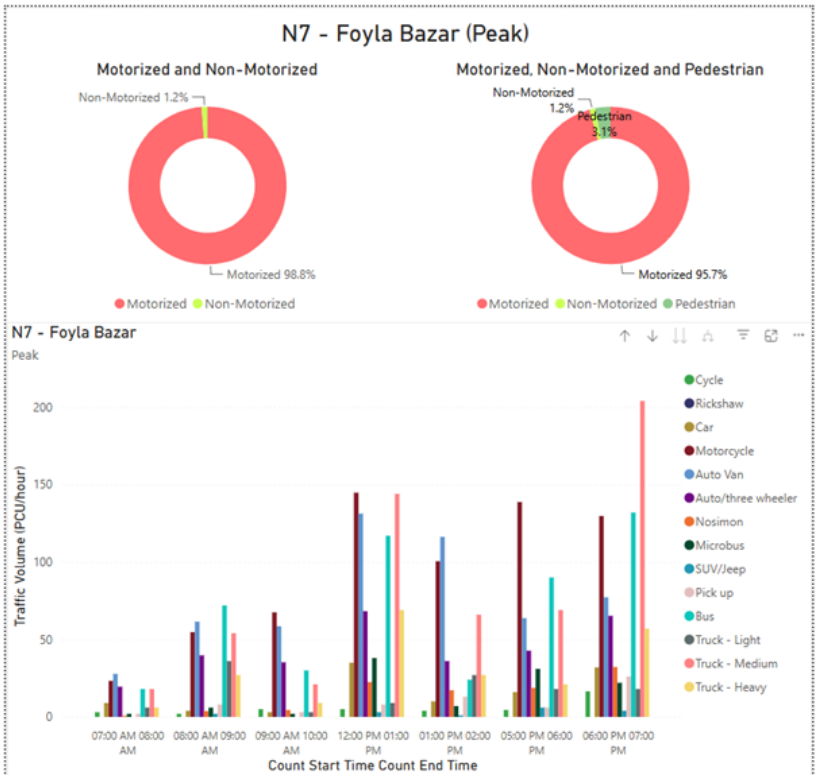


Figure 5: Traffic Volume Analysis: N7 – Foyla Bazar (Peak Day)

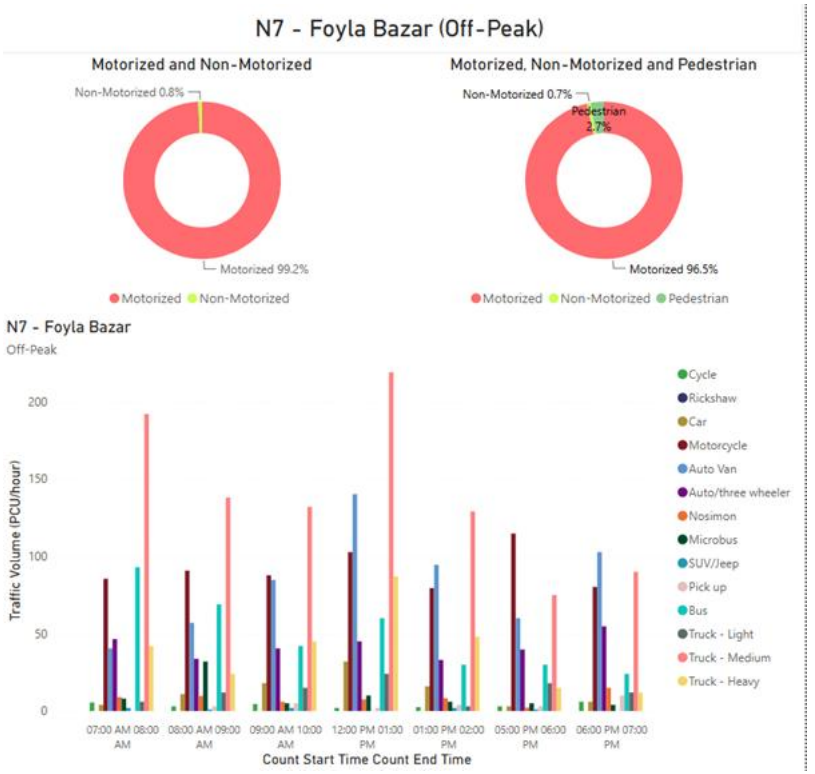


Figure 6: Traffic Volume Analysis: N7 – Foyla Bazar (Off-Peak Day)

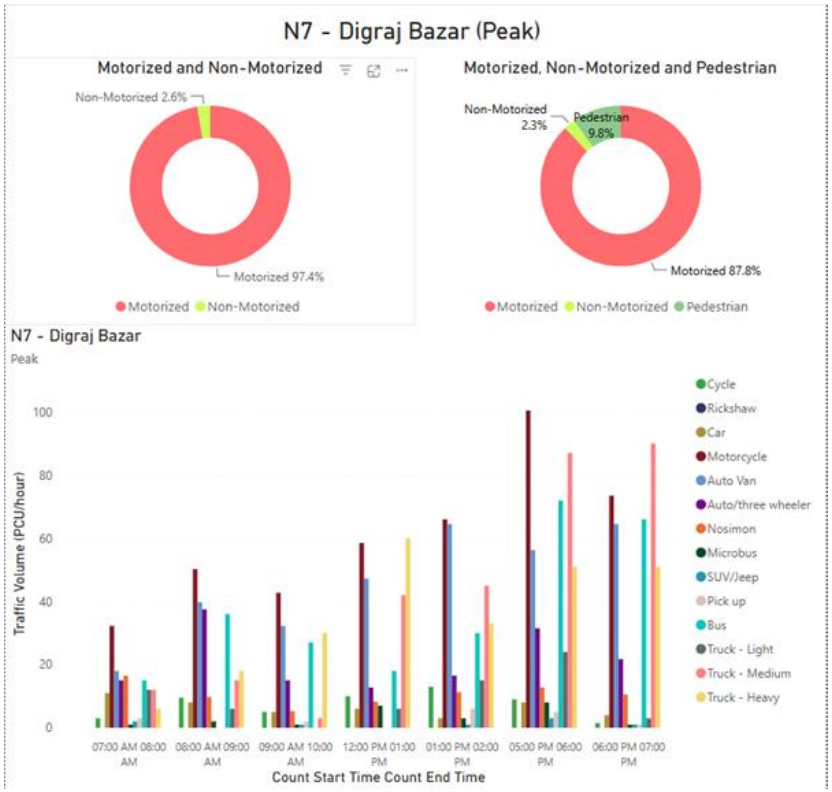


Figure 7: Traffic Volume Analysis: N7 – Digraj Bazar (Peak Day)

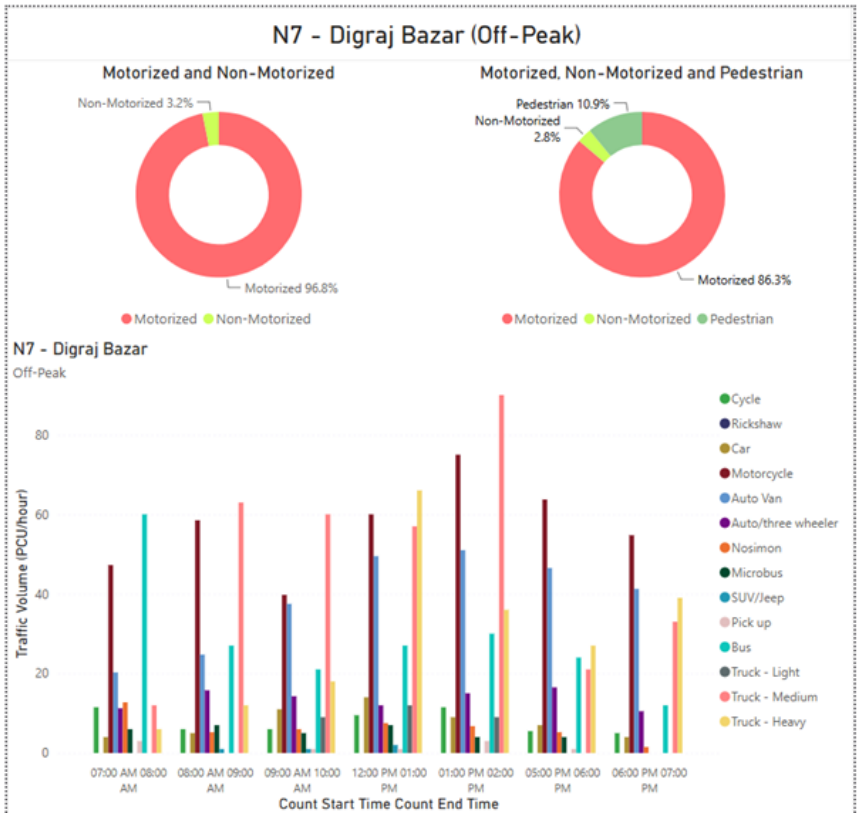


Figure 8: Traffic Volume Analysis: N7 – Digraj Bazar (Off-Peak Day)

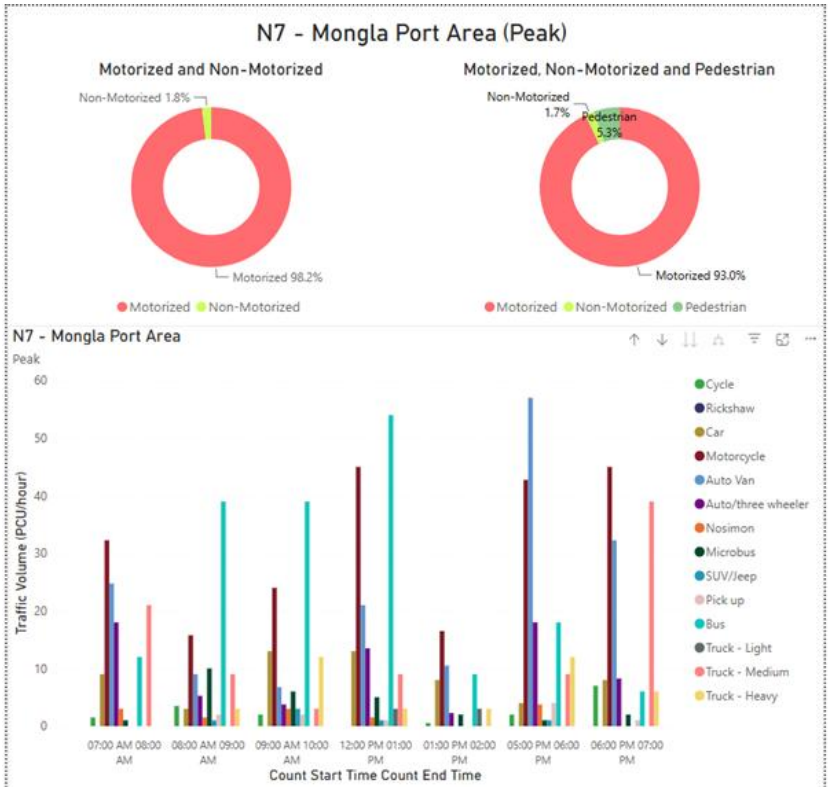


Figure 9: Traffic Volume Analysis: N7 – Mongla Port Area (Peak Day)

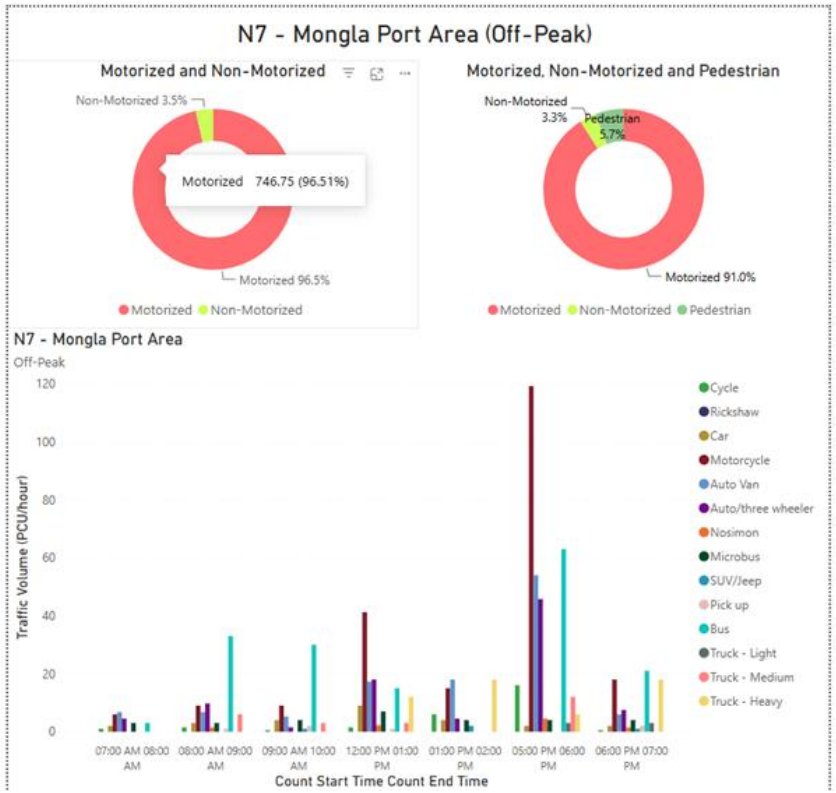


Figure 10: Traffic Volume Analysis: N7 – Mongla Port Area (Off-Peak Day)

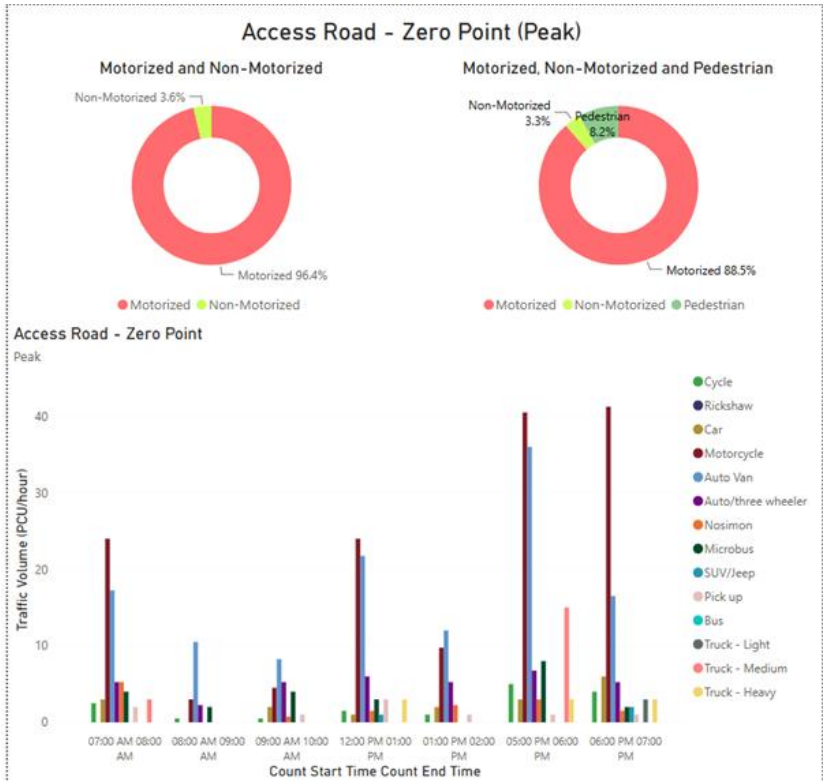


Figure 11: Traffic Volume Analysis: Access Road - Zero Point (Peak Day)

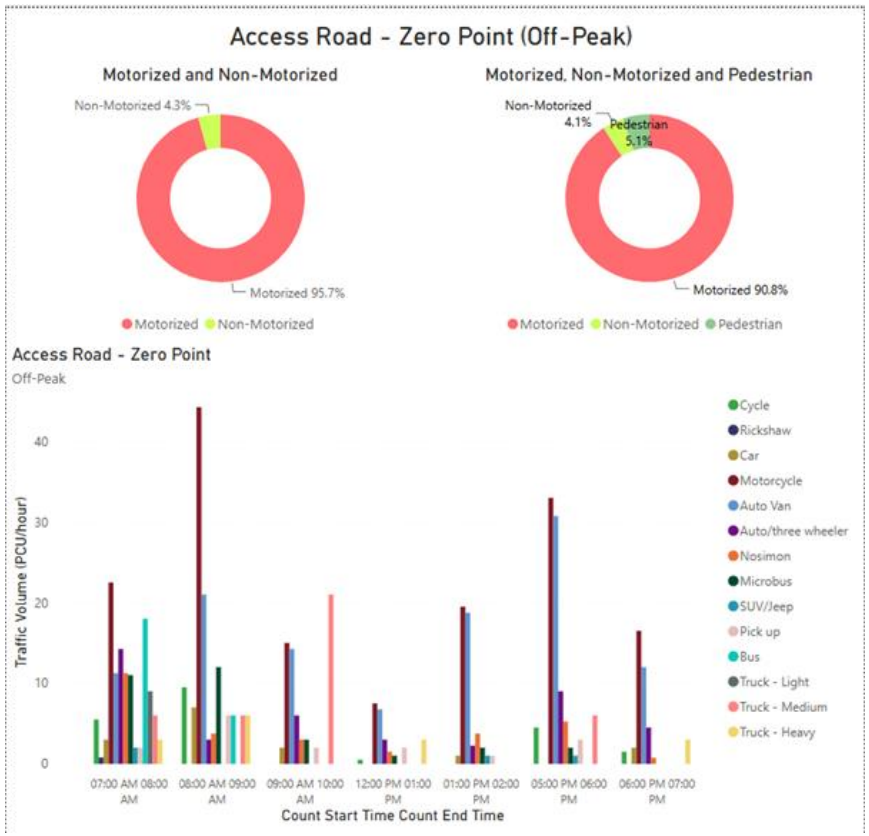


Figure 12: Traffic Volume Analysis: Access Road - Zero Point (Off-Peak Day)

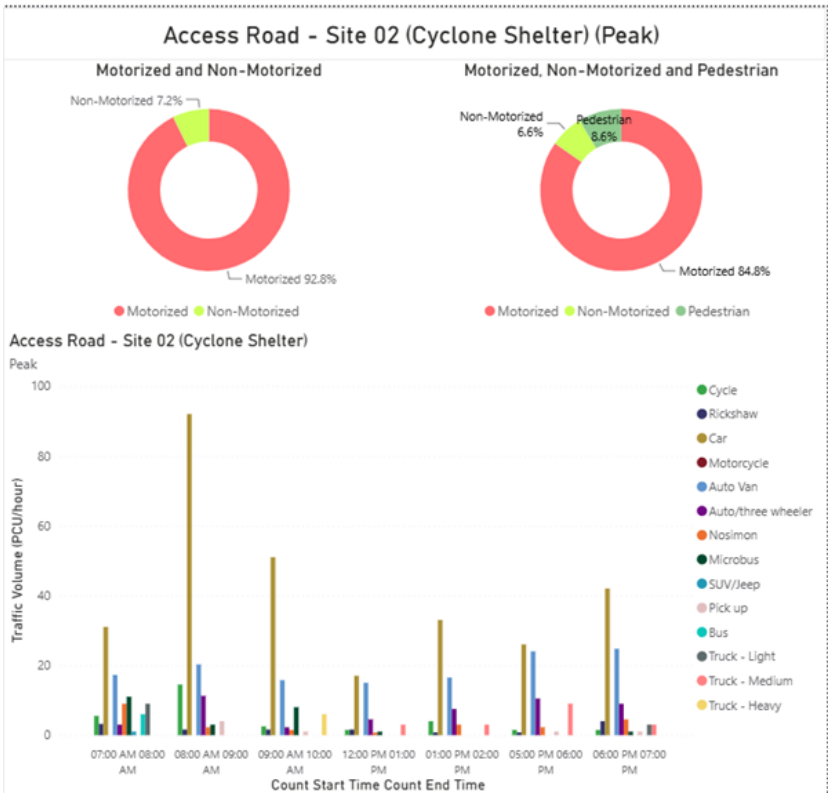


Figure 13: Traffic Volume Analysis: Access Road Site 02 – Cyclone Shelter (Peak Day)

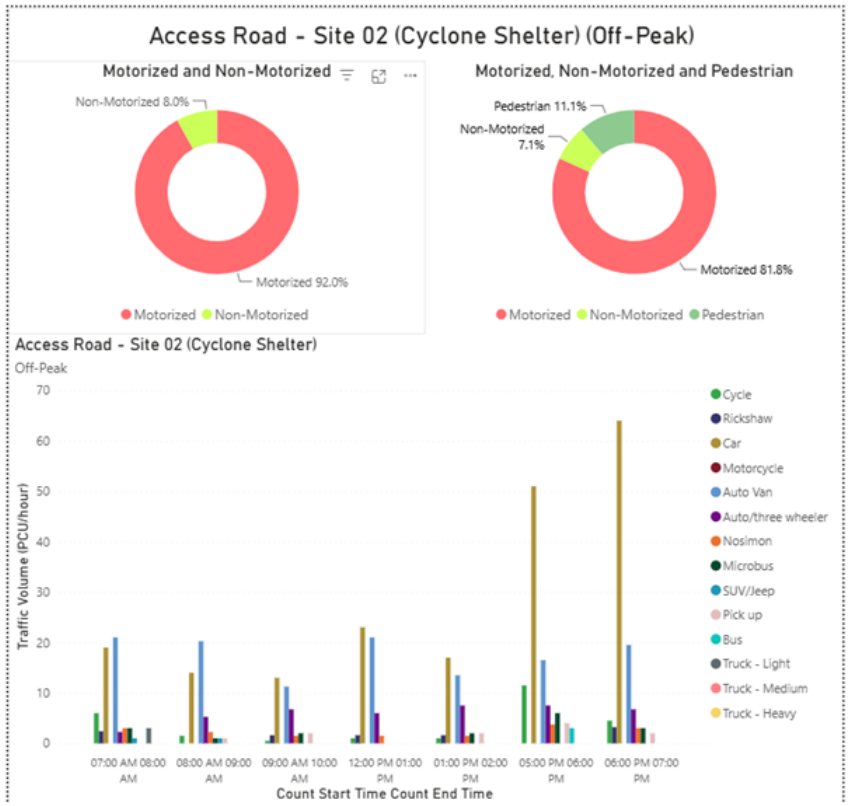


Figure 14: Traffic Volume Analysis: Access Road Site 02 – Cyclone Shelter (Off-Peak Day)

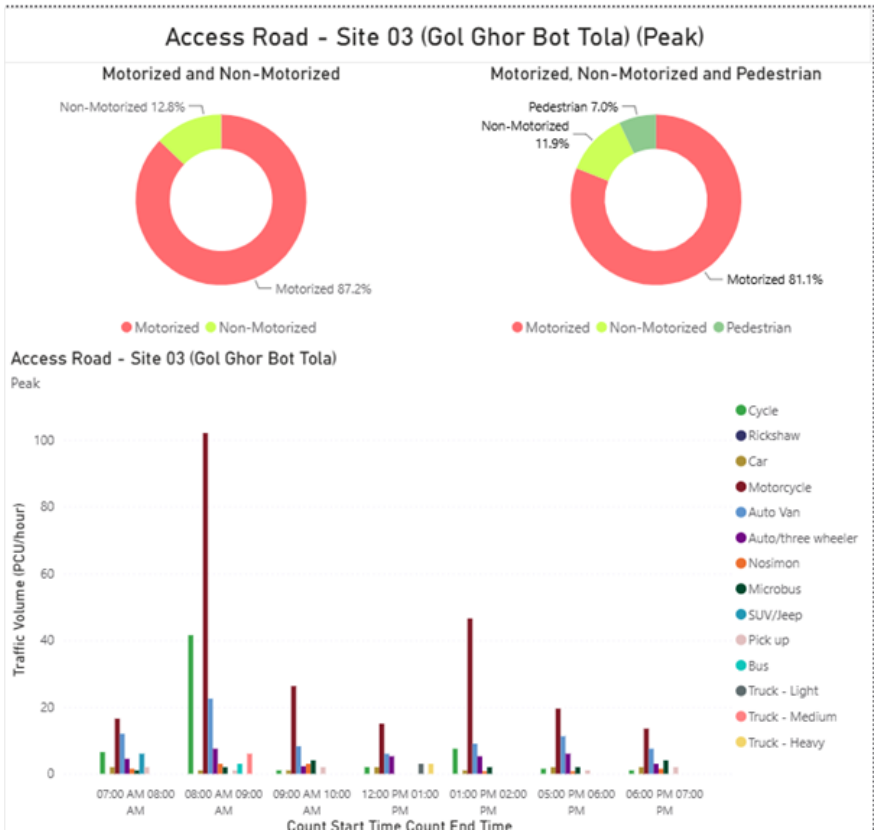


Figure 15: Traffic Volume Analysis: Access Road Site 03 – Bot Tola (Peak Day)

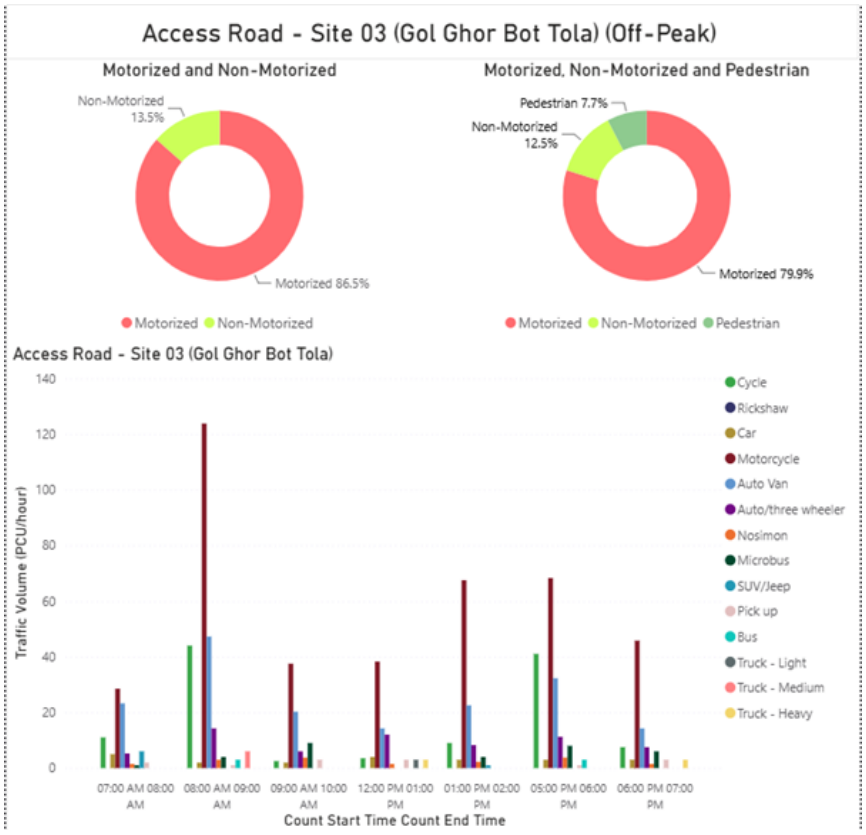


Figure 6: Traffic Volume Analysis: Access Road Site 03 – Bot Tola (Peak Day)

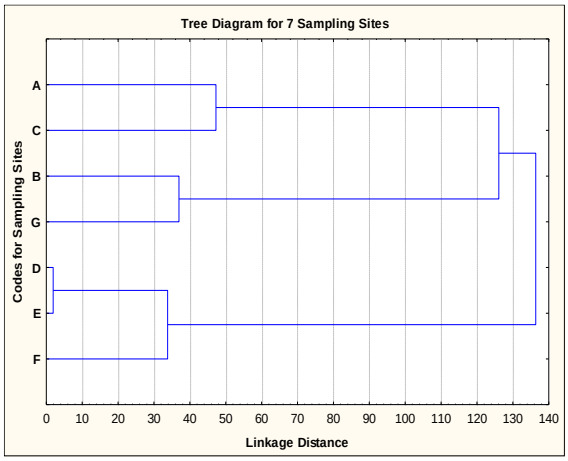
(E) Fisheries Resources Monitoring Data

Table E1: Classification of Habitat Use

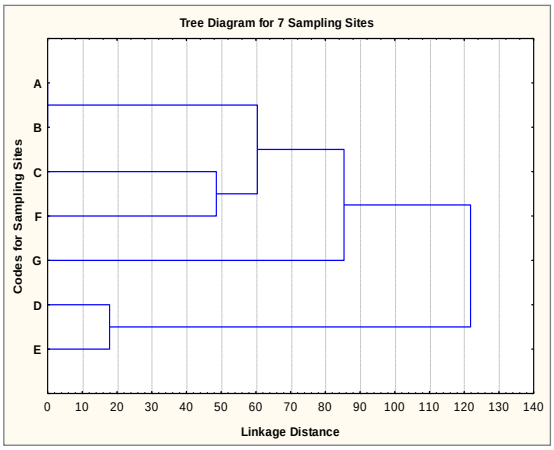
Monitoring Quarter	Type of Habitat Use
1st (April, 2014)	• Grazing Ground • Grazing and Breeding Ground
2nd (July, 2014)	• Grazing Ground • Spawning and Nursery Ground
3rd (October, 2014)	• Grazing Ground • Grazing and Breeding Ground • Spawning, Nursery and Grazing Ground
4th (January, 2015)	• Grazing Ground • Grazing and Breeding Ground • Spawning, Nursery and Grazing Ground
5th (April, 2015)	• Grazing Ground • Nursery Ground • Spawning and Nursery
6th (August, 2015)	• Grazing, Breeding Ground • Spawning, and Nursery Ground
7th (October, 2015)	• Grazing Ground, • Nursery Ground and • Growing and Feeding
8th (January, 2016)	• Nursery and Feeding Ground • Growing and Feeding
9th (April, 2016)	• Spawning and Nursery Ground • Feeding and Growing Ground
10th (July, 2016)	• Nursery Ground • Feeding and Breeding Ground
11th (October, 2016)	• Breeding and Spawning Ground • Feeding and Grazing Ground
12th (January, 2017)	• Grazing and Spawning Ground • Nursing Ground
13th (April, 2017)	• Grazing and Feeding Ground • Nursing Ground
14th (October, 2017)	• Grazing and Feeding Ground • Nursing Ground
15th (January, 2018)	• Grazing and Feeding Ground • Nursing Ground
16th (April, 2018)	• Feeding ground • Growing ground • Nursing ground
17th (July, 2018)	• Spawning and Nursery Ground • Nursery Ground with Feeding and Growing Capacity • Growing and Feeding Ground • Omni-ground
18th (November, 2018)	• Ground for Maturation • Omni-Ground: Nursery and Feeding Ground/Migratory Route; Ground for Maturation; Growing and Maturation Ground; Maturation Ground for Juveniles

Monitoring Quarter	Type of Habitat Use
19th (February, 2019)	• Ground for Feeding • Omni-Ground including Nursery Ground and Ground for Maturation
20th (April, 2019)	• Ground for Feeding and Maturation • Omni-Ground including Nursery Ground and Ground for Maturation
21st (July, 2019)	• Ground for Feeding and Maturation • Omni-Ground including Nursery Ground and Ground for Maturation
22nd (November, 2019)	• Spawning and Nursery Ground • Omni-Ground including Feeding and Maturation Ground
23rd (February, 2020)	• Nursery Ground • Spawning ground • Ground for maturation and feeding
25th (July, 2020)	• Nursery Ground • Ground for maturation and feeding
26th (November, 2020)	• Nursery Ground • Omni-Ground including Spawning and Nursery Ground, and Maturation Ground
27th (January, 2021)	• Nursery Ground • Omni-Ground including Spawning and Nursery Ground, and Maturation Ground
28th (April, 2021)	• Spawning and Nursery Ground • Ground for Maturation and Feeding
29th (September, 2021)	• Nursery Ground • Ground for Maturation and feeding
30th (November, 2021)	• Feeding Ground • Omni Ground including Nursery ground, and Maturation and Feeding Ground
31st (February, 2022)	• Nursery Ground • Maturation and Feeding Ground
32nd (May, 2022)	• Spawning and Nursery Ground • Maturation Ground
33rd (July, 2022)	• Spawning and Nursery Ground • Feeding and Maturation Ground
34th (October, 2022)	• Feeding Ground • Ground for Maturation
35th (January, 2023)	• Spawning and Nursery Ground • Ground for Maturation and Feeding
36th (June, 2023)	• Spawning and Nursery Ground • Omni Ground including Nursery Ground, Maturation and Feeding Ground
37th (September, 2023)	• Spawning and Nursery Ground • Omni Ground including Nursery Ground, Maturation and Feeding Ground
38th (November, 2023)	• Feeding Ground • Omni Ground including Spawning, Nursery and Maturation Ground
39th (February, 2024)	• Feeding and Maturation Ground • Omni Ground including Spawning, Nursery and Maturation Ground
40th (May, 2024)	• Nursery and Feeding Ground • Omni Ground including Spawning, Nursery and Maturation Ground
41st (August, 2024)	• Growing and Maturation Ground • Nursing and feeding ground

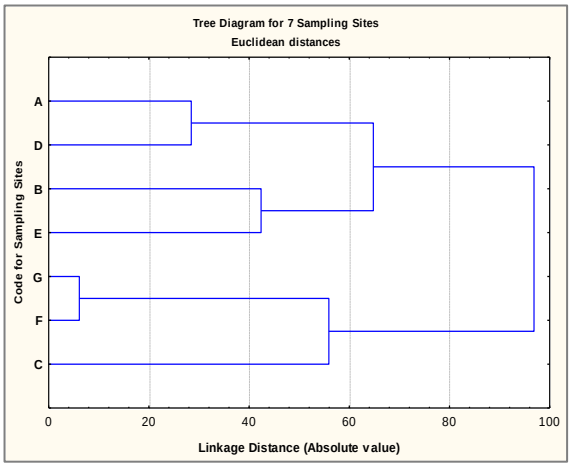
Monitoring Quarter	Type of Habitat Use
42nd (November, 2024)	• Growing and Feeding Ground • Maturation Ground
43rd February, 2025)	• Spawning and Nursery Ground • Omni Ground including Nursery, Feeding and Maturation Ground
44th (April, 2025)	• Spawning and Nursery Ground • Omni Ground including Spawning, Nursery and Maturation Ground
45th (August, 2025)	• Omni Ground including Spawning, Nursery and Maturation Ground • Ground for Maturation and Feeding
46th (November, 2025)	• Spawning and Nursery Ground • Omni Ground including Feeding and Maturation



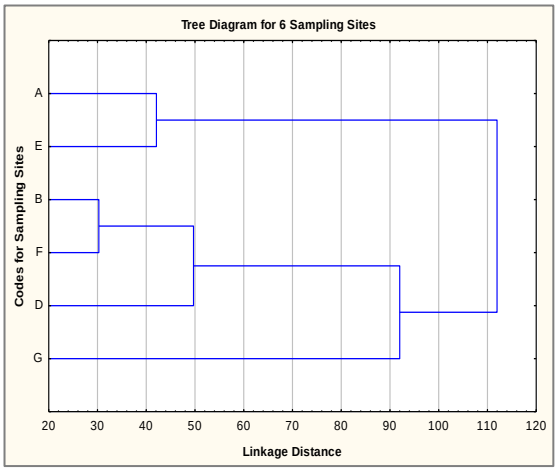
1st Monitoring, April, 2014



2nd Monitoring, July 2014

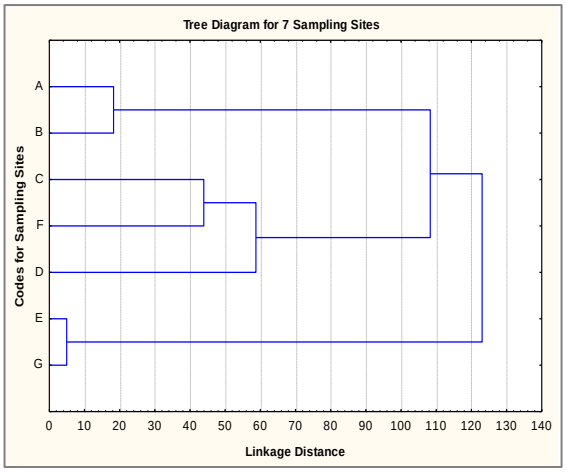


3rd Monitoring, October, 2014

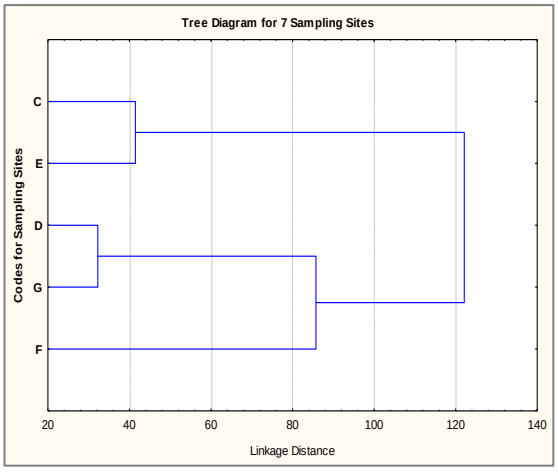


4th Monitoring, January 2015

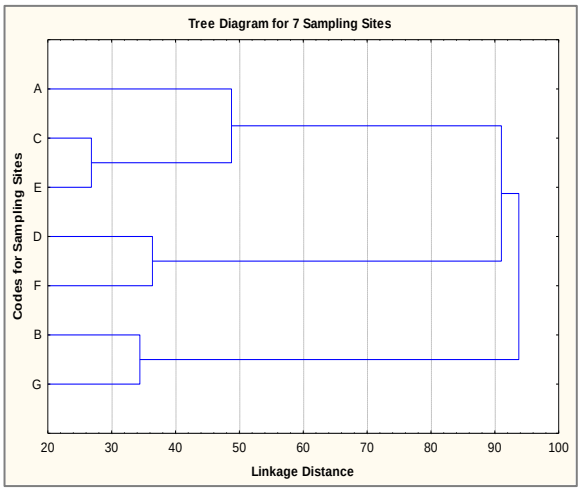
Figure E2: Classification of Functional Habitats



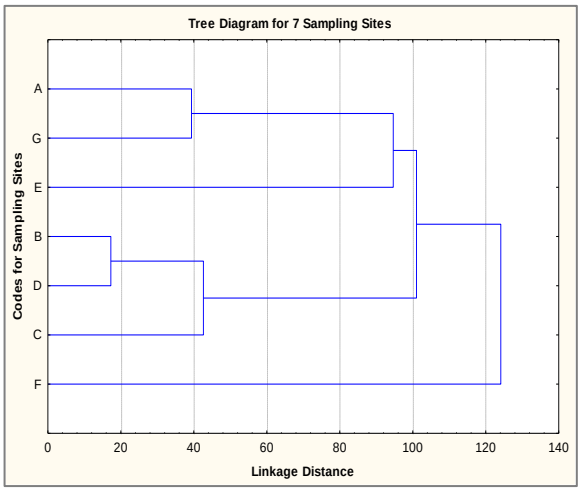
5th Monitoring, April, 2015



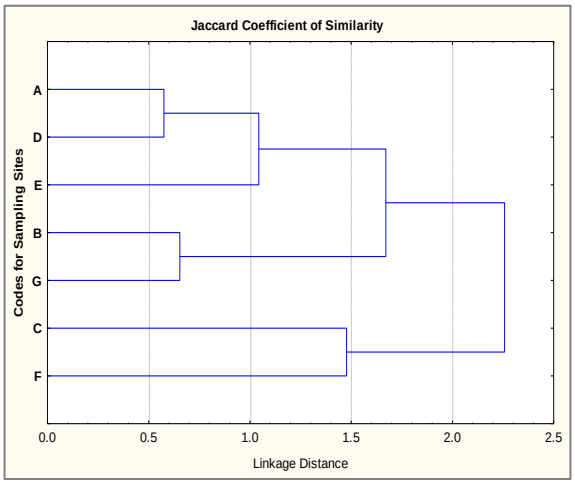
6th Monitoring, July, 2015

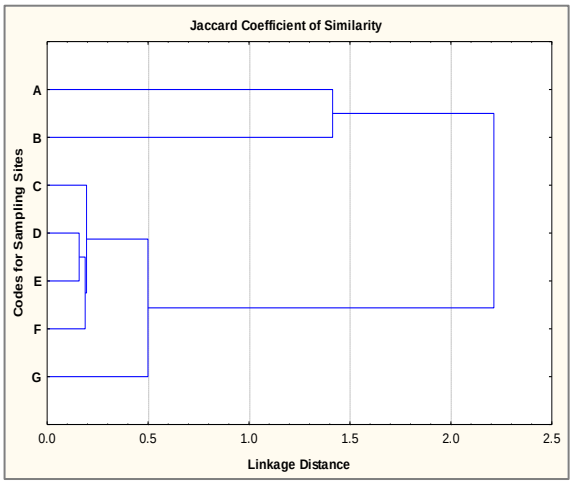


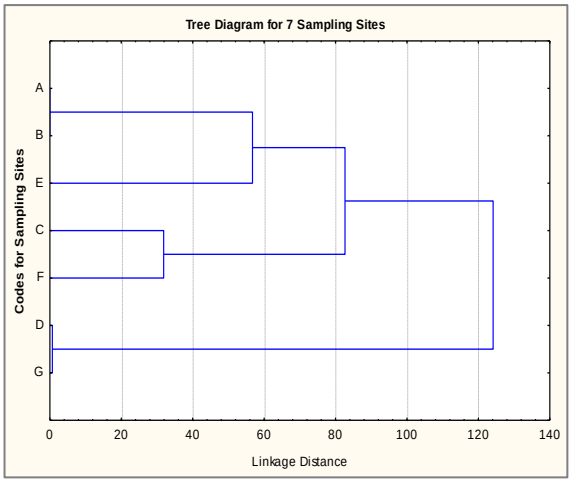
7th Monitoring, October, 2015



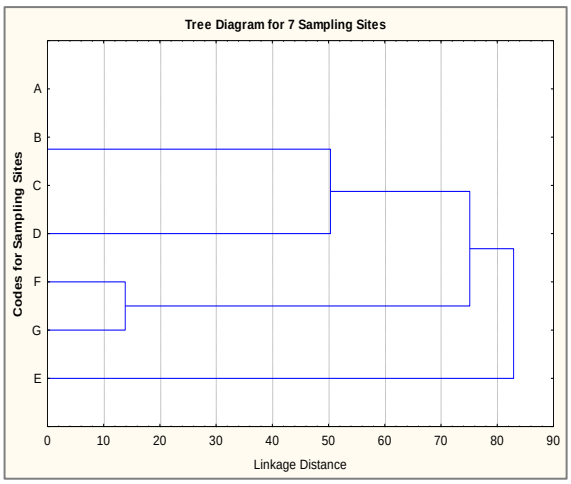
8th Monitoring, January, 2016



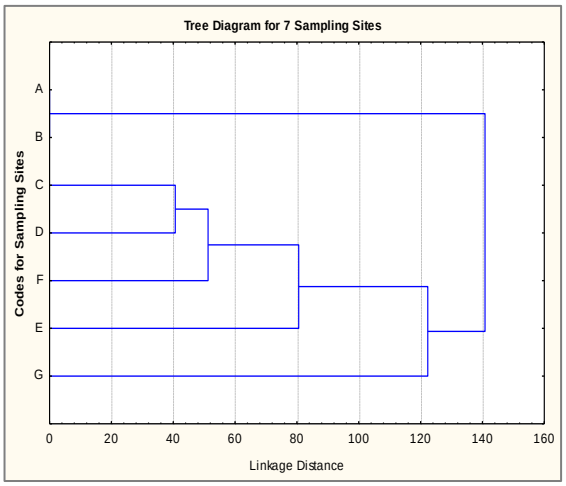




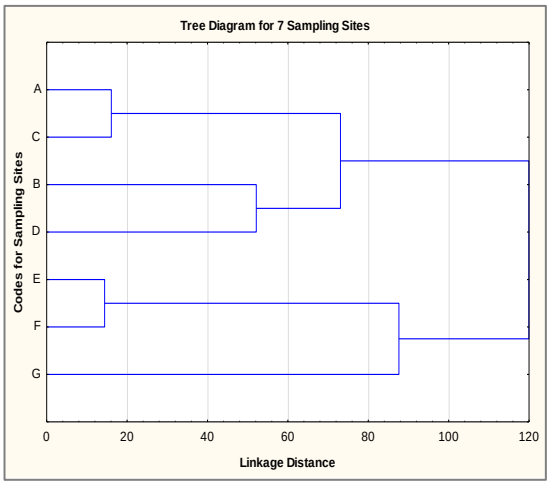
9th Monitoring, April, 2016



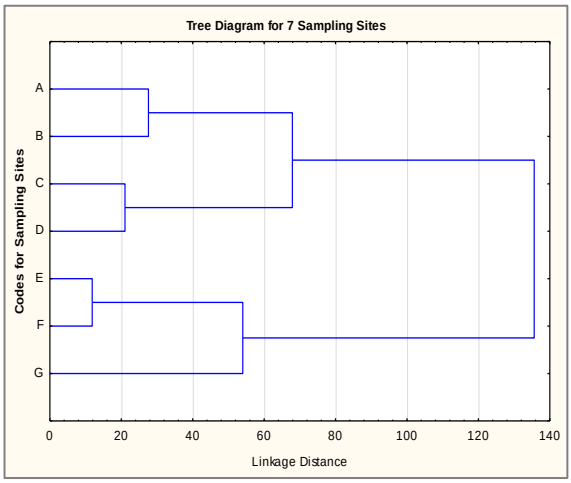
10th Monitoring, July, 2016



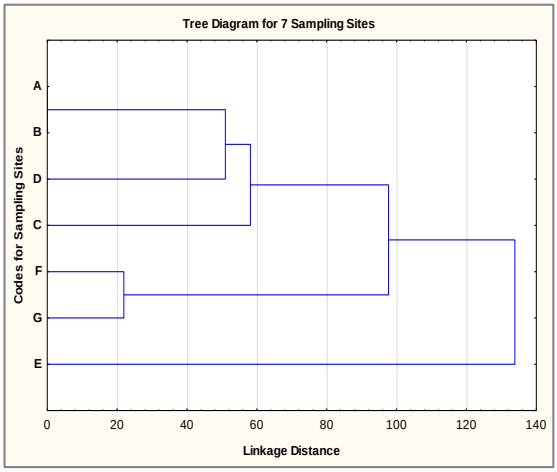
11th Monitoring, October, 2016



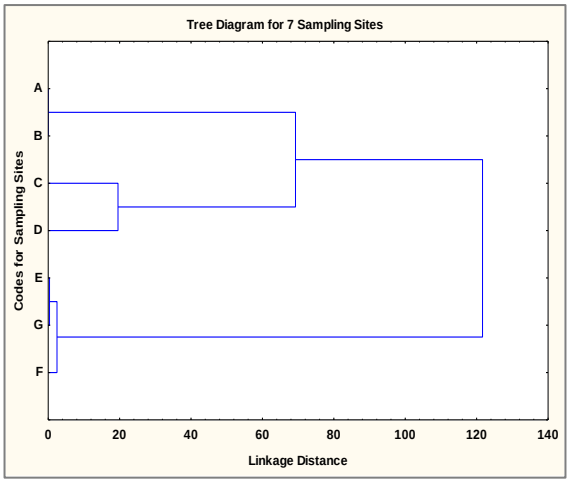
12th Monitoring, January, 2017



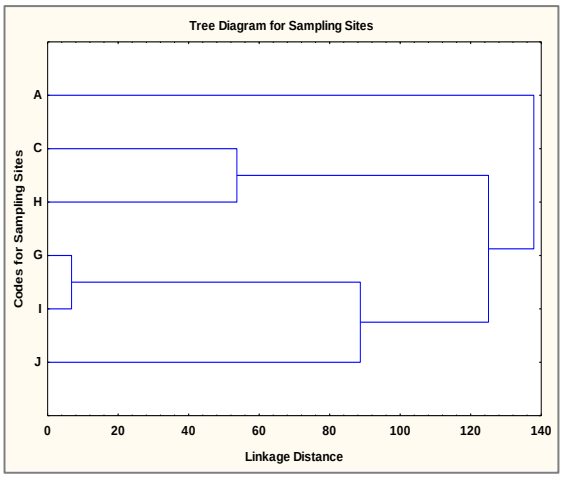
13th Monitoring, April, 2017



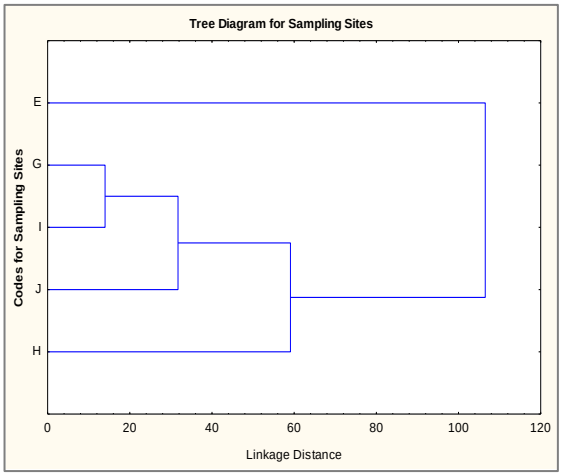
14th Monitoring, October, 2017



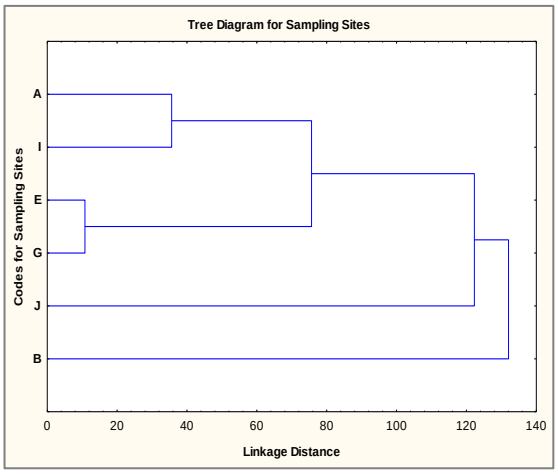
15th Monitoring, January, 2018



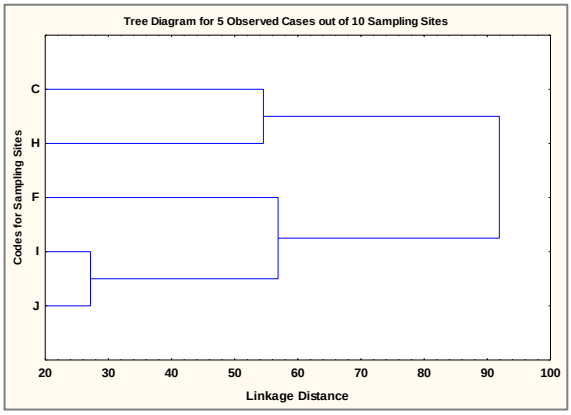
16th Monitoring, April, 2018



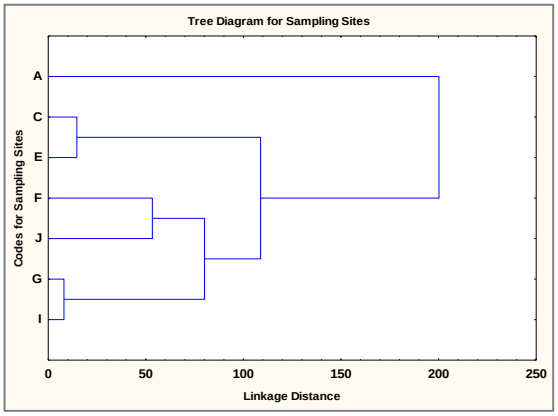
17th Monitoring, July, 2018



18th Monitoring, November, 2018



19th Monitoring, February, 2019



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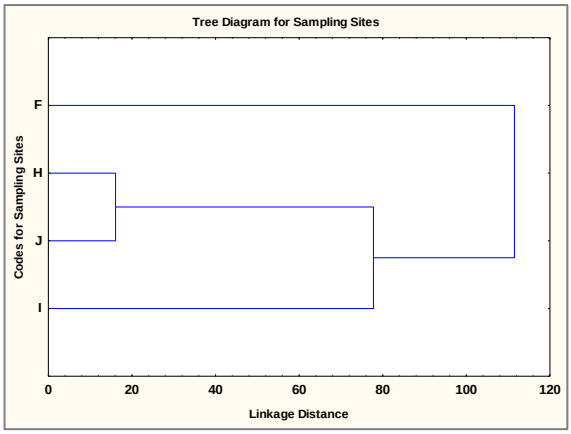
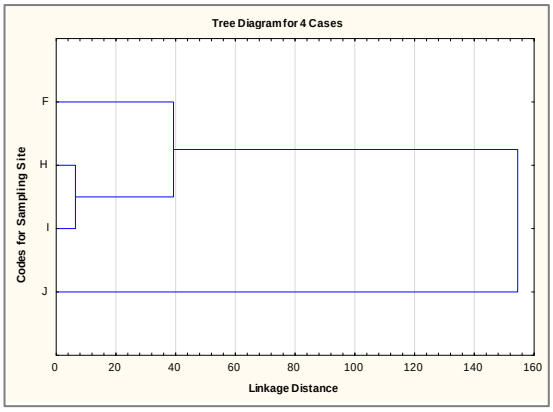


21st Monitoring, July 2019



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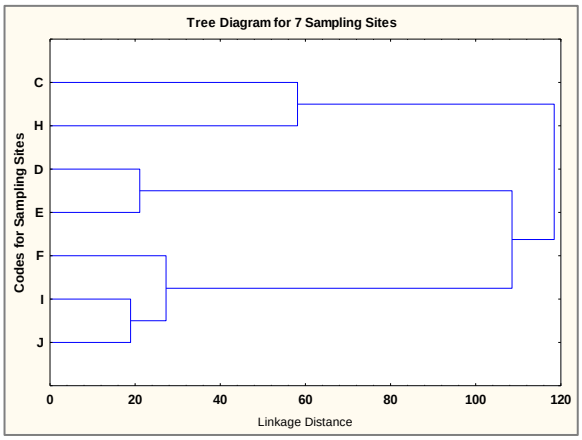
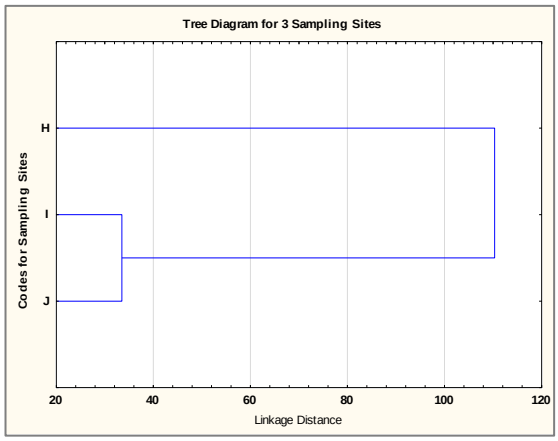


23rd Monitoring, February 2020



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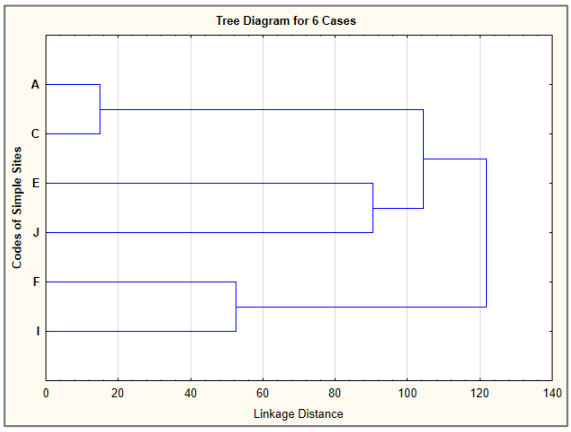

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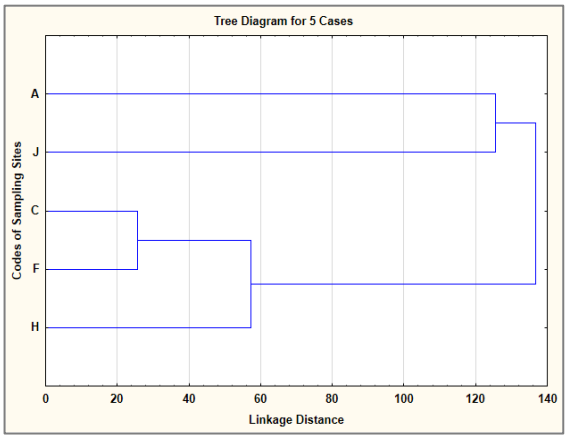
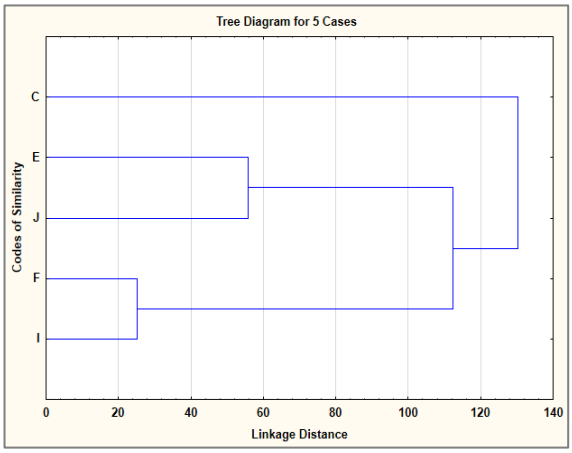


27th Monitoring, January 2021



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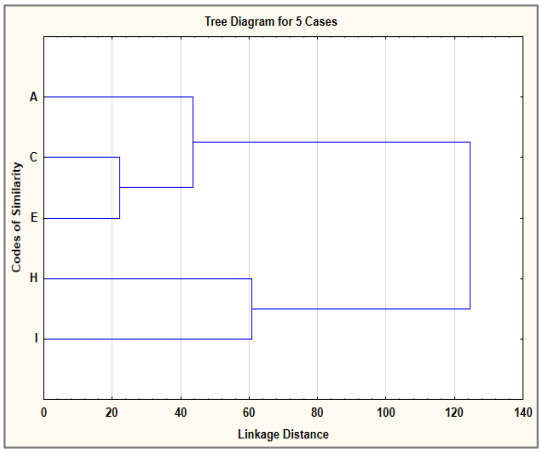
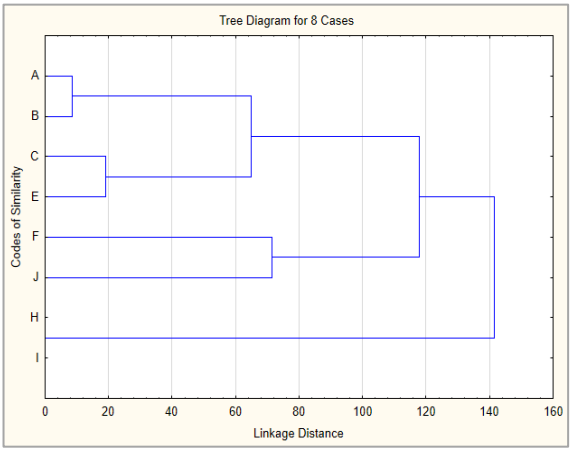


29th Monitoring, August 2021



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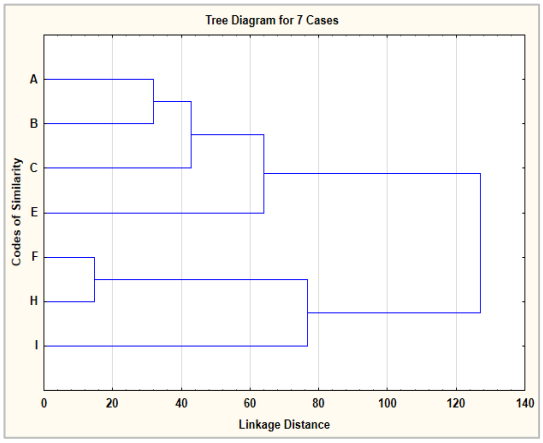
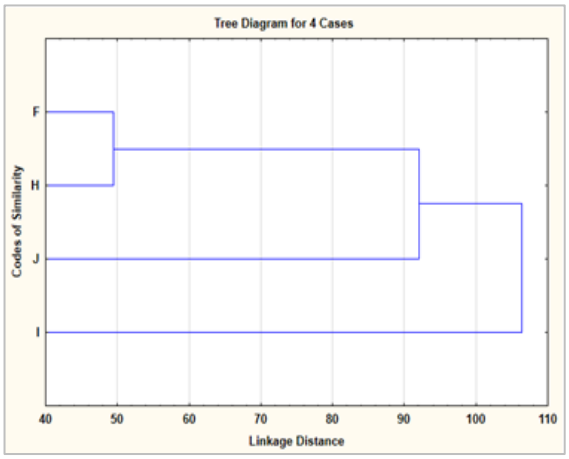
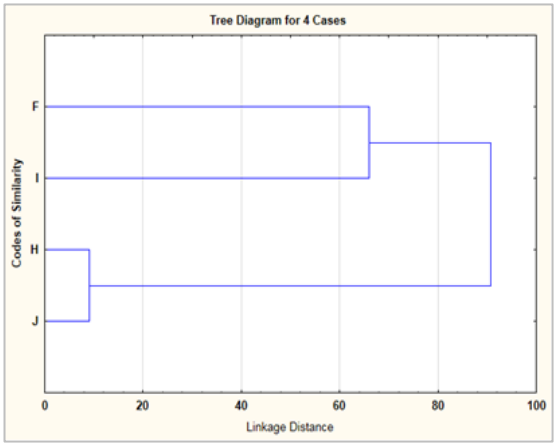


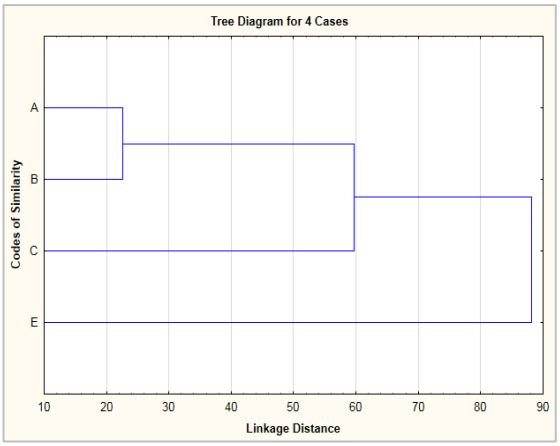
31st Monitoring, February, 2022



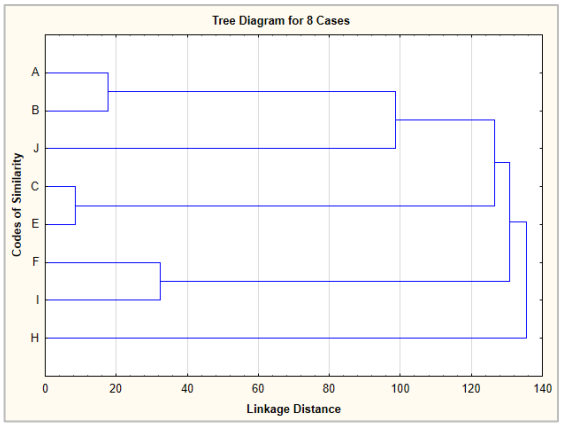
32nd Monitoring, May 2022



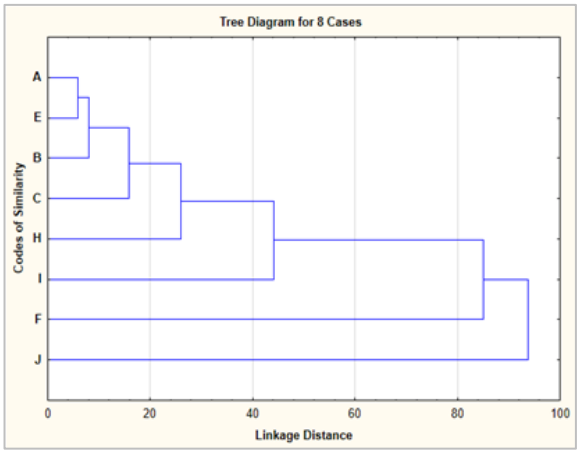
33rd Monitoring, July 2022



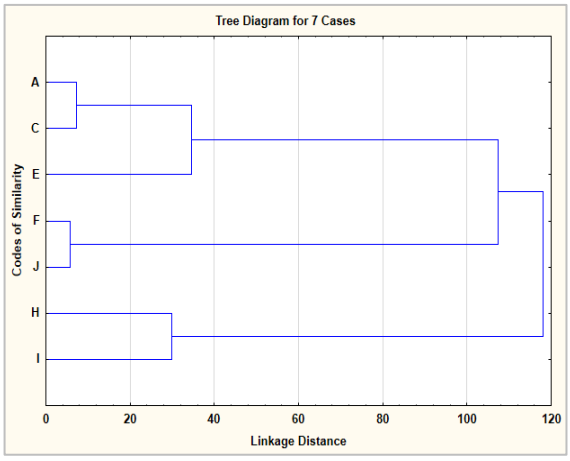
34th Monitoring, Oct 2022



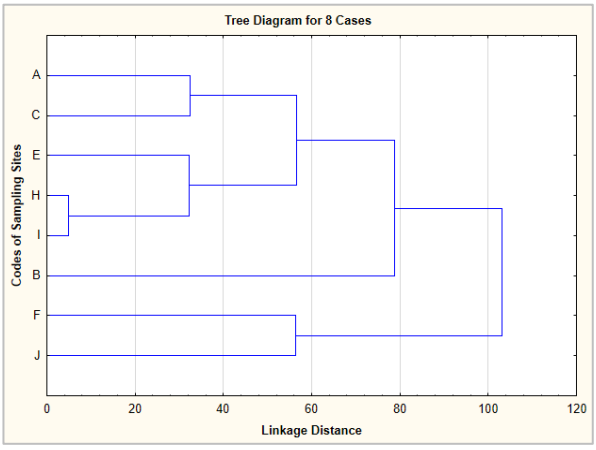
35th Monitoring, January 2023



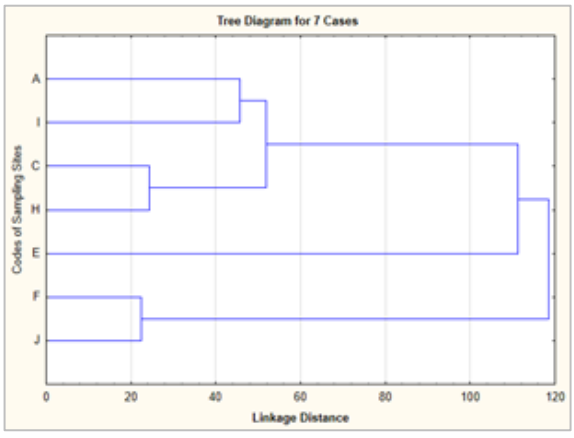
36th Monitoring, May 2023



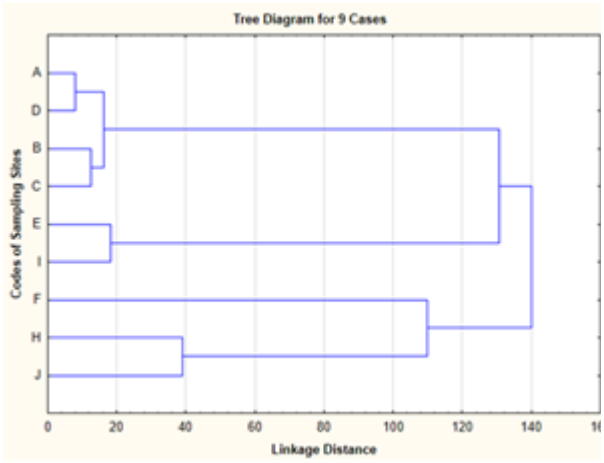
37th Monitoring, September 2023



38th Monitoring, November 2023



39th Monitoring, Feb 2024



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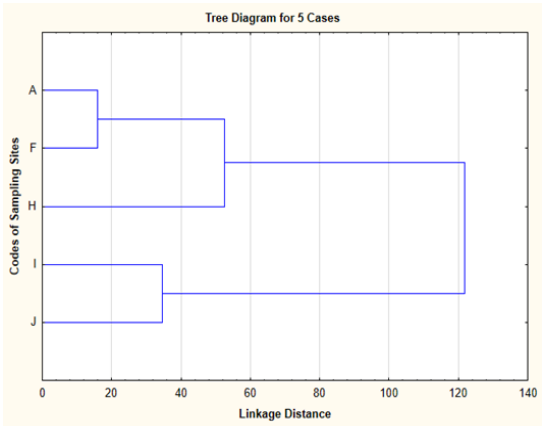
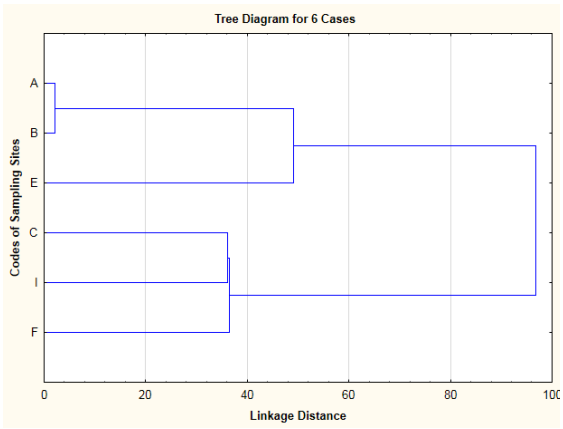
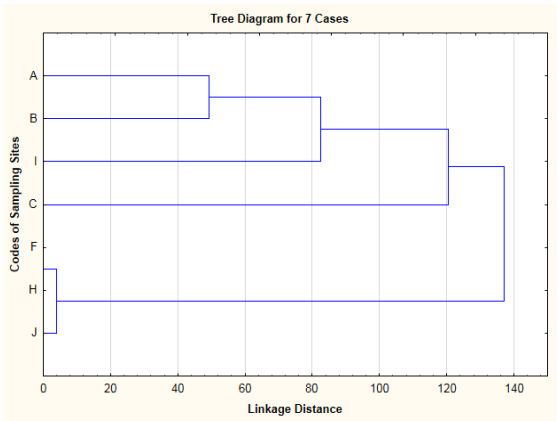


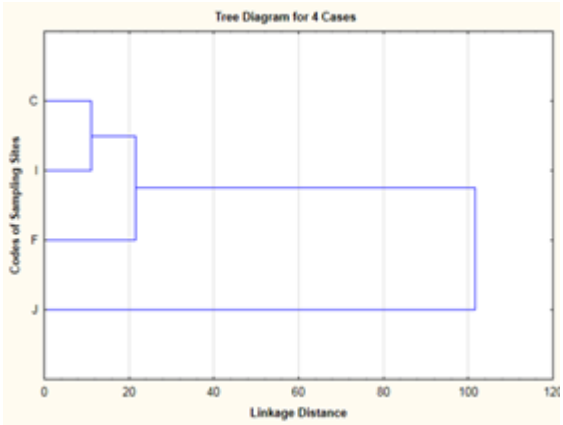
41st Monitoring, August 2024



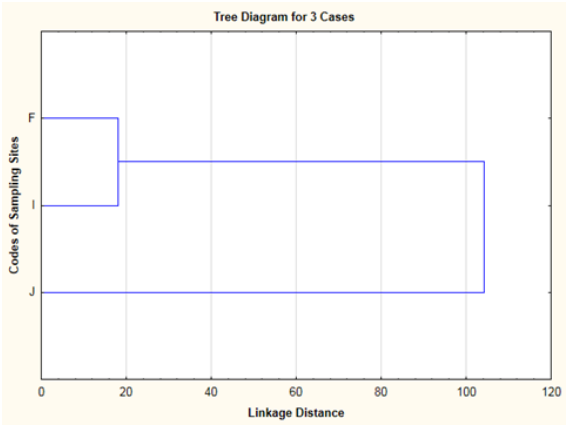
42nd Monitoring, October 2024



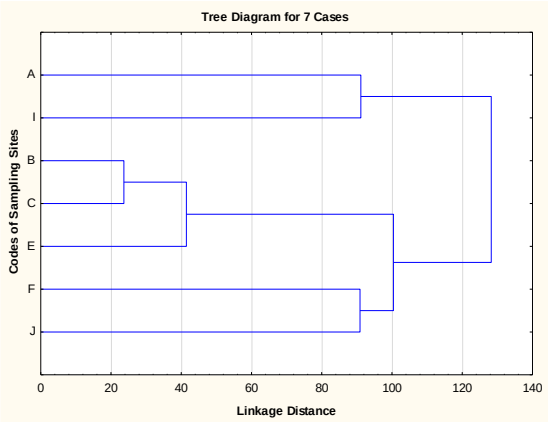
43rd Monitoring, February 2025



44th Monitoring, April 2025

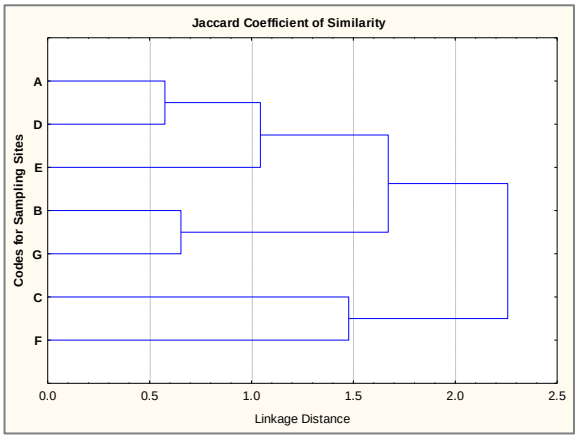


45th Monitoring October, 2025

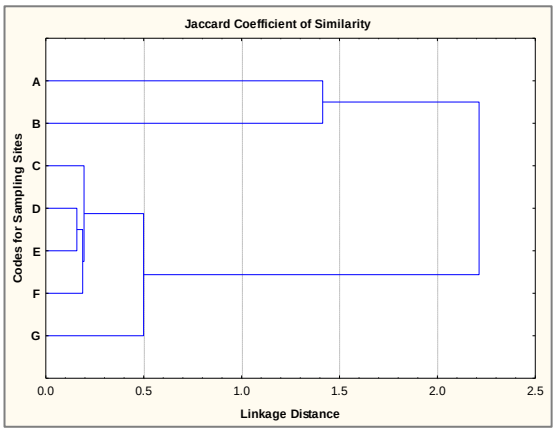


46th QM November 2025

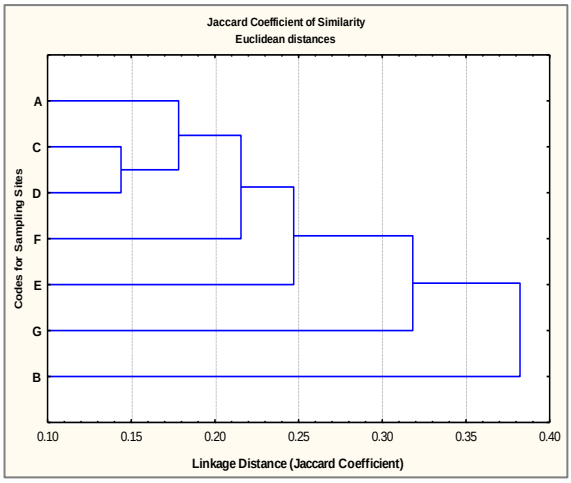
Figure E3: Jaccard Co-efficient of Similarity of Habitats respecting fish species occurrence



1st Monitoring, April, 2014



2nd Monitoring, July 2014



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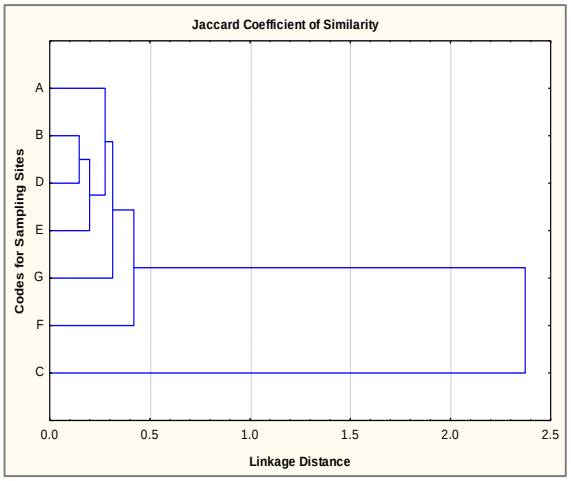
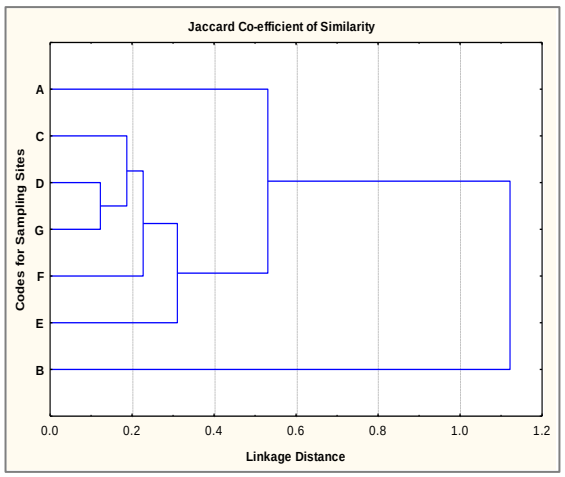


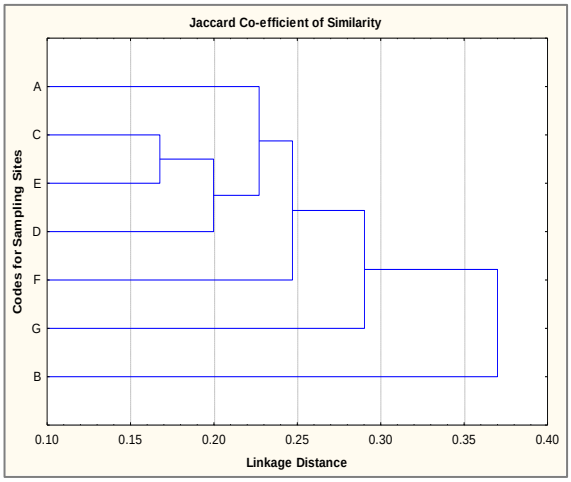
4th Monitoring, January 2015



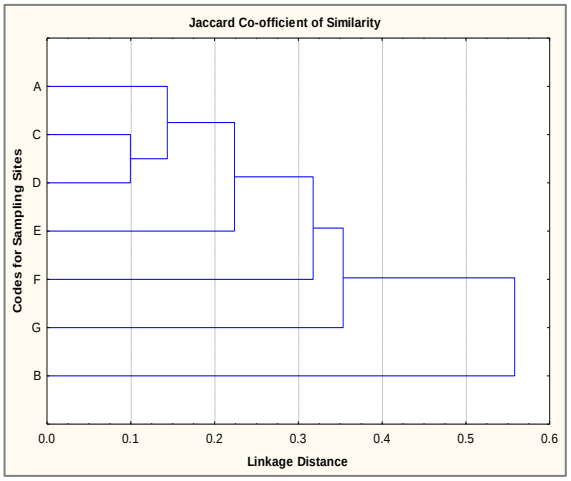
5th Monitoring, April 2015



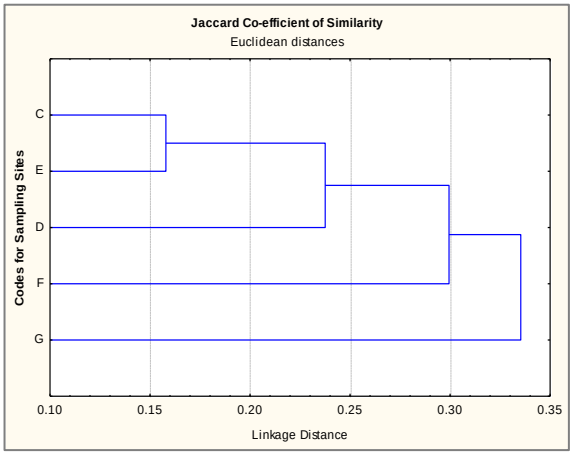
6th Monitoring, August 2015



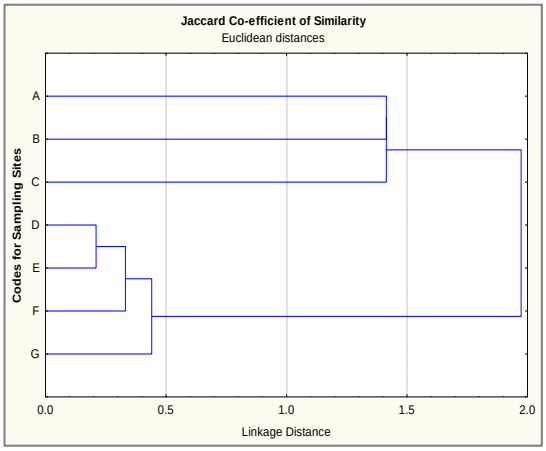
7th Monitoring, October, 2015



8th Monitoring, January, 2016



9th Monitoring, April, 2016



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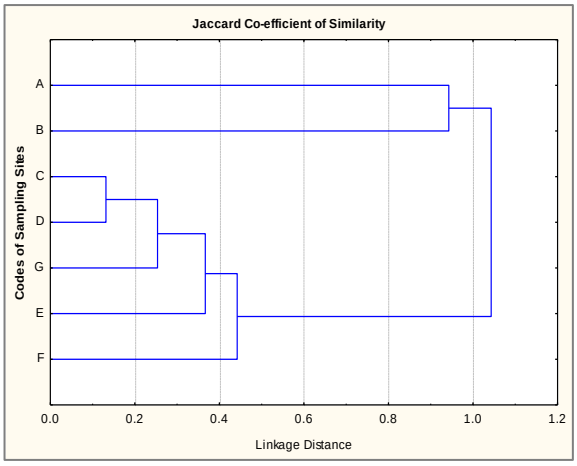
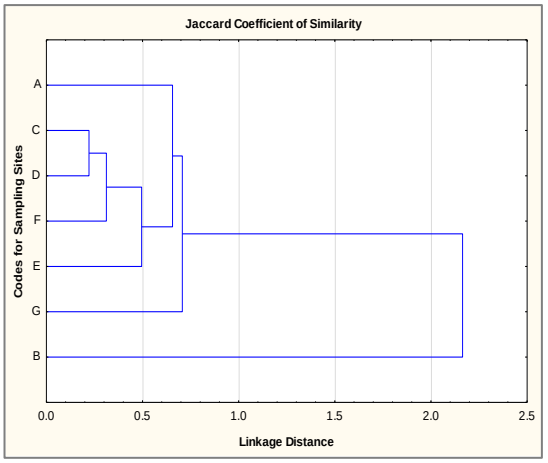


11th Monitoring, October, 2016



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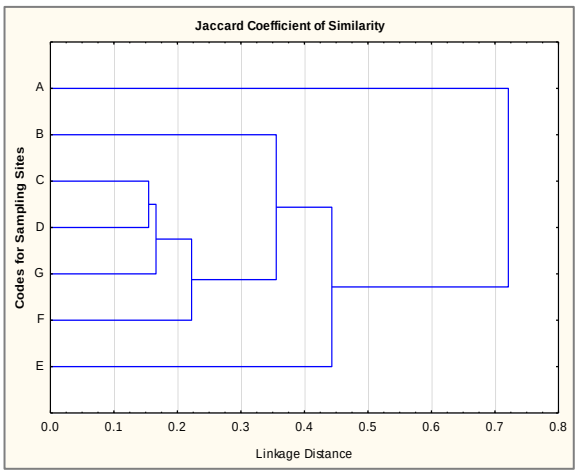

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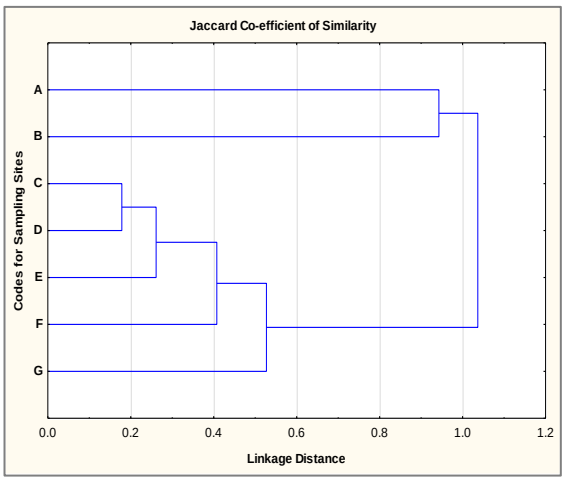
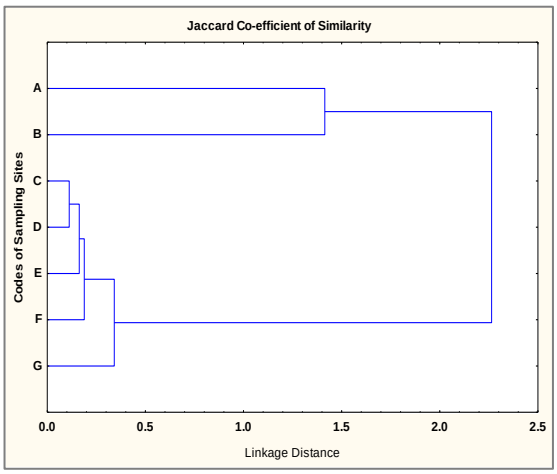
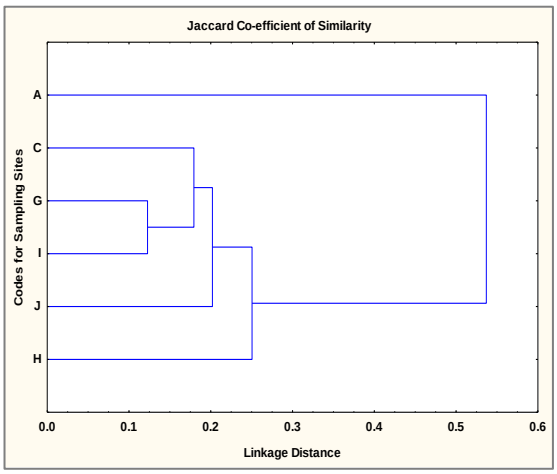


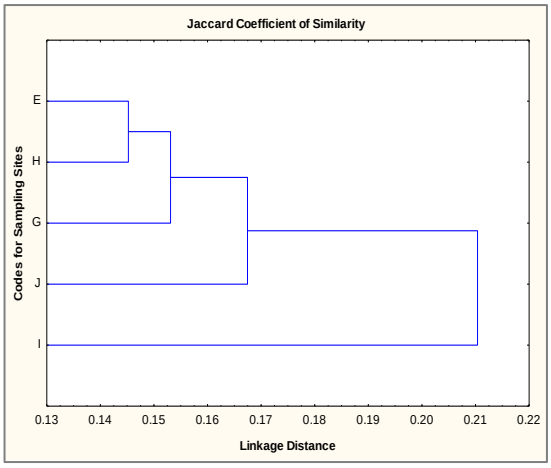
14th Monitoring, October, 2017



15th Monitoring, January, 2018



16th Monitoring, April, 2018



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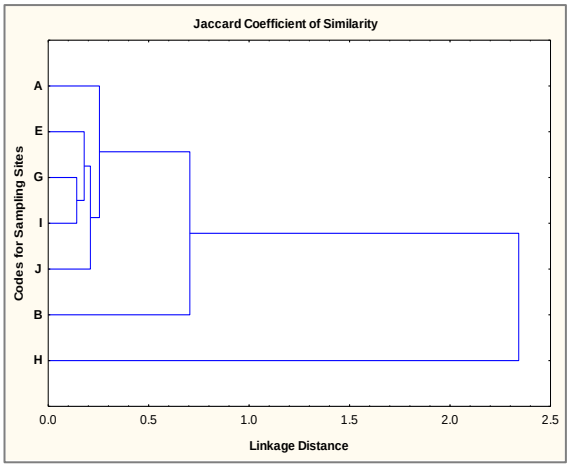
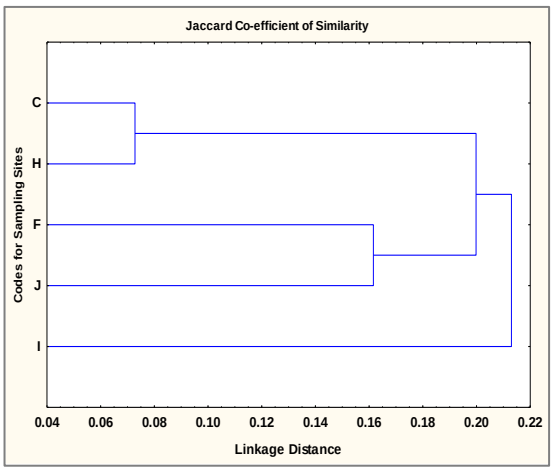


18th Monitoring, November, 2018



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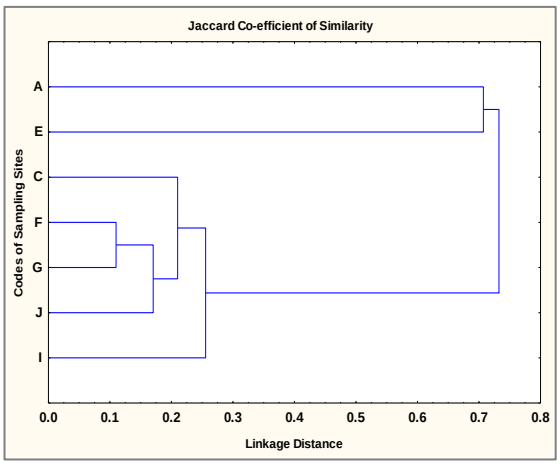
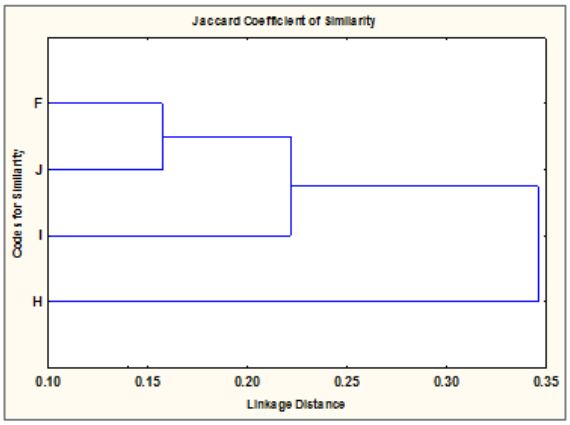
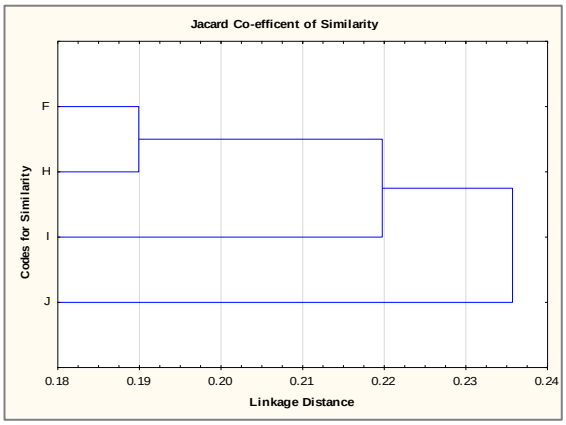


20th Monitoring, April, 2019



21st Monitoring, July 2019



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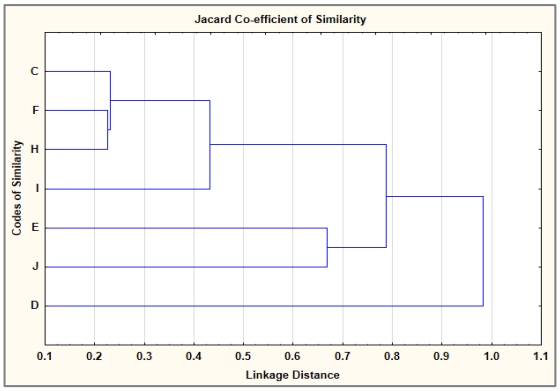

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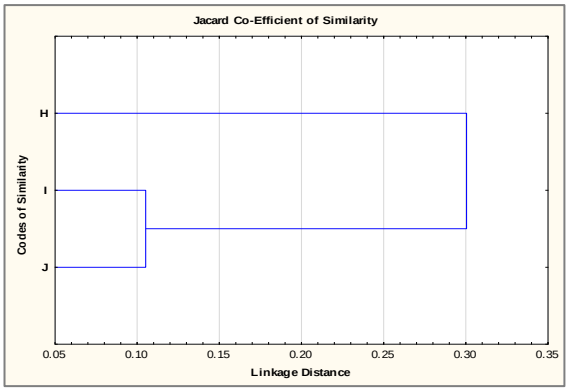

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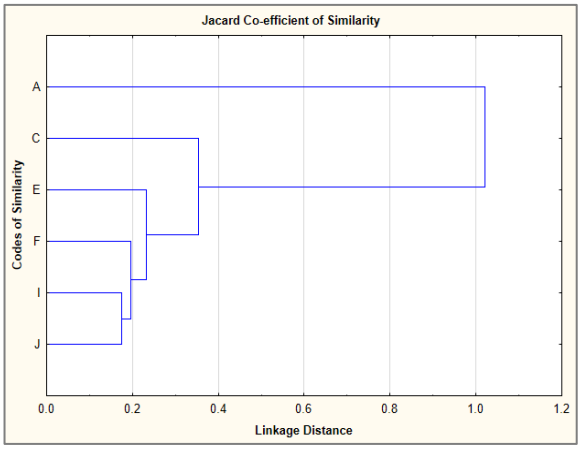

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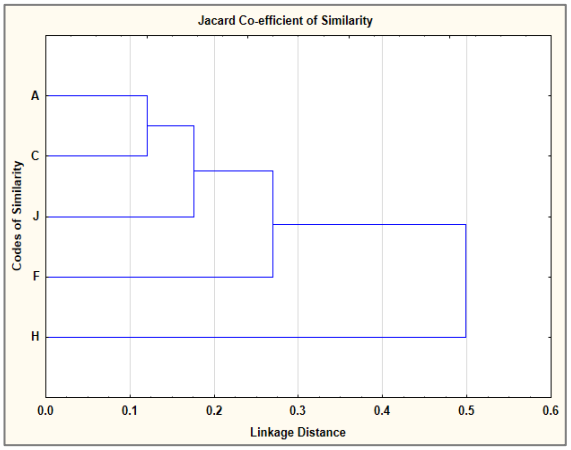
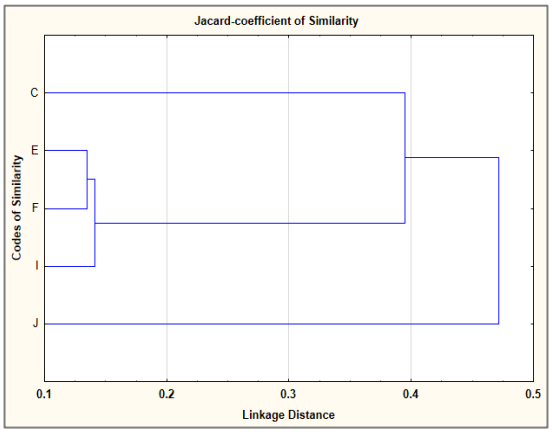


27th Monitoring, January, 2021



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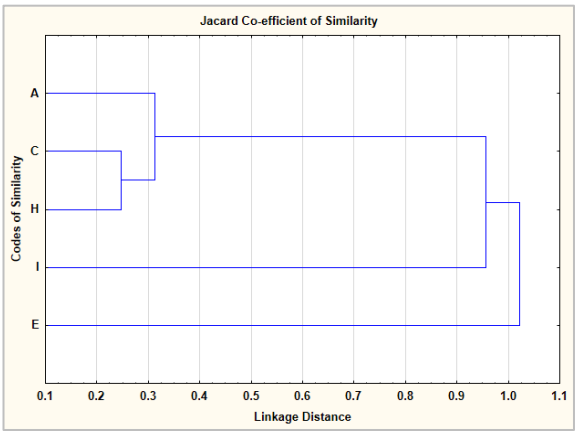

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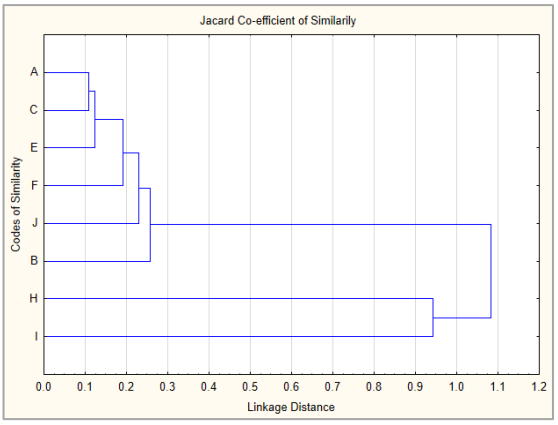

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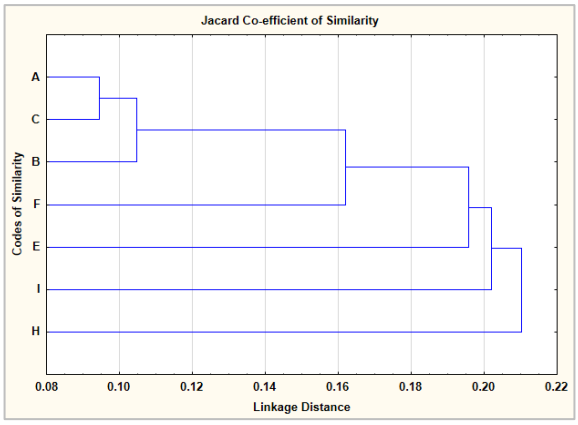
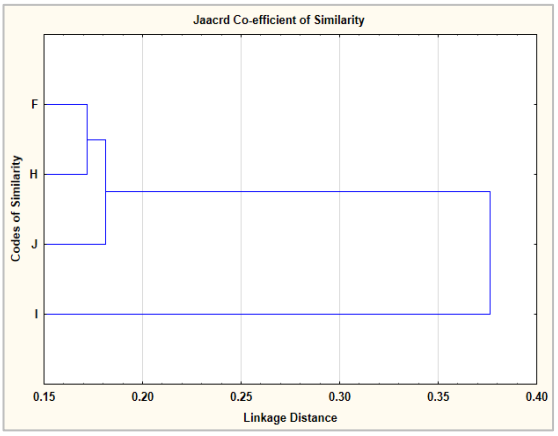
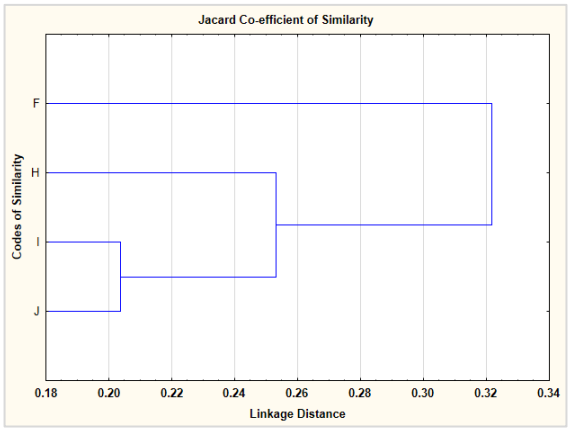


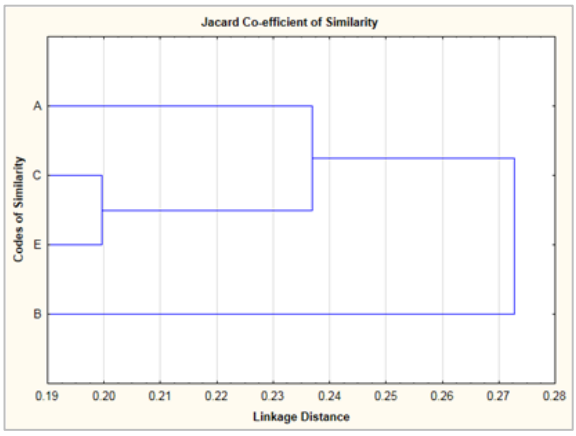
31st Monitoring, February, 2022



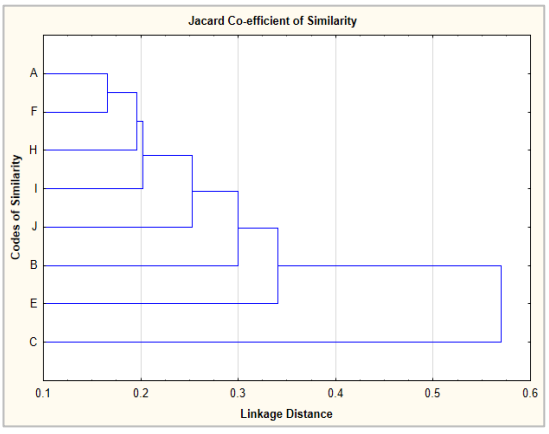
32nd Monitoring, May 2022



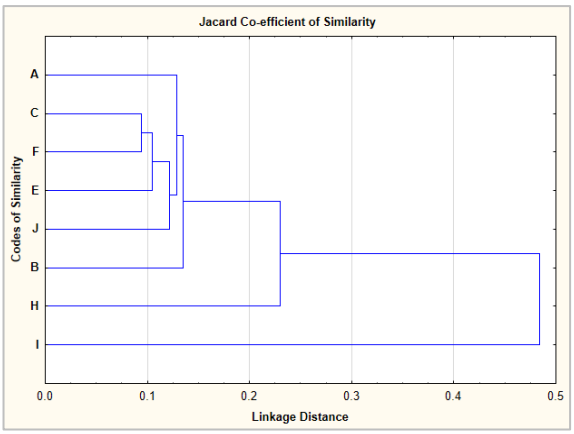
33rd Monitoring, July 2022



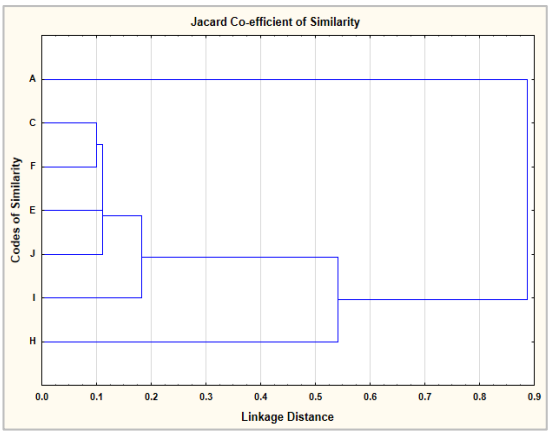
34th Monitoring, Oct 2022



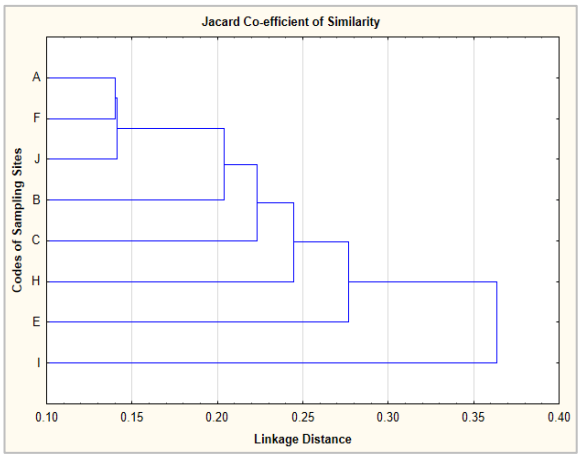
35th Monitoring, Feb 2023



36th Monitoring, May 2023



37th Monitoring, September 2023



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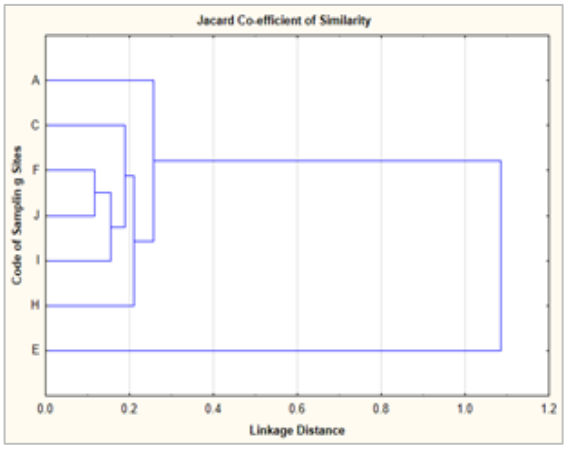
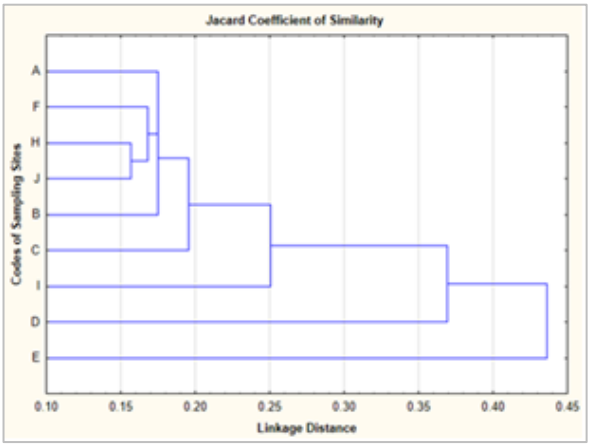


39th Monitoring, February 2024



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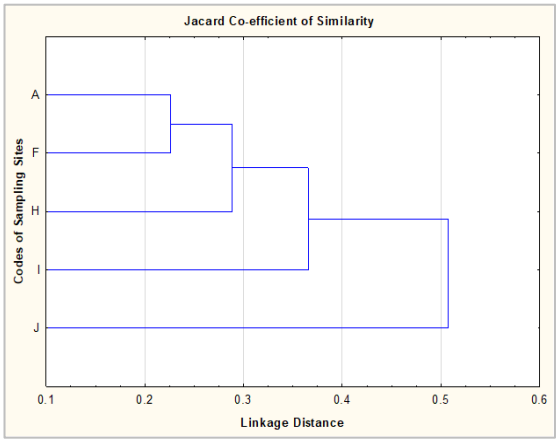
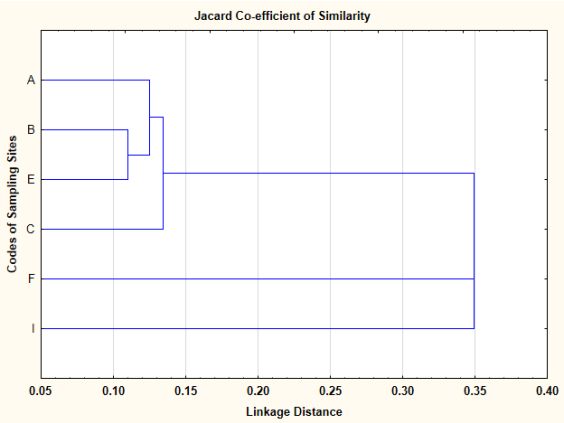
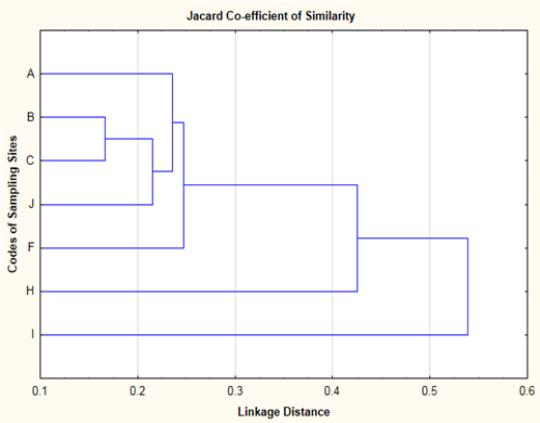


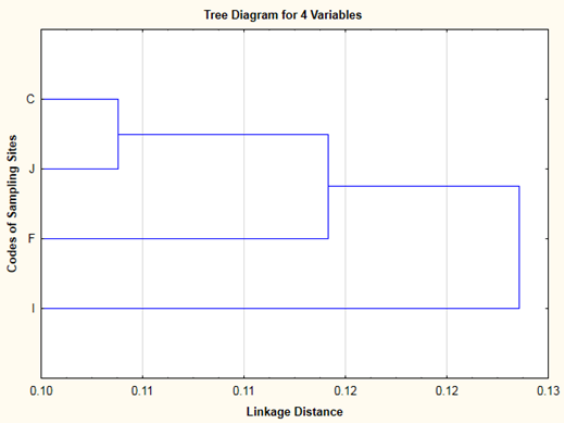
41st Monitoring, August 2024



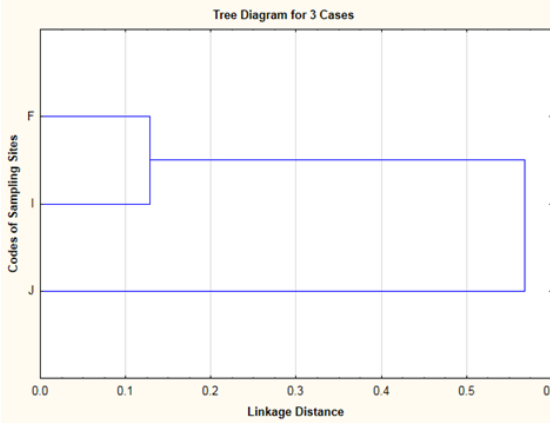
42nd Monitoring, November 2024



43rd Monitoring, February 2025



44th Monitoring, April 2025



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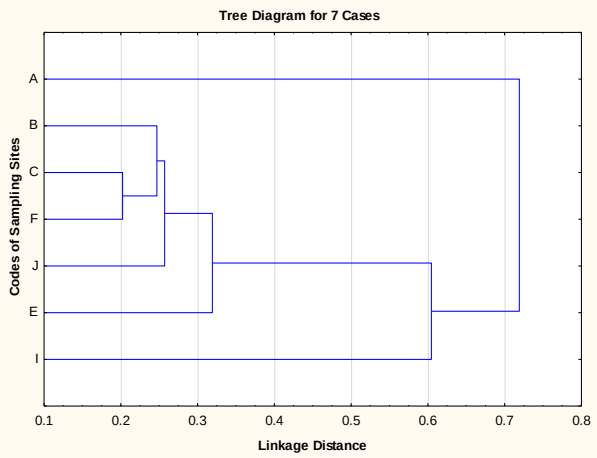
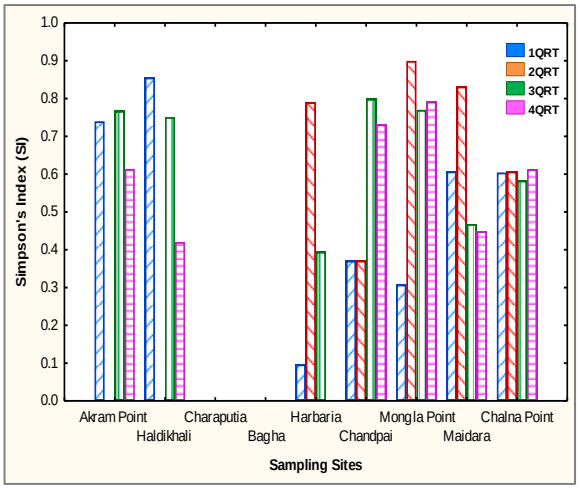
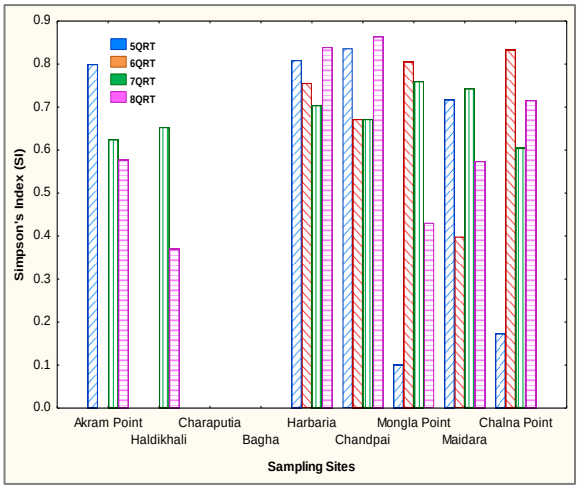


46th QM November 2025

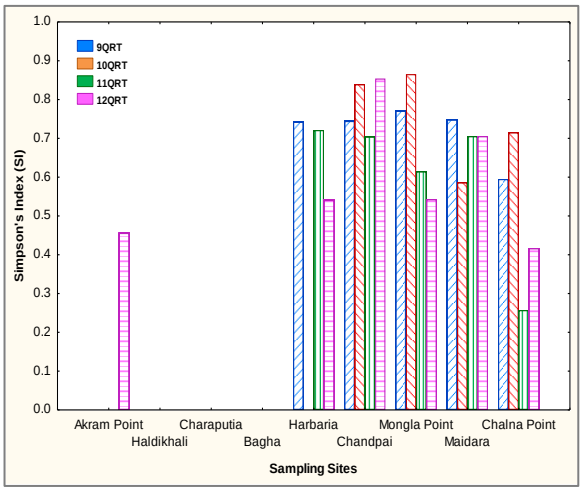
Figure E4: Site-wise fish species richness (FSR) in the Passur River System



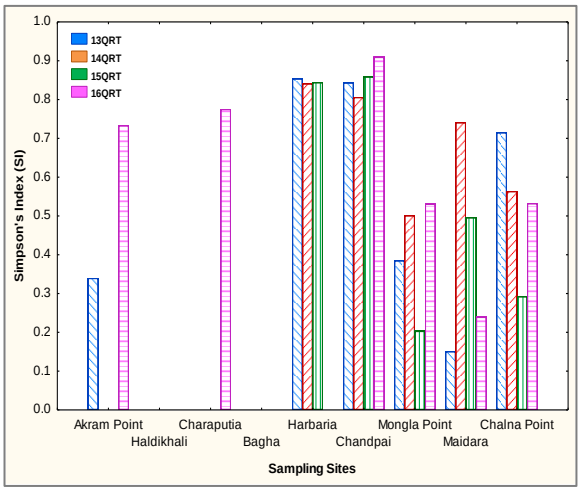
2014-2015



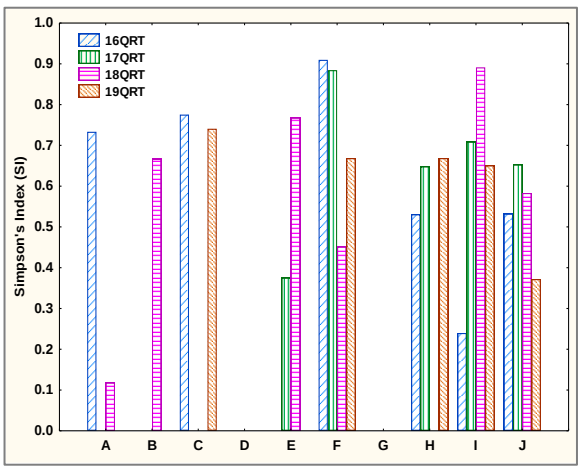
2015-2016



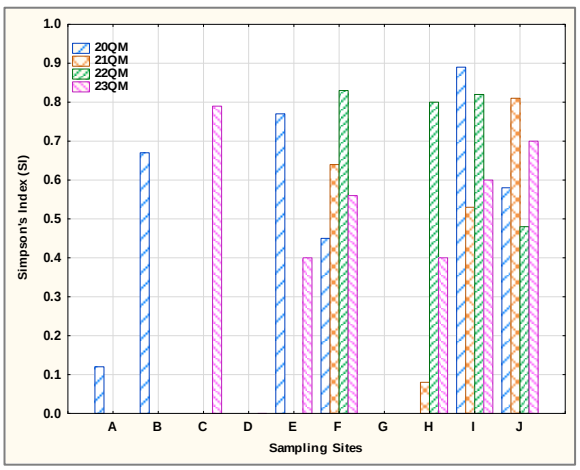
2016-2017



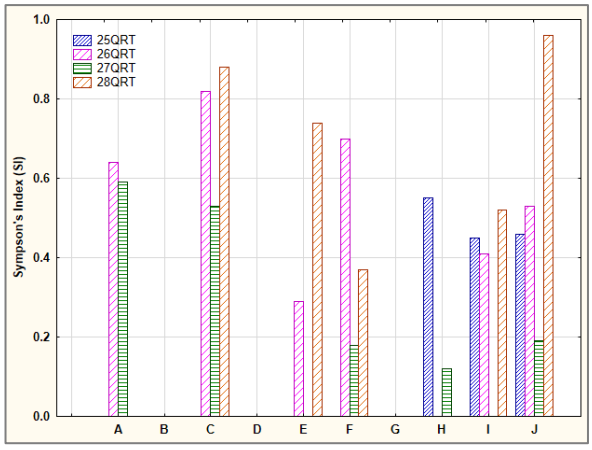
2017-18



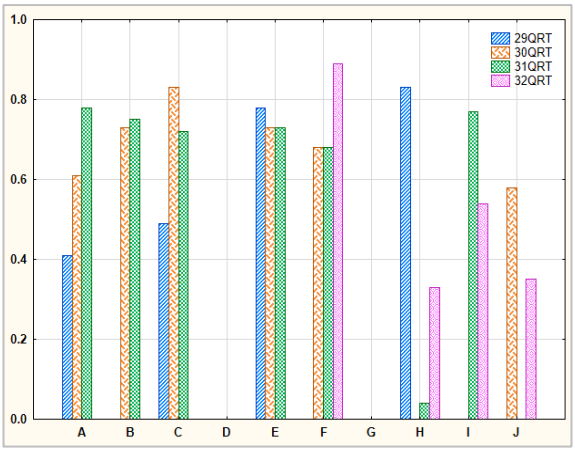
2018-19



2019-20



2020-21



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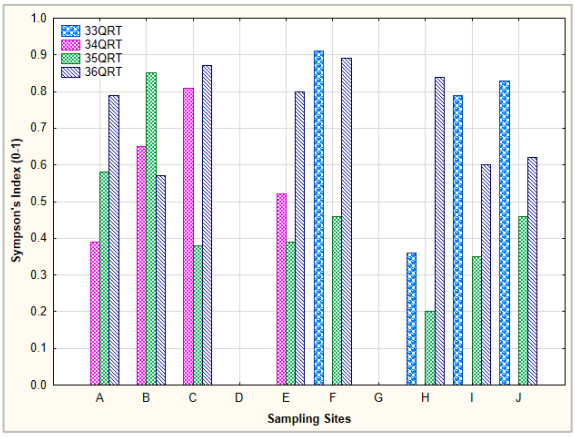

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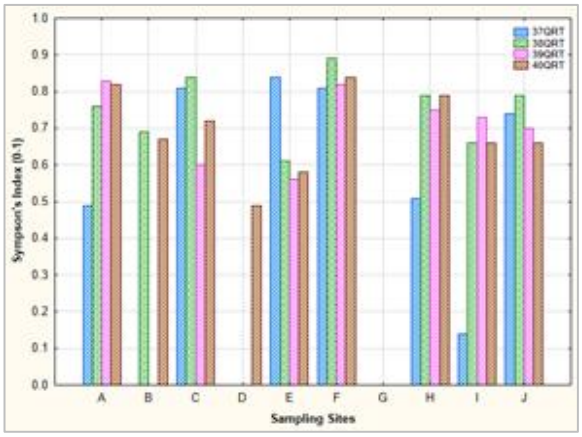

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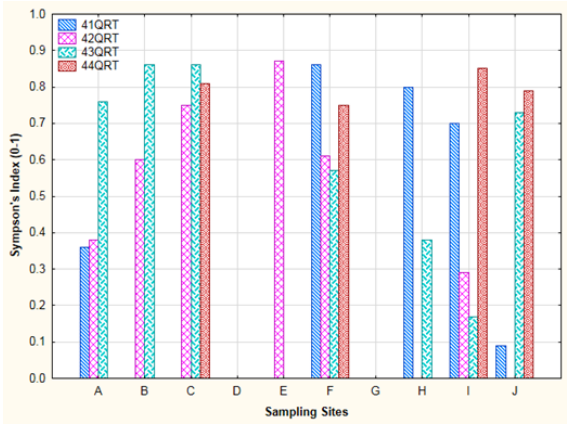

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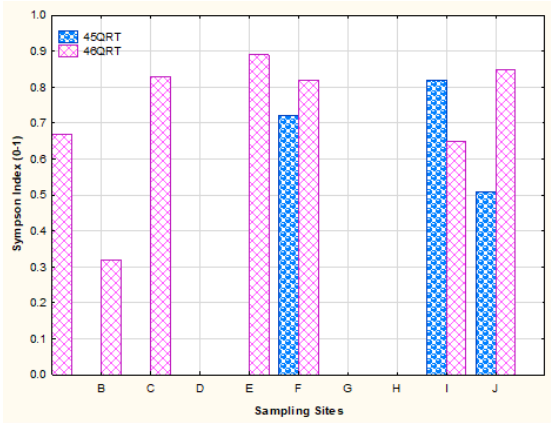
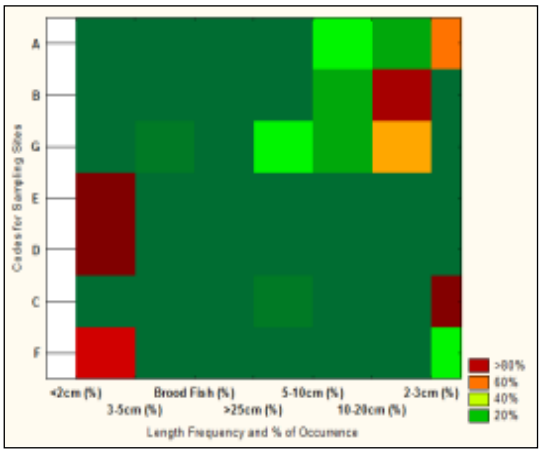


2025-2026

Figure E5: Fish Community Structure



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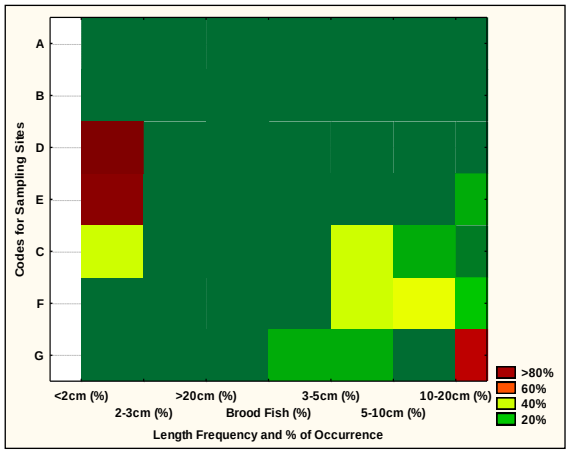
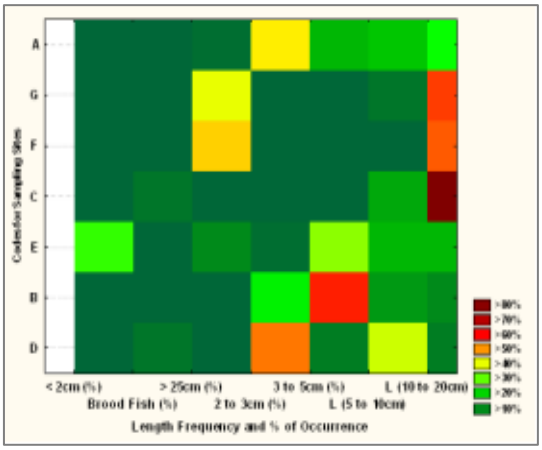
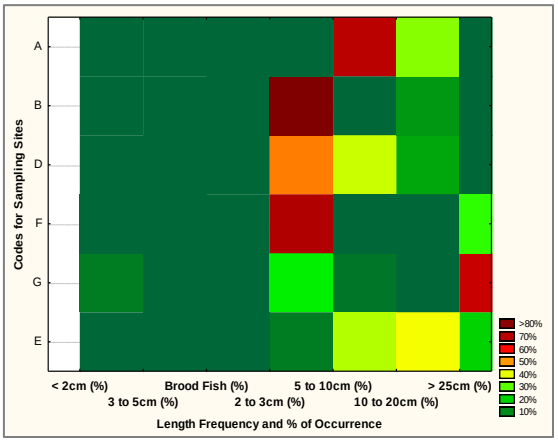


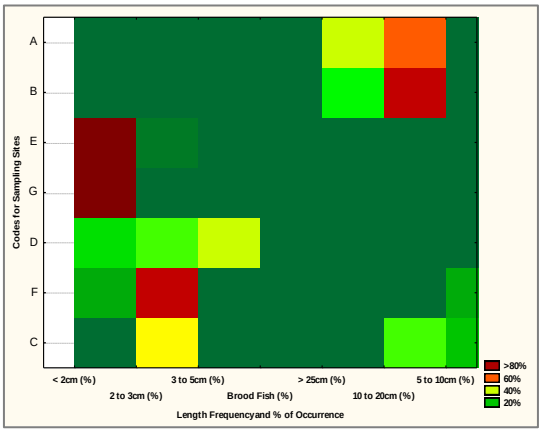
2nd Monitoring, July 2014



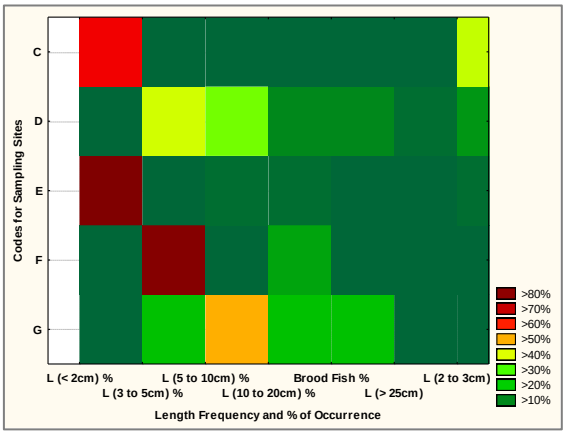
3rd Monitoring, October, 2014



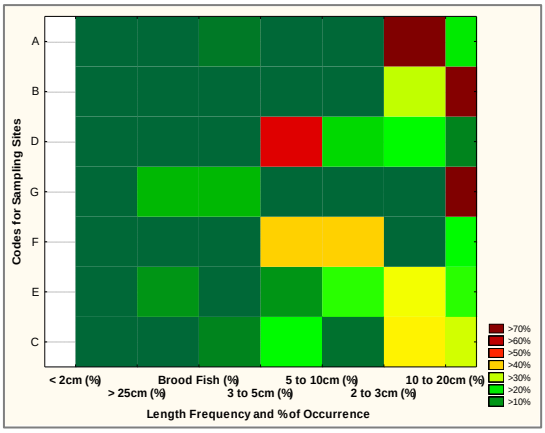
4th Monitoring, January 2015



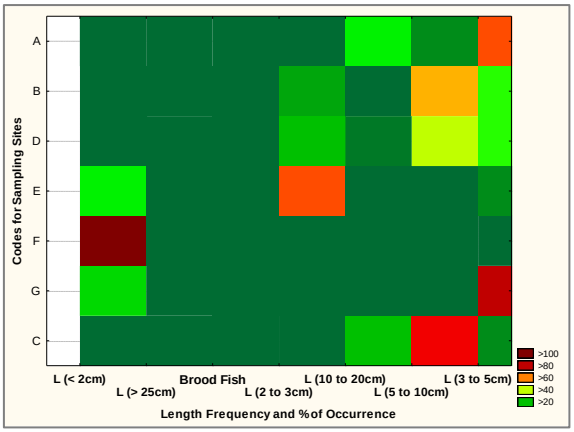
5th Monitoring, April, 2015



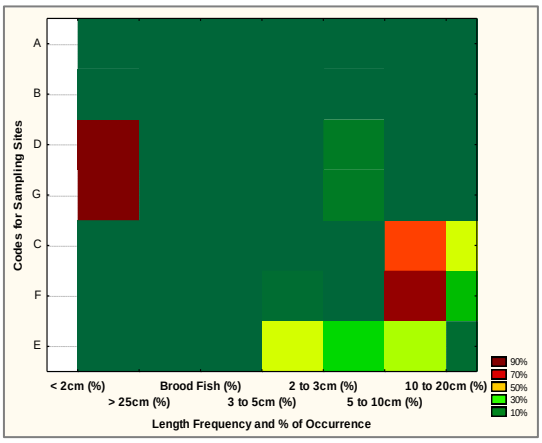
6th Monitoring, August, 2015



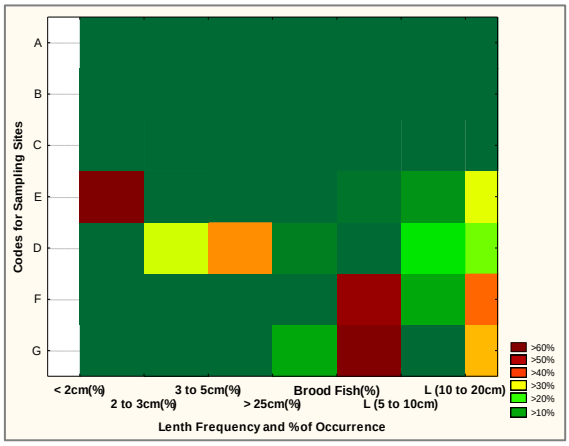
7th Monitoring, October, 2015



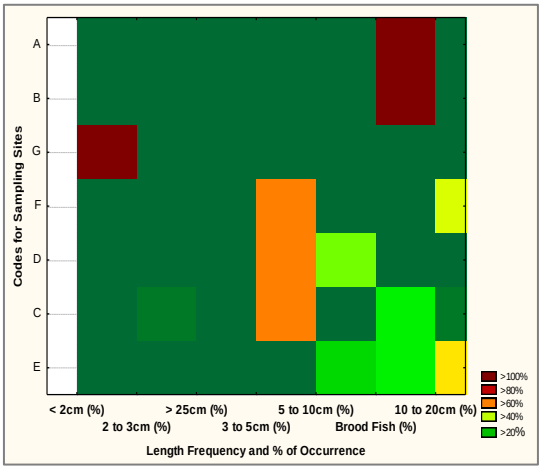
8th Monitoring, January, 2016



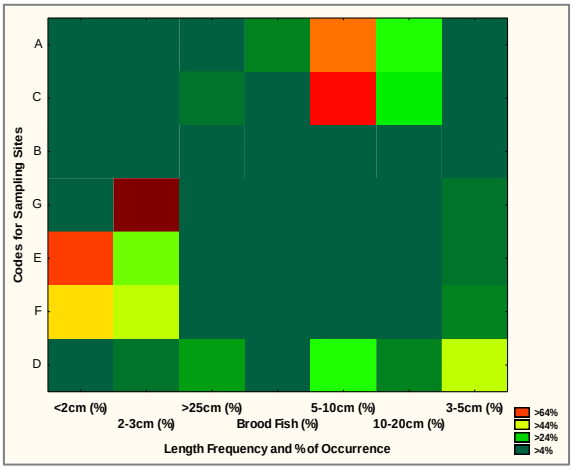
9th Monitoring, April, 2016



10th Monitoring, July, 2016



11th Monitoring, October, 2016



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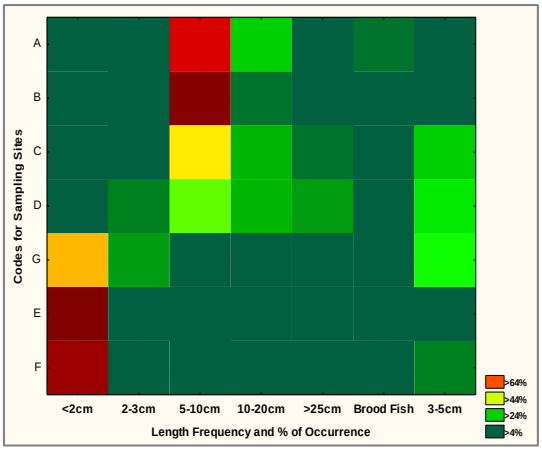
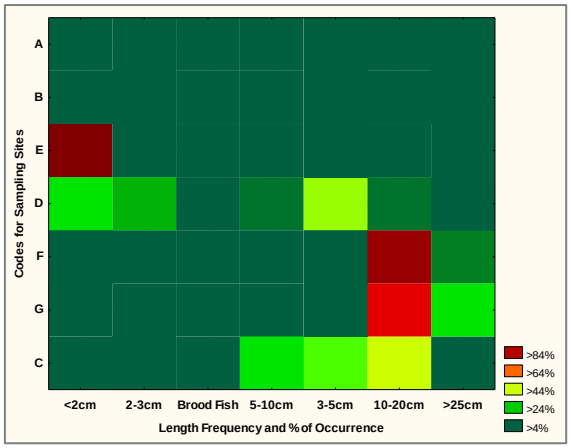
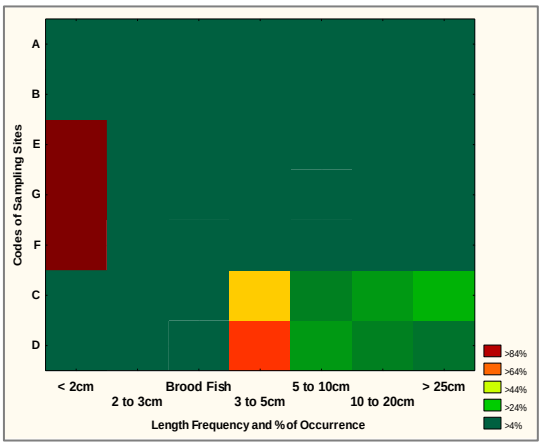


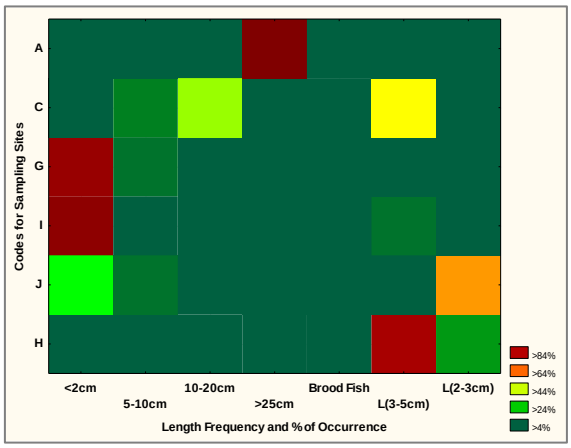
13th Monitoring, April, 2017



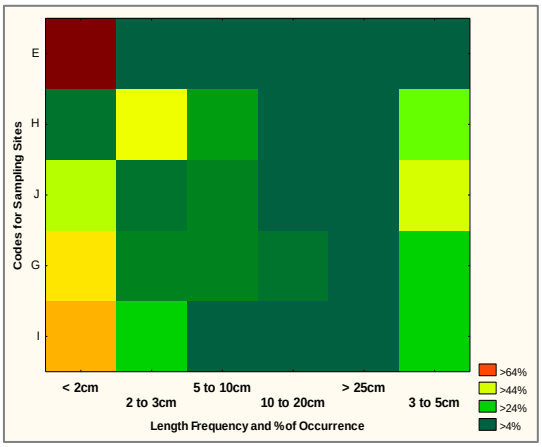
14th Monitoring, October, 2017



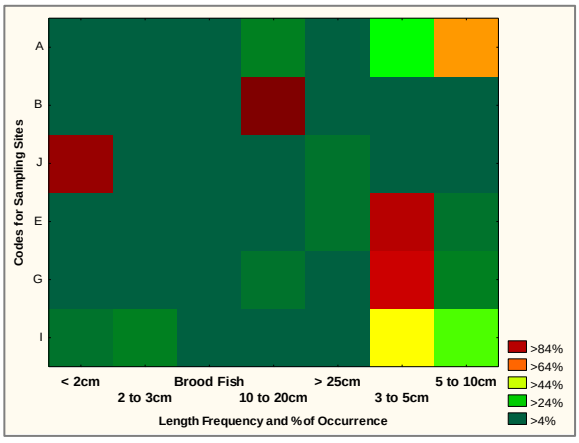
15th Monitoring, January, 2018



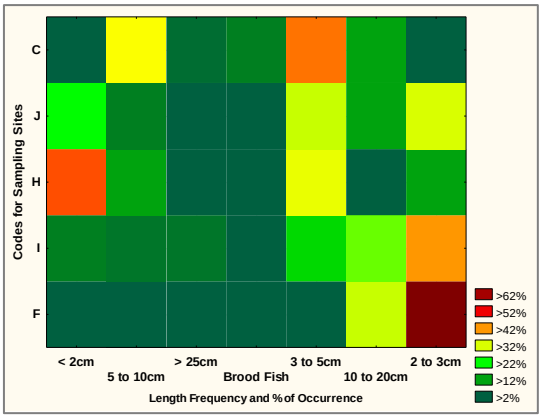
16th Monitoring, April, 2018



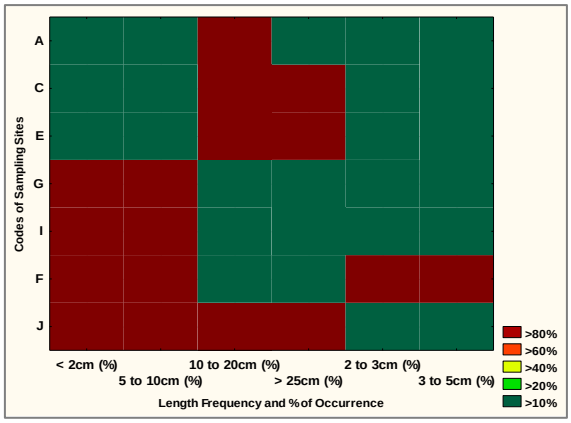
17th Monitoring, July, 2018



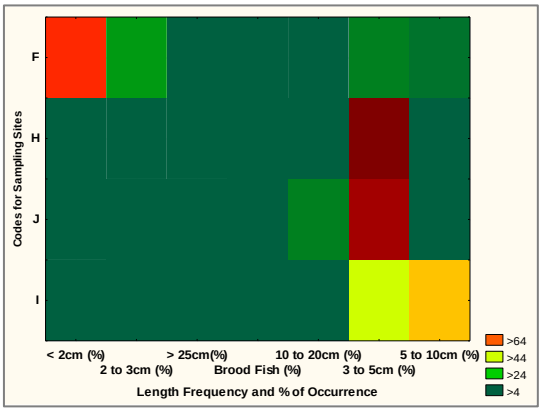
18th Monitoring, November, 2018



19th Monitoring, February, 2019



20th Monitoring, April, 2019



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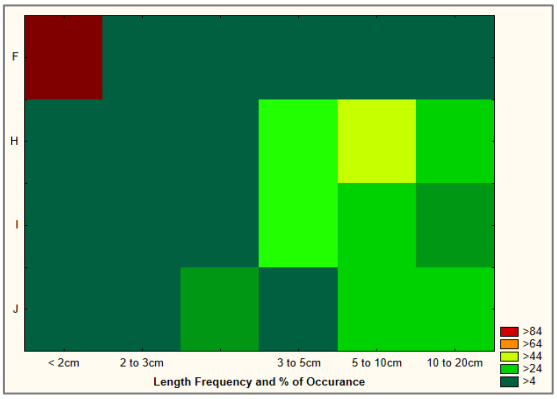

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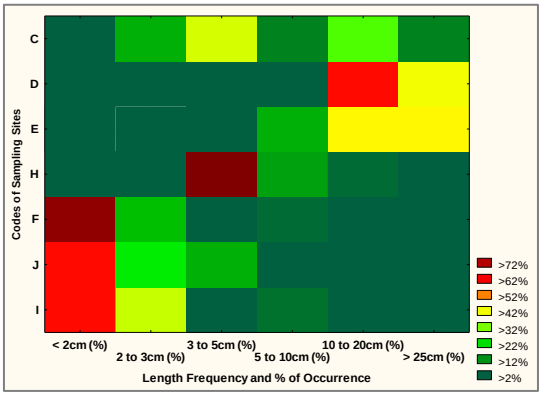
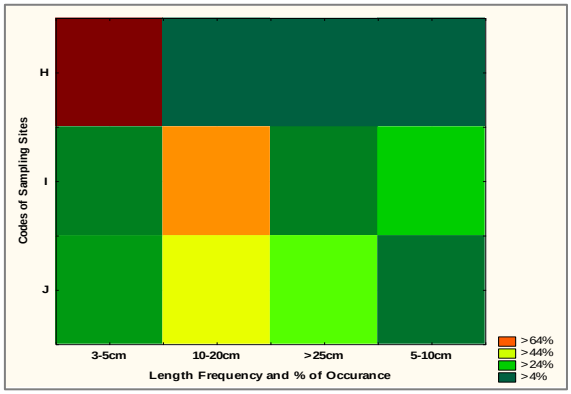


23rd Monitoring, February 2020



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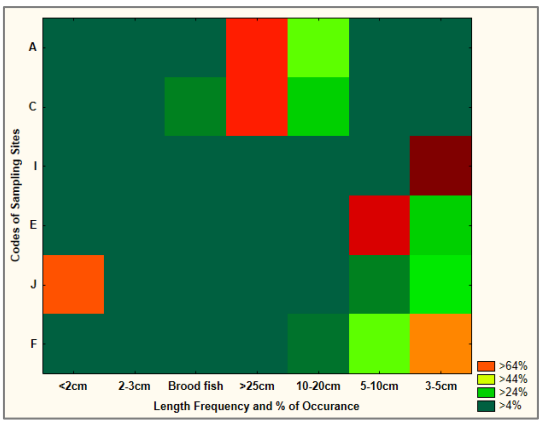
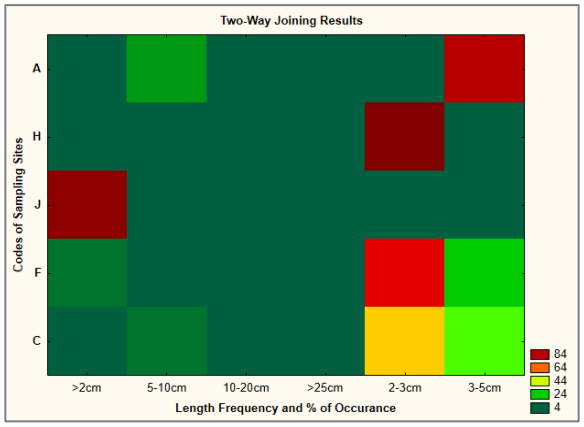
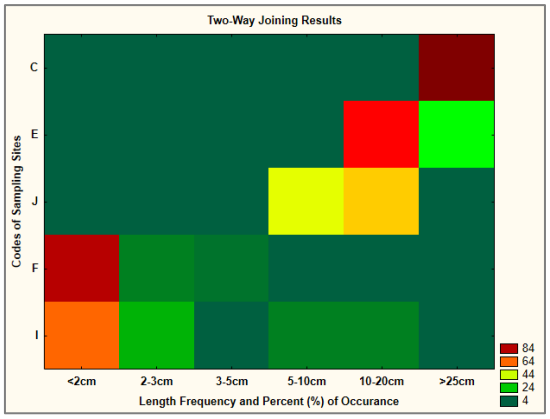


26th Monitoring, November 2021



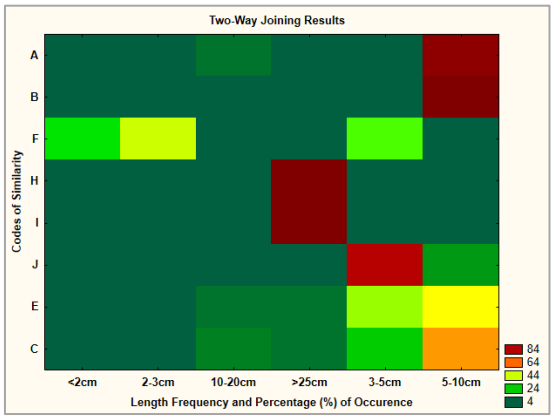
27th Monitoring, January, 2021



28th monitoring, April, 2021



29th monitoring, August, 2021



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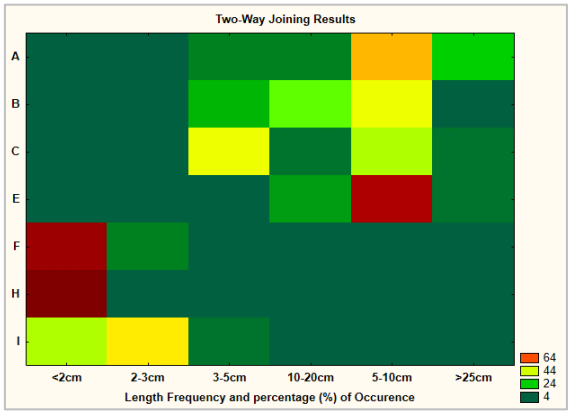

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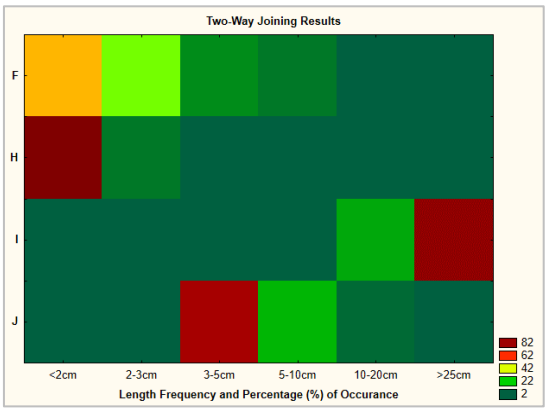
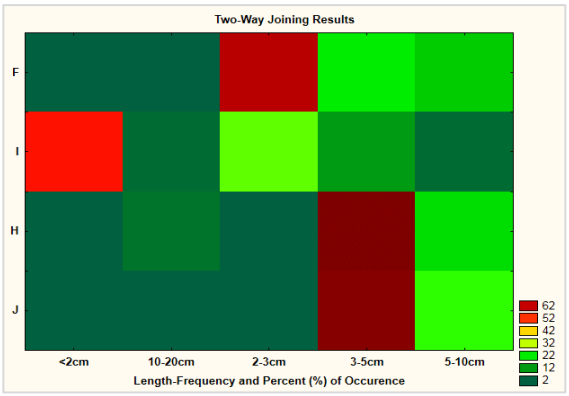


32nd Monitoring, May 2022



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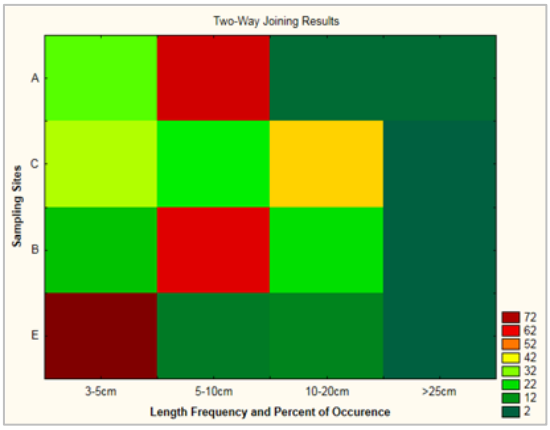
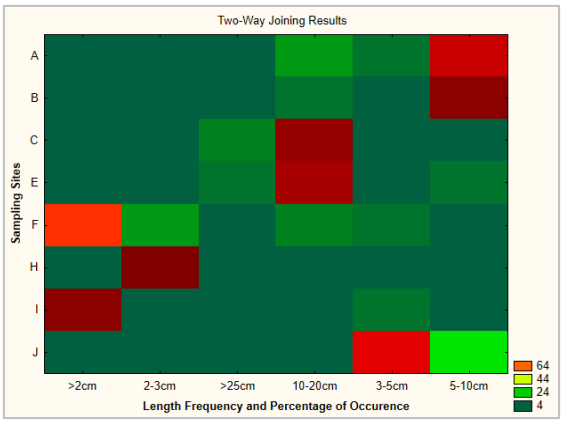
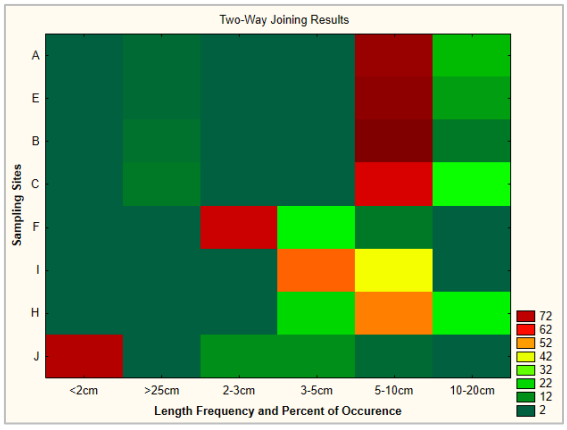


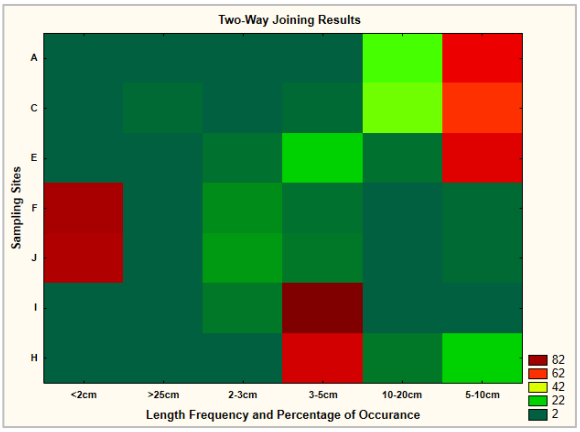
34th Monitoring, Oct 2022



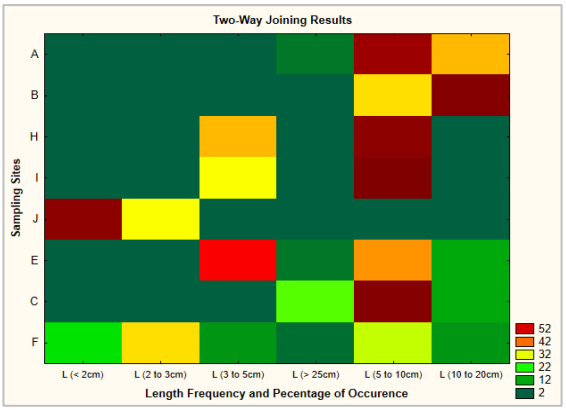
35th Monitoring, Feb 2023



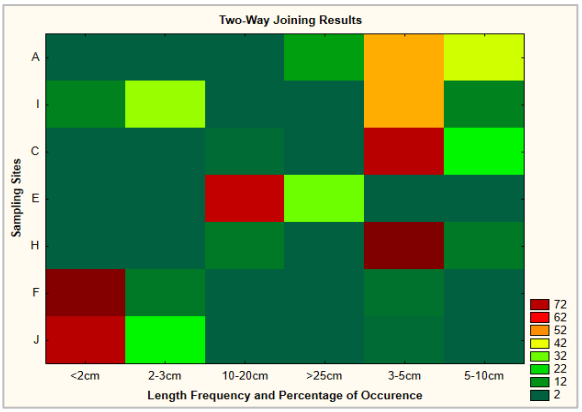
36th Monitoring, May 2023



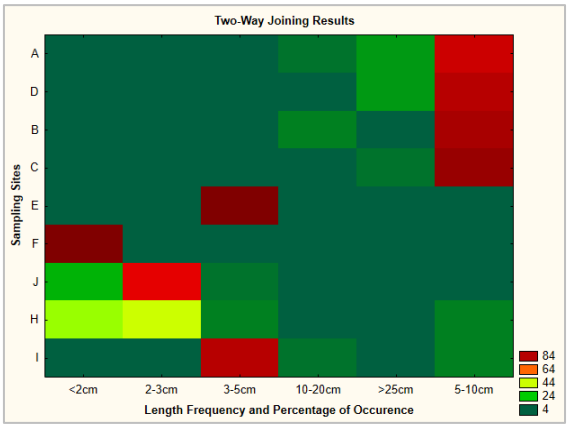
37th Monitoring, September 2023



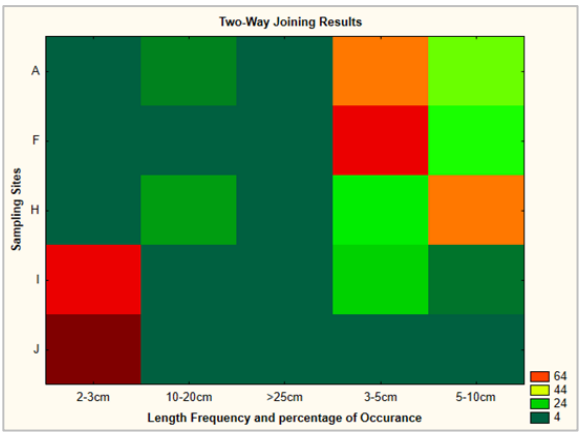
38th Monitoring, November 2023



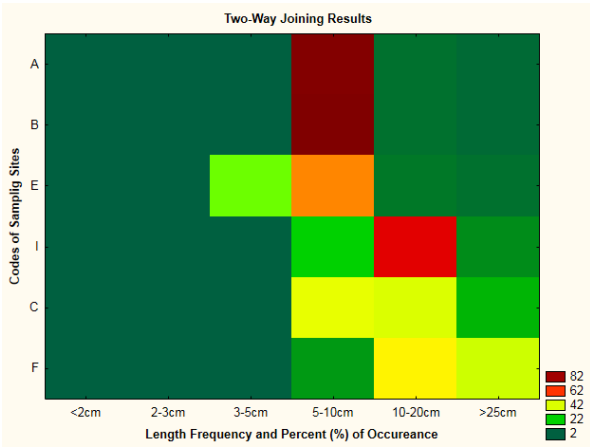
39th Monitoring, February 2024



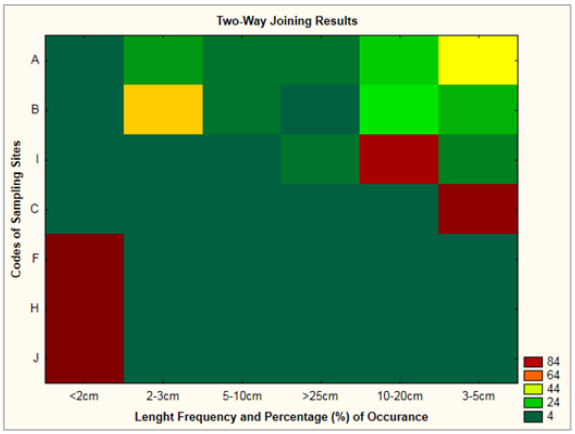
40th Monitoring, May 2024



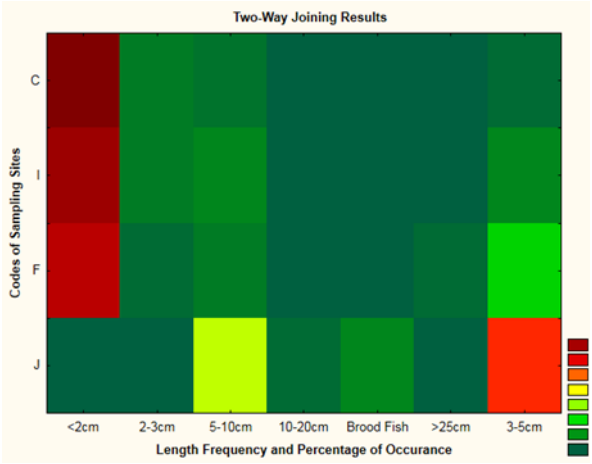
41st Monitoring, July 2024



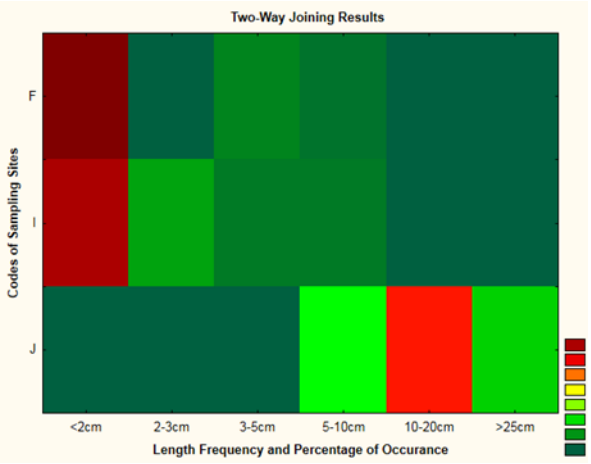
42nd Monitoring, Nov 2024



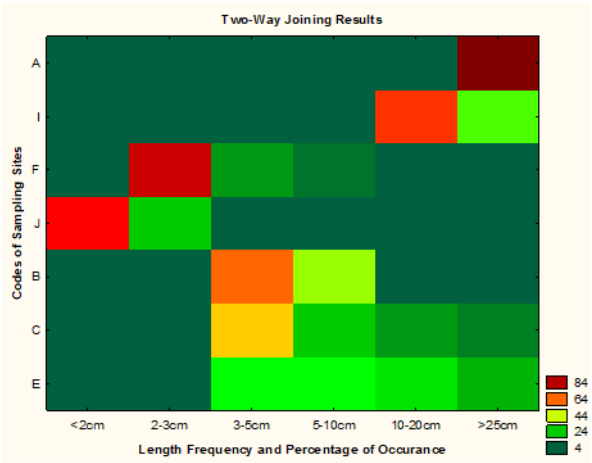
43rd Monitoring, Feb 2025



44th Monitoring, April 2025



45th Monitoring, August 2025



46th Monitoring, November 2025

Source: CEGIS Field Survey, 2019-20, 2020-21, 2021-22, 2022-23, 2023-2024, and 2024-2025

Table E6: Growth Rate and Mortality of Fish/Shrimp

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
1st QM	Growth Rate (cm/day)	0.3	0.3	0.2
	Mortality (%)	15-20	30-35	25-30
2nd QM	Growth Rate (cm/day)	0.2	0.3	0.2
	Mortality (%)	40	94	25
3rd QM	Growth Rate (cm/day)	0.25	0.25	0.2
	Mortality (%)	50	10	65
4th QM	Growth Rate	-	-	-
	Mortality (%)	-	-	-
5th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	30	-	10
6th QM	Growth Rate (cm/day)	0.18	0.14	0.15
	Mortality (%)	25	20	50
7th QM	Growth Rate (cm/day)	0.2	0.15	0.25

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
	Mortality (%)	60	100	20
8th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
9th QM	Growth Rate (cm/day)	-	0.21	0.17
	Mortality (%)	-	15	30
10th QM	Growth Rate (cm/day)	0.2	0.3	0.15
	Mortality (%)	20	40	30
11th QM	Growth Rate (cm/day)	0.2	0.25	0.2
	Mortality (%)	60	50	30
12th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
13th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	30	10	25
14th QM	Growth Rate (cm/day)	0.03	0.38	0.02
	Mortality (%)	50	35	25
15th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
16th QM	Growth Rate (cm/day)	0.28	0.42	0.4
	Mortality (%)	-	-	-
17th QM	Growth Rate (cm/day)	0.38	0.3	0.2
	Mortality (%)	80	70	50
18th QM	Growth Rate (cm/day)	-	0.3	-
	Mortality (%)	-	80	-
19th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
20th QM	Growth Rate (cm/day)	0.35	0.45	0.34
	Mortality (%)	50	80	40
21th QM	Growth Rate (cm/day)	0.38	0.44	0.36
	Mortality (%)	-	-	-
22nd QM	Growth Rate (cm/day)	0.35	0.45	0.37
	Mortality (%)			
23rd QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
25th QM	Growth Rate (cm/day)	0.38	0.48	0.32
	Mortality (%)	-	-	-
26th QM	Growth Rate (cm/day)	0.42	0.45	0.38
	Mortality (%)	35	30	90
27th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
28th QM	Growth Rate (cm/day)	0.41	0.35	0.39
	Mortality (%)	20	90	30
29th QM	Growth Rate (cm/day)	0.38	0.42	0.4

Monitoring Quarters	Growth and mortality rates	Gher No.		
		1	2	3
	Mortality (%)			
30th QM	Growth Rate (cm/day)	0.36	0.44	0.37
	Mortality (%)	-	-	-
31st QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
32nd QM	Growth Rate (cm/day)	0.36	0.43	0.33
	Mortality (%)	-	-	-
33rd QM	Growth Rate (cm/day)	0.39	0.42	0.37
	Mortality (%)	20	25	60
34th QM	Growth Rate (cm/day)	0.38	0.41	0.35
	Mortality (%)	22	25	29
35th QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	-	-	-
36th QM	Growth Rate (cm/day)	0.34	0.39	0.37
	Mortality (%)	15	20	15
37th QM	Growth Rate (cm/day)	0.38	0.33	0.34
	Mortality (%)	10	30	15
38th QM	Growth Rate (cm/day)	0.41	0.32	0.36
	Mortality (%)	-	60	-
39th QM	Growth Rate (cm/day)	0.35	0.39	0.38
	Mortality (%)	80	30	40
40th QM	Growth Rate (cm/day)	0.35	0.38	0.34
	Mortality (%)	80	25	20
41st QM	Growth Rate (cm/day)	0.31	-	0.28
	Mortality (%)	80	-	70
42nd QM	Growth Rate (cm/day)	0.35	-	0.32
	Mortality (%)	-	-	-
43rd QM	Growth Rate (cm/day)	-	-	-
	Mortality (%)	40	30	35
44th QM	Growth Rate (cm/day)	0.12	0.09	0.11
	Mortality (%)	80	40	70
45th QM	Growth Rate (cm/day)	0.15	0.2	0.14
	Mortality (%)	20	25	70
46th QM	Growth Rate (cm/day)	0.18	0.22	0.17
	Mortality (%)	15	11	16

Table E7: Site Wise Species Diversity using Shannon–Weiner Index

Quarters	Species Number										Shannon-Weiner Index									
Sites	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
1st QM	33	12	2	12	7	3	6	-	-	-	0.5	0.9	0.3	0.3	0.4	0.8	0.7	-	-	-
2nd QM	-	-	12	22	13	13	3	-	-	-	-	-	0.77	0.78	0.6	0.77	0.82	-	-	-
3rd QM	13	24	9	15	10	6	5	-	-	-	0.7	0.6	0.4	0.7	0.8	0.5	0.7	-	-	-
4th QM	7	14	-	26	11	4	7	-	-	-	0.6	0.4	-	0.5	0.8	0.6	0.7	-	-	-
5th QM	3	-	11	27	6	10	18	-	-	-	1	-	0.8	0.7	0.2	0.7	0.2	-	-	-
6th QM	-	-	26	24	16	8	3	-	-	-	-	-	0.6	0.7	0.7	0.4	1	-	-	-
7th QM	10	11	18	20	9	14	8	-	-	-	0.6	0.6	0.5	0.5	0.9	0.8	0.7	-	-	-
8th QM	15	3	24	25	9	6	6	-	-	-	0.4	0.6	0.7	0.7	0.4	0.7	0.8	-	-	-
9th QM	-	-	17	8	15	7	6	-	-	-	-	-	0.6	0.6	0.7	0.8	0.6	-	-	-
10th QM	-	-	-	19	12	5	4	-	-	-	-	-	-	0.6	0.5	0.7	0.9	-	-	-
11th QM	1	1	23	32	5	7	12	-	-	-	-	-	0.6	0.6	0.7	0.9	0.2	-	-	-
12th QM	2	-	10	27	4	12	3	-	-	-	0.9	-	0.6	0.8	0.7	0.9	0.7	-	-	-
13th QM	2	5	18	15	4	9	15	-	-	-	0.74	0.37	0.79	0.76	0.51	0.53	0.67	-	-	-
14th QM	-	-	-	-	-	6	81	112	3	4	-	-	-	-	-	0.85	0.62	0.54	0.88	0.78
15th QM	-	-	-	-	-	17	29	13	13	5	-	-	-	-	-	0.81	0.74	0.21	0.33	0.32
16th QM	3	-	12	-	-	-	21	3	12	10	0.92	-	0.69	-	-	-	0.78	0.55	0.21	0.54
17th QM	-	-	-	-	-	-	16	18	10	14	-	-	-	-	0.31	-	0.85	0.49	0.65	0.52
18th QM	8	2	-	-	12	-	19	2	17	11	0.16	0.92	-	-	0.73	-	0.34	-	0.85	0.52
19th QM	-	-	24	-	-	13	-	13	11	11	-	-	0.53	-	-	0.56	-	0.4	0.61	0.29
20th QM	2	-	11	-	2	22	26	-	8	12	0.65	-	0.86	-	0.99	0.74	0.58	-	0.14	0.5
21st QM	-	-	-	-	-	19	-	5	9	14	-	-	-	-	-	0.5	-	0.14	0.52	0.71
22nd QM	-	-	-	-	-	11	-	11	11	9	-	-	-	-	-	0.81	-	0.76	0.8	0.5
23rd QM	-	-	10	1	2	11	-	10	12	8	-	-	0.78	-	0.72	0.56	-	0.4	0.54	0.64
25th QM	-	-	-	-	-	-	-	11	6	15	-	-	-	-	-	-	-	0.55	0.45	0.46
26th QM	7	-	4	-	9	12	-	-	16	11	0.64	-	0.82	-	0.29	0.7	-	-	0.41	0.53
27th QM	18	-	28	-	-	7	-	3	-	12	0.59	-	0.53	-	-	0.18	-	0.12	-	0.19
28th QM	-	-	4	-	3	20	-	-	18	4	-	-	0.88	-	0.74	0.37	-	-	0.52	0.96
29th QM	6	-	10	-	13	-	-	9	1	-	0.49	-	0.82	-	0.79	-	-	0.85	-	-
30th QM	20	7	34	-	25	10	-	1	1	8	0.61	0.73	0.83	-	0.73	0.68	-	-	-	0.58

Quarters	Species Number										Shannon-Weiner Index									
Sites	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
31st QM	25	25	33	-	12	13	-	11	12	-	0.5	0.52	0.54	-	0.71	0.59	-	0.06	0.67	-
32nd QM	-	-	-	-	-	19	-	13	4	10	-	-	-	-	-	0.84	-	0.31	0.69	0.37
33rd QM	-	-	-	-	-	6	-	8	11	13	-	-	-	-	-	0.91	-	0.36	0.79	0.83
34th QM	11	7	13	-	12	-	-	-	-	-	0.39	0.65	0.81	-	0.52	-	-	-	-	-
35th QM	13	7	3	-	7	20	-	12	12	7	0.58	0.3	0.38	-	0.39	0.46	-	0.2	0.35	0.46
36th QM	20	18	5	-	23	22	-	9	4	20	0.69	0.47	0.73	-	0.66	0.75	-	0.9	0.75	0.48
37th QM	9	-	32	-	20	23	-	3	11	20	0.48	-	0.6	-	0.85	0.75	-	0.81	0.73	0.69
38th QM	16	10	9	-	7	31	-	8	5	13	0.91	0.6	0.85	-	0.66	0.75	-	0.81	0.73	0.69
39th QM	8	-	12	-	3	22	-	11	14	24	0.88	-	0.46	-	0.81	0.64	-	0.71	0.66	0.53
40th QM	13	12	9	4	10	14	-	16	8	16	0.76	0.53	0.73	0.65	0.51	0.78	-	0.65	0.69	0.55
41st QM	9	-	-	-	-	13	-	7	5	3	0.36	-	-	-	-	0.84	-	0.88	0.83	0.18
42nd QM	16	20	9	-	26	5	-	-	5	-	0.35	0.45	0.62	-	0.72	0.67	-	-	0.4	-
43rd QM	10	13	26	-	-	9	-	4	3	15	0.75	0.84	0.64	-	-	0.51	-	0.53	0.31	0.55
44th QM			9			20			18	15			0.61			0.54			0.65	0.67
45th QM	-	-	-	-	-	21	-	-	19	2	-	-	-	-	-	0.52	-	-	0.64	0.99
46th QM	2	9	17	-	17	11	-	-	4	12	0.97	0.32	0.75	-	-	0.73	-	-	0.80	0.82

**According to Shannon-Weiner Index, 0-0.30: Low diversity/equally distribution (VH); 0.31-0.50: Moderate Diversity (M); 0.51-0.80: High Diversity (HD) and 0.80-1.0: Very High Diversity (VHD)*

Table E8: Site wise Rich Species Number

Fiscal Year	Monitoring Quarters	Rich Species in Sampling Sites									
		A	B	C	D	E	F	G	H	I	J
2014-15	1st QM	4	7	1	2	1	3	3	-	-	-
	2nd QM	0	0	5	2	10	6	3	-	-	-
	3rd QM	4	4	2	5	4	2	2	-	-	-
	4th QM	3	2	0	4	5	2	3	-	-	-
2015-16	5th QM	3	0	4	5	3	4	1	-	-	-
	6th QM	-	-	4	8	6	2	3	-	-	-
	7th QM	3	3	3	3	4	4	3	-	-	-
	8th QM	2	2	6	7	2	2	4	-	-	-
2016-17	9th QM	0	0	4	4	4	3	2	-	-	-
	10th QM	0	0	0	6	7	2	4	-	-	-
	11th QM	1	1	4	3	3	3	1	-	-	-
	12th QM	2	0	2	7	2	3	2	-	-	-
2017-18	13th QM	2	1	-	-	7	6	-	2	1	4
	14th QM	-	-	-	-	6	5	-	2	3	2
	15th QM	-	-	-	-	6	7	-	1	2	1
2018-19	16th QM	4	-	4	-	-	11	-	2	1	2
	17th QM	-	-	-	-	2	9	-	3	3	3
	18th QM	1	3	-	-	4	2	-	-	9	2
	19th QM	-	-	4	-	-	3	-	3	3	2
2019-20	20th QM	2	-	7	-	2	7	3	-	1	2
	21st QM	-	-	-	-	-	4	-	1	1	3
	22nd QM	-	-	-	-	-	6	-	5	6	2
	23rd QM	-	-	5	1	2	2	-	2	3	3
2020-21	25th QM	-	-	-	-	-	-	-	3	2	2
	26th QM	2	-	3	-	1	4	-	-	3	3
	27th QM	4	-	3	-	-	1	-	1	-	1
	28th QM	-	-	2	-	2	2	-	-	3	2
2021-22	29th QM	1	-	2	-	4	-	-	3	1	-
	30th QM	3	4	6	-	4	3	-	-	1	2
	31st QM	5	4	4	-	4	5	-	3	4	-
	32nd QM	-	-	-	-	-	9	-	1	2	2
2022-23	33rd QM	-	-	-	-	-	5	-	2	4	5
	34th QM	2	3	6	-	2	-	-	-	-	-
	35th QM	3	1	1	-	2	3	-	1	2	2
	36th QM	5	2	8	-	5	9	-	6	2	3
2023-24	37th QM	2	-	5	-	6	5	-	2	1	4
	38th QM	4	-	5	-	3	9	-	5	3	5
	39th QM	6	-	3	-	2	6	-	4	4	3
	40th QM	5	3	4	2	2	6	-	5	5	3
2024-25	41st QM	2	-	-	-	-	7	-	5	3	1
	42nd QM	2	2	4	-	7	3	-	-	1	-
	43rd QM	4	7	6	-	-	2	-	2	1	4
	44th QM	-	-	5	-	-	4	-	-	7	5
2025-26	45th QM	-	-	-	-	-	4	-	-	5	2
	46th QM	-	1	2	-	5	5	-	-	2	3

Source: CEGIS Field Survey, April 2014 - October 2025

Table E9: Total Catch in the Sampling Sites

Monitoring Quarters	Total Catch (kg)									
	Sampling Site									
	A	B	C	D	E	F	G	H	I	J
1st QM	28	65	1,559	0	0	0	0	-	-	-
2nd QM	0	0	0.5	12	0.6	1.2	1.6	-	-	-
3rd QM	3	1	8	3	5	13	4	-	-	-
4th QM	28.7	3.3	8.7	30	0	3.7	0.7	-	-	-
5th QM	6	0	1.05	10.5	0.5	1.5	2.9	-	-	-
6th QM	0	0	0.33	5.08	0.4	0.7	0.83	-	-	-
7th QM	20	10	19.5	10.75	0.6	0.8	0.825	-	-	-
8th QM	276.2	12.8	173.6	189	7.8	0	70	-	-	-
9th QM	0	0	2.8	0	5	1.5	1	-	-	-
10th QM	0	0	0	12	7.5	0.8	0.8	-	-	-
11th QM	10	4	2.6	18	2.6	0.5	0.1	-	-	-
12th QM	2	0	10	56	0	0	0	-	-	-
13th QM	2	0.25	8.13	77.5	0	0.3	0.12	-	-	-
14th QM	-	-	-	-	1.5	0	10.5	-	0.4	0.3
15th QM	-	-	-	-	2.56	-	37.67	-	0.67	-
16th QM	17	-	1.5	-	-	-	3	0.33	0.13	1
17th QM	-	-	-	-	0.1	-	4	22	3	0.25
18th QM	16	1	-	-	2	-	27	-	5	1.2
19th QM	-	-	93	-	-	-	-	5	1.2	0.6
20th QM	0.4	-	17.5	-	0.5	-	-	-	-	0.17
21st QM	-	-	-	-	-	-	-	11.5	0.5	1.6
22nd QM	-	-	-	-	-	-	-	0.2	1.7	0.8
23rd QM	-	-	4.6	1.35	1.17	-	-	20	0.4	-
25th QM	-	-	-	-	-	-	-	10.5	3	6.3
26th QM	30.5	-	18.9	-	2.07	0.6	-	-	5	7.5
27th QM	3.5	-	33	-	-	-	-	4	-	-
28th QM	-	-	12.7	-	47.5	2.3	-	-	3.5	0.3
29th QM	1.1	-	5.85	0	11.34	-	-	6.1	7.75	-
30th QM	27	13	23	-	52	-	-	0.25	2.5	3.25
31st QM	30	14.5	20	-	4	-	-	1	0.1	-
32nd QM	-	-	-	-	-		-	-	1.2	1.3
33rd QM	-	-	-	-	-	0.6	-	0.8	1.25	3.1
34th QM	81	0.4	1.1	-	5.7	-	-	-	-	-
35th QM	51.7	20.5	8	-	27.5	0.8	-	0.2	-	0.5
36th QM	14	39	20.3	-	18.5	0.8	-	1.3	0.2	0.3
37th QM	1.25	-	10.9	-	10.6	1.1	-	0.2	0.25	0.5
38th QM	104.5	34.75	2.1	-	5	9.85	-	0.3	0.25	0.4
39th QM	0.4	-	6.4	-	13	-	-	0.72	1.3	3.16
40th QM	53.4	138.6	31.93	11	4	-	-	11.25	0.75	0.22
41st QM	47.6	-	-	-	-	31.3	-	0.5	-	3
42nd QM	8	7	5.25	-	11.25	0.32	-	-	3	-
43rd QM	3.5	3.3	16	-	-	2.0	-	-	2.0	0.5
44th QM	-	-	63.17	-	-	27.6	-	-	3.75	1.45
45th QM	-	-	-	-	-	5.55	-	-	4.17	9.45
46th QM	26.5	4.85	12.83	-	8.37	16.15	-	-	1.5	9.35

Average Weight 0.15kg/mud crab and average weight 0.6 kg/mud eel Weight of Fry is not considered for catch assessment.*

Table E10: Occurrence of Species (1st to 22nd QM)

Local Name	Scientific Name	Local Status*	1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM	22nd QM
			'-'= No; '+' = Occurrence																					
Hilsa	*Tenualosa ilisha*	NO	-	-	+	-	-	+	+	-	-	-	+	-	-	-	-	-	-	+	-	-	-	+
Sagor Baim	*Anguilla bengalensis*	NT	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacha	*Eutropiichthys vacha*	CR	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	+
Bagda Chingri	*Penaeus monodon*	DD	+	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+
Banspata	*Brachypleura novae*	NO	+	+	+	+	-	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-
Kukurjib	*Cynoglossus lingua*	NO	+	-	-	-	-	-	-	+	+	+	-	+	-	-	+	-	-	-	+	-	+	+
Bele	*Glossogobius giuris*	NO	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
Aswine Bele	*Butis butis*	NO	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	-
Bairagi	*Coilia dussumieri*	NO	+	+	+	+	+	+	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	-
Boishakhi Chingri	*Macrobrachium* sp.	NO	-	+	-	-	+	+	+	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-
Chammu Chingri	*Metapenaeus brevicornis*	DD	+	+	+	-	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+
Chaka Chingri	*Penaeus indicus*	DD	+	+	-	+	+	+	+	+	+	-	+	-	+	-	+	+	+	+	+	+	+	+
Ghora Chela	*Securicula gora*	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chanda Chela	*Securicula sp.*		-	+	+	-	-	-	-	-	+	+	-	-	-	-	+	+	+	+	-	-	-	+
Sada Chewa	*Trepauchen vagina*	NO	+	-	+	-	-	+	-	-	-	+	-	-	-	-	-	+	-	-	-	+	-	+
Lal Chewa	*Taenioides cirratus*	NO	+	+	+	+	+	+	+	+	+	-	-	-	+	+	-	+	+	-	+	+	-	-
Chhuri	*Trichiurus muticus*	NO	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
Sagor Chela	*Megalops cyprinoids*	NO	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purabi Chela	*Thryssa purava*	NO	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabashi Tengra	*Mystus cavasius*	DD	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Gagra Tengra	*Nemapteryx nenga*	DD	-	+	+	-	+	-	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	-
Gulsha Tengra	*Mystus bleekery*	DD	+	+	-	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-
Harina Chingri	*Metapenaeus ensis*	DD	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	+	+	+	+	+	+
Ekthuto	*Hyporhampus limbatus*	NO	+	-	+	+	-	-	-	+	+	-	+	-	+	+	-	-	+	+	+	+	+	+
Kakila	*Xenentodon cancila*	NO	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-	-	-	+
Chapila	*Gudusia chapra*	NO	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	+	+	-	+	+

Local Name	Scientific Name	Local Status*	1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM	22nd QM
			'-'= No; '+' = Occurrence																					
Kuchia	*Monopterus cuchia*	DD	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-
Loitta	*Harpodon nehereus*	NO	+	+	+	-	+	-	-	-	+	+	-	-	+	-	+	-	-	-	-	+	-	-
Motka Chingri	*Macrobrachium villosimanusless*	DD	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+
Mud Crab	*Scylla serrata*	NO	+	-	+	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	+	-	+
Tular Dandi	*Sillaginopsis panijus*	NO	+	-	+	-	+	-	+	-	-	-	+	-	-	+	-	-	-	+	+	+	+	-
Paira Chanda	*Scatophagus argus*	DD	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-
Paissa	*Liza parsia*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
Pangas	*Pangasius pangasius*	CR	+	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	+	+	+	+	+
Tak Chanda	*Leiognathus equulus*	NO	+	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Phessa	*Setipinna phasa*	NO	+	+	+	+	+	+	+	+	+	-	+	-	+	+	-	+	-	-	+	+	+	+
Teli Phessa	*Setipinna phasa*	DD	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Poma	*Poma poma*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potka	*Chelonodon patoca*	NO	+	+	-	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	-	-
Shilong	*Silonia silondia*	EN	+	-	+	-	-	-	-	-	-	-	+	-	+	+	-	-	-	-	-	-	-	+
Tailla	*Eleutheronema tetradactylum*	DD	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	+	-
Tapse	*Polynemus paradiseus*	DD	+	+	+	-	-	+	+	+	-	-	+	+	-	+	+	+	+	+	+	+	+	-
Daitna	*Acanthopagrus latus*	DD	-	-	-	+	-	-	-	+	+	-	+	+	-	+	+	+	-	+	+	+	-	-
Shole	*Channa striatus*	DD	-	-	-	+	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-
Magur	*Clarias batrachus*	DD	-	-	-	+	-	-	-	+	-	-	-	+	-	+	+	-	-	-	-	-	-	-
Koi	*Anabas testudineus*	DD	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
Vetki	*Lates calcarifer*	DD	-	-	-	+	+	+	+	+	+	-	+	+	+	+	+	+	-	+	+	-	+	-

Table D.5: Occurrence of Species (23rd to 47th QM)

Local Name	Scientific Name	Local Status*	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31th QM	32nd QM	33rd QM	34th QM	35rd QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM	46th QM	47th QM
			'-'= No; '+' = Occurrence																							
Hilsa	*Tenualosa ilisha*	NO	-	-	-	-	-	+	+	+	-	+	-	-	-	-	-	-	-	+	-	+	-	+	+	-
Sagor Baim	*Anguilla bengalensis*	NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacha	*Eutropiichthys vacha*	CR	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
Bagda Chingri	*Penaeus monodon*	DD	+	-	-	+	+	+	+	+	+	-	-	-	-	+	+	+	+	-	-	+	+	+	+	+
Banspata	*Brachypleura novae-zeelandiae*	NO	-	+	-	+	-	+	+	+	+	-	-	-	+	+	+	+	+	-	+	+	-	-	+	+
Kukurjib	*Cynoglossus lingua*	NO	-	+	+	+	-	+	+	+	-	+	-	+	+	-	-	+	+	+	-	-	-	-	-	+
Bele	*Glossogobius giuris*	NO	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+
Aswine Bele	*Butis butis*	NO	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+	+	+	-	-	+	-	-	-	+
Bairagi	*Coilia dussumieri*	NO	+	+	-	+	+	+	+	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+
Boishakhi Chingri	*Macrobrachium* sp.	NO	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chammu Chingri	*Metapenaeus brevicornis*	DD	+	-	+	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	+	-	+
Chaka Chingri	*Penaeus indicus*	DD	+	-	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	-	+
Ghora Chela	*Securicula gora*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Chanda Chela	*Securicula sp.*		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sada Chewa	*Trepauchen vagina*	NO	-	-	+	-	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lal Chewa	*Taenioides cirratus*	NO	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
Chhuri	*Trichiurus muticus*	NO	-	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Sagor Chela	*Megalops cyprinoids*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Purabi Chela	*Thryssa purava*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kabashi Tengra	*Mystus cavasius*	DD	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gagra Tengra	*Nemapteryx nenga*	DD	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Gulsha Tengra	*Mystus bleekery*	DD	+	-	+	+	-	-	+	+	-	+	+	+	+	+	+	+	+	-	+	+	+	-	+	+
Harina Chingri	*Metapenaeus ensis*	DD	+	+	-	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ekthuto	*Hyporhampus limbatus*	NO	-	-	+	+	-	-	-	-	-	-	-	-	+	-	+	-	-	-	+	-	-	-	-	+
Kakila	*Xenentodon cancila*	NO	-	-	-	-	-	-	+	+	-	-	+	+	-	-	+	-	-	-	+	-	+	+	-	+
Chapila	*Gudusia chapra*	NO	-	+	+	+	+	-	+	+	+	+	-	-	+	-	+	-	-	+	-	+	-	-	+	-

Local Name	Scientific Name	Local Status*	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31th QM	32nd QM	33rd QM	34th QM	35rd QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM	46th QM	47th QM
			'-'= No; '+' = Occurrence																							
Kuchia	*Monopterus cuchia*	DD	+	+	-	+	+	+	+	+	-	+	-	+	+	-	+	-	-	-	-	-	+	+	-	+
Loitta	*Harpodon nehereus*	NO	-	-	+	-	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
Motka Chingri	*Macrobrachium villosimanusless*	DD	+	-	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	+	+
Mud Crab	*Scylla serrata*	NO	+	-	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+
Tular Dandi	*Sillaginopsis panijus*	NO	-	-	-	-	+	-	-	-	+	-	-	-	+	+	+	+	+	+	+	+	+	-	-	-
Paira Chanda	*Scatophagus argus*	DD	-	-	+	+	-	-	+	+	-	-	+	-	+	+	-	-	-	-	+	+	-	+	+	+
Paissa	*Liza parsia*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pangas	*Pangasius pangasius*	CR	-	-	+	-	-	+	+	+	-	-	+	-	-	-	+	+	+	-	+	+	+	-	+	+
Tak Chanda	*Leiognathus equulus*	NO	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Pheksa	*Setipinna phasa*	NO	+	-	-	-	+	+	+	+	-	-	-	+	+	-	+	+	-	+	+	+	-	-	+	-
Teli Pheksa	*Setipinna phasa*	DD	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-
Poma	*Poma poma*	NO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
Potka	*Chelonodon patoca*	NO	-	-	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	-	-	+	+	+	+	+
Shilong	*Silonia silondia*	EN	-	+	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	-
Tailla	*Eleutheronema tetradactylum*	DD	-	-	-	+	-	+	+	-	-	-	+	-	+	-	-	-	-	-	-	+	-	-	+	-
Tapse	*Polynemus paradiseus*	DD	+	+	+	-	-	+	+	-	+	-	-	-	+	+	+	-	-	-	-	+	-	+	+	+
Datina	*Acanthopagrus latus*	DD	+	-	-	+	-	-	+	+	-	-	+	+	+	+	+	+	+	+	-	+	+	-	+	+
Shole	*Channa striatus*	DD	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magur	*Clarias batrachus*	DD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Koi	*Anabas testudineus*	DD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vetki	*Lates calcarifer*	DD	-	-	-	-	-	+	+	-	-	-	+	-	-	+	+	-		+	-	+	-		+	+

**Local Status Source: IUCN Bangladesh, 2015*

Table E11: Length-wise species distribution (%) in sampling sites

Fish Species	Sampling	L (< 2cm)	L (2 to 3cm)	L (3 to 5cm)	L (5 to 10cm)	L (10 to 20cm)	L (> 25cm)	Brood Fish
Amadi	F	0.00	42.86	42.86	14.29	0.00	0.00	0.00
	I	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	J	0.00	20.00	20.00	40.00	20.00	0.00	0.00
Bagda	E	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	F	50.00	0.00	16.67	16.67	16.67	0.00	0.00
	J	50.00	0.00	50.00	0.00	0.00	0.00	0.00
Bele	B	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	E	0.00	0.00	0.00	16.67	33.33	33.33	16.67
	F	0.00	0.00	33.33	33.33	0.00	33.33	0.00
	J	0.00	0.00	33.33	33.33	33.33	0.00	0.00
Bhut Bele	I	0.00	0.00	0.00	33.33	66.67	0.00	0.00
Chaka Chingri	B	0.00	33.33	33.33	33.33	0.00	0.00	0.00
	E	0.00	0.00	0.00	100.00	0.00	0.00	0.00
	F	0.00	42.86	42.86	14.29	0.00	0.00	0.00
	I	0.00	0.00	33.33	66.67	0.00	0.00	0.00
	J	0.00	0.00	33.33	33.33	33.33	0.00	0.00
Chamua Chingri	E	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	F	0.00	11.11	44.44	44.44	0.00	0.00	0.00
	I	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	J	0.00	0.00	50.00	50.00	0.00	0.00	0.00
Chewa	B	0.00	0.00	25.00	25.00	25.00	25.00	0.00
	F	0.00	0.00	14.29	28.57	28.57	28.57	0.00
Chitra	E	0.00	0.00	0.00	0.00	50.00	50.00	0.00
	I	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Chota Bele	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
Datina	E	0.00	0.00	0.00	25.00	25.00	25.00	25.00
Gagra Tengra	B	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
	J	0.00	0.00	0.00	33.33	33.33	33.33	0.00
Goda Chingri	J	0.00	33.33	33.33	33.33	0.00	0.00	0.00
Golda	F	44.44	11.11	22.22	11.11	11.11	0.00	0.00
	J	28.57	0.00	28.57	0.00	14.29	14.29	14.29
Gulsha Tengra	E	0.00	0.00	0.00	0.00	50.00	50.00	0.00
Harina Chingri	E	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	F	25.00	25.00	25.00	25.00	0.00	0.00	0.00
	I	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	J	0.00	0.00	28.57	42.86	28.57	0.00	0.00
Java	E	0.00	0.00	0.00	0.00	0.00	100.00	0.00
Kain Magur	E	0.00	0.00	0.00	0.00	0.00	50.00	50.00
	F	0.00	0.00	0.00	0.00	0.00	50.00	50.00

Fish Species	Sampling	L (< 2cm)	L (2 to 3cm)	L (3 to 5cm)	L (5 to 10cm)	L (10 to 20cm)	L (> 25cm)	Brood Fish
Kakila	I	0.00	0.00	0.00	33.33	66.67	0.00	0.00
Kakra	F	0.00	0.00	50.00	50.00	0.00	0.00	0.00
Kharsul Bata	F	0.00	0.00	0.00	0.00	50.00	50.00	0.00
Kuchia	F	0.00	0.00	0.00	0.00	80.00	20.00	0.00
	J	0.00	0.00	0.00	0.00	33.33	66.67	0.00
Kukurjib	E	0.00	0.00	0.00	33.33	33.33	33.33	0.00
Kumirer Khil	F	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	J	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Motka Chingri	E	0.00	0.00	100.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	50.00	50.00	0.00	0.00	0.00
	J	0.00	0.00	50.00	50.00	0.00	0.00	0.00
Nandi Bele	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
	J	0.00	0.00	50.00	50.00	0.00	0.00	0.00
Paissa	E	0.00	0.00	33.33	0.00	33.33	33.33	0.00
	F	0.00	0.00	33.33	33.33	33.33	0.00	0.00
	I	0.00	0.00	0.00	33.33	66.67	0.00	0.00
	J	0.00	50.00	0.00	0.00	50.00	0.00	0.00
Pangas	E	0.00	0.00	0.00	0.00	0.00	100.00	0.00
Poikka	E	0.00	0.00	0.00	0.00	100.00	0.00	0.00
	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
Poma	B	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	E	0.00	0.00	0.00	33.33	33.33	33.33	0.00
	F	0.00	9.09	9.09	36.36	18.18	27.27	0.00
	I	0.00	0.00	0.00	50.00	50.00	0.00	0.00
	J	0.00	0.00	0.00	33.33	33.33	33.33	0.00
Potka	F	0.00	50.00	0.00	0.00	50.00	0.00	0.00
	J	0.00	0.00	0.00	0.00	100.00	0.00	0.00
Ramchos	F	0.00	0.00	66.67	33.33	0.00	0.00	0.00
	J	0.00	0.00	0.00	50.00	50.00	0.00	0.00
Rekha	E	0.00	0.00	100.00	0.00	0.00	0.00	0.00
Vetki	E	0.00	0.00	0.00	0.00	100.00	0.00	0.00

Source: CEGIS field survey, October 2025

Table E12: Purpose, timing and extent of migration for different year-class of migratory fish species (1st QM to 21st QM)

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
Tapsi	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-		-	-	-	-	-	-	-	G	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Age-1 adult	F&G	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	F&G	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Age-1 adult and Brood fish	F&G	S	-	-	-	F	F&S	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	F&G	-	-	F	F	-	-	-		-	-	F	-	-	F	-	-	F	F
	E	Juvenile and Age-1 adult	F&G	F&G		-	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-	-	-
		Adult and Brood Fish	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Juvenile	-	-	F&G	-	-	-	F	-	-	-	F	-	-	F&G	-	F&G	-	-	-	-	-
	H	Adult	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
		Fry										-					N		-	-	-	-	-
	SWP	Age-1 adult	F&G	F&G	F&G	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bairagi	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Age-1 adult	F&G	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	B&S	F&G	F	-	F	-	-	-	-	-	-	-	N	-	N	-	-		N	
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	F&G	F&G	-	M	F&G	-	N

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
	J	Juvenile and Age-1 adult	F&G	-	-	-	F&G	F	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	N	N	-	-	-	-	N	-	N	-
	H	Fry	-	N	-	F	-	-	-	-	-	-	-	N	N	-	N	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	F&G	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	F&G	-	-	-	-
	SWP	Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-
Chapila	B	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Fry	-	N	-	-	-	-	-	-	-	-	-	-	-	-	N	-	N	-	-	-	-
	J	Adult																					M
	SWP	Age-1 adult	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loitta	B	Juvenile and Age-1 adult	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	F&	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Age-1 adult	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Fry, Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-
Poma	B	Juvenile	F&G	-	-	F	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	F&G	-	-	-	-	-	-	G&F	-	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 adult	-	-	F&G	-	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry and Juvenile	B&S	N	-	-	-	F	-	-	-	-	-	-	-	-	N	-	F	-	-	-	-
		Juvenile	-	-	F&G	F	F&G	-	F&G	-		F&G			F&G	-	F&G	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
		Adult	-	-	-	-	-	-	F	-					-	F	F	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-		S	-		-	-	-	-	-	-	-	-	-
	B	Fry and Juvenile	-	-	N	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-
	C	Brood Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	G&M	-
	E	Adult and Brood Fish	-	-	B&S	-	-	-	-	-	-	-	F&S	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	F	-		-	F		-	-	-	-	-	F	-	-	-
		Fry and Juvenile	-	-	-	-	-	S&N	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-
	H	Fry	-	-	S,F&G	-	-	-	-	N	-		-	N	N	-	-	-	N	-	F&G	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		-	-		-	N	-	-	-	-	-	-	-
		Age-1 Adult	-	-	-	-	-	-	F	F	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	F	-	F	-	-	-		F	-	-	-	-	-	-	-	-	F	-
		Brood Fish	-	-	-	-	-	-	-	-	-		S	-	-	-	-	-	-	-	-	-	-
	SWP	Adult	-	-	F	F	-	F	-	-	-		-	-	-	-	-	-	-	-	F	F	-
	C	Adult and Brood Fish	B&S	-	-	-	-	-	-	-	-	-	F,G&S	-	-	-	-	-	B&S	-	-	-	-
		Juvenile and Adult	-	-	F&G	F	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	M&F	M&F	-	-
		Fry	-	-	-	-	-	-	-	-	N	-	-	N	-	-	-	-	-	-	-	-	-
Chhuri	B	Adult	F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A		F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chela	B	Adult	F	-	F	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
	A	Juvenile and Adult	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Fry and Juvenile	-	F&G	-	-	-	N	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	F		-	-	-	-	-	-	-	G&F	N		-	-	-	-	F&G	-	-	-	-	-	N
	J	Fry and Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N&F	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
Gang Tengra	F	Juvenile and Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-
	J	Age-1 adult	-	-	-	-	F&G	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	F&G	-	-	-	-
	A	Juvenile and Adult	-	-	F&G	-	-	-	F	-	-		-	F	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	F&G	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	F	-	F&G	-	-	-	F		F		-	-	-	-	-	-	-	-	-
Gagra Tengra	F	Juvenile and Age-1 adult	-	F&G	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-						N	-	-	-	-
	J	Age-1 adult	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	M&F
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile and Adult	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	F	-	F&G	-	-	-	-	-	F	-	F	F	-	-	-	-	F	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-	M	-	-
	C	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
Gulsha Tengra	B	Adult	F&B	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile		-	-	-	-	-	-	-	-		-	-	F	-	-	-	-	-	-	-	-
	F	Age-1 adult	-	-	-	F	-	F	F&G	-	-		-	F	-	-	F&G	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		F&G	-		-	F&G	-	F&G	-	-	-	-	-
	H	Age-1 adult	-	F&G	-	F&G	-	F&G	-	F&G		-	-		-	-	-	-	F&G	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-		F&G	-		-	-	-	-	F&G	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																				
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
	E	Juvenile	-	-	-	-	-	-	F&G	-		-	-		-	-	-	-	F&G	-	-	-	-
		Age-1 adult	-	-	-	-	-	-	-	-	F&G	-	-	-	F	-	-	-	F&G	-	-	-	-
	I	Juvenile and Age-1 Adult	-	-	-	-	-	-	F&G	-		-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
Potka	B	Adult	F&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	S	S&N	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	F	F	-	-	-	-	-	F&G	-	-
		Adult	-	-	-	F	-	-	-	-	-	-	F	-	-	F&G	-	-	-	-	-	-	-
	H	Fry	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-
	E	Fry	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-
Paira Chanda	A	Adult	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chewa	A	Juvenile and Adult	F	-	F&G	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry and Juvenile	S	-	F&G	-	N&G	N	F&G	-	N	-	-	-	F&G	F&G	F&G	-	-	-	-	N	F&G
		Adult	-	-	-	F	-	F	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult	-	-	F&G	-	-	F&N	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	M	Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-
	I	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-
	SWP	Juvenile	-	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	F	-	-	-	-		-	-	-	-	-	-	F	-	-	-	-
		Age-1 Juvenile	-	-	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-
Bele	A	Adult	F	-	F	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
		Juvenile	-	-	-	-	-	-	-	F&G	-		-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	N&G	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult	-	-	F&G	-	F&G	N&F	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry	B&S	N	-	-	N	N	-	-	N	-	-	-	-	-	-	N	N	-	-	N	-
		Juvenile and Adult	-	-	F&G	F	-	F	-	F	-	-	F&G	-	-	-	F&G	-	-	-	-	F&G	-
	E	Juvenile and Age-1 Adult	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Fry	B&S	-	-	-	-	N	-	-	-		-	-	-	N	N	-	N	-	-	-	-
		Juvenile and Adult	-	-	N&G	F	F&G	F	F&G	-	-		-	-	-	-	-	-	-	-	-	-	M&F
	J	Fry	B&S	N	-	-	N	-	-	N	-		-	-	-	-	N	N	N	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	I	Juvenile and Age-1 adult	-	F&G	F&G	F	F&G	-	-	-	F&G		-	-	-	-	F	-	F&G	F&G	-	-	-
		Fry	-	-	-	-	-	-	-	N	-		-	N	N	-	-	-	-	-	-	-	-
Tular Dandi (Nona Bele)	A	Adult	F	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	F&M	-
	I	Adult														F	-	-	-	-	M	-	-
	F	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	G	-	-	-
	SWP	Adult	-	-	F	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-
	J	Adult	F	-	F	-	F	-	F	-	-	-	-	-	-	-	-	-	-	-	M	M	M&F
Tairel	A	Adult	F	-	-	-	-	-	-	F	-	-	-	-	-	-	-	F	-	-	-	-	-
	E	Age-1 Adult	-	-	-	-	-	-	-	-	F&G	-	-	-	-	F&G	F&G	-	-	-	-	-	-
	H	Juvenile	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G
Pheksa	A	Adult	F	-	-	-	-	-	-	F	-		-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	F&G	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	F&G		-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
	J	Juvenile and Adult	F	F&G	-	-	-	-	F&G	-			-	-	-	-	-	F&G	-	-	-	M	-
		Adult	-	-	F	F	F	-	F	-	-		-	-	-	F	F	-	-	-	M	-	M
	H	Adult	-	-	F	F	-	-	F&G	-	-		F	-	-	-	-	-	-	-	M	-	-
		Juvenile															-	G	-	-	-	-	-
	F	Juvenile and Adult	F	F&G	-	-	F&G	-		-	-		-	-	-	-	-	F&G	-	-	M	-	-
	I	Juvenile and Adult	F	F&G	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-		-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	F	F	-	F	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Paissa	A	Juvenile and Adult	F	-	F&G	F	-	-	-	F&G	-	-	-	F	F	-	-	-	-	G&M	-	-	-
		Brood	-	-	-	-	-	-	-	-	-	-	-	S	S	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G		-	-	-		-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	F	-	F&G	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	F	-	F&G	-	F&G	-	-	-	-	-	-	F&G	F&G	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-					-
	F	Fry	B&S	-	-	-	N	-	-	-	N	-	-	-	-	-	-	N	-	-	F&G	N	-
		Juvenile and Adult	-	-	F&G	-	-	N&F	-	-	-	-	F&G	F	F	-	-	F&G	-	M	-	-	-
	E	Juvenile	-	-	-	-	-	-	F&G	-	-	-		-	-	-	-	-	-	M	-	-	-
	H	Fry	B&S	-	-	-	-	N	-	-	N	-	-	-	-	-	N	-	-	-	-	-	-
		Age-1 Juvenile	-	-	-	-	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 Adult	-	-	-	-	F&G	F	-	-		-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry	B&S	F&G	-	-	F&G	-	-	-		-	-	-	-	-	-	-	-	-	F&G	-	-
		Juvenile	-	-	-	-	-	-	F&G	-	-	-	F&G	-	-	-	-	-	-	G	-	-	-
		Adult	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G
Banshpata	F	Juvenile	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	F&G	-	-	-	-

Migratory Species	Sites	Year Class*	Migration Purpose																			
			1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM	21st QM
		Adult	-	-	-	F	-	F	-	-	-	-	-	-	-	F	F	-	-	-	-	-	-
	A	Juvenile	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	Juvenile and adult	-	-	F&G	F	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-	G&M	-	-
	E	Adult	-	-	-	-	-	-	-	F	F	-	F	-	-	-	-	-	-	-	-	-	-
	H	Fry and Adult	F	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-
		Adult	-	-	-	F	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-
	I	Adult	-	-	F	F	-	B&S	-	-	-	-	-	-	-	F	-	-	-	G&M	G&M	-	-
	J	Adult	-	-	F	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G&M	F	-
Hilsa	A	Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	B	Brood Fish	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	F	Adult and Brood Fish	-	-	-	-	-	-	F&B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Adult	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Brood Fish	-	-	-	-	-	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	B&S	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
Pangas	B	Juvenile	-	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Juvenile and Adult	-	-	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F&G	-	F&G

Migratory Species	Site	Year Class*	Migration Purpose													
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
Tapsi	B	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-
	C	Adult	-	-	-	-	-	-	-	F	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	-	-	-	M&F	-	-	-	-	M&F	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Age-1 adult	-	-	-	-	-	F	F	-	-	-	-	-	F	-	-
	F	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Adult	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fry	-	N	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bairagi	B	Juvenile and Age-1 adult	-	-	-	-	-	-	-	M	-	-	-	-	F	-	-
	A	Juvenile and Age-1 adult	-	-	-	-	-	F	F	-	-	-	-	F&G	F	-	-
	F	Fry	-	-	-	-	-	-	-	-	-	-	-	N	-	-	-
		Juvenile	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-	M&F
	J	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	M&F	-	-	-	-	-	F
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-
	H	Fry	N	N	-	-	-	-	-	-	F&G	-	-	-	-	F&G	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Juvenile	-	-	-	-	F&G	-	-	-	M	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-
Chapila	B	Juvenile	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-
	A	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
	H	Fry	-	-	-	-	-	-	-	N	-	-	-	-	-	N	-
		Juvenile	-	F&G	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	-	-	-	F&G	F&G	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poma	B	Age-1 adult	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	A	Juvenile	-	-	-	-	-	-	-	G	-	-	-	F&G	-	-	-
		Age-1 adult	-	-	-	-	-	M	-	-	-	-	-	-	M&F	M&F	-

Migratory Species	Site	Year Class*	Migration Purpose													
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
	C	Juvenile and Adult	G&M	-	-	G&M	M	-	M	G&M	-	-	-	-	M&F	M&F	-
	J	Fry	-	-	-	-	-	-	N	-	G	-	-	-	-	-	N
		Juvenile	-	M&F	-	-	-	-	-	-	M&F	M&F	-	-	G	M&F	-
		Adult	-	-	-	-	F	-	-	-	-	-	-	-	-	-	F
	B	Fry and Juvenile	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-
	E	Juvenile and Adult		-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	M	-	M	-	-	-	-	-	-	F
		Fry and Juvenile	N	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-
	H	Fry	N&M	N	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 Adult	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-
	I	Adult	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile	-	M&F	-	-	-	-	-	-	-	-	-	-	-	M&F	-
		Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chhuri	A	Adult	-	-	-	-	-	F	-	-	-	-	-	-	-	-	-
	B	Adult	-	-	-	-	-	-	-	-	-	-	-	-	F	-	-
-Chela	A	Juvenile and Adult	-	-	-	M&F	-	-	-	F	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Adult	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-
	E	Fry and Juvenile	-	-	N&M	-	-	-	-	-	-	-	-	-	M&F	N&F	-
	J	Fry and Juvenile	-	N&M	-	-	-	-	-	-	-	M&F	-	-	-	-	-
	F	Fry and Juvenile	-	-	N&M	-	F&G	-	F&G	-	-	-	-	-	-	M&F	-
	H	Fry and Juvenile	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-	-
Gang Tengra	F	Adult	-	-	-	-	-	-	-	-	-	-	-	M	-	-	-
Gagra Tengra	F	Juvenile and Age-1 adult	-	-	M	-	M	-	-	-	-	-	-	-	-	M&F	-
	H	Age-1 adult	-		-	-	-	-	-	-	-	-	-	-	M&F	-	-
		Juvenile	-	F&G	-	-	-	N	-	-	-	-	-	-	-	-	-
	A	Juvenile and Adult	-	-	M	-	-	-	-	-	-	-	M&F		M&F	-	M&F
		Adult	-	-	-	-	-	-	-	-	-	-	-	F&G	-	-	-

Migratory Species	Site	Year Class*	Migration Purpose													
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
	B	Juvenile	-	-	-	-	-	-	F&G	-	-	-	-	M	-	-	-
		Adult	-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-
	E	Adult	-	-	M	-	M	F	M	-	-	-	-	-	M&F	-	F
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 adult	-	-	M	-	M	-	M	-	-	-	M&F	-	M&F	-	-
	I	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gulsha Tengra	B	Adult	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-
	A	Adult	-	-	-	-	-	-	-	M	-	-	-	-	-	-	-
	F	Juvenile	-	-	-	-	-	-	F&G	-	F&G	F&G	-	-	-	-	-
	C	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Age-1 adult	-	-	-	M	-	-	M	-	-	-	-	-	M&F	-	-
	E	Age-1 adult	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
	J	Juvenile	-	F&G		-	-	-	-	-	-	M	-	-	-	-	-
Potka	A	Adult	-		-	-	-	-	-	F	-	-	-	-	-	-	-
	B	Adult	-	-	-	-	-	-	-	F	-	-	-	-	M&F	-	-
	F	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N
	J	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N
		Juvenile	-	-	-	-	F&G	-	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and adult	-	-	-	F&G	-	-	F&G	-	-	-	-	-	M&F	M&F	-
Paira Chanda	A	Adult	-	-	-	-	-	-	-	-	-	-	M&F	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	F&G	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
	E	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chewa	F	Fry and Juvenile	-	-	-	-	F&G	-	F&G	-	-	-	-	-	-	-	-

Migratory Species	Site	Year Class*	Migration Purpose													
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
	G	Fry and Juvenile	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Juvenile	M	-	-	-	-	F	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-	F&G	-	-	-	-	-
	I	Juvenile	-	-	-	-	M	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	F	-	-	-	-	-	-	-	-	-	N	-	-	-
		Age-1 Juvenile	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bele	A	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	F	-	-	F&G	F&G	-	-	M&F	-	-	M&F	M&F
	J	Fry and Juvenile	N	N	-	-	M	-	-	-	-	-	-	N	-	-	N
		Adult	-	-	M&F	-	-	-	F&M	-	-	-	-	-	M&F	M&F	M&F
	E	Juvenile and Age-1 Adult	-	-	-	-	-	-	F&M	M	-	-	F	-	-	M&F	M&F
	F	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	-	M&F	M&F	-	-	M&F	-	M&F
	I	Juvenile and Age-1 adult	M&F	-	-	-	F&G	-	-	-	-	-	-	-	-	M&F	-
		Fry	-		-	-	-	-	-	N	-	-	-	-	-	-	-
	C	Juvenile and Age-1 adult	-		-	-	-	M	-	M	-	-	-	-	M&F	-	-
Tular Dandi	F	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	M&F	-	M&F	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tairel	A	Adult	-	-	-	M	-	-	M	-	-	-	-	-	M&F	-	-
	B	Juvenile	-	-	-	-	-	-	-	-	-	-	G&M	-	-	-	-
	C	Juvenile	-	-	-	-	-	-	M	-	-	-	-	-	M	-	-
	E	Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
	F	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pheksa	A	Adult	-	-	-	-	-	M	M	-	-	-	-	-	-	-	-
	B	Juvenile															
	C	Juvenile and Adult	-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-

Migratory Species	Site	Year Class*	Migration Purpose													
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
	E	Adult	-	-	-	-	-	-	-	-	-	-	-	-	M&F	-	-
	J	Juvenile and Adult		-	M	-	M	-	-	-	-	-	-	-	-	-	M&F
		Adult		-	-	-	-	-	M	-	-	-	-	-	-	-	-
	H	Adult	M	-	-	-	-	-	-	M	-	-	-	G&M	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M
	I	Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paissa	A	Juvenile and Adult	-	-	-	G&M	-	-	G&M	G&M	-	-	G&M	-	-	M&F	M&F
	B	Juvenile and Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Adult	-	-	-	F	-	-	G&M	G&M	-	-	G&M	-	-	M&F	M&F
		Fry	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	E	Juvenile and Adult	-	-	F&G	-	-	F	G&M	G&M	-	-	G&M	-	-	M&F	-
	J	Fry	N	N	-	F	-	-	-	-	-	G&M	-	-	-	M&F	F&G
	H	Fry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Fry and Juvenile	N	-	F&G	F	F&G	-	-	N	G&M	-	-	-	-	-	F
		Age-1 Adult	-	-	-	-	-	-	-	-	-	G&M	-	-	-	-	F&G
	I	Fry and Juvenile	-	-	F&G	-	-	-	-	-	M	G&M	-	-	-	G&M	-
		Age-1 adult	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Banshpata	F	Juvenile	-	-	-	-	-	-	-	-	-	-	-	G&M	G&M	-	-
		Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 Adult	-	-	-	G&M	-	-	G&M	M	-	-	-	-	M&F	M&F	-
	A	Juvenile	-	-	-	-	-	-	-	G&M	-	-	-	-	M&F	-	-
	B	Juvenile and adult	-	-	-	-	-	-	-	M	-	-	-	-	M&F	-	-
	E	Adult	-	-	-	-	-	-	F&G	-	-	-	-	-	M&F	-	-
	I	Juvenile and Age-1 Adult	-	-	M	-	-	-	-	-	-	-	-	-	-	-	-
	J	Juvenile and Age-1 Adult	-	G&M	-	-	-	-	-	-	-	-	-	-	-	-	-
Hilsa	A	Brood Fish	-	-	-	-	-	M	-	-	-	-	-	-	-	-	-
	F	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	-	M	M	-	-	-	-	-	-	-	-

Migratory Species	Site	Year Class*	Migration Purpose														
			23rd	25th	26th	27th	28th	29th	30th	31st	32nd	33rd	34th	35th	36th	37th	38th
	J	Adult	-	-	-	-	-	-	M	-	M	-	-	-	-	-	-
	H	Age-1 Adult	-	-	-	-	-	-	M	M	M	-	-	-	-	-	-
Pangas	A	Adult	-	-	-	-	-	-	-	-	-	-	F	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	-	G	-	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	M	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H	Juvenile	-	-	-	-	-	N	-	-	-	-	-	-	-	-	-
	I	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	40th	41st	42nd	43rd	44th	45th	46th	47th
Tapsi	B	Juvenile and Age-1 adult	-	M&F	-	-	-	-	-	-	-
	C	Adult	-	-	-	-	-	M&F	-	-	-
	J	Adult	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	-	-
	E	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-
	F	Juvenile and Age-1 adult	-	-	-	-	-	M&F	M&F	-	-
	H	Adult	-	M&F	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-
	I	Adult	-	-	-	-	-	M&F	M&F	-	-
Bairagi	B	Juvenile and Age-1 adult	-	M&F	-	-	M&F	-	-	M&F	-
	A	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-
	F	Fry	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	M&F	-	-	M&F	-	M&F	-
	J	Juvenile and Age-1 adult	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	-	-	-	-	-	-
	H	Fry	-	-	-	-	-	-	-	-	-
		Juvenile	-	F&G	-	-	-	-	-	-	-
	I	Juvenile	-	-	-	-	-	F&G	-	-	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	40th	41st	42nd	43rd	44th	45th	46th	47th
	C	Adult	-	-	-	-	-	F	-	-	-
Chapila	B	Juvenile	-	-	-	-	-	-	-	M&F	-
	A	Juvenile	-	-	-	-	-	-	-	-	-
	H	Fry	-	-	-	-	-	-	-	-	-
		Juvenile	-	F&G		-	-	-	-	-	-
	J	Adult	-	M&F	-	-	-	-	-	-	-
		Fry	-	-	-	-	N	-	-	-	-
Poma	B	Age-1 adult		-		-	M&F	-	-	M&F	M&F
		Juvenile	-	-	-	F&G	-	-	-	-	-
	A	Juvenile	F	-		-	-	-	-	-	-
		Age-1 adult	M&F	-		-	-	-	-	-	-
	C	Juvenile and Adult	-	-		M&F	M&F	M&F	-	M&F	-
	J	Fry	-	-	N	-	-	-	-	N	-
		Juvenile	-	-	-	F&G	F&G	M	M&F		-
		Adult	-	-	-	-	-	F	M&F	G&M	M&F
	B	Fry and Juvenile	-	-	-	F&G	-	-	-	-	-
	E	Juvenile and Adult	-	-	-	M&F	-	-	-	-	M&F
		Adult	-	-	-	-	-	-	-	-	-
		Fry and Juvenile	-	-	-	-	-	-	-	-	-
	H	Fry	-	N	-	-	-	-	-	-	-
		Juvenile	-	-		-	-	-	-	-	-
		Age-1 Adult	-	-		-	-	-	-	-	-
	I	Adult	-	-		-	-	F	-	-	M&F
		Juvenile	-	-		M&F	F&G	F&G	M&F	-	-
		Fry	-	-		-	-	-	-	-	-
Chhuri	A	Adult	-	-		-	-	-	-	-	-
	B	Adult	-	-		-	-	-	-	-	-
-Chela	A	Juvenile and Adult	-	-		-	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	-	-	-	-	M&F	-
	C	Juvenile and Adult	-	M&F		-	-	-	-	-	-
	E	Fry and Juvenile	-	F&G		-	-	-	-	-	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	40th	41st	42nd	43rd	44th	45th	46th	47th
	J	Fry and Juvenile	-	F&G		-	F&G	-	-	-	-
	F	Fry and Juvenile	-	-	-	-	-	-	-	-	-
	H	Fry and Juvenile	-	-	-	-	-	-	-	-	-
Gang Tengra	F	Adult	-	-	-	-	-	-	-	-	-
Gagra Tengra	F	Juvenile and Age-1 adult	-	M&F	-	M&F	-	-	-	M&F	-
	H	Age-1 adult	-	-	M&F	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-
	A	Juvenile and Adult	-	-	-	M&F	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	F&G	-	-	-	-	-
		Adult	-	M&F	-	-	M&F	-	-	M&F	M&F
	E	Adult	M&F	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	F&G	-	-	-	-	-
	C	Juvenile and Age-1 adult	M&F	M&F	-	M&F	-	M&F	-	-	-
	I	Juvenile	-	-	-	-	-	M	M&F	-	M&F
	J	Juvenile	-	-	-	-	-	M	-	-	M&F
Gulsha Tengra	B	Adult	-	-	-	-	-	-	-	M&F	-
	A	Adult	M&F	-	-	-	-	-	-	-	-
	F	Juvenile	-	-	-	-	-	F&G	-	-	-
	C	Juvenile	-	-	-	F&G	-	-	-	M&F	-
		Age-1 adult	-	-	-	-	M&F	M&F	-	-	-
	E	Age-1 adult	-	-	-	-	-	-	-	M&F	M&F
	J	Juvenile	-	M&F	-	-	-	F&G	-	-	-
Potka	A	Adult	-	-	-	M&F	-	-	-	-	-
	B	Adult	-	-	-	M&F	-	-	-	-	-
	F	Juvenile	-	-	-	-	-	-	M&F	-	-
	J	Fry	-	-	-	-	-	-	-	-	-
	J	Fry	-	-	-	-	-	-	-	-	-
		Juvenile	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	M&F	-	-	-	-	-
	C	Juvenile and adult	-	-	-	-	M&F	-	-	-	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	40th	41st	42nd	43rd	44th	45th	46th	47th
Paira Chanda	A	Adult	-	-	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	-	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	M&F	-	-	-	-	-
	C	Adult	-	-	-	-	-	M&F	-	M&F	-
	E	Adult	-	-	-	-	-	-	-	M&F	M&F
	I	Adult	-	-	-	-	-	-	M&F	-	M&F
Chewa	F	Fry and Juvenile	-	-	-	-	-	F&G	F&G	F&G	-
	G	Fry and Juvenile	-	-	-	-	-	-	-	-	-
	H	Juvenile	-	-	-	-	-	-	-	-	-
		Fry	-	-	-	-	-	-	-	-	-
	I	Juvenile	-	-	-	-	-	-	F&G	-	-
	J	Adult	-	-	-	-	-	-	-	-	
		Age-1 Juvenile	-	-	-	-	-	-	-	F&G	-
Bele	A	Adult	-	M&F	-	-	-	-	-	-	-
		Juvenile and Adult	-	-	-	M&F	-	-	-	-	-
	J	Fry and Juvenile	N	N	M	-	M	-	-	N	N
		Adult	M&F	M&F	-	M&F	-	-	-	-	-
	E	Juvenile and Age-1 Adult	-	-	-	M&F	-	-	-	-	-
	F	Juvenile and Adult	-	-	-	-	-	M&F	M&F	-	M&F
		Juvenile and Adult	M&F	-	M&F	-	-	-	--	-	-
	I	Juvenile and Age-1 adult	M&F	M&F	-	-	-	-	M&F	M&F	-
		Fry	-	-	-	-	-	-	-	-	-
	C	Juvenile and Age-1 adult	-	-	-	-	-	M&F	-	-	-
Tular Dandi	F	Age-1 Adult	-	-	M&F	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	-	-	-	-
	I	Age-1 Adult	-	-	-	-	M&F	-	-	-	-
Tairel	A	Adult	-	M&F	-	-	M&F	-	-	-	-
	B	Juvenile	-	-	-	-	-	-	-	-	-
	C	Juvenile	-	-	-	-	-	M	-	-	-
	E	Age-1 Adult	-	-	-	-	-	-	-	-	-
	F	Juvenile	-	-	F&G	-	-	-	-	F&G	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	**40th**	**41st**	**42nd**	**43rd**	**44th**	**45th**	**46th**	**47th**
	J	Juvenile	-	-	-	-	-	-	-	F&G	-
	I	Fry	-	-	N&G	-	-	-	-	-	-
Pheksa	A	Adult	-	-	-	-	-	-	-	-	-
	B	Juvenile			-	G&M	-	-	-	-	-
	C	Juvenile and Adult	-	-	-	-	-	-	-	-	-
	E	Adult	-	-	-	M&F	M&F	-	-	M&F	-
	J	Juvenile and Adult	-	-	-	-	-	-	-	-	-
		Adult	-	-	-	-	-	-	-	-	-
	H	Adult	-	-	-	-	-	-	-	-	-
		Juvenile	M&F	M&F	-	-	G&M	-	-	-	-
	F	Juvenile and Adult	-	-	M	-	-	-	-	-	-
	I	Adult	-	-	-	M&F	-	-	-	-	-
Paissa	A	Juvenile and Adult	M&F	M&F	G&M	M&F	-	-	-	-	-
	B	Juvenile and Adult	-	-	-	M&F	-	-	-	-	-
	C	Juvenile and Adult	M&F	M&F	-	M&F	-	M&F	-	M&F	-
		Fry	-	-	-	-	-	-	-		-
	E	Juvenile and Adult	M&F	-	-	M&F	-	-	-	M&F	G&M
	J	Fry	-	-	-	-	-	-	-	-	M&F
	H	Fry	-	-	-	-	G&M	-	-	-	-
	F	Fry and Juvenile	N	N	G&M	M&F	G&M	-	G&M	-	G&M
		Age-1 Adult	-	-	-	-	-	-	-	-	-
	I	Fry and Juvenile	-	-	-	-	-	M&F	G&M	-	-
		Age-1 adult	-	-	-	-	-	-	-	-	-
Banshpata	F	Juvenile	-	-	-		-	-	-	-	-
		Adult	-	-	-	M&F	-	-	-	-	-
	C	Juvenile and Age-1 Adult	-	-	-	-	M&F	-	-	M&F	-
	A	Juvenile	-	-	-	-	-	-	-	-	-
	B	Juvenile and adult	-	-	-	M&F	-	-	-	-	-
	E	Adult	-	-	-	M&F	-	-	-	M&F	-
	I	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	M&F	-
	J	Juvenile and Age-1 Adult	-	-	-	-	M&F	-	-	-	-

Migratory Species	Sites	Year Class	Migration purposes								
			39th	40th	41st	42nd	43rd	44th	45th	46th	47th
Hilsa	A	Brood Fish	-	-	-	-	-	-	-	-	-
	F	Juvenile and Age-1 Adult	-	-	-	-	-	-	M&F	-	-
	I	Age-1 Adult	-	-	-	-	-	-	-	-	-
	J	Adult	-	-	-	-	-	-	-	-	-
	H	Age-1 Adult	-	-	-	-	-	-	-	-	-
Pangas	A	Adult	-	-	-	-	-	-	-	-	-
	B	Juvenile	-	-	-	G&F	-	-	-	-	-
	C	Adult	-	-	-	-	-	-	-	-	-
	E	Juvenile	-	-	-	G&F	-	-	-	-	M&F
	F	Juvenile and Age-1 Adult	-	-	-	-	-	F&G	-	-	-
	H	Juvenile	-	-	-	-	-	-	-	-	-
	I	Juvenile and Age-1 Adult	-	-	-	-	-	-	-	-	-

Source: Field findings at different times; Only Age-1 to Brood fish was allowed to interpret the migration purpose; SWP= South-west of the Project; F = Feeding; B=Breeding, S= Spawning, N=Nursing, G=Growing, M=Maturation

Table D13: The Present Catch in Three (03) Sampling Ghers

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
1	Bagda	5.0	6.42	4.8	-	-	1.6	2.0		-	-	3.0	-	-	3.0	-	2.0	0.76	-	-	3.2
	Golda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-
	Harina	0.78	-	-	-	1	1	0.32	0.8	-	-	0.8	-	1.0	-	-	0.1	1.6	-	-	4.8
	Bele	0.98	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-
	Chali	0.11	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	1.2	-	-	-
	Chaka	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
	Paissa	-	-	-	-		0.25	0.24	0.6	-	-	0.1	-	-	-	-	-	-	-	-	-
	Vetki/Patari	1.57	-	-	-	-	-	0.02	0.8	-	-	2.0	-	-	-	-	-	-	-	-	-
	Gulsha	-	-	-	-	-	-	0.08	-	-	-	0.1	-	-	-	-	-	-	-	-	-
	Kailla	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tilapia	-	-	-	-	-	-	-	1.6	-	-	-	-	-	-	-	0.45	12.8	-	-	-
	Rui	-	-	-	-	-	-		3	-	-		-	-	1.3	-	0.12	0.12	4.2	-	-
	Catla	-	-	-	-	-	-	-	2	-	-	-	-	-	1.0	-	0.3	-	1.2	-	-

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
	Minar Carp	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	0.3	-	-
	Grass Carp	-	-	-	-	-	-	-	0.1	-	-		-	-	-	-	0.2	-	0.3	-	-
Sub-total =		**8.52**	**6.42**	**4.8**	**-**	**1.0**	**3.6**	**2.7**	**9.0**	**-**	**-**	**6.0**	**-**	**1.0**	**5.3**	**-**	**3.27**	**16.68**	**6.0**	**-**	**8.0**
2	Bagda	4	1	7	-	-	1.67	-	-	1.0	-	0.2	0.29	-	5	-	3.93	1.48	5.0	-	1.41
	Golda	-	0.01	0.9	-	-	-	-	-	-	-	-	-	-	-	-	0.13		0.08	-	0.1
	Harina	2	0.33	-	-	-	0.5	-	-	0.14	-	0.08	-	-	-	-	1.91	0.5	1.8	-	2.92
	Chali	0.18	0.08	-	-	-	0.3	-	-	-	-	0.04	-	-	-	-	1.16	0.04	0.4	-	1.52
	Motka																	0.05		-	-
	Bele	-	0.08	-	-	-	0.3	-	-	-	-	0.16	0.15	-	-	-	0.43	0.06		-	1.35
	Tengra	-	-	0.2	-	-	-	-	-	-	-	0.08	0.31	-	-	-	4.20	0.13	0.8	-	0.27
	Paissa	-	0.04	10	-	-	0.25	-	-	-	-	0.2	0.22	-	7	-	0.14	0.05	0.08	-	0.6
	Vetki	-	-	1	-	-	-	-	-	-	-	0.24	0.06	-	0.5	-	0.96	0.01	2.0	-	-
	Phessa	-	-	2.4	-	-	-	-	-	-	-	-	-	-	1.0	-				-	-
	Bhangan	-	-	1.7	-	-	-	-	-	-	-	-	-	-	0.7	-		0.01	0.05	-	-
	Tilapia	-	-		-	-	-	-	-	-	-	8.0	0.53	-	-	-	5.9	0.41	8.0	-	0.3
	Chela	-	-	-	-	-	-	-	-	-	-	-	0.45	-	-	-		0.01		-	-
	Rui																8.41		3.0	-	0.35
	Catla																		3.0	-	0.2
	Grass Carp																0.11			-	-
	Common Carp																5.55			-	-
	Sarpunti																0.53			-	-
	Tairel																0.003			-	-
	Pheksa																0.001			-	-
Sub-total =		**6.18**	**1.52**	**23.2**	**-**	**-**	**3.02**	**-**	**-**	**1.14**	**-**	**9.0**	**2.01**	**-**	**14.2**	**-**	**33.36**	**2.75**	**24.21**	**-**	**9.02**
3	Bagda	1.38	2.4	1.5	-	-	3.5	0.4	-	2	-	0.4	-	-	0.2	-	0.5	0.1	-	-	0.4
	Harina	0.34	0.34	-	-	-	-	0.35	-	-	-	0.3	-	-	-	-	0.6		-	-	0.1
	Chali	0.17	0.17	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-		-	-	0.03
	Chaka							0.1	-	-	-	-	-	-	-	-	-		-	-	0.01
	Motka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02
	Paissa	-	-	0.01	-	-	-	3.2	-	-	-	0.06	-	-	0.8	-	-		-	-	-
	Tengra	-	-	0.01	-	-	-	-	-	-	-	0.04	-	-	0.2	-	0.12		-	-	-
	Bele	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	0.01
	Tilapia	-	-	0.22	-	-	-	0.06	-	-	-	3.2	-	-	0.5	-	1.5	0.2	-	-	-

Sampling Site	Species	Total Catch (Ton)																			
		1st QM	2nd QM	3rd QM	4th QM	5th QM	6th QM	7th QM	8th QM	9th QM	10th QM	11th QM	12th QM	13th QM	14th QM	15th QM	16th QM	17th QM	18th QM	19th QM	20th QM
	Rui	-	-	0.21	-	-	-	-	-	-	-	-	-	-	0.3	-	-		-	-	-
	Catla							-							1.0	-	-		-	-	-
	Vetki	-	-	-	-	-	-	0.4	-	-	-	-	-	-	0.2	-	-		-	-	-
	Chami	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
	Tairel	-	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	-		-	-	-
Sub-total =		**1.89**	**2.91**	**1.97**	**-**	**-**	**3.5**	**5.17**	**-**	**2.0**	**-**	**4.0**	**-**	**-**	**3.2**	**-**	**2.72**	**0.3**	**-**	**-**	**0.57**
Grand-total =		**16.59**	**10.87**	**29.97**	**-**	**1.0**	**10.12**	**7.87**	**9.0**	**3.14**	**-**	**19.0**	**2.01**	**1.0**	**22.7**	**-**	**39.35**	**19.73**	**30.21**	**-**	**17.59**

Table E14: The Present Catch in Three (03) Sampling Ghers

Sampling Site	Species	Total Catch (Ton)																						
		21tst QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM	46th QM
1	Bagda	2.72	0.8	-	-	0.3	-	0.7	0.5	-	-	1.2	1.2	0.7	0.7	1.35	2.0	0.01	-	0.20	-	0.1	-	0.09	0.1	-
	Golda	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	0.08	-
	Harina	3.44	1.0	0.02	2.0	0.2	-	0.15	0.6	0.1	-	0.5	0.2	0.2	0.2	0.59	1.6	0.05	-	-	0.3	0.25	-	0.12	1.0	-
	Bele	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-
	Chali	-	0.2	-	-	-	-	-	0.3	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaka	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Paissa	0.17	-	-	-	0.05	-	-	0.05	-	-	-	-	0.05	0.05	-	0.2	0.08	-	-	-	0.04	-	-	-	-
	Patari	-	0.3	-	-	0.2	-	-	-	0.3	-	-	-	0.05	0.05	-	-	0.04	-	-	-	0.04	-	-	0.15	-
	Gulsha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kailla	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tilapia	0.7	0.5	-	-	0.5	-		2.0	1.2	-	-	-	2.0	0.2	0.53	4.0	2.4	-	-	1.2	0.09	-	-	-	-
	Rui	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.8	-
	Catla	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mrigal																								0.24	-
	Minar Carp	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grass Carp	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26	-
	Tairel	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Datina	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-
Sub-total =		**7.03**	**2.83**	**0.02**	**2.0**	**2.37**	**-**	**0.85**	**3.45**	**1.7**	**-**	**1.7**	**1.4**	**3.0**	**1.2**	**2.47**	**8.1**	**2.59**	**-**	**0.02**	**1.5**	**0.52**	**-**	**0.21**	**2.36**	**3.03**

Sampling Site	Species	Total Catch (Ton)																							
		21tst QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM	46th QM
2	Bagda	6.74	3.42	-	4.48	1.45	-	0.04	2.73	0.07	-	3.2	1.5	0.07	-	2.4	1.6	-	-	-	-	-	-	0.32	0.06	-
	Golda	0.01	0.4	-	0.03	0.3	-	-	-	-	-	-	-	-	-	0.22	0.4	-	-	-	-	-	-	-	-	-
	Harina	-	3.96	0.01	0.92	1.08	-	0.14	0.96	0.81	-	0.28	0.16	0.8	-	0.4	0.6	0.08	-	-	-	-	-	-	2.06	-
	Chali	0.04	0.38	-	0.20	0.3	-	0.03	0.11	0.01	-	0.12	0.1	0.12	-	-	-	-	-	-	-	-	-	-	-	-
	Bele	0.09	2.11	-	0.27	0.19	-	-	0.44	0.58	-	0.15	0.15	0.52	-	-	0.15	-	-	-	-	-	-	-	0.2	-
	Tengra	0.57	-	-	0.01	0.17	-	-	0.01	0.02	-	-	0.1	0.02	-	-	-	-	-	-	-	-	-	-	0.1	-
	Paissa	0.01	2.62	-	0.04	1.8	-	-	0.23	0.34	-	0.1	0.2	0.32	-	0.25	0.4	0.16	-	-	-	-	-	0.08	0.6	-
	Vetki/Patari	-	2.25	-	0.25	0.25	-	-	-	1.75	-	0.04	0.6	1.6	-	-	0.2	0.08	-	-	-	-	-	-	0.4	-
	Bhangan	0.08	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
	Tilapia	0.22	9.85	-	3.87	6.93	-	-	12.9	7.82	-	4.5	-	7.0	-	0.35	-	0.88	-	-	-	-	-	2.98	0.1	-
	Rui	-	1.27	-	1.95	-	-	-	-	0.27	-	-	0.6	0.24	-	-	2.0	0.20	-	-	-	-	-	-	2.0	-
	Catla	-	-	-	0.04	0.05	-	-	-	-	-	-	-	-	-	-	0.2	0.08	-	-	-	-	-	-	0.6	-
	Mrigal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-
	Kailla	-	0.96	-	-	-	-	-	-	0.03	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Grass Carp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	0.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Datina	-	1.01	-	-	-	-	-	-	0.06	-	-	0.14	0.06	-	-	-	-	-	-	-	-	-	-	-	-
	Chemo	-	0.02	-	0.32	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chaka	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nundi Bele	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kakra	-	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	-
Sub-total =		**8.41**	**28.83**	**0.01**	**12.38**	**12.57**	**-**	**0.21**	**17.38**	**11.76**	**-**	**8.39**	**3.65**	**10.75**	**-**	**3.62**	**5.55**	**1.48**	**-**	**-**	**-**	**-**	**-**	**3.38**	**6.3**	**5.09**
3	Bagda	0.02	0.02	-	0.1	0.02	-	0.01	0.04	0.04	-	0.04	0.05	0.06	-	0.02	0.14	0.01	-	0.08	-	0.05	-	0.02	0.03	-
	Golda	0.03	0.01	-	0.03	0.01	-	-	0.01	0.01	-	-	-	-	-	0.01	0.04	0.01	-	0.01	-	0.01	-	0.01	-	-
	Harina	0.02	0.01	-	0.15	0.02	-	0.06	0.06	0.04	-	0.07	0.4	0.40	-	0.12	0.18	0.01	-	0.02	0.05	0.04	-	0.03	0.06	-
	Chali	-	0.01	-	-	0.02	-	-	-	-	-	-	-	-	-	-	0.02	0.02	-	-	-	0.04	-	-	-	-
	Chaka	0.01	-	-	0.01	0.02	-	-	0.04	0.04	-	-	-	-	-	-		-	-	-	-		-	0.10	-	-
	Paissa	0.01	0.06	-	0.05	0.03	-	-	0.12	0.08	-	-	-	0.8	-	0.02	0.1	0.02	-	0.01	0.02	0.05	-	0.10	0.15	-
	Kharsul	-	0.01	-	0.01	-	-	-	-	-		-	-	0.05	-	-	0.04	-	-	-	-	0.01	-	-	-	-
	Tengra	-	0.01	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	0.01	-	-	-	-
	Bele	-	-	-	0.03	-	-	-	0.01	-	-	-	-	-	-	-	0.02	0.01	-	-	-	0.01	-	-	0.02	-
	Tilapia	-	0.24	-	-	0.06	-	-	0.08	0.16	-	-	-	0.12	-	-	0.11	0.01	-	-	0.16	0.06	-	0.01	0.01	-
	Patari	0.01	0.02	-	-	0.02	-	-	0.02	0.04	-	-	0.4	0.04	-	-	0.04	0.01	-	-	-	0.03	-	-	-	-

Sampling Site	Species	Total Catch (Ton)																							
		21tst QM	22nd QM	23rd QM	25th QM	26th QM	27th QM	28th QM	29th QM	30th QM	31st QM	32nd QM	33rd QM	34th QM	35th QM	36th QM	37th QM	38th QM	39th QM	40th QM	41st QM	42nd QM	43rd QM	44th QM	45th QM	46th QM
	Chaina Punti	-	0.05	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chami	-	-	-	-	-	-	-	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ilish	-	-	-	-	0.005	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.01	-		0.02	-	-	-	0.03	-
	Chaka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Kakra	-	-	-	-	-	-	0.01	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-		0.02	-	-
	Tairu	0.01	-	-	0.02	0.01	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
	Bhangan	0.01	-	-	-	0.005	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
	Datina	0.03	0.02	-	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-
	Pheksa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-
Sub-total =		**0.15**	**0.46**	**-**	**0.44**	**0.25**	**-**	**0.08**	**0.54**	**0.45**	**-**	**0.11**	**0.85**	**1.47**	**-**	**0.17**	**0.87**	**0.11**	**-**	**0.12**	**0.25**	**0.32**	**-**	**0.29**	**0.15**	**0.33**
Grand-total =		**15.59**	**32.14**	**0.03**	**14.82**	**15.46**	**-**	**1.14**	**21.37**	**13.91**	**-**	**10.20**	**5.90**	**15.22**	**1.2**	**6.26**	**14.52**	**4.18**	**-**	**0.32**	**1.75**	**0.84**	**-**	**3.88**	**8.81**	**8.45**

Table F1: vegetation diversity Index in the monitored homesteads

Sl. No.	Species Name	Local Name	Family	Borni				Kalekarber				Chalkghona				Bajua				Chalna				Total Number	pi	Ln pi	pi*ln pi	Biodiversity Index
				Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20					
1	Acrostichum aureum	Tiger Fern	Pteridaceae	6	15		12					6	22								25			86	0.158672	-1.84092	-0.2921	
2	Albizia richardiana	Chambol	Fabaceae		1				1	2	1					1		1			1			8	0.01476	-4.21582	-0.06223	
3	Albizia saman	Rendi Koroi	Fabaceae	5		1	1										1						1	9	0.016605	-4.09804	-0.06805	
4	Aphanamixis polystachya	Rhyna	Meliaceae						1	1														2	0.00369	-5.60212	-0.02067	
5	Areca catechu	Supari	Arecaceae	2		1	4													2	4	2	2	17	0.031365	-3.46205	-0.10859	
6	Azadirachta indica	Neem	Meliaceae	2	3	1		1		5	3					1	1			2				19	0.035055	-3.35083	-0.11746	
7	Borassus flabellifer	Taal	Arecaceae				1	4			4			2										11	0.020295	-3.89737	-0.0791	
8	Cocos nucifera	Narikel	Arecaceae	2		1		1	5	9	3	2				4		2	3	3	2	3	2	42	0.077491	-2.5576	-0.19819	
9	Diospyros pregrina	Gaab	Ebenaceae					1															1	2	0.00369	-5.60212	-0.02067	
10	Excoecaria agallocha	Gewa	Euphorbiaceae									24	13								1			38	0.070111	-2.65768	-0.18633	
11	Ficus hispida	Dumur	Moraceae							2				1		17	1			1		1		23	0.042435	-3.15977	-0.13409	
12	Hibiscus tiliaceus	Bola	Malvaceae	2	2						7		1											12	0.02214	-3.81036	-0.08436	
13	Lannea coromandelica	Jigar	Anacardiaceae												5				6					11	0.020295	-3.89737	-0.0791	
14	Manilkara zapota	Safeda	Sapotaceae																1				1	2	0.00369	-5.60212	-0.02067	
15	Mimusops elengi	Bokul	Sapotaceae						1															1	0.001845	-6.29527	-0.01161	
16	Moringa oleifera	Sazna	Moringaceae						1	1				1	1		1			3	5			13	0.023985	-3.73032	-0.08947	
17	Musa sp	Kola	Musaceae					4	2					1	1	8	7	2		8	5	5		43	0.079336	-2.53407	-0.20104	
18	Phoenix sylvestris	Khejur	Arecaceae	1	2	1				2	2		5	3	2					1				19	0.035055	-3.35083	-0.11746	
19	Phyllanthus acidus	Orboroi	Phyllanthaceae					1																1	0.001845	-6.29527	-0.01161	
20	Pithecellobium dulce	Jilapi	Fabaceae								1		1											2	0.00369	-5.60212	-0.02067	
21	Pongamia pinnata	Koromja	Fabaceae																					0	0	0	0	
22	Psidium guajava	Peyara	Myrtaceae											1					2					3	0.005535	-5.19665	-0.02876	
23	Sonneratia apetala	Kewra	Lythraceae																					0	0	0	0	
24	Magnifera Indica	Aam	Anacardiaceae						2					5		5	3	12	6			1	1	35	0.064576	-2.73992	-0.17693	
25	Swietenia mahagoni	Mahagoni	Meliaceae	3				10	9	5	8					3		5	5	2	3	8		61	0.112546	-2.18439	-0.24584	
26	Ziziphus mauritiana	Kul boroi	Rhamnaceae												2			1					1	4	0.00738	-4.90897	-0.03623	
27	Acacia auriculiformis	Akashmoni	Fabaceae			1										1								2	0.00369	-5.60212	-0.02067	
28	Morinda citrifolia	Noni	Rubiaceae	2	4	6	3					1												16	0.02952	-3.52268	-0.10399	
29	Avicenia officinalis	Baen	Acanthaceae																					0	0	0	0	
30	Eucalyptus sp	Eucalyptus	Myrtaceae	1																				1	0.001845	-6.29527	-0.01161	
31	Ficus benjamina	Lokkho Pakur	Moraceae																					0	0	0	0	3.1163531
32	Euphorbia tirucalli	Pencil Tree	Euphorbiaceae	2	3																			5	0.009225	-4.68583	-0.04323	
33	Acanthus ilicifolius	Hargoja	Acanthaceae																					0	0	0	0	
34	Ceiba pentandra	Shet-shimul	Bombacaceae									2		1										3	0.005535	-5.19665	-0.02876	
35	Nypa fruticans	Golpata	Arecaceae											1										1	0.001845	-6.29527	-0.01161	
36	Citrus grandis	Jambura	Rutaceae																	1				1	0.001845	-6.29527	-0.01161	
37	Colocasia esculenta	Taro	Araceae				5																	5	0.009225	-4.68583	-0.04323	
38	Cordia dichotoma	Bohal/Gum Tre	Boraginaceae	1		4																		5	0.009225	-4.68583	-0.04323	
39	Cassia fistula	Sonalu	Fabaceae		2																			2	0.00369	-5.60212	-0.02067	
40	Lawsonia inermis	Mehedi	Lythraceae																					0	0	0	0	
41	Erythrina ovalifolia	Mandar	Fabaceae			1																		1	0.001845	-6.29527	-0.01161	
42	Heritiera fomes	Sundori	Malvaceae																					0	0	0	0	
43	Phyllanthus reticulatus	Shitki	Phyllanthaceae																					0	0	0	0	
44	Albizia lebbeck	Kala Korai	Fabaceae																					0	0	0	0	
45	Terminalia arjuna	Arjun	Combretaceae												1									1	0.001845	-6.29527	-0.01161	
46	Tamarindus indica	Tetul	Fabaceae												1					1		1		3	0.005535	-5.19665	-0.02876	
47	Punica granatum	Dalim	Lythraceae											2										2	0.00369	-5.60212	-0.02067	
48	Spondias pinnata	Amra	Anacardiaceae															3	1				1	5	0.009225	-4.68583	-0.04323	
49	Cycas circinalis	cycus	Cycadaceae																1					1	0.001845	-6.29527	-0.01161	
50	Citrus × limon	Lemon	Rutaceae																4		1			5	0.009225	-4.68583	-0.04323	
51	Albizia lebbeck	Silkorai	Fabaceae														1							1	0.001845	-6.29527	-0.01161	
52	Phyllanthus emblica	Amloki	Phyllanthaceae																				1	1	0.001845	-6.29527	-0.01161	
53	Gmelina arborea	Gamar	Lamiaceae														1							1	0.001845	-6.29527	-0.01161	
54	Artocarpus heterophyllus	Jackfruit	Moraceae														1							1	0.001845	-6.29527	-0.01161	
55	Carica papaya	Pepe	Caricaceae																				1	1	0.001845	-6.29527	-0.01161	
56	Gardenia jasminoides	Gondhoraj	Rubiaceae																				1	1	0.001845	-6.29527	-0.01161	
57	Monoon longifolium	Debdaru	Annonaceae																			2		2	0.00369	-5.60212	-0.02067	
58	Bauhinia variegata	Kanchan	Fabaceae																			2		2	0.00369	-5.60212	-0.02067	
59	Justicia adhatoda	Bashok	Acanthaceae																		1			1	0.001845	-6.29527	-0.01161	
60	Terminalia catappa	Kathbadam	Combretaceae																			1		1	0.001845	-6.29527	-0.01161	
61	Nyctanthes arbor-tristis	Suili	Oleaceae																				1	1	0.001845	-6.29527	-0.01161	
62	Syzygium cumini	Jam	Myrtaceae											1	1		2	1					1	6	0.01107	-4.50351	-0.04985	
Total				29	32	17	26	22	22	27	29	35	42	19	14	40	19	27	29	24	48	26	15	542	1	-260.88	-3.11635	3.1163531

Table F2: Phenological behaviour of SRF trees

Species	Months											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
	Leafing											
Sundari												
Gewa												
Amor												
Goran												
Kakra												
Passur												
	Leaf Shedding											
Sundari												
Gewa												
Amor												
Goran												
Kakra												
Hental												
Passur												
Lata Sundari												
	Flowering											
Sundari												
Gewa												
Keora												
Baen												
Amor												
Hetal												
Goran												
Kakra												
kalilata												
Passur												
Jhanagarjan												
	Fruiting											
Sundari												
Gewa												
Goran												
Kakra												
Amor												
Urmoi												
Sanagarjon												
Passur												
	Seed/Popagule dropping time											
Sundari												
Gewa												
Goran												
Kakra												
Passur												
Golpata												

Source: CEGIS field visit, February 2025.

(F) Appendix V: Analysis Results from the Laboratory

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Environmental Laboratory

Ref No. ELAB202602000097-01 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°33'36.62"E; 22°35'31.0"N Sampling ID: AQ-01 Sampling Date: 05/02/2026

Monitoring Location (Administrative): Stack point.
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	21.70	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	31.47	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	53.17	24 hrs (average)	200 (ECR 1997)	-	
04	Carbon Monoxide (CO)	mg/m³	0.21	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	3.10	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	6.38	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	22.76	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-02 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°33'53.61"E; 22°35'1.32"N Sampling ID: AQ-02 Sampling Date: 31/01/2026

Monitoring Location (Administrative): 1 km towards windward direction.
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	33.64	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	µg/m³	44.68	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	78.31	24 hrs (average)	200 (ECR 1997)	-	
04	Sulphur dioxide (SO_2)	µg/m³	4.24	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
05	Nitrogen dioxide (NO_2)	µg/m³	6.35	24 hrs (average)	80 (24Hrs)	-	
06	Carbon Monoxide (CO)	mg/m³	0.30	08 hrs (average)	05 (08 Hrs)	-	
07	Ozone (O_3)	µg/m³	12.62	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Ref No. ELAB202602000097-03 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°34'9.82"E; 22°34'33.40"N Sampling ID: AQ-03 Sampling Date: 01/02/2026

Monitoring Location (Administrative): 2 km towards windward direction.
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	41.47	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	µg/m³	55.09	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	96.55	24 hrs (average)	200 (ECR 1997)	-	
04	Sulphur dioxide (SO_2)	µg/m³	3.76	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
05	Nitrogen dioxide (NO_2)	µg/m³	8.10	24 hrs (average)	80 (24Hrs)	-	
06	Carbon Monoxide (CO)	mg/m³	0.26	08 hrs (average)	05 (08 Hrs)	-	
07	Ozone (O_3)	µg/m³	22.66	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-04 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°34'45.7"E; 22°33'37.6"N Sampling ID: AQ-04 Sampling Date: 02/02/2026

Monitoring Location (Administrative): 4 km towards windward direction.
Weather Condition: Sunny

Analysis Results:

Sl. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	61.09	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	µg/m³	79.51	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	140.60	24 hrs (average)	200 (ECR 1997)	-	
04	Sulphur dioxide (SO_2)	µg/m³	5.96	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
05	Nitrogen dioxide (NO_2)	µg/m³	9.31	24 hrs (average)	80 (24Hrs)	-	
06	Carbon Monoxide (CO)	mg/m³	0.41	08 hrs (average)	05 (08 Hrs)	-	
07	Ozone (O_3)	µg/m³	21.31	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-05 **Date: 13/03/2026**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°33'26.1"E; 22°35'17.08"N Sampling ID: AQ-05 Sampling Date: 04/02/2026

Monitoring Location (Administrative): Coal stockyard.
Weather Condition: Sunny

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	62.92	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	µg/m³	81.93	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	144.85	24 hrs (average)	200 (ECR 1997)	-	
04	Carbon Monoxide (CO)	mg/m³	0.44	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	4.66	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	8.66	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	24.22	08 hrs (average)	100 (08Hrs)	**G-100** IT1-150	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-06 **Date: 13/03/2026**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°33'21.42"E; 22°35'2.0"N Sampling ID: AQ-06 Sampling Date: 03/02/2026

Monitoring Location (Administrative): Ash Disposal point.
Weather Condition: Sunny

Analysis Results:

SL NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	59.26	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	µg/m³	76.75	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	136.02	24 hrs (average)	200 (ECR 1997)	-	
04	Sulphur dioxide (SO_2)	µg/m³	4.35	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
05	Nitrogen dioxide (NO_2)	µg/m³	8.51	24 hrs (average)	80 (24Hrs)	-	
06	Carbon Monoxide (CO)	mg/m³	0.34	08 hrs (average)	05 (08 Hrs)	-	
07	Ozone (O_3)	µg/m³	26.62	08 hrs (average)	100 (08Hrs)	**G-100** IT1-150	

Note: *IT- Interim Target, G- Guideline; **Bold value** is applicable for Bangladesh context. US EPA approved Monitoring Equipment- AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Ref No. ELAB202602000097-07 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°35'36.9"E; 22°29'22.97"N Sampling ID: AQ-07 Sampling Date: 06/02/2026

Monitoring Location (Administrative): Mongla port area.
Weather Condition: Sunny

Analysis Results:

Sl. No.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	25.27	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	Sensor based instrumentation method
02	Particulate Matter (PM_{10})	$\mu g/m^3$	36.99	24 hrs (average)	150 (24Hrs)	G-50 **IT1-160** IT2-100	
03	Suspended Particulate Matter (SPM)	$\mu g/m^3$	62.26	24 hrs (average)	200 (ECR 1997)	-	
04	Carbon Monoxide (CO)	mg/m^3	0.31	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	$\mu g/m^3$	3.41	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	$\mu g/m^3$	7.62	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	$\mu g/m^3$	16.97	08 hrs (average)	100 (08Hrs)	G-100 IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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CEGIS Center for Environmental and Geographic Information Services

Environmental Laboratory

Ref No. ELAB202602000097-08 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°33'15.93"E; 22°48'5.51"N Sampling ID: AQ-08 Sampling Date: 09/02/2026

Monitoring Location (Administrative): Khulna City.
Weather Condition: Sunny

Analysis Results:

Sl. No.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	67.52	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	$\mu g/m^3$	87.32	24 hrs (average)	150 (24Hrs)	G-50 **IT1-160** IT2-100	
03	Suspended Particulate Matter (SPM)	$\mu g/m^3$	154.84	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m^3	0.523	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	$\mu g/m^3$	6.62	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	$\mu g/m^3$	15.48	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	$\mu g/m^3$	23.01	08 hrs (average)	100 (08Hrs)	G-100 IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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CEGIS Center for Environmental and Geographic Information Services

Environmental Laboratory

Ref No. ELAB202602000097-09 **Date: 13/03/2026**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°29'25.34"E; 22°29'52.5"N Sampling ID: AQ-09 Sampling Date: 24/02/2026

Monitoring Location (Administrative): Nearest point of Sundarbans_1 (Sutarkhali).
Weather Condition: Sunny

Analysis Results:

Sl. No.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	36.15	24 hrs (average)	65 (24Hrs)	G-25 **IT1-76** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	48.63	24 hrs (average)	150 (24Hrs)	G-50 **IT1-160** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	84.78	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.24	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	3.25	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	8.80	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	13.64	08 hrs (average)	100 (08Hrs)	G-100 IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-10 **Date: 13/03/2026**

Test Report

Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°34'57.79"E; 22°27'2.79"N Sampling ID: AQ-10 Sampling Date: 18/02/2026

Monitoring Location (Administrative): Nearest point of Sundarbans_2 (Dhangmari).
Weather Condition: Sunny

Analysis Results:

Sl. No.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	30.88	24 hrs (average)	65 (24Hrs)	G-25 **IT1-76** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	40.66	24 hrs (average)	150 (24Hrs)	G-50 **IT1-160** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	71.54	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.36	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	13.12	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	4.35	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	18.43	08 hrs (average)	100 (08Hrs)	G-100 IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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CEGIS Center for Environmental and Geographic Information Services

Environmental Laboratory

Ref No. ELAB202602000097-11 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°36'47.70"E; 22°17'55.9"N Sampling ID: AQ-11 Sampling Date: 19/02/2026

Monitoring Location (Administrative): Harbaria
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	42.27	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	54.76	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	97.03	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.29	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	6.87	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	8.01	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	16.33	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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CEGIS Center for Environmental and Geographic Information Services

Environmental Laboratory

Ref No. ELAB202602000097-12 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°30'40.28"E; 22° 0'51.2"N Sampling ID: AQ-12 Sampling Date: 22/02/2026

Monitoring Location (Administrative): Akram Point
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	43.82	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	56.11	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	99.93	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.20	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	6.15	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	6.84	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	10.88	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-13 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°17'7.56"E; 22°20'57.32"N Sampling ID: AQ-13 Sampling Date: 07/02/2026

Monitoring Location (Administrative): Koyra
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	37.41	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	47.13	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	84.55	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.20	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	4.10	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	7.23	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	15.61	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Ref No. ELAB202602000097-14 **Date: 13/03/2026**

Test Report
Analysis of Ambient Air Quality Monitoring Report

Project Name: Environmental and Social Parameters and the Implementation of the Environmental and Social Management Plan during the operational stage of the 2X 660 MW Maitree Super Thermal Power Plant. Project Code: FPC008

Location (Geographic): 89°48'36.7"E; 22°12'47.15"N Sampling ID: AQ-14 Sampling Date: 08/02/2026

Monitoring Location (Administrative): Sarankhola
Weather Condition: Sunny

Analysis Results:

SL. NO.	Air Pollutants	Unit	Concentration Present	Value exposures	Bangladesh (DoE) Standard	IFC, 2007	Method
01	Particulate Matter ($PM_{2.5}$)	µg/m³	35.89	24 hrs (average)	65 (24Hrs)	G-25 **IT1-75** IT2-50	
02	Particulate Matter (PM_{10})	µg/m³	45.71	24 hrs (average)	150 (24Hrs)	G-50 **IT1-150** IT2-100	
03	Suspended Particulate Matter (SPM)	µg/m³	81.60	24 hrs (average)	-	-	
04	Carbon Monoxide (CO)	mg/m³	0.36	08 hrs (average)	05 (08 Hrs)	-	
05	Sulphur dioxide (SO_2)	µg/m³	2.68	24 hrs (average)	80 (24Hrs)	G-20 **IT1-125** IT2-50	
06	Nitrogen dioxide (NO_2)	µg/m³	5.78	24 hrs (average)	80 (24Hrs)	-	
07	Ozone (O_3)	µg/m³	9.86	08 hrs (average)	100 (08Hrs)	**G-100** IT1-160	

Note: *IT- Interim Target, G- Guideline; Bold value is applicable for Bangladesh context. US EPA approved Monitoring Equipment-AirSENCE Continuous Ambient Air Quality Micro Monitoring Station, Model-ELITE (Canada)

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Environmental Laboratory

Memo No. ELAB202512004045 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_001 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_1	Nitrate (NO_3)	-	-	7	-	16.278	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	31.930	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.1077	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
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Environmental Laboratory

Memo No. ELAB202512004046 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_002 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_2	Nitrate (NO_3)	-	-	7	-	10.516	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	28.175	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0020	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Environmental Laboratory

Memo No. ELAB202512004047 Date: 28 /12/2025 T

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_003 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23 /12/2025

Laboratory Test Results:

Sl #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_3	Nitrate (NO_3^-)	-	-	7	-	8.2874	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	10.563	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	Undetectable	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Environmental Laboratory

Memo No. ELAB202512004048 Date: 28 /12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_004 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

Sl #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_4	Nitrate (NO_3^-)	-	-	7	-	1.6218	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	16.093	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	Undetectable	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Environmental Laboratory

Memo No. ELAB202512004049 Date: 28 /12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_005 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_5	Nitrate (NO_3)	-	-	7	-	2.1265	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	17.729	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0089	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by	Compiled & approved by
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Environmental Laboratory

Memo No. ELAB202512004050 Date: 28 /12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_006 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_6	Nitrate (NO_3)	-	-	7	-	4.4815	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	15.164	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	Undetectable	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by	Compiled & approved by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert	Designation: Laboratory Expert
Signature: 28.12.25	Signature: 28.12.25

CEGIS Center for Environmental and Geographic Information Services
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Environmental Laboratory

Memo No. ELAB202512004051 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_007 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_7	Nitrate (NO_3)	-	-	7	-	0.8438	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	15.046	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0026	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004052 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_008 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_8	Nitrate (NO_3)	-	-	7	-	1.4956	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	10.844	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0011	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004053 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_009 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 2312/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_9	Nitrate (NO_3^-)	-	-	7	-	0.2551	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	16.126	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0023	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004054 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_010 Collection Date: Nov-2025

Location: N/A

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{10}	Nitrate (NO_3^-)	-	-	7	-	0.6756	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	16.565	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	Undetectable	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004055 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_011 Collection Date: Nov-2025

Location: Shapmari.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{11}	Nitrate (NO_3^-)	-	-	7	-	0.7176	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	47.437	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0402	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004056 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_012 Collection Date: Nov-2025

Location: Mongla.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{12}	Nitrate (NO_3^-)	-	-	7	-	0.2340	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	32.824	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0017	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004057 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_013 Collection Date: Nov-2025

Location: Harbaria.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{13}	Nitrate (NO_3)	-	-	7	-	0.8438	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	71.661	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0162	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004058 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_014 Collection Date: Nov-2025

Location: Akram Point.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{14}	Nitrate (NO_3)	-	-	7	-	0.1920	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	167.13	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	Undetectable	ppt	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
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Environmental Laboratory

Memo No. ELAB202512004059 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_015 Collection Date: Nov-2025

Location: Hiron Point.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23 /12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	SW_{15}	Nitrate (NO_3^-)	-	-	7	-	0.6546	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	-	-	-	-	233.21	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	-	-	0.5	-	0.0695	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004060 Date: 28/12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Drinking Water ID: FPC008_016 Collection Date: Nov-2025

Location: PPj RO Drinking.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 -23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW_1	Nitrate (NO_3^-)	10	-	45	-	0.5915	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	8.8786	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	Undetectable	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004061 Date: 28 /12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_017 Collection Date: Nov-2025

Location: Rajnagar.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW_2	Nitrate (NO_3^-)	10	-	45	-	9.0233	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	1.5549	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	0.4957	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
Name: Rafiqul Islam & Md. Rafiqul Alam
Designation: Research Associate & Scientific Instrument In-Charge (addl.) and Laboratory Expert
Signature: 28.12.25

Compiled & approved by
Name: Md. Rafiqul Alam
Designation: Laboratory Expert
Signature: 28.12.25

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Environmental Laboratory

Memo No. ELAB202512004062 Date: 28 /12/2025

Test Report
Physical/Chemical/Bacteriological Analysis of water

Project Name: Environmental and Socio-Economic Monitoring of 2x660 MW MSTPP at Rampal. Code: FPC008

Sample Type: Surface Water ID: FPC008_018 Collection Date: Nov-2025

Location: Kapashdanga.

Received From: Md. Mutasim Billah Received Date: 01/12 /2025 Testing Date: 09 - 23/12/2025

Laboratory Test Results:

SL #.	Name of Sample	Water quality parameters	Bangladesh Standard ECR/1997		Bangladesh Standard ECR/2023		Concentration Present	Unit	Analysis Method	Min^{m} Detection Limit (MDL)
			Drinking	Others	Drinking	Others				
01	GW_3	Nitrate (NO_3^-)	10	-	45	-	4.1030	ppm	UV-VIS	0.05008
02		Sulphate (SO_4^{2-})	400	-	250	-	3.8752	ppm	UV-VIS	0.02
03		Phosphate (PO_4^{3-})	6	-	-	-	1.1244	ppm	UV-VIS	0.0003

N.B: UV-VIS: Ultra Violet - 1800 Visible Spectrophotometer. Report is valid only for supplied sample tested.

Test Performed by & checked by
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Signature: 28.12.25

Compiled & approved by
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Designation: Laboratory Expert
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Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Institute of National Analytical Research and Service (INARS)

ANALYSIS REPORT

ASC Ref No. : IN-557 of Analytical Service Cell
BCSIR-04/12/2025

Lab/Sample ID : A-800-822

Client's Details : মোঃ মু'তাসিম বিল্লাহ
রিসার্চ এসোসিয়েট, সি.ই.জি.আই.এস.
পাওয়ার এনার্জি এন্ড মিনারেল রিসোর্স ডিভিশন, সি.ই.জি.আই.এস।
Center For Environmental And Geographic Information Service (CEGIS)
CEGIS Bhaban, Plot: F-14/E, Agargaon Administrative Area, Sher-E-Bangla Nagar, Dhaka-1207.

Number of Sample : 23 (Twenty Three)

Sample Description : রামপাল 2×660 মেঃ ওঃ মৈত্রী সুপার থার্মাল পাওয়ার প্রকল্পের পানির নমুনা পরীক্ষণ প্রসংগে, তারিখঃ ০৪/১২/২০২৫ ইং।

Test Commencement Date : 04/12/2025

Test Completion Date : 12/01/2026

Lab ID	Particulars of supplied sample	Parameters	Results	Environment Conservation Rules Standard limit (ECR 2023) Surface Water	Test Method (APHA)
A-800	Water (Hiron Point)	Oil and Grease	<2.0 mg/L	0.1 mg/L (Max)	5520.B
A-801	Water (Maidara)	Oil and Grease	<2.0 mg/L	0.1 mg/L (Max)	5520.B
A-802	Water (Harbaria)	Oil and Grease	<2.0 mg/L	0.1 mg/L (Max)	5520.B
A-803	Water (Mongla)	Oil and Grease	<2.0 mg/L	0.1 mg/L (Max)	5520.B
A-804	Water (Akram Point)	Oil and Grease	<2.0 mg/L	0.1 mg/L (Max)	5520.B

Page 1 of 3

Note:
a. The results reported here are based only on the supplied samples in this laboratory.
b. Any complain about test report will not be acceptable after one month from the date of issuing of the said report.
c. This report/result shall not be reproduced/published without prior approval of the authority.

Analytical Service Cell
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Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Lab ID	Particulars of supplied sample	Parameter	Results	Environment Conservation Rules Standard limit (ECR 2023) Surface Water	Test Method (APHA)
A-805	Surface Water (Sample-01)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-806	Surface Water (Sample-02)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-807	Surface Water (Sample-03)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-808	Surface Water (Sample-04, Jetty)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-809	Surface Water (Sample-05)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	< 0.01 mg/L	0.05 mg/L (Max)	3111.B
A-810	Surface Water (Sample-06)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-811	Surface Water (Sample-07)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-812	Surface Water (Sample-08)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-813	Surface Water (Sample-09)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	< 0.01 mg/L	0.05 mg/L (Max)	3111.B
A-814	Surface Water (Sample-10)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-815	Surface Water (Akram Point)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B

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Note:
a. The results reported here are based only on the supplied samples in this laboratory.
b. Any complain about test report will not be acceptable after one month from the date of issuing of the said report.
c. This report/result shall not be reproduced/published without prior approval of the authority.

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Form No. QSF-22 Revision No. 14 Revision Date: 04 November, 2024

জীবনের জন্য বিজ্ঞান

বাংলাদেশ বিজ্ঞান ও শিল্প গবেষণা পরিষদ

BANGLADESH COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Lab ID	Particulars of supplied sample	Parameter	Results	Environment Conservation Rules Standard limit (ECR 2023) Surface Water	Test Method (APHA)
A-816	Surface Water (Mongla)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-817	Surface Water (Hiron Point)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-818	Surface Water (Shapmari)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-819	Water (Harbaria)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-820	Water (Kapasdanga)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-821	Water (P.P Ground Water)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B
A-822	Water (Rajnagar)	Mercury (Hg)	<0.0001 mg/L	0.0001 mg/L (Max)	3112.B
		Lead (Pb)	<0.01 mg/L	0.05 mg/L (Max)	3111.B

13.01.26

Analyst

Md. Al-Amin
Scientific Officer
Institute of National Analytical Research and Service (INARS)
BCSIR, Dhaka-1205

13/01/2026

Supervisor

Dr. Md. Ahedul Akbor
Principal Scientific Officer
Institute of National Analytical Research & Service (INARS)
BCSIR, Dhaka-1205

14/1/26

Director

Dr. Md. Salim Khan
Director (Additional In-Charge)
Institute of National Analytical Research and Service (INARS)
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Note:

a. The results reported here are based only on the supplied samples in this laboratory.
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Lab Memo: 51/1, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010135	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-01)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Calcium (Ca)	75	39	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	120	mg/L	CRM	-
4	Chloride	150-600	60	mg/L	Titrimetic	-
5	Silica (Sio2)	0.0	1	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	40	mg/L	Titrimetic	-
7	Hardness	200-500	150	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	3.70	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	16	mg/L	AAS	0.05
10	Potassium (K)	12.0	7	mg/L	AAS	-
11	Sodium (Na)	200	29	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	250	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	156	mg/L	Gravimetric Method	-
14	Turbidity	10	190	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.25	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

11/01/2026

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Lab Memo: 51/2, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010136	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-02)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	112	mg/L	CRM	-
3	Hardness	200-500	120	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	190	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	212	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/3, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010137	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-03)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	96	mg/L	CRM	-
3	Hardness	200-500	140	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	175	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	124	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/4, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010138	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-04)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Calcium (Ca)	75	40	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	4	mg/L	CRM	-
4	Chloride	150-600	40	mg/L	Titrimetic	-
5	Silica (SioZ)	0.0	1	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	30	mg/L	Titrimetic	-
7	Hardness	200-500	135	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	2.93	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	16	mg/L	AAS	0.05
10	Potassium (K)	12.0	5	mg/L	AAS	-
11	Sodium (Na)	200	17	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	170	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	148	mg/L	Gravimetric Method	-
14	Turbidity	10	181	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.26	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

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Lab Memo: 51/5, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010139	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-05)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	64	mg/L	CRM	-
3	Hardness	200-500	140	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	200	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	130	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/6, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010140	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-06)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	48	mg/L	CRM	-
3	Hardness	200-500	135	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	170	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	106	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/7, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010141	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-07)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Calcium (Ca)	75	37	mg/L	AAS	0.17
3	Chemical Oxygen Demand (COD)	4.0	96	mg/L	CRM	-
4	Chloride	150-600	45	mg/L	Titrimetic	-
5	Silica (Sio2)	0.0	2	mg/L	UVS	-
6	Bi-Carbonate (HCO3-)	0.0	30	mg/L	Titrimetic	-
7	Hardness	200-500	125	mg/L	Titrimetic	-
8	Iron (Fe)	0.3-1	2.75	mg/L	AAS	0.05
9	Magnesium (Mg)	30-35	13	mg/L	AAS	0.05
10	Potassium (K)	12.0	6	mg/L	AAS	-
11	Sodium (Na)	200	21	mg/L	AAS	0.34
12	Total Dissolved Solid (TDS)	1000	180	mg/L	Multimeter	-
13	Total Suspended Solid (TSS)	10	168	mg/L	Gravimetric Method	-
14	Turbidity	10	221	NTU	Turbidity Meter	-
15	Carbonate (CO3)	-	0.24	mg/L	Titrimetic	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

11/01/2026
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Lab Memo: 51/9, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010143	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-09)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	48	mg/L	CRM	-
3	Hardness	200-500	130	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	170	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	118	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/8, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010142	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-08)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	32	mg/L	CRM	-
3	Hardness	200-500	145	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	175	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	100	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 51/10, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010144	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-10)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	4	mg/L	CRM	-
3	Hardness	200-500	145	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	195	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	192	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/11, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010145	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-11, Shapmari)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	112	mg/L	CRM	-
3	Hardness	200-500	300	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	900	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	258	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/12, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010146	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Mongla
Care Taker: CEGIS (Sample : SW-12)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	48	mg/L	CRM	-
3	Hardness	200-500	185	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	230	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	468	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/13, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010147	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-13, Harbaria)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	120	mg/L	CRM	-
3	Hardness	200-500	230	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	550	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	648	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/14, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010148	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-14, Akram Point)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	148	mg/L	CRM	-
3	Hardness	200-500	1200	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	4400	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	476	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/15, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010149	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Surface Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : SW-14, Hiron Point)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.002	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	72	mg/L	CRM	-
3	Hardness	200-500	620	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	9500	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	218	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 51/16, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010150	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : GW-01, Karpasdanga)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.056	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	24	mg/L	CRM	-
3	Hardness	200-500	330	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	700	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	40	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 51/17, CC, DPHE, CL, Dhaka — Date: 11-01-2026

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2026010151	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : GW-02, Rajnagar)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.005	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	12	mg/L	CRM	-
3	Hardness	200-500	225	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	390	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	20	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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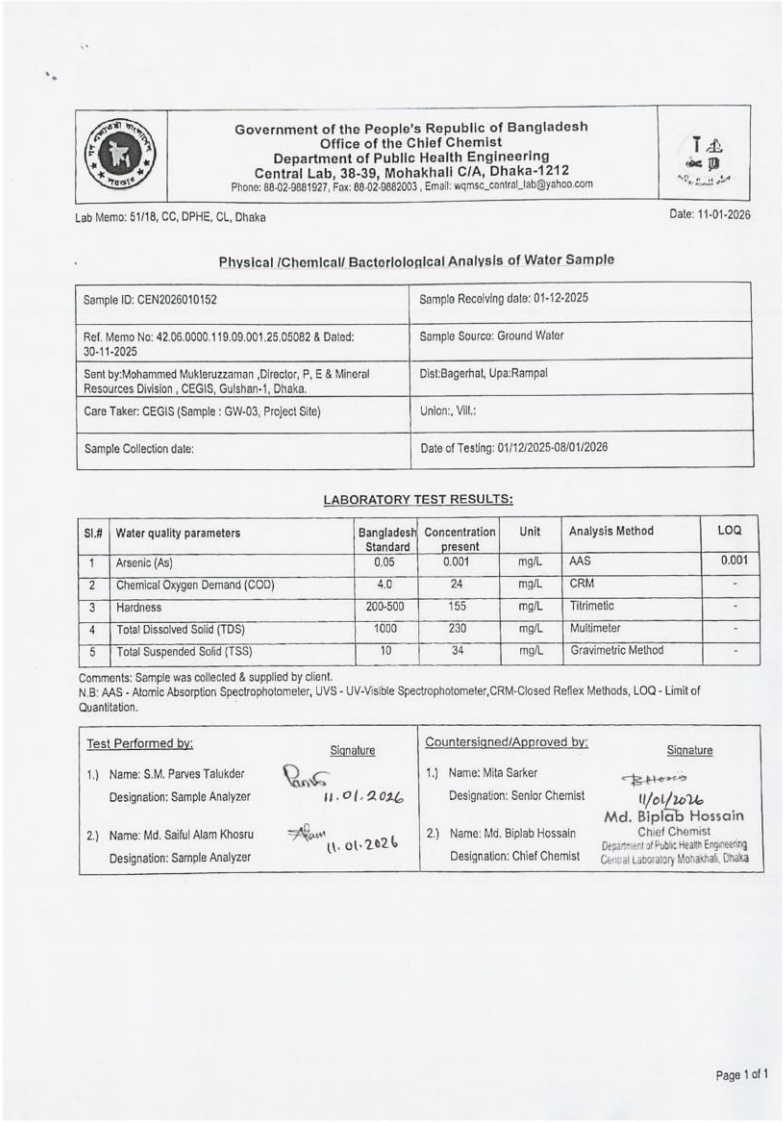

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Lab Memo: 51/18, CC, DPHE, CL, Dhaka

Date: 11-01-2026

Physical /Chemical/ Bacterlological Analysis of Water Sample

Sample ID: CEN2026010152	Sample Receiving date: 01-12-2025
Ref. Memo No: 42.06.0000.119.09.001.25.05082 & Dated: 30-11-2025	Sample Source: Ground Water
Sent by:Mohammed Mukteruzzaman ,Director, P, E & Mineral Resources Division , CEGIS, Gulshan-1, Dhaka.	Dist:Bagerhat, Upa:Rampal
Care Taker: CEGIS (Sample : GW-03, Project Site)	Union:, Vill.:
Sample Collection date:	Date of Testing: 01/12/2025-08/01/2026

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Chemical Oxygen Demand (COD)	4.0	24	mg/L	CRM	-
3	Hardness	200-500	155	mg/L	Titrimetic	-
4	Total Dissolved Solid (TDS)	1000	230	mg/L	Multimeter	-
5	Total Suspended Solid (TSS)	10	34	mg/L	Gravimetric Method	-

Comments: Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer,CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	11.01.2026	1.) Name: Mita Sarker Designation: Senior Chemist	11/01/2026
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	11.01.2026	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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