

Initial Environmental Examination

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IND: West Bengal Drinking Water Sector Improvement Project – Bulk Water Supply for North 24 Parganas

Package No: WBDWSIP/DWW/N24P/01

Prepared by Public Health Engineering Department, Government of West Bengal for the Asian Development Bank.

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CURRENCY EQUIVALENTS

(as of 3 March 2020)

| | | |
|---------------|---|------------------|
| Currency Unit | – | Indian rupee (₹) |
| ₹1.00 | – | \$0.0138 |
| \$1.00 | = | ₹72.388 |

ABBREVIATIONS

| | |
|---------|--|
| ADB | – Asian Development Bank |
| CTE | – consent to establish |
| CTO | – consent to operate |
| DBO | – design, build and operate |
| DSISC | – design, supervision and institutional support consultant |
| EAC | – expert appraisal committee |
| EARF | – environmental assessment and review framework |
| EHS | – environment, health and safety |
| EIA | – environmental impact assessment |
| EMP | – environmental management plan |
| EMS | – environmental management specialist |
| ESZ | – Eco Sensitive Zone |
| GLSR | – ground level service reservoir |
| GOWB | – Government of West Bengal |
| GRC | – grievance redress committee |
| GRM | – grievance redress mechanism |
| IEE | – initial environmental examination |
| MoEFCC | – Ministry of Environment, Forest and Climate Change |
| WBPCB | – West Bengal Pollution Control Board |
| NOC | – no objection certificate |
| OHS | – occupational health and safety |
| PHED | – Public Health Engineering Department |
| PIU | – project implementation unit |
| PMC | – project management consultant |
| PMU | – project management unit |
| PPTA | – project preparatory technical assistance |
| PWSS | – piped water supply schemes |
| ROW | – right of way |
| SGC | – safeguards and gender cell |
| SPS | – Safeguard Policy Statement |
| WHO | – World Health Organization |
| WTP | – water treatment plant |
| WBDWSIP | – West Bengal Drinking Water Sector Improvement Project |

WEIGHTS AND MEASURES

| | | |
|-----------------|---|--------------------------|
| dBa | - | decibel |
| °C | - | degree Celsius |
| km | - | kilometer |
| lpcd | - | liter per capita per day |
| m | - | meter |
| mgbl | - | meter below ground level |
| mm | - | millimeter |
| MLD | - | million liters per day |
| km ² | - | square kilometer |

NOTE

In this report, "\$" refers to United States dollars.

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EXECUTIVE SUMMARY

The proposed West Bengal Drinking Water Sector Improvement Project (WBDWSIP) aims to provide safe, reliable and continuous drinking water as per Government of India's standard to about 2.6 million people in the Arsenic, Fluoride, and salinity affected selected areas of North 24 Parganas, South 24 Parganas, East Medinipur and Bankura districts of West Bengal. The Project will adopt a sector approach, and subprojects will be selected and proposed for funding adhering to the agreed Subproject Selection Criteria. Project districts are North 24 Parganas (with two blocks of South 24 Parganas included for distribution network), Bankura and East Medinipur, and subprojects to be covered under the Project will be within these districts only unless otherwise agreed with ADB. Subprojects proposed under the Project stem from a district-wide comprehensive water quality and sustainability planning and completion of the Drinking Water Quality Action Plan (DWQAP) for the concerned district.

WBDWSIP will be implemented over a 6-year period, 2018-2024.

The Subproject. Creation of surface water based bulk water supply system to meet the water demand of arsenic (groundwater) affected blocks of Rajarhat and Haroa in North 24 Parganas and Bhargar II in South 24 Parganas district is taken up in this subproject under the WBDWSIP. These blocks are located in the eastern side of Kolkata city. Subproject includes the following civil works components: (i) 22 million gallons per day (MGD) (100 million liters per day or MLD) water treatment plant (WTP) including raw water intake facility to abstract water from the raw water ponds located within WTP campus, (ii) clear water pumping main from WTP to booster pumping station (4.9 km – 1200 diameter pipe); (iii) minimum 4600 kl clear water reservoir and a booster pumping station, (iv) 3 ground level service reservoirs (GLSRs) of 1000 kl, 3200 kl and 5000 kl, respectively at Rajarhat, Haroa and Bhargar II. *Later Rajarhat GLSR has been dropped from the present contract package.*

Project implementation arrangements. Public Health Engineering Department of Government of West Bengal is the executing and implementing agency for the WBDWSIP. Project Management Unit (PMU) exclusively established in Public Health and Engineering Department (PHED) for the WBDWSIP is implementing the project. PMU is assisted by district level Project Implementation Units. Safeguard and Gender Cell (SGC) in the PMU is responsible for safeguards compliance. Project Management Consultant and PIU-wise Design, Supervision and Institutional Support Consultant assist PMU and PIUs in implementation and management of the project.

Screening and assessment of potential impacts. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. As per the Government of India, Environmental Impact Assessment (EIA) Notification, 2006, this subproject does not require EIA study or environmental clearance. The potential environmental impacts of the subproject have been assessed using ADB Rapid Environmental Assessment Checklist for Water Supply. The potential negative impacts were identified in relation to pre- construction, construction and operation.

Categorization. Based on results of the assessment and ADB SPS, the subproject is classified as environmental Category B, i.e., the subproject is judged to be unlikely to have significant adverse environmental impacts. An initial environmental examination is required.

Description of the Environment. The subproject components are located in Rajarhat, and blocks in North 24 Parganas and Bhangar II block in South 24 Parganas districts, in the Ganga- Brahmaputra River Delta. 24 Parganas district was a single district before it was bifurcated into two districts – north 24 Parganas and south 24 Parganas in 1986. Topography of the districts is plain, gently sloping and altitude ranges from 1 m to 14 m above mean sea level (msl). North and south districts are divided into 22 and 29 community development blocks respectively, of which subproject covers 3 blocks. Being a deltaic district, major physiographic units are: natural levee areas, swamps area and older flood plain. Climate is humid and subtropical, characterized by a hot and dry summer from March to May/June, a south-west monsoon season from June to September, a pleasant post-monsoon from October to November and a cool winter from December to February. Project areas are blessed with plenty of water bodies – rivers, streams and ponds, etc., Haroa GLSR site is located near the bank of River Bidyadhari in Haroa. Kestopur Khal (canal), originating from Ultadanga in Kolkata, flows near the Booster pumping station site in New Town, Rajarhat, and also adjoining the proposed GLSR Site in Bhangar II. Almost all blocks of North 24 Parganas effected with arsenic contamination in groundwater.

Districts are home to environmental sensitive areas like Sundarbans Biosphere Reserve (SBR) and East Kolkata Wetland (EKW), however, none of the components of this subproject are located in or close to these. Small part of Haroa block is in the outer transitional zone of SBR. Subproject components are mostly selected in existing facilities owned by PHED. WTP and clear water reservoir cum booster pumping station located within the existing WTP and booster pumping station premises respectively in new town area of Rajarhat. Both the facilities are located in rapidly developing new town area, surrounded by residential and commercial areas. New sites have been identified for Haroa and Bhangar II GLSRs. Bhangar II site is an agricultural land with a mango orchard. Trees may need to be cut; measures suggested to minimize and compensate. Haroa GLSR site is located close to Bidhyadhari River, however, no interference envisaged. It is suggested to safeguard the site in case of heavy flood in the river. Proposed pipeline will be laid along the roads from WTP to booster pumping station. Overall, there are no notable sensitive environmental features in the project sites.

At present, only the land for WTP within the existing treatment plant has been made available. Consultations are in progress as regards to other sites and pipeline alignments. Once these are available, all project activities would start. As of 31st Dec 2019, following activities have been performed in this subproject:

- Soil test completed
- System Design of Hydraulic flow layout completed
- Design of unit sizing ongoing
- Pile layout/pile design calculation completed – piling ongoing
- QAP of MS Pipe approved
- Work started for chemical house and administrative building

Potential Environmental Impacts. The subproject is unlikely to cause significant adverse impacts because: (i) the components involve straightforward construction and operation, so impacts are mainly localized; (ii) there are no significant sensitive environmental features in the project sites and (iii) predicted impacts are site-specific and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements. The main design impacts of water supply system in general are due to abstraction of water. This subproject does not include any new source development or augmentation of existing sources. Water will be sourced from an existing raw water supply system that has adequate capacity to meet the project demand. Raw water

source is Hooghly River (Ganges), which carries significant quantities of water throughout the year. As per the available data on lean season flow (of the year 1996), the lowest was 580 cubic meter per second (m^3/sec) (i.e., 50,112 MLD), while the total requirement of this WTP is 100 MLD. River also is the source of water for Kolkata and rest of North 24 Parganas and South 24 Parganas districts. The water available during the lean flow season is adequate to meet the demand of this entire area. Quality of river water is good and is suitable for drinking water supply after conventional treatment and disinfection.

Construction activities are presently confined within the existing WTP site at Rajarhat, and the interference with the general public and community around is minimal. There are temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, equipment on local roads (traffic, dust, safety etc.), occupation health and safety aspects. During the construction phase of pipeline work along the public roads, impacts will arise from the construction dust and noise resulting in disturbance to residents, businesses, traffic by the construction work, and from the need to dispose of large quantities of waste soil. Of the 4.9 km length of pumping main, approx. 1 km will be laid via trenchless method, especially at sections crossing main roads, congested area etc., The social impacts (access disruptions) due to construction activities are minimal.

Anticipated impacts of water supply during operation and maintenance will be related to operation of WTP, handling and application of chlorine, operation of pump houses, and repair and maintenance activities. Various provisions are already made in the design: to recirculate wastewater from WTP; collect, thicken and dispose sludge; chlorine safety; use energy efficiency equipment, etc., water supply system will be operated using the standard operating procedures. It is unlikely that there will be any significant negative impacts. Application and handling of chlorine gas will involve certain risks, and appropriate measures are included.

Environmental Management Plan. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The EMP includes design and location related measures such as (i) minimizing tree cutting at GLSR sites by proper planning;; (ii) wash water recovery in WTP to improve the efficiency and avoid wastewater generation and disposal; (iii) collection, treatment and beneficial use of treated sludge; (iv) chlorine safety, (v) energy efficient pumping system, and (vi) noise controls.

The EMP prepared along with the IEE includes mitigation measures such as (i) barricading, dust suppression and control measures (ii) traffic management measures for works along the roads and for hauling activities; (iii) provision of walkways and planks over trenches to ensure access will not be impeded; and (iv) finding beneficial use of excavated materials to extent possible to reduce the quantity that will be disposed of, EMP will guide the environmentally-sound construction of the subproject. EMP includes a monitoring program to measure the effectiveness of EMP implementation and include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

Prior to construction, a site-specific environmental management plan (SEMP) has been prepared and approved by PIU. The SEMP includes mitigation measures such as (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. A copy of the EMP/approved SEMP are kept on site during the construction

period at all times.¹ The EMP is included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

Consultation, Disclosure and Grievance Redress Mechanism. The stakeholders have been involved in developing the IEE through discussions on-site and public consultation at several places in the subproject area, after which views expressed have been incorporated into the IEE and in the planning and development of the project. The IEE has been made available at public locations and are disclosed to a wider audience via the ADB and PHED/PMU websites. The consultation process has been continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

Monitoring and Reporting. The PMU and PIU are responsible for monitoring and will submit semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

Conclusions and Recommendations. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government guidelines WTP requires consent to establish (CTE) and consent to operate (CTO) from West Bengal Pollution Control Board. Accordingly, CTE from WBPCB has already been obtained. This IEE has been updated for the extent of construction activities presently undertaken. With the further implementation of the project this IEE will be again reviewed, updated and approved by PMU, and further submitted to ADB for approval.

¹ SEMP is included as Appendix

I. INTRODUCTION

A. Background

1. The proposed West Bengal Drinking Water Sector Improvement Project (WBDWSIP) aims to provide safe, reliable and continuous drinking water as per Government of India's standard to about 4 million people in the Arsenic, Fluoride, and salinity affected selected areas of North 24 Parganas, South 24 Parganas, East Medinipur and Bankura districts of West Bengal.

2. The project will adopt a sector approach, and subprojects will be selected and proposed for funding adhering to the agreed Subproject Selection Criteria. Project districts are North 24 Parganas (with two blocks of South 24 Parganas included for distribution network), Bankura and East Medinipur, and subprojects to be covered under the Project will be within these districts only unless otherwise agreed with Asian Development Bank (ADB). Subprojects proposed under the Project stem from a district-wide comprehensive water quality and sustainability planning and completion of the Drinking Water Quality Action Plan (DWQAP) for the concerned district. The DWQAP for the Project districts supported by the Project were prepared by the executing agency, the Public Health and Engineering Department (PHED) of Government of West Bengal (GOWB), with support of project preparatory consultants from the ADB, and has been adopted by PHED to guide present and future drinking water improvement in the districts.

3. The project is aligned with the following impact: drinking water security ensured in West Bengal. The project will have the following outcome: safe, sustainable, and inclusive drinking water service received in project districts. The Project outputs are as follows:

- (i) **Output 1: Climate resilient drinking water infrastructure constructed.** The project will provide a minimum of 70 lpcd of continuous potable water through metered connections to the households in selected areas of the project districts. The distribution systems will be designed on a DMA basis. Both the bulk and the distribution systems will be integrated with modern STWM and monitoring tools, including supervisory control and data acquisition and geographic information systems. Bulk water supply systems, consisting of intakes, water treatment plants, and transmission mains, will be sized to provide water supply en-route to urban and rural areas. They will be connected into a grid with the existing and the new systems in the project districts, where feasible, to reduce redundancy, improve resilience, and efficiently manage the system; and
- (ii) **Output 2: Institutions and capacity of stakeholders for drinking water service delivery strengthened.** The project will strengthen institutions and the capacity of stakeholders, including the PHED and the project gram panchayats, for sustainable service delivery. It will support them to operate the STWM system, including water quantity and quality monitoring, electronic billing and collections, meter reading, and accounting. The project will build capacities and skills of the stakeholders on O&M, and support public awareness on water, sanitation, and hygiene. It will strengthen the sector through introducing and implementing an AMSDF; institutionalizing water and sanitation safety planning; and developing a regulatory framework for, and piloting, fecal sludge and septage management.

4. WBDWSIP initially targets three districts: North 24 Parganas district is the most Arsenic- affected districts in West Bengal; Bankura is heavily affected by Flouride, and East Medinapur is affected by Salinity. These districts are also one of the most water-stressed districts in West Bengal as they are reliant on depleting groundwater sources. Overall, the Project is intended to meet the requirements of “VISION 2020”, endorsed by the GOWB and in line within the guidelines and implementation framework of NRDWP.

5. North 24 Parganas District is a worst arsenic affected district in West Bengal state; 21 of 22 blocks of the district are identified as arsenic affected. In South 24 Parganas 9 of total 29 blocks are arsenic affected. Though arsenic contaminated, groundwater is the main source of water supply due to lack of a surface water-based system. PHED proposed to provide a safe and sustainable surface water supply system. Accordingly, provision of water supply in blocks, 2-blocks Rajarhat, Haroa in North 24 Parganas, and Bhangar-II in South 24 Parganas is taken up on priority by the PHED and is proposed for implementation under WBDWSIP funded by ADB. The objective of the subproject is to provide sustainable water supply at a rate 70 litres per capita per day (lpcd) to each household in all habitations in the 3 selected blocks. A detailed description of the components is provided in Section III.

B. Purpose of Initial Environmental Examination Report

6. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. The potential environmental impacts of the subproject have been assessed using ADB rapid environmental assessment (REA) checklist for Water Supply (**Appendix 1**). Then potential negative impacts were identified in relation to pre- construction, construction and operation of the improved infrastructure, and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus, this initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects.

7. This IEE is based on the preliminary project report prepared by PHED, and a technical due diligence report prepared by the project preparatory technical assistance (PPTA) team. Now the IEE updated on the basis of activities undertaken and it is to be further updated as the project is progressed by design, build and operate (DBO) contractor to reflect any changes and final subproject designs. This updated IEE is based mainly on field reconnaissance surveys, secondary sources of information and monitored base line data of environmental parameters. Field monitoring (environmental) survey was conducted as part of the environmental management plan (EMP) to establish the baseline environmental conditions prior to commencement of civil works by the contractors. The results are reported as part of the environmental monitoring report and forms the basis to ensure no degradation takes place during subproject implementation. Stakeholder consultation has been an integral part of the IEE.

C. Report Structure

8. This report contains the following nine (9) sections excluding the executive summary at the beginning of the report:

- (i) Introduction;
- (ii) Description of the project;

- (iii) Policy, legal and administrative framework;
- (iv) Description of the environment;
- (v) Anticipated environmental impacts and mitigation measures;
- (vi) Public consultation and information disclosure;
- (vii) Grievance redress mechanism;
- (viii) Environmental management plan; and
- (ix) Conclusion and recommendation.

II. DESCRIPTION OF THE PROJECT

A. Project Area

9. Proposed project area falls in two districts of north and south 24 Parganas (prior to the bifurcation in 1986, both these areas were part of 24 Parganas district), eastern side of Kolkata City. Rajarhat and Bhangar II share the boundary with Kolkata City, and new development and expansion of city can be witnessed in the blocks, especially in the areas adjoining the city limits. New Town Kolkata, developed in the urban fringes adjoining Kolkata town in Barasat block in North 24 Parganas, adjoins the study area. Total population of 3 project blocks is 651,002 (2011) census and has a geographical area of 388 square kilometer (km²).

10. The subproject components locations are in three selected blocks of Rajarhat, Haroa, and Bhangar II. As far as possible, based on the land availability, components are located within the existing water supply facilities.

B. Existing Water Supply Situation

11. Arsenic contamination in groundwater is a serious problem in eastern and northern parts of India, and Uttar Pradesh, Bihar and West Bengal are the worst affected states. Out of 20 districts of West Bengal, eight districts (Malda, Murshidabad, Nadia, North 24 Parganas, South 24 Parganas, Bradhaman, Howrah, Hooghly and Kolkata) are arsenic affected. In terms of administrative blocks, 83 out of 341 administrative blocks are arsenic affected, with a concentration of above 3 milligram per liter (mg/l). In North 24 Parganas district 2,124 habitations of total 7,334 habitations (~29%) are affected by arsenic contamination with the following degrees of contamination, above the maximum concentration as per the Indian drinking water standards (0.05 mg/l):

- (i) 75% in the category of 50-200 ppb arsenic content;
- (ii) 22% in the category of 200-500 ppb arsenic content;
- (iii) 3% in the category of over 500 ppb arsenic content.

C. Proposed Project

12. Following table shows the nature and size of the various components of the subproject. Location of subproject components and conceptual layout plans are shown in **Figure 1 to Figure 6**.

Table 1: Proposed Water Supply Subproject Components

| Infrastructure | Function | Description | Location |
|--------------------------|---|---|--|
| Raw water intake system | Abstract water from raw water ponds in water treatment plant (WTP) compound, and pump it to WTP inlet | Raw water intake sump - cum - pumping station | New intake will be constructed near the outlet of the Pond 2 and 3 of the existing system comprising 5 ponds. These ponds are located within the existing WTP campus in New Town Rajarhat. Raw water is sourced from Hooghly River at Rani Debendrabala Ghat. |
| Water Treatment Plant | Treatment of raw water to meet the drinking water standards | 22 million gallons per day (MGD) (100 million liters per day or MLD) capacity conventional WTP with the following process: <ul style="list-style-type: none"> • Alum coagulation and flocculation • Sedimentation • Rapid gravity filtration, • Disinfection with chlorination • Wash water recovery • Sludge drying beds • Water quality testing laboratory • Miscellaneous infrastructure (compound wall, landscaping, lighting, rest rooms etc.). • Clear water reservoir (approx. 5000 kl) | New WTP will be constructed within the existing WTP compound in New Town area of Rajarhat in the eastern outskirts of Kolkata City. At present 20 MGD WTP is in operation, and another 20 MGD under construction. Adequate space within the compound is available for construction of the new WTP. Site is vacant. Site is surrounded mostly by residential apartments. However, there is adequate buffer space and boundary wall for the facility. For new WTP, design is going on. Already administrative building design is completed and it is under construction. Also, CTE has been obtained from West Bengal Pollution Control Board (Refer Appendix 2). |
| Clear water pumping main | Clear water transmission from WTP to clear water reservoir at booster pumping station | Clear water main <ul style="list-style-type: none"> • 4.9 kilometers (km) length 1200 millimeters (mm) Ductile Iron pipe Of the 4.9 km, some portion will be laid using trenchless method or pipe bridge, and the rest will be laid by open cut method | From WTP to clear water reservoir at booster pumping station, in the new town area. Pipes will be laid buried along the roads within the roads' right of way. |
| Clear water reservoir | Storage of clear water for further supply | Minimum 4600 kl RCC ground level circular reservoir | In the booster station compound. Site is currently vacant |
| Booster pumping stations | To provide adequate pressure to transmit water to Ground level service reservoirs in each block | Pumping machinery and pump room | In the existing booster pumping station in New Town Area |

| Infrastructure | Function | Description | Location |
|---|---|---|--|
| Ground Level Service Reservoirs (GLSR with pumping station) | Storage of clear water for further supply | RCC reservoirs Minimum 3200 kl ground level service reservoir (GLSR) at Haroa | Haroa GLSR site located in Haroa. The selected site is a vacant land near the bank of River Vidhayadhari. There are no trees in the site. Site is accessible by road, and not flood prone. |
| Ground Level Service Reservoirs (GLSR with pumping station) | Storage of clear water for further supply | RCC reservoirs Minimum 5000 kl ground level service reservoir (GLSR) at Bhangar II | Bhangar II GLSR site is located adjacent to Khestopur Khal (canal /drain) near Saduli in Bhangar. This is a privately owned agricultural land, and currently covered with a mango orchard. |

D. Implementation Schedule

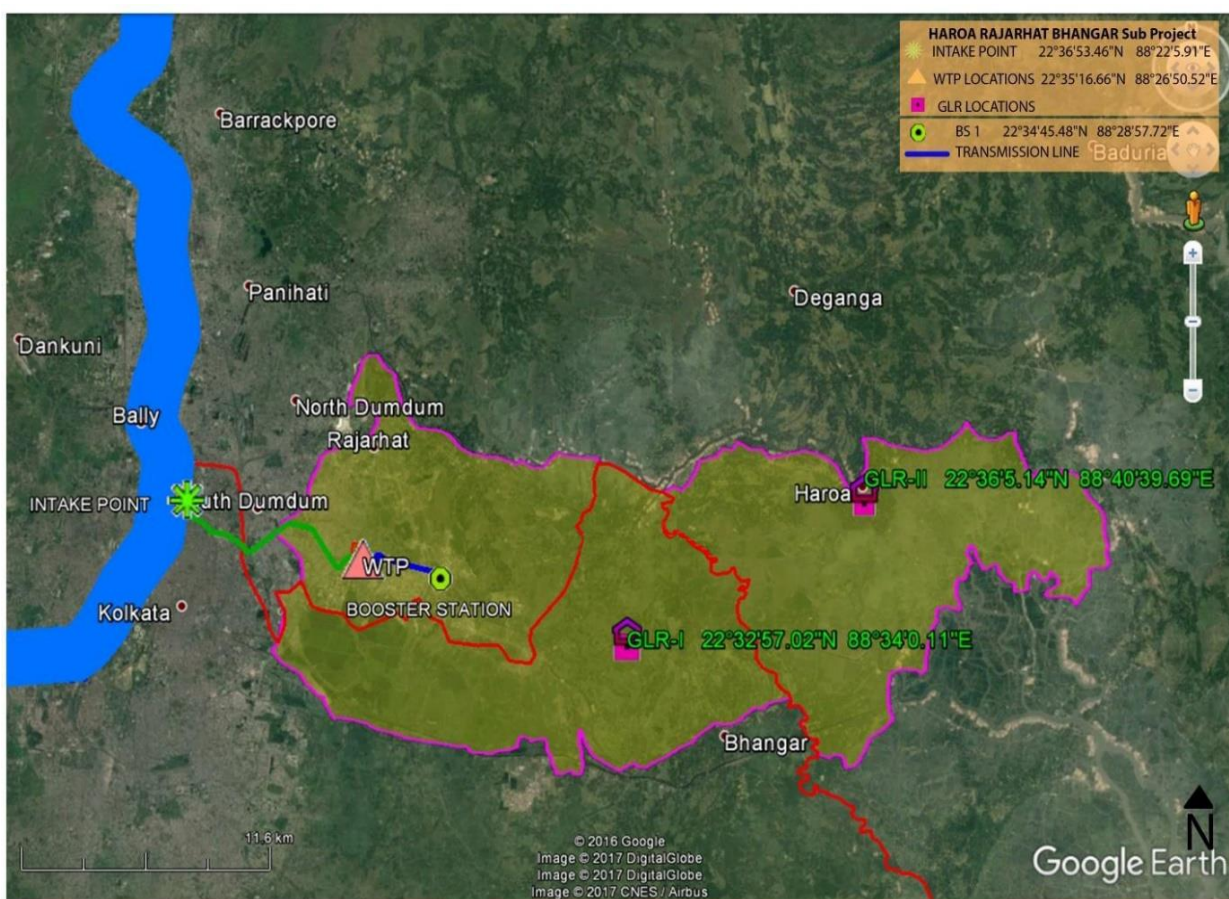
13. The project implemented on a DBO contract. Bids invited in the last quarter of 2017, and the contract awarded on December 2018. After which contractor mobilized, detailed designs prepared (some part under progress) from January 2019, the total period of design and construction is 36 months. After which the DBO contractor will operate and maintain for a period of 2 years.

14. **Implementation status** till 31st December 2019 is mentioned below.

- Soil test completed
- System Design of Hydraulic flow layout completed
- Design of unit sizing ongoing
- Pile layout/pile design calculation completed
- QAP of MS Pipe approved
- Pilling work undergoing at WTP site for administrative building
- Work started for chemical house
- Pre-construction work / designing are on-going for remaining components
- Transmission main pipeline alignment selection and designing going on.

15. Present construction status photo attached as **Appendix 5**.

Figure 1: Subproject Components



Source: Google Earth

Figure 2: Layout Diagram of Proposed Water Treatment Plant (Draft under finalization)

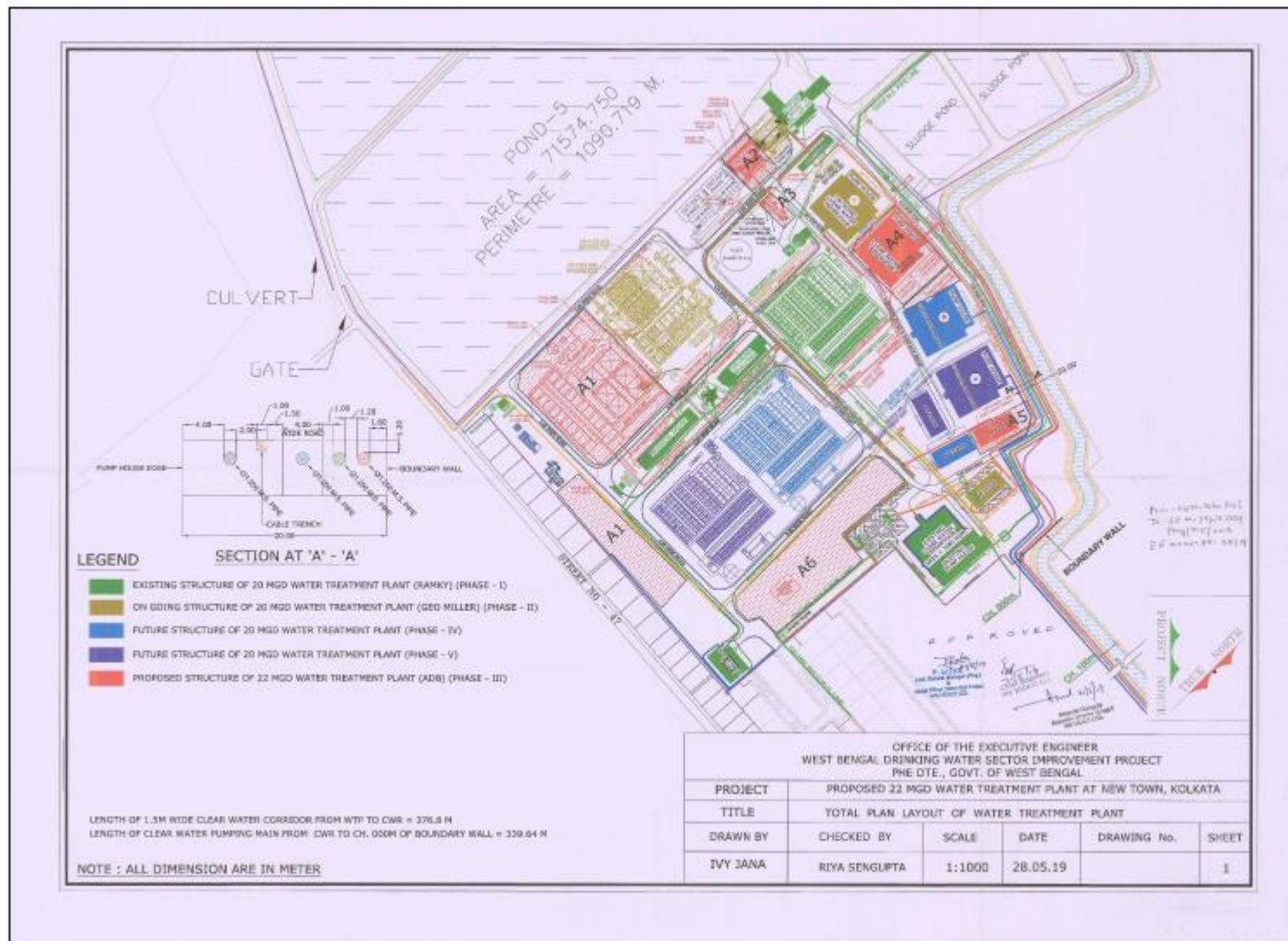
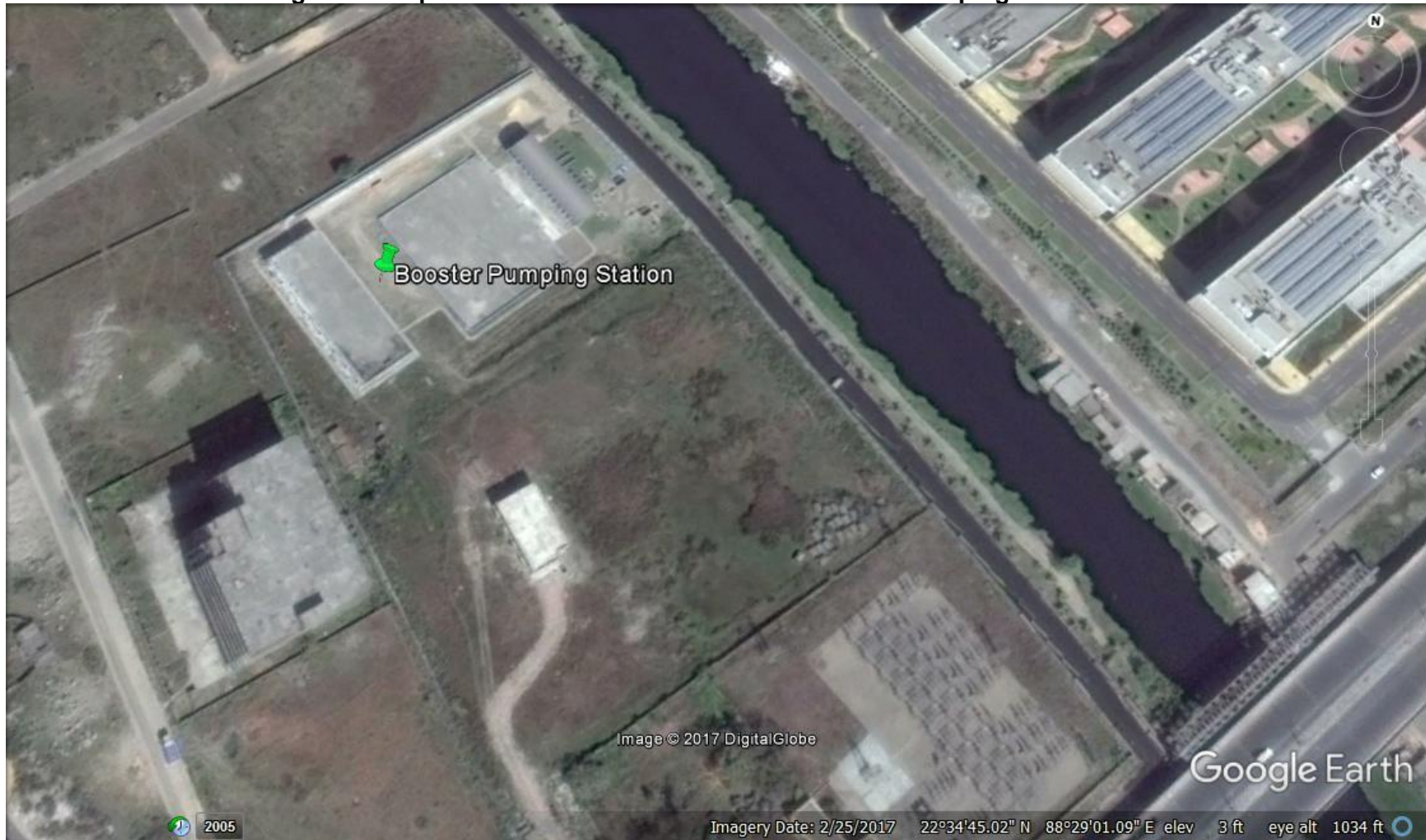


Figure 3: Proposed Clear Water Reservoir and Booster Pumping Station Site



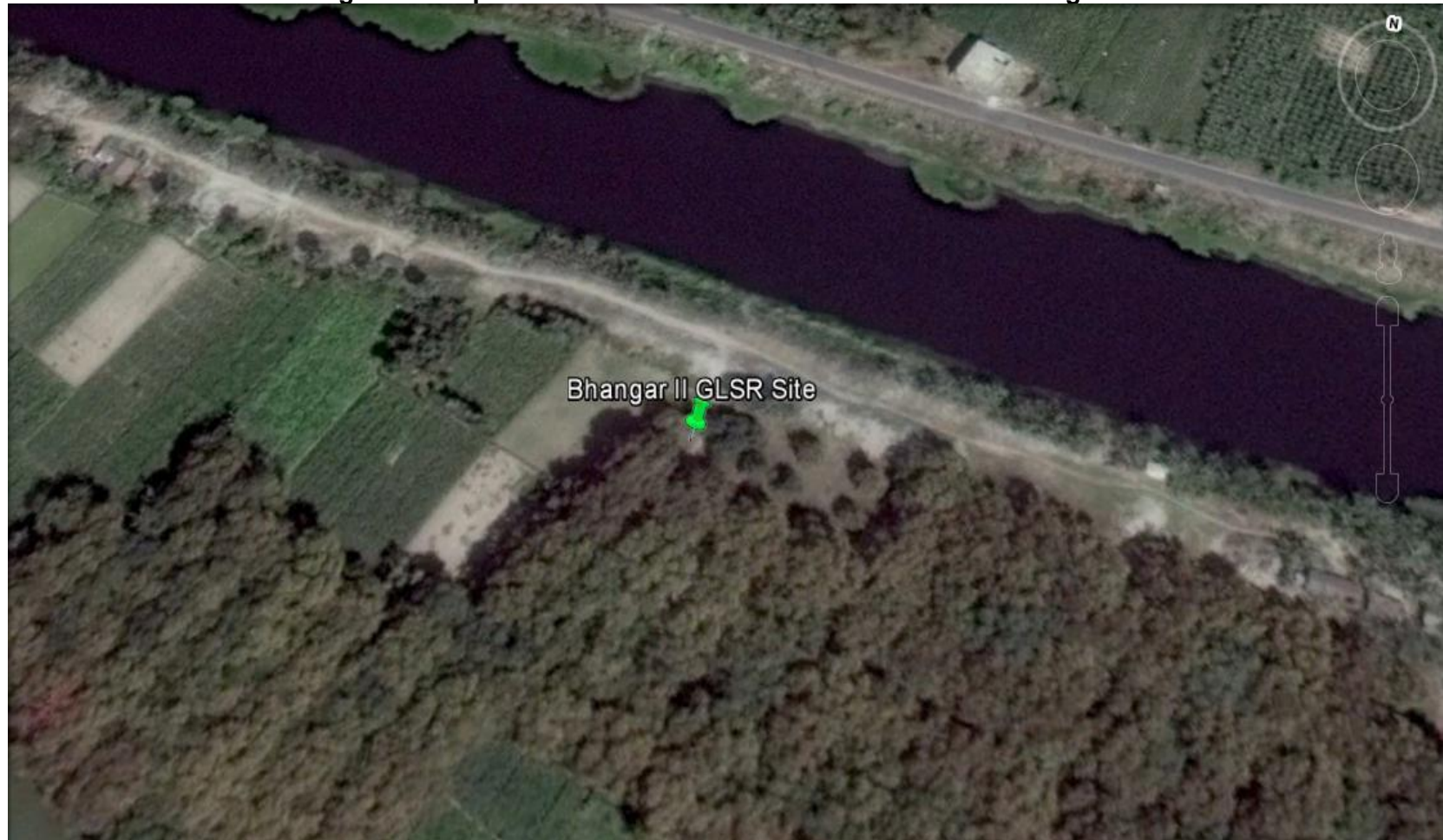
Source: Google Earth.

Figure 4: Proposed Ground Level Service Reservoir Site at Haroa



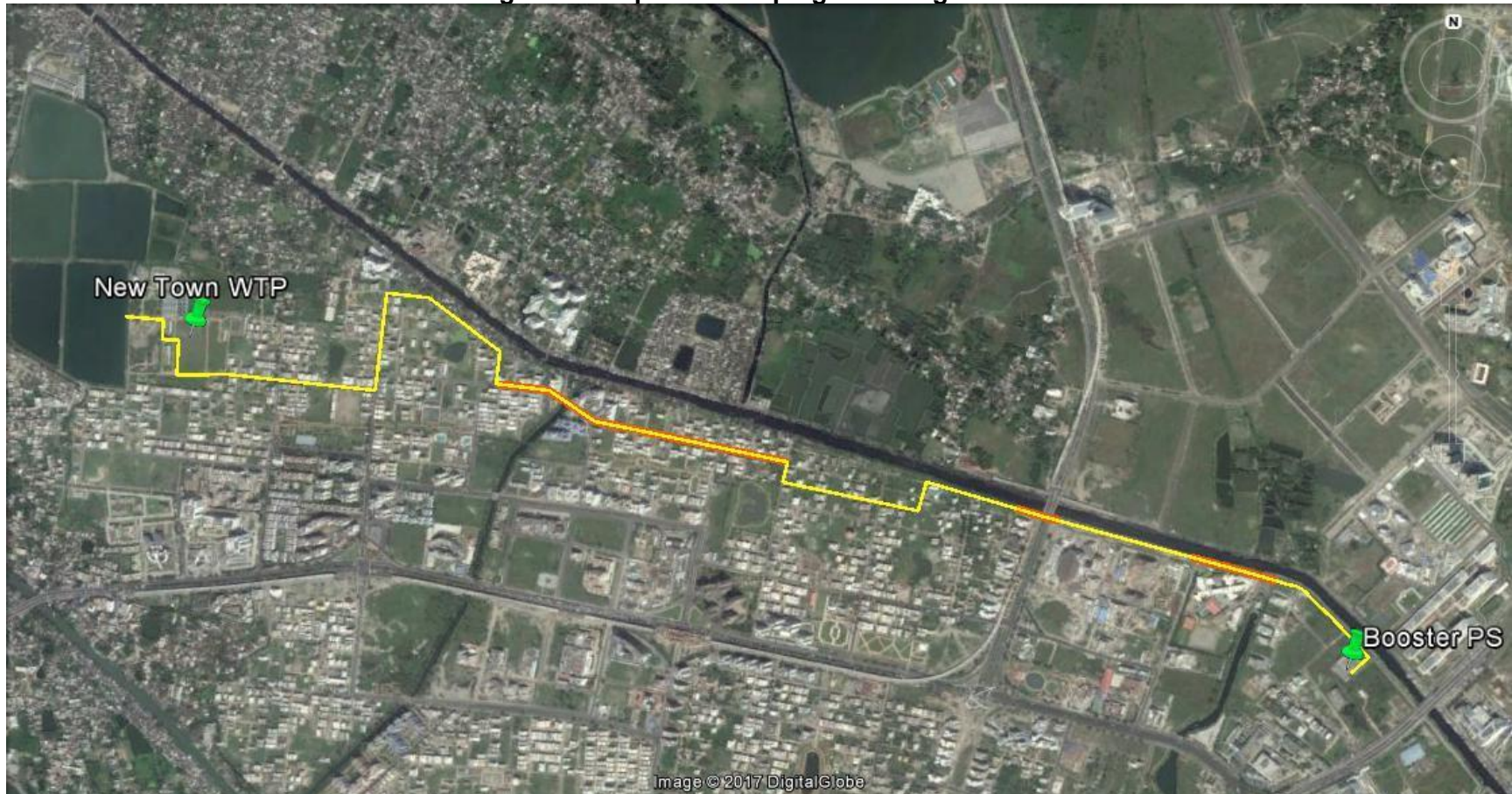
Source: Google Earth.

Figure 5: Proposed Ground Level Service Reservoir Site Bhangar II



Source: Google Earth.

Figure 6: Proposed Pumping Main Alignment



Note: Sections proposed for trenchless construction are highlighted in orange shade.
Source: Google Earth.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

16. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

17. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

- (i) **Category A.** Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
- (ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- (iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- (iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

18. **Environmental management plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP, the priority of the identified measures and actions should be commensurate with the project's impact and risks.

19. **Public disclosure.** ADB will post the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

- (i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
- (ii) final or updated EIA and/or IEE upon receipt; and
- (iii) environmental monitoring reports submitted by the implementing agency during project implementation upon receipt.

B. National Environmental Laws

20. **Environmental Assessment.** The Government of India EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance is required for specified

activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

21. Category A projects require Environmental Clearance from the central Ministry of Environment, Forest and Climate Change (MoEFCC). The proponent is required to provide preliminary details of the project in the prescribed manner with all requisite details, after which an expert appraisal committee (EAC) of the MoEFCC prepares comprehensive terms of reference (TOR) for the EIA study. On completion of the study and review of the report by the EAC, MoEFCC considers the recommendation of the EAC and provides the Environmental Clearance if appropriate.

22. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares terms of reference for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the Environmental Clearance based on the EAC recommendation. The Notification also provides that any project or activity classified as category B should be treated as category A if it is located in whole or in part within 10 kilometer (km) from the boundary of protected areas, notified areas or inter- state or international boundaries.

23. None of the components of this bulk water supply subproject falls under the ambit of the EIA Notification 2006, and, therefore EIA Study or Environmental Clearance is not required for the subproject.

24. **Applicable Environmental Regulations.** Besides EIA Notification 2006, there are various other acts, rules, policies and regulations currently in force in India that deal with environmental issues that could apply to infrastructure development. The specific regulatory compliance requirements of the subproject are shown in **Table 2**.

Table 2: Applicable Environmental Regulations

| Law | Description | Requirement |
|--|---|---|
| Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments | Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water. Control of water pollution is achieved through administering conditions imposed in consent issued under to this Act. All pollution potential activities will require consent to establish (CTE) from West Bengal Pollution Control Board (WBPCB) before starting implementation and consent to operate (CTO) before commissioning. | Water treatment plant (WTP) requires CTE and CTO from WBPCB. Consent to Establish (CTE) has been obtained from West Bengal Pollution Control Board (WBPCB) Appendix- 2 provides the copy of the CTE. |
| Environment (Protection) Act, 1986 and Central Pollution Control Board (CPCB) Environmental Standards. | Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards | Appendix 3 provides applicable standards for ambient air quality. Appendix 4 provides vehicular emission norms |
| Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010. | Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones. | Appendix 3 provides applicable noise standards. |

| Law | Description | Requirement |
|--|---|---|
| Air (Prevention and Control of Pollution) Act, 1981, amended 1987 and its Rules, 1982. Direction of West Bengal Department of Environment under the Air Act, 1981 Direction No. EN/3170/T-IV-7 /001/2009 dated: 10 December 2009 | <ul style="list-style-type: none"> - Applicable for equipment and machinery's potential to emit air pollution (including but not limited to diesel generators and vehicles); - CTE and CTP from WBPCB; <p>Compliance to conditions and emissions standards stipulated in the CTE and CTO.</p> <ul style="list-style-type: none"> - issued based on a study by WBPCB with help of ADB on air pollution from construction activities - lays out norms for control of air pollution from construction activities - prescribes two sets of norms: preventive measures, and practices to be discarded - failure to comply will lead to legal action, stoppage of work etc., -All construction activities under WBDWSIP shall follow the norms | Appendix 6 provides the pollution control measures indicated in the direction |
| Municipal Solid Wastes Management Rules, 2016 | Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing and disposal. | Solid waste generated at proposed facilities shall be managed and disposed in accordance with the MSWM Rules |
| Construction and Demolition Waste Management Rules, 2016 | Rules to manage construction and to waste resulting from construction, remodeling, repair and demolition of any civil structure. Rules define C and D waste as waste comprising of building materials, debris resulting from construction, re-modeling, repair and demolition of any civil structure. | Construction and demolition waste generated from the project construction shall be managed and disposed as per the rules (Appendix 7) |
| Labor Laws | The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type. | Appendix 8 provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works. |

25. **ADB Safeguard Policy Statement Requirements.** During the design, construction, and operation of the project the PMU and PIUs will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety (EHS) Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of India regulations differ from these levels and measures, the PMU and PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

26. **Table 3 and 4** shows WHO standard on air and noise level. Monitoring results relevant to project have been compared with these standards.

Table 3: WHO Ambient Air Quality Guidelines

| Table 1.1.1: WHO Ambient Air Quality Guidelines ^{7, 8} | | |
|---|----------------------|---|
| | Averaging Period | Guideline value in $\mu\text{g}/\text{m}^3$ |
| Sulfur dioxide (SO_2) | 24-hour | 125 (Interim target-1) 50 (Interim target-2) 20 (guideline) |
| | 10 minute | 500 (guideline) |
| Nitrogen dioxide (NO_2) | 1-year | 40 (guideline) |
| | 1-hour | 200 (guideline) |
| Particulate Matter PM_{10} | 1-year | 70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) |
| | 24-hour | 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline) |
| Particulate Matter $\text{PM}_{2.5}$ | 1-year | 35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) |
| | 24-hour | 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline) |
| Ozone | 8-hour daily maximum | 160 (Interim target-1) 100 (guideline) |

Table 4: World Bank Group's Environment, Health and Safety Noise Level Guidelines

| Table 1.7.1- Noise Level Guidelines ⁵⁴ | | |
|---|--------------------------|----------------------------|
| Receptor | One Hour L_{Aeq} (dBA) | |
| | Daytime 07:00 - 22:00 | Nighttime 22:00 - 07:00 |
| Residential; institutional; educational ⁵⁵ | 55 | 45 |
| Industrial; commercial | 70 | 70 |

IV. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for Baseline Study

27. **Data Collection and Stakeholder Consultations.** Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder

agencies, and field visits to the proposed subproject sites.

28. The literature survey broadly covered the following:

- (i) Project details, reports, maps, and other documents prepared by technical experts of the PHED, ADB PPTA Team
- (ii) Discussions with Technical experts of the PPTA team, municipal authorities, relevant government agencies like WBPCB, etc.
- (iii) Secondary data from previous project reports and published articles, and
- (iv) Literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and other planning documents collected from Government agencies and websites.

29. **Ocular inspection.** Several visits to the project sites were made during IEE preparation period in 2016-17 to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed project. A separate socioeconomic study was conducted to determine the demographic information, existing service levels, stakeholder needs and priorities.

30. During update of IEE report (2019) several time field visits, discussion with stakeholder and generation of primary data with the help of contractor have been conducted by environment safeguard team.

B. Physical Resources

1. Location, Area and Connectivity

31. Project area is located in the Ganga- Brahmaputra River Delta, in the two administrative districts of North and South 24 Parganas. Located in southern part of West Bengal, 24 Parganas district was a single district before it was bifurcated into two districts – north 24 Parganas and south 24 Parganas in 1986. Geographically, North 24 Parganas district lies between 21°25'30" and 23°16'50" north latitude and 88°01'10" and 89°06'15" east longitude, spreading over 4,094 km². The district shares its eastern boundary with Bangladesh, and southern boundary with South 24 Parganas district. Average altitude ranges from 1 to 14 meter above the mean sea level (MSL). With total geographical area of 4,094 km², North 24 Parganas district is divided into 5 administrative divisions and 22 Community Development blocks for administrative purpose. Project covers two blocks, Rajarhat and Haroa, located in the western part of the district. Barasat is the district headquarter. Rajarhat community development block is located at 22°36'37" N longitude and 88°31'33" E latitude, with an elevation ranges from 2m to 14m AMSL, and the total area of the block is 69.09 km². Haroa community development block is located at 22°35'54" N longitude and 88°40'46" E latitude, with an elevation range from 1m to 11m above MSL. The block is extended to an area of 152.81 km².

32. South 24-Parganas district is located between 22°30'45" to 20°29'00" North latitude and between 89°4'56" and 88°3'45" East longitudes, with a total geographical area of 9,960 sq.km. It is the largest district in West Bengal, and Alipore is the district headquarter town. District is bounded by the river Hooghly in the west, Bay of Bengal in the south, Kolkata city and North 24 Parganas in the north. It shares its eastern boundary with Bangladesh and Bidya and Matla River. District is located at an average altitude from 1 m to 7 m above MSL. South 24 Parganas district is divided into 29 community development blocks, and the project covers

Bhangar II community development Block, located in the northern part of the district, under Baruipur sub-division. Bhangar-II is located at 22°31'52.15" N longitude and 88°35'21.66" E latitude, with an elevation ranges from 3 m to 9 m above MSL, and an area of 162.04 km².

33. Located close to Kolkata, project area has good road connectivity with Kolkata and the rest of the state and country with national and state highways: NH2 (Kolkata-Delhi Road), NH 34 (Kolkata-Barasat-Dalkhola), and NH 35 (Barasat - Habra - Gaighata - Chandpara - Bangaon - Indo/Bangladesh Border).

2. Topography, Soils and Geology

34. Being a deltaic district, major physiographic units are: natural levee areas, swamps area and older flood plain. The southern part of the district is covered with active and growing delta with a number of tidal rivers, creeks, saline soils, swamps and marshes. North 24 Parganas district geological formation is a part of Gangetic basin and is underline by huge thickness of Quaternary Alluvium, laid down by the southerly flowing Bhagirathi River and its tributaries. The major area of the district is occupied by recent alluvium consists of grey sand, silt and grey clay. Older alluvium sediments occur beneath recent alluvium, comprises grey to brown sand fine to course grained, gravel, clay with kankar and ferrogeneous concretions. In northern and central part of district top surface clay is occurring down to 5 to 12 meters below ground level (mbgl), whereas in the southern and south-eastern part of district average thickness of top clay layer is in the range of 25 mbgl. Other than this, no prominent rock and mineral formations are found in the project district. Geology of Rajarhat and Haroa community development blocks are derived mainly from sedimentary rock formations from the sediments of Gangetic and Bhagirathi river basins.

35. South 24 Parganas district is located in the lower deltaic plain on the composite Gangetic Delta and is covered by the Quaternary sediments deposited by the Ganga and its tributaries. The top of the alluvium is clayey in nature with varying thickness of 15 to 75 meters. Fine sand and silty-clay capping also occurs in small patches in the alluvium. Underlying the clay blankets occur a huge thickness of unconsolidated sediments composed of silt, fine to coarse grained sand and gravel with increasing thickness towards east and southeast. The gravel zone is underlain by another extensive clay zone at varying depths. There is a succession of Tertiary and Mesozoic formations within the depth range of 350 m to 4000 meters. These geological horizons are sloping gently towards south-southeast. Other than this, no prominent rock and mineral formations are found in the project district.

36. **Soils.** The soil of North 24 Parganas district varies widely, and the common soil types found in the area alluvium, sandy and silty soils. As per US soil taxonomy soil type, the district is broadly classified in to two separate zones: Entisols comprises of mainly sandy loam which is found in the northern, central and western part of the district and Alfisols comprise loam, silty loam which is found in the southern and south-eastern part of the district. Soil in Rajarhat and Haroa community development blocks is fine loamy soil characterized by poorly drained and extends very deep in the sub surface soil strata. Soils in South 24 Parganas are mostly sandy loam and clay loam in texture and contain large percentage of silt and clay with good water holding capacity. Soils are highly fertile. Only in areas close to rivers, soils are sandy clay. As per US soil taxonomy soil type in the district are broadly classified in to three groups: Entisols comprises of mainly sandy loam which is found in the western corner of the district; Alfisols which are typically deltaic alluvium soils, are present central part of the district, and Aridisols which are saline and saline-alkali in nature are present in the southern

part of the district. Soil in Bhangar-I and Bhangar-II community development blocks is characterized by sandy loamy to clay loamy soil.

3. Seismology

37. As per the seismic zoning map of India, project area in both the districts falls under Zone IV, which is the high earthquake damage risk zone in India. Project area besides earthquake risk, is also vulnerable to various natural calamities like flood, cyclone, hailstorm, drought and embankment erosion etc.

4. Climatic Conditions

38. The climate of the project area is humid and subtropical, characterized by a hot and dry summer from March to May/June, a south-west monsoon season from June to September, a pleasant post-monsoon from October to November and a cool winter from December to February. Majority of the rain is received during the south-west monsoon, from late June to September end. It also receives pre-monsoon torrential rains in summers between March and May. Average annual rainfall North 24 Parganas district recorded is 1525 millimeter (mm), of which 75 percent (%) is received during the southwest monsoon. Maximum and Minimum average temperature registered are 41 degree Celsius (°C) and 9°C. Relative humidity lies between 50% in March and 90% in July. Figure shows average monthly rainfall and monthly mean maximum and minimum temperature of North 24 Parganas district. Average annual rainfall of South 24 Parganas district is 1663 mm. Maximum and Minimum average temperature registered in the project district is 41°C and 10°C. Relative annual humidity in the district is lies from 71% to 85%.

Figure 7: Annual Rainfall and Average Monthly Rainfall in Project Area

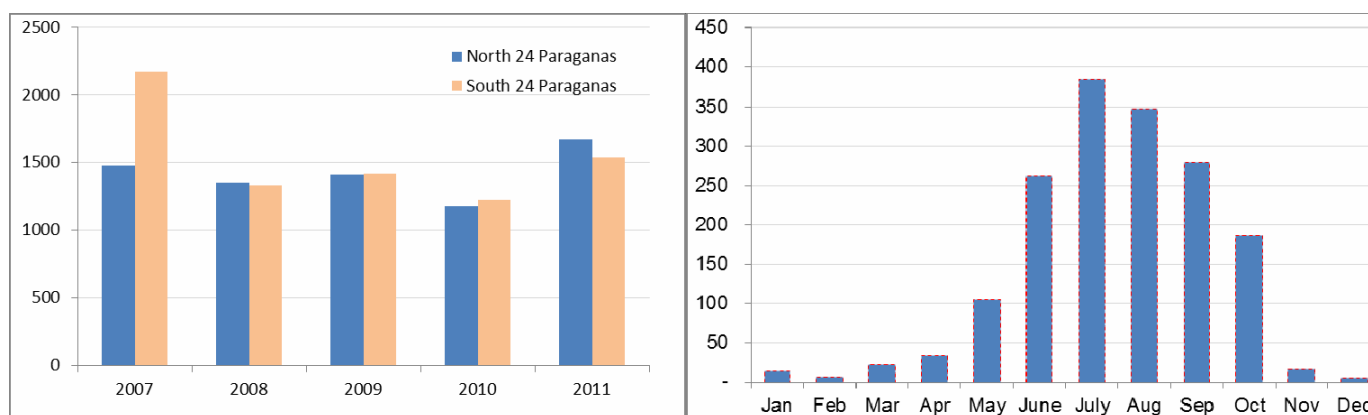
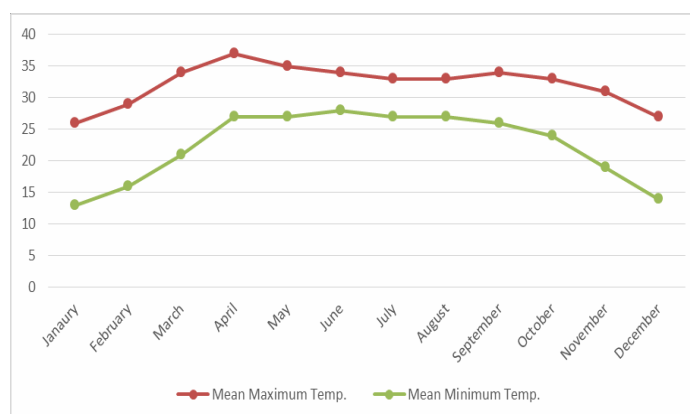


Figure 8: Average Minimum and Maximum Temperature in Project Area



5. Surface Water

39. Project area is blessed with plenty of water bodies – rivers, streams and ponds, distributed across the district. Notable rivers are Hooghly (the Ganges), Ichhamati, Kalindi, Raimangal, Dansa, Borokalagachi, Benti, Haribhanga, Gouchra and Bidyadhari. Ichhamati is the longest among these rivers. It enters the district through Bagdah block in the north of the district from Nadia and flows south through Bangaon, Swarupnagar, Baduria, Bashirhat-I, Hasnabad and Hingalganj. This river flows into river Kalindi and Kalindi in turn flows into Raimangal. It forms international border between India and Bangladesh during its course from Bashirhat to Hingalganj. River Hooghly lies between Hooghly District and North 24 Parganas district. Besides, Sunderban deltas make many rivers flow in this region due to high tidal water entering from Bay of Bengal. Other forms of surface water resources are reservoirs, ponds, lakes, bheris, canals, streams, roadside burrows, Beels etc., are also found in the project blocks. Project area, specially the rural hinterland, is dotted with large number of small water bodies (ponds), mainly used for fisheries.

40. Haroa GLSR site is located near the bank of River Bidyadhari in Haroa. Bidyadhari originates near Haringhata in Nadia district and then flows through North 24 Parganas before joining the Raimangal River in the Sunderbans. It is the major drainage system of North 24 Parganas and Kolkata and is tidal for 95 km. River flows only during the rainy season. Kestopur Khal (canal), originating from Ultadanga in Kolkata, flows near the Booster pumping station site in New Town, Rajarhat, and also adjoining the proposed GLSR Site in Bhangar II. Flowing through the city of Kolkata, this canal primarily carries wastewater including sewage from several areas along its course and finally joins River Bidyadhari near Makhali in the eastern side. This is one of highly polluted water bodies in the area. There are several shanties/slums developed along this canal.

41. Project water source is River Hoogly (the Ganges), and the existing river intake is at Rani Debendrabala Ghat in Kolkata. River Ganga is formed by two rivers at Devprayag in Uttarakhand State – Bhagirathi and Alakananda, originating from the glaciers of the Himalayas. From Uttarakhand, it flows down to Uttar Pradesh, where it is joined by its largest tributary River Yamuna at Allahabad, and then enters Bihar, where it is joined by another large river Kosi. The river finally enters West Bengal, and then it bifurcates into two branches about 40km downstream of Farakka Barrage. The left branch, called River Padma, flows eastwards and enters Bangladesh, and the right branch, called River Bagirathi/River Hooghly, flows southwards through West Bengal and ultimately discharges into Bay of Bengal near Kolkata. Of the total river length 2,575 km, the lowest portion of 570 km falls in West Bengal. River Hoogly is perennial in nature and owing to numerous large tributaries it carries huge quantities of water throughout the year. Water quality is suitable for drinking after treatment and disinfection. A study by the Hydraulic Study Department of Kolkata Port Trust assumes the flow in the river to be 1,135 cubic meter per second (m^3/sec). The width of river varies, but near Kolkata it is roughly 1000m wide. The Hooghly is under tidal influence for up to 300 km. The overall spring tide range is 4.27 m to 4.57 m and range of the neap tides is 1.83 m to 2.83 m. Near Kolkata, the water level fluctuates 4.0m per day during the rainy season and 2.75m twice in a day in the dry season. Highest high-water level (HHWL) and the lowest low water level (LLWL) are 5.34 m above mean sea level (msl) and 0.95 m below msl, respectively.

6. Groundwater

42. In North 24 Parganas district, the dynamics of ground water resources has been

studied and estimated jointly by CGWB and SWID, West Bengal. Ground water scenario in north and central part of district occurs under water table condition. However, isolated patches in Barrackpore, Amdanga, Hadra II and Rajarhat Blocks, imparting semi-confined nature of ground water body. Southern and southeastern part of the district viz., Basirhat, Haroa, Hasnabad, Hingalgaon, Sadeshkhali, Minakahn, ground water occurs in confined ground water body. Major water bearing formation is sand (grey to yellow) fine to coarse grained, silt and gravel. Depth of water level in unconfined aquifer during pre-monsoon period varies from 2 to 13.60 mbgl and post-monsoon it is from 1.64 to 10.66 mbgl. In confined region, during pre-monsoon, it varies from 3.47 mbgl to 6.25 mbgl and post-monsoon varies from 1.91 mbgl to 5.89 mbgl. Tube wells in the district are constructed tapping both confined and unconfined aquifers and are capable of yield 50 to 150 m³/h with nominal drawdown of 4-5m. Transmissivity values ranges from 699 – 8127 m²/day and storability ranges from 1.05×10^{-3} to 1.45×10^{-4} . Specific yield ranges from 0.035 to 0.765. Current stage of ground water development is 71.19 % and all the blocks of the district are in “safe category” in terms of groundwater availability.

43. **Groundwater Quality.** The chemical quality of ground water in the region is in general of bicarbonate type. The chloride content of the ground water is low (18-234) mg/l in northern and central part of the district. In southern and south-eastern part of the district upper aquifers are brackish to saline nature with chloride value ranges from 300 – 1241 mg/l. The ground water is mainly neutral to mildly alkaline in nature and pH value ranges between 7.5 and 8.2. Total Hardness as CaCO₃ ranges from 140-670 mg/l. Generally Iron content is above permissible limit in all blocks range from 1.23 – 18.10 mg/l. Shallow aquifer within a depth of 100 mbgl shows Arsenic concentration of more than 0.05 mg/l occurring in 253 Mouzas in 17 blocks of the district.

44. In South 24 Parganas district, the ground water bearing aquifers are present within Quaternary and Tertiary sediments and generally occur under confined condition in the depth range of 75m to 360m with numerous alternations of clayey and sandy layers of varying thickness. The confined aquifers are divided into two groups, from north to extreme south. The upper one, usually in the depth span of 20m to 160m has a sandy gravel layer as a marker bed at its base which pinches out eastward. The ground water in general except at a few places occurring in this upper group of aquifers, is brackish to saline (chloride ranging from 1750 to 6300 ppm) and is not in use. The lower group of aquifers occurring in the depth range of 160m to 360m, is separated from the upper group by a thick impermeable sticky clay bed which is laterally extensive with varying thickness. The ground water occurring in this lower group of aquifers is generally fresh and is used extensively. Groundwater level lies from 1.70 mbgl to 6.00 mbgl during pre-monsoon period and from 0.50 m to 5.80 mbgl during post-monsoon period. Productive fresh water bearing zones are in depths ranging from 115 to 402 mbgl and are capable to yield 100 to 120 m³/hr, with drawdown ranging from 2.3m to 16.5m. Transmissivity values range from 400 to 6500 m²/day and the Storativity values range from 0.0002 to 0.0015.

45. **Groundwater Quality.** Groundwater from unconfined aquifer except a few places is fresher within 60 mbgl than the deeper aquifers within 60 to 125 mbgl. Ground water from the unconfined aquifer is generally neutral to mildly alkaline with pH ranging from 7.2 to 8.1. Ground water in the western and central part of the district is primarily a Calcium-Magnesium-Bicarbonate type. The aquifer within the depth range of 150 mbgl in this area is generally marked by brackishness where chloride value ranges from 1750 to 6300 ppm. The deeper group of confined aquifers occurring within the depth range of 160 to 350 mbgl in the southern and south-eastern part of the district contain fresh water. The ground water is

neutral to mildly alkaline with pH ranging from 7.4 to 8.1. Conductivity ranges from 714 to 2692 $\mu\text{S}/\text{cm}$ and the chloride value ranges from 14 to 596 ppm. In the coastal belt of this district the aquifers under semi confined to confined condition contain ground water with very high dissolved salts. Arsenic content of groundwater has been found to be beyond permissible limit of 0.05 ppm in a number of localized patches in sporadic manner in 9 blocks-Baruipur, Sonarpur-Bhangar-I and II, Jaynagar-I, Bishnupur-I and II, Magrahat-II and Budge Budge-II in this district.

46. **Arsenic in Groundwater.** In 2015, the Indian standard (permissible concentration) for Arsenic in drinking water has been revised from 0.05 mg/l to 0.01 mg/l (WHO guidance value). As per the available data, as of 2016, there are around 13,000 habitations spread over 17 states in India, that have arsenic in groundwater above the permissible concentration. Most of the affected states are in the Ganga- Brahmaputra fluvial plains: Assam, Bihar and West Bengal. Over 50% of total affected habitations are in the state of West Bengal alone. The School of Environmental Studies (SOES), Jadavpur University carried out extensive sampling from the tube wells in the state for over a period of 20 years starting from 1988, and found that out of 135,555 samples analyzed from nine districts, 67,306 (49.7%) samples shown arsenic concentration above 0.01 mg/l and 33,470 (24.7%) samples above 0.050 mg/l. Specifically on project area, PHED sampling and analysis (a total of 5641 samples) indicate that all the 22 blocks in north 24 Parganas have groundwater with arsenic concentration above 0.01 mg/l. The maximum observed arsenic concentration has the lowest value in Barrackpur II and the highest is observed in Habra II, Bongaon and Gaighata (1.0 mg/l) blocks. Relatively low average concentration between 0.01 and 0.5 mg/l is observed in five blocks, out of which three are in the coastal area, and an average concentration between 0.05 mg/l and 0.10 mg/l is observed nine blocks. All the remaining eight blocks have an average concentration above 0.10 mg/l (**Table 5**). **Appendix 9** shows ground water quality standard.

Table 5: Arsenic Concentration in Groundwater, Block-wise, North 24 Parganas

| Average Arsenic Concentration (mg/l) | Name of Block (Max. Observed Arsenic Concentration in mg/l) |
|--------------------------------------|---|
| 0.01 - 0.05 | Barrackpur-I (0.97), Barrackpur-II (0.16), Haroa (0.73), Minakhan (0.5), Sandeshkhali I (0.77) |
| 0.05- 0.1 | Amdanga (0.57), Bagda (0.62), Barasat I (0.75), Barasat II (0.95), Basirhat II (0.63), Bongaon (1), Hasnabad (0.96), Hingalganj (0.46), Rajarhat (0.62) |
| > 0.1 | Baduria (0.96), Basirhat I (0.99), Deganga (0.69), Gaighata (1.0), Habra I (0.95), Habra II (1.0), Swarupnagar (0.72) |

7. Air and Noise Monitoring

47. West Bengal State Pollution Control Board (WBPCB) monitors air and noise pollution in the State. WBPCB have monitoring stations located at various places across the state; however, covers major cities, district headquarters and industrial locations. There are no monitoring stations in the project blocks of Rajarhat, Haroa and Bhangar I and II. In North 24 Parganas, ambient air quality is monitored by WBPCB at Barrackpore. Data shows that all the monitored ambient air quality parameters, except particulate matter (PM 10), are within the National Ambient Air Quality Standards (NAAQS). PM10 is slightly exceeding the standard while the respirable particulate matter (PM2.5) is almost near the permissible limit. Dust in the ambient air is mainly due to dry atmosphere, dusty roads and traffic.

Table 6: Ambient Air Quality (Daily Average)

| | Parameters | Barrackpore | Revised NAAQ Standard (24-hour average) | WHO (24-hour average) |
|---|---------------------------------------|-------------|---|-----------------------|
| 1 | PM ₁₀ , µg/m ³ | 103.64 | 100 | 100 |
| 2 | PM _{2.5} , µg/m ³ | 58.82 | 60 | 50 |
| 3 | SO ₂ , µg/m ³ | 9.62 | 80 | 50 |
| 4 | NO ₂ , µg/m ³ | 68.17 | 80 | - |
| 5 | CO, mg/m ³ | 0.73 | 2 | = |

48. Base line air quality and noise level have been monitored at WTP and booster pumping stations locations. Results are shown below.

Table 7: Ambient Air Quality Monitoring

| | Parameters | WTP Location Tank no. 1 | Booster pumping station Rajarhat | Revised NAAQ Standard (24-hour average) | WHO (24-hour average) |
|---|---------------------------------------|-------------------------|----------------------------------|---|-----------------------|
| 1 | PM ₁₀ , µg/m ³ | 189.0 | 149.0 | 100 | 100 |
| 2 | PM _{2.5} , µg/m ³ | 91.0 | 84.0 | 60 | 50 |
| 3 | SO ₂ , µg/m ³ | 8.7 | 8.3 | 80 | 50 |
| 4 | NO ₂ , µg/m ³ | 35.5 | 35.1 | 80 | - |
| 5 | CO, mg/m ³ | 0.469 | 0.446 | 2 | = |

(Contract package data, Date of monitoring 16th May 2019)

Table 8: Ambient Noise Monitoring

| SI No. | Location | Area Type | Leq dB (A) Day Time | Leq dB (A) Night Time |
|--------|--|-------------------------------|---------------------|-----------------------|
| 1 | WTP Location Tank no. 1 | Industrial | 66.5 | 58.5 |
| 2 | Booster pumping station Rajarhat | Industrial | 65.1 | 56.0 |
| | National Ambient Noise Standard | Industrial | 75.0 | 70.0 |
| | World Bank Ambient Noise Standard | Industrial, Commercial | 70 | 70 |

(Contract package data, Date of monitoring 16th May 2019)

49. Analysis of Environmental monitoring results

- (i) PM₁₀ and PM_{2.5} results are found to be exceeding the limits prescribed in National Ambient Air Quality Standard and WHO. However, CO, SO₂ and NO₂ concentration levels –typically emitted due to combustion of fossil fuels – were all found within the prescribed limits for the package. Therefore, it can be inferred that the increased levels of PM₁₀ and PM_{2.5} are due to high background concentration.
- (ii) At both the locations noise level is within the standard for day and night.

C. Ecological Resources

50. South and North 24 Parganas districts are the home of Sundarbans Biosphere Reserve, a unique ecosystem, and a World Heritage Site. This area is part of delta of Ganges and Brahmaputra river system. It is spread over 9,630 km² in 6 Community Development blocks of North 24 Parganas (Hingalganj, Hasnabad, Haroa, Seneschal - I, IlandMinakhan) and 13 Community Development blocks in in South 24 Parganas district (Sagar, Namkhana, Kakdwip, Patharpratima, Kultali, Mathurapur-I, II, Jaynagar-I, II, Canning-I, II, Basanti, and Gosaba). The extent of mangrove Reserve Forests is around 4260 km², out of which 55% is under land vegetation cover and balance 45% is under water body/ inter-tidal

zone. Nearly 40% of this reserve forest area is notified as protected areas: Sundarban National Park (1330 km²), Sajnekhali Wildlife Sanctuary (362 km²), Lothian Wildlife Sanctuary (38 km²) and Haliday Wildlife Sanctuary (6 km²). Sundarban Tiger Reserve, covers an area of 2585 km², which include Sundarban National Park as its core area, and the balance is the surrounding reserved forest area which forms its buffer zone.

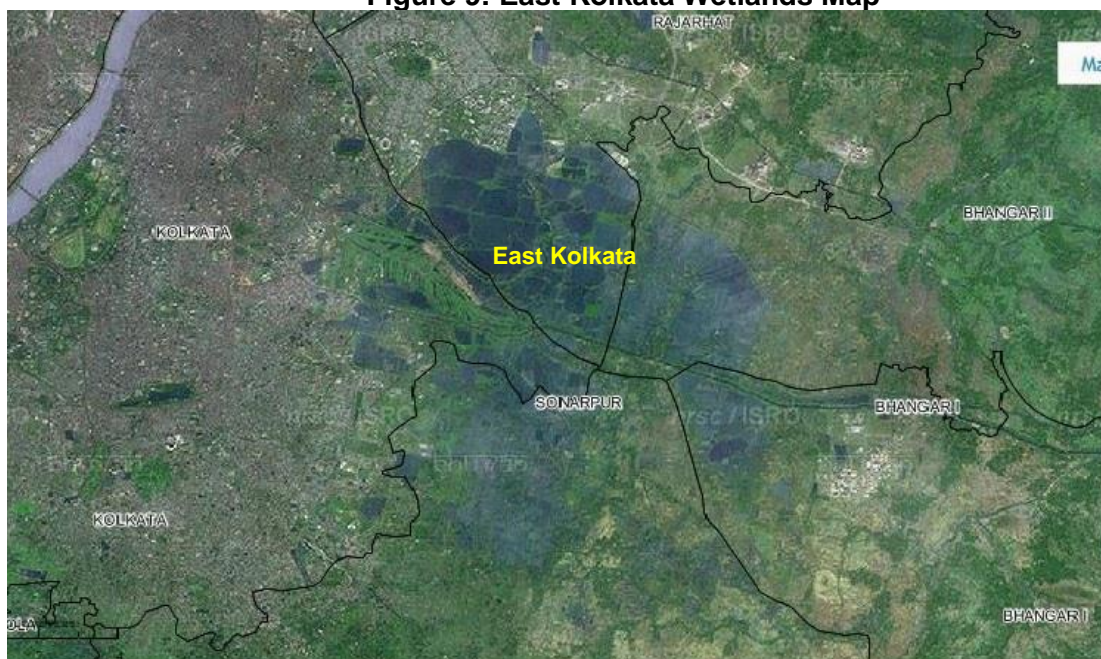
51. **Sundarban Biosphere Reserve** consists of following zones: Core Zone (protected site for conserving biological diversity and undertaking non-destructive research and other low-impact uses like education etc.); Buffer Zone (surrounding or adjoining the Core Zone, and is used for activities compatible with sound ecological practices); and Transition Area (contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, NGOs and other stakeholders work together to manage and develop the Area's resources). Biosphere reserves are managed under the existing forest, wildlife and environmental related laws as applicable, and there are no other specific regulations. Except Sundarbans in the southern extreme, there are no forest areas or protected areas in the project area, and consists of agricultural, habitation areas and water bodies etc., Based on preliminary designs, no work is conducted in the Sundarban areas, except for small civil works in one block of 24 South Parganas when the site for GLSR and small pipes are in the outer periphery of the transition zone. The project preparatory team has noted that this site and alignment are developed areas and construction allowed. No work is allowed beyond this location. The project will not consider any components in the core area. Chintamani Kar Bird Sanctuary is in the southwest of the project area at about 20-30 km from the project area. NOC from Sundarban Biosphere reserve has been obtained and attached in **Appendix 10**.

52. Floral species present in the project blocks are indigenous in nature. Commonly seen plant species are Tamarind (*Tamarindus indica*), Neem (*Azadirachta indica*), Gulmohur (*Delonix regia*), Jhau (*Casuarina equisetifolia*), Sisso (*Dalbergia sisso*), Babul (*Acacia nilotica*), Peepal (*Ficus religiosa*), etc. Domestic animals are commonly observed in the project blocks.

53. All the proposed project sites are vacant and there is no notable tree cover, except in Bhangar GLSR site, which is currently covered with mango orchard. Some trees required to be cut for the project.

54. **East Kolkata Wetlands (EKW)**. A Ramsar designated wetland of international importance, located in the eastern outskirts of Kolkata city covering a total area of 12.5 km² (12,500 ha). It comprises large number of water bodies, sewage fed fish forms, agricultural lands and also some built up areas. Administratively, these wetlands are located in Kolkata municipal area and in the districts of north and south 24 Parganas. These water bodies include man-made and as well as natural ponds. Of the total area of 12,500 ha, slightly less than half (~47%) is covered with water bodies, nearly 43% is fish/agriculture farming area, and the remaining 10% consists of built-up area (both rural and urban). These wetlands are unique and used to treat sewage generated here through pisciculture. There are various deep canals, which flow with very low velocity that bring sewage from the city, and circulate in the wetlands. These canals act as facultative lagoons, and while fish ponds act as maturation ponds for completing the sewage treatment. Solid waste also dumped here. So, these wetlands provide natural treatment for both sewage and solid waste, while providing benefits to the local people via fish farming. Outflow from fishponds flows naturally into streams, for further disposal into sea via natural drainage channels/rivers.

Figure 9: East Kolkata Wetlands Map



55. Besides providing the benefits of waste treatment and fish farming, wetlands has very rich biodiversity and is a waterfowl habitat. It is also known migratory birds. There are about 100 plant species recorded in and around the EKW. Several kinds of water hyacinths grow here, which also control land erosion. Area is known for paddy, coconut, vegetable cultivation. Fish species farmed in these sewages fed ponds include silver carp and tilapia. There are about 20 type of mammals and several reptiles in this area, which include: marsh mongoose, small Indian mongoose, Palm Civet, Small Indian Civet, Checkered keel back, smooth water snake, Buff striped keel back, and Bronze back tree snake.

56. However due to its location just outside Kolkata city and the neighboring rapidly developing New Town area of Rajarhat, has put tremendous pressure on the existence and functioning of this wetland ecosystem. Government has set up an EKW Management Authority to regulate the activities in and around the EKW. This wetland is located close to project area (Rajarhat CD block), however, no component of this subproject is located within this wetland area.

D. Economic Development

1. Land Use

57. Following table shows the land use/utilization pattern as per Census 2011. In North 24 Parganas district, 57.70 percent land of the total reporting area is under cultivation, and 32.3 percent land is used for nonagricultural purpose (this includes all lands occupied by buildings, roads and railways, water bodies and the lands put to uses other than agriculture). In South 24 Parganas district, nearly 45% of the total reporting area is under forest, 38% land is under cultivation and 15% land is under non-agricultural use. However, in Project block of Bhangar II, Haroa and Rajarhat in the district, there is no forest area.

Table 9: Land Use in Project Area

| Land Use Classification | N24PGS District | Rajarhat Block | Haroa Block | S24PGS District | Bhangar II Block |
|--|-------------------------|----------------|---------------|-----------------|------------------|
| | <i>Area in hectares</i> | | | | |
| Forests | 93.7 | 2.1 | 1.1 | 426,360 | - |
| Area under non-agricultural uses | 124,780 | 1,133.9 | 2,366.4 | 143,320 | 6,002.6 |
| Barren and uncultivable land | - | - | - | 70 | - |
| Permanent pastures and other grazing lands | - | - | - | 20 | - |
| Land under miscellaneous tree crops | 4,810 | - | - | 2,560 | - |
| Culturable waste land | - | 104.5 | 4,332.1 | 1,340 | 43.7 |
| Fallow | 33,910 | - | - | 16,700 | - |
| Net area sown | 223,020 | 3,642.0 | 3,905.3 | 358,400 | 7,935.6 |
| <i>Total reported area (total district area excluding the area under census towns and urban areas)</i> | <i>386,614</i> | <i>4,883</i> | <i>4,911</i> | <i>948,770</i> | <i>13,177.7</i> |
| Total Geographical area | 409,400 | 7,290 | 15,273 | 996,000 | 16,204 |

Source: Census 2011.

2. Industry and Agriculture

58. Owing to its location close to Capital City Kolkata, and good connectivity, abundance of water infrastructure availability etc., North 24 Parganas is among the top most districts in industrial development in the state of West Bengal. Due to favorable features, the district has been in the forefront of development even during the British era. District is home several industries related to cotton handloom, leather tanning, manufacturing of cutlery, brass and bell-metal industries, pottery, embroidery and lace works (chikan) etc., for many years. Textile and jute industries are very prominent in the district; major jute mills in India are located here, and district exports significant value of handlooms. There are a number of power looms manufacturing textiles. There are several large-scale industries. There are 6876 registered industrial units and 7 industrial areas in the district.

59. District has also become the Information Technology hub of West Bengal, and is home for several well-known and large Information technology multinational companies. Most of these industries are located in New Town area of Rajarhat Block (eastern and south-eastern part of the block). However, there are notable industries in Haroa block. Industrial activities are limited to brick kilns, small engineering and manufacturing units and household industries.

60. Located in highly fertile Gangetic delta, soils in the district are very fertile and rich with nutrients. With abundance of water from numbers rivers, creeks, ponds, etc., lands in the district are extensively cultivated. Major crops grown are rice, oil seeds, potato and cash crops like jute, sugarcane, tobacco etc. Because of abundant rivers, creeks, khals etc., fishery is an important economic activity in the district, and provided fish for the domestic market and it is also exported to other states.

61. **South 24 Parganas.** Owing to various natural and man-made factors, industrial development in the district is very limited. Due to presence of large tracts of forest lands, numerous rivers, streams, creeks etc., much of the areas is not accessible to industrial development. Small scale household and cottage industries such as jute, handlooms, manufacturing cutlery, pottery, agriculturally based industries, are in the district. There are a small number of large-scale industrial units (dealing in food, chemical, engineering and ship

building) in the district. Located in the vast delta with number rivers, streams, creeks etc., land suitable for agriculture is also limited. District comprises area with non-saline soils and with saline (coastal) soils of tidal origin. Non-saline soils are very fertile and rich with nutrient, and are very good for agriculture with abundance of water availability, while the coastal soils are not suitable for agriculture. As per the land use statistics, 38% of the area is under cultivation. Paddy is the main crop, and other include pulses, potato and cash crop Jute. Fishery is an important economic activity in the district. Due to presence of both fresh water and saline water bodies, fresh water and well as saline water fishing is practiced in the district, and a significant number of families depend on this activity for their livelihood.

3. Infrastructure

62. **Water Supply.** The North 24 Parganas District has a predominantly urban profile with almost 50% of the people living in the 27 municipalities. Urban local bodies provide water supply in urban areas while Public Health Engineering Department (PHED) is responsible for rural water supply covering the blocks and the census towns within the blocks. At present 61% of population (mainly rural) under the PHED jurisdiction is provided with piped water supply schemes, and rest depend on tube wells, dug wells etc. Groundwater in the district is not suitable for drinking due to high arsenic content, however, only 5% of habitations are provided with water supply schemes based on surface water sources. Rest all are depending on groundwater which is potentially unsafe. There are 181 commissioned Piped Water Supply Schemes (PWSS) in the district, and additional 32 schemes are under implementation. Out of the 181 commissioned schemes, 170 are based on ground water and 11 are based on surface water. Phasing out of groundwater-based schemes as per the recommendation of the Arsenic Master Plan is in progress. Groundwater is the only source for the PWSS in nine blocks, viz. Baduria, Bagda, Barasat - II, Bongaon, Haroa, Rajarhat, Sandeshkhali - I, Sandeshkhali - II, Swarupnagar. The typical groundwater-based scheme comprises a borewell and pumping arrangement, supplying water to the households after disinfection through chlorination. Where surface water sources are too far distant, Arsenic Master Plan recommended setting up on Arsenic/Iron Removal Plants (ARPs) and accordingly a number of existing schemes have been retrofitted with ARP and new schemes have been proposed with ARP. In North 24 Parganas, a total of 33 groundwater based PWSS has been considered for provision of ARPs. At present there is only one major surface water based PWSS in the district. This scheme covers four blocks of Amdanga (Part), Deganga, Barasat – I, Barrackpore – II, and a small portion of Basirhat I.

63. **Sewerage and Drainage.** There is no sewage collection system in the project area. Households mainly depend on individual sanitation systems like pit latrines, flush latrines, some connected to septic reservoirs. Due to flat topography, low laying lands, high rainfall and several water bodies around, project area is prone flooding. Cyclones are also common; 2009 cyclone and subsequent torrential rains badly affected 20 of 22 blocks in the district. Large tracts of lands were inundated. Storm water drainage system mainly consists of natural stream and major canals. Open drains along the roads are provided in some places. Kestopur Khal is a major canal passing through the project, and carries sewage from Kolkata city and other areas during its course. This is highly polluted, and solid waste dumping in the canal is prevalent.

64. **Solid Waste Management.** There is no proper solid waste management system in the project area. Respective village panchayats are responsible for SWM services within their areas. Villages lack solid waste collection and disposal systems. Due to this, disposal of solid waste in water bodies, canals and ponds etc., is very common, and is creating unhygienic

conditions.

65. **Transport.** Transport infrastructure in the district is well developed with national highways (NH 34 and NH 35) and state highways (SH 1, SH 2 and SH 3) passing through the project area. Area is well connected with district roads and village roads. District is also well connected by railways. Internal roads in villages are mostly narrow. Due to high population density, traffic on the roads is considerable. Most of the roads are maintained by Public Works Department, except the roads in municipalities, which are maintained by the respective urban local bodies. Road the condition is generally poor, with many roads in need of repairs and resurfacing.

E. Socio Cultural Resources

1. Demography

66. Total population of the project area, comprising 3 community development blocks in the districts of north and south 24 Parganas, is 651,002 (2011 census). Population density is high in the project area, much higher than the state average. As this is one of the fastest developing areas close to Kolkata, the population growth is also higher than the state average. Sex ratio is much lower than the state and district averages. Literacy rate is comparatively higher in north 24 Parganas blocks. Population of schedule castes is higher in the project districts. There is no urban population in Haroa block, while Rajarhat block is highly urbanized (53%). Work participation rate is 33-34%. Agriculture is predominant economic activity in Haroa and Bhangar II blocks, with large number of households engaged in agricultural activities, while in Rajarhat service sector is the major employment generating sector indicating its most urbanized profile. Main language spoken in the project area is Bengali.

Table 10: Demographic Characteristics

| Demographic Parameters | West Bengal State | North 24 Parganas | Rajarhat Block | Haroa Block | South 24 Parganas | Bhangar II Block |
|--|-------------------|-------------------|----------------|-------------|-------------------|------------------|
| Population (2011) | 91,276,115 | 10,009,781 | 189,893 | 214,401 | 8,161,961 | 246,708 |
| Geographical area (km ²) | 88,752 | 4,094 | 72.9 | 152.77 | 9960 | 162.04 |
| Total households | 20,380,315 | 2,348,683 | 42910 | 46,888 | 1,775,756 | 50,209 |
| Decadal Growth rate (2001- 11) | 13.84% | 12.18% | 30.64% | 17.48% | 18.87% | 18.87% |
| Sex ratio | 950 | 955 | 945 | 930 | 956 | 940 |
| Population Density, (per km ²) | 1028 | 2,445 | 2,605 | 1,403 | 819 | 1,523 |
| Household size | 4.5 | 4.3 | 4.4 | 4.6 | 4.6 | 4.9 |
| literacy rate | 76.26% | 84.06% | 83.13% | 73.13% | 77.51% | 74.45% |
| literacy rate (male) | 81.69% | 87.61% | 87.25% | 78.13% | 83.35% | 78.01% |
| literacy rate (female) | 70.54% | 80.34% | 78.78% | 67.75% | 71.40% | 70.64% |
| % of urban population | 31.87% | 57.27% | 52.8% | 0.0% | 25.58% | 0.00% |
| SC Population | 23.5% | 21.67% | 35.05% | 23.62% | 30.19% | 19.82% |
| ST Population | 5.8% | 2.64% | 0.62% | 5.94% | 1.19% | 0.77% |
| Total workers | 38.08% | 35.68% | 33.49% | 34.17% | 36.32% | 34.27% |
| Male workers | 57.07% | 57.53% | 56.26% | 29.35% | 56.46% | 29.07% |
| Female workers | 18.08% | 12.81% | 9.41% | 4.82% | 15.24% | 5.21% |
| Main workers | 28.14% | 30.53% | 30.45% | 26.98% | 24.55% | 27.30% |
| Marginal workers | 9.94% | 5.15% | 9.08% | 21.02% | 11.77% | 18.21% |
| Cultivators | 14.72% | 8.07% | 4.84% | 17.94% | 11.99% | 26.44% |
| Agricultural Laborers | 29.32% | 16.77% | 4.28% | 33.71% | 27.21% | 24.53% |
| HH industry workers | 7.09% | 4.36% | 2.86% | 3.38% | 8.13% | 6.20% |

| Demographic Parameters | West Bengal State | North 24 Parganas | Rajarh at Block | Haroa Block | South 24 Parganas | Bhangar II Block |
|------------------------|-------------------|-------------------|-----------------|-------------|-------------------|------------------|
| Other workers | 48.87% | 70.80% | 88.03% | 44.97% | 52.68% | 42.83% |

(Census data 2011)

2. History, Culture and Tourism

67. Prior to their bifurcation in 1986 as separate districts, both south and north 24 Parganas districts were part of 24 Parganas district. Located in the revered Gangetic belt, as per the legends, reference to this landmass is found in the great epic Mahabharata. References to this place is also found in the writings of Greek navigators, geographers, chroniclers and historians. Ruler of the Sundarbans between 1561 to 1611 A.D is said to be a Hindu Chieftain, named Pratapaditya, and enjoyed independence in the south and south-east of the Gangetic delta. During the middle half of the 16th century A.D., the region was invaded by the Portuguese pirates. In the early 17th century, Maharaja Pratapaditya fought and resisted the Portuguese. Maharaja Pratapaditya was a Bhuian (feudal lord of Bengal who declared their sovereignty from the Mughal Empire along with another 11 Bhuians together referred as the BaroBhuians means twelve chieftains) of Jessor, Khulna, Barisal and Greater Twenty-Four Parganas. Maharaja Pratapaditya was defeated and captured in the battles of Salka and Magrahat by the Mughals. Independent Nawab of Bengal Siraj-ud-Dullah faced defeat in the battle of Plassey (1757). Subsequently, the area came under British rule, under which entire Sunderbans were under 24 Parganas.

68. The district name Twenty-Four (24) Parganas is derived from the number of Parganas comprised in the Zamindari (Land Lordship) of Calcutta, which was ceded to East India Company in 1757 by the then Nawab of Bengal Mir Jafar. In the year 1824, the district got focus when the sepoys (soldiers) deployed at Barrackpur declared that they will not take part in the Burma war as crossing the sea was forbidden as per Hindu belief. The European troop opened fire; many of them were killed. In the year 1857, the second mutiny by the sepoys broke out at the then headquarters of the Presidency Division of Bengal, Barrackpore. This mutiny is often referred as the First War of Independence. The rebellion was ignited with Mangal Pandey, a Sepoy of the 34th Regiment, stationed at Barrackpore in March, 1857. After the mutiny, India came under the direct rule of the British Emperor from the East India Company. In 1905, some portions of the district were attached neighboring districts, which are now part of Bangladesh. In 1986, the district is divided into two districts – north and south. Satellite township of Kolkata (Salt Lake City) is included in North 24 Parganas district.

69. West Bengal has rich and unique culture and tradition. Many pujas and festivals are celebrated here with gaiety and grandeur. People from all faiths participate in these celebrations. Durga Puja, dedicated to the Goddess Durga is the most prominent and main festivals of the state. This symbolizes the triumph of Goddess Durga over the devil Mahishasura. There are several places of religious importance in the project districts. The most popular tourist attraction in north 24 parganas include Dakshineswar temple, Adyapeath Temple, Mangal Pandey Park, BibhutiBhusan Wild Life Sanctuary, Chandraketugarh, Baraha Mihirer Dhipi, etc. The most popular tourist attractions in South 24 Parganas includes Temple of Sagardiwp, Sunderban National Park, Bakkhali and Frasergunj beach, Diamond Harbour, Maheshtala, etc.



70. There are few protected monuments/archeological places of national importance in north 24 Parganas district. These are: Chandraketu's Fort at Berachampa; Ancient mound known as BarahMihirer Dhipi at Deuliaand Kaukipara; Clive's House Dum Dum known as





Barakothi, Dum Dum; 26 Siva Temples at Barrakpore – Khardah, Warren Hasting's House in Barasat. JhaterDeul Temple in Jhata is the only protected monument in south 24 Parganas district. None of these monuments are however located in the project area.

F. Subproject Site Environmental Features

71. Features of the selected subproject sites are presented in the following table.

Table 11: Site Environmental Features

| Infrastructure | Location and Environmental Features | Site Photograph |
|------------------------------------|---|--|
| Water Treatment Plant (WTP) | <p>New WTP will be constructed within the existing WTP compound in New Town area of Rajarhat in the eastern outskirts of Kolkata.</p> <p>This large land parcel part of New Town developed by New Town Development Authority is earmarked for water supply facility. Currently a WTP of 20 MGD is in operation, and another 20 MGD plant is under construction. The facility also includes 5 large raw water storage ponds. There is adequate vacant space for construction of proposed plants. There is no notable tree cover at the site. However, part of the vacant land is covered with landscaped garden/lawns, part of which will be removed for construction of new plant.</p> <p>Land belongs to WBHIDCO.</p> <p>Land already under procession of PHED. Permissive Possession letter attached as Appendix 11</p> <p>Site is surrounded by well developed areas; WTP facility is well confined by a boundary wall. New WTP located inside the boundary, as far as possible away from the surrounding houses. Also, CTE has been obtained from West Bengal Pollution Control Board and administrative building is under construction.</p> |  |
| | |  |

| Infrastructure | Location and Environmental Features | Site Photograph |
|--|--|---|
| Clear water pumping main | <p>Pipeline will be laid along the roads. Pipeline will be buried along the roads connecting WTP and the booster pumping station site, both of which are located in New Town area. For most of the stretch there is adequate land in the road shoulder beside the tarmac, and pipeline will be buried under this. Alignment crosses some busy roads / highways, at these sections, trenchless technology will be adopted to cross the roads. This project area is located in the newly developing new town area; developments are still not dense.</p> |  |
| Booster pumping station + clear water reservoir | <p>Clear water reservoir and booster pumping station will be constructed within an existing booster pumping station compound in New Town area in Rajarhat. Site is situated in an area which is witnessing large scale development all around the site. Immediate surroundings of the site are currently vacant, there is no much activity. Khestopur Khal (canal or drain), which mostly carries wastewater from the city flows near the site. There are no notable sensitive environmental features in and around the site.</p> <p>Land belongs to WBHIDCO. Transfer of land under process</p> |  |
| GLSR at Bhangar II | <p>Bhangar II GLSR site is located adjacent to KhestopurKhal (canal or drain) near Saduli in Bhangar. This is a privately agricultural land, and currently occupied by a mango orchard. Purchase of land under process</p> |  |
| GLSR at Haroa | <p>Haroa GLSR is located near the bank of Vidyadhari River in Haroa. This is a privately-owned vacant land. Purchase of land under process</p> |  |

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

72. Potential environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize/mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

73. Screening of potential environmental impacts are categorized into four categories considering subproject phases: location impacts and design impacts (pre-construction phase), construction phase impacts and operations and maintenance phase impacts.

- (i) **Location Impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.
- (ii) **Design Impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.
- (iii) **Construction Impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.
- (iv) **O&M Impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

74. Screening of environmental impacts has been based on the impact magnitude (negligible/moderate/severe – in the order of increasing degree) and impact duration (temporary/permanent).

75. This section of the IEE reviews possible project-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks should be analyzed during pre-construction, construction, and operational stages in the context of the project's area of influence.

76. The ADB rapid environmental assessment (REA) checklist in http://www.adb.org/documents/guidelines/environmental_assessment/eaguidelines002.asp has been used to screen the project for environmental impacts and to determine the scope of the IEE.

77. In the case of this project (i) most of the individual elements involve straightforward construction and operation, so impacts are mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and some works are located in the reservoir and (iii) being mostly located in an urban area, will not cause direct impact on biodiversity values. The project has been in properties held by the local government and access to the project location is through public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

A. Pre-Construction Impacts – Design and Location

78. **Design of the Proposed Components.** Technical design of the (i) intake facilities at ponds; (ii) water treatment plant; (iii) clear water mains, (iv) storage reservoirs and other items like flow meters, follows the relevant national planning and design guidelines, focusing on providing a robust system which is easy to operate, sustainable, efficient and economically viable. Following environmental considerations are included in the project:

- (i) Discontinuation of current unsafe and unsustainable groundwater sources and creating a new comprehensive surface water (river) based water supply system
- (ii) Recovering wash water from treatment process to optimize the water use;
- (iii) Treatment and reuse of sludge from treatment process;
- (iv) Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage;
- (v) Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies;
- (vi) Preparation and implementation of a water quality surveillance program including development of a laboratory as part of the project by DBO contractor to ensure that supplied water meets the drinking water standards;
- (vii) Development of laboratory with all necessary EHS measures and adopting international standard procedures for water quality testing;
- (viii) Using low-noise and energy efficient pumping systems;
- (ix) Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas;
- (x) Provision of appropriate personal protection equipment to the workers and staff.

79. **Water Source Sustainability.** Proposed project does not include development of any new water source as it utilizes an existing source and intake facilities within the available design capacity. The source of water supply is River Hooghly, which is principle source of water supply for the City of Kolkata and many other areas.

80. New Town area, which is part of Rajarhat block is developed by Housing Infrastructure Development Corporation (HIDCO) of Government of West Bengal, is a IT (Information Technology) hub in Kolkata, and houses several large and reputed multinational IT companies. This is a well-developed town with commercial, industrial and residential areas. HIDCO, jointly with the Public Health Engineering Department (PHED) has developed a project for supply of water in New Town, Rajarhat and surrounding areas with a total design capacity of 100 million gallons per day (100 Mgd or 454 MLD), with Hooghly as source of water. This project is being implemented in a phased manner, and at present components of (i) intake and raw water pumping station facility on River Hooghly at Debendrabala Ghat in North Kolkata, and (ii) raw water pumping main to carry 100 MGD from the intake to WTP and (iii) Water treatment plant of 20 Mgd (91 MLD) capacity, have been completed and put into operation. Another WTP of 20 MGD capacity is under construction. Due to lack of treatment capacity and also the downstream storage and distribution infrastructure, at present, the intake and raw water system is operated only partially.

81. Under present funding it is proposed to supply water from this New Town WTP in the neighboring blocks of Haroa and Bhangar II by enhancing the treatment capacity (by 22 MGD) and creating required clear water transmission and distribution infrastructure. Existing

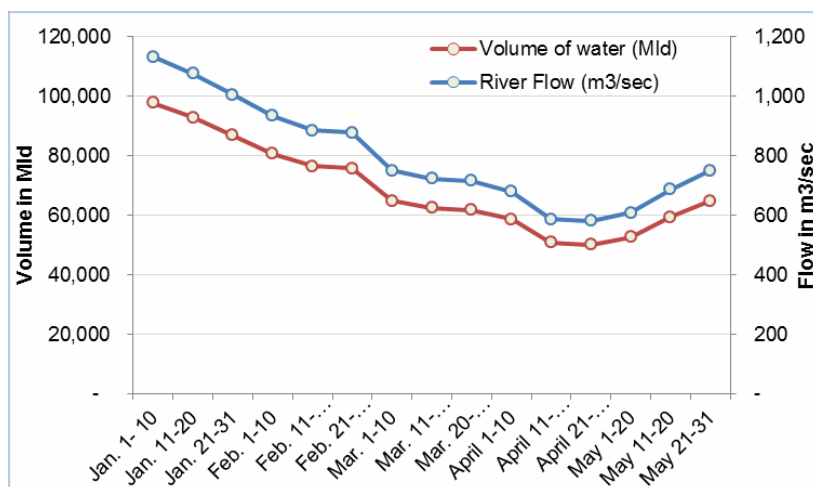
raw water abstraction system (including pumping and conveyance from source to WTP) has adequate capacity and therefore the ADB funded project does not include creation of any new or augmentation of source.

82. River Ganga is formed by two rivers at Devprayag in Uttarakhand State – Bhagirathi and Alakananda, originating from the glaciers of the Himalayas. From Uttarakhand, it flows down to Uttar Pradesh, where it is joined by its largest tributary River Yamuna at Allahabad, and then enters Bihar, where it is joined by another large River Kosi. The river finally enters West Bengal, and it bifurcates into two branches about 40 km downstream of Farakka Barrage. The left branch, called River Padma, flows eastwards and enters Bangladesh, and the right branch, called River Bagirathi / River Hooghly, flows southwards through West Bengal and ultimately discharges into Bay of Bengal near Kolkata. Of the total river length 2,575 km, the lowest portion of 570 km falls in West Bengal. River Hooghly is perennial in nature and owing to numerous large tributaries it carries huge quantities of water throughout the year.

83. The main source of surface water for this district is River Hooghly. The other rivers of the district, like Ichhamati and Kalindi, are either not perennial or carry insignificant water during the non-monsoon season. Most of the rivers in the southern fringe of the district, which is part of the Sunderban area, are saline in nature due to tidal effects. A study by the Hydraulic Department of Kolkata Port Trust indicates the lowest flow in Hooghly River as 1,135 m³/sec. The width of river varies, but near Kolkata it is roughly 1000 m wide. The Hooghly is under tidal influence for up to 300km. The overall spring tide range is 4.27 m to 4.57 m and range of the neap tides is 1.83 m to 2.83 m. Near Kolkata, the water level fluctuates 4.0m per day during the rainy season and 2.75 m twice in a day in the dry season. Highest HHWL and the LLWL are 5.34 m above msl and 0.95 m below msl, respectively.

84. As per the available data on lean season flow (of the year 1996), the lowest was 580 m³/sec (which in terms of volume of water translates to 50,112 MLD), while the total requirement of this WTP is 454 MLD. River also is the source of water for Kolkata and rest of North 24 Parganas and South 24 Parganas districts. The water available during the lean flow season is adequate to meet the demand of this entire area.

Figure 10: Hooghly River – Lean Season Flow, 1996



85. **Hooghly Water Quality and Suitability as Drinking Water Source.** Source raw water quality data collected from the WTP laboratory for a period of one year (February 2016 to January 2017, see **Table 12**) indicates that river water quality is suitable for drinking water supply after the conventional water treatment. This is further confirmed by a baseline sampling survey during the preparation of IEE. All the parameters of water quality in comparison with drinking water standards are well within the limits, except for turbidity and bacteriological contamination. Conventional water treatment and disinfection which is proposed in the project is adequate to make the water usable for drinking purposes. A regular water quality regime needs to be established for checking the raw water quality. The water supplied to the consumers at all times must meet the drinking water standards (**Appendix 9**).

86. **Heavy Metals in Water.** **Table 13** presents the concentration of heavy metals in the raw and treated water at the WTP. All the parameters tested in raw water are within the desirable limit except, copper, lead and manganese, which are above the desirable limit but well within the permissible concentration limit.

87. Thus, as presented above, in terms of water availability and quality of water, selected source, Hooghly River, is adequate and suitable to meet the project water demand, and there are unlikely to be any issues related source sustainability during the project life cycle.

Table 12: Hooghly River Water Quality (February 2016 to January 2017)

| Parameter | Feb-16 | Mar-16 | Apr-16 | May-16 | Jun-16 | Jul-16 | Aug-16 | Sep-16 | Oct-16 | Nov-16 | Dec-16 | Jan-17 |
|--------------------------------|--------|--------|---------|---------|--------|---------|--------|--------|--------|--------|--------|--------|
| pH | 7.21 | 7.23 | 7.56 | 7.58 | 7.83 | 7.23 | 7.36 | 7.74 | 7.69 | 7.87 | 7.8 | 7.68 |
| TDS, mg/l | 153.6 | 180.4 | 164.2 | | 178.7 | 154.7 | 132.9 | 130 | 122.1 | 145 | 154.8 | 174.1 |
| Turbidity, mg/l | 10.12 | 9.21 | 6.42 | 30.35 | 15.78 | 32.79 | 32.28 | 25.09 | 13.01 | 46.26 | 12.7 | 7.93 |
| Conductivity, mg/l | 306 | 360 | 424 | | 357 | 309 | 266 | 260 | 244 | 290 | 310 | 348 |
| Temperature, mg/l | 25.3 | 26.2 | 27.5 | | 28.1 | 27.7 | 27.9 | 28.3 | 28.6 | 25.1 | 25.1 | 21.7 |
| Total hardness, mg/l | 120 | 140 | 120 | 132 | 124 | 84 | 88 | 84 | 100 | 100 | 140 | 128 |
| Total alkalinity, mg/l | 100 | 120 | 120 | 180 | 140 | 80 | 80 | 88 | 104 | 104 | 144 | 136 |
| Iron, mg/l | 0.0058 | 0.0089 | 0.0097 | 0.131 | 0.0098 | 0.0062 | 0.015 | 0.0089 | 0.0095 | 0.0892 | 0.0124 | 0.0081 |
| Chloride, mg/l | | | | 159.04 | 19.9 | 19.95 | 17.15 | 19.95 | 19.95 | 159.04 | 14.2 | 11.36 |
| Fluoride, mg/l | | | 0.3145 | BDL | 0.1254 | 0.1956 | 0.5213 | 0.1258 | 0.1021 | BDL | 0.4471 | 0.0356 |
| Nitrate, mg/l | | | 10.2641 | 12.7856 | 3.6501 | 12.0021 | 28.89 | 32.65 | 15.64 | 16.27 | 10.21 | 10.41 |
| Arsenic, mg/l | | | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL | BDL |
| BOD, mg/l | - | - | - | 4 | - | - | - | - | - | 14 | - | - |
| COD, mg/l | - | - | - | 10 | - | - | - | - | - | 65.2 | - | - |
| Total coliform, colony/100 ml | TNC | TNC | TNC | TNC | TNC | TNC | 162 | TNC | - | TNC | TNC | 178 |
| Feacal coliform, colony/100 ml | 66 | 54 | 28 | 40 | 20 | 64 | 25 | 52 | - | 72 | 20 | 22 |

BDL = below detectable limit, TNC = Too numerous to be counted

Table 13: Heavy Metal Concentration in Raw and Treated Water at Water Treatment Plant

| Parameter | May-2016 | | Nov-2016 | | Drinking Water Standard |
|----------------------|----------|---------|----------|---------|-------------------------------|
| Heavy Metals | Raw | Treated | Raw | Treated | Desirable – Rejection limits* |
| Iron, mg/l | 0.131 | 0.131 | 0.0892 | 0.0461 | 0.3 – 1.0 |
| Arsenic, mg/l | BDL | BDL | BDL | BDL | 0.01 |
| Copper, mg/l | 0.1456 | 0.0222 | 0.1456 | 0.1146 | 0.05 – 1.5 |
| Lead, mg/l | 0.0443 | 0.0036 | 0.0443 | 0.0097 | 0.01 - 0.05 |
| Total Chromium, mg/l | 0.0141 | 0.0036 | 0.0141 | 0.0139 | 0.05 |
| Cadmium, mg/l | 0.0046 | 0.0014 | 0.0046 | 0.0019 | 0.01 |
| Manganese, mg/l | 0.1163 | 0.011 | 0.1163 | 0.1128 | 0.1 – 0.3 |

* standards prescribe lower and higher values for parameters, lower value is the 'desirable limit' while higher value is the 'permissible limit in the absence of alternate source'; there is only lower value for parameters which have no relaxation. Green shade indicates values below desirable limit, orange indicates above desirable but below permissible limit.

Source: PHED.

88. **Use of Chlorine as Disinfectant.** It is proposed to use chlorine at WTP to disinfect the water prior to supply to consumers. There is invariably a safety risk when considerable quantities of chlorine are handled at the WTP. (Chlorine cylinders will be brought by trucks to the site, installed and operated to disinfect the water supplies). Since facilities are located in the urban area, precautions will thus be needed to ensure the safety of both workers and citizens.

89. The average dose of chlorine for pre-chlorination will be about 4mg/l and that for post-chlorination will be about 2 mg/l. With the design capacity of WTP 50 MGD, nearly 1400 kg of chlorine will be consumed daily. Chlorine cylinders (called tonners of capacity 900 kg) will be procured from nearest manufacturing unit and stored at the site. Tonners sufficient for a month will be stored in the storage; i.e. 45-50 cylinders will be stored at the WTP.

90. To avoid any risk to workers and public, the chlorination facility at the WTP should be designed developed with all appropriate safety features and equipment to meet with any accidental eventuality, which may include:

- (i) Chlorine neutralization pit with a lime slurry feeder;
- (ii) Chlorine absorption and neutralization facility;
- (iii) Proper ventilation, lighting, entry and exit facilities;
- (iv) Visible and audible alarm facilities to alert chlorine gas leak;
- (v) Facility for isolation in the event of major chlorine leakage;
- (vi) Eye wash and shower facility;
- (vii) Personal protection and safety equipment for the operators in the chlorine plant (masks, oxygen cylinders, gloves, etc.);
- (viii) Provide training to the staff in safe handling and application of chlorine; this shall be included in the contract of Chlorinator supplier;
- (ix) Supplier of Chlorinator equipment shall provide standard operating manual for safe operation and as well as maintenance and repairs; preferably these shall be provided both in English and Bengali Languages.

91. **Energy Efficiency.** Owing to almost flat topography of the project area, the water supply system requires pumping (using the electrical energy) to transport and supply water at requisite terminal pressure to the consumers. The raw water from the ponds in the WTP campus will be pumped to WTP inlet; within WTP it is mostly gravity flow, but requires energy to operate all the units. From clear water reservoir at the WTP, water will be pumped to the clear water reservoir at the booster pumping station, and from this, water will be further pumped to 2 GLSRs in 2 blocks of Haroa and Bhangar II. From GLSRs, water will be further pumped to Overhead Service Reservoirs (OHSRs) located in each block. From OHSRs, water will be supplied by gravity to the consumers.

92. To optimize the power consumption, the hydraulic design shall follow optimal approach, and the following shall also consider in design and selection of pumping systems. According to Manual for the Development of Municipal Energy Efficiency Projects in India (jointly developed by Bureau of Energy Efficiency and International Finance Corporation in 2008), energy savings, at minimum, of 25% to 40% is possible with appropriate measures. The following measures shall be considered and incorporated into the subproject designs:

- (i) Installation of Energy Efficient Motors;
- (ii) Efficient Pumping system operation;
- (iii) Installation of Variable Frequency Drives.

93. Waste Water and Sludge from Water Treatment Plant - Treatment and Disposal.

Water treatment process will generate sludge from sedimentation of particulate matter in raw water, flocculated and precipitated material resulting from chemical coagulation, residuals of excess chemical dosage, plankton etc., and waste from rinsing and back washing of filter media containing debris, chemical precipitates, straining of organic debris and plankton. Following are included in the subproject design to dispose the sludge and back wash:

- (i) Provision of recirculation system for backwash water – backwash water from filter beds will be re circulated to WTP inlet and mixed with raw water; the retention is 2 to 3 hours and 95% of the suspended solid gets removed in this process; this arrangement will minimize wastage of water, which otherwise would have disposed to open drains, and also avoids the pollution of receiving water body
- (ii) Provision of sludge drying - accumulated sludge from clariflocculator will be flushed to sludge drying beds, for natural drying.
- (iii) Dried sludge will be used as soil conditioner. Periodic testing of dried sludge will be conducted to ensure that it does not contain heavy metals that make it unsuitable for food crops. Tests will be conducted to confirm the concentrations below the following standards. Backwash water and clarifier sludge (if any) will be disposed in line with the guideline issued by West Bengal Pollution Control Board. Contractor in consultation with PHED will identify disposal site for excess dried sludge, if any. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Municipal Solid Waste Management and Handling Rules, 2000 have been adopted here. The MSWMH Rules stipulate that “In order to ensure safe application of compost, the following table of specifications for compost quality shall be met.

Table 14: Specifications for Compost Quality

| Parameters | Concentration not to exceed ^a (mg/kg dry basis, except pH value and C/N ratio) |
|------------|--|
| Arsenic | 10.00 |
| Cadmium | 5.00 |
| Chromium | 50.00 |
| Copper | 300.00 |
| Lead | 100.00 |
| Mercury | 0.15 |
| Nickel | 50.00 |
| Zinc | 1000.00 |
| C/N ratio | 20-40 |
| pH | 5.5-8.5 |

^a Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.

94. Tree Cutting at Selected Project Sites. Proposed site for GLSR at Bhangar II is covered with trees. Bhangar II site is originally an orchard land covered with mango trees. Few trees need to be removed. Total number of trees to be felled will be confirmed during implementation phase based on the final design and layout. IEE will be updated further during implementation phase, with the actual data.

95. Following measures need to be implemented to compensate for the loss of tree cover:

- (i) Minimize removal of trees by adopting to site condition and with

- appropriate layout design of GLSRs;
- (ii) Obtain prior permission for tree cutting;
- (iii) Plant and maintain 5 trees for each tree that is removed.

96. **Disturbance to Natural Drainage.** Haroa GLSR site is located next to River Bidhyadhari. Proper study to locate and design the GLSR is required to avoid any future flooding issues: Following measures need to be implemented to mitigate impact if any

- (i) Construction GLSR at Haroa away from the flood plain of Bidhyadhari river;
- (ii) Integrate measures into GSLR design to avoid risk of flooding.

97. **Utilities.** Telephone lines, electric poles and wires, water lines within the proposed project locations may require to be shifted in few cases. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with the PHED will (i) identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and (ii) instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

98. **Site Selection of Construction Work Camps, Stockpile Areas, Storage Areas, and Disposal Areas.** Priority is to locate these near the project location. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered for setting up construction camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Areas near forests and water bodies are being avoided in the selection of disposal sites.

99. **Site Selection of Sources of Materials.** Significant quantities of coarse aggregate and fine aggregate will be required for construction works. Requirement of gravel is limited. Contractor has committed to procure these materials only from the quarries permitted/licensed by Mines and Geology Department. Contractor should, to the maximum extent possible, procure material from existing quarries, and creation of new quarry areas should be avoided as far as possible. If new quarries are required then the contractor is responsible for obtaining all permissions and clearances, including environmental clearance for mining. Contractor should factor in the time required for obtaining clearances including conduct of EIA if required under the law. It is the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Department of Mines and Geology and local revenue administration.

B. Construction Impacts

100. Main civil works in the subproject include construction of water treatment plant, water reservoirs / tanks (ground level), pumping stations, at the identified sites. Present construction works are confined to sites, and construction includes general activities like site clearance, excavation for foundations, and creation of concrete structures, etc. Many of the subproject components will be fixed to concrete plinths and most will be housed in buildings with at least some concrete structural elements. Most such structures will be constructed from reinforced concrete (RC), where steel reinforcing rods and bars are placed and attached by hand to create an interior skeleton for the foundations, walls, columns, plinths, etc., and heavy-duty metal and timber/plywood formwork is bolted around the outside to build a mould into which pre-mixed concrete is poured. Once the concrete has set, the formwork is

removed, and the concrete surface is finished by masons by hand if necessary. Some buildings, such as the pump station, facilities, etc., may be constructed from brick work, in which case this work will be done using standard house-building techniques.

101. Most of the technical components of the WTP (intake pump station, intake screens, pre- and post-treatment systems and reverse osmosis racks) comprise a variety of pre-fabricated elements, which are installed on site as ready-made individual units. These will be directly brought from the manufacturers place to the sites lifted into position by crane, affixed to plinths or other installation points, and connected up to pipework and the electricity supply.

102. Since these works are confined to the boundary of identified sites, there is no direct interference of construction work with the surrounding land use. However, construction dust, noise, use of local roads for transportation of construction material, waste, labour camps etc., will have negative impacts, which needs to be avoided or mitigated properly.

103. Subproject also included laying of pumping main pipeline from WTP to booster pumping station. This alignment is located within the New Town Area, and alignment crosses some important roads which carry significant traffic. Considering this, it is proposed to lay the pipeline partly by trenchless technology, especially at the junctions where the pipeline crosses busy roads. In the other sections, it will be laid by open cut method. Appropriate trenchless technology will be adopted by the contractor such as modern micro tunneling with boring pipe jacking technique. Although the main purpose of trenchless here is to lay the pipelines at the sections where it crosses main roads to avoid road closures and traffic disruptions, other important issues such as large scale public inconvenience, safety, and blocking access to properties, business and houses will also be considered while selecting the sections for trenchless approach.

104. Open cut trenching method of pipe laying involves excavation for laying pipes along the roads, placing pipes in the trench, jointing and testing, and refilling with the excavated soil. The trenches will be of 1.5 m – 2.0 m wide and 2 to 3 m depth. Earth work excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades at every 100 m., while pipe laying works will include laying pipes at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness. Sufficient care will be taken while laying so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. As trenches are 2-3 m deep, there is risk of collapse of trenches or damage to surrounding buildings. Necessary precautions such as bracing or shoring in the trench will be provided. Once they are laid, pipes will be joined as per specification and then tested for any cracks or leakages. The minimum working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. About 95% of the excavated soil will be used for refilling the trench after placing the pipe and therefore residual soil after pipe laying and refilling is not significant.

105. Although pipe laying work involves quite simple techniques of civil work, the invasive nature of excavation and pipeline alignment in the built-up areas of New Town where there are a variety of human activities, will result in impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration, however, needs to be mitigated.

106. Anticipated impacts during the construction phase are discussed below along with appropriate mitigation measures to avoid, minimize or mitigate those impacts to acceptable

levels.

107. **Sources of Materials.** Significant amount of sand and coarse aggregate will be required for this project, which will be sourced from quarries. Quarries inevitably cause extensive physical changes; as construction materials are excavated from the ground, leaving large cavities, or levelling hillsides, etc. The physical damage caused by quarries is controlled by allowing them to operate within specific limited areas only, so the damage is restricted in extent and not allowed to spread indiscriminately. New quarries are subject to a rigorous process of environmental assessment to ensure appropriate siting and adequate environmental controls on the operation. It will therefore be important to ensure that construction materials for this project are obtained from government approved licensed quarries only, to ensure these controls are in place. Contractor should avoid new borrow pits/quarries as far as possible, if necessary, all the permissions, including conduct of environmental assessment, and environmental clearance as necessary shall be obtained prior to start of quarrying activity. The contractor should also make a concerted effort to re-use as much excavated material from this project as possible. The construction contractor will be required to:

- (i) Obtain construction materials only from government approved quarries with prior approval of PIU;
- (ii) PIU to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval;
- (iii) Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit);
- (iv) Avoid creation of new borrow areas, quarries etc., for the project; if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance prior to approval by PIU.

108. **Air Quality.** Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic, have high potential to generate dust. Also, emissions from construction vehicles, equipment, and machinery used for excavation and construction induce impacts on the air quality. Anticipated impacts include dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation from construction work in individual and confined work sites like WTP, GLSRs, pumping station etc., are mainly during the initial construction phase of earth work, as the site is confined, dust can be effectively controlled with common measures. Dust generation will be significant during pipeline laying along the roads. Increase in dust/ particulate matter in ambient air is detrimental, and may have adverse impacts on people and environment. To mitigate the impacts, construction contractors are required to:

109. **For all construction works**

- (i) Comply with the air pollution/dust control measures for construction activities stipulated by the “Direction of West Bengal Department of Environment under the Air Act, 1981 Direction No. EN/3170/T-IV-7 /001/2009 dated: 10 December 2009” (**Appendix 6**);
- (ii) Provide a dust screen around the construction sites at GLSR and WTP work sites
- (iii) Damp down the soil and any stockpiled material on site by water sprinkling;

- (iv) Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks;
- (v) Clean wheels and undercarriage of haul trucks prior to leaving construction site/quarry;
- (vi) Control dust generation while unloading the loose material (particularly aggregate, soil) at the site by sprinkling water and unloading inside the barricaded area;
- (vii) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition
- (viii) Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks;
- (ix) Clean wheels and undercarriage of haul trucks prior to leaving construction site/quarry;
- (x) Control dust generation while unloading the loose material (particularly aggregate, soil) at the site by sprinkling water and unloading inside the barricaded area
- (xi) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition;
- (xii) Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization;
- (xiii) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process;
- (xiv) Cover the soil stocked at the sites with tarpaulins;
- (xv) Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation
- (xvi) Ensure that all the construction equipment and machineries are fitted with pollution control devices, which are operating correctly, and have a valid pollution under control (PUC) certificate.

110. For pipeline works

- (i) Barricade the construction area using hard barricades (of 2 m height) on both sides;
- (ii) Initiate site clearance and excavation work only after barricading of the site is done;
- (iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded area;
- (iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area;
- (v) Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded;
- (vi) Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done;
- (vii) Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for back filling, this will avoid stocking of material, and minimize the dust;
- (viii) Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind

will generate dust from backfilled section. Road restoration shall be undertaken immediately.

111. Surface Water Quality. Run-off from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate downstream surface water quality of the streams. Project area receives considerable rainfall, although mostly confined during the monsoon months. Haroa GLSR site is located just near the bank of River Bidyadhari and there are five raw water ponds in WTP compound. Kestopur Canal, which is mainly a wastewater channel, flows adjacent to Bhangar II GLSR site and Booster Pumping Station site in New Town Rajarhat. It is important that runoff from the construction areas, which may contain silt and chemical traces do not enter these water bodies. Impact will be temporary, and may not be significant, but needs to be mitigated. Construction contractor will be required to:

- ✓ All earthworks be conducted during the dry season to prevent the problem of soil run-off during monsoon season;
- ✓ Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- ✓ Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used;
- ✓ Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- ✓ Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- ✓ Store fuel, construction chemicals etc., on an impervious floor, also avoid spillage by careful handling
- ✓ Dispose any wastes generated by construction activities in designated sites; and
- ✓ Conduct surface quality inspection according to the environmental management plan (EMP).

112. Surface and Groundwater Quality. Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. In the project area, groundwater depth is shallow, there are numerous water bodies and ponds, and it also receives high rainfall during the monsoon. Conducting excavation works during non-monsoon season will certainly help, but due to high water table, water may collect in pits as they are excavated. The water collected in excavated pits will contain silt and disposal of this in drainage channels lead to silting. To avoid this the contractor needs to be implement the following measures:

- ✓ Create a temporary drainage channel around the work area to arrest the entry of runoff from upper areas into the work area
- ✓ Pump out the water collected in the pits / excavations to a temporary sedimentation pond; dispose of only clarified water into drainage channels/streams after sedimentation in the temporary ponds
- ✓ Consider safety aspects related to pit collapse due to accumulation of water

113. Generation of Construction Wastes. Solid wastes generated from the construction activities are excess excavated earth (spoils), discarded construction materials, cement bags, wood, steel, oils, fuels and other similar items. Domestic solid wastes may also be generated from the workers' camp. Improper waste management could cause odor and vermin problems, pollution and flow obstruction of nearby watercourses and could negatively impact the landscape. The following mitigation measures to minimize impacts from waste generation shall be implemented by the contractor:

- ✓ Prepare and implement a Construction Waste Management Plan;
- ✓ As far as possible utilize the debris and excess soil in construction purpose, for example for raising the ground level or construction of access roads etc.;
- ✓ Avoid stockpiling any excess spoils at the site for long time. Excess excavated soils should be disposed at approved designated areas immediately;
- ✓ If disposal is required, the site shall be selected preferably from barren, infertile lands; site should be located away from residential areas, forests, water bodies and any other sensitive land uses;
- ✓ Domestic solid wastes should be properly segregated in biodegradable and non- biodegradable for collection and disposal to designated solid waste disposal site; create a compost pit at workers' camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material shall be collected separately and sold in the local recycling material market;
- ✓ Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of in disposal sites approved by WBPCB;
- ✓ Prohibit burning of construction and/or domestic waste;
- ✓ Ensure that wastes are not haphazardly thrown in and around the project site, provide proper collection bins, and create awareness to use the dust bins;
- ✓ Conduct site clearance and restoration to original condition after the completion of construction work; PIU to ensure that site is properly restored prior to issuing of construction completion certificate.

114. **Noise and Vibration Levels.** While all GLSR sites (Haroa and Bhangar II) are located in rural areas, rest of the components (WTP, clear water reservoir cum booster pumping station, and pumping main from WTP to clear water reservoir) are located predominantly in a rapidly developing urban area (New town area of Kolkata). All these sites are located close to habitation areas, where there are houses, schools and hospitals, religious places and businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads for laying of pumping main, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby buildings. This impact is negative but short-term, and reversible by mitigation measures. The construction contractor will be required to:

- ✓ Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- ✓ Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimise sound impact to surrounding sensitive receptor; and
- ✓ Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s;
- ✓ Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- ✓ Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; and
- ✓ Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

115. **Accessibility.** Excavation along the roads for laying of transmission main pipeline,

hauling of construction materials and operation of equipment on-site can cause traffic problems. Roads connecting GLSR sites are narrow and carry considerable local traffic, mainly comprise bicycles, 2 wheelers, Mini trucks, auto rickshaws, buses etc., Vegetable cultivation is predominant in Bhangar, Haroa, and large number of vehicles carrying vegetable produce to market can be seen in the area. New Town area comprises mostly of wide roads with earthen shoulder, with main roads carrying heavy traffic almost throughout the day. Pumping main pipeline work will be conducted along roads from WTP to booster pumping station in New Town, which has potential to create accessibility to issues to surrounding houses and business, and may also affect the traffic movement. Works related to all the remaining components will be confined to the selected sites, therefore there is no direct interference of these works with the traffic and accessibility. Hauling of construction material, equipment, construction waste, etc., to and from the work site may increase the road traffic on local roads, which are not in good condition. This will further inconvenience the local community and road users. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

116. Hauling (material, waste/debris and equipment) activities

- ✓ Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- ✓ Schedule transport and hauling activities during non-peak hours;
- ✓ Locate entry and exit points in areas where there is low potential for traffic congestion;
- ✓ Drive vehicles in a considerate manner; and
- ✓ Notify affected public by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

117. Pipeline works

- ✓ Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the as and when required
- ✓ Leave spaces for access between mounds of soil to maintain access to the houses/ properties
- ✓ Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.
- ✓ Inform the affected local population 1-week in advance about the work schedule
- ✓ Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- ✓ Keep the site free from all unnecessary obstructions;
- ✓ Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours

118. Socio-Economic – Income. All the project components, except GLSR sites are Haroa and Bhangar II, located in government lands and there is no requirement for land acquisition or any resettlement. Haroa and Bhangar II GLSR sites, which are under private ownership, to be purchased at market price with the willingness of the land owners to sell their property for the project. Resettlement and social issues are being studied in a parallel resettlement planning study of this subproject. Blocking of access to the business / livelihood

activities, especially during pipeline laying along the roads, may impact the income of households. However, given the alignment of pipeline, trenchless technology for road crossing, and also the measures suggested for ensuring accessibility during pipeline works, no notable impact is envisaged. Impact will be assessed further after finalization of transmission main alignment.

119. **Socio-Economic – Employment.** Manpower will be required during the 36-months construction stage. This can result in generation of temporary employment and increase in local revenue. Thus, potential impact is positive and long-term. The construction contractor will be required to employ local labor force as far as possible.

120. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

- ✓ Comply with all national, state and local labour laws (see **Appendix 8**);
- ✓ Develop and implement site-specific occupational health and safety (OHS) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training² for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- ✓ Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- ✓ Provide medical insurance coverage for workers;
- ✓ Secure all installations from unauthorized intrusion and accident risks;
- ✓ Provide health and safety orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- ✓ Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensured also that visitor/s do not enter hazard areas unescorted;
- ✓ Ensured the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- ✓ Ensured moving equipment is outfitted with audible back-up alarms;
- ✓ Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate;
- ✓ Disallow worker exposure to noise level greater than 85 dBA for duration of

² Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

- ✓ Provide supplies of potable drinking water;
- ✓ Provide clean eating areas where workers are not exposed to hazardous or noxious substances

121. **Asbestos Materials.** Existing water distribution network is mostly asbestos cement pipes, and because of the health risks these will be left in situ and replaced by new pipes. Plan pipeline alignments carefully to avoid any conflict or damage. Till now, no asbestos pipeline has been found in this subproject. In case if any such pipes need to be excavated, the same will be stored and kept at a designated place and suitable mitigation measures for their disposal will be implemented.

122. **Community Health and Safety.** Pipeline works along the road, and hauling of equipment and vehicles have potential to create safety risks to the community. Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- ✓ Restrict construction vehicle movements to defined access roads and demarcated working areas (unless in the event of an emergency);
- ✓ Enforce strict speed limit (20-30 kmph) for playing on unpaved roads, construction tracks;
- ✓ Night-time driving will be by exception only, as approved by the PIU to minimise driving risk and disturbance to communities;
- ✓ Adopt standard and safe practices for micro tunneling;
- ✓ Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions;
- ✓ All drivers will undergo safety and training;
- ✓ Public access to all areas where construction works are on-going will be restricted through the use of barricading and security personnel;
- ✓ Warning signs, blinkers will be attached to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation;
- ✓ The period of time when the pipeline trench is left open will be minimized through careful planning;
- ✓ Control dust pollution – implement dust control measures as suggested under air quality section;
- ✓ Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure;
- ✓ Provide road signs and flag persons to warn of on-going trenching activities.

123. **Construction Camps.** Contractor has set up a construction camp within the WTP site – for temporary storage of construction material (pipes, cement, steel, fixtures, fuel, lubricants etc.), and stocking of surplus soil, and also include separate living areas for migrant workers. The contractor is however encouraged to engage local workers as much as possible. Operation of work camps cause temporary air, noise and water pollution, and may become a source of conflicts, and unhealthy environment if not operated properly. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor is required to:

- (i) As far as possible locate the camp site within the work sites (at WTP and

- GLSR sites); if any camp to be established outside these, then select a camp site away from residential areas (at least 50 m buffer shall be maintained)
- (ii) Avoid tree cutting for setting up camp facilities
 - (iii) Ensured that a proper compound wall is provided, and erect a wind/dust screen around
 - (iv) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas
 - (v) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit
 - (vi) Provide proper temporary accommodation with proper materials, adequate lighting and ventilation, appropriate facilities for winters and summers; ensure conditions of livability at work camps are maintained at the highest standards possible at all times;
 - (vii) Consult PIU before locating project offices, sheds, and construction plants;
 - (viii) Minimize removal of vegetation and disallow cutting of trees
 - (ix) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be allowed as accommodation for workers
 - (x) Camp shall be provided with proper drainage, there shall not be any water accumulation
 - (xi) Provide drinking water, water for other uses, and sanitation facilities for employees
 - (xii) Prohibit employees from cutting of trees for firewood; contractor should be provided proper facilities including cooking fuel (oil or gas; fire wood not allowed)
 - (xiii) Train employees in the storage and handling of materials which can potentially cause soil contamination
 - (xiv) Recover used oil and lubricants and reuse or remove from the site
 - (xv) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for biodegradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market
 - (xvi) Remove all wreckage, rubbish, or temporary structures which are no longer required
 - (xvii) At the completion of work, camp area shall be cleaned and restored to pre-project conditions, and submit report to PIU; PIU to review and approve camp clearance and closure of work site

C. Operation and Maintenance Impacts

124. Operation and Maintenance of the water supply system will be carried out by Public Health Engineering Department directly or through an external operator. Operation will involve treatment of water in the WTP, disinfection with chlorine, conveying clear water by pumping to clear water storage reservoir at the booster pumping station, and then further transmit water by pumping from booster pumping station to 2 GLSRs in 2 zones of Haroa and Bhangar II, for distribution in their respective zones via distribution system (comprising of overhead reservoirs and distribution pipes) that will be developed through another subproject under the

WBDWSIP.

125. During its operation phase, WTP will treat 22 million gallons (100 million liters) of water every day. The main impact of WTP operation is from (i) generation of wastewater and sludge, noise from operation of pumps and motors, (iii) chlorine gas leakage risk, and (iv) consumption of electricity. All of these are duly considered in the design of WTP, and various measures such as the following are already incorporated into the project design:

- (i) Recirculation and recovery of wastewater including backwash water generated from treatment process- backwash water from filter beds will be sent to a sump, and after allowing adequate time for settlement of solids, clarified water will be pumped back to WTP inlet. This arrangement will avoid pollution and also minimize wastage of water;
- (ii) Collection of accumulated sludge, thickening, drying and reuse;
- (iii) Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage;
- (iv) Using low-noise and energy efficient pumping systems;
- (v) Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas;
- (vi) Provision of appropriate personal protection equipment to the workers and staff
- (vii) Developing chlorine facility with all necessary safety measures.

126. Since backwash water is recovered and recirculated in the WTP, no wastewater will be generated from water treatment process. Water treatment process will generate sludge from sedimentation of particulate matter in raw water, flocculated and precipitated material resulting from chemical coagulation, residuals of excess chemical dosage, plankton etc.; and waste from rinsing and back washing of filter media containing debris, chemical precipitates, straining of organic debris and plankton. In the WTP sludge will be collected, thickened and disposed of or reused as soil conditioner. Sludge will be tested periodically for heavy metal concentration.

127. Water supply system will be operated using the standard operating procedures following an operating manual, which will be prepared by the DBO contractor. This will cover all necessary items such as preventive maintenance, periodic maintenance and emergency maintenance, replacement of pumps, motors, and other electro-mechanical parts as per the design life to optimize energy use and system efficiency etc., Adequate resources – technical and financial, has been taken into consideration in the project design. Manual will also include safety awareness and mock drills for chlorine safety. Thus, considering the design and proposed operational procedures, it is unlikely that there will be any significant negative impacts due to WTP operation.

128. During the system design life (15/30 years for mechanical/civil components) it shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

129. The project is designed to deliver potable water in sufficient quantities to the consumers in their homes with proper terminal pressure. Source water quality data shows that

Hooghly water is suitable for drinking after conventional treatment and disinfection, and WTP has been designed treat the source water to meet the drinking water standards. The quality of water supplied will be affected by the raw water quality and as well as treatment efficiency at the WTP. To ensure that water delivered to consumers at all times meets the drinking water standards, the following measures are suggested:

- (i) Preparation and implementation of a water quality surveillance program including development of a laboratory as part of the project by DBO contractor to ensure that supplied water meets the drinking water standards;
- (ii) Water quality surveillance program to cover source, WTP and consumer end water quality;
- (iii) Development of laboratory with all necessary environment, health and safety measures and adopting international standard procedures for water quality testing.

130. Recurrence of pipe bursting and leakage problems can be managed by the leak detection and water auditing surveys. PHED will be required to ensure that the leak detection and rectification time is minimized.

131. The citizens of the Haroa and Bhangar II will be the major beneficiaries of the improved water supply system, as they will be provided with a constant supply of better quality water, piped into their homes at an appropriate pressure. The project will improve the over-all health condition of the project area as diseases due to arsenic in groundwater, and other water borne diseases will be reduced, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. This should also improve the environment of these areas, should deliver major improvements in individual and community health and well-being.

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

132. The active participation of stakeholders including local community, NGOs/CBOs, etc., in all stages of project preparation and implementation is essential for successful implementation of the project. It ensure that the subprojects are designed, constructed, and operated with utmost consideration to local needs, ensures community acceptance, and will bring maximum benefits to the people. Public consultation and information disclosure are a must as per the ADB policy.

133. Most of the main stakeholders have already been identified and consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Primary stakeholders of the subproject are: residents, shopkeepers and businesspeople who live and work near sites where facilities are being built (WTP, water reservoirs and pumping main pipeline), PHED, government and utility agencies responsible for provision of various services in project area, and West Bengal Pollution Control Board (WBPCB). Secondary stakeholders are: NGOs and CBOs working in the area, community representatives, beneficiary community in general, government agencies, Government of India and the ADB.

B. Public Consultation

134. The public consultation and disclosure program are a continuous process throughout the project implementation, including project planning, design and construction.

1. Consultation during Project Preparation

135. Institutional consultations were conducted with the project agencies, and Government Departments such as PHED, Pollution Control Board, Kolkata Port Trust etc. The subproject proposal is formulated in consultation with the local bodies in the project area to suit their requirements.

136. Focus-group discussions with affected persons and other stakeholders were conducted to learn their views and concerns. A socio-economic household survey has been conducted in the project area, covering sample households, to understand the household characteristics, health status, and the infrastructure service levels, and also the demand for infrastructure services. General public and the people residing along the project activity areas were also consulted during visits to the project sites. Important issues or concerns that were raised by the stakeholders during consultations along with photographs and attendance sheets are provided in **Appendix 12** and recent construction activities photographs are provided in **Appendix 5**. Further a project-level consultation workshop will also be conducted in the project area. Still designing of transmission main is under process. Public consultation at work site will be conducted shortly.

137. It has been observed that people are very happy about the project as the project area currently faces severe water problem due to lack of any potable water supply system as the groundwater in the area is arsenic contaminated. People are very much willing to extend their cooperation as the project will be provide much needed potable water and enhance living standard of the public. There are no negative impacts perceived by the community, however, project team explained the likely issues during construction and proposed EMP to manage the negative impacts. Increasing traffic and disturbance to agricultural vehicle movement (vegetable transport from fields to market) during the work is raised during the meeting, and it was informed that proper care will be taken for movement of construction vehicles including traffic management plan, prior information to people etc., It was also informed no road closures anticipated due to this work, and if needed during the construction phase, alternative access will be provided. These measures are included in the EMP.

2. Consultation during Construction

138. Prior to start of construction, PIU in coordination with the local bodies has conducted information dissemination sessions at various places and solicit the help of the local community, leaders/prominent for the project work. Focus group meetings will be conducted to discuss and plan construction work (mainly pipeline work) with local communities to reduce disturbance and other impacts and also regarding the project grievance redress mechanism. A constant communication has been established with the affected communities to redress the environmental issues likely to surface during construction phase.

C. Information Disclosure

139. Executive summary of the final IEE will be translated in Bengali and made available at the offices of PMU, PIU, Block offices, and also displayed on their notice boards. Hard copies of the IEE are accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE in English and Executive

Summary in Bengali will be placed in the official website of the PHED, PMU after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

140. Public information campaigns to explain the project details to a wider population is being conducted. Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plans. Prior to start of construction, the PMU/PIU will issue Notification on the start date of implementation in local newspapers. A board showing the details of the project has been displayed at the construction site for the information of general public.

141. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. The road closure together with the proposed detours will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.

VII. GRIEVANCE REDRESS MECHANISM

142. A common Grievance Redress Mechanism (GRM) has been put in place to redress social, environmental or any other project and/or subproject related grievances. The GRM described below has been developed in consultation with stakeholders. Public awareness campaign are being conducted to ensure that awareness on the project and its grievance redress procedures is generated. The campaign ensured that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per project entitlement matrix, and PMU and concerned PIUs ensure that their grievances are addressed.

143. Affected persons have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes or through telephone hotlines at accessible locations, by e-mail, by post, or by writing in a complaint register in Gram Panchayat office or PMU or PIU office. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved is recorded. The names of the persons to be included in the Field Level GRM are already suggested. The Sample Grievance Registration Form has been translated in Bengali (**Appendix 13**). On 16 May 2019, the notification was issued on constitution and function of GRC. GRC Notification is attached in **Appendix 14**.

144. PMU Head, Safeguards and Gender Officer (HSGO) together with PIU Safeguard Officers are entrusted with the joint responsibility for timely grievance redressal on safeguards and gender issues and for registration of grievances, related disclosure, and communication with the aggrieved party. The affected persons are encouraged to seek a complaint registration number through the PIU.

145. The Grievance Redress Mechanism provides an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project. A two-tier grievance redress mechanism is conceived, one, at project level and another, beyond project level. For the project level GRM, a Grievance Redress Cell is being established at PIU; the safeguards officers of the ESSU PIU, supported by the social safeguards specialist of DSICS is responsible for conducting periodic community meetings with affected communities to understand their concerns and help them through the process of grievance redressal including translating the complaints

into Bengali or English, recording and registering grievances of non-literate affected persons and explaining the process of grievance redress mechanism. All expedient and minor grievances plan to resolved at field level; should the PIU fail to resolve any grievance within the stipulated time period, the PMU is being consulted and suggested actions by PMU taken by PIU with SPISC support, within specified time. PIU is also responsible for follow-through for each grievance, periodic information dissemination to complainants on the status of their grievance and recording their feedback (satisfaction/dissatisfaction and suggestions). In the event that certain grievances cannot be resolved at project level, they are being referred to the district steering committee (DSC), which also acts as grievance redress committee (GRC), particularly in matters related to land purchase/acquisition, payment of compensation, environmental pollution etc. Any higher than district level inter-departmental coordination or grievance redress required have been referred to the state level Steering Committee.

146. The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. All grievances – major or minor, are being registered. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from the PIU supported by design, supervision and institutional support consultant (DSISC) tries to successfully resolve them in consultation with the Member, Panchayat and the Gram Panchayat Pradhan. In case of larger issues, they will seek the advice and assistance of the SE PIU. Grievances not redressed through this process within/at the project level within stipulated time period, is referred to the DSC/GRC.

147. The DSC has been set up to monitor project implementation in each district. In its role as a GRC, the DSC will meet every month (if there are pending, registered grievances), determine the merit of each grievance, and resolve grievances within specified time upon receiving the complaint-filing which the grievance is being addressed by the state-level Steering Committee. The Steering Committee will resolve escalated/unresolved grievances received. Grievances remaining unresolved by Steering Committee may be referred by affected persons to appropriate courts of law. The multi-tier GRM for the project is outlined below (**Figure 11**), each tier having time- bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required. The GRC continues to function throughout the project duration. The PMU shall issue notifications to concerned PHE Divisions to establish the respective PIU (and field) level GRCs, with details of composition, process of grievance redress to be followed, and time limit for grievance redress at each level.

148. An aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

149. Composition of Grievance Redress Committee and District Steering Committee. The DSC, acting as GRC will have District Magistrate (Chairperson), Superintending Engineer, PIU as Member Secretary, Additional Executive Officer, Zilla Parishad, Assistant (Social and Environmental) Safeguard Officers of the Environment and Social Safeguard Units (ESSU) of the PIU, Institutional Support and Capacity Building Officer, PIU, Block Development Officers from respective blocks, and representatives from the affected village panchayat and / or community, if any, eminent citizens, CBOs and NGOs. The DSC/GRC must have a minimum of two women members. In case of any indigenous people impacts in future subprojects, the DSC/GRC must have representation of the affected indigenous people community, including at least one female indigenous person, the chief of the tribe or a member of the tribal council

as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.

150. The Hon'ble District Magistrate, North 24 Parganas suggested that PHED should put up the proposal for formation of the Steering Committee. After the election only it was worked out. The names/ positions of ADM, Zilla Parishad; ISGP Coordinator; Secretary, Zilla Parishad; NRDMS Coordinator and the CEO of NKDA considered in the Steering Committee. The Importance of creating a WhatsApp group for effective communication is considered. The steering committee already formed for state and district level and copy is attached in **Appendix 14**.

151. Areas of Jurisdiction. The areas of jurisdiction of the GRC, headed by the District Magistrate is being (i) all locations or sites within the district where subproject facilities are proposed, or (ii) their areas of influence within the District. The Steering Committee has jurisdictional authority across the state (i.e., areas of influence of subproject facilities beyond district boundaries, if any).

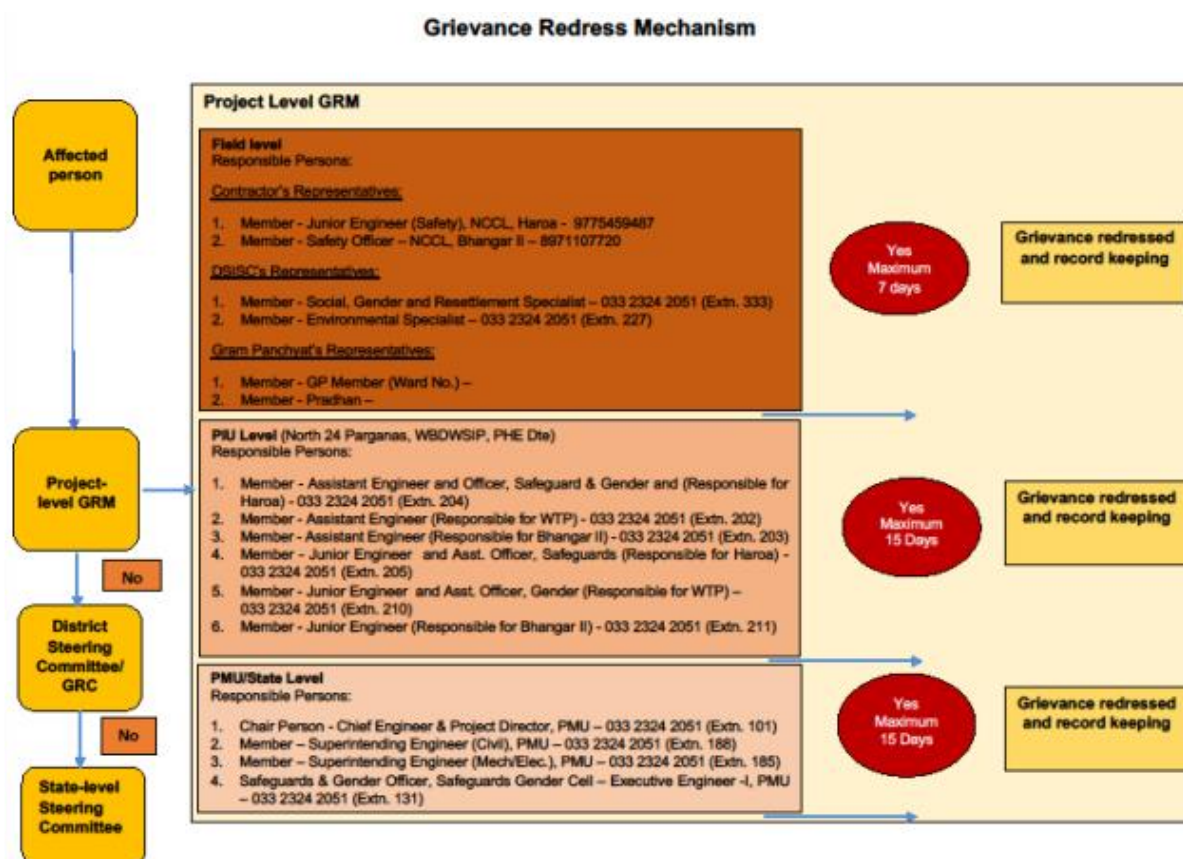
152. Record keeping. Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome is kept by PIU (with the support of DSISC) and submitted to PMU.

153. Information Dissemination Methods of the GRM. The PIU, assisted by DSISC is responsible for information dissemination to affected persons on grievance redressal procedure. Gram Panchayat/coverage area/affected area-wide public awareness campaigns are being conducted to ensure that awareness on grievance redress procedures is generated through the consultation and participation plan. Public awareness campaign is being conducted to ensure that awareness on the project and its grievance redress procedures is generated. The PIU assistant safeguard officers (environment and social) are assisted by DSISC safeguards specialists with information/collateral/awareness material etc. and in conducting project awareness campaigns. The campaigns ensure that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per agreed entitlement matrix including, who to contact and when, where/ how to register grievance, various stages of grievance redress process, time likely to be taken for redressal of minor and major grievances, etc. Grievances received and responses provided are documented and reported back to the affected persons. The number of grievances recorded and resolved and the outcomes is displayed/disclosed in the PMU and PIU offices, Gram Panchayat/concerned local panchayat notice boards and on the web, as well as reported in the semi-annual environmental and social monitoring reports to be submitted to ADB. A Sample Grievance Registration Form has been attached in **Appendix 13**. Till report period no grievances received.

154. Periodic review and documentation of lessons learned. The PMU Head, Safeguards and Gender Officer (HSGO) periodically reviews the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the PIU's ability to prevent and address grievances.

155. Costs. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) are borne by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates. The grievance redress process is shown in **Figure 11**.

Figure 11: Grievance Redress Mechanism



156. **ADB's Accountability Mechanism.** In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB India Resident Mission. The complaint can be submitted in any of the official languages of ADB's developing member countries. Before submitting a complaint to the Accountability Mechanism, it is recommended that affected people make a good faith effort to resolve their problems by working with the concerned ADB operations department (in this case, the resident mission). Only after doing that, and if they are still dissatisfied, they could approach the Accountability Mechanism. The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of the project GRM.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

157. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

158. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PHED, project management unit (PMU), project implementing unit (PIU), consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of

environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

159. The contractor submits to PIU, for review and approval, a site specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. Contractor has already submitted Site Specific Environment Management plan for the construction activities that has commenced. The Site Specific Environment Management plan is attached in **Appendix 19**. SEMP will be updated after designing of all project components and before commencement of those works.

160. A copy of the EMP/approved SEMP is kept on site during the construction period at all times. The EMP included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

161. For civil works, the contractor has committed to (i) carry out all of the mitigation and monitoring measures set forth in the approved SEMP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer may prepare from time to time to monitor implementation of this IEE and SEMP. The contractor has allocated budget for compliance with these SEMP measures, requirements and actions.

162. The following tables show the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring. The following table is only for the construction works has already started.

Table 15: Design Stage Environmental Impacts and Mitigation Measures

| Field | Anticipated Impact | Mitigation Measures | Responsibility of Mitigation | Cost and Source of Funds |
|---------------------------------------|---|---|------------------------------|--------------------------|
| Design of water supply system | Source sustainability and efficiency | <ul style="list-style-type: none"> (i) Discontinuation of current unsafe and unsustainable groundwater sources and creating a new comprehensive surface water (river) based water supply system (ii) Recovering wash water from treatment process to optimize the water use (iii) Treatment and reuse of sludge from treatment process (iv) The entire system is designed to maintain optimal flow and terminal pressure, and optimizing the overall energy usage (v) Steps have been taken to reduce the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies (vi) To meet the drinking water standards, implementation of a water quality surveillance program including development of a laboratory as part of the project by DBO contractor is being carried out. (vii) Development of laboratory with all necessary environment, health and safety measures and adopting international standard procedures for water quality testing (viii) Using low-noise and energy efficient pumping systems (ix) Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas (x) Provision of appropriate personal protection equipment to the workers and staff | DBO Contractor / PIU | Project Costs |
| Chlorine usage as disinfectant at WTP | Chlorine handling and application risk – health and safety risk to workers and general public | <p>Following measures will be undertaken at the chlorine application unit:</p> <ul style="list-style-type: none"> (i) Chlorine neutralization pit with a lime slurry feeder (ii) Chlorine absorption and neutralization facility (iii) Proper ventilation, lighting, entry and exit facilities (iv) Visible and audible alarm facilities to alert chlorine gas leak (v) Facility for isolation in the event of major chlorine leakage (vi) Eye wash and shower facility (vii) Personal protection and safety equipment for the operators in the chlorine plant (masks, oxygen cylinders, gloves, etc.,) (viii) Provide training to the staff in safe handling and application of chlorine; this shall be included in the contract of Chlorinator supplier (ix) Supplier of Chlorinator equipment shall provide standard operating | DBO Contractor / PIU | Project Costs |

| Field | Anticipated Impact | Mitigation Measures | Responsibility of Mitigation | Cost and Source of Funds |
|---|------------------------------|---|------------------------------|--------------------------|
| | | manual for safe operation and as well as maintenance and repairs; preferably these shall be provided both in English and Bengali Languages | | |
| Layout plan of GLSR at Haroa and Bhangar II | Tree cutting | (i) Minimize removal of trees by adopting to site condition and with appropriate layout design of GLSR (ii) Obtain prior permission for tree cutting (iii) Plant and maintain 5 trees for each tree that is removed | DBO Contractor / PIU | Project Costs |
| | Disturbance natural drainage | (i) Construction GLSR at Haroa away from the flood plain of Bidhyadhari river (ii) Integrate measures into GLSR design to avoid risk of flooding | DBO Contractor / PIU | Project Costs |

Table 16: Pre-Construction Stage Environmental Impacts and Mitigation Measures

| Field | Anticipated Impact | Mitigation Measures | Responsibility of Mitigation | Cost and Source of Funds |
|--|---|--|--|--|
| Utilities | Telephone lines, electric poles and wires, water lines within proposed project area | (i) Operators of these utilities have been identified and included in the detailed design documents to prevent unnecessary disruption of services during construction phase; (ii) Construction contractor will prepare a contingency plan to include actions to be taken in case of unintentional interruption of services. (iii) Require contractors to prepare spoils (waste) management plan (Refer to Attachment O7 of the SEMP). (iv) Present activities at WTP site do not require traffic management plan. | DBO Contractor in collaboration with PIU and with approval of PMU | (i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), waste management plan a |
| Construction work camps, stockpile areas, storage areas, and disposal areas. | Conflicts with local community; disruption to traffic flow and sensitive receptors | (i) Construction camp has been set up within the WTP site; (ii) Extreme care has been taken in selecting sites to avoid direct disposal near water body which may inconvenience the community. Till date, no requirement for excess spoil disposal has been encountered. If required, | DBO Contractor to finalize locations in consultation and approval of PIU | (i) List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, |

| Field | Anticipated Impact | Mitigation Measures | Responsibility of Mitigation | Cost and Source of Funds |
|---|--|--|---|---|
| | | for excess spoil disposal, (a) sites will be selected from barren, infertile lands. In case agricultural land selected, written consent will be taken from landowners ; (b) debris disposal site will be selected 200 m away from surface water bodies; (c) no residential areas be located within 50 m downwind side of the site; and (d) site will be selected 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies. | | and disposal areas. Written consent of landowner/s (not lessee/s) |
| Sources of Materials | Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. | <ul style="list-style-type: none"> (i) Construction materials are obtained only from government approved quarries with prior approval of PIU (ii) PIU ensured that quarry sources have all necessary clearances/ permissions in place prior to approval (iii) Contractor submits to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) (iv) Creation of new borrow areas, quarries etc., have been avoided for the project to date; if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance prior to approval by PIU | DBO Contractor to prepare list of approved quarry sites and sources of materials with the approval of PIU | (i) List of approved quarry sites and sources of materials; |
| Consents, permits, clearances, NOCs, etc. | Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or stoppage of works | <ul style="list-style-type: none"> (i) all necessary consents, permits, clearance, NOCs, etc. prior to award of civil works have been obtained (ii) all necessary approvals for construction have been obtained by contractor before start of construction (iii) It has been acknowledged in writing and report on compliance of all obtained consents, permits, clearance, NOCs, etc. are provided.. (Refer to Attachment O3 of SEMP which is attached in Appendix 19) (iv) Detailed design drawings and documents are | PIU and PMC | Incorporated in final design and communicated to contractors. |

| Field | Anticipated Impact | Mitigation Measures | Responsibility of Mitigation | Cost and Source of Funds |
|----------------------|---|---|--|---|
| | | included. | | |
| Asbestos Cement pipe | Health risk due to exposure to asbestos materials | (i) Details on location of underground asbestos cement pipes will be noted, if encountered. (ii) To avoid encountering AC pipes the new pipes has been aligned carefully (iii) Asbestos Cement pipes, if encountered, will be left undisturbed in the ground. | DBO Contractor coordination with and PMC | Detailed construction drawings showing alignment of asbestos cement pipes |

Table 17: Construction Stage Environmental Impacts and Mitigation Measures

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|---|--|--|----------------------------|--|
| Environmental Management Plan (EMP) Implementation Training | Irreversible impact to the environment, workers, and community | Project manager and all key workers have undergone training on EMP implementation including spoils/waste management, Standard operating procedures (SOP) for construction works; occupational health and safety (OHS), core labor laws, applicable environmental laws, etc. A sample training record is attached in Appendix 16 . | DBO Contractor | Project cost / PMU cost |
| Air Quality | Emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. | For all construction works (i) The Direction of West Bengal Department of Environment under the Air Act, 1981 in controlling air pollution from construction activities have been complied with. (ii) The air pollution / dust control measures for construction activities stipulated by the "Direction of West Bengal Department of Environment under the Air Act, 1981 Direction No. EN/3170/T-IV-7 /001/2009 dated: 10 December 2009" have been complied with. (iii) The soil and stockpiled material are damped down on site by water sprinkling (iv) Tarpaulins are used to cover the loose material (soil, sand, aggregate etc.) when transported by trucks; (v) A dust screen around the construction sites at WTP work sites are provided (vi) Wheels and undercarriage of haul trucks are cleaned prior to leaving construction site/quarry | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--------------------------|
| | | <p>(vii) Sprinkling water and unloading inside the barricaded area have been made to Control dust generation while unloading the loose material (particularly aggregate, soil) at the site</p> <p>(viii) Surface soils are stabilized where loaders, support equipment and vehicles will operate by using water n</p> <p>(ix) Tarpaulins are used to cover the loose material (soil, sand, aggregate etc.) when transported by trucks;</p> <p>(x) Water is used to maintain soils in a visible damp or crusted condition for temporary stabilization</p> <p>(xi) Water is used prior to leveling or any other earth moving activity to keep the soil moist throughout the process</p> <p>(xii) Tarpaulins are used to cover the soil stocked at the sites</p> <p>(xiii) Access is controlled to work area, preventing unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance to minimize dust generation</p> <p>(xiv) All construction equipment and machineries are fitted with pollution control devices and have a valid pollution under control (PUC) certificate</p> <p>Pipeline works <u>Present construction activities do not include pipeline works. However following mitigation measure are proposed for the remaining subproject components</u></p> <p>(i) Barricade the construction area using hard barricades (of 2 m height) on both sides and provide dust/wind screen (such geo textile fabric) up to 3 m height (1m above the hard barricading)</p> <p>(ii) Initiate site clearance and excavation work only after barricading of the site is done</p> <p>(iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded area</p> <p>(iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to</p> | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|-----------------------|---|--|----------------------------|--|
| | | <p>the designated disposal area</p> <p>(v) Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded</p> <p>(vi) Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done.</p> <p>(vii) Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for back filling, this will avoid stocking of material, and minimize the dust.</p> <p>(viii) Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Road restoration shall be undertaken immediately.</p> | | |
| Surface water quality | <p>Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during construction can Contaminate nearby surface water quality. Ponding of water in the pits/foundation excavations</p> | <p>(i) All earthworks are conducted during the dry season to prevent the problem of soil run-off during monsoon season;</p> <p>(ii) Stockpiling of earth fill especially during the monsoon season are avoided unless covered by tarpaulins or plastic sheets;</p> <p>(iii) Excess spoils and debris are re-used in the construction works. Only designated area, if required, will be used for soil disposal</p> <p>(iv) Temporary silt traps or sedimentation basins are installed along the drainage leading to the water bodies.</p> <p>(v) Storage areas for fuels and lubricants have been placed away from any drainage leading to water bodies.</p> <p>(vi) Fuel, construction chemicals etc., are stored on an impervious floor, also spillage is avoided by careful handling</p> <p>(vii) Construction wastes are disposed in designated</p> | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|--|--|--|----------------------------|--|
| | | sites; (viii) Temporary drainage channels are created around the work area to arrest the entry of runoff from upper areas into the work area (ix) The water collected in the pits / excavations are pumped to a temporary sedimentation pond; dispose of only clarified water then dispose into drainage channels/streams after sedimentation in the temporary ponds (x) Safety aspects are considered related to pit collapse due to accumulation of water | | |
| Noise Levels | Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people | (i) Activities are planned in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Horns are not used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers are used in construction equipment to minimize sound impact to surrounding sensitive receptor; and (iv) maximum sound levels are maintained which not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. (v) Buildings which are at risk from vibration damage are identified and use of pneumatic drills or heavy vehicles in the vicinity are avoided (vi) Local communities are consulted in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals. | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |
| Landscape and aesthetics– waste generation | Impacts due to excess excavated earth, excess construction materials, and solid | (i) Construction Waste Management Plan is prepared and implemented (ii) As far as possible the debris and excess soil are utilized in construction purpose, for example for raising the ground level or construction of access | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|--|---|--|----------------------------|--|
| | waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. | <p>roads etc.,</p> <p>(iii) Stockpiles, lubricants, fuels, and other materials are located away from steep slopes and water bodies;</p> <p>(iv) for disposal, the site selected will be preferably from barren, infertile lands; site would be located away from residential areas, forests, water bodies and any other sensitive land uses;</p> <p>(v) Domestic solid wastes are properly segregated into biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; compost pit is created at workers' camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material are collected separately and sold in the local recycling material market;</p> <p>(vi) Residual and hazardous wastes such as oils, fuels, and lubricants are disposed of through approved vendors by West Bengal Pollution Control Board (WBPCB);</p> <p>(vii) Burning of construction and/or domestic waste are prohibited;</p> <p>(viii) Wastes are not haphazardly dumped/ thrown within and around the project site and adjacent areas; proper collection bins are provided, and awareness is created to use the dust bins.</p> <p>(ix) Site clearance and restoration are done immediately after the completion of construction work to restore to the original condition; PIU ensures that site is properly restored prior to issuing of construction completion certificate</p> | | |
| Existing Infrastructure and Facilities | Disruption of service and damage to existing infrastructure at specified project location | <p><u>Present construction activities do not pose this impact. However following mitigation measure are proposed for the remaining subproject components</u></p> <p>(i) Prepare a list of affected utilities and operators if any; and</p> <p>(ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service</p> | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |
| Ecological | Loss of vegetation | <u>Present construction activities do not pose this impact.</u> | DBO | Cost for |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|-----------------------|---|---|----------------------------|--|
| Resources Terrestrial | and tree cover | <p><u>However following mitigation measure are proposed for the remaining subproject components</u></p> <ul style="list-style-type: none"> (i) Minimize removal of vegetation and disallow cutting of trees; (ii) If tree-removal will be required, obtain tree-cutting permit and (iii) Plant 5 native trees for every one that is removed. | Contractor | implementation of mitigation measures responsibility of contractor. |
| Accessibility | Traffic problems and conflicts near project locations and haul road | <p>Hauling (material, waste/debris and equipment) activities</p> <ul style="list-style-type: none"> (i) Transportation routes has been planned so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites (ii) Transport and hauling activities are scheduled during non-peak hours; (iii) Entry and exit points are located in areas where there is low potential for traffic congestion; (iv) Vehicles are driven in a considerate manner (v) Affected public are notified by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. <p>Pipeline works</p> <p><u>Present construction activities do not include pipeline works. However following mitigation measure are proposed for the remaining subproject components</u></p> <ul style="list-style-type: none"> (i) Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the as and when required (ii) Leave spaces for access between mounds of soil to maintain access to the houses / properties (iii) Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access. | Construction Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|--------------------------------|--|---|----------------------------|--|
| | | <ul style="list-style-type: none"> (iv) Inform the affected local population 1-week in advance about the work schedule (v) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. (vi) Keep the site free from all unnecessary obstructions; (vii) Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours | | |
| Socio-Economic - Employment | Generation of temporary employment and increase in local revenue | <ul style="list-style-type: none"> (i) Employ local labor force as far as possible; and (ii) Comply with labor laws (See Appendix 8 of this IEE) | DBO Contractor | Contractor costs |
| Occupational Health and Safety | Occupational hazards which can arise during work | <ul style="list-style-type: none"> (i) All national, state and local core labor laws complied with (see Appendix 8 of this IEE). Labour license and Workmen Compensation policy has been attached in Appendix 15. (ii) Site-specific occupational health and safety (OHS) Plan have been developed and implemented which includes measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) OHS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (iii) qualified first-aiders have been provided at all times. Equipped first-aid stations are easily accessible throughout the site; (iv) Medical insurance has been provided for workers; (v) All installations are secured from unauthorized intrusion and accident risks; (vi) Potable drinking water is provided; (vii) Clean eating areas are provided where workers are not exposed to hazardous or noxious substances; | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|------------------------------|---|---|----------------------------|--|
| | | <p>(viii) Health and safety orientation training are provided to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;</p> <p>(ix) Visitor orientation is provided if visitors to the site can gain access to areas where hazardous conditions or substances may be present. visitor/s are not allowed to enter hazardous areas unescorted;</p> <p>(x) visibility of workers is ensured through the use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(xi) Moving equipment are outfitted with audible back-up alarms;</p> <p>(xii) Sign boards are provided for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage are in accordance with international and national norms/</p> <p>(xiii) workers are disallowed exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. (Refer to Attachment O4 of sample SEMP)</p> | | |
| Asbestos Cement Materials | Health risks associated with asbestos cement pipes | <p>AC pipes were not found where construction has commenced.</p> <p>For future if any such pipes are found, they will be properly stored at a designated place and disposed off only after a suitable asbestos disposal plan is worked out.</p> | DBO Contractor / PMU | Contractor costs |
| Community Health and Safety. | Traffic accidents and vehicle collision with pedestrians during material and waste transportation | <p><u>Present construction activities do not pose this impact. However following mitigation measure are proposed for the remaining subproject components, specifically pipe laying work.</u></p> <p>(i) Movements of construction vehicles are restricted to defined access roads and demarcated working areas (unless in the event of an emergency)</p> | DBO Contractor | Cost for Implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|--------------------------|--|--|----------------------------|--|
| | | <ul style="list-style-type: none"> (ii) strict speed limit (20-30 kmph) is enforced for plying on unpaved roads, construction tracks (iii) Night-time haulage is by exception only, as approved by the PIU to minimize driving risk and disturbance to communities (iv) Safe practices are adopted for micro tunneling (v) Temporary traffic control (e.g. flagmen) and signs are provided where necessary to improve safety and provide directions (vi) All drivers went through safety and training sessions (vii) Public access to all areas where construction works are on-going will be restricted through the use of barricading and security personnel (viii) Warning signs, blinkers are attached to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation (ix) The period of time when the pipeline trench is left open have been minimized through careful planning (x) Control dust pollution –dust control measures are implemented as suggested under air quality section (xi) vehicles are regularly maintained and manufacturer-approved parts are used to minimize potentially serious accidents caused by equipment malfunction or premature failure. Road signs and flag persons are there to warn of on-going trenching activities. (xii) Road signs and flag persons are provided to warn of on-going trenching activities. | | |
| Work Camps and worksites | Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Unsanitary and poor living conditions for | <ul style="list-style-type: none"> (i) Camp site has been established only within WTP site presently. (ii) No Tree has been having been cut for settling of camp. (iii) A proper compound wall already exists around the camp site and it acts as a wind screen. (iv) Camp site is not located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|-------|--------------------|---|----------------------------|--------------------------|
| | workers | <ul style="list-style-type: none"> (v) The workers living areas and material storage areas are separated clearly (vi) proper temporary accommodation with proper materials, adequate lighting and ventilation are provided, appropriate facilities are provided for winters and summers; conditions of livability at work camps are ensured and maintained at the highest standards possible at all times; (vii) PIU was consulted before locating project offices, sheds, and construction plants; (viii) removal of vegetation is minimized and cutting of trees disallowed without permission from concerned authorities (ix) conditions of livability at work camps are ensured and maintained at the highest standards possible at all times; living quarters and construction camps are provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., are not used as accommodation for workers (x) Camp are provided with proper drainage, without any water accumulation (xi) drinking water, water for other uses, and sanitation facilities for employees have been provided (xii) Employees are prohibited from cutting of trees for firewood; contractor provided proper facilities including cooking fuel (oil or gas; fire wood not allowed) (xiii) employees are trained in the storage and handling of materials which can potentially cause soil contamination (xiv) used oil and lubricants are recovered and removed from the site (xv) solid waste is managed according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit is | | |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|---|---|---|----------------------------|--|
| | | <p>provided for biodegradable waste, and non-biodegradable / recyclable waste are collected and sold in local market</p> <p>(xvi) All wreckage, rubbish, or temporary structures which are no longer required are removed</p> <p>(xvii) At the completion of work, camp area will be cleaned and restored to pre-project conditions, and submit report will be submitted to PIU; PIU to review and approve camp clearance and closure of work site</p> | | |
| Chance Finds | There are no protected properties in the subproject sites. However, in case of chance finds, contractors will be required to follow a protocol as defined in the mitigation measures. | <p>(i) Till date no chance has been found. If any artefact is found following actions will be taken:</p> <p>(ii) Consult Archaeological Survey of India (ASI) or West Bengal State Archaeology Department to obtain an expert assessment of the archaeological potential of the site</p> <p>(iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available.</p> <p>(iv) In case of chance finds, works must be stopped immediately until such time chance finds are cleared by experts</p> <p>Sample chance find protocol attached as Appendix 20</p> | PIU- PMU | |
| Submission of EMP implementation report | Unsatisfactory compliance to EMP | <p>(i) Appointment of Environment, Health and Safety (EHS) Supervisor to ensure EMP implementation</p> <p>(ii) Timely submission of monitoring reports including pictures</p> | DBO contractor | Contractor cost |
| Post-construction clean-up | Damage due to debris, spoils, excess construction materials | <p>(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;</p> <p>(ii) All excavated roads shall be reinstated to original condition.</p> <p>(iii) All disrupted utilities will be restored</p> <p>(iv) All affected structures will be rehabilitated/compensated</p> <p>(v) The area that previously housed the construction camp is to be checked for spills of substances such</p> | DBO Contractor | Cost for implementation of mitigation measures responsibility of contractor. |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|-------|--------------------|--|----------------------------|--------------------------|
| | | <p>as oil, paint, etc. and these shall be cleaned up.</p> <p>(vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and re-grassed using the guidelines set out in the revegetation specification that forms part of this document.</p> <p>(vii) The contractor must arrange the cancellation of all temporary services.</p> <p>(viii) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.</p> | | |

Table 18: Operation Stage Environmental Impacts and Mitigation Measures

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|---|---|--|----------------------------|--------------------------|
| WTP operation – malfunction and effect on efficiency | Public health, safety and environmental impacts | <p>(i) Operate as per the Operational Manual following Standard Operating Procedures as per the WTP design</p> <p>(ii) Undertake preventive and periodic maintenance activities as required</p> <p>(iii) Ensure periodic training to staff in WTP operation, especially in chemical handling and dosing, filter backwash, etc.,</p> <p>(iv) replace pumps, motors and other parts as per the operating life prescribed by manufacturer</p> <p>(v) Maintain the mechanical parts as per the maintenance plan to avoid any hazards</p> <p>(vi) Ensure that all safety apparatus at WTP including personal protection equipment are in good condition all times; and are at easily accessible and easily identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations</p> <p>(vii) Ensure that backwash recirculation system and sludge management system are operated as per the manual</p> | DBO Contractor | Operating costs |
| Check for blockage and leakage problems reducing the water losses | Loss of water, increased demand and inconvenience to consumers and general public | Effectiveness of leak detection and water auditing to reduce the water losses | DBO Contractor | Operating costs |

| Field | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Cost and Source of Funds |
|--------------------------------|---|---|---|--------------------------|
| Occupational health and safety | Health, social and economic impacts on the workers | (i) Provide appropriate PPE and training on its proper use and maintenance. (ii) Use fall protection equipment when working at heights. (iii) Maintain work areas to minimize slipping and tripping hazards. (iv) Implement a training program for operators who work with chlorine regarding safe handling practices and emergency response procedures. (v) Prepare escape plans from areas where there might be a chlorine emission. (vi) Install safety showers and eye wash stations near the chlorine equipment and other areas where hazardous chemicals are stored or used. (vii) Prohibit eating, smoking, and drinking except in designated areas. | DBO Contractor | Operating costs |
| Increased in sewage generation | Water pollution, and impacts on public health and environment | Sanitation and sewerage/septage facilities needs to be improved/provided in the project area to suit the increased sewage generation | PHED and respective local bodies (gram panchayat) | To be identified |

Table 19: Construction Stage Environmental Monitoring Plan

| Monitoring field | Monitoring Location | Monitoring Parameters | Frequency | Responsibility | Cost and Source of Funds |
|---|--|---|---|--|--|
| Construction disturbances, nuisances, public and worker safety, | All work sites | Implementation of dust control, noise control, traffic management, and safety measures. Site inspection checklist to review implementation is appended at Appendix 17 (sample copy) | Weekly during construction | Supervising staff and safeguards specialists | No costs required |
| Ambient air quality | 5 locations (WTP, Booster pumping station, 2 GLSRs, 1 pipe line) | <ul style="list-style-type: none"> PM10, PM2.5 NO₂, SO₂, CO | Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (3-years period considered) | DBO Contractor | Cost for implementation of monitoring measures responsibility of contractor (50 samples x 4500 per sample = 225,000) |

| Monitoring field | Monitoring Location | Monitoring Parameters | Frequency | Responsibility | Cost and Source of Funds |
|-----------------------|--|---|---|----------------|---|
| Ambient noise | 5 locations (WTP, Booster pumping station, 2 GLSRs, 1 pipe line) | Day time and night time noise levels | (i) Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (3-years period considered) | DBO Contractor | Cost for implementation of monitoring measures responsibility of contractor (50 samples x 1350 per sample = 67,500) |
| Surface water quality | 2 locations (Bidyadhari River and Kestopur Canal) | <ul style="list-style-type: none"> pH, Oil and grease, Cl, F, NO₃, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity | Once before start of construction Half yearly during construction (3 - year construction period considered) | DBO Contractor | Cost for implementation of monitoring measures responsibility of contractor (10 samples x 2860 per sample = 40,000) |
| Chance Finds | Areas protected by ASI or West Bengal State Archaeology Department | Chance finds protocol | Before finalization of detailed design, consult with ASI or West Bengal State Archaeology Department | DBO Contractor | Cost for implementation of monitoring measures responsibility of contractor |

Table 20: Operation Stage Environmental Monitoring Plan

| Monitoring field | Monitoring Location | Monitoring Parameters | Frequency | Responsibility | Cost and Source of Funds |
|--|---|--|-------------------------------------|-----------------------|---|
| Source water quality | Raw water intake pond in the WTP | pH, Cl, F, NO ₃ , TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity, heavy metals and pesticides | Yearly twice (pre and post monsoon) | DBO Contractor / PHED | O&M costs (water quality will be tested at the internal laboratory part of WTP) |
| Monitoring of quality of water supplied to consumers | Consumer end-random sampling in all zones | pH, Nitrite, Nitrate, Turbidity BOD, Total Alkalinity, Total coliform and Faecal coliform | Monthly once | DBO Contractor / PHED | O&M costs (water quality will be tested at the internal laboratory part of WTP) |

| Monitoring field | Monitoring Location | Monitoring Parameters | Frequency | Responsibility | Cost and Source of Funds |
|--|---------------------|---|-------------|-----------------------|---|
| Sludge quality and suitability as manure | WTP | Analysis for concentration of heavy metals and confirm that value is within the following limits (all units are in mg/kg dry basis except pH) <ul style="list-style-type: none"> • Arsenic - 10.00 • Cadmium - 5.00 • Chromium - 50.00 • Copper - 300.00 • Lead - 100.00 • Mercury - 0.15 • Nickel - 50.00 • Zinc - 1000.00 • PH - 5.5-8.5 | Yearly once | DBO Contractor / PHED | O&M costs (testing to be done at an accredited external laboratory) |

B. Implementation Arrangements

163. PHED is the Executing and Implementing Agency for the WBDWSIP, responsible for management, coordination and execution of all activities funded under this sector project. PMU, established within the PHED, will implement the project. PMU is being supported by district level Project Implementation Units (PIUs). PMU is being headed by a Project Director (PD) in the rank of Chief Engineer. Each PIU is being headed by a Superintending Engineer (SE), reporting to the PD. PMU with the support of PIUs is responsible for planning, implementation, monitoring and supervision, and coordination of all activities under the WBDWSIP. PMU is being supported by a Project Management Consultant (PMC) to supervise, monitor and oversee the implementation. Each PIU will be supported by a DSISC.

164. **Safeguards Compliance Responsibilities.** A Safeguard and Gender Cell (SGC) is being established in PMU with the overall responsibility of ensuring compliance with ADB SPS to ensure consistency with PAM. SGC is being headed by a Head, Safeguards and Gender Officer (HSGO) and will report to the Project Director directly. The HSGO has overall responsibility in implementation of the resettlement framework, EARF, RPs, EMPs, SEMP, GESI action plan, and appropriate monitoring and reporting responsibilities. Key safeguard tasks and responsibilities at the PMU level are as follows:

- Ensure subprojects confirms to exclusion criteria and project selection guidelines as stipulated in the EARF;
- Approve subproject environmental category;
- Approve IEEs; ensure that updated IEEs/EMPs reflect final project designs;
- Ensure that EMPs are included in bidding documents and civil works contracts;
- Ensure proper implementation of EMPs by contractors;
- Facilitate and ensure compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g. location clearance certificates, environmental clearance certificates), as relevant;
- Oversee public consultation and disclosure;
- Approve quarterly EMP implementation reports;
- Review and approve semi-annual monitoring reports prepared by PMC; and submit to ADB;
- Oversee grievances redress process and ensure timely redress;
- Undertake regular review of safeguards related loan covenants, and the compliance in program implementation; and
- Organize periodic capacity building and training programs for WBDWSIP stakeholders, PHED, PMU and PIU staff on safeguards.

165. The SGC is being supported by environmental, social and gender safeguard specialists in the PMC. Key safeguard tasks and responsibilities of Environmental Management Specialist of the PMC on environmental safeguards are as follows:

- Review and finalize REA checklist and classify the project;
- Review and confirm project selection/ design; ensure compliance with exclusion criteria and project environmental selection guidelines;
- Review and finalize IEE reports including EMPs prepared/updated by PIUs/DSISCs;
- Oversee public consultation and information disclosure activities; ensure timely disclosure;
- Provide advise/support in obtaining government clearance/ approvals;

- Review and confirm that IEEs/EMPs are included in bids and contracts;
- Review and confirm SEMP prepared by contractor;
- Oversee the implementation of SEMP by contractors and ensure corrective actions, where necessary;
- Review and approve quarterly environmental monitoring reports submitted by PIU/DSISCs;
- Conduct site visits of project facilities and work sites to oversee implementation;
- Prepare semi-annual environmental monitoring reports and submit to PMU SGC HSGO;
- Oversee grievance redress process; advise on critical grievance related to environmental issues and concerns; and
- Organize training and capacity development programs.

166. **Project Implementation Unit.** At each PIU, an Assistant Engineer has been given additional responsibilities of safeguard tasks and has been designated as Assistant Safeguards Officer. The Safeguards Officer oversees the safeguards implementation at PIU level, coordinate public consultations, information disclosure, regulatory clearances and approvals, RP implementation, EMP implementation and grievance redressal. Key environmental safeguard tasks and responsibilities of Safeguards Officer are as follows:

- Coordinate public consultation and information disclosure;
- Liaise with local offices of regulatory agencies in obtaining clearances /approvals; assist PMU for clearances obtained at state level;
- Review and approve contractors SEMPs;
- Oversee day-to-day implementation of SEMPs by contractors, including compliance with all government rules and regulations;
- Take necessary action for obtaining rights of way;
- Ensure continuous public consultation and awareness;
- Coordinate grievance redress process and ensure timely actions by all parties;
- Review monthly contractor's SEMP Monitoring Reports;
- Review and forward quarterly monitoring reports to PMU; and
- Inform PMU of unanticipated impacts and formulate corrective action plan; and
- Recommend issuance of work construction work completion certification to the contractor upon verification of satisfactory post-construction clean-up.

167. The PIUs is assisted by DSISC teams which will include an Environmental Specialist and a Social Safeguards Specialist. Following are the key tasks of Environmental Specialist of DSISC:

- Assist PIU in identifying projects/components in compliance with the project exclusion criteria and selection guidelines stipulated in EARF;
- Prepare environmental screening checklists and submit to PMU for categorization; update checklist and category as and when required to reflect project changes, and report to PMU;
- Work closely with PIU and design teams to include environmental considerations in project location, design and technical specifications;
- Identify statutory clearance / permissions / approvals required for subproject; assist PIU in obtaining them;
- Assist in including standards/conditions, if any, stipulated in regulatory clearances, consents in the project design;

- Update IEE and EMP to reflect any changes in subproject during detail design / implementation; IEE shall reflect the final project design;
- Lead / assist PIU in public consultation in compliance with the EARF; reflect inputs from public consultation in IEEs, EMPs, and project design;
- Advise/assist PIU in disclosing relevant information on safeguards to stakeholders, affected people etc.;
- Assist / ensure all EMP measures related project design and location and included in the detailed designs;
- Integrate EMP into the bid and contract documents (for DBO contracts, include full IEE including EMP in bids);
- Advise contractor in preparation of SEMP as per the final design, prior to start of construction;
- Ensure that all necessary clearances/permission (including those required by Contractor) are in place prior to start of construction;
- Monitor implementation of SEMP;
- ensure Contractors including subcontractor's, if any, comply with the measures set forth in the EMP;
- Assist PIU in establishing GRM for the Project:
- Assist PIU in grievance redress, advise the contractor on appropriate actions on grievances, ensure timely resolution and proper documentation;
- Identify, if any, non-compliance or unanticipated impacts; initiate corrective actions, report to PMU;
- Review and approve monthly monitoring reports submitted by Contractor; consolidate and prepare quarterly Environmental Monitoring Reports (EMR) and submit to PMU; and
- Conduct training and capacity building activities (workshops, hands-on trainings, visits etc.,) in EMP implementation.

168. **Civil works contracts and contractors.** IEEs are included in bidding and contract documents. The PMU and PIUs are ensured that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites. The contractor appoints an Environment, Health and Safety (EHS) supervisor to implement EMP. The EHS Supervisor update the EMP and submit a SEMP for approval of PIU. Contractors are to carry out all environmental mitigation and monitoring measures outlined in EMP, approved SEMP and their contracts. Key responsibilities of the EHS supervisor are:

- Prepare SEMP and submit to PIU for approval prior to start of construction;
- Conduct orientation and daily briefing sessions to workers on environment, health and safety;
- Ensure that appropriate worker facilities are provided at the work place and labour camps as per the contractual provisions;
- Records accidents and undertake remedial actions;
- Implement SEMP measures and report to PIU/DSISC if any new impacts are surfaced; seek guidance from as required in EMP implementation;
- Conduct environmental monitoring (air, noise etc.,) as per the monitoring plan
- Ensure conduct of water quality surveillance program;

- Prepare monthly EMP monitoring reports and submit to PIU;
- Work closely with PIU SO and consultants to ensure communities are aware of project-related impacts, mitigation measures and GRM; and
- Address any public compliance and grievances effectively and in timely manner.

C. Capacity Building and Training

169. PMU HSGO and PIU SOs have been trained by PMC and DSISC's safeguards experts on safeguards issues related to the project, GESI action plan and GRM. The EARF, RF, IPPF and GESI action plan provided indicative capacity building program which included modules on: (i) introduction and sensitization to ADB SPS on environmental, involuntary resettlement and indigenous people policies and requirements; (ii) project related requirements as provided in the EARF, RF, IPPF and GESI action plan, (iii) review, updating and preparation of the IEEs, SEMP, RPs, DDRs and IPPs (as required) upon the completion of project detailed design; (iv) improved coordination within nodal departments; (v) monitoring and reporting system; and (vi) project GRM. Briefings on safeguards principles, GRM and GESI action plan are to be conducted to the contractors upon their mobilization by PIU SOs supported by DSISCs.

170. The following **Table 21** presents the outline of capacity building program to ensure EMP implementation. The estimated cost is ₹225,000 (excluding trainings of contractors which is a part of EMP implementation cost during construction) to be covered by the project's capacity building program. The detailed cost and specific modules are being customized for the available skill set after assessing the capabilities of the target participants and the requirements of the project by the ES of PMC.

Table 21: Outline Capacity Building Program on EMP Implementation

| Description | Target Participants and Venue | Estimate (Rs) | Cost and Source of Funds |
|--|--|--------------------|---------------------------------------|
| 1. Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement - Government of India and West Bengal applicable safeguard laws, regulations and policies including but not limited to core labor standards, OHS, etc. - Incorporation of EMP into the project design and contracts - Monitoring, reporting and corrective action planning | All staff and consultants involved in the project At PMU (combined program for all subprojects) | 100,000 | Included in the overall program cost |
| 2. EMP implementation (1/2 day) - EMP mitigation and monitoring measures - Roles and responsibilities - Public relations, - Consultations - Grievance redress - Monitoring and corrective action planning - Reporting and disclosure - Construction site standard operating procedures (SOP) -- Chance find (archeological) protocol - asbestos cement pipe protocol - Traffic management plan - Waste management plan - Site clean-up and restoration | All PIU staff, contractor staff and consultants involved in the subproject At PIU | 100,000 (Lump sum) | Included in subproject cost estimates |

| | | | |
|---|--|--------|------------------|
| 3. Contractors Orientation to Workers (1/2 day) - Environment, health and safety in project construction | Once before start of work, and thereafter regular briefing every month once. Daily briefing on safety prior to start of work All workers (including unskilled laborers) | 25,000 | Contractors cost |
|---|--|--------|------------------|

D. Monitoring and Reporting

171. Immediately after mobilization and prior to commencement of the works, the contractor is to submit a compliance report to PIU that all identified pre-construction mitigation measures as detailed in the EMP are undertaken. Contractor should confirm that the staff for EMP implementation (EHS supervisor) is mobilized. PIU is required to review, and approve the report and permit commencement of works.

172. During construction, results from internal monitoring by the contractor is to be reflected in their monthly EMP implementation reports to the PIU. DSC is required to review and advise contractors for corrective actions if necessary. Quarterly report summarizing compliance and corrective measures taken is to be prepared by DSC team at PIU and submitted to PMU. During operation, the contractor is required to conduct management and monitoring actions as per the operation stage EMP, and submit to PMU a quarterly report on EMP implementation and compliance.

173. Based on monthly and quarterly reports and measurements, PMU (assisted by PMC) is required to submit semi-annual environmental monitoring report (SEMR) (Template referred as **Appendix 18**). Once concurrence from the ADB is received the report will be disclosed on PHED/PMU websites.

174. ADB will review project performance against the WBDWSIP commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system.

175. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

E. Environmental Management Plan Implementation Cost

176. Most of the mitigation measures require the contractors to adopt good site practices, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. The costs which are specific to EMP implementation and are not covered elsewhere in the projects are given below.

Table 22: Cost Estimates to Implement the Environmental Management Plan

| | Particulars | Stages | Unit | Total No. | Rate (₹) | Cost (₹) | Costs Covered By |
|-----------|-----------------------------|--------------|-----------|-----------|----------|-----------|------------------|
| A. | Implementation staff | | | | | | |
| 1 | Environment, | Construction | per month | 24 | 50,000 | 1,200,000 | Design, |

| | Particulars | Stages | Unit | Total No. | Rate (₹) | Cost (₹) | Costs Covered By |
|-----------|---|------------------|-----------------|-----------|----------|------------------|----------------------------------|
| | Health and Safety Supervisor | | | | | | build and operate (DBO) contract |
| | Subtotal (A) | | | | | 1,200,000 | |
| B. | Mitigation Measures | | | | | | |
| 1 | Consent for establishments and consent for operation from West Bengal Pollution Control Board (WBPCB) | Pre-construction | Lump sum | | | 200,000 | Project costs |
| 2 | Provision for tree cutting and compensatory plantation measures (1: 5 ratio replantation) | Construction | Per tree | 100 | 1,000 | 100,000 | DBO contract |
| 3 | Traffic management at work sites (Pavement Markings, Channelizing Devices, Arrow Panels and Warning Lights) | Construction | Lump sum | - | - | 100,000 | DBO contract |
| | Subtotal (B) | | | | | 400,000 | |
| C. | Monitoring Measures | | | | | | |
| 1 | Air quality monitoring | Construction | per sample | 50 | 4500 | 225,000 | DBO contract |
| 2 | Noise levels monitoring | Construction | Per sample | 50 | 1350 | 67,500 | DBO contract |
| 3 | Surface water monitoring | Construction | Per sample | 14 | 2860 | 40,000 | DBO contract |
| 4 | Source water quality, water quality at consumer end, sludge quality | Operation | Lump sum / year | - | - | 10,000 | DBO Contract |
| | Subtotal (C) | | | | | 342,500 | |
| D. | Capacity Building | | | | | | |
| 1. | Training on environmental management plan (EMP) implementation | Pre-construction | lump sum | | | 100,000 | PMU |
| 2 | Preparation of plans and protocols (traffic management plan, waste (spoils) management plan | Pre-construction | Lump sum | | | 25,000 | DBO contract |

| | Particulars | Stages | Unit | Total No. | Rate (₹) | Cost (₹) | Costs Covered By |
|----|--|-------------------------------|----------|-----------|----------|------------------|------------------|
| | etc., | | | | | | |
| 3. | Contractors Orientation to Workers on EMP implementation | Prior to dispatch to worksite | Lump sum | | | 25,000 | DBO contract |
| | Subtotal (D) | | | | | 150,000 | |
| | Total (A+B+C+D) | | | | ₹ | 2,092,500 | |

| | |
|-----------------|--------------------|
| Contractor Cost | - 1,992,500 |
| PMU Cost | - 100,000 |
| Total | - 2,092,500 |

IX. CONCLUSION AND RECOMMENDATIONS

177. The process described in this document has assessed the environmental impacts of all elements of the proposed bulk water supply subproject for Haroa, and Bhangar II Blocks. All potential impacts were identified in relation to pre-construction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location were not significant.

178. The main design impacts of water supply system in general are due to abstraction of water. This subproject does not include any new source development or augmentation of existing sources. Water will be sourced from an existing raw water supply system that has adequate capacity to meet the project demand. Raw water source is Hooghly River (Ganges), which carries significant quantities of water throughout the year. Available river flow data indicates that, even during the lean flow season (January to May), project water demand will be only a fraction of total water availability in the river. Quality of river water is good and is suitable for drinking water supply after conventional treatment and disinfection.

179. Locations for subproject components are mostly selected in existing facilities owned by PHED. WTP and clear water reservoir cum booster pumping station will be located within the existing WTP and booster pumping station premises respectively in new town area of Rajarhat. Both the facilities are located in rapidly developing new town area, surrounded by residential and commercial areas. New sites are identified for Haroa and Bhangar II GLSRs. Bhangar II site is an agricultural land with a mango orchard. Few trees will be required to cut; measures suggested to minimize and compensate. Haroa GLSR site is located close to Bidhyadhari River, however, no interference envisaged. It is suggested to safeguard the site with proper engineering against heavy floods in the river. Proposed pipeline will be laid along the roads from WTP to booster pumping station along the roads. Overall, there are no notable sensitive environmental features in the project sites.

180. Construction activities will be confined to the selected sites, and the interference with the general public and community around is minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupation health and safety aspects. During the construction phase of pipeline work along the public roads, impacts arise from the construction dust and noise; from the

disturbance of residents, businesses, traffic by the construction work, and from the need to dispose of large quantities of waste soil. The social impacts (access disruptions) due to construction activities are minimal. Trenchless technology is suggested at critical sections where pipeline crosses the main transportation corridors. These are all general impacts of construction in urban and habitation areas, and there are well developed methods of mitigation that are suggested in the EMP.

181. Anticipated impacts of water supply during operation and maintenance will be related to operation of WTP, handling and application of chlorine, operation of pump houses, and repair and maintenance activities. Various provisions are already made in the design: to recirculate wastewater from WTP; collect, thicken and dispose sludge; chlorine safety; use energy efficiency equipment, etc., Water supply system will be operated using the standard operating procedures following an operating manual, which will be prepared by the DBO contractor. Thus, considering the design and proposed operational procedures, it is unlikely that there will be any significant negative impacts due to operation of water supply system. It is important that proper O&M system as per the SOPs is must. Application and handling of chlorine gas will involve certain risks, and appropriate measures are suggested for safe application including PPEs, awareness programs and mock drills. The DBO Contractor will implement the operation stage EMP. There may be requirement of repairs in pipelines due to leaks and pipe bursts. Proper design and selection of good quality pipe material shall mean that leaks are minimal. Leak repair work will be similar to the pipe-laying work.

182. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation. No land parcels excepting that for the WTP are available at present. This process would commence once land parcels are made available.

183. The project's grievance redress mechanism will provide the citizens with a platform for redress their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

184. The EMP will assist the project agencies and DBO contractor in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project.

185. A copy of the EMP/approved SEMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

186. The project will benefit the general public by contributing to the long-term improvement of water supply system and community livability in the project blocks of Haroa and Bhangar II. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.

187. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government guidelines WTP requires consent to establish (CTE) and consent to operate

(CTO) from WBPCB. CTE has already been obtained from WBPCB.

188. This IEE shall be updated again after finalization of all design (including possession of all land) to reflect any changes, amendments and will be reviewed and approved by PMU, and further submitted to ADB for approval.

Appendix 1: Rapid EA Checklist

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

WATER SUPPLY

Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- ☐ Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project

India / West Bengal Drinking Water Sector Improvement Project – Rajarhat, Haroa and Bhangar II Bulk Water Supply Subproject

Title: Sector

Division:

Urban Development

| SCREENING QUESTIONS | Yes | No | REMARKS |
|--|-----|----|---------|
| Water Supply | | | |
| A. Project Siting | | | |
| Is the project area... | | | |
| ▪ Densely populated? | | √ | |
| ▪ Heavy with development activities? | | √ | |
| ▪ Adjacent to or within any environmentally sensitive areas? | | √ | |
| • Cultural heritage site | | √ | |
| • Protected Area | | √ | |
| • Wetland | | √ | |
| • Mangrove | | √ | |
| • Estuarine | | √ | |
| • Buffer zone of protected area | | √ | |
| • Special area for protecting biodiversity | | √ | |
| • Bay | | √ | |

| | | | |
|---|---|---|---|
| B. Potential Environmental Impacts Will the Project cause... | | | |
| <ul style="list-style-type: none"> Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff? | | √ | Project involves no new source development. Raw water quality is tested and found that it is suitable for domestic use after conventional treatment and disinfection. Water surveillance program will be included to monitor the raw water quality. |
| <ul style="list-style-type: none"> Impairment of historical/cultural monuments/areas and loss/damage to these sites? | | √ | - |
| <ul style="list-style-type: none"> Hazard of land subsidence caused by excessive ground water pumping? | | √ | Not applicable; subproject does not involve groundwater abstraction |
| <ul style="list-style-type: none"> Social conflicts arising from displacement of communities? | | √ | Project does not involve land acquisition /displacement. No social conflicts envisaged |
| <ul style="list-style-type: none"> Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters? | | √ | Project involves no new source development. Adequate capacity raw water system is already available. |
| <ul style="list-style-type: none"> Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)? | | √ | Raw water quality is tested and found that it is suitable for domestic use. Bacteriological contamination is noticed, and water will be subjected for treatment prior to supply |
| <ul style="list-style-type: none"> Delivery of unsafe water to distribution system? | | √ | Water will be treated and disinfected prior to supply |
| <ul style="list-style-type: none"> Inadequate protection of intake works or wells, leading to pollution of water supply? | | √ | Project involves no new source development. Raw water quality is tested and found that it is suitable for domestic use after conventional treatment and disinfection. Water surveillance program will be included to monitor the raw water quality. |
| <ul style="list-style-type: none"> Over pumping of ground water, leading to salinization and ground subsidence? | | √ | - |
| <ul style="list-style-type: none"> Excessive algal growth in storage reservoir? | | √ | Regular cleaning of storage reservoirs will be conducted during operation |
| <ul style="list-style-type: none"> Increase in production of sewage beyond capabilities of community facilities? | √ | | Sanitation and sewerage system need to be developed in the project area |
| <ul style="list-style-type: none"> Inadequate disposal of sludge from water treatment plants? | | √ | Appropriate provisions for sludge drying and disposal is included in the project |
| <ul style="list-style-type: none"> Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities? | | √ | Adequate buffer is available; all the pumping stations will be located in enclosed buildings with noise control walls to minimize noise propagation |
| <ul style="list-style-type: none"> Impairments associated with transmission lines and access roads? | | √ | - |
| <ul style="list-style-type: none"> Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals. | | √ | Measures for safe handling of chlorine are included |

| | | | |
|--|---|---|--|
| <ul style="list-style-type: none"> Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants? | | √ | Measures for safe handling of chlorine are included |
| <ul style="list-style-type: none"> Dislocation or involuntary resettlement of people | | √ | There is no resettlement of people for project implementation. |
| <ul style="list-style-type: none"> Social conflicts between construction workers from other areas and community workers? | | √ | The contractor will be utilizing the local labor force as far as possible; in case if it is unavoidable, labor camps and facilities will be provided appropriately. No conflicts envisaged |
| <ul style="list-style-type: none"> Noise and dust from construction activities? | √ | | All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed |
| <ul style="list-style-type: none"> Increased road traffic due to interference of construction activities? | √ | | Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference |
| <ul style="list-style-type: none"> Continuing soil erosion/silt runoff from construction operations? | √ | | Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains. |
| <ul style="list-style-type: none"> Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems? | | √ | No; appropriate O&M will be conducted |
| <ul style="list-style-type: none"> Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals? | | √ | Not envisaged |
| <ul style="list-style-type: none"> Accidental leakage of chlorine gas? | | √ | Measures for safe handling of chlorine are included |
| <ul style="list-style-type: none"> Excessive abstraction of water affecting downstream water users? | | √ | River carries huge flow, and the water abstraction for the project is negligible even during lean season |
| <ul style="list-style-type: none"> Competing uses of water? | | √ | Project involves no source augmentation; existing raw water system is being utilized within its available capacity |
| <ul style="list-style-type: none"> Increased sewage flow due to increased water supply | √ | | Sanitation & sewerage needs to be improved |
| <ul style="list-style-type: none"> Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant | √ | | Sanitation & sewerage needs to be improved |

A Checklist for Preliminary Climate Risk Screening

Country/Project: India / West Bengal Drinking Water Sector Improvement Project – Rajarhat, Haroa and Bhangar II Bulk Water Supply Subproject

Sector: Urban Development

Subsector: Water Supply

Division/Department: SARD/SAUW

| Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks. | Yes | No | Remarks |
|---|-----|----|---|
| Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes? | √ | | Area is prone for floods and cyclones |
| Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns disrupt reliability of water supply; sea level rise creates salinity intrusion into proposed water supply source)? | | √ | Unlikely as river carries significant quantities of water; although there will be change in flow due to these events, but may be insignificant. |
| Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? | | √ | No |
| Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)? | | √ | No |

Appendix 1: Copy of CTE Obtained from WBPCB

110C-N0159232

WEST BENGAL POLLUTION CONTROL BOARD

Paribesh Bhawan
10A, Block - LA, Sector III, Bidhannagar
Kolkata - 700 106

Memo No. 140-86-nc-0/19/0317 Dated 19/12/2019

From :
Member Secretary,
West Bengal Pollution Control Board

To :
The Executive Engineer,
P.T.U., 24 Pgs(N), WBDWSTP, P.H.E. Dte.
Utility Building, Tank No. 3, 2nd Floor, Block - AT,
Action Area - IA, New Town, Kolkata - 700156

Sub : Consent to Establish (NOC) from Environmental Point of View

Ref : Your letter No. 790/BD(c) P.T.U.N.24P dated 19/11/2019

WEST BENGAL

Dear Sirs,

In response to the application for Consent to Establish (NOC) for proposed Unit of M/s WBDWSTP, PHE Directorate, Govt. of West Bengal,
for manufacturing/storage/installation of Water Treatment Plant - 100 MLD for water supply to WBHIDCO
at Plot No. WTP/AT Town WTP/AGP D.H. - 5/1, Mouza - Tarulia, P.O. & P.S. -
this is to inform you that this Board hereby grants the Consent to Establish (NOC) from the environmental point of the above subject to the following conditions and special conditions annexed.

New Town, Dist - 24 Pgs(N), Pin - 700156.

1. The quality of sewage and trade effluent to be discharged from your factory shall satisfy the permissible limits as prescribed in IS : 2490 (Pt. I) of 1974, and/or its subsequent amendment and Environment (Protection) Rules 1986.
2. Suitable measures to treat your effluent shall be adopted by you in order to reduce the pollutional load so that the quality of the effluent satisfies the standards mentioned above.
3. You shall have to apply to this Board for its consent to operate and discharge of sewage and trade effluent according to the provisions of the water (Prevention & Control of Pollution) Act, 1974. No sewage or trade effluent shall be discharged by you without prior consent of this Board.
4. All emission from your factory shall conform to the standards as laid down by this Board.
5. No emission shall be permitted without prior approval of this Board and you shall apply to this Board for its consent to operate and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act, 1981.
6. No industrial plant, furnace, flues, chimneys, control equipment, etc. shall be constructed/reconstructed/erected/re-erected without prior approval of this Board.

NO159232

7. You shall comply with
- Water (Prevention and Control of Pollution) Cess Act, 1977, if applicable.
 - Water (Prevention and Control of Pollution) Cess Act, 1978, if applicable.
 - Environment (Protection) Act, 1986
 - Environment (Protection) Rules, 1986
 - Hazardous Wastes (Management and Handling) Rules, 1989 and Amended Rules, 2000
 - Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and Amended Rules, 2000
 - Manufacture, Use, Import and Storage and Hazardous Micro-Organisms, Genetically Engineered Organisms or Cell Rules, 1989
 - The Public Liability Insurance Act, 1991 and Amended Act, 1992
 - The Public Liability Insurance Rules, 1991 and Amended Rules 1993
 - Biomedical Wastes (Management & Handling) Rules, 1998 and Amended Rules 2000 if applicable.
 - Recycled Plastics Manufacture and Usage Rules 1999, if applicable and
 - Ozone Depleting Substances (Regulation & Control) Rules, 2000, if applicable
8. You will have to abide by any other stipulations as may be prescribed by any authority/local bodies/Government Departments etc.

SPECIAL CONDITION: See Annexure:

Any violation of the aforesaid conditions shall entail cancellation of this Consent to Establish (NOC)

Gross Capital Investment Rs. 118,27,75,400/-

Yours faithfully,

Member Secretary,
West Bengal Pollution Control Board
Environmental Engineer
Date: 19/12/19
West Bengal Pollution Control Board
Operation & Execution Cell

Mems. No.

Copy forwarded for information to :

- Chief Inspector of Factories, Government of West Bengal, N. S. Building, Kolkata-700 001
- Director of Industries/Director of Cottage & Small Scale Industries, Government of West Bengal, N. S. Building, Kolkata-700 001
- Guard file, West Bengal Pollution Control Board.
- Environmental Engineer, W/Alipur R.O./Howrah R.O./Hooghly R.O./B.R.O./D.R.O./Haldia R.O./S.R.O./Asansol/ Sub-R.O./WBPC Board

| | | | |
|--|--|--|--|
| Himalaya Bhawan Delhi Road, Dankuni Dist. Hooghly | Vill. Panpur Kalyani Expressway P.O. Narayanpur Dist. 24 Pgs. (N) | Sahid Khudiram Sarani City Centre, Durgapur-16 Dist. Burdwan | 10, Camac Street 2nd Floor Kolkata-700 017 |
| Paribesh Bhawan 10A, LA-Block, Sector-III Salt Lake City, Kolkata - 700 098 | Block-05 at 40 Flats Complex Adjacent to Priyambada Housing Estate P.O. : Khanjanchak, P.S. Durgachak Haldia-721602 Dist. : Purba Medinipur | Paribahan Nagar Matigara, Siliguri Dist.-Darjeeling | |
| Satya Chowdhury Indoor Stadium Balurchar Bandh Road Malda-732101 | Asansol Sub-Regional Office ADDA Commercial Market (2nd Floor) Opposite Asansol Fire Station G.T. Road, Asansol-713 301 | Member Secretary, West Bengal Pollution Control Board | |

Annexure to NOC SL NO159232

Special Conditions issued to **Water Treatment Plant -100 MLD** by WBDWSIP, PHE Directorate, Govt. of West Bengal located at Plot No. WTP/A1 TO WTP/A6 & DH-5/1, Mouza-Tarulia, P.O&P.S-New Town, Dist-24 Pgs(N), PIN-700156.

A. Emission:- Nil

B. Raw Water Treatment :-

Raw river water : 100 MLD to be treated in Water Treatment Plant as per process description and finally treated water to be supplied to WBHIDCO through the supply pipeline.

C. Solid Waste :- WTP sludge to be used for landfilling and PVC/Plastic waste /gunny bags to be sold.

D. General :-

1. The unit shall take proper measures to control air, water and noise pollution.
2. This NOC is valid only subject to obtaining permission/clearances from the other Competent Authorities as applicable.
3. Ambient noise level not to exceed the permissible limit.
4. No addition/alteration/modification can be done without prior permission from the State Board.
5. The unit shall obtain Consent to Operate of the State Board before starting operation.
6. Good housekeeping to be maintained.
7. Adequate green belt around the unit to be developed.
8. This NOC is valid upto **30.11.2026** for setting up the Water Treatment Plant – 100 MLD capacity.

Handwritten signature and date: 19/12/19
 Environmental Engineer
 West Bengal Pollution Control Board
 Environmental Engineer
 W. B. Pollution Control Board
 Operation & Execution Cell

1981. ...and atmospheric emission as per provision of the Air (Prevention & Control Pollution) act,

6. No industrial plant, furnace, flues, chimneys, control equipment, etc. shall be constructed/reconstructed/erected/re-erected without prior approval of this Board.

Appendix 2: National Ambient Air Quality Standards

A. NATIONAL AMBIENT AIR QUALITY STANDARDS

| | Pollutants | Time Weighted Average | Concentration in Ambient Air | | Method of Measurement |
|---|---|-----------------------|--|------------------------------|---|
| | | | Industrial, Residential, Rural and Other Areas | Ecologically Sensitive Areas | |
| 1 | Sulphur Dioxide (SO ₂) µg/m ³ | Annual 24 hours | 50 80 | 20 80 | Improved West and Geake-Ultraviolet fluorescence |
| 2 | Nitrogen Dioxide (NO ₂) µg/m ³ | Annual 24 hours | 40 80 | 30 80 | Modified Jacob and Hochheiser (Na-Arsenite) Chemiluminescence |
| 3 | Particulate Matter (Size less than 10 µm) or PM10 µg/m ³ | Annual 24 hours | 60 100 | 60 100 | Gravimetric -TOEM -Beta attenuation |
| 4 | Particulate Matter (Size less than 2.5 µm) or PM2.5 µg/m ³ | Annual 24 hours | 40 60 | 40 60 | Gravimetric -TOEM -Beta attenuation |
| 5 | Carbon Monoxide (CO) mg/m ³ | 8 hours 1 hours | 02 04 | 02 04 | Non Dispersive Infra Red (NDIR) Spectroscopy |

B. NATIONAL AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

| Area code | Category of area/zone | Limit (dBA) | |
|-----------|-----------------------|-------------|------------|
| | | Day time | Night time |
| A | Industrial area | 75 | 70 |
| B | Commercial area | 65 | 55 |
| C | Residential area | 55 | 45 |
| D | Silence zone | 50 | 40 |

Appendix 3: Vehicle Exhaust Emission Norms

VEHICLE EXHAUST EMISSION NORMS

1. Passenger Cars

| Norms | CO(g/km) | HC+ NOx(g/km) |
|------------------------|------------|-----------------|
| 1991 Norms | 14.3-27.1 | 2.0(Only HC) |
| 1996 Norms | 8.68-12.40 | 3.00-4.36 |
| 1998 Norms | 4.34-6.20 | 1.50-2.18 |
| India stage 2000 norms | 2.72 | 0.97 |
| Bharat stage-II | 2.2 | 0.5 |
| Bharat Stage-III | 2.3 | 0.35 (combined) |
| Bharat Stage-IV | 1.0 | 0.18 (combined) |

2. Heavy Diesel Vehicles

| Norms | CO(g/kmhr) | HC (g/kmhr) | NOx (g/kmhr) | PM(g/kmhr) |
|------------------------|------------|-------------|--------------|------------|
| 1991 Norms | 14 | 3.5 | 18 | - |
| 1996 Norms | 11.2 | 2.4 | 14.4 | - |
| India stage 2000 norms | 4.5 | 1.1 | 8.0 | 0.36 |
| Bharat stage-II | 4.0 | 1.1 | 7.0 | 0.15 |
| Bharat Stage-III | 2.1 | 1.6 | 5.0 | 0.10 |
| Bharat Stage-IV | 1.5 | 0.96 | 3.5 | 0.02 |

Source: Central Pollution Control Board

CO = Carbon Monoxide; g/kmhr = grams per kilometer-hour; HC = Hydrocarbons; NOx = oxides of nitrogen; PM = Particulates Matter

Appendix 4: Recent Activities at Construction Sites

Photo Illustration



Arrangement of beds (bamboo cot) in labour camp at WTP site, Rajarhat



Toilet arrangement in labour camp at WTP site, Rajarhat



Use of caution tape, public information board and safety signage placed at excavation area of WTP site, Rajarhat



Uncleaned surrounding area of labour camp at WTP site, Rajarhat. Housekeeping is required



Outdoor training program on First Aid done at WTP site



Partial use of safety gears seen in piling activity

Appendix 5: Air Pollution from Construction Activity

DEPARTMENT OF ENVIRONMENT'S DIRECTION UNDER AIR ACT, 1981 FOR CONTROL OF AIR POLLUTION FROM CONSTRUCTION ACTIVITIES IN WEST BENGAL



**Department of Environment
Government of West Bengal
Writers' Buildings, "G" Block, (2nd. Floor),
Kolkata-700 001.**

No. EN/3170/T-IV-7/001/2009

Dated: December 10th, 2009.

D I R E C T I O N

WHEREAS, Department of Environment, Govt. of West Bengal is entrusted to look after the execution of the different environmental laws within the territorial jurisdiction of West Bengal and also responsible for maintaining pollution free environment and also responsible for restraining different environment hazardous activities which are causing serious impact on human beings, other living creatures, plant, micro-organism, property or the environment ;

AND WHEREAS, Department of Environment has already taken different steps for controlling air pollution in the atmosphere generated from the different sources i.e. industrial source, vehicular source and burning of bio-mass;

AND WHEREAS, Department of Environment in exercising the power conferred under section 19 of the Air (Prevention & Control of Pollution) Act, 1981, has already declared entire West Bengal as 'Air Pollution Control Area';

AND WHEREAS, West Bengal Pollution Control Board conducted a study with the help of the Asian Development Bank and it is revealed that the contribution of the construction activities is one of the source of air pollution in Kolkata and its surroundings ;

AND WHEREAS, it is further revealed that burning of old tyres in hot mix plant as a fuel during construction and repairs of road for melting coal tar contributes significant obnoxious element into the air which cause a serious problem of the human beings ;

HENCE, in view of the above and in consultation with the West Bengal Pollution Control Board and in exercise of the power conferred under Air (Prevention & Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986, all the municipalities, local authorities and all other concerned Govt. Departments within the State of West Bengal, are now directed to take immediate steps to implement the following norms which need to be strictly followed by the developers, contractors or any other infrastructure developers ;

- Preventive measures need to be taken: -
 - a) Wrap construction area/buildings with geotextile fabric, installing dust barriers, or other actions, as appropriate for the location,
 - b) Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization,
 - c) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process;
 - d) Limit vehicle speeds to 15 mph on the work site.
 - e) Clean wheels and undercarriage of haul trucks prior to leaving construction site.
 - f) Apply and maintain dust suppressant on haul routes.
 - g) Apply a cover or screen to stockpiles and stabilize stockpiles at completion of activity by water and maintain a dust palliative to all outer surfaces of the stockpiles;
 - h) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate;
 - i) Stabilize adjacent disturbed soils following paving activities with immediate landscaping activity or installation of vegetative or rock cover.
 - j) Maintain dust control during working hours and clean track out from paved surfaces at the end of the work shift/day. Track out must now extend 50 feet or more and must be cleaned daily, at the minimum.
 - k) Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slope,
 - l) Disposal of debris in consultation with the local authorities following proper environmental management practice.
 - m) During construction work, including cutting of marbles, ambient noise level should not exceed more than 65 dB(A).

Appendix 6: C & D Waste Management Rules

EXTRACT FROM CONSTRUCTION AND DEMOLITION MANAGEMENT RULES, 2016

[Published In the Gazette of India, Part-II, Section-3, Sub-section (ii)]
Ministry of Environment, Forest and Climate Change

NOTIFICATION

New Delhi, the 29th March, 2016

G.S.R. 317(E).—Whereas the Municipal Solid Wastes (Management and Handling) Rules, 2000 published vide notification number S.O. 908(E), dated the 25th September, 2000 by the Government of India in the erstwhile Ministry of Environment and Forests, provided a regulatory frame work for management of Municipal Solid Waste generated in the urban area of the country;

And whereas, to make these rules more effective and to improve the collection, segregation, recycling, treatment and disposal of solid waste in an environmentally sound manner, the Central Government reviewed the existing rules and it was considered necessary to revise the existing rules with a emphasis on the roles and accountability of waste generators and various stakeholders, give thrust to segregation, recovery, reuse, recycle at source, address in detail the management of construction and demolition waste.

And whereas, the draft rules, namely, the Solid Waste Management Rules, 2015 with a separate chapter on construction and demolition waste were published by the Central Government in the Ministry of Environment, Forest and Climate Change vide G.S.R. 451 (E), dated the 3rd June, 2015 inviting objections or suggestions from the public within sixty days from the date of publication of the said notification;

And Whereas, the objections or suggestions received within the stipulated period were duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sections 6, 25 of the Environment (Protection) Act, 1986 (29 of 1986), and in supersession of the Municipal Solid Wastes (Management and Handling) Rules, 2000, except as respect things done or omitted to be done before such supersession, the Central Government hereby notifies the following rules for Management of Construction and Demolition Waste —

1. Short title and commencement.—(1) These rules shall be called the Construction and Demolition Waste Management Rules, 2016.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. Application.—The rules shall apply to every waste resulting from construction, re-modeling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.

3. Definitions —(1) In these rules, unless the context otherwise requires,—

(a) “ACT” means the Environment (Protection) Act, 1986 (29 of 1986);

(b) “**construction**” means the process of erecting of building or built facility or other structure, or

building of infrastructure including alteration in these entities,;

- (c) **"construction and demolition waste"** means the waste comprising of building materials, debris and rubble resulting from construction, re-modeling, repair and demolition of any civil structure;
- (d) **"de-construction"** means a planned selective demolition in which salvage, re-use and recycling of the demolished structure is maximized;
- (e) **"demolition"** means breaking down or tearing down buildings and other structures either manually or using mechanical force (by various equipment) or by implosion using explosives.
- (f) **"form"** means a Form annexed to these rules;
- (g) **"local authority"** means an urban local authority with different nomenclature such as municipal corporation, municipality, nagarpalika, nagarnigam, nagarpanchayat, municipal council including notified area committee and not limited to or any other local authority constituted under the relevant statutes such as gram panchayat, where the management of construction and demolition waste is entrusted to such agency;
- (h) **"schedule"** means a schedule annexed to these rules;
- (i) **"service provider"** means authorities who provide services like water, sewerage, electricity, telephone, roads, drainage etc. often generate construction and demolition waste during their activities, which includes excavation, demolition and civil work;
- (j) **"waste generator"** means any person or association of persons or institution, residential and commercial establishments including Indian Railways, Airport, Port and Harbour and Defence establishments who undertakes construction of or demolition of any civil structure which generate construction and demolition waste.
- (2) Words and expressions used but not defined herein shall have the same meaning defined in the ACT.

(4) Duties of the waste generator -

- (1) Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules.
- (2) The generator shall ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately.
- (3) Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work and keep the concerned

authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis.

(4) Every waste generator shall keep the construction and demolition waste within the premise or get the waste deposited at collection centre so made by the local body or handover it to the authorised processing facilities of construction and demolition waste; and ensure that there is no littering or deposition of construction and demolition waste so as to prevent obstruction to the traffic or the public or drains.

(5) Every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities; Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by them, apart from the payment for storage, collection and transportation. The rate shall be fixed by the concerned local authority or any other authority designated by the State Government.

(5) Duties of service provider and their contractors -

(1) The service providers shall prepare within six months from the date of notification of these rules, a comprehensive waste management plan covering segregation, storage, collection, reuse, recycling, transportation and disposal of construction and demolition waste generated within their jurisdiction.

(2) The service providers shall remove all construction and demolition waste and clean the area every day, if possible, or depending upon the duration of the work, the quantity and type of waste generated, appropriate storage and collection, a reasonable timeframe shall be worked out in consultation with the concerned local authority.

(3) In case of the service providers have no logistics support to carry out the work specified in sub-rules (1) and (2) , they shall tie up with the authorised agencies for removal of construction and demolition waste and pay the relevant charges as notified by the local authority.

(6) Duties of local authority-The local authority shall,-

(1) issue detailed directions with regard to proper management of construction and demolition waste within its jurisdiction in accordance with the provisions of these rules and the local authority shall seek detailed plan or undertaking as applicable, from generator of construction and demolition waste;

(2) chalk out stages, methodology and equipment, material involved in the overall activity and final clean up after completion of the construction and demolition ;

(3c) seek assistance from concerned authorities for safe disposal of construction and demolition waste contaminated with industrial hazardous or toxic material or nuclear waste if any;

(4) shall make arrangements and place appropriate containers for collection of waste and shall remove at regular intervals or when they are filled, either through own resources or by appointing private operators;

- (5) shall get the collected waste transported to appropriate sites for processing and disposal either through own resources or by appointing private operators;
- (6) shall give appropriate incentives to generator for salvaging, processing and or recycling preferably in-situ;
- (7) shall examine and sanction the waste management plan of the generators within a period of one month or from the date of approval of building plan, whichever is earlier from the date of its submission;
- (8) shall keep track of the generation of construction and demolition waste within its jurisdiction and establish a data base and update once in a year;
- (9) shall devise appropriate measures in consultation with expert institutions for management of construction and demolition waste generated including processing facility and for using the recycled products in the best possible manner;
- (10) shall create a sustained system of information, education and communication for construction and demolition waste through collaboration with expert institutions and civil societies and also disseminate through their own website;
- (11) shall make provision for giving incentives for use of material made out of construction and demolition waste in the construction activity including in non-structural concrete, paving blocks, lower layers of road pavements, colony and rural roads.

(7) Criteria for storage, processing or recycling facilities for construction and demolition waste and application of construction and demolition waste and its products-

- (1) The site for storage and processing or recycling facilities for construction and demolition waste shall be selected as per the criteria given in **Schedule I**;
- (2) The operator of the facility as specified in sub- rules (1) shall apply in **Form I** for authorization from State Pollution Control Board or Pollution Control Committee.
- (3) The operator of the facility shall submit the annual report to the State Pollution Control Board in **Form II**.
- (3) Application of materials made from construction and demolition waste in operation of sanitary landfill shall be as per the criteria given in **Schedule II**.

(8) Duties of State Pollution Control Board or Pollution Control Committee-

- (1) State Pollution Control Board or Pollution Control Committee shall monitor the implementation of these rules by the concerned local bodies and the competent authorities and the annual report shall be sent to the Central Pollution Control Board and the State Government or Union Territory or any other State level nodal agency identified by the State Government or Union Territory administration for generating State level comprehensive data. Such reports shall also contain the comments and suggestions of the State Pollution Control Board or Pollution Control Committee with respect to any comments or changes required;

(2) State Pollution Control Board or Pollution Control Committee shall grant authorization to construction and demolition waste processing facility in **Form-III** as specified under these rules after examining the application received in **Form I**;

(3) State Pollution Control Board or Pollution Control Committee shall prepare annual report in **Form IV** with special emphasis on the implementation status of compliance of these rules and forward report to Central Pollution Control Board before the 31st July for each financial year.

(9) Duties of State Government or Union Territory Administration-

(1) The Secretary in-charge of development in the State Government or Union territory administration shall prepare their policy document with respect to management of construction and demolition of waste in accordance with the provisions of these rules within one year from date of final notification of these rules.

(2) The concerned department in the State Government dealing with land shall be responsible for providing suitable sites for setting up of the storage, processing and recycling facilities for construction and demolition waste.

(3) The Town and Country planning Department shall incorporate the site in the approved land use plan so that there is no disturbance to the processing facility on a long term basis.

(4) Procurement of materials made from construction and demolition waste shall be made mandatory to a certain percentage (say 10-20%) in municipal and Government contracts subject to strict quality control.

(10) Duties of the Central Pollution Control Board - (1) The Central Pollution Control Board shall,-

(a) prepare operational guidelines related to environmental management of construction and demolition waste management;

(b) analyze and collate the data received from the State Pollution Control Boards or Pollution Control Committee to review these rules from time to time;

(c) coordinate with all the State Pollution Control Board and Pollution Control Committees for any matter related to development of environmental standards;

(d) forward annual compliance report to Central Government before the 30th August for each financial year based on reports given by State Pollution Control Boards of Pollution Control Committees.

(11) Duties of Bureau of Indian Standards and Indian Roads Congress -The Bureau of Indian Standards and Indian Roads Congress shall be responsible for preparation of code of practices and standards for use of recycled materials and products of construction and demolition waste in respect of construction activities and the role of Indian Road Congress shall be specific to the standards and practices pertaining to construction of roads.

Schedule III
Timeframe for Planning and Implementation
[See Rule 13]

| Sl. No. | Compliance Criteria | Cities with population of 01 million and above | Cities with population of 0.5-01 million | Cities with population of less than 0.5 million |
|---------|--|--|--|---|
| 1 | Formulation of policy by State Government | 12 months | 12 months | 12 months |
| 2 | Identification of sites for collection and processing facility | 18 months | 18 months | 18 months |
| 3 | Commissioning and implementation of the facility | 18 months | 24 months | 36 months |
| 4 | Monitoring by SPCBs | 3 times a year – once in 4 months | 2 times a year – once in 6 months | 2 times a year – once in 6 months |

**The time Schedule is effective from the date of notification of these rules.*

FORM – I
See [Rule 7 (2)]
Application for obtaining authorisation

To,
The Member Secretary

_____ Name of the local authority or Name of the agency :
appointed by the municipal authority

| | |
|---|---|
| Correspondence address Telephone No. Fax No. | |
| Nodal Officer and designation (Officer authorized by the competent authority or agency responsible for operation of processing or recycling or disposal facility) | |
| Authorisation applied for (Please tick mark) | Setting up of processing or recycling facility of construction and demolition waste |
| Detailed proposal of construction and demolition waste processing or recycling facility to include the following Location of site approved and allotted by the Competent Authority. Average quantity (in tons per day) and composition of construction and demolition waste to be handled | |

Appendix 7: Labor laws

SALIENT FEATURES OF MAJOR LABOR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN CONSTRUCTION OF CIVIL WORKS

- (i) Workmen Compensation Act, 1923 - The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (ii) Payment of Gratuity Act, 1972 - Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days' wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (iii) Employees' PF and Miscellaneous Provisions Act, 1952 - The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are: (a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.
- (iv) Maternity Benefit Act, 1951 - The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (v) Contract Labour (Regulation and Abolition) Act, 1970 - The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.
- (vi) Minimum Wages Act, 1948 - The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.
- (vii) Payment of Wages Act, 1936 - It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (viii) Equal Remuneration Act, 1979 - The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (ix) Payment of Bonus Act, 1965 - The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

(x) Industrial Disputes Act, 1947 - The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(xi) Industrial Employment (Standing Orders) Act, 1946 - It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

(xii) Trade Unions Act, 1926 - The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) Child Labor (Prohibition and Regulation) Act, 1986 - The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labor is prohibited in Building and Construction Industry.

(xiv) Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979 - The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.

(xv) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996 - All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

Appendix 8: Drinking Water Standards

DRINKING WATER STANDARDS

| No. | Substance or Characteristic | Requirement Desirable Limit | Undesirable Effect Outside the Desirable | Permissible Limit in the Absence of Alternate Source | Remarks |
|----------------------------------|---|-----------------------------|---|--|---|
| Essential Characteristic | | | | | |
| 1. | Color Hazen Units, Max | 5 | Above 5, consumer acceptance decreases | 25 | Extended to 25 only if toxic Substance are not suspect in absence of alternate sources |
| 2. | Odor | Unobjectionable | - | - | a) test cold and when heated b) test are several dilutions |
| 3. | Taste | Agreeable | - | - | Test to be conducted only after safely has been established |
| 4. | Turbidity (NTU) Max | 5 | Above 5, consumer acceptance decreases | 10 | - |
| 5. | pH value | 6.5 to 8.5 | Beyond this range the water will after the mucous membrane and/or water supply system | No relaxation | - |
| 6. | Total Hardness (mg/L) CaCO ₃ | 300 | Encrustation in water supply structure and adverse effects on domestic use | 600 | - |
| 7. | Iron (mg/L, Fe) Max | 0.3 | Beyond this limit taste/appearance are affected; has adverse effects on domestic uses and water supply structure and promotes iron bacteria | 1.0 | - |
| 8. | Chlorides 250 (mg/L, Cl) Max | 250 | Beyond effects outside the desirable limit | 1000 | - |
| 9. | Residual free Chlorine (mg/L), Max | 0.2 | - | - | To be applicable only when water is chlorinated. Tested at customer end. When protection against viral infection is required, it should be min. 0.5 mg/L. |
| Desirable Characteristics | | | | | |
| 10. | Dissolved solids mg/L. Max | 500 | Beyond this, palatability decreases and may cause gastrointestinal irritation. | 2000 | - |
| 11. | Calcium (mg/L, Ca) Max. | 75 | Encrustation in water supply structure and adverse effects on domestic use. | 200 | - |
| 12. | Magnesium (mg/L, Mg) Max | 30 | Encrustation in water supply structure and adverse effects on domestic use. | 100 | - |

| | | | | | |
|-----|--------------------------|------|---|-----|---|
| 13. | Copper (mg/L, Cu) Max | 0.05 | Astringent taste dis coloration and corrosion of | 1.5 | - |
|-----|--------------------------|------|---|-----|---|

| No. | Substance or Characteristic | Requirement Desirable Limit | Undesirable Effect Outside the Desirable | Permissible Limit in the Absence of Alternate Source | Remarks |
|-----------------------|---|-----------------------------|--|--|---|
| | | | pipes fittings and utensils will be caused beyond this. | | |
| 14. | Manganese (mg/L, Mn) Max | 0.1 | Beyond this limit taste/appearance are affected, has adverse effect on domestic use and water supply structure | 0.3 | - |
| 15. | Sulphate (mg/L, SO ₄) Max. | 200 | Beyond this causes gastro intestinal irritation when magnesium or sodium are present | 400 | May be extended up to 400 provided magnesium (as Mg) does not exceed 30 |
| 16. | Nitrate (mg/L, NO ₃) Max. | 45 | Beyond this methaemoglobinemia takes place. | 100 | - |
| 17. | Fluoride (mg/L, F) Max. | 1.0 | Fluoride may be kept as low as possible. High fluoride may cause fluorosis. | 1.5 | - |
| 18. | Phenolic Compounds (mg/L C ₆ H ₅ OH) Max. | 0.001 | Beyond this, it may cause objectionable taste and odor | 0.002 | - |
| 19. | Mercury (mg/L Hg) Max | 0.001 | Beyond this the water becomes toxic | No Relaxation. | To be tested when pollution is suspected |
| 20. | Cadmium (mg/L, Cd) Max | 0.01 | Beyond this the water becomes toxic | No Relaxation. | To be tested when pollution is suspected |
| 21. | Selenium (mg/L, Se) Max | 0.01 | Beyond this the water becomes toxic. | No Relaxation. | To be tested when pollution is suspected |
| 22. | Arsenic (mg/L, As) Max. | 0.01 | Beyond this the water becomes toxic | No Relaxation | To be tested when pollution is suspected |
| 23. | Cyanide | 0.05 | Beyond this the water becomes toxic | No Relaxation | To be tested when pollution is suspected |
| 24. | Lead (mg/L Pb) Max. | 0.05 | Beyond this the water becomes toxic | No Relaxation | To be tested when pollution is suspected |
| 25. | Zinc (mg/L, Zn) Max. | 5 | Beyond this limit it can cause astringent taste and an opalescence in water | 15 | To be tested when pollution is suspected |
| 26. | Anionic detergents (mg/L, MBAS) Max | 0.2 | Beyond this limit it can cause a light froth in water | 1.0 | To be tested when pollution is suspected |
| 27. | Chromium (mg/L, Cr ⁶⁺) | 0.05 | May be carcinogenic above this limit | - | - |
| 28. | Polynuclear Aromatic Hydrocarbons (mg/l, PAH) Max | - | May be carcinogenic | - | - |
| 29. | Mineral oil (mg/L) | 0.01 | Beyond this limit, undesirable taste and odor after chlorination takes place | 0.03 | To be tested when pollution is suspected |
| 30. | Pesticides (mg/L) max | Absent | Toxic | 0.001 | - |
| Radioactive materials | | | | | |
| 31. | Alpha emitters Bq/L Max | - | - | 0.1 | - |
| 32. | Beta emitters Pci/L Max | - | - | 1.0 | - |

| No. | Substance or Characteristic | Requirement Desirable Limit | Undesirable Effect Outside the Desirable | Permissible Limit in the Absence of Alternate Source | Remarks |
|------------|------------------------------------|------------------------------------|---|---|----------------|
| 33. | Alkalinity (mg/L.) Max | 200 | Beyond this limit, taste becomes unpleasant | 600 | - |
| 34. | Aluminum (mg/L, Al) Max | 0.03 | Cumulative effect is reported to cause dementia | 0.2 | |
| 35. | Boron (mg/L) Max | 1.0 | - | 5.0 | - |

Appendix 9: NOC for Sundarban Biosphere

NOC of Sundarban Biosphere Reserve from Sundarban Biosphere Authority

DIRECTORATE OF FORESTS
OFFICE OF THE ADDL. PRINCIPAL CHIEF CONSERVATOR OF FORESTS & DIRECTOR
SUNDARBAN BIOSPHERE RESERVE, WEST BENGAL
BIKASH BHAWAN, 3RD FLOOR, NORTH BLOCK
SALT LAKE CITY, KOLKATA - 700 091
TELEFAX 2321-1750/1529, E-MAIL :sbrdir@gmail.com

No. 1095 /SBR/C-21/17

Dated : 05-03-2019

From : The APCCF & Director, Sundarban Biosphere Reserve
West Bengal.

To : The Project Director, PMU
West Bengal Drinking Water Sector Improvement Project
PHE Dte., Govt. of West Bengal

Sub : Construction of ground level storage reservoir and small pipelines in
Haroa and Bhangar -II blocks of North and South 24 Parganas requirement of
regulatory permission, if any.

Ref : Your Memo No. PMU/WBDWSIP/PHED/06/79 dt. 25.01.2019

With reference to the above noted communication this is to inform you that Haroa and Bhangar -II blocks of North and South 24 Parganas does not have Forest land & does not required any permission from this end.

APCCF & Director
Sundarban Biosphere Reserve
West Bengal

Murmu/HC/SBR/05.03.19

Appendix 10: Land Possession Letter from WBHIDCO

Land Possession Letter from WBHIDCO – For WTP

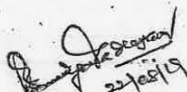


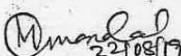
Permissive Possession Certificate

In pursuance of memo no. PMU/WBDWSIP/PHEP/92/774 Dated, New Town, the 22.08.2019 of Chief Engineer & Project Director PMU, WBDWSIP, PHE Dte. Govt. of West Bengal the permissive Possession of the bulk land in plot no. 1) WTP/A1+A1/1, measuring about (1.935 Acres+0.828 Acres) 2.763 Acres, 2) WTP/A2, measuring about 0.241 Acres, 3) WTP/A3, measuring about 0.083 Acres, 4) WTP/A4+A4/1, measuring about (0.739 Acres+0.104 Acres) 0.843 Acres, 5) WTP/A5, measuring about 0.224 Acres and 6) WTP/A6, measuring about 1.439 Acres in Action Area-IA, Total land Measuring 5.593 Acres under New Town Police Station in favour of Public Health Engineering Department, Government of West Bengal, for establishing of extension of Water Treatment Plant, as per the enclosed drawing No. HIDCO/PLG/AA-I/W-676 (R-2) dated 25.07.2019, prepared by the Planning Wing of WBHIDCO showing the boundary coordinates as properly demarcated by RCC made HIDCO pillars is handed over to authorized person Shri Sudip Kumar Mandal, Executive Engineer, PIU, North 24 Parganas, WBDWSIP, Public Health Engineering Directorate and such Permissive Possession of the said plot of land has been taken over by him on behalf of Public Health Engineering Department, Government of West Bengal on this 22nd day of August, 2019. This is however subject to execution and registration of the Deed of Lease of after having full payment of lease premium.


Encl: Co-ordinate plot Plan No. HIDCO/PLG/AA-I/W-676 (R-2) dated 25.07.2019 Prepared by Planning Wing of WBHIDCO.

Permissive Possession Handed Over

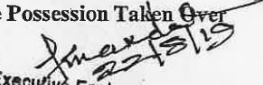

.....
Field Supervisor (EM)
WBHIDCO


.....
Surveyor (EM),
WBHIDCO

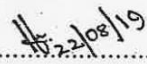

.....
Sub-Asstt. Engineer (EM)
WBHIDCO


.....
Asstt. Engineer (EM),
WBHIDCO

Permissive Possession Taken Over


.....
Executive Engineer
PIU, N-24 Pgs., WBDWSIP, PHE Dte.,
Govt. of West Bengal
Shri Sudip Kumar Mandal, Executive Engineer,
PIU, North 24 Parganas, WBDWSIP, Public Health Engineering Directorate

Countersigned


.....
Estate Manager, WBHIDCO

Copy forwarded for information to:

1. Chief Engineer & Project Director, PMU, WBDWSIP, PHE Dte., Govt. of West Bengal
2. General Manager (Admn.), WBHIDCO.
3. General Manager (Commercial), WBHIDCO
4. Chief Planner, WBHIDCO
5. PS to Hon'ble Chairman, WBHIDCO.
6. PA to Joint Managing Director, WBHIDCO.

WEST BENGAL HOUSING INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.
(A Govt. of West Bengal Undertaking)

"HIDCO BHABAN", Premises No. : 35 - 1111, Biswa Bangla Sarani, 3rd Rotary, New Town, Kolkata-700156
Telephone : (033) 2324-6037/6038, Fax No. : (033) 2324-4833/3016/6009, e-mail : wbhidcoltd@gmail.com / info@wbhidco.in
Website : www.wbhidcoltd.com CIN : U70101WB1999SGC089276

Appendix 11 : Stakeholder Consultations

Table A 12.1. Consultation with Local Community Members at Bhangar

| | Block | Mouza | GP | OHR/GLR Zone Code | No. of Participants | Concerns/Issues Discussed |
|---|-------------|--------------|-------------|--|--------------------------------------|--|
| 1 | Bhangar- II | Satulia | Bhagabanpur | GLR Site | Male : 7 Female : 2 Total : 9 | <ul style="list-style-type: none"> Requirement of piped water supply in the area is broadly accepted by all the participants. Poor quality of drinking water causing threat for the health of local villagers and cattle's too. Ground Water can be contaminated by Arsenic, hence, surface water is ideal. Apart from domestic connection, if possible, the authority may consider to expand the scope of use of piped water to agricultural purpose also. A reasonable and affordable water tariff fixed by the government will be gladly accepted by all. |
| 2 | Bhangar- II | Satulia | Bhagabanpur | Irrigation Department land near approach to GLR site | 8 women 2 girls Total=10 | A cluster of squatter households is located on Irrigation Department land close to the proposed GLR site, Bhangar. On being asked where they collect water from at present, the participants replied that women and girl children had to travel almost 1 Km distance to fetch water from a tube well, and spend about 2 hours each day for the same. As squatter/non-titleholder households, they were concerned whether they would receive water from the project. Every household was desirous of an individual connection and indicated willingness to pay a reasonable user charge, while expressing inability to bear connection charge at one go. In case the project could not provide individual connections, they urged that their cluster be provided with stand posts, which they would maintain. |
| 3 | Bhangar- II | Pithapukuria | Bhagabanpur | Bamunia sch (Z-1) | Male : 8 Female : 2 Total : 10 | <ul style="list-style-type: none"> Consultation with the local people revealed that, they are aware about the side effects of consuming arsenic contaminated water. As they do not have any alternate choices so they choose to use the same. Local tube wells are checked periodically through Panchayats and health dept. officials. The proposed water supply project of PHED will solve their problem permanently. Treated Surface water will not only be good for their health but at the same time people purchasing water from private source will be able save money. Health related expenses due to water will be reduced which will indirectly increase the savings. Women & children are expected to have more benefits. In the question of affordability, the respondents unanimously said that they are willing to pay charges if provided individual household connections. |



List of Participants in Consultation: Bhangar-GLSR

13/8/17

| Sl. NO | Names | Ph. NO | Signature |
|--------|----------------------|------------|-----------|
| 1. | Haran chandra Mondal | 9933506809 | - Brahm |
| 2. | ... | — | NO |
| 3. | ... | — | NO |
| 4. | ... | — | NO |
| 5. | ... | — | NO |
| 6. | ... | — | NO |
| 7. | ... | 8001274900 | — |
| 8. | ... | 7074078961 | — |
| 9. | Subhas Ch. Gogoi | 9735241611 | - Rakhat |
| 10. | Rajkumar Mondal | 9733893984 | — |
| 11. | ... | 9733651201 | — |
| 12. | ... | 9733678186 | — |
| 13. | ... | 9836866159 | — |
| 14. | ... | 8001415018 | — |
| 15. | ... | — | — |
| 16. | ... | 9883916454 | — |
| 17. | ... | 9735366524 | — |
| 18. | ... | 9732559525 | — |
| 19. | ... | 8016672240 | — |
| 20. | ... | NO | — |
| 21. | ... | NO | — |
| 22. | ... | 9732707676 | — |
| 23. | ... | NO | — |
| 24. | ... | NO | — |
| 25. | ... | NO | — |
| 26. | ... | NO | — |
| 27. | ... | NO | — |
| 28. | ... | NO | — |
| 29. | ... | NO | — |
| 30. | ... | NO | — |
| 31. | ... | NO | — |
| 32. | ... | NO | — |
| 33. | ... | NO | — |
| 34. | ... | 9134175206 | — |
| 35. | ... | NO | — |

Table A 12.2. Consultation with Affected Persons and Community Members at Proposed GLSR Site, Haroa

| | Date of Visit | Block | Mouza | Gram Panchayat | OHR / GLR Zone Code | No. of Participants | Concerns/Issues discussed |
|---|----------------------|--------------|--------------|-----------------------|----------------------------|----------------------------|---|
| 1 | 15.1.17 | Haroa | Nazarnagar | Sonapukur Sankarpur | GLSR | 7 male | By lessee: whether 5 bighas land really required, as any land sale over 4 bighas would lead to loss of income of more than Rs. 1 lakh per month to the kiln and would affect him and his workers. By owners/family members: Whether project operation related job could be assured for a member of the land seller's families. By community members: When the project would be operational, how much would be the connection and operation charges. |

Photos of Stakeholder Consultations



Appendix 12: Sample GRC form

SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Bengali and English)

The _____ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

| | | | | | |
|---|-----------------------|--------------|--------------------|-----|--|
| Date | Place of registration | Project Town | | | |
| | | Project: | | | |
| Contact information/personal details | | | | | |
| Name | | Gender | * Male * Female | Age | |
| Home address | | | | | |
| Place | | | | | |
| Phone no. | | | | | |
| E-mail | | | | | |
| Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below: | | | | | |
| If included as attachment/note/letter, please tick here: | | | | | |
| How do you want us to reach you for feedback or update on your comment/grievance? | | | | | |

FOR OFFICIAL USE ONLY

| | |
|--|-----------|
| Registered by: (Name of official registering grievance) | |
| Mode of communication: Note/letter E-mail Verbal/telephonic | |
| Reviewed by: (Names/positions of officials reviewing grievance) | |
| Action taken: | |
| Whether action taken disclosed: | Yes No |
| Means of disclosure: | |

অভিযোগ নিবন্ধন ফর্মের নমুনা

..... প্রকল্পকে বাস্তবায়িত করার লক্ষে অভিযোগ, পরামর্শ, অনুসন্ধান এবং মন্তব্যের জন্য স্বাগত।

আমরা অভিযোগকারীকে অভিযোগ সহ নাম জানাতে উৎসাহিত করি এবং আপনার সাহচর্যে এসে এর শোধন ও প্রতিক্রিয়া জানাতে সক্ষম হই।

অবশ্যই আপনি আপনার ব্যক্তিগত বিষয় বিস্তারিত ভাবে যুক্ত করতে ইচ্ছাপ্রকাশ করবেন। যে তথ্য আপনি দেবেন, তা অবশ্যই গোপন থাকবে। তাই অনুগ্রহ করে আপনার নাম লিখে / টাইপ করে জানান।

| | | | | | |
|---|------------------|---------------------------|----------------|------|--|
| তারিখ | নিবন্ধনের জায়গা | প্রকল্পের শহর প্রকল্পঃ | | | |
| যোগাযোগের তথ্য / বিস্তারিত ব্যক্তিগত তথ্য | | | | | |
| নাম | | লিঙ্গ | পুরুষ মহিলা | বয়স | |
| বাড়ীর ঠিকানা | | | | | |
| জায়গা / স্থান | | | | | |
| ফোন নং | | | | | |
| ই-মেল | | | | | |
| যেকোন অভিযোগ / পরামর্শ / মন্তব্য / প্রশ্ন অনুগ্রহ করে নিচে বিস্তারিতভাবে (কে, কি, কোথায় এবং কেমন করে) আপনার অভিযোগ জানান | | | | | |
| যদি কোন সংযুক্তি / চিরকুট / চিঠি অন্তর্ভুক্ত করতে চান, অনুগ্রহ করে সেখানে টিক দিন। | | | | | |
| আপনার অভিযোগ / মন্তব্যের হালনাগাদ (আপডেট) বা প্রতিক্রিয়া কিভাবে পেতে চান? | | | | | |

Office ব্যবহারের জন্যঃ

| | |
|--|-------------|
| অভিযোগ নিবন্ধনকারী আধিকারিকের নামঃ | |
| যোগাযোগ ব্যবস্থাঃ | |
| চিরকুট / চিঠি- | |
| ই-মেল- | |
| মৌখিক / টেলিফোন- | |
| নিবন্ধকৃত অভিযোগ পর্যালোচনাকারী আধিকারিকের নাম ও পদঃ | |
| অভিযোগের বিরুদ্ধে গৃহীত ব্যবস্থা- | |
| গৃহীত ব্যবস্থা প্রকাশ্যে আনা হয়েছে কি না | হ্যাঁ না |
| প্রকাশের উপায় | |

Appendix 13: GRC Notification

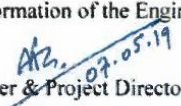
State & District Level Steering committee

Memo no. PMU/WBDWSIP/PHED/104/ 356(1-9)

Dated Kolkata the 07.05.2019

Copy forwarded for information to:

1. P.A. to the Chief Secretary, Govt. of West Bengal. For kind information of the Chief Secretary.
2. P.A. to the Additional Chief Secretary, I & W Department. For kind information of the Additional Chief Secretary.
3. P.A. to the Additional Chief Secretary, P & R Department. For kind information of the Additional Chief Secretary.
4. P.A. to the Additional Chief Secretary, Finance Department. For kind information of the Additional Chief Secretary.
5. P.A. to the Principal Secretary, PHE Department. For kind information of the Principal Secretary
6. P.A. to the Principal Secretary, Public Works Department. For kind information of the Principal Secretary.
7. P.A. to the Principal Secretary, Urban Development & Municipal Affairs Department. For kind information of the Principal Secretary.
8. P.A. to the Principal Secretary, Land and Land Reforms Department. For kind information of the Principal Secretary.
9. P.A. to the Engineer-in-Chief, PHE Department. For kind information of the Engineer-in-Chief.

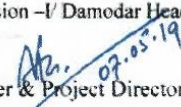

 Chief Engineer & Project Director
 PMU, WBDWSIP, PHE Dte
 Government of West Bengal

Memo no. PMU/WBDWSIP/PHED/104/ 356(1-30)

Dated Kolkata the 07.05.2019

Copy forwarded for information and necessary action to:

1. The District Magistrate, North 24 Parganas/South 24 Parganas/Purba Medinipur/Bankura.
2. The Additional District Magistrate (LR)/DLLRO, Land and Land Reforms Department, North 24 Parganas/ South 24 Parganas/Purba Medinipur/Bankura.
3. The Additional Executive Officer, North 24 Parganas/ South 24 Parganas/ Purba Medinipur/Bankura Zilla Parisad.
4. The Superintending Engineer, PIU, North 24 Parganas/Purba Medinipur/Bankura, WBDWSIP, PHED
5. The Superintending Engineer, Western Highway Circle-II/South Western Highway Circle/Eastern Highway Circle/ Southern Highway Circle, PW (Roads) Dte.
6. The Superintending Engineer, Western Circle II/ South Western Circle, PWD
7. The Superintending Engineer, Metropolitan Drainage Circle-I / Eastern Circle / Kangsabati Circle-I, Bankura / Western Circle-II, Medinipore/ Damodar Irrigation Circle, Irrigation and Waterways Dte.
8. The Executive Engineer, PIU, North 24 Parganas/ Purba Medinipur/ Bankura, PHE Dte
9. The Executive Engineer, Barasat Highway Division -I/ South 24 Parganas Highway Division /Tamluk Highway Division/ Bankura Highway Division, PW (Roads) Dte.
10. The Executive Engineer, Tamluk Division/ Bankura Division, PWD
11. The Executive Engineer, Contai Division/ Kangsabati Canal Division -I/ Damodar Headworks, I & W Dte.


 Chief Engineer & Project Director
 PMU, WBDWSIP, PHE Dte
 Government of West Bengal

**Public Health Engineering Department
West Bengal Drinking Water Sector Improvement Project
(WBDWSIP)**

Minutes of the 1st Meeting of State Level Steering Committee on West Bengal Drinking Water Sector Improvement Project (WBDWSIP) under the Chairmanship of Chief Secretary, West Bengal in the Conference Hall, Nabanna, 13th Floor, Howrah, held on 16.04.2019 at 11:00AM.

The list of Members present is attached as Annexure-A

Chief Secretary, Government of West Bengal took the chair and initiated the discussions.

2) Principal Secretary, Public Health Engineering Department apprised the committee that after the approval of Government of West Bengal and the Department of Economic Affairs, Government of India, Loan agreement with Asian Development Bank was signed on 03.10.2018 for an amount of 240 Million US Dollar as Loan and 3 million US Dollar as Grant under Japanese Fund for Poverty Reduction (JFPR) for execution of 3 (three) Water Supply Projects in Arsenic affected areas of North 24 Parganas district, salinity affected areas of Purba Medinipur district and fluoride affected areas of Bankura district under WBDWSIP. The objective of the Project is to deliver safe, sustainable and inclusive drinking water services in the aforesaid project districts with provision of 100% house hold metered connection to provide 24 X 7 water supply. One Project Management Unit (PMU) headed by Chief Engineer & Project Director and 3 (Three) Project Implementation Units (PIU) headed by Superintending Engineer under P.H. Engineering Department have been established for timely implementation of the Project.

3) Chief Engineer & Project Director described the details of the project through a power point presentation and highlighted the following points in respect of three subprojects:

- i) In Bankura district, the DPR for Bankura district has been prepared considering 8 (eight) blocks namely Taldangra, Indpur, Gangajalghati, Mejhia, Sonamukhi, Patrasayer, Joypur and Kotolpur. But presently the 4 (four) blocks, namely Taldangra, Indpur, Gangajalghati and

Mejhia will be covered fully through piped water supply with the financial assistance from ADB. The proposal for remaining 4(four) blocks will be taken up with ADB for additional funding as the ADB officials advised in their *aide memoire* during their last consultation mission on 26-27 March, 2019.

- ii) In **Purba Medinipur district**, DPR for 4(four) Blocks namely Nandakumar, Chandipur, Nandigram-I and Nandigram-II has been prepared. But presently 2(Two) Blocks namely Nandigram –I and Nandigram –II will be covered fully through piped water supply with the financial assistance from ADB. But the Water Treatment Plant will be constructed for catering to all 4(four) blocks as mentioned above. The proposal for remaining 2(Two) blocks will be taken up with ADB for additional funding.
- iii) In **North 24 Parganas and South 24 Parganas districts**, Haroa and Bhangar-II blocks will be covered fully through piped water supply but Water Treatment Plant is considered for Barasat-II block also. The cost of distribution network for Barasat-II block is not considered under this Loan assignment. Now one DPR has been prepared for distribution network of Barasat-II Block for proposal initiation with ADB.
- iv) Presently 4 (four) Consultancy firms and 3 (three) NGOs have been engaged to assist PMU and 3(three) PIUs as per ADB approved Project Administration Manual (PAM). Moreover, Technical Assistance (TA) Consultant has also been engaged by the ADB for Smart Water Management.
- v) Purchase of Private land for construction of Intake Structure, Water Treatment Plant and Overhead reservoirs is under process for all the schemes. The land parcels lying with other Government Department are also being processed for Inter Departmental Transfer. All efforts will be taken to get the required parcels of land in possession of PHED well in advance so that project implementation is not affected for want of site at any stage.
- vi) Communication has been made with WBIDC for issuance of confirmation to Damodar Valley Reservoir Regulatory Commission

(DVRRC) regarding drawal of 70MLD water from Durgapur Barrage to get the drawal permission from DVRRC. The same was issued by WBIDC on 29.06.2018 addressed to Member Secretary DVRRC but DVRRC again asked for reconfirmation regarding the present requirement. The matter will be taken up again with WBIDC and also referred to me&W Department for taking up with DVRRC for expeditious action.

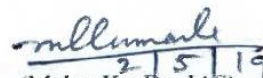
- vii) Postings of Sr. Accounts Officer at PMU and Accounts Officer at PIU-Purba Medinipur is required to be made on urgent basis as the loan disbursement and expenditures have already been started. The ADB officials highlighted the issue during their last mission. AGWB has already replied that there is no sanctioned post of Sr Accounts Officer/Accounts Officer under the Administrative Control of Works Miscellaneous Section and no scope to provide any regular Sr A.O./A.O. for the post. Proposal for re-designation of Sr Accounts Officer/Accounts Officer Post as Divisional Accounts Officer have been submitted to Finance Department for approval in consultation with the Financial Advisor, PHE Department. The Additional Secretary, Finance Department informed that he will look into the proposal of PHED.
- 4) Additional Chief Secretary, Irrigation and Waterways Department assured that the issues related to I & W Department will be taken care of on priority basis for smooth implementation of the project.
- 5) Additional Chief Secretary, Panchayats & Rural Development Department informed that necessity of piped water supply in other water quality affected blocks of North 24 Parganas, South 24 Pargana, Purba Medinipur and Bankura districts also needs to be looked into on urgent basis. The Principal Secretary, PHE Department informed that at present PHE Department has taken up a few surface water based water supply schemes which include ADB and JICA assisted schemes to provide safe and sustainable drinking water in the quality affected blocks of West Bengal under different Programmes which will be commissioned within the next 2 to 3 Years. The present population

covered through piped water supply scheme in west Bengal is about 58% and once the ongoing schemes are commissioned the coverage would reach 72%.

- 6) Principal Secretary, PHE Department proposed that the Principal Secretaries of P.W. Department, Land and Land Reforms Department and Urban Development & Municipal Affairs Departments may also be incorporated as members of the committee for more effective coordination and collaboration for timely commissioning of projects. In addition, Superintending Engineer/Executive Engineer, PWD, PW (Roads) and ADM (LR)/ DLLRO of the Project districts may also be included as invitee members of the District Level Steering Committee. The Chief Secretary agreed with the proposal. The revised list of members of State Level and District Level Steering Committee is attached as Annexure-B.

Chief Secretary advised that PHED must prepare an action plan and shelf of projects so that the entire state is covered with piped water supply schemes within the next 6 to 7 years by fixing priority in the quality affected blocks. He further advised that proposals for the remaining blocks to be covered under this project may be initiated by the PHE Department as early as possible.

There being no other issues for discussion, the meeting ended with vote of thanks to and from the Chair.


21/5/19
(Malay Kr. De, IAS)

Chief Secretary
Government of West Bengal

Annexure-B**A. Restructured State Level Steering Committee for ADB Assisted Project (WBDWSIP) under PHE Department.****Members of the State Level Steering Committee :-**

| | | |
|----|--|-------------------------|
| 1 | The Chief Secretary, Govt. of West Bengal- | Chairperson |
| 2 | The Principal Secretary / Additional Chief Secretary, PHE Department- | Member |
| 3 | The Principal Secretary / Additional Chief Secretary, P & RD Department | Member |
| 4 | The Principal Secretary/ Additional Chief Secretary, Finance Department | Member |
| 5 | The Principal Secretary/ Additional Chief Secretary, I & W Department | Member |
| 6 | The Principal Secretary/ Additional Chief Secretary, Public Works Department | Member |
| 7 | The Principal Secretary/Additional Chief Secretary, Urban Development & Municipal Affairs Department | Member |
| 8 | The Principal Secretary/ Additional Chief Secretary, Land and Land Reforms Department | Member |
| 9 | The Engineer-in-Chief, PHE Department | Member |
| 10 | The Project Director, WBDWSIP, PHE Directorate | Member Secretary |
| 11 | The District Magistrate (each District) | Invitee Member |

B. Restructured District Level Steering Committee for ADB Assisted Project (WBDWSIP) under PHE Department**Members of the District Level Steering Committee :-**

| | | |
|----|---|-------------------------|
| 1 | The District Magistrate | Chairperson |
| 2 | The Additional District Magistrate/DLLRO, Land and Land Reforms | Member |
| 3 | The Additional Executive Officer, Zilla Parisad | Member |
| 4 | The Superintending Engineer, PIU (each PIU). PHE Dte | Member Secretary |
| 5 | The Superintending Engineer/Executive Engineer, PW (Roads) | Member |
| 6 | The Superintending Engineer/Executive Engineer, PWD | Member |
| 7 | The Superintending Engineer/Executive Engineer, I & WD | Member |
| 8 | The Executive Engineer, (PIU), PHE Dte | Member |
| 9 | The Assistant Engineer, Social Safeguard (PIU) PHE Dte | Member |
| 10 | The Block Development Officer (each Block) | Member |
| 11 | Representative of NGO | Invitee Member |

PMU Level committee

Grievance Redressal new file M.A.O - 418/PIU, dt-24.0

Social & life guard

19.5.19

27/5/19

1024

28.05.2019

1

FF(Civil) P.W.,
N.W.P.M. PI.

Superintending Engineer,
PIU, North 24-Parganas
WBDWSIP. P.H.E. Dte.
Govt. of West Bengal

Government of West Bengal
Public Health Engineering Directorate
Project Management Unit, West Bengal Drinking Water Sector Improvement Project
Utility Building, 1st Floor, (Premises No.-09/1-0024)
AA-1A, (Tank No.-3), New Town Kolkata-700 156
Phone No.-(033) 2324-2095, E-mail.: pd.pmu.adb@wbphed.gov.in;
pmu.adb@wbphed.gov.in

Memo No. PMU/WBDWSIP/PHED/28.1.380

Date: 16.05.2019.

NOTIFICATION

In order to address social, environmental and any other project or sub project related grievances in the implementation of Piped water supply schemes in the districts of Bankura, North & South 24 Parganas, Purba Medinipur under West Bengal Drinking Water Sector Improvement Project, PHE Dte with the assistance of Asian Development Bank (ADB), a common grievance redress mechanism has been developed for Project Management Unit.

The following members constitute the Grievance Redressal Committee to resolve the grievances at the PMU level:

1. Chair person- Chief Engineer & Project Director ,PMU
2. Member-Superintending Engineer (Civil), PMU
3. Member-Superintending Engineer (Mech/Elec.), PMU,
4. Safeguards and Gender Officer, Safeguards Gender Cell- Executive Engineer-I PMU,

The functions of GRC at PMU level are as follows:-

1. Accept Grievances of the Aggrieved parties through telephone hot lines at accessible location, email, post at PMU office
2. Address and Facilitate resolution of Grievances not resolved at the field and PIU level within stipulated time.
3. PMU HSGO together with PIU safeguard officers will have the joint responsibility for timely grievance redress on safeguards and gender issues and for registration of grievances, related discloser, and communication with the aggrieved party.
4. Resolve grievances and suggest corrective measures or solutions for their redressal to PIU for implementation within the specified time (within 15 days).
5. If grievances cannot be resolved at the project level they will be referred to the District Steering Committee (DSC), which will also act as Grievance Redressal Committee particularly in matters related to land purchase and or acquisition, payment of compensation, and environmental pollution among others.

6. Any matter deemed higher than the district level or that may require inter departmental coordination, the required grievances redress will be referred to the state level steering committee.
7. Careful documentation of the name of the complainant and date of receipt of complaint, address and contact details of complainant, location of the problem area and how the problem was resolved and report the same in the Quarterly Progress Report and Semi Annual Safeguard Monitoring report to be submitted to ADB.
8. Periodically Review the functioning of the GRM at the field and PIU level.

The GRC will continue to function throughout the project duration.

At. 16.05.19
 Chief Engineer & Project Director,
 PMU, WBDWSIP, P.H.E. Dte.,
 Govt. of West Bengal.

Memo No. PMU/WBDWSIP/PHED/...../.....

Date: 16.05.2019.

Copy forwarded for information to :-

1. The Superintending Engineer, Civil / (M/E), PMU, WBDWSIP, PHE Dte.
2. The Superintending Engineer, PIU, North 24 Parganas, / Purba Medinipur / Bankura, WBDWSIP, PHE Dte. with a directive to constitute the GRC at the PIU level and Field level as suggested in PAM approved by ADB.
3. The Executive Engineer-I, PMU, WBDWSIP, PHE Dte.
4. The Executive Engineer, PIU, North 24 Parganas/ Purba Medinipur/Bankura, WBDWSIP, PHE Dte.

At. 16.05.19
 Chief Engineer & Project Director,
 PMU, WBDWSIP, P.H.E. Dte.,
 Govt. of West Bengal.

PIU Level Committee

GOVERNMENT OF WEST BENGAL
OFFICE OF THE SUPERINTENDING ENGINEER
P.I.U., NORTH 24 PARGANAS WEST BENGAL DRINKING
WATER SECTOR IMPROVEMENT PROJECT
PUBLIC HEALTH ENGINEERING DIRECTORATE
UTILITY BUILDING, 3RD FLOOR, (PRIMISES NO.-09/1-0024)
AA-IA (TANK NO. 3), NEW TOWN, KOLKATA-700156
Email : se.piun24p.adb@wbphed.gov.in

Memo No.

/PIUN24PGS

Dated :

NOTIFICATION

In order to address social, environmental and any other project or sub project related grievances in the implementation of Asian Development Bank (ADB) assisted Piped water supply schemes in the district of North 24 Parganas under West Bengal Drinking Water Sector Improvement Project (WBDWSIP), a project level Grievance Redress Mechanism (GRM) has been developed for the Project Implementation Unit (PIU), North 24 Parganas, WBDWSIP, PHE Dte. and the Grievance Redress Committee (GRC) has been constituted with the following members to resolve the grievances at the PIU level:

| Status in the GRC | Designation | Contact No. |
|-------------------|--|---------------------------|
| Member | Assistant Engineer and Officer, Safeguard & Gender (Responsible for Haroa), PIU, North 24 Parganas, WBDWSIP, PHE Dte | 033 2324 2051 (Extn. 204) |
| Member | Assistant Engineer (Responsible for WTP), PIU, North 24 Parganas, WBDWSIP, PHE Dte. | 033 2324 2051 (Extn. 202) |
| Member | Assistant Engineer (Responsible for Bhargar-II), PIU, North 24 Parganas, WBDWSIP, PHE Dte. | 033 2324 2051 (Extn. 203) |
| Member | Junior Engineer and Asst. Officer, Safeguards (Responsible for Haroa), PIU, North 24 Parganas, WBDWSIP, PHE Dte. | 033 2324 2051 (Extn. 205) |
| Member | Junior Engineer and Asst. Officer, Gender (Responsible for WTP), PIU, North 24 Parganas, WBDWSIP, PHE Dte. | 033 2324 2051 (Extn. 210) |
| Member | Junior Engineer (Responsible for Bhargar-II), PIU, North 24 Parganas, WBDWSIP, PHE Dte. | 033 2324 2051 (Extn. 211) |


Note : This is in accordance to the structure enumerate in PAM.

The function of GRC at PIU level are as follows-

1. Being assisted by the Design Supervision & Institutional Support Consultants (DSISC) the PIU will disseminate information and awareness campaigns on grievance redress procedures.
2. Brief the contractors on GRM with support from DSISC.
3. Accept grievances of the aggrieved person(s) in the grievance redress form (as specified in Appendix 6 of PAM).
4. Careful documentation of the name of the aggrieved person(s), date of receipt of the grievance, address/ contact details of the aggrieved person, location of the problem area etc.

5. Address and facilitate resolution of grievances not resolved at the field level within stipulated time (7 days).
6. The Officer, Safeguard & Gender, PIU, North 24 Parganas supported by the Social, Gender & Resettlement Specialist of DSISC, North 24 Parganas will be responsible for conducting meeting with the affected/ aggrieved person(s) to understand their concerns and help them through the process of grievance redressal including translating the complaints into Bengali or English, recording and registering grievances of non-literate affected persons and explaining the process of grievance redress mechanism.
7. If the PIU level GRC fails to resolve the grievance, the matter may be conveyed to the GRC established within PMU and the actions suggested by them to be taken up/ followed by this GRC.
8. Ensure redress of grievances on safeguards and gender Issues and for registration of grievances, related disclosure and communication with the aggrieved party.
9. If grievances cannot be resolved at the PIU level, they will be referred to the District Steering Committee (DSC), acting as the GRC.
10. Any matter deemed higher than the district level or that may require inter-departmental coordination, the required grievance redress will be referred to the State Level Steering Committee (SLSC).
11. The GRC at PIU, North 24 Parganas will also be responsible for follow-through for each grievance, periodic information dissemination to the aggrieved person(s) on the status of their grievances and recording their feedback (satisfaction/ dissatisfaction and suggestions).
12. Periodically Review the functioning of the GRM at this end as well as field level.

The GRC will continue to function throughout the project duration.

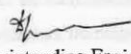

Superintending Engineer
P.I.U., North 24 Parganas, WBDWSIP
Public Health Engineering Directorate
Govt. of West Bengal

Memo No. 409/(1-12) /PIUN24PGS

Dated : 20.05.19

Copy forwarded for information to :-

1. The Chief Engineer & Project Director, PMU, WBDWSIP, PHE Dte.
2. The Dy. Superintending Engineer, PIU, North-24 Pgs., WBDWSIP, PHE Dte.
3. The Executive Engineer (Civil), PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
4. The Executive Engineer (Elec./Mech.), PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
5. The Executive Engineer-I and Head Safeguard & Gender Officer, PMU, WBDWSIP, P.H.E. Dte.
6. The Assistant Engineer-I / II, PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
7. The Assistant Engineer and Officer Safeguard & Gender, Sub Divn.-I under PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
8. Sri Shyamalendu Debadhikari, Junior Engineer, PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
9. The Junior Engineer and Junior Safeguard & Gender Officer, PIU, North 24 Parganas, WBDWSIP, PHE Dte.
10. The Junior Engineer and Junior Environmental Officer, PIU, North 24 Parganas, WBDWSIP, P.H.E. Dte.
11. The Team Leader, DSISC, North 24 Parganas.
12. The Social / Gender / Resettlement Specialist, DSISC, North 24 Parganas.


Superintending Engineer
P.I.U., North 24 Parganas, WBDWSIP
Public Health Engineering Directorate
Govt. of West Bengal

Appendix 14: Labour License & workman compensation

A. LABOUR LICENSE



GOVERNMENT OF WEST BENGAL
OFFICE OF THE ASSISTANT LABOUR COMMISSIONER, BARASAT
34, K.N.C. Road (Station Road), Top Floor, Barasat, Pin Code - 700124

FORM VI

[See Rule 25(1)]

Licence No. : **BRS15/CLL/000443**

Date : **20th May, 2019**

| | |
|-----------|-------|
| Lic Fees | 250 |
| S.Deposit | 10000 |

LICENCE

Licence is hereby granted to **FFIL-RIL JV at 1582 RAJDANGA MAIN ROAD 7TH FLOOR KASBA NEW MARKET, Ward.107, PS - Kasba, Kolkata, Pin Code - 700107** under Section 12(1) of the Contract Labour (Regulation and Abolition) Act, 1970 subject to the conditions specified in Annexure.

The Licence shall remain in force till: **18th May, 2020.**

**DEBOJYOTI
BOSE**

Digitally signed by
DEBOJYOTI BOSE
Date: 2019.05.20
11:25:38 +05'30'

Licensing Officer
Under the Contract Labour(R&A) Act, 1970

&
Assistant Labour Commissioner
Barasat, North 24 Parganas

Establishment Information:

Executive Engineer, North-24 Parganas Water Supply Division-II, PHE Dte. [BRS15/CLR/000207]

W.Site - Utility Building, Tank No.-3, 2nd Floor, Action Area-IA, New Town, Kolkata,

Notified Area- NKDA, NKDA, Barasat - 700156, PS - New Town, North 24 Parganas

Work site exact location:

WATER TREATMENT PLANT NEAR TANK NO. 1 ACTION AREA 1 NEW TOWN RAJARHAT

Notified Area-NKDA, Barasat

PS - New Town, District - North 24 Parganas, Pin Code - 700156

ANNEXURE

The licence is subject to the following conditions:

- (1). The licence shall be non-transferable.
- (2). The number of workmen employed as contract labour in the establishment shall not on any day, exceed **100 (One Hundred)**.
- (3). Except as provided in the rules the fees paid for the grant, or as the case may be, for renewal of the licence shall be non-refundable.
- (4). The rates of wages payable to the workmen by the contractor shall not be less than the rates prescribed for the Schedule of employment under the Minimum Wages Act, 1948, where applicable, and where the rates have been fixed by agreement, settlement or award, not less than the rates fixed.
- (5). In cases where the workmen employed by the contractor perform the same or similar kind of work: as the workmen directly employed by the principal employer of the establishment, the wage rates, holidays, hours of work and other conditions of service of the workmen of the contractor shall be the same as applicable to the workmen directly employed by the principal employer of the establishment on the same or similar kind of work provided that in the case of any disagreement with regard to the type of work the same shall be decided by the Labour Commissioner, West Bengal, whose decision shall be final.
- (6). In other cases the wage rates, holidays, hours of work and conditions of service of the workmen of the contractor shall be such as may be specified in this behalf by the Labour Commissioner, West Bengal.
- (7). In every establishment where 50 or more, women having children are ordinarily employed as contract labour there shall be provided 2 rooms of reasonable dimensions for the use of their children under the age of six years. One of such rooms would be used as a play room for the children and the other as bed room for the children. For this purpose the contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the sleeping room. The standard of construction and maintenance of the creches may be such as may be specified in this behalf by the Labour Commissioner, West Bengal.
- (8). The Licensee shall notify any change in the number of workmen or the conditions of work to the Licensing Officer.

B. WORKMAN COMPENSATION POLICY



Royal Sundaram
General Insurance

Royal Sundaram General Insurance Co. Limited

(Formerly known as Royal Sundaram Alliance Insurance Company Limited)
"Millennium City", Information Technology Park, Unit No.: T-2-2A,
Tower-II, Plot No.: DN-62, Sector-V, Salt Lake, Kolkata - 700 091
Tel. No.: 033-4222 7373 | Fax No.: 033-2367 5523
Toll No.: 1860 425 0000 | Email: customer.services@royalsundaram.in
Website: www.royalsundaram.in
Registered Office: 21, Patullo Road, Chennai - 600 002.
IRDAI Registration Number - 102 | CIN-U67200TN2000PLC045611

WORKMEN'S COMPENSATION INSURANCE POLICY SCHEDULE

Intermediary Code : OA504383
Intermediary Name : Saibal Sengupta
Contact : 9831176521

Policy No. LW00010835000100

Insured Name and Address : Furnace Fabrica India Ltd
: 1582, Rajdanga Main Road
: Kasba New Market, 7th Floor

Business : Civil Construction works as per Specification attached

Law(s)

The Policy will provide coverage under the following Law(s)

- WC Act 1923 and subsequent amendment of the said Act
- The Fatal Accident Act 1855
- Or Common Law

Period of Insurance: 12 Months

From 00.00 Hrs. of 01/04/2019 to 23:59:59 on 31/03/2020

Premium : Rs. 3,62,260/- (Including Rs. 55,260/- GST.)

Subject to adjustment in the terms of Condition 6 the estimated amount of wages salaries and other earnings on which Premium is based.

| Estimated Number of Employees (A) | Occupation of Employees (B) | Estimated Total Salaries Wages and other money earnings per employee (C) | Estimated Total Earnings (D=A*C) | Place or Places of Employment. (E) |
|-----------------------------------|-----------------------------|--|----------------------------------|------------------------------------|
| As per the Specification attached | | | | |

Date of signature of Proposal and Declaration 01/04/2018

Appendix 15:OHS Training Records

INDUCTION/TOOL BOX TRAINING RECORD

FURNACE FABRICA
PROJECT EXECUTION DELIVERED.

SAFETY TOOL BOX TALK TRAINING
Furnace Fabrica India Ltd.

LOCATION : Chemical Building DATE : 25/10/17
NAME OF SUPERVISOR/ENGINEER: Sudipta Dey
NO OF WORKERS: (11)

| ACTIVITIES | POTENTIAL HAZARDS | CONTROL MEASURES |
|-----------------------|-----------------------|--|
| 1. Shuttering work. | 1. Falling hazards | 1. Properly used full body harness |
| 2. Reinforcement work | 2. Electrical hazards | 2. All electrical connection checked properly and also used RCB. |

MANDATORY PPES - SAFETY HELMET, SHOE, REFLECTIVE JACKETS, GLOVES, GOGGLES, NOSE MASK, SAFETY BELTS, APRONS

| SL NO | NAME | DESIGNATION | SEX | SIGNATURE |
|-------|-----------------|-------------|-----|-------------|
| 1 | Injammul Sk | Helper | M | Sudipta Dey |
| 2 | Kamrul Sk | Helper | M | |
| 3 | Apel Sk | Helper | M | |
| 4 | Sahabul Sk. | Helper | M | |
| 5 | Mijanul Sk. | Helper | M | |
| 6 | Saiful Sk. | Helper | M | |
| 7 | Subir Das | Helper | M | |
| 8 | Rabiul Sk. | SUP | M | |
| 9 | Jiyarul Mandal. | Helper | M | |
| 10 | Alam Sk. | Helper | M | |
| 11 | Raju Sk. | Helper | M | |
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CONTRACTOR SITE ENGINEER: Sudipta Dey
CONTRACTOR SAFETY OFFICER: Sudipta Dey

Appendix 16: Environmental Site Inspection Report

FILLED ENVIRONMENTAL SITE INSPECTION REPORT

| ENVIRONMENTAL SITE INSPECTION REPORT | | | | | | | | | | | | |
|---|--|---|--------|--|--------|--|----------------|---|-------------------|--|------------------|--|
| Project Name: WBDWSIP | | | | | | | | | | | | |
| Contract Number: WBDWSIP/DWW/NCB/N24P/02A/2017-13 | | | | | | | | | | | | |
| Block: <u>W.T.P. (Rajahal)</u> | DATE: <u>19/10/19</u> | | | | | | | | | | | |
| Zone: <u>(W.T.P.)</u> | | | | | | | | | | | | |
| WEATHER: <u>(Clear Sunny)</u> | | | | | | | | | | | | |
| | Project Activity Stage | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Survey</td><td></td></tr> <tr><td>Design</td><td></td></tr> <tr><td>Implementation</td><td style="text-align: center;">✓</td></tr> <tr><td>Pre-Commissioning</td><td></td></tr> <tr><td>Guarantee Period</td><td></td></tr> </table> | Survey | | Design | | Implementation | ✓ | Pre-Commissioning | | Guarantee Period | |
| Survey | | | | | | | | | | | | |
| Design | | | | | | | | | | | | |
| Implementation | ✓ | | | | | | | | | | | |
| Pre-Commissioning | | | | | | | | | | | | |
| Guarantee Period | | | | | | | | | | | | |
| Sr. No. | Monitoring Items | | | | | | | | | | | |
| Compliance marked as Yes/No/Not Applicable/Partially Implemented (PI) | | | | | | | | | | | | |
| 1 | Environment, Health and Safety supervisor appointed by Contractor and available on site | Yes | | | | | | | | | | |
| 2 | Construction site management plan (spoils, safety, schedule, equipment etc.) prepared | Yes | | | | | | | | | | |
| 3 | Traffic Management Plan Prepared | NR | | | | | | | | | | |
| 4 | Dust is under control | PI | | | | | | | | | | |
| 5 | Excavated soil properly placed within minimum space | PI | | | | | | | | | | |
| 6 | Construction area is confined, no traffic/pedestrian entry observed | PI | | | | | | | | | | |
| 7 | Surplus soil/debris/waste is disposed without delay | PI | | | | | | | | | | |
| 8 | Construction material (sand/gravel/aggregate) brought to site as and when required only | Yes | | | | | | | | | | |
| 9 | Tarpaulins used to cover sand and other loose material when transported by vehicles | Yes | | | | | | | | | | |
| 10 | After uploading, wheels and undercarriage of vehicles cleaned prior to leaving the site | PI | | | | | | | | | | |
| 11 | No AC pipes disturbed/removed during excavation | NO | | | | | | | | | | |
| 12 | No chance finds encountered during excavation | NO | | | | | | | | | | |
| 13 | Work is planned in consultation with traffic police | NR | | | | | | | | | | |
| 14 | Work is not being conducted during heavy traffic | NR | | | | | | | | | | |
| 15 | Work at a stretch is completed within a day (excavation, pipe laying and backfilling) | NR | | | | | | | | | | |
| 16 | Pipe trenches are not kept open unduly | NR | | | | | | | | | | |
| 17 | Road is not completely closed, work is conducted on edge, at least one line is kept open | NR | | | | | | | | | | |
| 18 | Road is closed, alternative route provided and public informed, information board provided | NR | | | | | | | | | | |
| 19 | Pedestrian access to houses is not blocked due to pipe laying | NR | | | | | | | | | | |
| 20 | Spaces left in between trenches for access | NR | | | | | | | | | | |
| 21 | Wooden planks/metal sheets provided across trench for pedestrian | PI | | | | | | | | | | |
| 22 | No public/unauthorized entry observed in work site | NO | | | | | | | | | | |
| 23 | Children safety measures (barricades, security) in place at works in residential areas | PI | | | | | | | | | | |
| 24 | Prior public information provided about the work, schedule and disturbances | NR | | | | | | | | | | |
| 25 | Caution/warning board provided on site | Yes | | | | | | | | | | |
| 26 | Guards with red flag provided during work at busy roads | NR | | | | | | | | | | |
| 27 | Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc.) | Yes | | | | | | | | | | |
| 28 | Workers conducting or near heavy noise work is provided with ear muffs | NR | | | | | | | | | | |
| 29 | Contractor is following standard and safe construction practices | PI | | | | | | | | | | |
| 30 | Deep excavation is conducted with land slip/protection measures | NR | | | | | | | | | | |
| 31 | First aid facilities are available on site and workers informed | Yes | | | | | | | | | | |
| 32 | Drinking water provided at the site | PI (Tape water) | | | | | | | | | | |
| 33 | Toilet facility provided at the site | PI (Comm. Toilet) | | | | | | | | | | |
| 34 | Separate toilet facility is provided for women workers | NR | | | | | | | | | | |

| | | |
|----|---|-------------------|
| 35 | Workers camps are are maintain cleanly | PI |
| 36 | Adequate toilet and bath facilities provided | PI |
| 37 | Contractor employed local workers as far as possible | PI |
| 38 | Workers camp set up with the permission of PIU | Yes |
| 39 | Adequate housing provided | PI |
| 40 | Sufficient water provided for drinking/washing/bath | PI |
| 41 | No noisy work is conducted in the nights | NR |
| 42 | Local people informed of noisy work | NR |
| 43 | No blasting activity conducted | NR |
| 44 | Pneumatic drills or other equipment creating vibration is not usede near old/risly building | NR |
| 45 | Funai activity till date on site | NO |
| 46 | Waste water discharge from site | Yes - (From Camp) |
| 48 | Tree cutting/Trimming | NO |
| 49 | Soild waste disposal from site under norms | PI (Store) |
| 50 | | |

| | |
|---|--|
| Signature <u>VS. Chatterjee</u> | |
| Sign off | |
| <u>SHUBHANKAR CHATTOPADHYAY</u> Name Position <u>Safety Engineer</u> | |
| <u>Rohan Kumar</u> / 19/10/19 Name Position <u>Environmental Safeguard</u> <u>(DISE)</u> | |

Appendix 17: Sample SEMR Template

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

1. Introduction

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

| Name | Designation/Office | Email Address | Contact Number |
|----------------|--------------------|---------------|----------------|
| 1. PMU | | | |
| | | | |
| | | | |
| 2. PIUs | | | |
| | | | |
| | | | |
| | | | |
| 3. Consultants | | | |
| | | | |
| | | | |
| | | | |

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

| Package Number | Components/List of Works | Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M) ^a | Contract Status (specify if under bidding or contract awarded) | If On-going Construction | |
|----------------|--------------------------|--|--|--------------------------|--------------------------|
| | | | | %Physical Progress | Expected Completion Date |
| | | | | | |
| | | | | | |
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| | | | | | |
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| | | | | | |
| | | | | | |

^a If on-going construction, include %physical progress and expected date of completion.

2. Compliance status with National/State/Local statutory environmental requirements^a

| Package No. | Subproject Name | Statutory Environmental Requirements ^b | Status of Compliance ^c | Validity if obtained | Action Required | Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish ^d |
|-------------|-----------------|---|-----------------------------------|----------------------|-----------------|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

^a All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.

^b Specify (environmental clearance? Permit/consent to establish? Forest clearance? etc.).

^c Specify if obtained, submitted and awaiting approval, application not yet submitted.

^d Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.

3. Compliance status with environmental loan covenants

| No. (List schedule and paragraph number of Loan Agreement) | Covenant | Status of Compliance | Action Required |
|--|----------|----------------------|-----------------|
| | | | |
| | | | |
| | | | |

4. Compliance status with the environmental management plan (refer to EMP Tables In Approved IEE/s)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise Implementation Status

| Package Number | Components | Design Status (Preliminary Design Stage/Detailed Design Completed) | Final IEE based on Detailed Design | | | | Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No) | Remarks |
|----------------|------------|--|---|---|---|---|--|---------|
| | | | Not yet due (detailed design not yet completed) | Submitted to ADB (Provide Date of Submission) | Disclosed on project website (Provide Link) | Final IEE provided to Contractor/s (Yes/No) | | |
| | | | | | | | | |
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| | | | | | | | | |

- Identify the role/s of Safeguards Team including schedule of on-site verification of

reports submitted by consultants and contractors.

- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below
- Provide the monitoring results as per the parameters outlined in the approved EMP (or site- specific EMP/construction EMP when applicable).

- In addition to the table on EMP implementation, the main text of the report should discuss in details the following items:
 - (i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).
 - (ii) **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).
 - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
 - Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
 - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
 - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
 - Confirm spill kits on site and site procedure for handling emergencies.
 - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
 - Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
 - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
 - Provide information on barricades, signages, and on-site boards. Provide photographs.
 - Provide information on
 - Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)^a

| Impacts (List from IEE) | Mitigation Measures (List from IEE) | Parameters Monitored (As a minimum those identified in the IEE should be monitored) | Method of Monitoring | Location of Monitoring | Date of Monitoring Conducted | Name of Person Who Conducted the Monitoring |
|-------------------------------|-------------------------------------|---|----------------------|------------------------|------------------------------|---|
| Design Phase | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Pre-Construction Phase | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |
| Construction Phase | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Operational Phase | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

^a Attach Laboratory Results and Sampling Map/Locations.

Overall Compliance with CEMP/ EMP

| No. | Sub-Project Name | EMP/ CEMP Part of Contract Documents (Y/N) | CEMP/ EMP Being Implemented (Y/N) | Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory) | Action Proposed and Additional Measures Required |
|-----|------------------|--|-----------------------------------|--|--|
| | | | | | |
| | | | | | |
| | | | | | |

5. Approach and Methodology for Environmental Monitoring of the Project

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

6. Monitoring of environmental Impacts on Project Surroundings (Ambient Air, Water Quality and Noise Levels)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

| Site No. | Date of Testing | Site Location | Parameters (Government Standards) | | |
|----------|-----------------|---------------|-----------------------------------|--------------------------|--------------------------|
| | | | PM10 µg/m ³ | SO2 µg/m ³ | NO2 µg/m ³ |
| | | | | | |
| | | | | | |
| | | | | | |

| Site No. | Date of Testing | Site Location | Parameters (Monitoring Results) | | |
|----------|-----------------|---------------|---------------------------------|--------------------------|--------------------------|
| | | | PM10 µg/m ³ | SO2 µg/m ³ | NO2 µg/m ³ |
| | | | | | |
| | | | | | |
| | | | | | |

Water Quality Results

| Site No. | Date of Sampling | Site Location | Parameters (Government Standards) | | | | | |
|----------|------------------|---------------|-----------------------------------|-----------------------|-------------|-------------|------------|------------|
| | | | pH | Conductivity µS/cm | BOD mg/L | TSS mg/L | TN mg/L | TP mg/L |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Site No. | Date of Sampling | Site Location | Parameters (Monitoring Results) | | | | | |
|----------|------------------|---------------|---------------------------------|-------------------------------|----------|----------|---------|---------|
| | | | pH | Conductivity $\mu\text{S/cm}$ | BOD mg/L | TSS mg/L | TN mg/L | TP mg/L |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Noise Quality Results

| Site No. | Date of Testing | Site Location | LA _{eq} (dBA) (Government Standard) | |
|----------|-----------------|---------------|--|------------|
| | | | Day Time | Night Time |
| | | | | |
| | | | | |

| Site No. | Date of Testing | Site Location | LA _{eq} (dBA) (Monitoring Results) | |
|----------|-----------------|---------------|---|------------|
| | | | Day Time | Night Time |
| | | | | |
| | | | | |

7. Summary of Key Issues and Remedial Actions


- Summary of follow up time-bound actions to be taken within a set timeframe.

8. Appendixes

- Photos
 - Summary of consultations
 - Copies of environmental clearances and permits
 - Sample of environmental site inspection report
 - Other
-

Appendix 18: SEMP

SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN (SEMP)

 **FFIL - RIL JV**
 **Public Health Engineering Department**
Government of West Bengal

Document Reference Number: K201810003/HSE/02

SITE ENVIRONMENTAL MANAGEMENT PLAN (SEMP)

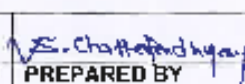
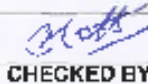


PROJECT: DESIGN, CONSTRUCTION AND OPERATION OF WATER TREATMENT PLANT, RESERVOIRS, TRANSMISSION MAINS AND PUMPING STATIONS WORK IN HAROA, RAJARHAT AND BHANGAR II

Location : New Town ; Rajarhat

CONTRACT PMU/WBDWSIP/DWW/N24P/NCB/01/2017-18 PACKAGE NO.:

EMPLOYER: PUBLIC HEALTH ENGINEERING DEPARTMENT (PHED)

CONTRACTOR: FFIL-RIL JV

| | | | | | |
|-----|------------|---|--|---|---|
| 0 | 21/08/2019 |  |  |  |  |
| REV | DATE | PREPARED BY | CHECKED BY | APPROVED BY DSISC | APPROVED BY PKJ |

West Bengal Drinking Water Sector Improvement Project

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Boosting Station – I, Rajarhat, New Town

Ground Level Service Reservoir at Bhangar – II

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8. Details of construction waste / debris / surplus soil

LIST OF ABBREVIATIONS:

| | |
|---------|---|
| ADB | Asian Development Bank |
| BS | Boosting Station |
| EHS | Environment, Health and Safety |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EMS | Environmental Management Specialist |
| GLSR | Ground Level Service Reservoir |
| MGD | Million Gallon per Day |
| MLD | Million Liter per Day |
| OHS | Occupational Health and Safety |
| PHED | Public Health Engineering Department |
| PIU | Project Implementation Unit |
| PMC | Project Management Consultant |
| PMU | Project Management Unit |
| WHO | World Health Organization |
| WTP | Water Treatment Plant |
| WBDWSIP | West Bengal Drinking Water Sector Improvement Project |

1. Introduction

Background

A large part of India's population is dependent on groundwater as the major source of potable water. Contamination of groundwater, especially by naturally elevated inorganic contaminants like arsenic and fluoride, is a major issue in parts of the country, potentially leading to serious health hazards for the affected populations. Prolonged exposure to excess arsenic in drinking water may lead to keratosis, melanosis and cancer, while exposure to excess fluoride may lead to dental, skeletal and non-skeletal fluorosis. The total population at risk with respect to arsenic and fluoride Contamination is estimated at around 21.45 million as of August 2016.

The arsenic affected habitations are primarily concentrated in the older alluvial deposits of Ganges and Brahmaputra. An assessed 92% of the arsenic affected population are concentrated in the States of West Bengal, Assam and Bihar, of which 69% of the population are from West Bengal.

The proposed West Bengal Drinking Water Sector Improvement Project (WBDWSIP or the Project) is being prepared by the PHED, supported by its design consultants and grant funded consultants from ADB, part of which will be implemented under the Sub-Mission. Government of West Bengal is implementing the Project initially in the priority areas of the following districts: North 24 Parganas, South 24 Parganas, East Medinipur and Bankura.

The proposed Project aims to provide safe, reliable and continuous drinking water in line with government of India's guidelines and standards and with the Vision 2020 of Govt. of W.B. to about 6 million people in selected Arsenic, Fluoride, and salinity affected areas of North 24 Parganas, South 24 Parganas, East Medinipur and Bankura districts. The Project will ensure drinking water security through 24/7 piped water supply schemes in the areas covered, and strengthen institutional structures and build capacities of stakeholders at all levels of service delivery for sustainable operation and maintenance and public health improvement.

PHED has established a dedicated Project Management Unit (PMU) at the PHED and three dedicated Project Implementation Units (PIUs) for the priority districts: North 24 Parganas(N24P).

Project Description

The Subproject - Creation of surface water based bulk water supply system to meet the water demand of arsenic (groundwater) affected blocks of Rajarhat and Haroa in North 24 Parganas and Bhargar II in South 24 Parganas district is taken up in this subproject under the WBDWSIP. These blocks are located in the eastern side of Kolkata city.

Surface Water Source

Raw surface water is presently abstracted from River Hooghly at Rani Debendra Bala Ghat near Bagbazar and delivered through a 11.5 km, 1829 mm diameter transmission main to the existing WTP at Rajarhat. The raw water is received in five pre-settlement ponds located adjacent to the WTP site at Rajarhat. Proposed raw water intake sump will get supply from the inlet ponds and raw water will be conveyed by the proposed transmission main to the proposed WTP under this contract.

The WTP site is located near Reservoir No 1, in New Town Area, Rajarhat. The planned ultimate capacity of the WTP to be constructed in phases, preferably in 5 modules distributed among WBHIDCO and WBPHEd contracts. A 20MGD (91MLD) phase of the WTP has been already constructed by WBHIDCO and has been functional since February, 2016. Construction work for another 20MGD (91MLD) phase of the WTP is in progress. Under this Contract WBDWSIP/DWW/N24P/01, a 22 MGD (100 Mld) WTP will be constructed. Some facilities for the proposed 22MGD (100 MLD) plant is common with the existing plants.

Scope of Work

The scope of work includes the following civil works components:

- i) 22 MGD (100 MLD) Water Treatment Plant (WTP) including raw water intake facility to abstract water from the raw water ponds located within WTP campus
- ii) Clear water pumping main from WTP to Booster Pumping Station (4.3km – 1200dia, MS pipe)
- iii) 4600 kl Clear Water Reservoir and a Booster Pumping Station
- iv) 2 nos. Ground Level Service Reservoirs (GLSRs) of 3200 kl and 5000 kl, respectively at Haroa and Bhangar II.

The subject contract or **WBDWSIP/DWW/N24P/01 for Bulk Water Supply**, which includes the design, construction, supply and installation of equipment, commissioning and operation for two years of Intake, 100 Mld WTP, Clear Water Reservoir cum Booster Pumping Station (BS- I), transmission main from WTP to CWR-BS-I, GLRs cum booster stations at Haroa and Bhangar-II, completion of parts of the transmission mains between BS-I and the other GLRs cum booster stations, and completion of parts of the transmission mains between the GLRs cum booster stations and the OHRs, including all necessary surge suppression and system control (SCADA) equipment.

The Scope of Work under this contract Package is presented below.

Component A: Design, build, supply, install and commission raw water intake sump with pump house and raw water transmission main to WTP, Water Treatment Plant of 100 Mld capacity with mechanical sludge dewatering system and clear water reservoir and pumping station, sub-station within the existing WTP Complex with all ancillary Civil, Mechanical, Electrical and Instrumentation works all complete. The SCADA equipment shall cover the whole of the bulk water supply system, including Components B and C below.

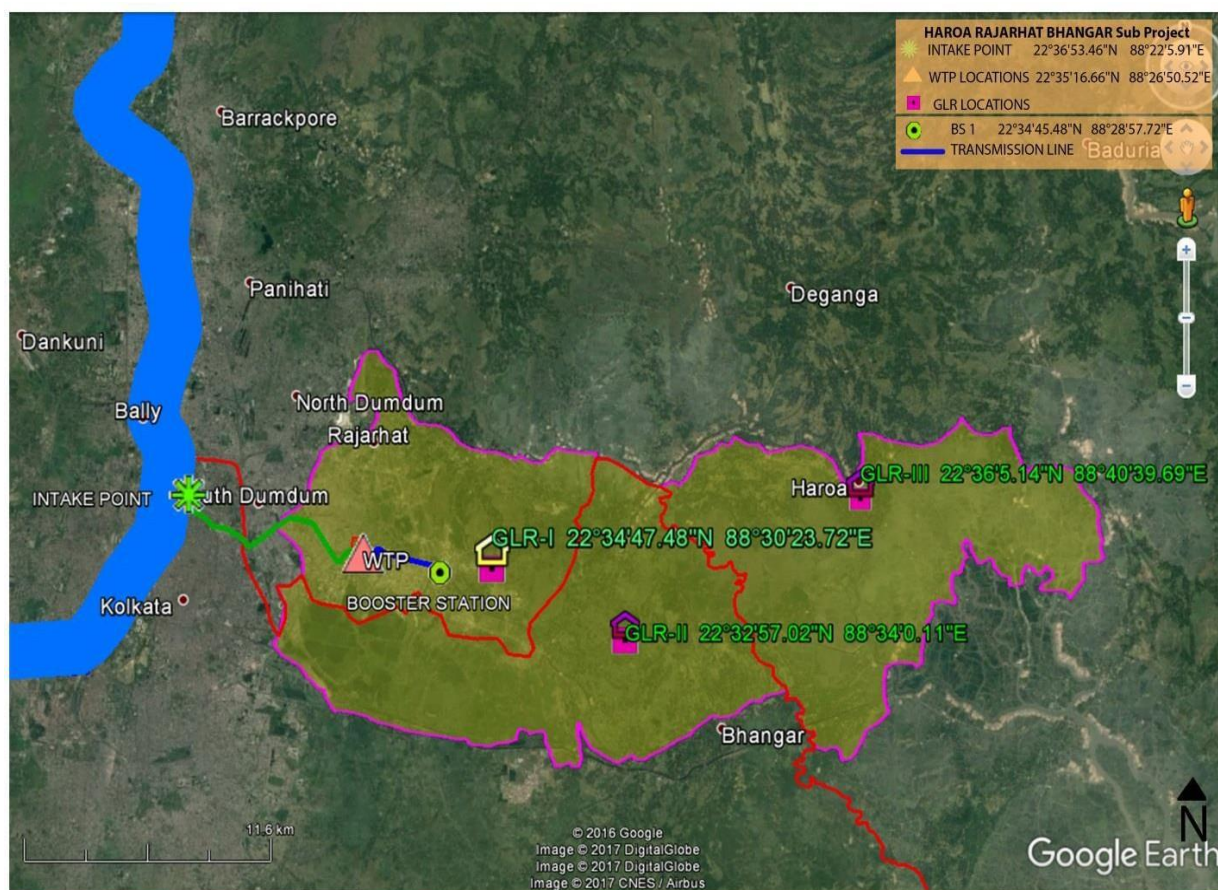
Component B: Design, build, supply, install and commission Intermediate Clear Water Reservoir cum Booster Pumping Station (BS-I), chlorination and substation and two ground level reservoirs (GLR) cum booster pumping stations at Bhangar II and Haroa with all ancillary works including booster chlorination and substation.

Component C: Design, supply, lay and commission transmission main from 100 Mld Water Treatment Plant to the Intermediate Clear Water Reservoir cum Booster Pumping Station (BS-1)

including laying of substantial stretches by suitable trenchless methods; design, supply, laying of pipe line by suitable trenchless methods or over pipe carrying structure and commission transmission main in various stretches to complete the transmission mains being laid in part by others under PHED management in primary and secondary mains as per drawing and specifications.

Component D: Operation Service (OS) for a period of 2 years after successful commissioning of the WTP and the entire Bulk Water Supply system (from the raw water intake at the pre-settlement ponds to the OHRs serving the distribution networks as per the scope under this contract in Haroa, Rajarhat, and Bhangar II.




Project Location





Project Objectives

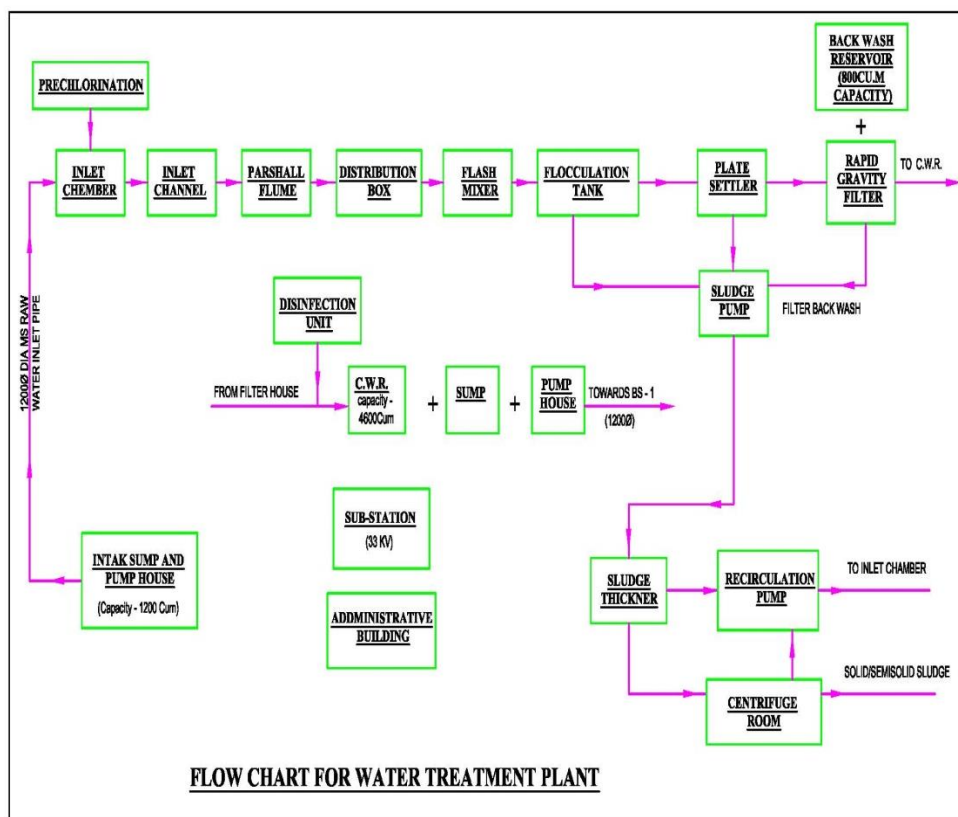
The proposed project aims to provide safe, reliable and continuous drinking water as per Government of India's standard to the people in the Arsenic, Fluoride, and salinity affected selected areas of North 24 Parganas, South 24 Parganas, districts of West Bengal.

2. Details of Project Components and Status of Progress

| Infrastructure | Location and Environmental Features | Site Photograph | Status |
|--|--|--|--|
| Water Treatment Plant (WTP) – 22 MGD Capacity | <p>New WTP will be constructed within the existing WTP compound in New Town area of Rajarhat in the eastern outskirts of Kolkata. This large land parcel part of New Town developed by New Town Development Authority is earmarked for water supply facility. Currently a WTP of 20 MGD is in operation, and another 20 MGD plant is under construction. The facility also includes 5 large raw water storage ponds. There is adequate vacant space for construction of proposed plants. There is no notable tree cover at the site. However, part of the vacant land is covered with landscaped garden/lawns, part of which will be removed for construction of new plant.</p> <p>Site is surrounded by well developed areas; WTP facility is well confined by a boundary wall. New WTP will be located inside the boundary, as far as possible away from the surrounding houses.</p> |  | Physical Site handed Over on 22-Aug-2019 |
| Clear Water Transmission Main (Approx. 4.3 Km) | <p>Pipeline will be laid along the roads. Pipeline will be buried along the roads connecting WTP and the booster pumping station site, both of which are located in New Town area. For most of the stretch there is adequate land in the road shoulder beside the tarmac, and pipeline will be buried under this. Alignment crosses some busy roads / highways, at these sections, trenchless technology will be adopted to cross the roads. This project area is located in the newly developing new town area; developments are still not dense.</p> |  | Transmission Route yet to be finalized |
| Booster Pumping Station and Ground Level Service Reservoir(4600 Kl capacity) | <p>Clear water reservoir and booster pumping station will be constructed within an existing booster pumping station compound in New Town area in Rajarhat. Site is situated in an area which is witnessing large scale development all around the site. Immediate surroundings of the site are currently vacant, there is no much activity. Khestopur Khal (canal or drain), which mostly carries wastewater from the city flows near the site. There are no notable sensitive environmental features in and around the site.</p> |  | Physical site Yet to be Handed Over |

| Infrastructure | Location and Environmental Features | Site Photograph | Status |
|---|---|--|-------------------------------------|
| Ground Level Service Reservoir(5000 KI capacity) and Pump House | Bhangar II GLSR site is located adjacent to Khestopur Khal (canal or drain) near Saduli in Bhangar. This is a privately agricultural land, and currently occupied by amango orchard |  | Physical site Yet to be Handed Over |
| Ground Level Service Reservoir(3200 KI capacity) and Pump House | Haroa GLSR is located near the bank of Vidyadhari River in Haroa. This is a privately owned vacant land. |  | Physical site Yet to be Handed Over |

3. Typical Flow Chart for Water Treatment Plant



4. Details of Manpower

| Details of contractors on-site-personnel and workers | 22 MLD WTP, NEW TOWN , RAJARHAT | Remarks |
|--|---|---|
| Project Manager Representative | Mr. Bidyut Kumar Debnath 6292128086 | |
| Site Engineer | Mr. Dibyendu Samanta 6292128046 | |
| Site Supervisor | Mr. Sudipta Dey 9046970333 | |
| Archeological supervisor | NA | |
| Skilled / semi-skilled workers | 22 | |
| Unskilled workers | 10 | |
| Women workers | NIL | |
| Workers – local / migrant | 10/22 | Migrant labours are from other districts of West Bengal |
| Details of facilities | | |
| Construction camps, (no's and locations) | One labor camp (Rajarhat) 1. WTP site, New Town, Rajarhat | Refer Attachment 2 for details |

5. Management Framework

Roles & Responsibilities

Project Organization Chart

| | |
|-----|--|
| 1. | Position: Project Manager |
| | Name: Mr. Sujay Das |
| 2. | Position: Dy. Project Manager |
| | Name: Mr. Bidyut Kr. Debnath |
| 3. | Position: Sr. Design Engineer (Civil) |
| | Name: Mr. Arun Kr. Guha |
| 4. | Position: Sr. Design Engineer (Civil) |
| | Name: Mr. Mrinal Mukherjee |
| 5. | Position: Sr. Design Engineer (Mechanical) |
| | Name: Mr. Pronab Kr. Mukherjee |
| 6. | Position: Sr. Design Engineer (Electrical) |
| | Name: Mr. Dipankar Banerjee |
| 7. | Position: Sr. Design Engineer (Inst. & SCADA) |
| | Name: Mr. Subodh Kr. Datta |
| 8. | Position: Resident Engineer (Civil) |
| | Name: Mr. Kaustav Sain |
| 9. | Position: Resident Engineer (Mechanical / Electrical) |
| | Name: Mr. Sohan Banerjee |
| 10. | Position: HSE Officer |
| | Name: Mr. Shubhankar Chattopadhyay |

Induction, Training, Awareness & Competency

Objective

The objective of the environmental inductions and training is to ensure that all personnel working on the project understand and are committed to:

- Preventing environmental harm.
- Complying with the incident management procedures.
- Achieving the required environmental outcomes.
- The implementation of the OEMP.
- Awareness and compliance with legislative requirements.

Induction Content

Significant on-site and off-site environmental issues and impacts (actual or potential) of their work activities, and the environmental benefits of improved personal performance.

- Individual responsibilities.
- Environmental management techniques for relevant elements such as waste, noise, and chemical storage.
- Incident Management. Specifically,

This will include:

- Locations of the incident management plan and spill kits;
- Actions to be taken in the event of different types of emergencies;
- Responsibilities and authorities during an incident.

Emergency Response Planning

OBJECTIVE

The Occupational Health and Safety Act requires that the contractors shall establish Emergency Response Procedures for every project. This document provides a plan to assist contractors in

developing these procedures.

Emergency preparedness helps to minimize the human suffering and economic losses that can result from emergencies.

It should be understood that the size and complexity of projects, as well as their access and location, have a bearing on the degree of planning necessary for emergencies. It is therefore strongly recommended that the constructor ensure that a member of staff on site assist in developing the emergency response plan.

HOW TO DEVELOP A PLAN

Planning shall begin before any work commences on the project. Although there may be little time between the award of the contract and the start of the project, a good emergency response plan can be generic and, with some minor changes, can be easily adapted to specific sites and readily implemented. This is especially the case where a constructor specializes in similar types of projects.

Development should include the following considerations:

1. Hazard identification/assessment
2. Emergency resources
3. Communication systems
4. Administration of the plan
5. Emergency response procedure
6. Communication of the procedure

Each of these components are explained in the following sections.

Hazard Identification/Assessment

The process of hazard identification and assessment involves a thorough review that should include, but not be limited to, the following points:

- Transportation, materials handling, hoisting, equipment or product installation, temporary structures, material storage, start-up, and commissioning activities
- Environmental concerns
- Consultation with the client regarding potential hazards when working in or adjacent to operating facilities.
- Resources such as material safety data sheets (MSDSs) to determine potential hazards from on-site materials
- Proximity to traffic and public ways.

Because construction sites are frequently fast-changing, the process of hazard assessment must be ongoing to accommodate the dynamic environment. Once hazards are identified, the next task is to assess the potential or risk involved in each. For each hazard identified, ask:

- What can go wrong?
- What are the consequences?

For each potential hazard it is important to identify resources necessary for an appropriate emergency response.

For most events in construction, a simple analysis based on the experience of the people involved on the project is likely sufficient.

Emergency Resources

It is important to identify which resources are available and have contingency plans in place to make up for any deficiencies.

On-site resources such as fire extinguishers, spills containment equipment, and first aid kits must be maintained and clearly identified. Construction equipment may be included among

potential emergency resources. Personnel, especially on-site medical staff or workers trained in first aid, should be included in the plan.

There may be situations where outside resources are so far away that an adequate response is not possible. In these situations, resources may have to be obtained and kept on site. Examples would include fire protection or ambulance/medical resources in remote areas.

Whatever the situation may be, people, equipment, facilities, and materials are needed for emergency response. Where they will come from must be determined in advance. Moreover, the people supplying these resources must be made aware of their role in the plan.

Communication System

An important key to effective emergency response is a communications system that can relay accurate information quickly. To do this, reliable communications equipment must be used, procedures developed, and personnel trained. It is a good idea to have a backup system in place, in case the system is rendered useless by the emergency. For example, telephone lines may be cut.

The type and location of emergency communication systems must be posted on the project. This will include location of telephones, a list of site personnel with cellular phones or two-way radios, and any other equipment available. Emergency phone numbers and the site address/location should be posted beside all site phones. On large sites, the location of emergency phones must be clearly marked. The poster Emergency Response available from site office and all working area, can be used to record this and other information.

A communication system must be made up of strategically placed equipment and properly defined responsibilities. The emergency response plan posted in a conspicuous place on the project must identify the designated equipment and the people to operate it.

Emergency Response Procedure

An emergency can be reported from any source—a worker on site, an outside agency, or the public. Remember that circumstances may change during the course of an emergency. Any procedures you develop must be able to respond to the ongoing situation.

The following list covers basic actions to take in an emergency. These steps apply to almost any emergency and should be followed in sequence.

- Stay calm.
- Assess the situation.
- Take command.
- Provide protection.
- Aid and manage.
- Maintain contacts.
- Guide emergency services.

Stay calm – Your example can influence others and thereby aid the emergency response.

Assess the situation – Determine what happened and what the emergency is. Look at the big picture. What has happened to whom and what will continue to happen if no action is taken? Try to identify the cause that must be controlled to eliminate immediate, ongoing, or further danger.

Take command – The most senior person on the scene should take charge and call, or delegate someone to call, emergency services generally and explain the situation. Assign tasks for controlling the emergency. This action also helps to maintain order and prevent panic.

Provide protection – Eliminate further losses and safeguard the area. Control the energy source.

Causing the emergency. Protect victims, equipment, materials, environment, and accident

scene from continuing damage or further hazards. Divert traffic, suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures. Preserve the accident scene; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses.

Aid and manage – Provide first aid or help those already doing so. Manage personnel at the scene. Organize the workforce for both a headcount and emergency assignments. Direct all workers to a safe location or command post. This makes it easier to identify the missing, control panic, and assign people to emergency duties. Dispatch personnel to guide emergency services on arrival.

Maintain contact – Keep emergency services informed of situation. Contact utilities such as gas and hydro where required. Alert management and keep them informed. Exercise increasing control over the emergency until immediate hazards are controlled or eliminated and causes can be identified.

Guide emergency services – Meet services on site. Lead them to emergency scene. Explain ongoing and potential hazards and cause(s), if known.

Communication of the Procedure

To be effective, an Emergency Response Procedure must be clearly communicated to all site personnel. The following activities should be considered:

- Review the procedure with new site subcontractors and new workers to ensure that it covers their activities adequately.
- Review the procedure with suppliers to ensure that it covers any hazards that the storage or delivery of their materials might create.

Review new work areas in operating plants with owner/client to ensure that new hazards are identified and covered in the procedure.

6. Anticipated Environmental Impacts and Mitigation Measures

Pre-construction Environmental Mitigation Plan

| Field/Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|-------------------------------|--|---|----------------------------|--|-------------------------|
| Utilities | Telephone lines, electric poles and wires, water lines within proposed project area may get affected | <ul style="list-style-type: none"> Contingency Plan has been developed by informing to emergency services like WBSEDCL, Telecommunication, local administration and police etc. First we are digging the trial pit manually, if any obstruction arise the same is removed as per direction of end user The construction work to continue without disturbing the existing pipeline and electric poles. Spoil Management Plan is included in Attachment 7 as part of this SEMP | PIU & DSISC | (i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions | Project cost |
| Water Supply | Health risk due to closure of water supply during pipe jointing and replacement of pipes | As the new transmission main line has to be constructed, therefore we may not come across this type of hazards. If required in future closure will be done in coordination with PHED, provide alternative potable water to affected households and businesses for the duration of the shut-down for a very short period | PIU & DSISC | (i) Schedule of closure; (ii) delivery of potable water to affected people by PHED | Project cost |
| Social and Cultural Resources | Ground disturbance can uncover and damage archaeological and historical remains | Work is not started yet. If such type of chance finds happen, we definitely will follow up as per EMP mentioned below: (i) Consulting Archaeological Survey of India (ASI) or concerned dept. of Govt. of West Bengal to obtain an expert assessment of the archaeological potential of the site; (ii) Consideration of | PIU & DSISC | Chance Finds Protocol | Project cost |

| Field/Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|---|--|--|---|--|-------------------------|
| | | alternatives if the site is found to be of medium or high risk; (iii) Development a protocol for use by us in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved. | | | |
| Construction work camps, spot mix plants, stockpile areas, storage areas, and disposal areas. | Disruption to traffic flow and sensitive receptors | We have selected three vacant spaces near the project location at Rajarhat, Bhangar-II & Haroa by taking extreme care in selecting sites to avoid residential areas & direct disposal to water body. Hence, we do not anticipate causing any adverse impact to the community directly or indirectly. | FFIL – RIL JV will conduct a detail survey before selection of spot | List of selected sites for construction work camps, spot mix plants, stockpile areas, storage areas, and disposal areas. | Project cost |
| Sources of Materials | Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. | Sources of materials will be from the approved quarry against all valid documents. | FFIL – RIL JV to prepare list of approved quarry sites and sources of materials | (i) List of approved quarry sites and sources of materials; and (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary | Project cost |

Construction Environmental Mitigation Plan

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|--------------------------|---|--|----------------------------------|---|-------------------------------|
| Sources of Materials | Extraction of rocks and material may cause ground instability | We are following the mitigation measures as per IEE. Materials are procured from sources approved by government against all valid documents. | FFIL-RIL JV | FFIL-RIL JV Document | Project cost |
| Air Quality | Emissions from construction vehicles, equipment, and machinery used for excavation of pipe line tranches and construction resulting to dusts and increase in concentration of vehicle- related pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) | Air quality monitoring to be done during construction. (i) Consultation will be carried out with PHED/DSISC on the designated areas (ii) Exposed soil and any stockpiled will be damp down on site by spraying with water when necessary during dry weather; (iii) Tarpaulins will be used to cover sand and other loose material when transported by trucks (iv) Fit all heavy equipment and machinery with air pollution control devices which will be operated during main work | FFIL-RIL JV | (i) Location of stockpiles; (ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Ambient air for reparable particulate matter (RPM) and suspended particulate matter (SPM); (v) Vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NO _x), carbon monoxide (CO), and hydrocarbons (HC). | Project cost |
| Surface water quality | Mobilization of settled silt materials, run- off from stockpiled materials, and chemical contamination from fuels and | Surface water quality monitoring is required and to be done before and during construction. The following measures will be considered during implementation of the project (i) Avoiding stockpiling of | FFIL-RIL JV | (i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps | Project cost |

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|------------------|--|--|----------------------------------|--|-------------------------------|
| | lubricants during construction works can contaminate nearby surface water quality. | earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Prioritization of re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PHED/DSISC on designated disposal areas; (iii) Storage areas for fuels and lubricants will be selected away from any drainage leading to water bodies; (iv) Any wastes generated by construction activities will be disposed in designated sites; and (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP). | | installed along drainages leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectiveness of water management measures; (v) For inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coliforms. | |
| Noise Levels | Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people | As per our nature of work we will be using concrete mixtures, vibrators, bar cutting, grinding machine which may produce medium level of harmful noise. Noise monitoring will be carried out before and during construction. We also follow the mitigation measures as mentioned below, (i) Plan activities in consultation with PHED/DSISC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Require horns not be used unless it is necessary to warn other road users; | FFIL-RIL JV | (i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Log Equivalent day and night time noise levels | Project cost |

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|--------------------------|---|--|----------------------------------|---|-------------------------------|
| | | (iii) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s | | | |
| Landscape and Aesthetics | Solid wastes as well as excess construction materials | <p>We have planned to utilize all the excavated soil back to the trench and foundation back filling at site and designated locations as instructed by PHED. We will maintain our company's policy for Waste Management & also follow up the requirements of bid documents.</p> <ul style="list-style-type: none"> • Solid waste will be managed according to the following preference hierarchy: reuse, recycling and disposal to designated areas; • Removal of all wreckage, rubbish from the sites at earliest. | FFIL-RIL JV | (i) Waste Management Plan; (ii) Complaints from sensitive receptors; (iii) PHED/DSISC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work. | Project cost |
| Accessibility | Traffic problems and conflicts near project locations and haul road | <p>Some of the Project sites are located in the main traffic road, hence we will be following the mitigation wherever applicable according to our site need, once land is made available for work in those areas.</p> <p>(i) Transportation routes will be planned so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (ii) Schedule transport and hauling activities will be planned during non-peak hours; (iii) Site will be free from all unnecessary</p> | FFIL-RIL JV | (i) Traffic Management Plan; (ii) Complaints from sensitive receptors; (iii) Number of signage placed at subproject location. | Project cost |

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|--------------------------------|--|--|----------------------------------|---|-------------------------------|
| | | obstructions; (iv) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. | | | |
| Socio-Economic – Income. | Impede the access of residents and customers to nearby shops | Once land is made available for work outside the WTP area , we will inform nearby community & commercial establishment before executing the excavation work in that specific location before one day in advance of execution to avoid unwanted obstruction (if any) at working site. | FFIL-RIL JV | (i) Complaints from sensitive receptors; (ii) Number of walkways, signage, and metal sheets placed at subproject location. | Project cost |
| Socio-Economic - Employment | Generation of contractual employment and increase in local revenue | Local labours are employed as per availability and competence. | FFIL-RIL JV | (i) Employment records; (ii) records of sources of materials | Project cost |
| Occupational Health and Safety | Occupational hazards which can arise during work | We are following the Safety Policy of the Company. Also follow the points mentioned in the bid documents <ul style="list-style-type: none"> All workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose mask and ear plugs; H and S Training for all site personnel has been arranged Documented procedures to be followed for all site activities; Work-related accidents will be recorded; | FFIL-RIL JV | (i) Site-specific Health and Safety (H and S) Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous | Project cost |

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|------------------------------|---|--|----------------------------------|---|-------------------------------|
| | | <ul style="list-style-type: none"> • First Aid box is provided at all of the working sites; • Medical insurance coverage for workers is being arranged; • Potable drinking water is provided at site; • Clean eating areas are provided to workers; • H and S orientation training is being provided to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Moving equipment are outfitted with audible back-up alarms; • Worker will be disallowed of exposure to noise level greater than 80 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. | | or noxious substances; (vii) record of H and S orientation trainings (viii) personal protective equipment; (ix) Percentage of moving equipment outfitted with audible back-up alarms; (x) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. | |
| Community Health and Safety. | Traffic accidents and vehicle collision with pedestrians during material and waste material/ earth transportation | <p>We are following the Safety Policy of the Company. Also follow the points mentioned in the bid documents</p> <p>(i) Plan routes to avoid times of peak-pedestrian activities.</p> <p>(ii) Liaise with PHED/DSISC in identifying high-risk areas on route cards/maps.</p> <p>(iii) Maintain regularly the vehicles and use of</p> | FFIL-RIL JV | <p>(i) Traffic Management Plan;</p> <p>(ii) Complaints from sensitive receptors</p> | Project cost |

| Field/ Issues | Anticipated Impact | Mitigation Measures | Responsible for Mitigation | Monitoring of Mitigation | Cost and source of fund |
|-------------------------------|---|---|----------------------------------|--|-------------------------------|
| | | <p>manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.</p> <p>Refer Appendix 1 for Project Specific OHS Plan.</p> | | | |
| Work Camps | Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants | <p>Work camps will be constructed beside the location of project sites and also follow the points mentioned below:</p> <p>(i) Before locating project offices, sheds, and construction plants we will discuss with PHED/DSISC;</p> <p>(ii) Till date no trees have been cut;</p> <p>(iii) Employees will be trained for storage and handling of materials which can potentially cause soil contamination;</p> <p>(iv) Solid waste will be managed according to the following preference hierarchy: reuse, recycling and disposal to designated areas;</p> <p>(v) All wreckage, rubbish, or temporary structures will be disposed; and</p> <p>(vi) Report will be submitted to PHED/DSISC with the information that “camp has been vacated and restored to pre-project conditions before acceptance of work”</p> | FFIL-RIL JV | <p>(i) Complaints from sensitive receptors;</p> <p>(ii) Water and sanitation facilities for employees; and</p> <p>(iii) PHED/DSISC report in writing that the camp has been vacated and restored to pre-project conditions</p> | Project cost |
| Social and Cultural Resources | Risk of archaeological chance finds | <p>No archaeological chances found are reported at project sites. Strictly follow the protocol for chance finds in any excavation work;</p> | FFIL-RIL JV | Records of chance finds | Project cost |

7. CONSTRUCTION STAGE ENVIRONMENT MONITORING PLAN

Work Locations:

1. **WTP** - This area inside the boundary of existing Water Treatment Plant near Tank No. – 1, Action Area – 1, New Town, Rajarhat
2. **BS-I** - This area is near the New Town DPS school beside the existing Boosting Station – 1, New Town, Rajarhat
3. **GLSR** - 1- This area is at same location as above
4. **GLSR** - 2- At Haroa location
5. **GLSR** - 3- At Bhangar – II location

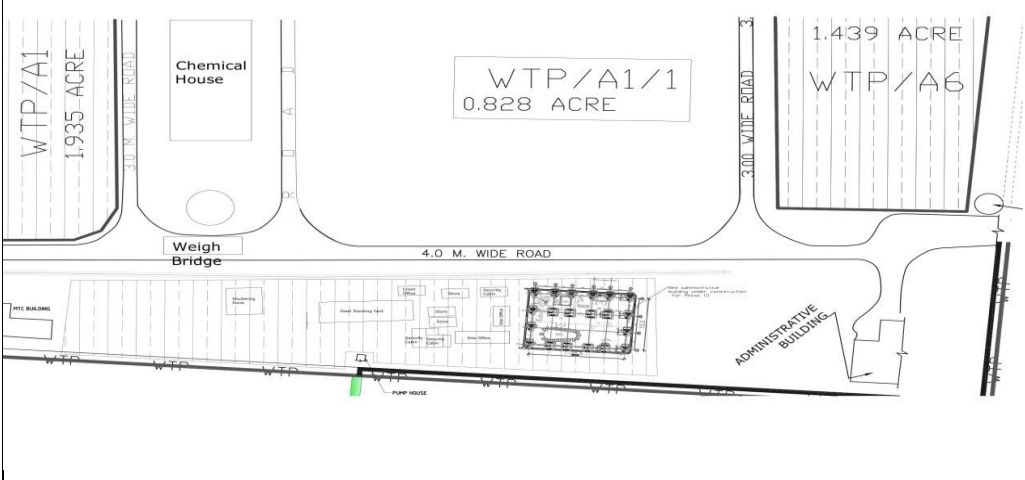
| Sl. No. | Monitoring field | Monitoring Location | Monitoring parameters | Frequency | Total Quantity | Cost of Monitoring (in INR) |
|---------|--------------------------------|---|--|--|----------------|-----------------------------|
| 1 | Ambient air quality – 24 hours | All 5 location mentioned above | PM10, PM2.5 NO2, SO2, CO | Once before start of construction; Quarterly (Yearly 4 times) during construction period of 2 years | 45 samples | 225,000 |
| 2 | Ambient noise | All 5 location mentioned above | Day time and Night time noise levels | Once before start of construction; Quarterly (Yearly 4 times) during construction period of 2 years | 45 samples | 67,500 |
| 3 | Surface water quality | 2 locations (Bidyadhari River and Kestopur Canal) | pH, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity | Once before start of construction; Half yearly during construction period of 2 years | 10 samples | 40,000 |

Presently work has been initiated only at WTP area.

List of Attachments

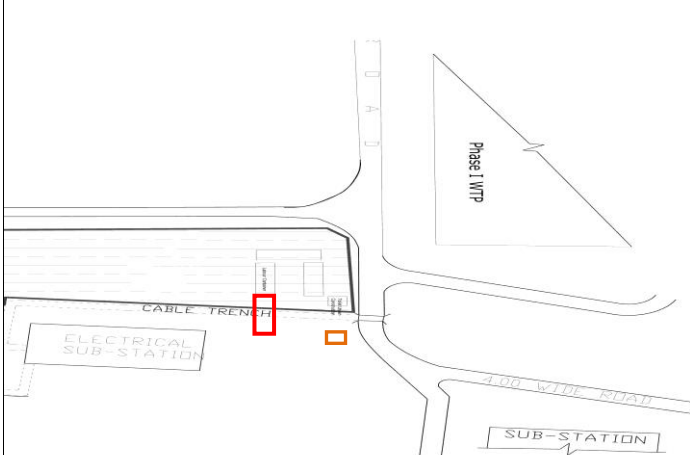

- Attachment 1: Details of construction Work sites
- Attachment 2: Details of construction camp sites
- Attachment 3: List of clearances & statutory requirements
- Attachment 4: Contractor's OHS Policy & Organization
- Attachment 5: Utility shifting/relocation
- Attachment 6: Details of Construction Materials
- Attachment 7: Spoil Management Plan

Attachment 1: Details of construction Work sites

| | |
|----|---|
| 1. | Admin building construction Site Location- New Town ; Rajarhat |
| 1 | Material storage <ul style="list-style-type: none"> • Cement • Steel • Fine Aggregate • Shuttering Material |
| 2 | Plant & Machinery <ul style="list-style-type: none"> • Concrete Mixer – 1 Nos • Needle Vibrator – 3 Nos • Steel Cutter – 2Nos |
| 3 | Site office – 1 No |
| 4 | Laboratory – 1 No |
| 5 | Security cabin – 1 No |
| 6 | Labor welfare facilities <ul style="list-style-type: none"> • Toilets • Drinking water • First Aid Box. • Fire system |
| 7 | Site layout Plan  |

| | | |
|--|--|---|
| 8 | Site photographs | |
| Original site Photographs |  |  |
| | Admin Building Site Before Construction | |
| Site photos with facilities/ Work area |  |  |
| | Fire extinguisher provide at Labour camp | Safety Signage |
| | | |
| |  | |
| | First Aid Training at Site | |

Attachment 2: Details of construction camp site

| | |
|--------------------------------------|--|
| 1. | Labour camp, WTP site |
| | Location- – New Town, Rajarhat |
| 1 | <p>Accommodation – For construction workers No women / families in the camp</p> <p>Facilities provided at camp site</p> <ul style="list-style-type: none"> • Type of living accommodation – Workers container • Separate cooking area • Cooking gas • Drinking water • Bath rooms • Toilets • Drainage system • First aid box |
| 2 | <p>Site layout plan showing Camp Location</p>  |
| 3 | Camp Site photograph |
| Original Camp site photographs |  |

| | |
|--|---|
| | WTP Site Rajarhat |
| Photograph: Camp and its facilities |  A photograph showing the interior of a sleeping area. The structure has a thatched roof made of bamboo or similar material. Various items of clothing, including shirts and trousers, are hanging from a horizontal pole across the middle of the room. A person is lying down on a bed or mat in the foreground, partially visible. The floor appears to be made of woven mats or similar material. |
| | Sleeping area with beds and fan |
| |  A photograph showing the exterior of a toilet facility. It is a long, low structure with a dark roof. The walls and doors are made of woven bamboo or similar material. There are several stalls, each with a door that is slightly ajar. The structure is situated in a grassy area with some trees in the background. |
| | Toilet for labours |

Attachment 3: List of clearances & statutory requirements

| Sl. No. | Project related | Status |
|----------|---|---|
| A | Construction/work related | |
| 1 | Possession of land | Available (WTP area) |
| 2 | Notice to Proceed from PIU | In Process |
| B | Labour Safety / Welfare Related | |
| 1 | Labour license | Available |
| 2 | Workmen Compensation | Available |
| C | Safety / liability safety related | |
| 1 | Medical Insurance | Tie-up with local hospital is under process |
| D | Others | |
| 1 | Fitness certificate for vehicles, equipment used in construction | Available |
| 2 | Pollution under control (PUC) certificates for vehicles and equipment | Available |
| 3 | Driving licenses for drivers | Available |
| 4 | Insurance for vehicles / equipment, as required | Available |

Attachment 4: Contractor's OHS Policy & Organization

| 1 | Contractor agency has a OHS policy | Yes / No |
|---|--|---|
| A | If yes, provide policy details | No |
| | 1. Policy statement: 2. EHS organization & responsibilities: | Yes [Refer Appendix 1] |
| B | List safety risks anticipated in the project Area works (WTP) <ul style="list-style-type: none"> • Trips and falls • Rotating equipment • Head injury from falling objects • Confined work space • Slope failure / trench collapse • Road accidents Linear works (pipelines) • Accidents from open trenches | - |
| C | List personal protection equipment provided to workers <ul style="list-style-type: none"> • Safety Shoes – 32 pair • Safety Gum Boots – 18 pair • Hand Gloves – 12 pair • Safety Helmet – 32 nos • Reflective Vest – 32 nos • Full Body Harness – 4 nos | Yes |
| D | Preventive Measures | |
| | • Orientation of all workers on OHS | Done |
| | • Work permit system | Yes – for work at height |
| | • Toolbox/safety meetings (how often will this be conducted, what are the minimum topics) | Twice Weekly on work at height, firefighting, first-aid, housekeeping, etc. |
| | • Safety signages | Displayed on site |
| | • Barricades (more than 1 m deep requires hard barricading) | Yes |
| 2 | Contractor Emergency Procedure | |
| A | Detail what steps/procedure to be adopted in emergency situation (eg. accidents) <ul style="list-style-type: none"> • In case of emergency first aid treatment to injured labour/person shall be provided. • In case hospitalization is required, concerned site in-charge will immediately take necessary action for hospitalization and he will inform to our Project Manager. • Details of accident shall be reported in accident register | |

| | | |
|--------------------------------|--|--|
| | and the same shall be informed to client also. | |
| B | Contact information, staff and responsibilities for emergency situations | Yes |
| Designation | Staff name & contact | Emergency responsibility |
| Site Engineer | Mr. Sudipta Dey Mob: 9046970333 | Site Engineer shall be responsible for arranging of first aid treatment and other necessary action required in case of emergency. He will also be responsible for informing to EHS Supervisor. |
| EHS Supervisor | Mr. Shubhankar Chattopadhyay Mob: -6292128071 | EHS Supervisor should assess the emergency situation and accordingly instruct the Site Engineer of appropriate actions. Depending on the gravity of the situation, he should also inform Project Manager Representative. |
| Project Manager Representative | Bidyut Kumar Debnath Mob: 6292128086 | Project Manager Representative shall be responsible for taking all necessary action and decisions. |
| C | Reporting procedure in case of work accidents | Yes |
| | Reporting procedure in case of work accidents <ul style="list-style-type: none"> • Details of accidents shall be recorded in accident register. • Copy of accident register shall be submitted to client at the end of every month. • In case of any major accidents client shall be informed immediately. | |
| D | Mandatory Reporting to Authorities | Yes |
| E | Prohibited Acts and Penalties for Violations | Yes |

Attachment 5: Utility shifting/relocation

| Sl. No. | List work sites that require utility shifting, relocation, temporary shut off | Remarks |
|---------|---|--------------|
| 1 | Area work sites (WTP; New Town, Rajarhat) <ul style="list-style-type: none"> • Administrative Building | Not Required |

| | | |
|--|---|--|
| | <ul style="list-style-type: none"> • Chemical House Extension • Inlet Chamber | |
|--|---|--|

Attachment 6: Details of Construction Materials and Wastes

| Sl. No | Material | Approximate quantity required (m3) for project | Source | Indicate if source has all necessary government clearances |
|--------|---------------------------|--|---------------|--|
| 1 | Concrete of various grade | 22,000 cum | RMC vendor | Yes |
| 2 | Reinforcement Steel | 2000 MT | SRMB, Adhunik | Yes |

Details of construction waste / debris / surplus soil

| Sl. No. | Waste likely be generated | Type of debris / waste | Approximate quantity | Indicate whether it will be reused /disposed off | In case of disposal, indicate disposal site name & location |
|---------|-----------------------------|--|---|--|---|
| 1 | Construction waste / debris | Steel, Shuttering Plates, Bamboos, Ply etc | N/A | Scrap steel shall be sold, shuttering plate, bamboo, ply etc. shall be reuse | N/A |
| 2 | Surplus soil | Excavated earth | 30000 cum | Good earth Shall be used to fill up the low land area inside the premises and balance shall be disposed at designated area shown by HIDCO. Top soil will be preserved and re-laid on top of fill area. | HIDCO land |
| 3 | Hazardous waste, if any | (oils, lubricants, chemicals), if any | N/A as only preparatory construction activities are in progress | N/A | N/A |

Attachment 7: Spoil Management Plan

 **FFIL - RIL JV**
 **Public Health Engineering Department**
Government of West Bengal

Document Reference Number: K201810003/HSE/02

Spoil Management Plan (SMP)





PROJECT: DESIGN, CONSTRUCTION AND OPERATION OF WATER TREATMENT PLANT, RESERVOIRS, TRANSMISSION MAINS AND PUMPING STATIONS WORK IN HAROA, RAJARHAT AND BHANGAR II

Location : New Town ; Rajarhat

CONTRACT PMU/WBDWSIP/DWW/N24P/NCB/01/2017-18 PACKAGE NO.:

EMPLOYER: PUBLIC HEALTH ENGINEERING DEPARTMENT (PHED)

CONTRACTOR: FFIL-RIL JV

| 0 | 21/08/2019 |  |  |  |  |
|-----|------------|---|---|--|---|
| REV | DATE | PREPARED BY | CHECKED BY | APPROVED BY DSISC | APPROVED BY PU |

West Bengal Drinking Water Sector Improvement Project.

SPOIL MANAGEMENT PLAN

PROJECT: - DESIGN, CONSTRUCTION AND OPERATION OF WATER TREATMENT PLANT, RESERVOIRS, TRANSMISSION MAINS AND PUMPING STATIONS WORK IN HAROA, RAJARHAT AND BHANGAR II

CONTRACT PACKAGE NO: - PMU/WBDWSIP/DWW/N24P/NCB/01/2017-18

1 INTRODUCTION OF SMP

SMP is to describe how the project will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works.

LEGAL AND OTHER REQUIRMENTS

In this project, there is no legal litigation at site for land and working area or site. Disposal of spoil will confirming the Environmental Protection Rules and Regulations of Govt. of India and the state Govt.

2. ROLES AND RESPONSIBILITY

In this project, major roles and responsibilities are mentioned below:

- Excavated earth should be utilized at site only.
- Traffic movement should not be obstructed by dumping soil during the work.
- No low land, pond, ditch etc. will be filled up by extra soil outside the work place.
- Ensuring no accident occurs during rainy season by excavated earth during or finished the work.
- All the drains, outlet should be free from excavated earth.

3. IDENTIFICATION AND ASSESSMENT OF SPOIL ASPECTS AND IMPACTS

In this project, there are some places which will be assessed and identified jointly along with design engineer. Main places where the excavated earth can be utilized are the trench of pipes and backfilling location. There are three backfilling lands in this project and need to be developed by earth filling.

4. SPOIL VOLUMES AND CHARACTERISTICS

In this project, approx. generation of excavated earth will be 51000 cum. There is no excess earth in this project as the same earth is to be used to fill the low land area of ESRs.

As per report from soil expert, excavated earth is cohesive in nature.

5. SPOIL REUSES OPPORTUNITIES.IDENTIFICATION AND ASSESMENT

In this project, there is no excess quantity of excavated earth; total excavated earth should be reused as per plan.

6. ON SITE SPOIL MANAGEMENT APPROACH

In this project, no need of the approach as there is no extra soils for disposal.

7. SPOIL TRANSPORTATION METHODOLOGY

In this project, no need of transport as there is no extra soils for off-site disposal.

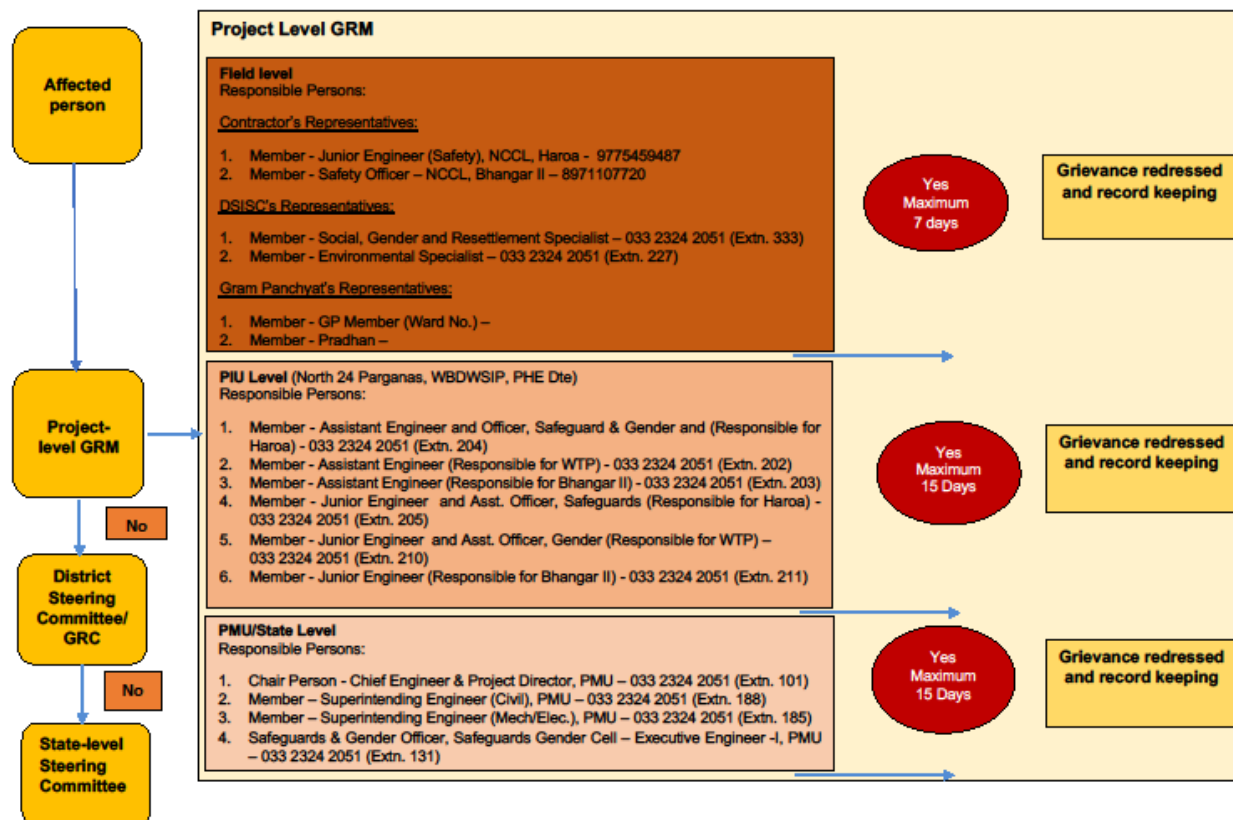
8. MONITORING, REPORTING, REVIEW AND IMPROVEMENTS

Monitoring, Reporting and all necessary improvements will be done as per requirement.

Attachment 8: Procedure for on-site Grievance Redressal Mechanism

A common Grievance Redressal Mechanism (GRM) is in place to redress social, environmental or any other project and/or subproject related grievances. The GRM presented below has been developed in consultation with stakeholders. Public awareness campaign has been conducted to ensure that awareness on the project and its grievance redress procedures is generated. The campaign has ensured that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per project entitlement matrix, and PMU and PIU will ensure that their grievances are addressed in time.

Grievance Redress Mechanism



All grievances are recorded in site grievance register and resolved at the earliest. The sample grievance registration form is included in Appendix 2.

Appendix 1: Contractor's OHS Plan and Workmen Compensation Policies

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Government of West Bengal

Health and Safety Management Plan

June 2019

PROJECT: DESIGN, CONSTRUCTION AND OPERATION OF WATER TREATMENT PLANT, RESERVOIRS, TRANSMISSION MAINS AND PUMPING STATIONS WORK IN HAROA, RAJARHAT AND BHANGAR - II

CONTRACT PACKAGE NO: PMU/WBDWSIP/DWW/N24P/NCB/01/2017-18

EMPLOYER: PUBLIC HEALTH ENGINEERING DEPARTMENT (PHED)

CONTRACTOR: FFIL-RIL JV

PREPARED & SUBMITTED BY

FFIL – RIL JV
1582, RAJDANGA MAIN ROAD,
KASBA NEW MARKET – 7TH FLOOR,
KOLKATA – 700107



RESPONSIBILITY:

The overall responsibility for the safe works will be of the Project Manager and the HSE Officer who is the authorized representative of the site to advice, inspect and monitor compliance to this plan. Implementation and responsibility of ensuring safety on the project is that of the site personnel.

TRAINING, AWARENESS AND COMPETENCE

The site HSE Officer regularly carries out safety training related to works and scheduled activities. In addition, Supervisors are to carry out tool box talks on a scheduled basis covering at least 80% of all employees on the site.

All new employees are required to report to the HSE Dept. prior to being delegated any duties thereby ensuring 100% new employees are inducted into the Company HSE systems and are made aware of the basic HSE requirements and standards of the Company.

Subcontractors and suppliers carrying out works on the project are inducted to the Company's HSE systems and made aware of the minimum HSE requirements. All contracts with these parties bind the subcontractor / supplier to the need to abide and maintain FFIL-RIL JV's HSE systems and standards.

Schedule of safety training / tool box talks:

Tool Box talks will be conducted at site on regular basis at least once in a week either by the concerned supervisory staff or by the Safety Officer. Before starting any new activity, it will be conducted at site by the concerned supervisory staff. The topics covered and the attendance of the persons attend will be recorded on the specified training format.

The specific safety training will be conducted periodically to the specified group of persons based on the need. These will be more detailed as per the specific trade based safety requirements for effective operational control. Either the Safety Officer or any identified person based on his expertise will conduct these programs and the records will be maintained on the specific training format with all details.

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Visitors are expected to sign in a visitor's register prior to being allowed entry into the Project area and are thereby made aware of the minimum Safety rules and Emergency Procedures by the Security Personnel.

HSE MANAGEMENT SYSTEM IMPLEMENTATION PLAN.

HAZARD IDENTIFICATION & RISK ASSESSMENT.

Before any activity is carried out, the site engineer submits a method statement and the HSE Officer initiates the risk assessment. Risk Assessment is carried out jointly by the respective foreman, engineer and the HSE Officer. The Risk assessment drafted is then reviewed by the Site safety committee and approved by the Project Manager. Control measures are defined ensuring that where possible risk is eliminated or reduced to the maximum limit. The **ERICPD** (Eliminate, Reduce, Isolate, Control, Personal Protective Equipment and Discipline) system is followed as a policy of the Company.

HSE Officer on a daily basis ensures inspections of activities being carried out. Prior to the onset of any activity, inspections are carried out to ensure that all controls including operations controls are set in place.

HSE - INSPECTION AND AUDIT PLAN:

- Health and safety inspection are undertaken by the HSE Officer(s) of all work areas including site offices and worker accommodation camps.
- As a minimum, health and safety inspections are to be undertaken weekly and a full and detailed inspection report identifying non compliances is to be prepared. Using safety inspection checklists HSE Officer will carry out the safety inspection, all site activities and have the responsibility and authority to raise HSE violation report to the Engineers and Project Management. The same has to be corrected / closed out and sent back the compliance reports.
- The documents / procedures corresponding to the corrective / preventive actions will be revised whenever required and will be recorded as per the requirement of Integrated Management System (IMS) procedure.

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- Corrective and preventive actions will be reviewed at the proposal stage through the risk assessment process prior to implementation. Evaluation of OH & S risk assessment and prioritization of significant risk to be utilized for taking corrective and preventive action.
- The Engineers are required to take corrective / preventive action prior to the onset of works or before proceeding with the works.
- At the end of every Week and Month site has to send Monthly safety reports in the appropriate format to the corporate safety department on the safety performance. At the end of each month Site has to send the monthly safety performance to the concerned Consultant also such that the same can be used as a measuring tool on our continual safety performance improvement.

Safety Audit Plan:

A programme of planned and documented Safety Audits/Review will be carried out in order to provide objective evidence of the compliance to Safety requirements and procedures. These will be carried out once in 3 months.

Safety Audits will be carried out in order to:

- Provide objective evidence of conformance with agreed systems, methods and procedure.
- Determines the effectiveness of the existing Safety procedures and plans. —
- Identify any shortcoming in the Safety system and plans and to establish where improvements can be made.
- The Audit team will consist of Corporate HSE Personnel, Site HSE Officer and site execution representative(s).
- All Audit/Review reports(s) will be submitted to Project Manager for approval and copied to the corporate HSE Department.

PROJECT LOGISTICS PLAN.

PUBLIC PROTECTION

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The public shall be protected from all the dangers/ hazards associated with construction sites and for which the following has to be followed:

- Perimeter fencing and hoarding.
- Restrictive or no access signs.
- Safety signs & Posters.

CONTROL OF ACCESS AT THE MAIN ENTRANCE TO THE SITE:

- Access to the site will be restricted to authorize personnel.
- At all times, a safe and protected means of access will be provided for site personnel.
- An access for emergency evacuation will be provided.
- All the vehicles entering the site should follow strict traffic rules including for entry and exits. Access to the site is restricted through the approved entry points. If any vehicle or person entering the site from any other access will be treated as offender and liable for disciplinary action as per the company rules including imposing the penalties.
- Subsequent entry of the vehicles should show the identity of gate/ access pass or sticker issued at the time of first entry. The same is applicable to the drivers also.
- Speed limit of 40 KMPH shall be followed strictly whether it is a light vehicle or heavy vehicle.
- Any vehicle entering first time to the site should register its particulars at the main security gate "The registration number of the vehicle, Permit Number, Its Validity, Driver's Name, Driving license number & validity, and vehicle owner's name, purpose of the entry and emergency contact person & telephone number.

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- All new drivers and operators of heavy equipment should report to the site HSE department for induction when they enter first time the premises and shall be aware of site safety rules, entry & exit points and other particulars of the site. No new person will be allowed straight to site during night operations as the new person induction training programme will be conducted only during day office hours at main site office Safety Department. After induction every person will get induction card/sticker signed by the site HSE Officer.
- Strict competent supervision has to be ensured till completion of the activities by the vehicle owner if the vehicle is hired or not belongs to FFIL-RIL JV.
- All lifting equipment like cranes, Hydra's should have a valid 3rd party inspection certificate for Safe working load of the equipment and shall be operated by the licensed person who is certified for his competency by the approved 3rd party. During lifting operations one trained signal man shall be deployed for rigging and banks man for reversing the vehicles.
- Both the persons should wear high visibility reflective jackets and night time electronic batten lights. No one shall be allowed in the load lifting and shifting areas beneath the load and in its travelling path.
- No unauthorized person should enter into the loading and unloading points.
- At loading and unloading points the approved safe practices relating to tying down the loads, lifting accessories and material handling (including manual and mechanical handling) procedures are to be followed.
- Any violations of the above shall be taken very seriously and the violators are liable for disciplinary action and penalties.
- The hired vehicle owners and agencies are solely responsible for any accidents / damages taking place due to their activities inside the premises. If any company property damaged due to their role including the poor maintenance of their vehicles, their person's inefficiency and irresponsibility,

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the company will deduct all the cost of damages from their bills without any further notice.

- In case of any damage to third party taking place by the hired or other vehicles / equipment belongs to sub-contractors, transporters or their agents will be based by them only. The concerned agencies are primarily responsible to settle all disputes & legal formalities by themselves. In case of any further dispute in this regard, and FFIL-RIL JV being the main contractor will take decisions as per the requirement and situation and its decision is final and all agencies have to bind to this.

ACCESS CONTROLL:

Main Hazards

- Unaware of site rules and Hazardous locations
- The movement of plant and traffic
- Overhead cables
- Excavations
- One way and restricted access areas
- Dust/fume / fog

Precautions

- Carrying out the works with special attention, where restrictions are imposed by physical obstructions, i.e. Overhead power lines, slip roads, etc.
- The guidelines given by IRC SP55:2001 for Traffic Management and Safety at work zones shall be followed.
- A safety zone has to be provided between live traffic lanes and the working area (this includes equipment, plant, tools, excavated materials, etc.).

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- Adequate barriers are provided to protect the workforce; portable vertical barriers should be considered for this.
- Where half constructed or constructed but not opened to traffic shall be covered with Jersey barriers on both the ends of the road. These barriers shall in two parallel lines one third length opened on the opposite ends.
- Access / egress locations for site transport are kept to a minimum, preferably one at every work area.
- Adequate measures are to be implemented to prevent traffic coming into contact with temporary / permanent structures, i.e. by using temporary barriers.
- Adequate temporary lighting is to be provided wherever it is required.
- Speed limits are to be set, marked and enforced specific to the work activity.
- All access routes are to be clearly signed and maintained.
- Arrangements are to be made to reduce the need to reverse vehicles. Where this is not possible, a trained banks man must be provided.
- All appropriate personnel should wear high visibility clothing.
- Precautions like goal post are to be in place for overhead cables.
- Underground cables and pipes shall be protected with adequate covering and markings.
- Define the working area in the live road/footway using cautionary boards and flag men.
- Define the working space – this include the areas for storage of tools and equipment and space to move around the job.
- Provide a safety zone – this is an area to separate the work from the traffic – it must be kept clear of all work, materials storage and people and must be clear of the working radius of all plant.

COMMUNICATION:

Communication between the staff, workmen, clients & consultants is to be established through the following:

- Safety Committee meeting – Minutes will be circulated

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- Daily Tool box talks
- Safety Walk around
- Notice boards & Display of Posters and slogans.
- HSE Trainings.

Information to be given to new persons (Including Visitors)

| | | |
|------------------|---------------------------|------------|
| Project Manager | Mr. Sujay Das | 6292128002 |
| Project Engineer | Mr. Kaustav Sain | 6292128008 |
| HSE Officer | Mr. Shubhankar Chatterjee | 7604062851 |

List of Emergency service telephone numbers

| | |
|-------------------|--------------|
| POLICE | 100 |
| AMBULANCE | 108 |
| FIRE | 101 |
| Nearest HOSPITAL | 033-23961687 |
| Project HR Deptt. | 6292128085 |

HEALTH –WELFARE & HYGIENE PLAN

THE OBJECTIVE IS TO PROVIDE AND MAINTAIN A CONSISTENTLY HIGH STANDARD OF OCCUPATIONAL HEALTH AND WELFARE FACILITIES ON THIS PROJECT SITE CONFORMING TO BRDC & IRC: 67:2001 REGULATIONS. WELFARE FACILITIES WILL BE PROPERLY PROVIDED AT ALL STAGES OF CONSTRUCTION, FROM COMMENCEMENT TO COMPLETION. THIS MAY REQUIRE TEMPORARY FACILITIES TO BE PROVIDED PARTICULARLY AT COMMENCEMENT AND COMPLETION IN ADEQUATE STANDARD AND SUITABLE FOR THE NUMBERS OF PERSONNEL ON SITE.

Basic considerations of the arrangements are as follows:

- Adequate Sanitary Conveniences, including temporary toilets with septic tanks which can be cleaned and cleared as per the requirement. At no point of time allow any overflow or leakage or accumulation of stagnated water in the surrounding area.

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- Time to time cleaning of toilets, at least twice in a day with disinfectants. All septic tanks will be cleared timely; to take out the sludge from the septic tanks before they are full. All BRDC/IRC regulations in this regard will be complied.
- Housekeeping will be the top priority to maintain best hygiene to prevent any spread of infectious diseases. For this we deploy dedicated team of workers who will clean all the rest rooms and lunch rooms immediately after the designated hours at least twice in a day and collect all food waste in the designated dust bins with proper lids and dispose as per the BRDC/IRC norms.
- We will maintain adequate skips at designated areas and make arrangements with BRDC/IRC for timely clearing of the same at least once every alternative day and if required every day such that there will not be any overflow of the same.
- Adequate drinking water through portable water coolers like thermal insulated cans kept at all work locations as per the man power working at that particular locations. Through a dedicated vehicle ensure the supply of cool water in these throughout the working hours at all locations.
- In general, all work locations are Non-Smoking areas; to facilitate good administrative control over this we will identify and designate smoking zones after considering the required factors relating to the particular location. All the demarcated smoking areas will be provided with minimum infrastructure of shaded area, sitting arrangement, ash tray and dust bins.

FIRST AID ARRANGEMENT PLAN

First Aid Room

Company provides a suitably equipped and staffed First - Aid room. The First aid room shall meet the following.

- The first-aid room shall be located in such a way that it allows easy access and egress for the emergency services.
- The room shall be large enough accommodate a wheel chair and stretcher.

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- The room shall be clearly identified as the first-aid room by use of signage on site and on drawing.
- The male nurse shall have adequate facilities available to call an ambulance or contact any other agency or transport the injured person from the workplace.
- The first-aid room shall also contain the following suitable equipment and facilities; First-aid box or cupboard, Sink, Hot and cold water, drinking water and disposable cups, soaps, smooth top work surfaces, Suitable first-aid equipment and materials, Disposable plastic bags for refuse, Chair, Record keeping arrangements etc.

ACCIDENT AND INCIDENT ANALYSIS PLAN:

- The Project HSE Officer will carry out investigation to identify the root causes of accidents, incidents, dangerous occurrence and non-conformances. The detailed investigation report should reach the Corporate HSE department within 48 hours with Project Manager's remarks on the incident/ occurrence. Project HSE Officer's Role and responsibility is to work as facilitator between site and Corporate HSE Department. He will facilitate to take preventive measures required (the non-conformances and corrective actions) immediately. Project HSE Officer will intimate Corporate HSE Department in details about corrective, preventive measures complied at site to mitigate accidents in future.
- Corporate HSE Department will advise to Project HSE Officer on the analysis and findings of the accident, incident data for taking corrective and preventive measures to prevent reoccurrences.

Classification of Accident and Incident

Accident: Any injury or illness-related to work activities that results in:

- Death
- Amputations involving the loss of bone tissue
- Loss of consciousness due to electrical shock, lack of oxygen or chemical exposure
- Possible permanent functional impairment of a body part (excluding those resulting from a back strain)

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- Admission to a hospital (other than 24-hour observation, hernia repair or back strain)
- Accidents or incidents that results in three (3) or more days admitted to a hospital or medical treatment facility.

Recordable Incident - Any accident/incident that results in:

- Medical treatment other than first-aid, (Examples: treatment of an infection, sutures, second or third degree burns, etc.)
- Restriction of normal work activities (reduced work activities, or reduced work days);
- In days away from work (lost-time)
- Or any occupational illness.

SAFETY PLAN FOR WORKMEN AT SITE:

- Safety of the project workers at site during duty hours is the responsibility of FFIL-RIL JV.
- It shall be ensured by him that safety measures appropriate for the job a workman Performs shall be provided.
- Role of FFIL-RIL JV is to regulate the working hours for the workers engaged by the sub-contractors.
- Safety measures against accidents of the workers by the traffic using the highway and / or diversions shall be taken. The FFIL-RIL JV shall provide helmets and protective retro Reflective jackets to their workmen at site and make it compulsory for them to wear the same.
- The FFIL-RIL JV shall insure for the employees working under him against accident.
- Labor laws in force shall be followed.
- Duration of shift for the workers will be scheduled as per the labor rules. (BOCW ACT 1996).
- FFIL-RIL JV will arrange a temporary shed in the working area, it can serve as a rest area to take interim rest breaks for the workers.

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- In respect of all labor directly or indirectly employed in the work for the Performance of the FFIL-RIL JV part of this agreement, the FFIL-RIL JV shall at his expense arrange for the safety provisions as per Indian standards safety codes and shall at his own expense provides for all facilities in connection there with.

ROAD WORK SAFETY PLAN:

General requirements

- Any contractor who undertakes road work shall conform to the Construction Safety.
- Road works are considered among dangerous and hazardous works; therefore, the Contractor shall carry out adequate Risk Assessment and determine the safe work procedure to protect his employees, users of the road, and the public against these hazards.
- All works implemented on roads shall be supervised by a competent person who has been adequately trained, and this person must be permanently available on site.
- All workers working at road works shall be provided by necessary and adequate personal protective equipment.
- All construction workers engaged in highway works shall take all precautions.
- The provision of a complete system of advanced warning signs on high way works shall be maintained by the contractor and this system shall be approved by the Independent consultants.
- All areas within site where the work will be performed during night shall be adequately illuminated and all workers shall wear retro reflected jackets.
- All workers handling bituminous material or concrete and all other workers on roadwork sites shall at all times wear protective clothing, safety boots, gloves, safety helmets and eye protection.
- All holes, excavations, open manholes, wet concrete, and soil heaps on road work sites shall be provided with suitable barriers (with suitable light flashers) to protect pedestrians, workers, plant or vehicles from falling over or into such places.

Road maintenance

While performing maintenance of road we must ensure the safety of

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- ♦ General public
- ♦ Workmen
- ♦ Motorists
- ♦ Construction equipment

- Depending upon the traffic movement, maintenance of the work to be decided either day or night to reduce the hazard.
- Engage only trained workmen and check the condition of the equipment.
- The type of work area protection required is also to be determined by the nature and vicinity of the traffic.

Safety in excavation

- a) Excavations are the most hazardous activities in construction workplaces. Most construction work involves some forms of excavation for foundations, drains, sewers, etc.
- b) Workers involved in excavation activities are exposed to various potential hazards.
- c) The contractor shall be responsible for providing all necessary precautions and applying all necessary protective procedures to protect employees public and road users against potential hazards to which they might be exposed during excavations, such as cave-ins.

General Requirements:

- a) All adequate and appropriate personal protective equipment shall be provided to protect head, eyes, respiratory, hands, feet and other body parts.
- b) Excavated materials/spoils shall be placed at least 1 meter away from the edge of an excavation and shall not be accumulated.
- c) Protective barricades and flashing lights, warning signs shall be placed in all excavations near sidewalks, pavements and streets. Warning signs shall be illuminated from dusk to dawn and when weather conditions reduce visibility.
- d) All wells, holes, pits and shafts shall be covered or barricaded and backfilled upon completion of the work.
- e) Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guard-rails shall be

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provided.

- f) Dimensions of the members of shoring, shielding and bracing systems shall be appropriately and adequately determined.
- g) When a soil is adversely affected by weather, coverage and adequate support systems shall be installed to prevent cave-ins. The worksite shall be adequately and properly illuminated especially in access and egress points.
- h) Excavations greater than 1.2 m. in depth shall be provided access / egress, ladders or ramps. Ladders used as access ways shall extend from the bottom of the excavation to not less than 90 cm (3 feet) above the surface.

PILING WORK SAFETY PLAN:

Hazards in piling: Fall of tripod, electrocution, slip hazard and hit by objects.

Safety precautions:

- a) Do competent inspection before deploying tools & tackles like chain pulley, block, winch, wire rope, D-shackles, tripod, hooks etc.
- b) Guard all the rotating parts like flywheel, belt transmission, chain, couplers, Flywheel, radiator fan etc.
- c) Never shift the arrangement without disconnecting the electrical power supply.
- d) The approach must be tide and clean & free from hindrance, water logging etc.
- e) Use proper PPE like safety helmet, gum boot, leather hand gloves, goggles etc.
- f) All power cables must have rated capacity and should be routed overhead only.
- g) Before leaving the workplace at night ensure the hammer is brought down.
- h) Adequate lighting arrangement.
- i) Covering of the pile hole to prevent fall of person or animals.
- j) Disconnecting of power supply.
- k) Use crane for shifting the rig frame from one place to other.

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- l) Cordon the work area.
- m) Practice good housekeeping.
- n) Provide adequate dewatering arrangement during monsoon.
- o) Inspect all electrical accessories.
- p) Provide drainage point to prevent water logging at workplace
- q) Always position the tripod legs in the leveled and compacted area etc.



Royal Sundaram
General Insurance

Royal Sundaram General Insurance Co. Limited

(Formerly known as Royal Sundaram Alliance Insurance Company Limited)
"Millennium City", Information Technology Park, Unit No.: T-2-2A,
Tower-II, Plot No.: DN-62, Sector-V, Salt Lake, Kolkata - 700 091
Tel. No.: 033-4222 7373 | Fax No.: 033-2367 5523
Toll No.: 1860 423 0000 | E-mail: customer.services@royalsundaram.in
Website: www.royalsundaram.in
Registered Office: 21, Paulloos Road, Chennai - 600 002.
IRDAI Registration Number - 102 | CIN-1067200IN2000PLC045611

WORKMEN'S COMPENSATION INSURANCE POLICY SCHEDULE

Intermediary Code : OA504383
Intermediary Name : Saibal Sengupta
Contact : 9831176521

Policy No. LW00010835000100

Insured Name and Address : Furnace Fabrica India Ltd
: 1582, Rajdanga Main Road
: Kasba New Market, 7th Floor

Business : Civil Construction works as per Specification attached

Law(s)

The Policy will provide coverage under the following Law(s)

- WC Act 1923 and subsequent amendment of the said Act
- The Fatal Accident Act 1855
- Or Common Law

Period of Insurance: 12 Months

From 00.00 Hrs. of 01/04/2019 to 23.59.59 on 31/03/2020

Premium : Rs. 3,62,260/- (Including Rs. 55,260/- GST.)

Subject to adjustment in the terms of Condition 6 the estimated amount of wages salaries and other earnings on which Premium is based.

| Estimated Number of Employees (A) | Occupation of Employees (B) | Estimated Total Salaries Wages and other money earnings per employee (C) | Estimated Total Earnings (D=A*C) | Place or Places of Employment. (E) |
|-----------------------------------|-----------------------------|--|----------------------------------|------------------------------------|
| As per the Specification attached | | | | |

Date of signature of Proposal and Declaration 01/04/2018



Royal Sundaram

General Insurance

Memoranda

The Policy is subject to following clauses, conditions & warranties

- Proper register recording the attendance and wage disbursement must be maintained at all times and to be produced as and when required by the Company.
- Classification Number 46
- Endorsement Number –
- Liability of the Company under this policy is applicable only in respect of claims occurred during the policy period and reported within 60 days from the date of expiry of the policy.
- The maximum liability of the Company under Common Law is 100 times the monthly salary/wages/earnings of the worker/employee covered under this policy. The Onus of proof that the worker/employee is covered under this policy is upon the Insured.
- If the amount of Wages declared for this insurance for all the Employees is less than the actual Wages paid until date of accident, the Company shall be liable to indemnify on any claim only in proportion that the Wages declared bears to the Wages paid. For the purpose of this clause, the Wages declared shall be calculated proportionately for the period from commencement of Policy until date of accident for comparison with the actual Wages paid during such period to determine applicability of this clause.
- The insurance granted hereunder excludes :
 - Any interest and/or penalty imposed on the Insured on account of his/their failure to comply with the requirements laid down under WC Act 1923,
 - Occupational diseases
 - Compressed Air Diseases listed in Part A of the Schedule III of the Act unless specifically covered by an endorsement to the policy,
- Exclusions as per annexure I



Royal Sundaram
General Insurance

- Ø Loss or Liability due to Terrorism Excluded as per the attached wording
- Ø Onus of Proof as per the attached wording
- Ø Applicability of Policy cover as per the attached wording
- Ø Warranted that work at heights is restricted to 50 metres and all recommended safety precautions for work at height are implemented at all times during the policy.
- Ø Designation Basis Cover as per the attached wording
- Ø Company's liability in respect of any one event shall be restricted to maximum of INR 5 Crores
- Ø Endorsement No.179 as per the attached wording
- Ø Medical expenses as per the attached endorsement wording.
- Ø Co Insurance Clause

Consolidated Stamp Duty paid to Government of Tamil Nadu.
issued at: Chennai

IN WITNESS WHEREOF, this Policy of Insurance has been signed on 29-03-2019

GSTIN No. : 19AABCR7106G1ZG

PAN No.AABCR7106G

Cheque No: 100188 (Axis bank Ltd) Dt 27-03-2019

Policy Servicing Address: Kolkata, Salt Lake

For Royal Sundaram General Insurance Co. Limited



Authorized Signatory



Royal Sundaram
General Insurance

Annexure I : Exclusions :

This policy excludes work involving

- I. Risk locations manufacturing and or supplying, producing, storing, filling, breaking down or transporting
 - a) Fireworks,ammunition,fuses,cartridges,powder,nitro-glycerine,celluloid,pyroxylin or any explosions
 - b) Gases and/or air under pressure in containers
 - c) Butane, methane,propane, and other liquefied gases.
 - d) Petrochemicals and also chemicals of a "toxic", noxious, explosive and/or highly inflammable nature.
- II. Demolition of towers/steepless, bridges, dams and chimney shafts
- III. Excavation and tunnelling work in connection with mining.
- IV. Quarrying involving the use of explosives
- V. Drilling for, producing, refining and/or distributing oil and gas.
- VI. Operation of Railways
- VII. Mines/under water/ wet works/bridges/dams construction
- VIII. Tunnelling and Blasting and use of explosives

For Royal Sundaram General Insurance Co. Limited



Authorized Signatory



Royal Sundaram
General Insurance

Specification attached to and forming part of Policy No. LW00010835000100

| Place or Places of Employment. | Occupation of Employees | Estimated Number of Employees | Estimated Total Salaries Wages and other money earnings per employee | Estimated Total Earnings |
|--|-------------------------|-------------------------------|--|--------------------------|
| SK Mines (Rajasthan). | Skilled | 67 | 188,975 | 12,661,325 |
| | Un-Skilled | 105 | 126,464 | 13,278,720 |
| RA Mines (Rajasthan). | Skilled | 50 | 188,975 | 9,448,750 |
| | Semi-Skilled | 0 | 157,900 | 0 |
| | Un-Skilled | 50 | 126,464 | 6,323,200 |
| WS 16 (West Bengal). | Skilled | 9 | 188,975 | 1,700,775 |
| | Semi-Skilled | 0 | 157,900 | 0 |
| | Un-Skilled | 19 | 126,464 | 2,402,816 |
| WS 18 (West Bengal). | Skilled | 11 | 188,975 | 2,078,725 |
| | Semi-Skilled | 0 | 157,900 | 0 |
| | Un-Skilled | 28 | 126,464 | 3,540,992 |
| Santragachi Flyover (West Bengal). | Skilled | 0 | 188,975 | 0 |
| | Semi-Skilled | 0 | 157,900 | 0 |
| | Un-Skilled | 23 | 126,464 | 2,908,672 |
| RFCL (Telengana). | Skilled | 0 | 188,975 | 0 |
| | Semi-Skilled | 30 | 157,900 | 4,737,000 |
| | Un-Skilled | 65 | 126,464 | 8,220,160 |
| PHED WTP Site at Rajarhat, Haroa and Bhargar, 24 Parganas (N), West Bengal | Un-Skilled | 50 | 126,464 | 6,323,200 |
| | Semi-Skilled | 30 | 157,900 | 4,737,000 |
| | Skilled | 20 | 188,975 | 3,779,500 |

For Royal Sundaram General Insurance Co. Ltd.





Royal Sundaram
General Insurance

Memoranda attached to and forming part of Policy No. LW00010635000100

3. Endorsement wording for Medical Expenses:

In consideration of the payment of an additional premium it is hereby understood and agreed that this Policy subject to its terms provisions and conditions is extended to indemnify the Insured in respect of the reasonable, medical, surgical and hospital expenses (including cost of conveyance to hospital) incurred by the Insured within six months from the date of accident in connection with any case of injury to which the indemnity granted under this policy applies or would have applied had disablement exceeded three days.

Provided always that the liability of the Company under this endorsement shall be limited to Rs 1,00,000/- in respect of any one insured person during the Period of Insurance.

The medical expenses, so incurred, should be substantiated by medical / diagnostic tests, doctor's report and certificate.

All medical treatments for the purpose of this insurance will have to be taken in India only

4. Designation Basis Cover:

The Policy being issued on Designation Basis, the cover under this Policy shall apply to an estimated 557 Number of Employees as mentioned in Policy Schedule on the rolls of the Insured during the Period of Insurance.

Should the number of such employees during the Period of Insurance under any designation exceed the number specified in the Schedule, such employees who have enrolled/joined employment with the Insured after the specified number of employees under the respective designation as noted in the Schedule are deemed to be outside the scope of this Insurance.

Warranty

Limitation on cover: Warranted that at the time of claim the total number of employees in each cadre as per Insured's rolls, should not exceed the numbers declared to the Insured till that date for which Premium has been accounted for. In case the numbers declared are less than the numbers as per rolls on the date of loss, the Company reserves the right to repudiate all claims pertaining to persons who have joined after the date of the last declaration made by the Insured to the Insurance Company for which Premium has been accounted for.

For Royal Sundaram General Insurance Co. Ltd.



Authorized Signatory



Royal Sundaram
General Insurance

Memoranda attached to and forming part of Policy No. IW00010835000100

5. Onus of Proof:

Warranted that in the event of claim the onus of proving that the affected person was on rolls at the time of claim will lie on the Insured. The full details including date on which the employee joined is to be given

6. Applicability of Policy Cover:

This Policy being issued on Unnamed Basis, the cover under this Policy shall apply to an estimated 557 Number of Employees as mentioned in Policy Schedule on the rolls of the Insured during the Policy Period. Should the number of such Employees during the Period of Insurance under any designation exceed the number specified in the Specification, such Employees who have enrolled/joined employment with the Insured after the specified number of employees under the respective designation as noted in the specification are deemed to be outside the scope of this insurance. (Eg: 125 Number of Employees as mentioned in Policy Schedule are covered under the Policy - If it is found that there are 126th Number of Employees, the 126th number employee who has joined will be outside the scope of this insurance).

7. Endorsement No. 179:

It is hereby understood and agreed that the indemnity herein granted is extended to cover the legal liability of the Insured to workmen in the employment of Contractors performing work for the Insured while engaged in the business and occupations in respect of which the within Policy is granted, but only so far as regard claims under the Workmen's Compensation Act, 1923, and subsequent amendments of said Act prior to the date of the issue of this Policy, the premium in respect of such extended insurance to be calculated at the rate agreed of the total sums paid to such Contractors by the Insured in respect of work executed during each period of insurance.

For Royal Sundaram General Insurance Co. Ltd,



Authorized Signatory



Royal Sundaram
General Insurance

Memoranda attached to and forming part of Policy No. LW00010835000100

9. Terrorism Damage Exclusion Clause:

- a) Injury or Damage directly or indirectly caused by resulting from or in connection with any Act of Terrorism regardless of any other cause or event contributing concurrently or in any other sequence to such Injury or Damage.
- b) Injury or Damage directly or indirectly caused by resulting from or in connection with any action taken in controlling preventing suppressing or in any way relating to any Act of Terrorism.

For the purposes of this Exception Act of Terrorism shall mean an act including but not limited to the use of force or violence and/or the threat thereof of any person or group(s) of persons whether acting alone or on behalf of or in connection with any organisation(s) or government(s) which from its nature or context is done for or in connection with political religious ideological ethnic or similar purposes or reasons including the intention to influence any government and/or to put the public or any section of the public in fear

10. Classification No: 46

Special Condition: Warranted that Workmen Covered Under this Policy is engaged in Civil Construction only for the specified location mentioned in the policy

Subject to otherwise to the terms, provisions and conditions of the within Policy.

For Royal Sundaram General Insurance Co. Ltd.





Royal Sundaram
General Insurance

Memoranda attached to and forming part of Policy No. LW00010835000100

COINSURANCE CLAUSE

It is hereby declared and agreed that insurers named hereunder severally agree and accept the following for the proportion set against its name

1.1. In event of any claim being admissible by the insurer towards the liability, to pay or make good to the insured the value of the property at the time of the happening of its loss or destruction or the amount of such damage thereto as provided for under the policy and or

1.2. To indemnify the insured against liability at law or damage to any property or injuries to persons as provided for under the policy

2 Co-insurance Schedule:

| Sl. No. | Name of the Insurer | Share (%) |
|---------|--|-----------|
| 1 | Royal Sundaram General Insurance Co. Limited | 51 |
| 2 | Shiram General Insurance Co Ltd. | 49 |

3 Conditions forming part of this clause

It is hereby agreed and understood that:

3.1 The Insured in exercise of his option has after having understood the implications, selected the above named lead Insurer and the named Co-insurers vide sr. Nos. of the co-Insurance schedule as in point no. 2 under the policy.

3.2 The duties of insured would devolve upon the authorized intermediary licensed by IRDA (referred to as authorised representative here after) where the insured appoints such authorized intermediary to transact on his behalf with the insurer/s.

3.3 It shall be the responsibility of the insured or his authorised representative licensed by IRDA to decide on the panel of co-insurers and their respective shares of the risk herein as set out in co-insurance share under paragraph 2 above and communicate the same to all such participating co-insurers, prior to assumption of risk.



Royal Sundaram

General Insurance

3.4 The lead Insurer shall finalise the terms and conditions applicable to the risk in the form of an underwriting slip with a unique code to be handed over to the Insured/ Authorised intermediary.

3.5 It shall be the responsibility of the insured or his authorized representative to ensure that all insurers listed in the co-insurance schedule under paragraph 2 above, are fully aware of the terms and conditions of this policy and shall secure their unqualified acceptance of such terms and conditions prior to issuance of cover and inclusion of names of insurers in this co-insurance arrangement.

3.6 During the currency of the policy, if there are any material changes in risk or as changes in original terms and conditions such as variation in Sum Insured, changes in premium charged, extension of policy period, etc., the same shall be communicated by the insured or his authorised representative giving sufficient advance notice of 7 days to the leader as well as all other participating co-insurers listed in the co-insurance schedule under paragraph 2 above and procure confirmation thereon. The endorsement to this effect shall be executed by the lead insurer under advice to all other participating co-insurers.

3.7 The liability of the insurers shall in no case exceed in respect of each item of the sum expressed in the set schedule to be insured thereon or in the all, the total sum insured hereby or sums as may be substituted thereof by endorsement.

3.8 In the event of any of the insurers, chosen by the Insured as per paragraph 3.1 above and listed in the co-insurance schedule, withdrawing from participation in this Policy at any time during its currency after giving due notice of 14 days, the insured shall arrange for an alternative insurer to take up the full share of risk vacated by the existing insurer. In the event of insured failing to do so, the insured shall be considered as his own insurer for such share of risk or part thereof which is not taken up by such alternative co-insurer.

3.9 In the event of a claim under this policy, the insured shall give notice of its occurrence to the Lead Insurer with a copy to all the insurers as listed in clause 2 above.

3.10 Upon receipt of such notification of claim, all claim related activities including appointment of surveyors, etc shall be done by the lead insurer who shall decide the admissibility as well as quantum of the claim and the co-insurers shall abide by the same.

3.12 In all other cases, where the Lead Insurer pays 100% of the assessed loss, the following co-insurer/s shall remit their share of the loss to the Lead Insurers within a maximum period of 21 days from the date on which the Lead Insurer makes the demand.



Royal Sundaram
General Insurance

Lead Insurer's declaration that the Claim and the amount there of was in accordance with terms and conditions of the Policy issued shall be considered sufficient by the co-insurers for the purpose of remitting their share of the loss to the Lead Insurer.

3.13 The co-insurers forming part of this agreement shall be entitled to demand and obtain from the Lead Insurer/Intermediaries copies of all policies, endorsements or other claim related documents relevant to this co-insurance clause.

In witness, whereof, this policy has been signed by Royal Sundaram Alliance Insurance Co. Ltd. (Lead Insurer) for itself and as authorized agents for other participating insurers named herein Subject otherwise to the terms, exceptions, conditions and limitations of this policy.

For Royal Sundaram General Insurance Co. Ltd,



Appendix O.3: Sample Grievance Registration Form

(Available in Bengali and English)

The _____ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing ***(CONFIDENTIAL)*** above your name. Thank you.

| | | | | | |
|---|-----------------------|--------------|--------------------|-----|--|
| Date | Place of registration | Project Town | | | |
| | | Project: | | | |
| Contact information/personal details | | | | | |
| Name | | Gender | * Male * Female | Age | |
| Home address | | | | | |
| Place | | | | | |
| Phone no. | | | | | |
| E-mail | | | | | |
| Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below: | | | | | |
| If included as attachment/note/letter, please tick here: | | | | | |
| How do you want us to reach you for feedback or update on your comment/grievance? | | | | | |

FOR OFFICIAL USE ONLY

| | |
|--|-----------|
| Registered by: (Name of official registering grievance) | |
| Mode of communication: Note/letter E-mail Verbal/telephonic | |
| Reviewed by: (Names/positions of officials reviewing grievance) | |
| Action taken: | |
| Whether action taken disclosed: | Yes No |
| Means of disclosure: | |

অভিযোগ/ পরামর্শ/ মন্তব্য/ প্রশ্নাদি লিপিবদ্ধ করার নমুনা পত্র

এই প্রকল্পটি সৃষ্ট ও সুন্দরভাবে রূপায়নের উদ্দেশ্যে সকলের অভিযোগ, পরামর্শ, প্রশ্ন এবং মন্তব্য প্রত্যাশা করে। আপনার কোনও অভিযোগ থাকলে আপনার নাম ও যোগাযোগের ঠিকানা দিয়ে আমাদের সহযোগিতা করবেন, আপনার অভিযোগ / প্রশ্নের যথার্থ সদুত্তর ও আপনাকে পরিস্থিতি সম্পর্কে আমরা অবগত করবো।

যদি আপনি আপনার ব্যক্তি পরিচয় গোপন রাখতে চান তাহলে আপনার নামের উপরে " গোপনীয় " কথাটি লিখবেন।

ধন্যবাদান্তে

| | | | |
|--|--|-------------------|------|
| তারিখ | পঞ্জীকরণের বা Registration এর স্থানঃ ব্লক- গ্রাম পঞ্চায়েত- গ্রাম সংসদ- | | |
| যোগাযোগের ঠিকানা / ব্যক্তিগত তথ্য | | | |
| নাম | | লিঙ্গ | বয়স |
| বাড়ির ঠিকানাঃ গ্রাম- ফোন নং- | পাড়া- ই-মেইল- | পুরুষ - মহিলা- | |
| অভিযোগ/ পরামর্শ/ মন্তব্য/ প্রশ্নাদি- দয়া করে কে, কি, কোথায় এবং কিভাবে - অভিযোগের এই বিশদ বিবরণ নিচে লিখুন- | | | |
| | | | |
| যদি কোন অতিরিক্ত কাগজ জুড়তে হয় / বা নোট থাকে বা চিঠি থাকে তাহলে এই ঘরে (✓) টীক দিন। | | | |
| আপনি কিভাবে আপনার অভিযোগ / মন্তব্য বিষয়ে অবগত হতে চান ? | | | |

শুধুমাত্র অফিসের ব্যবহারের জন্যঃ

| |
|---|
| যে আধিকারিক অভিযোগ জমা নিলেন তার নামঃ |
| কিভাবে জানানো হল (✓) টীক দিনঃ নোট বা চিঠির মাধ্যমে – ই-মেইল- মুখে মুখে বা টেলিফোনে- |
| যিনি অভিযোগ পাবার পর খতিয়ে দেখেছেনঃ |
| (নাম / পদ) |
| কি ব্যবস্থা গ্রহণ করা হয়েছেঃ |
| ব্যবস্থা যা গৃহীত হয়েছে তা জানানো হয়েছে কি না - হ্যা / না |
| কিভাবে জানানো হলঃ |

মন্তব্য-

প্রস্তুতকারক -

আনুমদনকারী -

তারিখ-

APPENDIX 20: SAMPLE CHANCE FIND PROTOCOL

Introduction

Project town being a heritage town, there are possibility of any chance finds (artefacts) recovery during excavations. Contractors working at heritage towns must take additional care not to destroy or damage historic features during excavations. There may be many buried historic features in heritage towns such as – idols, toys, wells, ancient drains, remains of buildings, other walls, grain pits, etc. Every care must be made not to destroy these during excavations.

Excavator drivers need to be instructed to be aware of hitting buried features and that they must be investigated before continuing work. When features are encountered during mechanical excavation, work should stop and the PIU/Consultants engineers must be informed immediately so that they can be inspected at the first opportunity.

When historic features such as walls, brick constructions and other features are encountered during excavation the excavation must be stopped immediately and the PIU/Consultants must be informed immediately.

- 1.1 **Contractors' instruction:** As soon as contractor recovers any chance find during any excavation works for pipe laying, they should immediately inform PIU/Consultant present in town about the chance find recovery. Immediately stop the excavation activity near point of recovery. After PIU/consultants engineers come at site, contractor should follow cleaning and photography in supervision of PIU/Consultant engineers.
- 1.2 **Cleaning** - When a feature/chance find is discovered it must be defined by careful cleaning. Roots must be removed and dirt must be carefully cleaned away. The section or trench base should also be cleaned back for a little distance around the feature.
- 1.3 **Record photography** – When the feature is clean good photography should be taken – vertical and face-on shots and a few general shots of the feature, also showing its position in relation to surrounding features, buildings, etc. The photographed should be catalogued (date, location, direction of shot)
- 1.4 **Drawn record** - When features/chance finds are revealed a drawn record should also be made.
 - a. General location record – measuring its position and orientation within the protected site / in relation to surrounding structures
 - b. Record drawings – detail drawings made in plan and section/profile. The extent (edges) of the feature should be drawn and the level of the existing ground surface and the top and base of the feature should be recorded. These levels should be marked on the drawings. The drawings should include detail of the construction of the feature. Perspective sketches could also be made if necessary. Explanatory notes can also be put on the drawings.
- 1.5 **Reporting finds** - When finds are made these should be reported to PIU/Consultants. Photographs and record drawings should be sent.
- 1.6 **Discovery of historic objects** - When clearance and excavation takes place artifacts and historic objects are sometimes found. These should be recovered and kept in a safe place. The place of discovery should be recorded and each find given a number and tag

tied to the find with the same number on it. A list of the finds should be kept (with the find No. And place of discovery and date of discovery recorded).

- 1.7 ***PIU/Consultants responsibility-*** PIU/Consultants should inform in written to the State Archaeological Department at the earliest with photographs and request to Archaeology Department to visit the site and hand over the chance finds to them.

**SOUTH ASIA REGIONAL DEPARTMENT
SAFEGUARDS INFORMATION LOG FOR SAUW PROJECTS**

| Project: | India: West Bengal Drinking Water Sector Improvement Project – Subproject: Bulk Water Supply for Haroa and Bhargar II Blocks | | | | | | | | | | | | | |
|---------------------------------|--|--|---------|----------|--------------------------------|---|---|------------------------------|---|--|---------------------------------|--|--|--|
| Loan No.: | 49107 – 006 IND | Package No.: WBDWSIP/DWW/N24P/01 | | | | | | | | | | | | |
| Components: | Water Supply Distribution System | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Project Component</th><th>Details</th><th>Location</th></tr> </thead> <tbody> <tr> <td>Raw water intake system</td><td>Raw water intake sump - cum - pumping station</td><td>New intake will be constructed near the outlet of the Pond 2 and 3 of the existing system comprising 5 ponds. These ponds are located within the existing WTP campus in New Town, Rajarhat. Raw water is sourced from Hooghly River at Rani Debendrabala Ghat.</td></tr> <tr> <td>Water Treatment Plant</td><td>22 million gallons per day (MGD) (100 million liters per day or MLD) capacity conventional WTP with the following process: <ul style="list-style-type: none"> • Alum coagulation and flocculation • Sedimentation • Rapid gravity filtration, • Disinfection with chlorination • Wash water recovery • Sludge drying beds • Water quality testing laboratory • Miscellaneous infrastructure (compound wall, landscaping, lighting, rest rooms etc.). • Clear water reservoir (5000 kl) </td><td>New WTP will be constructed within the existing WTP compound in New Town area of Rajarhat in the eastern outskirts of Kolkata City. At present 20 MGD WTP is in operation, and another 20 MGD under construction. Adequate space within the compound is available for construction of the new WTP. Site is vacant. Site is surrounded mostly by residential apartments. However, there is adequate buffer space and boundary wall for the facility.</td></tr> <tr> <td>Clear water pumping main</td><td>Clear water main <ul style="list-style-type: none"> • 4.9 kilometers (km) length 1200 millimeters (mm) Ductile Iron pipe Of the 4.9 km, some portion will be laid using trenchless method or pipe bridge, and the rest will be laid by open </td><td>From WTP to clear water reservoir at booster pumping station, in the new town area. Pipes will be laid buried along the roads within the roads right of way.</td></tr> </tbody> </table> | Project Component | Details | Location | Raw water intake system | Raw water intake sump - cum - pumping station | New intake will be constructed near the outlet of the Pond 2 and 3 of the existing system comprising 5 ponds. These ponds are located within the existing WTP campus in New Town, Rajarhat. Raw water is sourced from Hooghly River at Rani Debendrabala Ghat. | Water Treatment Plant | 22 million gallons per day (MGD) (100 million liters per day or MLD) capacity conventional WTP with the following process: <ul style="list-style-type: none"> • Alum coagulation and flocculation • Sedimentation • Rapid gravity filtration, • Disinfection with chlorination • Wash water recovery • Sludge drying beds • Water quality testing laboratory • Miscellaneous infrastructure (compound wall, landscaping, lighting, rest rooms etc.). • Clear water reservoir (5000 kl) | New WTP will be constructed within the existing WTP compound in New Town area of Rajarhat in the eastern outskirts of Kolkata City. At present 20 MGD WTP is in operation, and another 20 MGD under construction. Adequate space within the compound is available for construction of the new WTP. Site is vacant. Site is surrounded mostly by residential apartments. However, there is adequate buffer space and boundary wall for the facility. | Clear water pumping main | Clear water main <ul style="list-style-type: none"> • 4.9 kilometers (km) length 1200 millimeters (mm) Ductile Iron pipe Of the 4.9 km, some portion will be laid using trenchless method or pipe bridge, and the rest will be laid by open | From WTP to clear water reservoir at booster pumping station, in the new town area. Pipes will be laid buried along the roads within the roads right of way. | |
| Project Component | Details | Location | | | | | | | | | | | | |
| Raw water intake system | Raw water intake sump - cum - pumping station | New intake will be constructed near the outlet of the Pond 2 and 3 of the existing system comprising 5 ponds. These ponds are located within the existing WTP campus in New Town, Rajarhat. Raw water is sourced from Hooghly River at Rani Debendrabala Ghat. | | | | | | | | | | | | |
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| Clear water pumping main | Clear water main <ul style="list-style-type: none"> • 4.9 kilometers (km) length 1200 millimeters (mm) Ductile Iron pipe Of the 4.9 km, some portion will be laid using trenchless method or pipe bridge, and the rest will be laid by open | From WTP to clear water reservoir at booster pumping station, in the new town area. Pipes will be laid buried along the roads within the roads right of way. | | | | | | | | | | | | |

| | | cut method | |
|--------------------------------------|--|--|---|
| | Clear water reservoir | Minimum 4600 KL RCC ground level circular reservoir | In the booster station compound. Site is currently vacant |
| | Booster pumping stations | Pumping machinery and pumping room | In the existing booster pumping station in New Town Area |
| | Ground Level Service Reservoirs (GLSRs with pumping stations) | RCC reservoirs <ul style="list-style-type: none"> • Minimum 3200 kl ground level service reservoir (GLSR) at Haroa • Minimum 5000 kl GLSR at Bhangar- II | Haroa GLSR site located in Haroa. The selected site is a vacant land near the bank of River Vidhayadhari. There are no trees in the site. Site is accessible by road, and not flood prone. Bhangar II GLSR site is located adjacent to Khestopur canal near Saduli in Bhangar II block. This is a privately owned agricultural land, and currently covered with a mango orchard. |
| Contract Type: | DBO type Detailed design will be completed by contractor. | | |
| Date of IEE: | July 2018 Zone wise updated IEE : January 2020 | | |
| Draft IEE | | Updated/Revised IEE | Others/Remarks |
| (due to detailed engineering design) | | The IEE has been updated based on completion of design upto 31 st December 2019 for which SEMP's were also submitted by the contractor to PIU/PMU for clearance prior to start of work. No work has commenced until SEMP's for that zone was cleared by PIU and PMU. IEE has been updated with regard to preparatory construction activities and piling works for WTP administration building only. Rajarhat GLSR has been dropped from the present contract package. | The final IEE including updated EMPs (SEMPs) for remaining components will be submitted to PIU/PMU -ADB for review and disclosure after completion of detailed design |

| | Activity | Status | | Detailed Comments and Further Actions Required |
|----|---|--------|----|--|
| | | Yes | No | |
| 1. | Environmental assessment has been satisfactorily conducted based on ADB REA Checklist and scoping checklist. ³ | X | | <p>The updated IEE covers the impacts of preparatory construction activities and piling works for WTP administrative building. The environmental assessment is based on best available information and design (completed till 31st December 2019).</p> <p>Further action/s: The environmental assessment will be revisited based on completed detailed engineering design. This is to confirm/verify findings of “Category B” and record in the final IEE.</p> |
| 2. | Environmental assessment based on latest project components and design | X | | <p>The environmental assessment is based on updated design of the WTP which has been handed over to the PIU. The detailed engineering designs are being completed by the contractor.</p> <p>At present, only the land for WTP within the existing treatment plant has been made available. Efforts are being made for procurement of other sites and obtaining permission for laying of pipelines from WBHIDCO..</p> <p>Further action/s: The environmental</p> |

³ ADB Rapid Environmental Assessment Checklist for screening and categorization. Scoping Checklist (“No Mitigation Scenario” Checklist) for scope of IEE, identification of impacts and development of environmental management plan.

| | Activity | Status | | Detailed Comments and Further Actions Required |
|----|-------------------------------------|--------|--------------------------------------|---|
| | | | | assessment for the remaining sub-project components will be conducted after completion of detailed engineering design . |
| 3. | Statutory Requirements ⁴ | | Forest Clearance | Not applicable. The components are not located in sites regulated under The Forest (Conservation) Act, 1980 |
| | | | No Objection Certificate | Road cutting permissions will be obtained for pipe laying work by the contractor under the supervision of PIU from NH/PWD and HIDCO authorities (after finalization of design) |
| | | | Site Location Clearance | Not Applicable |
| | | | Environmental Compliance Certificate | Not applicable. The components are not listed in the Schedule 1 of the EIA Notification Act and its rules and regulations. |
| | | | Permit to Construct (or equivalent) | The construction of WTP requires Consent to Establish (CTE) from the West Bengal State Pollution Control Board (WBPCB). Consent to Establish (CTE) for WTP has been obtained on 19 th December 2019 . Further action/s: Conditions of CTE will be fulfilled. |
| | | X | Permit to Operate (or equivalent) | The following will require Consent to Operate from WBPCB: (a) Water Treatment Plant besides |

⁴ If applicable, Include date accomplished or obtained.

| | Activity | Status | | Detailed Comments and Further Actions Required |
|--|----------|--------|--------|---|
| | | | | <p>(b) diesel generators; and (c) hot mix plants, wet mix plants, batching plant, stone crushers, etc. (if installed for construction).</p> <p>Further action/s: The contractor under the supervision of PIU will obtain the Permit to Operate for the WTP and other machineries, if required. The application will be filed at West Bengal Pollution Control Board, Salt Lake Regional Office before commencement/operation of machineries at site. Further, on account of increase in storage of chlorine at WTP site, applicable provisions of the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and amendments of 2016 should be satisfied prior to commencement of operation.</p> |
| | | X | Others | <p><u>Pollution Under Control (PUC) certificates are available for all the vehicles and construction equipment.</u></p> <p>Further action/s: There may be need for Tree-felling during the construction of remaining components. PIU will obtain the Tree-felling Permission from Forest Department under West Bengal Trees (Protection and Conservation in Non-Forest Areas) Act, 2006.</p> |

| | Activity | Status | | Detailed Comments and Further Actions Required | |
|----|---|----------------------|---|--|--|
| | | | | The application will be filed once detailed designs are completed. The replacement ratio will be 1:5. | |
| 5. | Policy, legal, and administrative framework | Adequate | | The IEE includes discussions on applicable policy, acts and rules. Obtaining the required permits and NOC is the responsibility of PMU/PIU. The IEE also confirmed that international best practices (specified in EHS Guidelines) have been incorporated in the preliminary design. Further action/s: All condition in the permit/NOC will be incorporated in the updated IEE and contractor's updated SEMP. | |
| | | X | | | |
| | | Frameworks included: | | | |
| | | X | National regulation/law on EIA | | |
| | | X | Environmental agency | | |
| | | X | Relevant international environmental agreements | | |
| X | Environmental standards (IFC's EHS Guidelines) | | | | |
| 6. | Anticipated environmental impacts and mitigation measures | Impacts and risks: | Mitigation Measures: | | Site-specific EMP (SEMP) has been prepared by DBO contractor based on present design status. The SEMP has been reviewed and cleared by PIU and PMU before start of construction activities at the WTP site. Work has not been allowed to commence until the SEMP is cleared. Implementation of the Site Environment Management Plan (SEMP) and Spoil Management Plan (SMP) will be recorded and reported to ADB. |
| | | | Yes | No | |
| | | | | | |

| | Activity | Status | | | Detailed Comments and Further Actions Required |
|--|----------|--------|------------------------------------|---|--|
| | | | | | Further action/s: Once the design for clear water pumping main is finalized, Traffic Management Plan for the affected areas will be developed. |
| | | | Biodiversity conservation | X | Not applicable. No habitats/areas attracts biodiversity conservation (as defined in ADB SPS). |
| | | | Pollution prevention and abatement | X | The updated IEE also confirmed that international best practices (specified in EHS Guidelines) have been incorporated in the preliminary design. |
| | | | Health and safety | X | Included in the EMP/SEMPs The contractor has appointed an appropriately qualified Health and Safety Officer. Further action/s: The contractor is required (i) follow the mitigation measures in the EMP; and (ii) if required, expand in the SEMP the mitigation measures as appropriate in the site conditions. (iii) identify MAHs with respect to Chlorine storage as per MSIHC Rules and prepare site emergency response plan. |
| | | | Physical cultural resources | X | Not applicable |
| | | | Cumulative impacts | X | Not applicable. There are no other on-going or planned projects that may cause negative cumulative impacts. |
| | | | Transboundary impacts | X | Not applicable. The subproject/package is relatively small-scale in |

| | Activity | Status | | | | Detailed Comments and Further Actions Required |
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| | | | | | | nature to have potential transboundary impacts. |
| 7. | Impacts from Associated Facilities ⁵ | Addressed | Not Addressed | None | | Not applicable. There are no associated facilities under this subproject/package. |
| | | | | X | | |
| 8. | Analysis of Alternatives | Yes | | No | | Not applicable. This is Category B project. Alternatives analyses related to alignment/sites and designs were conducted as part of the preliminary design stage. |
| | | | | X | | |
| 9. | EMP budget included | Yes | | No | | The indicative cost of EMP for this Package is INR 2,092,500. Further action/s: The cost of EMP and monitoring program will be reviewed based on remaining detailed engineering design. The IEE will update the costs/budget of the DBO contractor to implement the SEMP's and other requirements related to environmental safeguards once other components are finalized. |
| | | X | | | | |
| 10. | EMP implementation integrated in PAM and bid documents | Yes | | No | | (i) The Project Administration Manual (as cleared by ADB) included sections on environmental safeguards. Information in the PAM has been considered in the preparation of the updated IEE. (ii) The EARF also provided detailed |
| | | X | | | | |

⁵ ADB SPS (Appendix 1 para 6) defines associated facilities as not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project.

| | Activity | Status | | Detailed Comments and Further Actions Required |
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| | | | | <p>requirements on EMP implementation. These are included in the updated IEE.</p> <p>(iii) The draft IEE (cleared by ADB) is included in the contract documents and has been provided to the contractor. Environmental Specialist of DSISC has provided EMP and safeguards induction sessions to contractors upon mobilization.</p> <p>Further action/s: The PAM and EARF should be used in the updation of the IEE after completion of detailed design of all components of the package. Environmental Specialist of DSISC should ensure the contractor is given a safeguards induction prior to mobilization.</p> |
| 11. | Consultation and Participation | Yes | No | <p>Consultation with contractor personnel has been conducted. However, in want of land allotment and final design of all project components, the scope of consultation was limited.</p> <p>Further action/s: Meaningful consultations with stakeholders and affected people will be conducted by PIU/ DSISC once detailed engineering design is finalized for all the project components and at monthly frequency during construction.</p> |
| | | X | | |
| 12. | Grievance Redress Mechanism | Yes | No | |
| | | X | | |

| | Activity | Status | Detailed Comments and Further Actions Required |
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| | | Description of GRM | Project GRM has been included in the PAM and EARF cleared by ADB. The same GRM is included in updated IEE (main text). Notification of the GRM, identification/ appointment/ designation of the GRC members has been completed. State, District, PMU and PIU level GRC included in Appendix of updated IEE. Further action/s: Capacity building of the GRC members by the PMU to ensure they are capable to address project-related complaints and grievances. |
| | | Identification of GRC members | Completed. Notification issued. |
| 13. | Disclosure | Endorsement to disclose on ADB website | Upon approval from ADB, PMU has disclosed the draft IEE in their Website. Further action/s: ADB will disclose updated and final IEE upon review and confirmation that these satisfactorily meet ADB SPS requirements |
| | | Disclosed on project website | For follow-up |
| | | Relevant information available to stakeholders and affected people in language and form they understand | Public disclosure meeting was held on 4 th January, 2018 at Haroa GP. Subsequently public disclosure meetings were organized at Shalipur and Bhagwanpur locations in Haroa and Bhargar-II blocks of 24 Parganas North and South respectively in Nov, 2019. Pamphlets in Bengali |

| | Activity | Status | | Detailed Comments and Further Actions Required |
|-----|---|----------|----|---|
| | | | | <p>were distributed to the participants, describing the need and benefits provided by the project.</p> <p>Further action/s: Information sharing will be continued, recorded, and reported in the monitoring report during implementation.</p> |
| 14. | Mobilized Environment Specialist PMU | Yes X | No | PMU Environmental Specialist Mr. Tanay Banerjee, Executive Engineer |
| 15. | Mobilized Environment Specialist PIU | Yes X | No | PIU Environmental Specialist Mr. Sourav Bose Assistant Engineer, N24 Pgs PIU |
| 16. | Mobilized Environment Specialist at PMU level | Yes X | No | <p>The Environmental specialist of PMU is supported by Environmental expert of Project Management Consultant (PMC) to supervise, monitor and oversee the implementation of safeguard issues.</p> <p>Dr. Ardhendu Mitra PMC Environmental Specialist</p> |
| 17. | Mobilized Environment Specialist at PIU level | Yes X | No | <p>Apart from Environmental Specialist of PIU, The PIU is assisted by DSISC team which will include an Environmental Specialist to monitor environmental safeguard tasks and responsibilities and also ensure day-to-day supervision and monitoring of contractor's compliance.</p> |

| | Activity | Status | | Detailed Comments and Further Actions Required |
|-----|--|---|----|---|
| | | | | Mr. Swarnabha Bandyopadhyay DSISC Environmental Specialist |
| 18. | Awareness training on compliance to safeguard requirements | Yes | No | The updated draft IEE included indicative training program. Awareness program continued. Further action/s: The training program to be provided by the DSISC will be updated with inclusion of new work sites. |
| | | X | | |
| 19. | Others/Remarks | <p>1. The Raw water source is Hooghly river, which has abundant quantity of water throughout the year, even during the lean flow season. The quality of raw water is good and is suitable for drinking water supply after conventional treatment and disinfection.</p> <p>2. Districts are home to environmental sensitive areas like Sundarbans Biosphere Reserve (SBR) and East Kolkata Wetland, however, none of the components are located in or close to this sub-project foot-print. Subproject components are mostly selected in existing facilities owned by PHED. Trees may need to be cut; measures have been suggested to minimize and compensate. Overall, there are no notable sensitive environmental features in the project sites.</p> <p>3. Anticipated impacts of water supply during operation and maintenance will be related to operation of WTP, handling and application of chlorine, operation of pump houses, and repair and maintenance activities. Various provisions are already made in the design: to recirculate wastewater from WTP; collect, thicken and dispose sludge; chlorine safety; use energy efficiency equipment, etc., Water supply system will be operated using the standard operating procedures.</p> <p>4. The project will benefit the general public by contributing to the long-term improvement of water supply system and community livability in the project blocks of Haroa and Bhangar II. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.</p> <p>5. As per ADB SPS, the project is classified as environmental</p> | | |

| | Activity | Status | Detailed Comments and Further Actions Required |
|--|----------|--------|--|
| | | | <p>category B and does not require further environmental impact assessment.</p> <p>6. This IEE shall be updated further during completion of entire design and to reflect any changes, amendments and will be reviewed and approved by PMU, and further submitted to ADB for approval.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. The updated draft IEE for Package N 24pgs/ 01 is recommended for ADB Clearance for disclosure. 2. Cleared updated IEE to be disclosed on project website (PMU and PIU).. 3. The relevant information in the updated IEE should also be disclosed to stakeholders and affected people in a timely manner in language/form they understand. 4. Continuous meaningful consultations including information dissemination on project GRM should be conducted during detailed engineering design (till completion) construction and if required, until O&M. 5. Contractor should submit to PMU and PIU the updated SEMP/s upon completion of the detailed engineering design. No works should be allowed until the SEMP/s is/are cleared and confirmed to satisfactorily meet the requirements of Government of India laws, rules and regulations and ADB SPS. 6. PMU to submit to ADB the final IEE together with Contractor's SEMP/s for review and disclosure. The final IEE should include detailed information on how the above-mentioned further actions are conducted/met. 7. Reporting of SEMP/s implementation and environmental safeguards should be: (i) Contractor to PIU to be done on the monthly basis; (ii) PIU to PMU to be done every three months; and (iii) PMU to ADB every six months. |

Prepared by:

Dr. Ardendu Mitra, Environment Specialist, PMC
Mr. Swarabha Bandyopadhyay, DSISC Environment Consultant

Noted and Checked By:

Mr. Tanay Banerjee (EE), PMU Environmental Specialist

Documents/References:

1. Draft IEE
2. ADB REA Checklist
3. SEMP/s