

Initial Environmental Examination

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India: Kolkata Municipal Corporation Sustainability, Hygiene, and Resilience (Sector) Project – Development of Sewerage and Drainage Network Including Construction of Pumping Station in Anandapur Area in Borough XII (Part of Ward 108)

Package No.: KSHARP/ OCB/ SD 03/ 2023-24

CURRENCY EQUIVALENTS

(as of 28 July 2024)

Currency unit	–	Indian rupee (₹)
₹ 1.00	=	\$ 0.01
\$ 1.00	=	₹ 83.68

ABBREVIATIONS

ADB	- Asian Development Bank
ASI	- Archaeological Survey of India
BOD	- biochemical oxygen demand
COD	- chemical oxygen demand
CPCB	- Central Pollution Control Board
CTE	- consent to establish
CTO	- consent to operate
DWF	- dry weather flow
EIA	- environmental impact assessment
EKW	- East Kolkata Wetlands
EMP	- environmental management plan
FDL	- Full Discharge Level
GRC	- grievance redress committee
GRM	- grievance redress mechanism
IEE	- initial environmental examination
KEIP	- Kolkata Environmental Improvement Project
KEIIP	- Kolkata Environmental Improvement Investment Program
KMC	- Kolkata Municipal Corporation
KMDA	- Kolkata Metropolitan Development Authority
KSHARP	- Kolkata Municipal Corporation Sustainability, Hygiene, and Resilience (Sector) Project
MFF	- Multi-tranche financial facility
NIOSH	- National Institute of Occupational Health
O&M	- operation and maintenance
PMU	- program management unit
PMDSC	- project management and design supervision consultant
REA	- rapid environmental assessment
ROW	- right-of-way
S&D	- sewerage and drainage
SEMR	- semi-annual environmental monitoring report
SPS	- Safeguard Policy Statement
STP	- sewage treatment plant
SWF	- storm water flow
TDS	- total dissolved solid
TMP	- traffic management plan
WBPCB	- West Bengal Pollution Control Board

WEIGHTS AND MEASURES

m ³ /h	- cubic meter per hour
dB(A)	- decibel in A network
°C	- degree Celsius
km	- kilometer
km/h	- kilometer per hour
kVA	- kilovolt-ampere
kW	- kilowatt
m	- meter
µg/m ³	- microgram per cubic meter
mg/l	- milligram per liter
ML	- million liters
MLD	- million liters per day
mm	- millimeter
MPN/100ml	- Most Probable Number per one hundred milliliters
NTU	- Nephelometric Turbidity Unit
km ²	- square kilometer

NOTE

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

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EXECUTIVE SUMMARY

Background: Kolkata Municipal Corporation Sustainability, Hygiene, and Resilience (Sector) Project (KSHARP) is a key urban infrastructure initiative of the Kolkata Municipal Corporation (KMC). KSHARP is a continuation endeavour of ADB's support to improve the liveability and quality of life of the urban people in the jurisdiction of the KMC area. The Project aims to improve the urban environmental condition and quality of life in Kolkata Municipal Area through improvement of sewerage and drainage (S&D) system. The expected outcome of the project is to increase access to resilient, inclusive and sustainable urban services. The following are the outputs: **Output 1:** Climate and disaster-resilient urban infrastructure and systems developed and **Output 2:** Enabling environment for inclusive and resilient urban services improved.

The subproject. This subproject focuses on the development of sewerage & drainage (S&D) system in the added areas of Anandapur covering part of ward 108 (Borough XII of KMC). Total area considered under this sub-project is 67 ha. The proposed system will be developed as a combined network to carry both dry weather flow (DWF) and storm water flow (SWF) generated from the catchment area. This sub-project includes following civil works: (i) laying of combined sewer networks of 5.1 kilometer (km), (ii) construction of combined Pumping Station (PS) and laying of two dedicated SWF pumping main of 1000mm diameter with MS pipe of 200m and 1700m length respectively, (iii) laying of one DWF pumping main of 700mm diameter with Ductile Iron (DI) pipe of 800m length; (iv) construction of manholes (331 nos), catch pits (572 nos.), and gully pits (30 nos) (v) house service connections (estimated number 580), (vi) Six number gravity outfalls (GOF) for discharge of SWF (4 nos. on D-D1 Lead Channel and 2 nos. on Tollygunj-Panchannagram canal (TP canal).

Screening and Categorization. The proposed project is classified as environmental category B as per ADB's Safeguard Policy Statement (SPS), 2009, and accordingly this initial environmental examination (IEE) prepared. As per the Government of India environmental impact assessment (EIA) Notification, 2006, this subproject does not require EIA study or environmental clearance.

Description of environment. Generally, the topography of the project location is flat and elevations range from 1.9 to 3.4m above MSL. Low lying areas are predominant within the subproject areas and the area regularly experiences water logging in rainy season. There are existing storm water drains and water bodies (ponds) that serve as holding tanks that partially take care of the storm water load and reduces the initial flooding during the start of rainfall. The area is located within lower deltaic alluvial plain of the Ganges River system. The soil has cohesive characteristic and low permeability which reduces infiltration of storm water into the soil. Sub-soil water level varies from 1 to 6 m below ground level in this area.

In general climate is hot and humid between the months of March and October. An average temperature of about 13 °C in winter (December to February) and about 38 °C in summer (March to July) were recorded. Relative humidity was recorded above 90 % during summer and monsoon seasons. Annual rainfall is about 1500 mm. The land use pattern in the subproject area is predominantly residential mostly built-up urban areas with few commercial activities are also observed in some parts of the project areas specially in KMC constructed market area in Anandapur. Few major hospitals such as Rubi Hospital, Desun Hospital exists within the project areas.

Based on the existing topography and outfall system, the entire KMC area comprising all 16 boroughs was re-delineated into the following nine (9) major S&D Basins. Drainage system in and around Kolkata area mostly gravitated eastwards to Kulti River of Matla estuary system about 45

km downstream of Kolkata which ultimately meets with River Bidyadhari further at a distance of about 70km. The sub-project area comprising of ward no. 108 under Boroughs XII comes under Tollygunge-Panchanagram Basin (TP Basin). The sub project area is bounded by Eastern Metropolitan Bypass (EM Bypass) from west side, Lead channel D-D1 from the north, Tollygunge - Panchannagram Main canal (TP canal) and Anandapur highway from the east and Lead Channel C1-C2 from the south side. Both D-D1 channel and C1-C2 channel ultimately meets with TP canal. TP canal terminates at Chowbhaga pumping station, from where water is pumped to Storm Water Flow (SWF) canal. There is a fishery pond (bheri) beside D-D1 channel. No other waterbodies found within project area.

No tree felling will be required as the pipeline will be laid in the middle of the existing Government roads. No areas of ecological diversity occur within the subproject location. The boundary of East Kolkata Wetland (EKW), a designated Ramsar site is located 1 km away from the proposed Anandapur pumping station site and 700 m from the project boundary and intervening area is highly residential urbanized area. EKW is a largest assemblage of sewage fed fish ponds, and agricultural lands on the eastern fringes of Kolkata. The above referred SWF traverses EKW, however do not discharge into EKW, and flows directly into Kulti River after crossing the EKW. Kulti ultimately meets with Bidyadhari River, about 70 km downstream. There is no nearby archaeological site within or close to the subproject area. No flora, fauna and fish of threatened category has been reported at the sub-project locations.

Potential environmental impacts. In this draft IEE, potential impacts were identified in relation to location, design, construction and operation of the improved infrastructure. Environmental impacts due to the project design is not significant as various measures are already included in site planning and preliminary design. The proposed project area mostly comprises of urban habitation / built-up areas of KMC within to Kolkata city limit. The pipelaying are proposed in roads under the ownership of local authority and proposed Anandapur pumping station will be constructed in a vacant land within the existing pumping station premises of Kolkata Metropolitan Development Authority (KMDA). Access to the project locations is through public rights-of-way and existing roads. No impacts on ecologically sensitive areas, forests or archaeological resources.

Sewer network in the subproject area is proposed to be designed as a combined system, considering the prevailing drainage pattern and narrow road network in the entire catchment area which is prohibitive for laying at least two conduits required for a separate system – one to carry dry weather flow and other for storm flow and in the line of system adopted in KEIP & ongoing KEIIP.

The proposed system will be developed as a combined network to carry dry weather flow (DWF) and storm water flow (SWF) generated from the catchment area. The combined flow generated from the project area will be transported to proposed Anandapur pumping station (PS).

In the proposed system the dry weather flow (DWF) and storm water flow (SWF) generated from the catchment area flows through the same conduit. As quantum of storm water flow is several times greater than the dry weather flow, the system carries an insignificant flow for major period of a year. One combined (SWF + DWF) pumping station at Anandapur is proposed to cater flow under this project. DWF from the Anandapur PS will be pumped to the proposed manhole of Hossainpur S&D network on Anandapur Highway via dedicated pumping main of length of about 800m for onward transmission to proposed Hossainpur PS (at a distance 1.7km). From Hossainpur PS, DWF will be transmitted to proposed STP at Hossainpur for treatment. Hossainpur PS and Hossainpur STP are also proposed under KSHARP, and separate IEEs have

been prepared. The DWF from the subproject area will be treated at STP to meet discharge standards as suggested by CPCB in 2015 and order of National Green Tribunal (NGT) dated 30th April 2019. Surplus treated effluent from the STP after reuse will be discharged into nearby TP canal. Considering the present canal water quality no adverse impact is anticipated.

SWF from the Anandapur PS will be disposed of to D-D1 & TP canals by two dedicated pumping mains at two separate locations to avoid discharging of enormous flow in a single location, thereby reducing chances of overtopping of the canal from that particular stretch. A part of SWF generated from the project area will be disposed of to D-D1 channel through four (4) number of gravity outfalls (GOF) and to TP Main Canal through two (2) number of GOF flowing along the boundary of the project area. During the rains, the combined flow from the trunk sewers is diverted into D-D1 canal and TP canal. D-D1 also joins with TP Canal, and ultimately flows into SWF and then to Kutil River as explained earlier. SWF passes through EKW but do not discharge into the wetland system and directly flows into Kulti River. Adequate dilution is ensured in the system for SWF discharge through (i) overflow structures level in gravity outfall ensures minimum dilution before bypassed into SWF channels, (ii) pumping from wet well to SWF is initiated only after attaining the requisite level and thus dilution, and (iii) standard operating procedures are already available and followed.

The proposed sewers will be laid by conventional open trenching (cut and cover method) method through the centre alignment. Anandapur pumping station will be constructed in the existing pumping station premises under the ownership of KMDA. The site is vacant located in a developing area with mostly commercial and government establishments. Nearest commercial complex (Leather house) is about 35m from the boundary of the PS land and from wet well distance of another nearest commercial building is about 65 m. There are 10 non-scheduled trees along the periphery of the plot, however no tree felling is required for the project. Some bushes and overgrowths of vegetations will be cleared off at the proposed pumping station site.

Temporary impacts were identified in busy narrow roads in commercial areas such as behind the Passport office and KMC market area at RR Plot. Temporary income loss of street vendors/ shop owners is envisaged during the construction phase at market areas. Laying of pipeline in those areas will be carried out in phased manner upon due consultation with local people/ concerned authorities. Traffic management planning and temporary diversion will be adopted for pipe laying in front of office buildings. Potential impacts during construction are considered significant but temporary and are common impacts of construction in urban areas, and there are well developed methods to mitigate the same. In these works, the temporary negative impacts arise mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupational health and safety (OHS) aspects. Pipe laying works will be conducted along public roads in an urban area congested with people, activities and traffic. Therefore, these works may have significant impacts during the construction arising mainly from the disturbance of residents, businesses and traffic due to construction work; safety risk to workers, public and nearby buildings due to trench excavations in the road; access impediment to houses and business, disposal of large quantities of construction waste etc. Therefore, appropriate mitigation measures are necessary.

Environmental Management Plan. EMP has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels, along with the delegation of responsibility to appropriate agency. Various design related measures are already included in the project preliminary design, which will be further fine-tuned as required during detailed design. For construction, the EMP includes mitigation measures such as (i) proper planning of construction works, especially linear works, to minimize the public inconvenience; (ii) barricading, dust

suppression and control measures; (iii) traffic management measures for works along the roads and for hauling activities; (iv) provision of walkways and planks over trenches to ensure access will not be impeded; (v) occupation and community health and safety and (vi) finding beneficial use of excavated materials to extent possible to reduce the disposal quantity. 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. This draft IEE and the corresponding EMP will be included in the bidding and contract documents, which will be updated during the detailed design. The contractor will prepare a site-specific EMP (SEMP) prior to start of works, and an EMP/ approved SEMP will be always kept on site. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

Implementation Arrangements. The Kolkata Municipal Corporation (KMC) will be the executing and implementing agencies, and the project management unit (PMU) established within KMC for the ADB-financed Kolkata Environmental Improvement Investment Program (KEIIP), will implement the project. The project will be governed by a high-level steering committee headed by the Minister-in-charge, Municipal Affairs and Urban Development Department (MAUDD). The PMU, headed by a Project Director. The Project Director will be supported by Director General - Project for procurement and contract management and Deputy Chief Engineer (DCE) for safeguards implementation. The DCE, supported by a Manager – Environment, Health and Safety and Manager - Social, will be responsible for environmental and social safeguards in compliance with project agreements, government requirements and ADB SPS, 2009. Gender, Safeguard management unit (GSMU) headed by DCE and staffed with 3 Managers, 3 Deputy Managers, and 8 project assistants to implement and monitor of gender action plan, EMP, resettlement plans, and with focus on community and occupational health and safety aspects¹. PMU will be supported by a Project Management and Design Supervision Consultant (PMDSC). The PMDSC will have an Environmental Safeguards Specialist (ESS) and an Health and Safety Expert to support in all tasks related to environment management and monitoring activities. At contractor level, an Environment, Health and Safety (EHS) supervisor will be appointed on-site, one for each package, to assist in preparing and implementing site-specific EMP.

Consultation, disclosure and grievance redress mechanism. The public participation processes have been undertaken during project preparation stage which ensures that stakeholders are engaged during the preparation of this IEE. Informal and formal consultations were conducted with local population of the area at six places along with proposed alignment in the month of November 2023 and February 2024. Total number of attendees were 121 among which female attendees in the consultation were 80 (66% of total consulted people). This draft IEE will be disclosed to a wider audience via the ADB and KSHARP websites. The consultation process will continue during project implementation. A grievance redress mechanism (GRM) will be established to redress public grievances.

Monitoring and Reporting. “The PMU and PMDSC will be responsible for monitoring and reporting. During construction, results from internal monitoring by the contractor will be reflected in their monthly EMP implementation reports to the PMU. PMU with the assistance of PMDSC, will monitor the compliance of contractor. The PMU will oversee the implementation and compliance and will submit semi-annual environmental monitoring reports (SEMR) to ADB. SEMRs will be disclosed on ADB and KSHARP websites. The semi-annual submission of Environmental Monitoring Reports (EMRs) will be required during both the construction and operation phases of the project.

¹ The existing Social Safeguard Cell will function as the Safeguard and Safety Cell (SSC) for the project.

Conclusion and Recommendations. Sub-project is unlikely to cause significant adverse impacts, and potential impacts are mainly due to construction and can be mitigated or minimized to acceptable levels through measures included in the EMP. The benefits arising from the project include: (i) better public health particularly reduction in waterborne and infectious diseases due to improved sewerage and drainage systems in project areas; (ii) relief from water logging conditions within the sub-project area specially at RR Plot, Anandapur East Kolkata Township (EKTP), Kasba Industrial Park area and in front of CISF headquarter, (iii) reduced risk of groundwater contamination through appropriate sewer collection and treatment; (iv) reduced risk of contamination of treated water supplies; and (v) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

Based on the findings of the IEE, the classification of the project as **Category “B”** is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006). This IEE is based on detailed design. If there are any changes during pre-construction and construction phases, the IEE will be updated and submitted to ADB for review, clearance, and disclosure prior to start of construction. Since the pumping station (SPS) and sewage treatment plant (STP) proposed at Hossainpur are essential for operation of the S&D network to further convey, treat and dispose the sewage collected in Anandpur subproject area, the bidding, final designs, implementation and completion of works of all three packages (SD-03, SD-04 and SD-05) shall be synchronized.

I. INTRODUCTION

A. Project Background

1. The proposed Kolkata Urban Resilience Improvement Project (KSHARP) is a continuation endeavor of ADB's support to improve the livability and quality of life of the urban people in the jurisdiction of the Kolkata Municipal Corporation area. The project will provide comprehensive and services in uncovered areas of Kolkata (project area under KSHARP given in (A series of subprojects will be implemented under sector loan for development of S&D network in the selected part of un-sewered areas of KMC. Subprojects will be selected from the 11 eligible subprojects (Appendix 1A & Figure 1) identified under the *Master Plan of S&D System for Project Area under KSHARP*, KMC, which are:

2.). The project is aligned with the country partnership strategy for India, 2018–2022, which recognizes the need to address infrastructure bottlenecks and provide better municipal services for the urban poor. The project is also in line with the state of West Bengal's 20-year vision, Kolkata's sewerage, and drainage master plan (2007), Kolkata's Urban Sector Investment Plan, 2012–2022, and KMC's solid waste management master plan (2018). The expected outcome of the project is increased access to resilient, inclusive and sustainable urban services. the outcome will be achieved through two outputs:

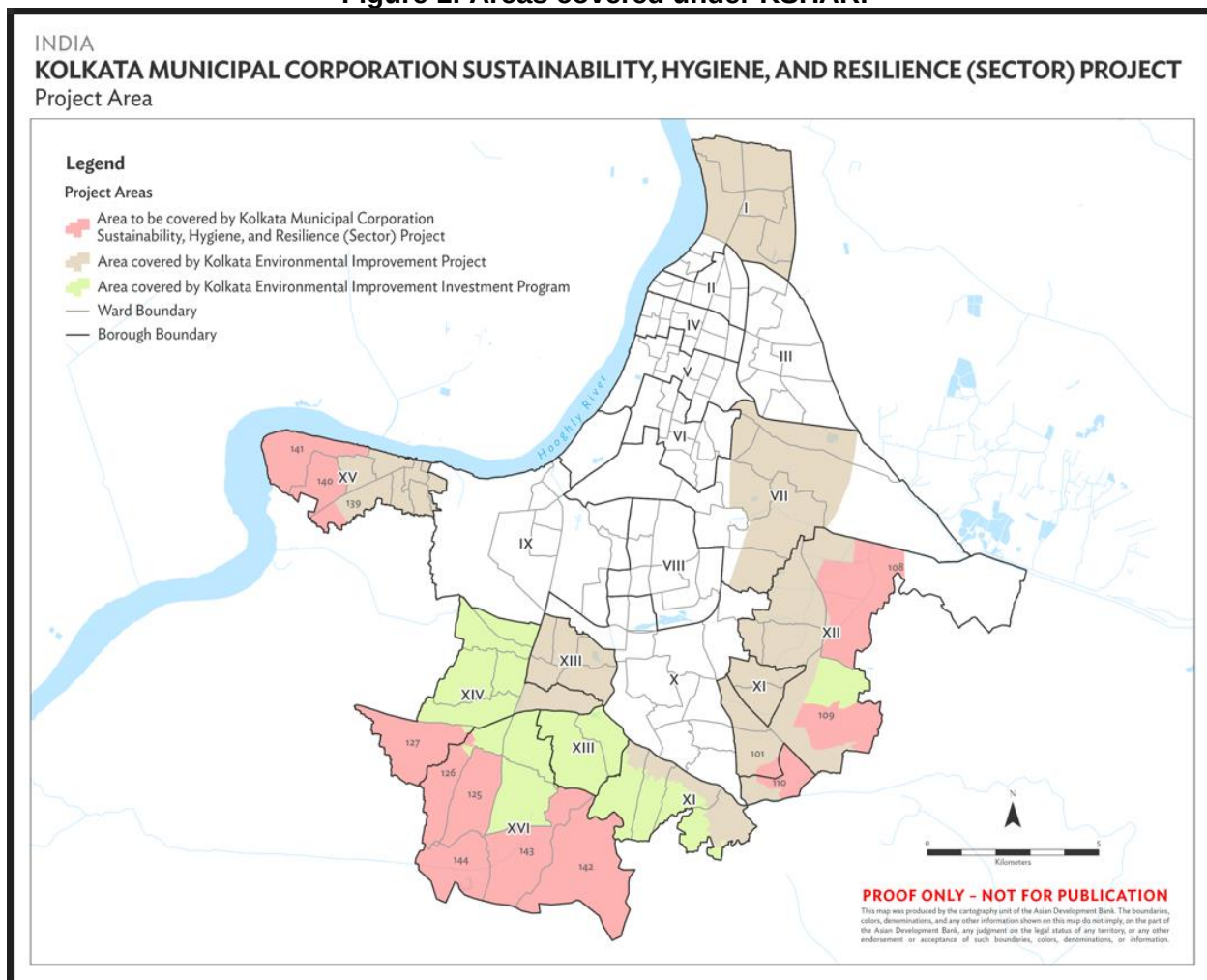
- (i) **Output 1: Climate and disaster-resilient urban infrastructure and systems developed.** The project will support the development of climate- and disaster-resilient sewerage and drainage infrastructure and systems, which will cover unserved areas of KMC. It includes the construction of 84.0 kilometers (km) of trunk and secondary sewerage and drainage networks and 176.0 km of lateral network up to customer connections, 50,000 household sewer connections, one sewage treatment plant with a capacity of 41 million liters per day, and five pumping stations. The infrastructure solution will be supplemented by ongoing waterbody rejuvenation efforts by KMC and flood early warning and forecasting systems to be enhanced under output 2 of this project. Strengthened urban infrastructure and systems will provide better services to all people, while women, children, the poor, and the disadvantaged will especially benefit from improved urban sanitation, health, and hygiene.
- (ii) **Output 2: Enabling environment for inclusive and resilient urban services improved.** This output will build upon efforts delivered under KEIIP to enhance KMC's operational capacity and resilience of urban services. Specific initiatives include support in (i) development of a comprehensive asset management system to be institutionalized in KMC. This includes formulation of an asset management policy, development of an information technology system, and establishment of an inventory of all classes of KMC assets, following physical survey, verification, and valuation. Additionally, capacity building support and training will be provided to establish processes, practices, and clear accountabilities for institutionalizing the asset management system in KMC; (ii) expansion of the flood forecasting and early warning system established under KEIIP to KSHARP areas;² (iii) upgrade of

² The project will consider GESI-responsive early warning systems and take into consideration the most effective channels to communicate with women, persons with disability, elderly, and other vulnerable groups taking into account the levels of literacy.

comprehensive web-enabled GIS for infrastructure information in KMC.³ The proposed upgrade includes incorporating data on all utility networks that are laid under KEIIP and proposed under KSHARP. This will complement the proposed asset management system that would be established under KSHARP; (iv) training and mainstreaming women self-help groups (SHGs) in O&M of public toilets in project boroughs; (v) community outreach for improved knowledge on hygiene and sanitation, and (vi) awareness generation amongst school students on flood hazards, preparedness, and emergency evacuation procedures.

2. A series of subprojects will be implemented under sector loan for development of S&D network in the selected part of un-sewered areas of KMC. Subprojects will be selected from the 11 eligible subprojects (Appendix 1A & Figure 1) identified under the *Master Plan of S&D System for Project Area under KSHARP*, KMC, which are:

Figure 1: Areas covered under KSHARP



³ KEIIP supported in establishing a web-enabled GIS by integrating information from remote sensing data and on-ground surveys to create a comprehensive infrastructure information system for Kolkata. The system covers all 144 wards of the city and provides detailed information on properties, as well as the water supply, sewerage, and drainage networks. All properties within the city have been geo-tagged, creating a digital map with precise location data for each property.

3. This draft initial environmental examination (IEE) report is prepared for S&D subproject i.e. Development of S&D Network including construction of pumping station in Anandapur area in Borough XII (Part of Ward 108) under Package no. KSHARP/ OCB/ SD 03/ 2023-24 with Operation & Maintenance (O&M) for 5 years.

B. Purpose and Scope of Initial Environmental Examination Report

4. 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 Safeguards Policy Statement (2009). Accordingly, this Initial Environmental Examination (IEE) has been conducted to assess the environmental impacts and provide mitigation and monitoring measures to ensure that there are no significant impacts because of the subproject.

5. The subproject will be implemented as item rate contract modality. This IEE is based on detailed design. If there are any changes during pre-construction and construction phases, the IEE will be updated and submitted to ADB for clearance and disclosure.

C. Report Structure

6. The report has been structured in compliance with ADB SPS, 2009 and contains the following sections:

- Executive summary;
- (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) Conclusions and recommendations.

II. DESCRIPTION OF THE PROJECT

A. Project Background

7. The subproject covers part of ward 108 an administrative division of KMC in Borough XII. This area was incorporated under KMC in 1984 under Calcutta Municipal Corporation Act, 1980. Total catchment area covered under this subproject is 67 ha. The sub project area is bounded on the west by the EM bypass, on the north by Lead channel D – D1, on the east side by TP main canal and Anandapur Highway and the southern boundary is marked by Lead channel C1-C2. The subproject area is connected with adjacent localities through Anandapur main road, Anandapur high road (430m) and E.M. Bypass (600m). Nearest railway station is Howrah railway Station (10.35 km) and nearest airport, Netaji Subhas Chandra Bose International Airport is at a distance of 14.98 Km.

8. The selected subproject area is a rapidly developing localities with increasing number of populations. According to the 2011 Census of India, Ward No.108 in Kolkata Municipal Corporation had a total population of 64,777. Based on 2011 census population number of

projected population in the proposed subproject area of Anandapur in 2028 (base year), mid-year (2043) and at ultimate year (2058) would be 62670, 98881 and 153864 respectively.

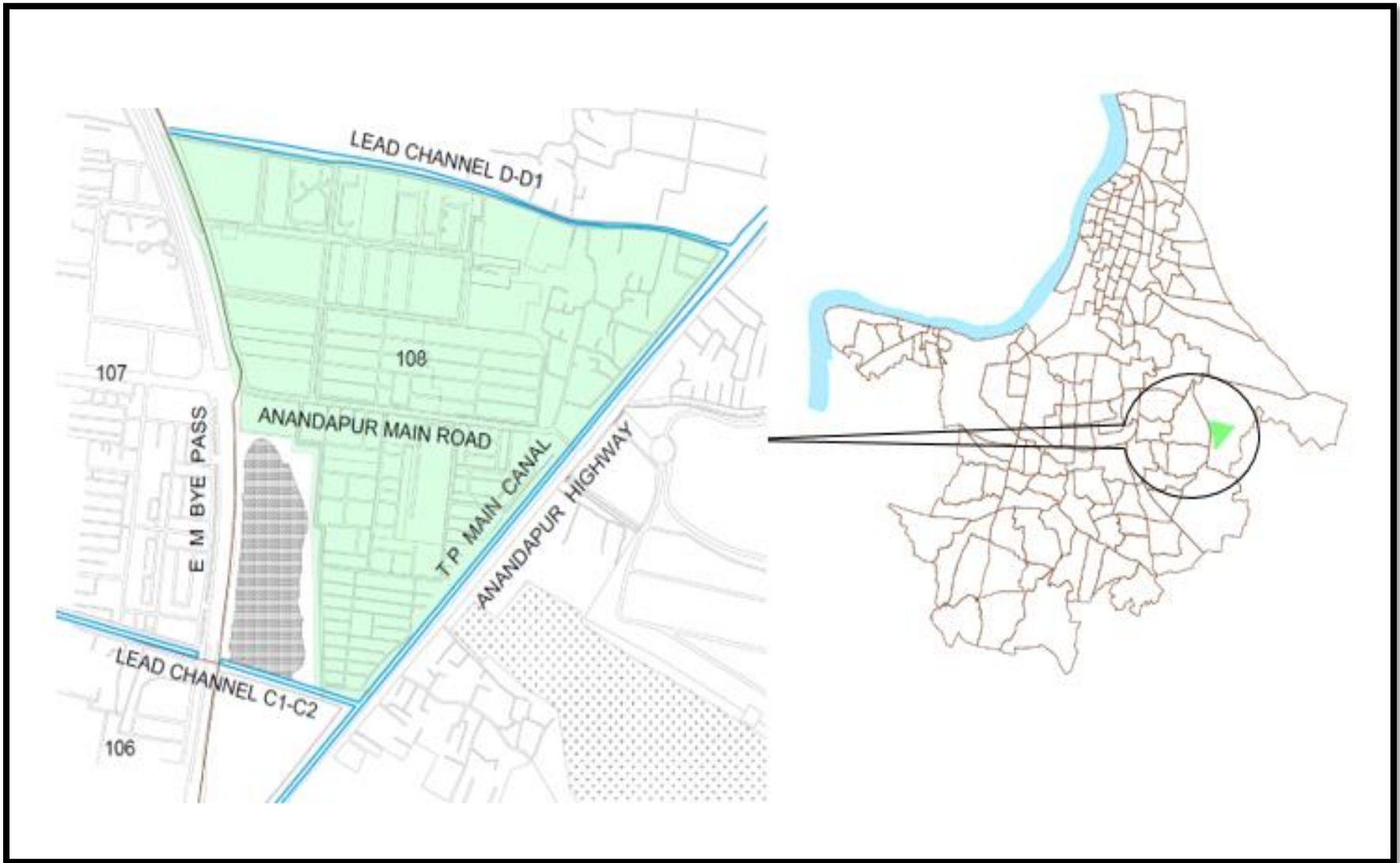
9. The proposed S&D work zone is delineated based on the prevailing drainage system of the area, ground topography, existing road network of the area, drainage outlets, location of pumping stations/ STP, catchment area of outlet canals, carrying capacity of the canals etc. Package wise major areas proposed to be covered under this subproject are given in Table 1 and Figure 2 showing the subproject area covered under this subproject.

Table 1: Major areas covered under subproject

Borough XII	Ward 108	Major Areas
		• RR Plot • Anandapur Main Road • Anandapur EKTP • Other Roads in Anandapur area as shown in the drawing

Source: Detailed Project Report for Package SD – 03

Figure 2: Location of sub project area



Source: DPR, 2024

B. Existing Situation

10. Kolkata has a combined sewerage and drainage system. An organized S&D system (Town System) was first introduced in 1859 covering 19.13 sq. km area. For the fringe areas (covering wards 101 to 144) annexed to KMC in 1984 & subsequently in 2012, the existing drainage network was grossly inadequate, before development of S&D system in KEIP & ongoing KEIIP. The sewerage & drainage system in the study area of Borough XII is grossly inadequate. The present study area which is a part of the 'Added Areas' but not covered under KEIP and ongoing KEIIP and is almost devoid of any organized sewerage and drainage system except for some segregated parts of the study areas (a small part of Anandapur and Rajdanga area). At present there is no organized existing sewerage system in these areas. Wherever sewerage and drainage system exist, DWF from those areas is being discharged to the canals. However, there are few drainage lines which not only carry storm water but also carry DWF to TP canal via. different tributaries and ultimately leads to River Kult. In the process, not only the canals but also the river water is getting polluted. The project area depends largely on septic tank arrangement for household sanitary systems and open surface drainage systems mainly for storm water and effluents of septic tanks. In many cases the drains do not have any proper outlet and terminated into low land/ canal. All these existing practices need to be controlled by providing a comprehensive combined flow (DWF + SWF) collection system and diversion of the entire quantum of DWF generated from the project area to the STP for treatment.

11. In Anandapur, a part of area is having separate system for SWF & DWF. But interconnectivity between the two systems is observed at many locations and system is running virtually as a combined system to minimize water logging problem in the project areas. Other part of the Anandapur areas is served by surface drains / sewer lines. It is observed that wastewater is being discharged to the canals through drainage system at many locations. It is also observed that the existing drains are encroached and choked at many locations. Surface drainage system, existing in the project areas disposes off the storm runoff as well wastewater to the different canals flowing along the boundary of the project area. It has been found that surface drainages are not properly maintained resulting water logging in the areas. Further, maintenance of the drainage system becomes difficult due to encroachment.

12. DWF generated from the Rajdanga area (ward 107), lying to the west of EM Bypass is being conveyed through sewer networks to the existing pumping station (East Kolkata Sewage PS), maintained by Kolkata Metropolitan Development Authority (KMDA) and located within this zone after crossing EM Bypass. This pumping station presently receives DWF generated from the portion of Rajdanga area (135 ha) and portion of subproject areas within Anandapur zone also. This pumping station is in dilapidated condition and has already exceeded its design life and proposed to be dismantled after construction and operation of a new pumping station in the same premises under KSHARP. There are 4 nos. of pumps with the capacity of 75 HP (2 nos.) and 45 HP (2 nos.) in the PS. SWF generated from the Rajdanga Areas gets drained to Lead canal D-D1, Intercepting Channel & lead Channel C1-C2 under TP basin. DWF generated from the Rajdanga area is also being conveyed to the Anandapur pumping station through the exiting sewer line along Rash Behari Avenue and finally discharged into the canal.

13. The existing system, wherever available, in most of the cases is inadequate to take care of the generated storm water load and prolonged periods of pooling of stagnant water mixed with sewage are a common sight of nuisance in the major portion of areas during the monsoons. As a result, unhygienic conditions and prolonged water logging instances prevail in the area. Moreover, due to inadequate sewer line waterlogging phenomenon are common at RR Plot, along Anandapur Main Road, Anandapur East Kolkata Township (EKTP), Kasba Industrial Park Area

and in front of CISF headquarter after any event of moderate to high intensity rainfall occurrence. Therefore, it is urgently required to develop an adequate S&D network along with sewage treatment facility for improvement of citizen services and overall enhancement of quality of life.

C. Proposed Subproject Components

14. Details of the subproject components are summarized below and thematic maps, typical layout plan and schematic diagrams are shown in Figure 3 to 15 at the end of this Chapter. Figure 16 shows the photographs of proposed outfall locations in Anandapur area.

Table 2: Project Component Details

Component	Function	Description	Location
Laying of trunk sewer and secondary sewer network with manholes and house sewer connections	Collection of Storm Water Flow (SWF) from entire catchment area and Dry Weather Flow (DWF) from individual houses Each gully pit / catch pit with proper road camber would receive storm runoff from the road surface.	1. Sewer and Drain network Length: 5.1 km - secondary sewer – 1.9 km - trunk sewer – 3.2 km 2. Pipe material: Reinforced Cement Concrete (RCC) 3. Pipe diameter: 300 mm to 2000 mm 4. Diameter-wise sewer pipe lengths: • upto 900 mm dia sewer: 3683m • above 900 mm and upto 1000 mm dia sewer: 431m • above 1000 mm and upto 1200 mm dia sewer: 329m • above 1200 mm dia upto 2000mm dia sewer: 676m 5. Road width: 5.0 to 10 m 6. Trench width: 0.85 to 3.4 m 7. Trench depth: 1.8 m to 6.2 m 8. Manholes – 331 nos. Material: Brick masonry circular manholes 9. Gully pits – 30 nos. (dimension: 625mm x 1100mm x 1550mm depth) 10. Catch pits– 572 nos (dimension: 600mm x 525mm x 1250mm depth) 11. Household sewer connections: 580 (estimated) Materials: Unplasticized Polyvinyl Chloride (uPVC) Diameter 110 mm or 160 mm 12. Road restoration: 7.8 km	Trunk sewers are proposed to be laid along the major roads of the catchment viz. RR Plot, Anandapur Main Road and Anandapur EKTP Road etc. The manholes will be constructed based on the assessment of subsoil condition and traffic loads well within the ROW of KMC/ PWD/KMDA roads along the sewer network. Gully pits will be provided in broader roads and Catch pits in narrow roads

Component	Function	Description	Location
Outfall structures	Discharge storm runoff / combined flow into canals All the outfalls are proposed to be with controlling arrangement to prevent possibility of intrusion of canal water into the S&D system during the high-water level condition in the canals. Invert level of all the outfalls are considered to be at the full discharge level (FDL) or above FDL of canal with sluice gate with requisite size.	New: Six Gravity outfalls proposed Components: Sluice gate structure or Flap gate as per site condition.	New: <u>Outfalls on D-D1 Lead Channel connecting to TP canal:</u> 1. Outfall near Sanchi International (Long. 88.407503, Lat. 22.516823) 2. Outfall near Anandapur Nabarun Sangha (Long. 88.409712, Lat. 22.516226) 3. Outfall beside Adrija apartment (Long. 88.411254, Lat. 22.516132) 4. Outfall beside Adrija apartment (Long. 88.411254, Lat. 22.516132) <u>Outfalls in T.P Main Canal under TP Basin</u> 1. Outfall beside Sefali Bhavan (Long. 88.411094, Lat. 22.514088) 2. Outfall near Gongotri apartment (Long. 88.410424, Lat. 22.513436) Outfall locations (canals) are under the Irrigation department, Govt. of West Bengal.
Construction of one number of combined Pumping Station and Pumping mains	The combined flow (DWF +SWF) generated from the project area will be conveyed to proposed Anandapur pumping station. SWF from this PS will be disposed of to D-D1 and TP Main Canal and DWF will be conveyed to Hossainpur pumping station for onward transmission to proposed STP at Hossainpur for treatment and disposal.	New Construction of Pumping station Area required: 0.66 Acre Components: • <u>SWF Pumps</u> ➤ SWF Pumps – 2W+1S for two clusters ➤ Capacity: 750 lps each ➤ SWF Pumping main - 1000 mm diameter mild steel (MS) pipe with length of 200 m and 1,700 m respectively. ➤ Wet well: 10.5m diameter, and 13.5m depth • <u>DWF pumps</u> ➤ DWF Pump – 2W+1S each for two clusters	One new pumping station will be constructed on the vacant plot within the premises of existing Anandapur PS under KMDA. (latitude: 22.515733, longitude: 88.407116). <u>Pumping mains:</u> • SWF to D-D1 along D-D1 canal side road • SWF to TP Canal along TP canal side road • DWF to Hossainpur network manhole along D-D1 canal road

Component	Function	Description	Location
		➤ Capacity of pump: 150 lps of 15 m head. ➤ DWF Pumping Main – 700mm diameter ductile iron) DI pipe of 800 m length	

D. Proposed Subproject

15. The proposed sewerage system in the sub-project area is designed as a combined system to convey both dry weather flow (DWF) and storm water flow (SWF). One combined Pumping Station (PS) is proposed to be constructed in the vacant land within the premises of existing Anandapur PS of KMDA (**Error! Reference source not found.**) to cater flows generated under this project. In the combined system, the sewage as well as the storm water flows through the same conduit (total proposed length is 5.1km). As the quantum of storm water flow is several times higher than the dry weather flow, the system carries an insignificant flow for major periods of a year. In the KMC areas the roads are in general narrow, particularly in the study areas. Therefore, it will be extremely difficult to lay at least two separate conduits for storm water flow (SWF) and dry weather flow (DWF) keeping into consideration the presence of other utility lines. Further, the prevailing drainage system in the city is combined in nature i.e. carries both sewage and storm runoff. Therefore, the sewer network in the study area is proposed to be designed as a combined system in the line of system adopted in KEIP and ongoing KEIIP. In order to avoid undue loading on the STP, bypass arrangement is proposed at strategic locations so that during heavy showers, excess flow is diverted through the outfall system. Adequate dilution is ensured in the system for SWF discharge through (i) overflow structures level in gravity outfall ensures minimum dilution before bypassed into SWF channels, (ii) pumping from wet well to SWF is initiated only after attaining the requisite level and thus dilution, and (iii) standard operating procedures are already available and followed.

16. Trunk sewers (3.2 km) are proposed to be laid along the major roads of the catchment viz. RR Plot, Anandapur Main Road and Anandapur EKTP Road and other roads as shown in Figure 8 and 9. The combined flow generated flow from these sewers will be transported to the proposed pumping station. Flows, generated from RR Plot, Rail Vihar housing and adjoining areas of Anandapur Main Road are proposed to be conveyed to the proposed sewer line along Anandapur internal roads for onward transmission to the proposed pumping station at Anandapur (Figure 9). Flows, generated from adjoining areas of Anandapur EKTP road are proposed to be conveyed to the proposed sewer line along D -D1 canal side road for onward transmission to the proposed pumping station.

17. **Treatment and Discharge.** DWF from the Anandapur PS will be pumped to the proposed manhole of Hossainpur S&D network on Anandapur Highway via dedicated pumping main of length of about 800m for onward transmission to proposed Hossainpur PS (1.7 km distance). From Hossainpur PS, DWF will be transmitted to the proposed adjoining STP at Hossainpur for treatment (Figure 10). The treated effluent from STP after reuse will be discharged into the nearby T.P canal. Construction of Hossainpur S&D networks including proposed Hossainpur PS and STP are considered under KSHARP and separate IEEs are prepared. SWF from the Anandapur PS will be disposed of to the D-D1 & TP canal by two dedicated pumping mains at two separate locations to avoid discharging of enormous flow in a single location, thereby reducing chances of overtopping of the canal from that particular stretch. Two dedicated pumping mains has been

considered in the design to avoid discharge of heavy flow at one single location. Length of SWF pumping mains of 1000 diameter of MS pipe to discharge into D-D1 channel is 200m and into TP canal is 1700m. A part of SWF generated from the subproject area will be disposed of to D-D1 channel through four (4) number of gravity outfalls (GOF) and to TP Main Canal through two (2) number of GOF flowing along the boundary of the project area. All the gravity outfall (GOF) structures are provided with sluice gates or Flap gate arrangements (Figure 14 & 15). Sluice gates will be provided as the controlling device to prevent backflow into the system. Considering tidal influence and water level in all the drainage outlets, invert level of the outfalls are proposed to be fixed at the full discharge level (FDL) of the canal. During heavy rainfall event, the sluice gate will be opened and the storm water flow will be disposed of to the canal gravity outfall (Figure 16). Sluice gate will be operated by motorized mechanism.

18. Drainage system in and around KMC area including T.P canal mostly gravitated eastwards to Kulti River of Matla estuary system (about 45 km downstream of Kolkata) which ultimately meets with River Bidyadhari at a distance of about 70km. There are two canals that primarily carry wastewater and storm water (DWF canal and SWF canal), which traversing mainly through East Kolkata Wetland area (EKW). From the subproject area, both SWF and treated DWF is discharged into TP canal, which ultimately discharges into SWF via a pumping station at Chowbhaga. SWF traverses EKW area and flows into Kulti River. Therefore, there will be no discharge of treated or combined flow into EKW.

19. Road wise proposed pipeline diameter, length, trench width and depth and width of the road are given below in Table 3. Roads through which sewer pipelines will be laid are under the ownership of Kolkata Municipal Corporation (KMC), Kolkata Metropolitan Development Authority (KMDA) and Public Works Department (PWD).

Table 3: Road wise Proposed Pipeline Details

Sr. no	Name of Road	Proposed Pipe Diameter (mm)	Length (mt)	Trench Width (mt)	Road Width (mt)	Proposed Trench Depth (mt)
1	Anandapur Main Road	500 – 1600	610	1.15 – 2.8	10	3.2
2	R.R Plot Road	300-1000	1331	0.85-1.9	7.0	2.4
3	Anandapur Road (Back Site)	1800-2000	312	3.1-3.4	10	6.2
4	Anandapur Road (Mid of Industrial Area)	2000	307	3.4	9	6.2
5	Anandapur EKTP Road	700	324	1.45	6	2.3
6	D-D1 Canal Side Road	500-800	488	1.15-1.6	6	2.2
7	T.P Canal Side Road	300-500	421	0.85-1.15	5	1.8
8	D-D1 canal side road and T.P canal side roads for SWF Pumping Main	1000	1900	1.90	5-6	2.0
9	DWF Pumping Main along D-D1 canal side road	700	800	1.450	5-6	1.75

Source: DPR SD 03, 2024

E. Analysis of Alternatives

20. Alternative analysis provides an opportunity to integrate environmental considerations into early stages of project (i.e., pre-feasibility or feasibility study), so that adverse environmental impacts can be avoided or minimized by various alternatives.

21. The development of sewerage & drainage (S&D) system in the added areas of Anandapur covering part of ward 108 (Borough XII of KMC) include construction of one Pumping station and laying of combined networks (DWF and SWF collection) of 5.1km and allied works like construction of manholes, catchpits, gully pits, outfall structures and house sewer connections which are proposed in government owned lands. There are no eco-sensitive or protected areas within or close to proposed project activity areas. No wildlife is also reported in the project town.

22. The proposed system will be developed as a combined networks to carry dry weather flow (DWF) and storm water flow (SWF) generated from the catchment area. The combined flow generated from the project area will be transported to proposed Anandapur pumping station (PS). SWF from the Anandapur PS will be disposed of to the D-D1 & TP main canal by two dedicated pumping mains at two separate locations to avoid discharging of enormous flow in a single location, thereby reducing chances of overtopping of the canal from that particular stretch. DWF from the Anandapur PS will be pumped to the proposed manhole of Hossainpur S&D network on Anandapur Highway via dedicated pumping main of length of about 800m for onward transmission to proposed Hossainpur PS at a distance 1.7km. From Hossainpur PS, DWF will be transmitted to proposed STP at Hossainpur based on SBR for treatment.

23. “Without” subprojects would yield the area to be continuously under-serviced that puts the health of the general public at an increasing risk and could potentially worsen the living environment. This ‘no project’ scenario would impede further social and economic development of the City of Kolkata and the defer commitments to improve the proportion of the population with sustainable access to better drainage system and basic sanitation. Given the large-scale benefits to the population and environment, ‘With Project’ alternative is considered appropriate.

24. “With” the implementation of the proposed subproject, people will have convenient access to improved drainage and sewerage system. The sewerage system will remove the human waste from their homes safely and quickly and relief from water logging conditions within the sub-project area specially at RR Plot, Anandapur East Kolkata Township (EKTP), Kasba Industrial Park area and in front of CISF headquarter through improved drainage system. As a result, good hygiene and sanitation practices will be promoted and there will be better public health particularly reduction in waterborne and infectious diseases due to improved sewerage and drainage systems. Improved sanitation and drainage system will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of the municipality will benefit from; thus, contributing to the overall economic development of the region.

F. Subproject Benefit

25. The population of ward 108 will be the major beneficiaries of the sub project. The benefits arising from the project include: (i) relief from prolonged water logging at RR Plot, Anandapur East Kolkata Township (EKTP), Kasba Industrial Park Area and in front of CISF headquarter due to improved combined sewer network including construction of pumping station (ii) better public health particularly reduction in waterborne and infectious diseases due to improved sewerage systems in project areas; (iii) reduced risk of groundwater contamination through appropriate

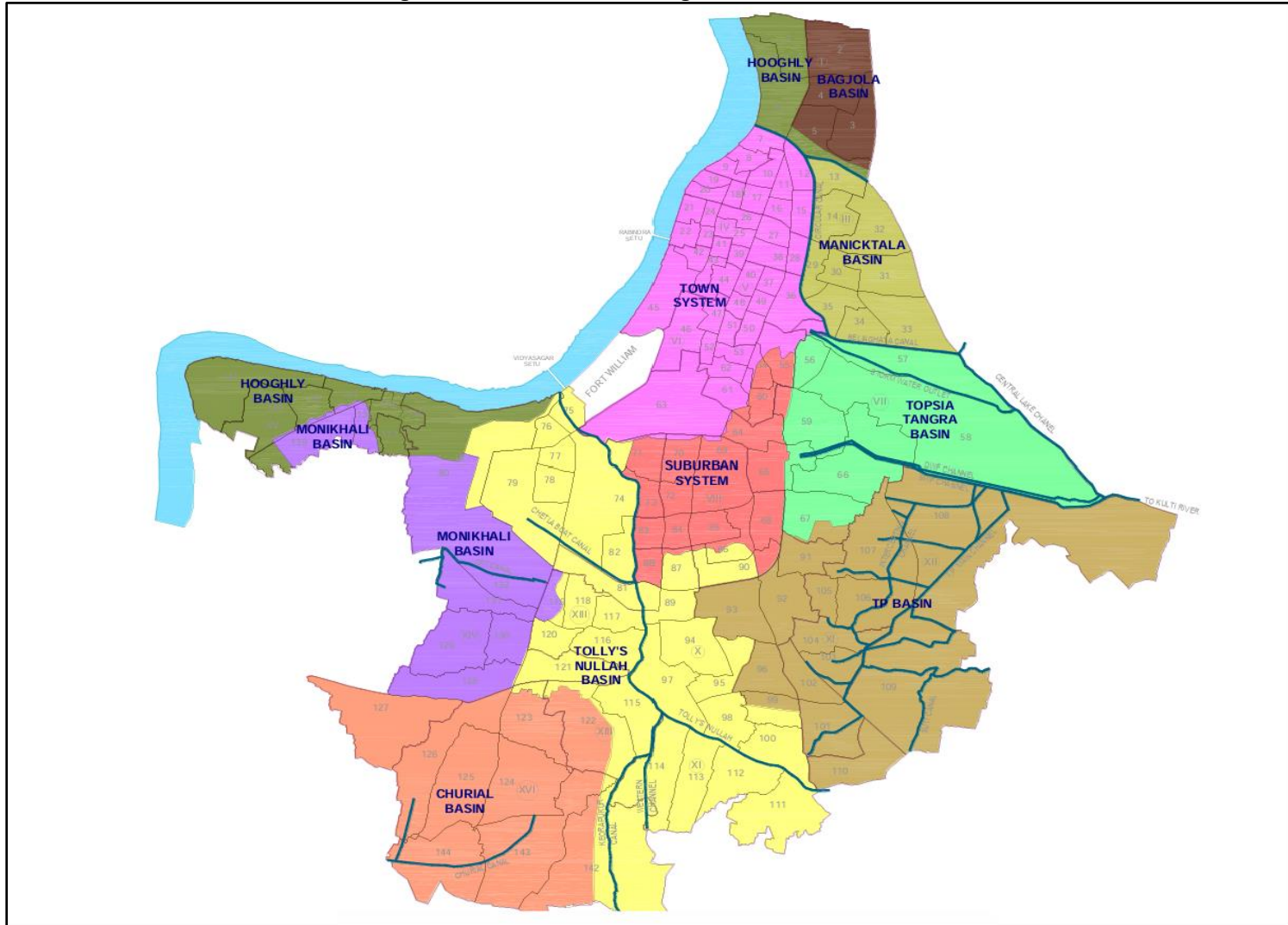
sewer collection and treatment; (iv) reduced risk of contamination of treated water supplies; and (v) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

G. Implementation Schedule

26. The project will be implemented under Item rate contract. The implementation schedule for the project involves a survey and construction period of 3.5 years. Bids will be invited in March 2024 and the project is likely to be awarded by August 2024. Contractor will submit a System Improvement Plan (SIP), after carrying out detailed survey / study of the existing system within first 3 months after award of the work. The operation and maintenance (O&M) activity 5 years considered in this package.

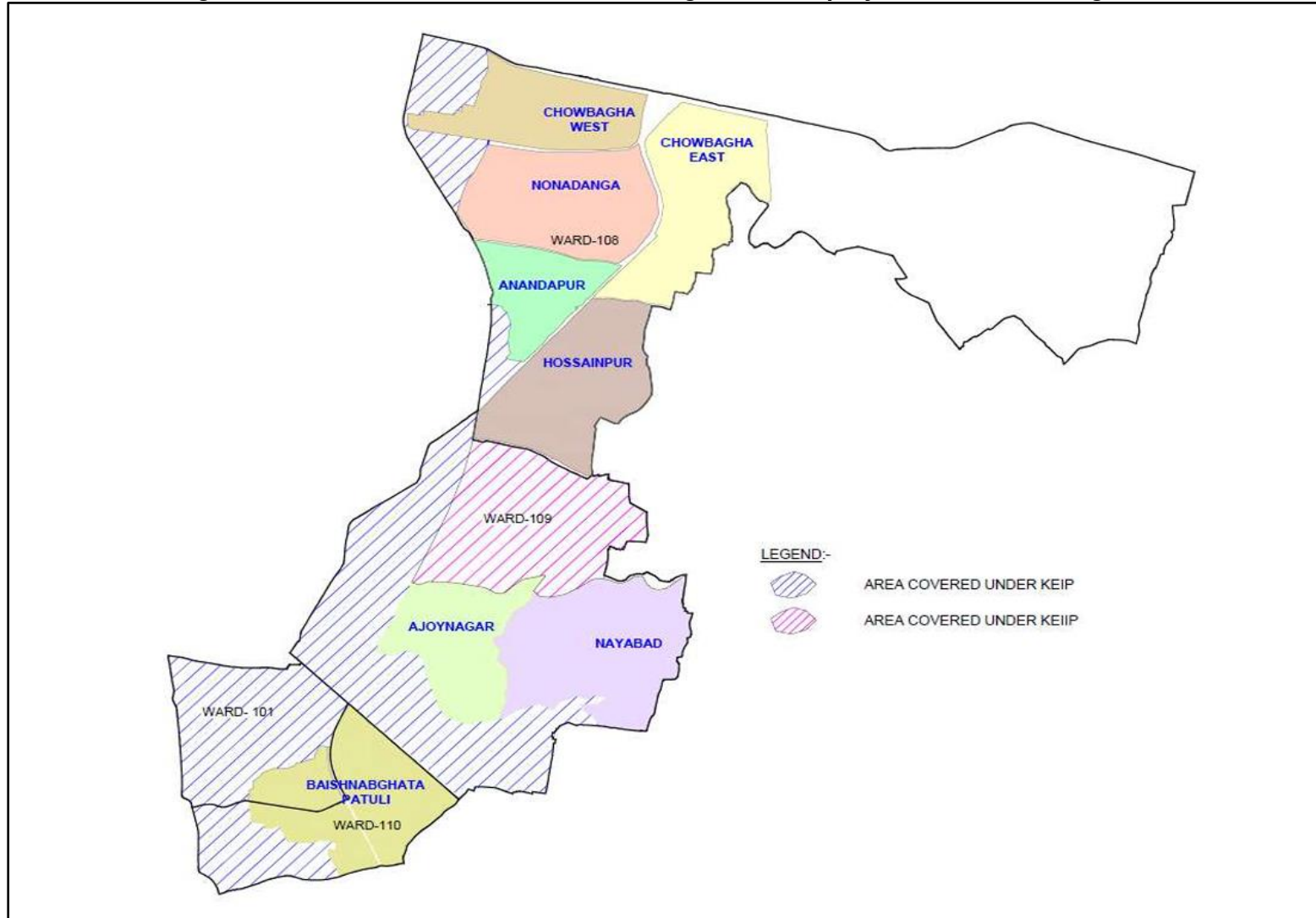
27. Since the pumping station (SPS) and sewage treatment plant (STP) proposed at Hossainpur are essential for operation of the S&D network to further convey, treat and dispose the sewage collected in Anandpur subproject area, the bidding, final designs, implementation and completion of works of all three packages (SD-03, SD-04 and SD-05) shall be synchronized. Bidding (and contract award) for S&D network packages (SD-03 and SD-05) shall be done only after bidding (and contract award) for STP (SD-04) and ensured that STP works are completed and ready for operation prior to completion of network.

Figure 4: Different Drainage Basins in Kolkata



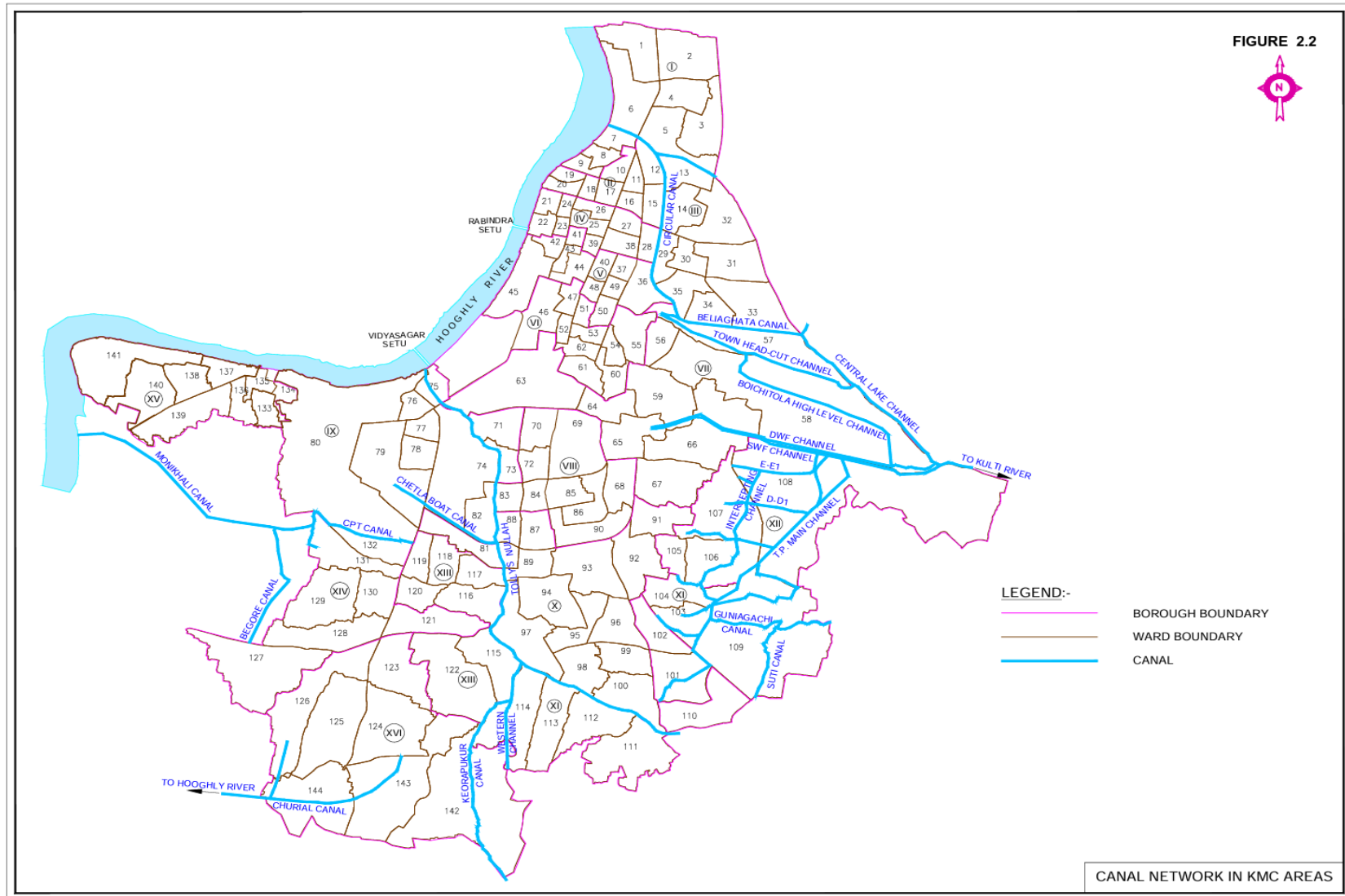
Source: DPR, 2023

Figure 5: Command area of different drainage zones of project areas in Borough XII



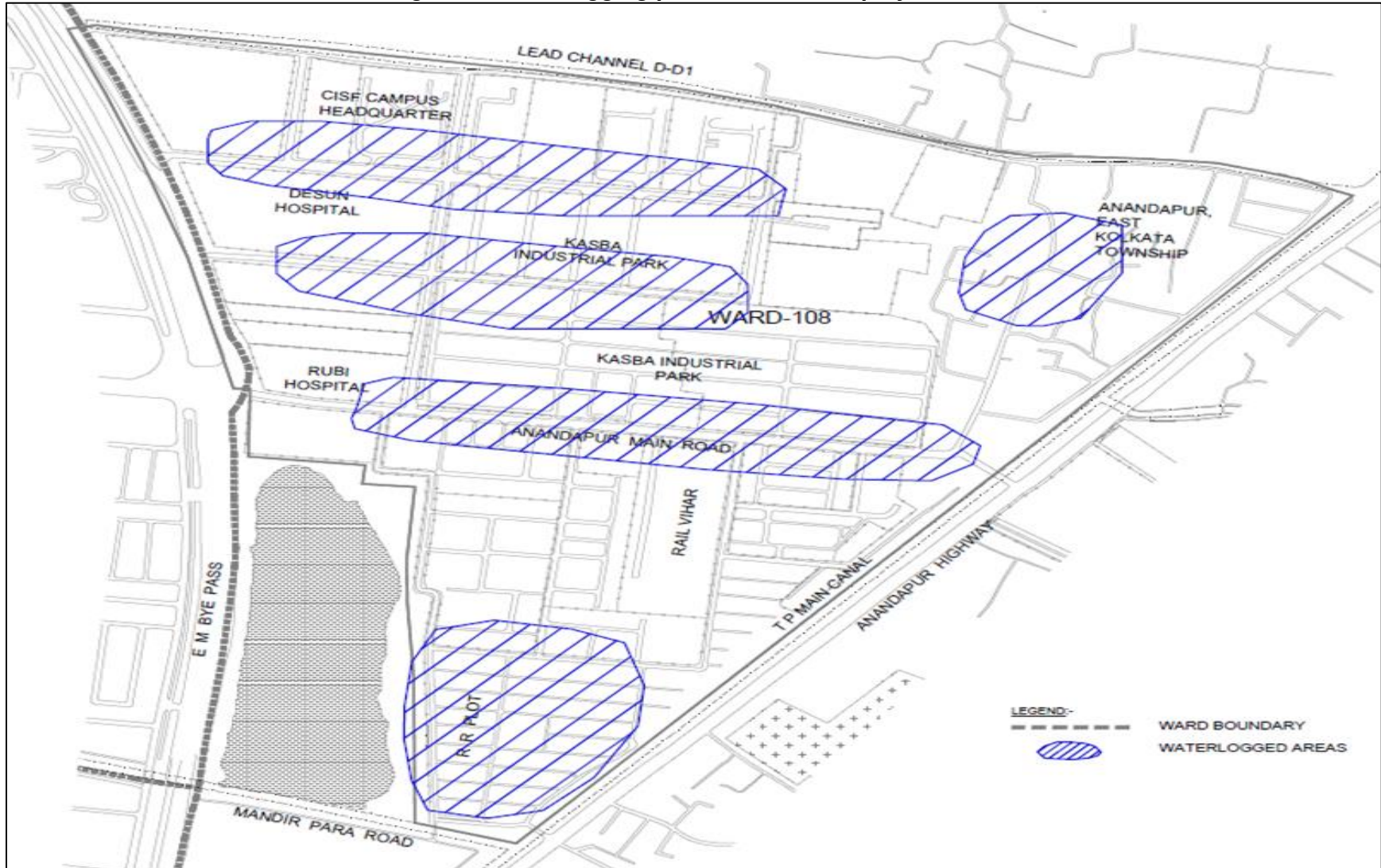
Source: DPR,2023

Figure 6: Canal Network in KMC Area



Source: DPR,2023

Figure 7: Water logging pockets in the subproject area



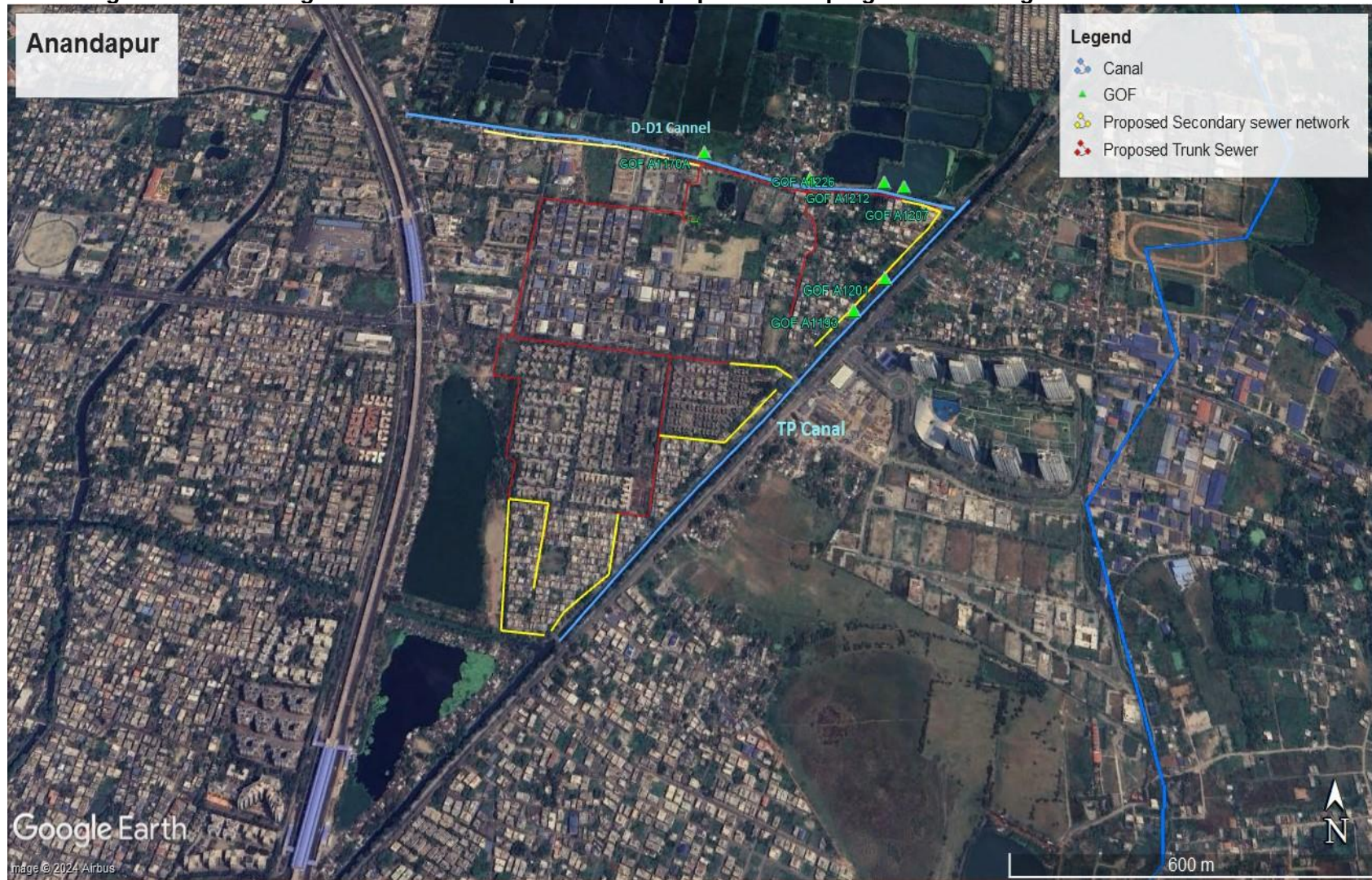
Source: DPR,2023

Figure 8: S&D Network and proposed pumping station site in the sub project area



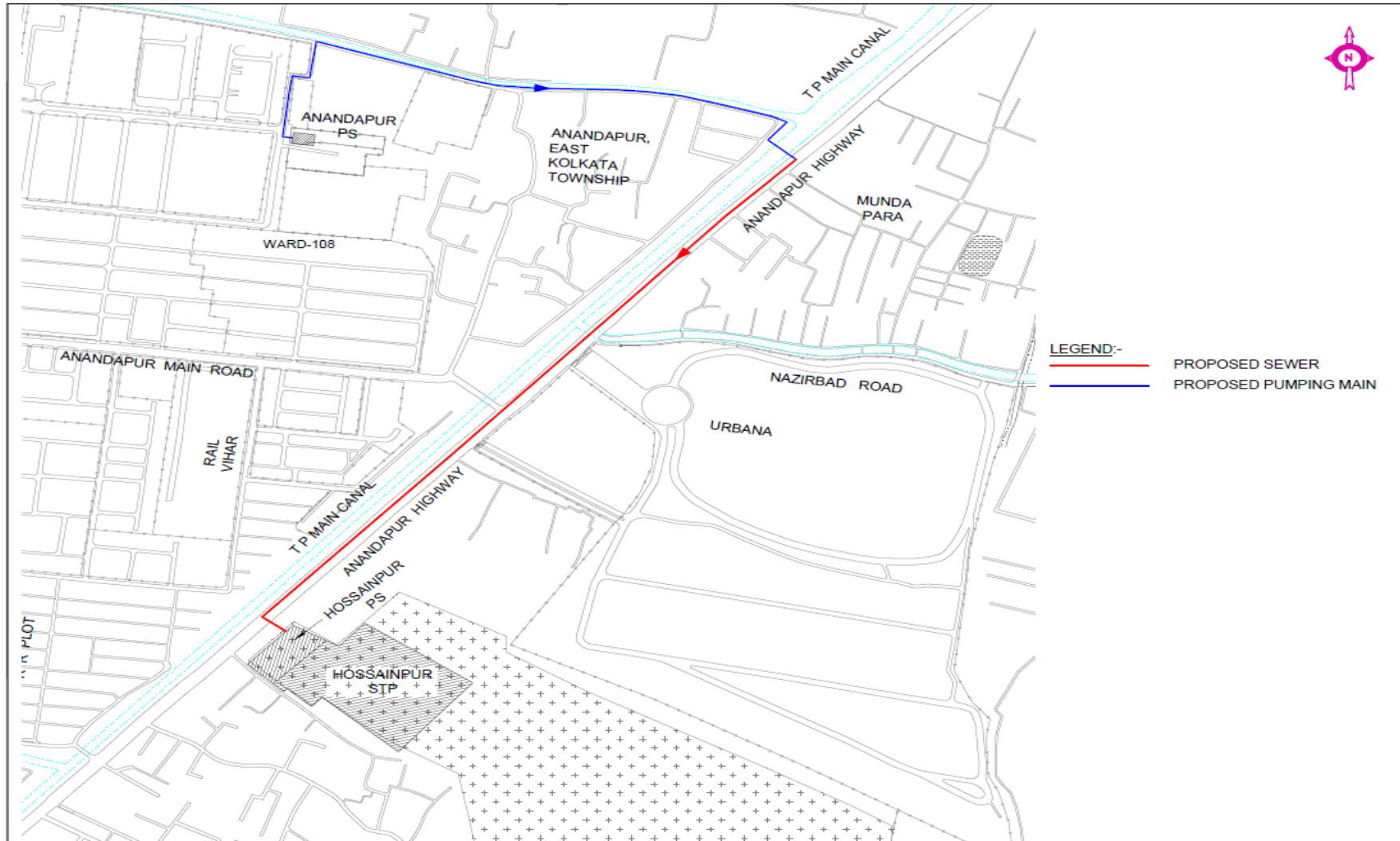
Source: DPR,2023

Figure 9: Sewer Alignment in Anandapur area and proposed Pumping Station along with SWF outfall locations



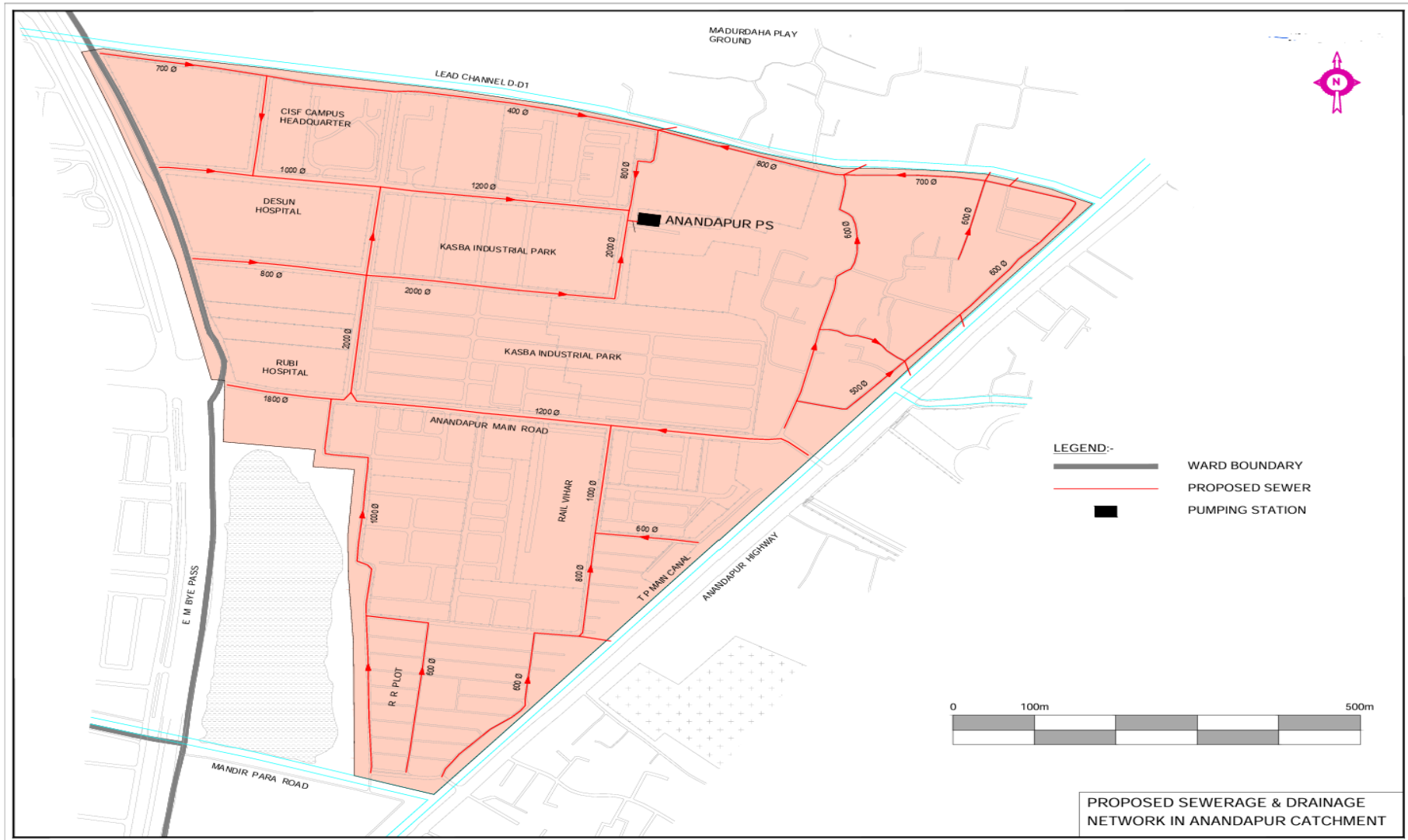
Source: DPR,2023

Figure 10: Alignment of proposed DWF Pumping main connecting to Hossainpur PS and STP



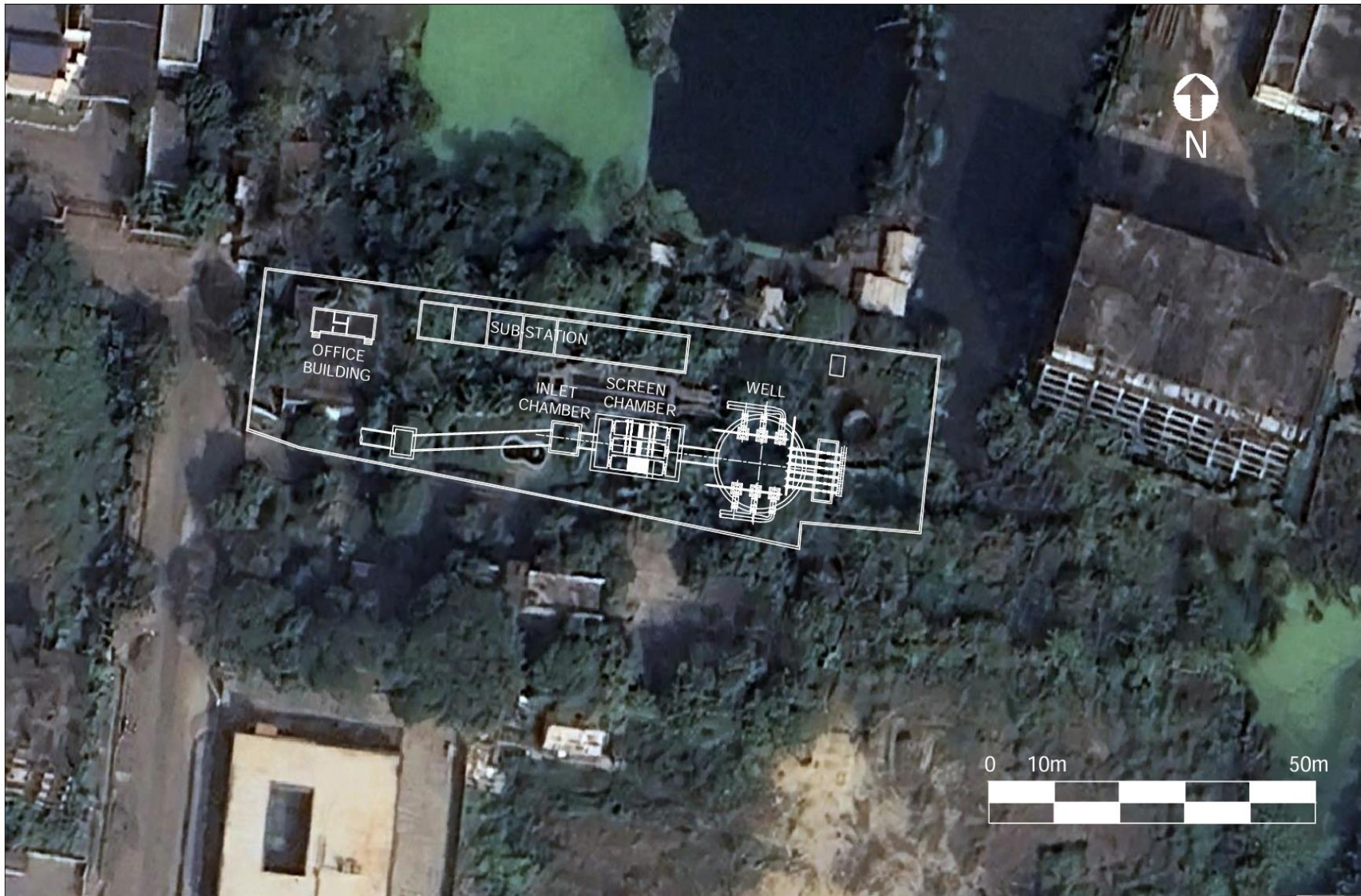
Source: DPR,2023

Figure 11: Alignment of proposed SWF Pumping main



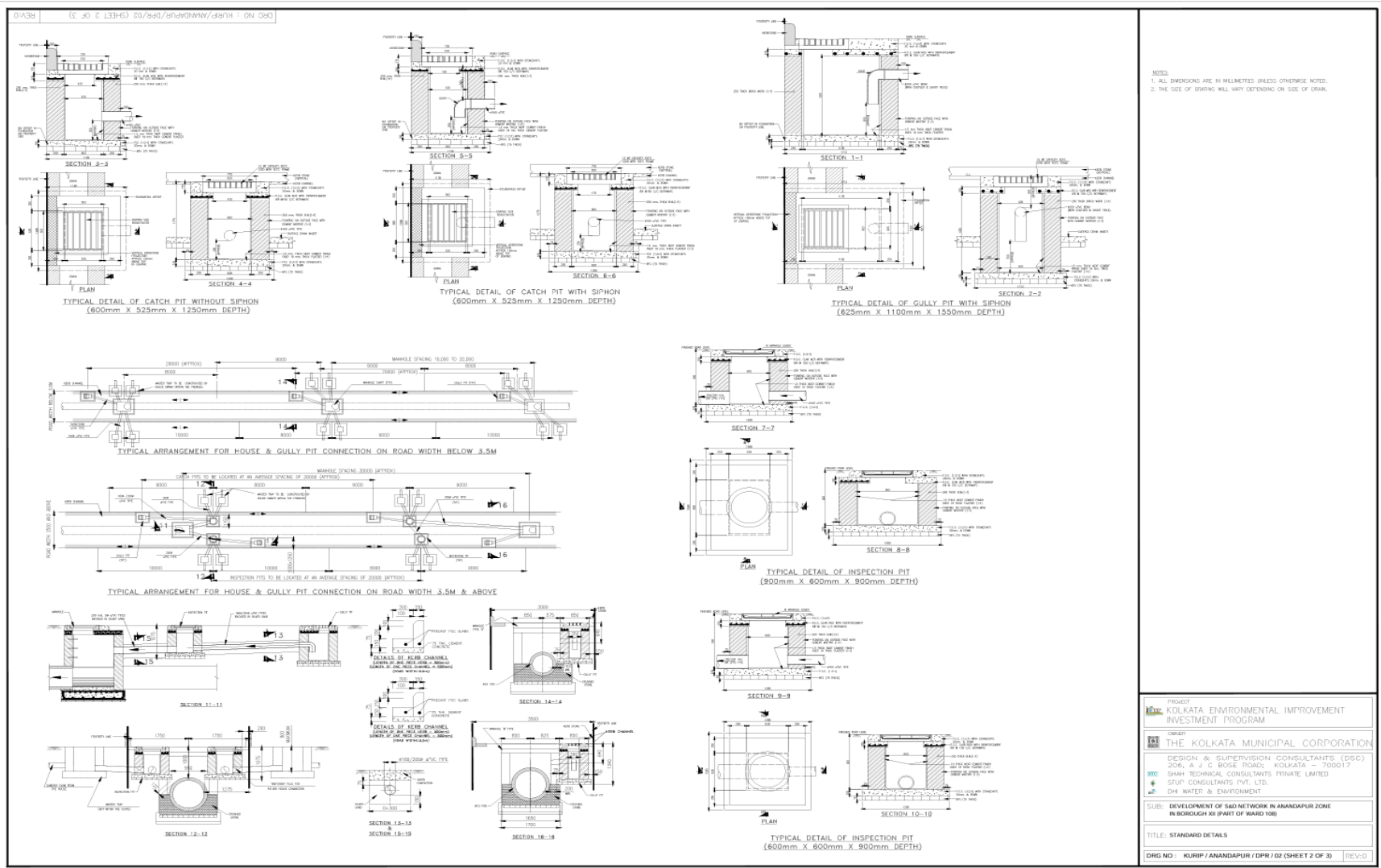
Source: DPR,2023

Figure 12: Layout of proposed Pumping Station



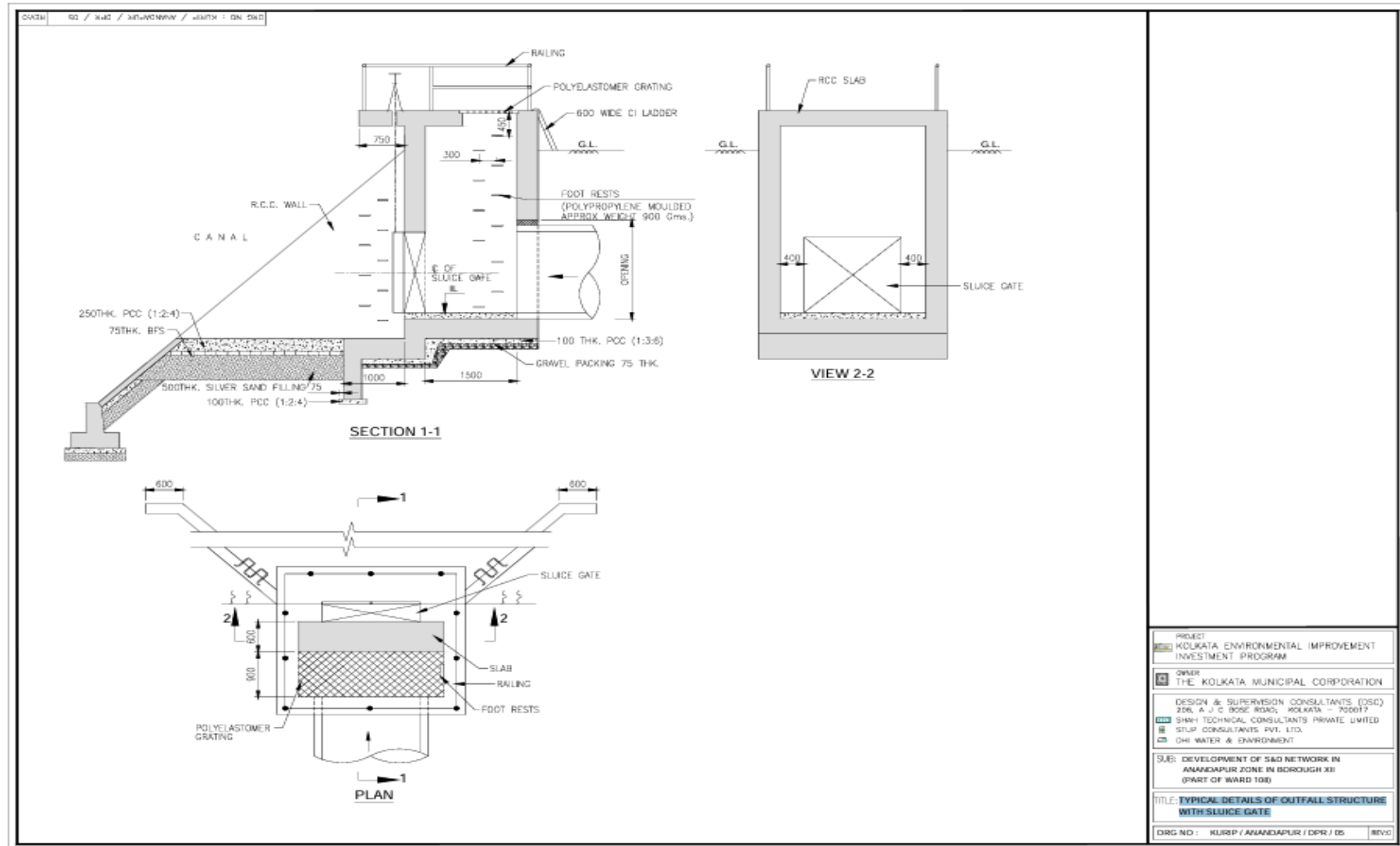
Source: DPR,2023

Figure 13: Typical Design of Catch Pit, Gully Pit and Inspection Pit



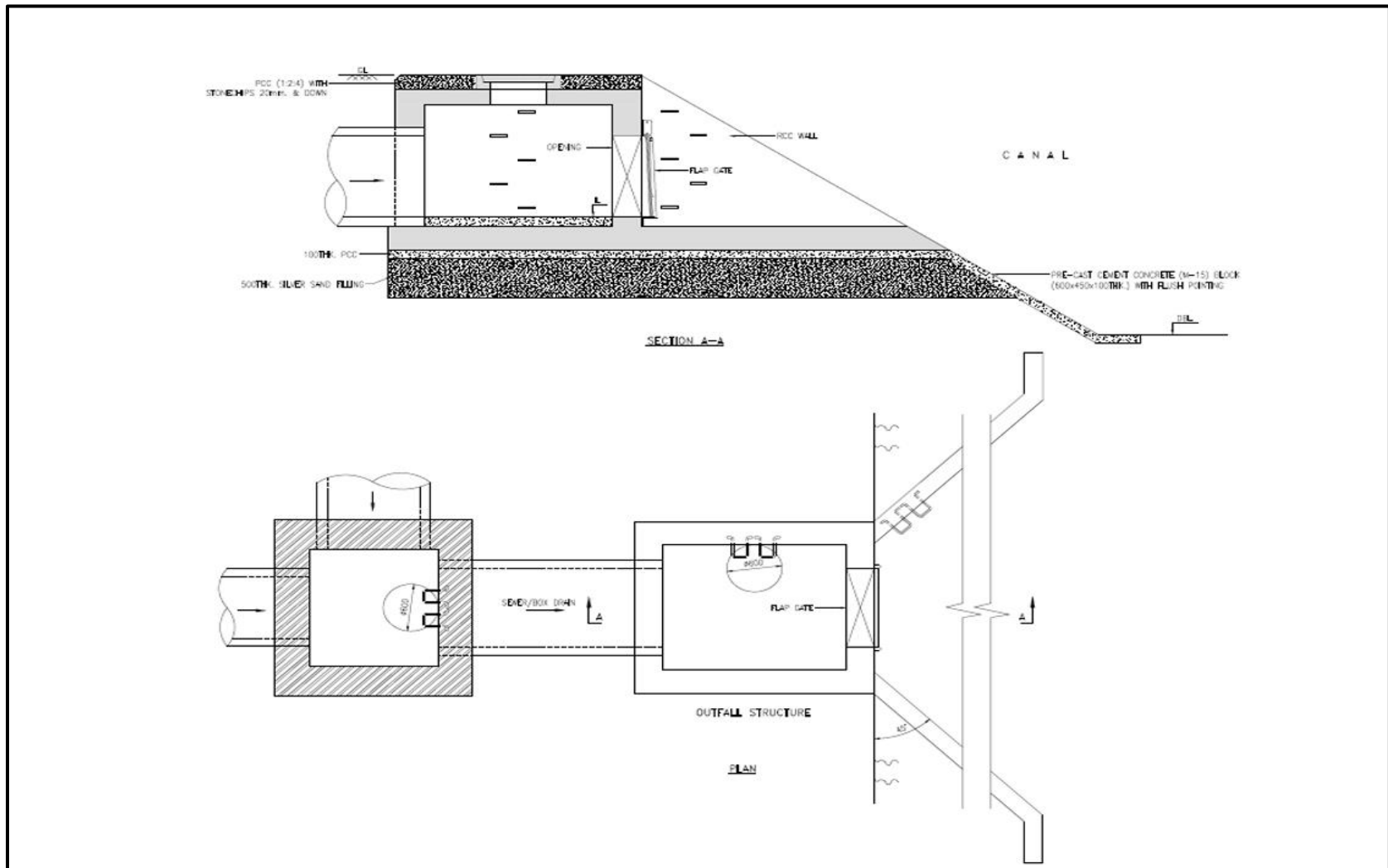
Source: DPR, 2023

Figure 14: Typical Details of Outfall Structure with Sluice Gate



Source: DPR,2023

Figure 15: Typical outfall structures for Flap gate



Source: DPR,2023

Figure 16: Proposed Outfall locations in Anandapur Area



Outfall near Sanchi International



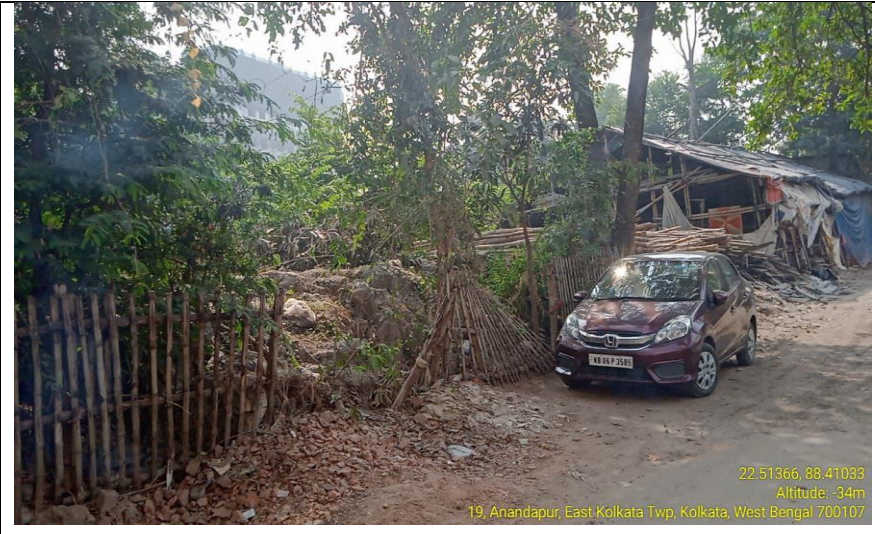
Outfall near Anandapur Nabarun Sangha



Outfall beside Adrija apartment



Outfall beside Sefali Bhavan



Outfall near Gongotri apartment



T. P. Canal



D-D1 Channel

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

28. 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 project loans, program loans, sector loans, sector development program loans, and loans involving financial intermediaries, and private sector loans.

29. 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 impact and are assigned to one of the following four categories:

- (i) **Category A.** project likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. An EIA is required.
- (ii) **Category B.** potential adverse environmental impacts are less adverse than those of category A projects. An IEE is required.
- (iii) **Category C.** project likely to have minimal or no adverse environmental impacts. No EIA/IEE is required although environmental implications need to be reviewed.
- (iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a FI.

30. The potential environmental impacts of Anandapur S&D network and PS have been assessed using ADB's Rapid Environmental Assessment Checklist for S&D (**Error! Reference source not found.**) was conducted, and results of the assessment show that the sub-project is unlikely to cause significant adverse impacts. Therefore, it is classified as **Category B** and this IEE has been prepared in accordance with ADB SPS's requirements.

31. **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 and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

32. **Environmental Audit of Existing Facilities.** ADB SPS, 2009 requires an environmental audit, if a subproject involves facilities and/or business activities that already exist or are under construction, including an on-site assessment to identify past or present concerns related to impacts on the environment. The objective of this compliance audit is to determine whether actions were in accordance with ADB's safeguard principles and requirements for borrowers/clients, and to identify and plan appropriate measures to address outstanding compliance issues.

33. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices, libraries, community centers, etc.), and a summary translated into local language for the project affected people and other stakeholders. The following safeguard documents will be put up in ADB's website so that the affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

- (i) For environmental category A projects, a 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 PMU during project implementation upon receipt.

34. **Consultation and Participation.** ADB SPS, 2009 require borrower to conduct meaningful consultation⁴ with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

35. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, ADB SPS, 2009 requires the borrower to update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

36. **Occupational Health and Safety.** ADB SPS, 2009 requires the borrower⁵ to ensure that workers⁶ are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. Borrower shall take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, including: (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

37. **Community Health and Safety.** ADB SPS, 2009 requires the borrower to identify and assess risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and shall establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts. The borrower shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. PMU shall also adhere to necessary protocols in response to benefits and opportunities, and implementation issues. In case where responsibility is delegated to subproject contractors during construction phase, borrower shall ensure that the responsibilities

⁴ Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle 1; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

⁵ In case where responsibility is delegated to subproject contractors during construction phase, borrower shall ensure that the responsibilities on occupational health and safety are included in the contract documents.

⁶ Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

on occupational health and safety are included in the contract documents including non-employee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

38. **ADB SPS International Best Practice Requirements.** ADB SPS, 2009 requires that, during the design, construction, and operation of the project, the executing agency shall apply pollution prevention and control technologies and practices that are consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety (EHS) Guidelines. (IFC's General EHS Guidelines⁷ and Sector Specific [Water and Sanitation] Guidelines⁸). These standards contain performance levels and measures that are normally acceptable and applicable to projects. 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 PMUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PMUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

B. National and State Laws

39. Implementation of the subproject will be governed by the national and State of West Bengal environmental acts, rules, regulations, and standards. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/ local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

40. **Environmental Assessment.** The Government of India EIA Notification of 2006) sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance (EC) 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.

41. None of the components of this sewerage and drainage system subproject falls under the ambit of the EIA Notification 2006, and therefore EIA Study or environmental clearance (EC) is not required for the subproject.

42. **Other 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 4.

⁷<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

⁸<https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>

Table 4: Applicable Environmental Regulations for Sewerage and Drainage Subproject

Law	Description	Requirement
Environmental Impact Assessment (EIA) Notification, 2006	Environmental Clearance is required for activities/projects notified in the schedule, and this must be obtained before any construction work or land preparation (except land acquisition) may commence.	Not applicable. Components of this sub projects are not listed in the schedule
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	Control of water pollution is achieved through administering conditions imposed in consent issued under the Act. These conditions regulate the quality and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the Project having the potential to generate sewage or trade effluent will come under the purview of this Act, its rules and amendments. Such projects shall obtain consent to establish (CTE) under Section 25 of the Act from West Bengal Pollution Control Board (WBPCB) before starting implementation and consent to operate (CTO) before commissioning. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies.	Development of S&D network will not require CTE and CTO from WBPCB Implement measures to mitigate water pollution from project activities; construction facilities may require CTE and CTO based on type of facilities to be established by the contractor
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	The subprojects having potential to emit air pollutants into the atmosphere have to obtain CTE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from WBPCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.	Development of S&D network will not require CTE and CTO from WBPCB Implement measures to mitigate air pollution from project activities; construction facilities may require CTE and CTO based on type of facilities to be established by the contractor.
Environment (Protection) Act, 1986 and Central Pollution Control Board (CPCB) Environmental Standards.	An umbrella act for environmental protection in India. Various rules, notifications and standards established under the Act. Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards notified.	Table 8 provides applicable standards for ambient air, air emission, effluents, receiving water bodies, and drinking water at the consumer end. Contractors to comply with emissions and discharge standards
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Table 9 provides applicable noise standards. Contractors to ensure all noise-producing activities during civil works conform to standards
Solid Waste Management Rules 2016	Rules for management of municipal solid waste. Responsibility of solid waste generator include waste segregation, and no throwing, burning or bury the solid waste generated on streets, open public	Contractor to follow all the rules in managing solid waste during construction works

Law	Description	Requirement
	spaces outside the premises or in the drain or water bodies, storage and disposal as per the rules	
Construction and Demolition Management Rule 2016 of MOEF & CC (26 March 2016)	Applies to everyone who generates construction and demolition waste. Every waste generator shall segregate construction and demolition waste and deposit at collection center or handover it to the authorized processing facilities. Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains.	Contractor to follow all the rules in managing construction debris and waste (soil, road debris etc.) during construction works
Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	According to the Rules, hazardous wastes are wastes having constituents specified in Schedule II of the Rules if their concentration is equal to or more than the limit indicated in the said schedule.	Contractor to comply all the requirements of this Act, if there are any hazardous waste generated, handled or managed during construction and operation works. However, it is unlikely that it will involve any hazardous waste.
Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended	As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the Central Government.	No notified forest land within the subproject area.
Wetlands (Conservation and Management) Rules, 2010 and 2017	The Rules specify activities which are harmful and prohibited in the wetlands such as industrialization, construction, dumping of untreated waste and effluents, and reclamation. The Central Government may permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	The subproject area is not within the East Kolkata Wetlands thus no permission from the Central Government is required.
Ancient Monuments and Archaeological Sites and Remains Act, 1958 The Ancient Monument and Archaeological Sites and Remains (Amendment and Validation) Act 2010	Act for the preservation of ancient and historical monuments and archaeological sites and remains of national importance. It regulates archaeological excavations and for the protection of sculptures, carvings and other like objects. Any construction activities in the protected monument and within 300 m around is subjected to prior permission of National Monument Authority	There are no protected properties in the subproject area. However, in case of chance finds, the contractors will be required to follow a protocol as defined in the Environmental Management Plan (EMP).
West Bengal Trees (Protection and Conservation in Non-Forest Areas) Act, 2006	Any felling / cutting of tree requires permission from the Divisional Forest Officer (Utilization Division), Forest Directorate, Government of West Bengal. Act specifies provisions for trees/species looked upon as sacred groves, identifies as belonging to an endangered species, or given the status of heritage	Not applicable, subproject requires no tree cutting
East Kolkata Wetlands (Conservation and Management) Act, 2006	In August 2002, 12,500 hectares (ha) of the East Kolkata Wetland (EKW) area was included in the 'Ramsar List'. This act is enacted for conservation and	The subproject is not within the East Kolkata Wetlands thus no permission from the EKWMA is required.

Law	Description	Requirement
and the Rules issued under the Act	management of EKW. The East Kolkata Wetlands Management Authority (EKWMA) established under the Act, has the power to enforce land use control in the substantially water body-oriented areas and other areas in the EKW. Any change in land use or construction activities are permitted by EKWA if it may not adversely affect the ecology or environment of the EKW, or may not adversely affect the livelihood or socioeconomic conditions of the people in the area; or is not against the principles of Ramsar Convention	Intervening area is highly residential urbanized area.
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, December 10, 2009) Circular No - EN/3170/ T- IV-7/ 001/ 2009.	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 also suggested some guideline to minimize such impacts	Contractor will follow the guideline and KMC will ensure implementation of the guidelines.
National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	NIOSH has laid down criteria for a recommended standard: occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed.	Table 9 provides applicable NIOSH occupational noise standards. Contractors are required to provide hearing-protection equipment and ensure exposures of workers to noise-generating activities are within allowed NIOSH standards.
The Child Labour (Prohibition and Regulation) Amendment Act, 2016	No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act's Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule. Child can help his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations	No children between the age of 14 to 18 years will be engaged in hazardous working conditions.
Workmen Compensation Act, 1923	Provides for compensation in case of injury by accident arising out of and during the course of employment.	Compensation for workers in case of injury by accident
The Building and Other Construction Workers (BOCW) Act 1996	Labour Department, GoWB has adopted proactive approach and initiated necessary steps to implement the provisions of the BOCW Act for the welfare of construction workers	Contractors are required to follow all the provisions of the Act with respect to construction workers.

Law	Description	Requirement
Contract Labour (Regulation and Abolition) Act, 1970.	Provides for 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.	Contractor to comply with the provisions of the Act
The inter-state migrant workmen (regulation of Employment and Conditions of service) act, 1979.	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.,	Contractor to comply with the provisions of the Act if interstate migrant workers are engaged for the work
Payment of Wages Act, 1936 Minimum Wages Act, 1948	Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of buildings, roads and runways are scheduled employment.	Contractor to comply with the provisions of the Act All construction workers should be paid not less than the prescribed minimum wage
Equal Remuneration Act, 1979	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.	Contractor to comply with the provisions of the Act Equal wages for work of equal nature to male and female workers

International Conventions

Convention	Relevance
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), 1971	Project site is about a km away from East Kolkata Wetlands, a Ramsar site. No components are in wetland area that spread over 125 sq. km. Project will implement measures to avoid interference in the wetland area.
Convention on Migratory Species of Wild Animals, 1979 (Bonn convention)	No direct relevance, project will ensure no impacts on migratory species, if any
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	No direct relevance; project will ensure no impacts on endangered species, if any
Basel Convention on Trans-Boundary Movement of Hazardous Wastes, 1989	Hazardous waste if any from the construction will manage as per the provisions of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016. No transboundary movement envisaged.
ILO Core Labour Standards	Project will ensure compliance with core labour standards

43. Clearances / permissions to be obtained prior to start of construction. Table 5 below shows the list of clearances/permissions required for project construction. This list is indicative, and the contractor should ascertain the requirements prior to start of the construction and obtain all necessary clearances/permission prior to start of construction.

Table 5: Clearances and Permissions required for Construction Activities

S. No	Construction Activity	Statute under which Clearance is Required	Implementation	Supervision
1	Hot mix plants, Crushers and Batching plants	Consent to establish and consent to operate under Air Act, 1981 from WBPCB	Construction Contractor	PMU/PMDSC
2	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules, 2016; Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from WBPPCB	Construction Contractor	PMU/PMDSC
3	Material Sourcing- Approval for sourcing stones and sand from quarries and sand mining and borrow areas	Permission from District Collector/ State Department of Mining	Construction Contractor	PMU/PMDSC
4	Temporary traffic diversion measures	Kolkata traffic police along with district traffic police	Construction Contractor	PMU/PMDSC
5	Road cutting for Sewer laying works	KMC/ PWD/ KMDA	PMU	PMU/PMDSC
6	Discharge of storm water and construction of outfall structures on D-D1 and TP canals	Irrigation & Waterways Department	PMU	PMU/PMDSC
7	Construction Waste and Demolition Debris Management	Approval from KMC if disposal site is required as per Construction and Demolition Waste Management Rules 2016	Construction Contractor	PMU/PMDSC
8	Labour License	Labour Commissioner, Government of West Bengal	Construction Contractor	PMU/PMDSC
9	Use of Vehicles and Equipment- noise, emissions and Pollution Under Control (PUC) Certificate	WBPCB under Motor Vehicle Rules, 1989	Construction Contractor	PMU/PMDSC
10	Land NOC for new Pumping Station	Interdepartmental transfer from KMDA	PMU	PMU/PMDSC

IV. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

A. Subproject Area of Influence

44. The right-of-way (ROW) for roads includes the width of the roads plus footpaths on both sides of wider roads, with the width varying by location. On main roads, the ROW ranges from 7m to 10m, while in residential areas, it narrows to between 5m and 6m. Considering the boundary of alignments and non-linear components like pumping stations, the area of influence for potential environmental impacts extends up to 70m for the direct impact zone and between 50m to 100m for the indirect impact zone. Direct environmental impacts for the subproject encompass effects on ambient air quality from dust and emissions, noise and vibration from work areas, and disruptions to traffic and pedestrian access in the immediate vicinity. The indirect impacts of pipelaying works can extend beyond 100m, particularly affecting traffic conditions over a broader area depending on the work location.

45. The direct impact area for the subproject encompasses the site of the pumping station and the surrounding areas within 70 to 100 meters from its boundary. Located within the Kasba Industrial Estate, this area is likely to experience disturbances from construction activities, vehicular movements, potential access issues, and road re-routing. Figure 12 illustrates this direct impact area around the pumping station.

B. Physical Resources

46. **Location, Area and Connectivity.** The sub project covers part of ward 108 an administrative division of KMC in Borough XII. This area was incorporated under KMC in 1984 under Calcutta Municipal Corporation Act, 1980. Total catchment area covered under this subproject is 67 ha. The sub project area is bounded on the west by the EM Bypass, on the north by Lead Channel D – D1, on the east side by TP main canal and Anandapur High Road and the southern boundary is marked by lead channel C1-C2. The sub project area is connected with adjacent localities through Anandapur main road, Anandapur High road (430m) and E.M.Bypass (600m). Nearest railway station is Howrah railway Station (10 km) and nearest airport, Netaji Subhas Chandra Bose International Airport is at a distance of 15 km.

47. **Topography:** General topography is flat having slope towards north to south and from west to east. The elevation ranges from 1.9 to 3.5 m above the mean sea level (msl). Low lying areas are predominant within the subproject areas that regularly experience water logging during monsoon even with moderate rainfall.

48. **Drainage:** Based on the topography and river and canal system in the region, the city of Kolkata is divided into two major drainage systems – the Hooghly system and the Kulti System. The primary surface water resource in Kolkata is the Hooghly River. It forms the western boundary of the KMC area. However, the natural gradient of the city is such that storm runoff from only a small portion of the city gets discharged to the river Hooghly directly. Besides this, Bidyadhari and Kultigong rivers meander along the eastern boundaries of KMC areas and discharge directly into the Bay of Bengal. These rivers, along with an elaborate network of canal systems are the recipients of entire drainage water generated from KMC and its adjacent areas. The KMC area, with its generally flat terrain condition, receives more than 1,582 mm of rainfall yearly mainly spread over a 4 months period and comprised of mainly medium density – high frequency long duration storms. Due to the absence of an efficient drainage system to cater such an adverse condition, large areas of KMC suffer from prolonged inundation during monsoon causing severe health and economic hazards to the inhabitants.

49. Based on the existing topography and outfall system, the entire KMC area comprising all 16 boroughs was re-delineated into nine (9) major drainage basins namely Kolkata basin, Manicktala basin, Tolly's Nullah basin, Topsia - Tangra basin, Hooghly basin, Tollygunge - Panchannagram (TP) basin, Bagjola basin, Monikhali basin and Churial basin. The sub-project area comprising ward 108 under Boroughs XII comes under Tollygunge-Panchannagram Basin (T P Basin) system. The major drainage channels flowing through the sub-project area are Lead channel D-D1 from the north, Tollygunge - Panchannagram Main canal (TP canal) from the east and Lead Channel C1-C2 from the south side. Both D-D1 channel and C1-C2 channel meet with TP canal.

50. **Geology and Soil:** Kolkata city, which is a part of the South Bengal Basin, is characterized by extremely flat topography. The subsurface lithological assemblages of the upper few hundred meters comprise a buried late Pleistocene landscape of palaeo-channels and palaeo-interfluvies overlain by Holocene channel/flood plain deposits. The topographic elevation

ranges between 3 and 8 m above mean sea level (msl). The area has a fluvio-deltaic depositional environment. The peat layers in the upper horizons were deposited as result of boggy and marshy conditions at the end of the sedimentation process. The irregular nature of the subsurface lithology is characterized by the filled up palaeo-channels and a natural levee on both sides of the River Hugli. The KMC area is located within lower deltaic alluvial plain of the Ganges River system and is underlain by Quaternary sediments consisting of clay, silt, and various grades of sand, gravel, and pebbles deposited in deltaic environment by Ganga-Bhagirathi River system. Regional subsoil data covering a large area in subproject area reveal six levels of strata up to a depth of about 50 m below ground level. Near surface general stratigraphy of the project area is given:

Table 6: Near Surface Stratigraphy of the Project Area

Horizon I	Stratum I	Brownish grey/ light brown, silty clay/ clayey silt/ sandy silt with occasional lenses of silty fine sand; encountered from the top ground surface to a depth of about 3 to 4 m; occasionally only fill material of widely varying characteristics (about 4 m).
	Stratum II	Grey/ dark grey silty clay with semi-decomposed timber pieces, having lenses of silt and peaty clay; encountered between depths 3-4m and approximately 15m below ground level (about 10m).
Horizon II	Stratum III	Bluish grey and mottled brown/ grey, silty clay with kankar nodules and minute pockets of silt and sand (about 5.5m).
	Stratum IV	Brown/ yellowish brown, sandy silt/ silty fine sand/ clayey silt with lenses and pockets of brown/ grey silty clay (about 6m).
	Stratum V	Mottled brown/ grey, grey silty clay and brown silty clay frequently showing laminar character (about 18m).
	Stratum VI	Brown/ light brown, silty fine to medium sand (9m +).

51. On the basis of soil types, the Kolkata area may be divided into two groups viz. Entisols and Alfisols. The Entisols are present at the western part of the area and the other part is represented by Alfisols. These soils are typically deltaic alluvial soils. The agro-climatic zone characterization of the area is Gangetic alluvium group of soils rich in calcium. Free calcium carbonate occurs in surface soils and the soil profile shows low to medium levels of organic matter and medium levels of available phosphate and potash. Kolkata and the neighbouring areas are represented predominantly by clayey soils. Gangetic alluvium type of soils is mainly found in the project area. The soil is fertile in nature. Table 7 shows the physical and chemical characteristics of soil sampled and analyzed from the two selected locations of Ward no 108. The soil is predominantly silty in nature (53 to 58% silt content). The pH ranges from 6.5 to 7.5 at 25°C. The soil has cohesive characteristic and low permeability with specific gravity of 2.65.

Table 7: Soil Quality

Sr. No	Soil Sample Location	pH at 25 °C	Temp (°C)	Available Sulphate SO ₃ (ppm)	Natural Moisture Content (%)	Sand	Silt	Clay	Specific Gravity
1	Hossainpur Borehole No.1	7.5	33.4	54.878	26.4	33.37	58.12	11.33	2.65
2	Hossainpur Borehole No.2	6.5	33.4	ND	26.4	32.44	53.44	21.16	2.65

*ND=Not Detected

52. **Seismology:** Geologically Kolkata falls within Moderate Earthquake Damage Risk Zone (Zone-III) within very close vicinity of High Earthquake Damage Risk Zone (Zone-IV) of North and South 24 Parganas districts (District Survey Report_2018)

53. **Climate:** The climate of Kolkata is predominantly tropical wet and dry type and is highly influenced by the Bay of Bengal. There are three seasons' namely - Summer, Monsoon and Winter. The climate is hot and humid from March to October. It is somewhat cool from November to February. Rains are received principally from June to September with frequent pre monsoon showers and nor 'westers during April and May. The winter season begins in November and continues to February, followed by the summer season which continues until mid-June. The monsoon starts in mid-June and goes up to mid-September, sometimes extending up to October.

54. April and May are the hottest months with monthly mean maximum temperature above 35 degrees Celsius (°C). Mean maximum temperature is above 30°C from March to October. Relatively low monthly mean minimum temperatures occur during December (15.2°C), January (14.1°C) and February (18.1°C). The mean monthly minimum temperature is relatively high and is between 26°C and 27°C during the months of May, June, July and August. The average annual rainfall is about 1919 mm with the four monsoon months (June to September). Rainfall peaks in July with approximately 157 mm of precipitation, while January and December received the lowest rainfall, approximately 5 mm (refer: District Environment plan, 2023). Average number of rainy days is about 146 days per annum. During monsoon months it is not uncommon to receive 75 mm to 100 mm of rainfall in a 24-hour period. Such heavy rainfall may occur from 4 to 10 times in a year.

55. Kolkata experiences an average relative humidity (RH) of approximately 77%, with variations throughout the year. The humidity typically ranges from around 66% in March (Summer) to 88% in July (Monsoon). July stands out as the most humid month, with a range of 69.5% to 96.4%. Conversely, March is the least humid month, with humidity fluctuating between 22.9% and 96.2%. The wind is light to gentle with maximum monthly average speed 7.22 kilometer per hour (km/h). The post-monsoon and winter months (October-February) experience very light wind. The average monthly wind speed during pre-monsoon and monsoon are 6.10 and 5.03 km/h, respectively. The mean annual wind speed is 4.28 km/h. The prevalent wind direction was from southwest during most of the time in the year, except during winter when the northerly wind became significant. However, during cyclonic storms and depressions, especially those occurring in September to October, high wind speed is not uncommon.

56. **Air Quality.** The concentrations of air pollutants in Kolkata are highly variable over the seasons. They are at their highest during winter months (November to February) and at their lowest during monsoon months (June to September). Seasonal variations in temperature, wind direction, rainfall, and other factors account for this. There are no ambient air quality monitoring stations in the subproject area, air quality is not monitored by West Bengal Pollution Control Board (WBPCB). The following table 8 presents ambient air quality measured at Mukundapur pumping station PS during the implementation of sewer works in ward 109, borough XII under KEIIP (Tranche 3) for the period of April 2022 to April, 2023. Mukundapur PS is located about 2.27 km away from the proposed Anandapur PS site. When compared with National ambient air quality standards (NAAQS,2009), the air quality monitoring results (24-hours monitoring) are found within the permissible limit. The concentration of all parameters is above the standard when compared with IFC-WB EHS Guidelines 2007 (the WHO Global Update 2021) prescribed standard.

Table 8: Ambient Air Quality Data at Borough XII

Monitoring location	Monitoring stage	Date of monitoring	Parameters, µg/m ³ (24-hours)			
			PM ₁₀	PM _{2.5}	SO ₂	NO ₂
Nitai Nagar Road, Mukundapur (ward 109)	Construction Stage of KEIP	30.04.2022	86	45	8.4	29.2
Mukundapur pump house (ward 109)	Construction stage of KEIP	02.11.2022	92	48	9.1	31.0
Mukundapur pump house (ward 109)	Construction Stage of KEIP	18.04.2023	89	50	7.7	32.8
NAAQS standard (2009), (24-hr) - µg/m ³			100	60	80	80
IFC-WB EHS Guidelines 2007 (the WHO Global Update 2021) (24-hr) (µg/m ³)			15	45	4	25

Source: Air Quality Monitoring report of Package SD 32, KEIP Tranche 3

57. **Noise.** Noise level in KMC area is high and often exceeds the national standards. Average noise level in typical residential areas away from the busy streets are high during daytime. Noise levels near busy roads is relatively high but variable. High noise level depending on the density of vehicle moving on the roads at the time of measurements. Noise level was measured during the construction of Mukundapur PS and laying of sewer line at ward 109, borough XII under KEIP, Tranche 3 project for the period of April 2022 to April 2023.

58. The results are shown below in Table 9 and noise level standards for different sources are provided in Table 10 for India National Noise Level Standards and WHO Standards. Noise level monitoring results indicates that both day time and night time noise levels (Table 9) meet the permissible limits only at Nitainagar main road sampling location as per standards for residential areas for Indian and WHO standards (Table 10). In other locations it is above the prescribed standards.

Table 9: Noise Level data at Borough XII

Sampling Locations- Area	Implementation Stage	Date of Monitoring	Day Time Leq dB(A)	Night Time Leq dB(A)
Nitai Nagar main road, Mukundapur	Construction Stage of KEIP	30.04.2022	54.3	45.5
Mukundapur Pump house	Construction stage of KEIP	02.11.2022	62.0	46.4
Mukundapur Pump house	Construction stage of KEIP	18.04.2023	61.7	50.4

Source: Noise monitoring report, Package SD 32, KEIP Tranche 3.

Table 10: Reference Noise level

Receptor/ Source	India National Noise Level Standards (dBA) ^a		WHO Guidelines Value for Noise Levels Measured Out of Doors (One Hour Leq in dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00
Industrial area	75	70	70	70
Commercial	65	55	70	70

Receptor/ Source	India National Noise Level Standards (dBA) ^a		WHO Guidelines Value for Noise Levels Measured Out of Doors (One Hour Leq in dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00
area				
Residential Area	55	45	55	45
Silent Zone	50	40	55	45

^a Noise Pollution (Regulation and Control) Rules, 2002 as amended up to 2010.

^b Guidelines for Community Noise. WHO. 1990

59. Baseline air quality monitoring and noise level monitoring shall be conducted during pre-construction phase by the contractor, and these are accordingly included in the contractor's contract.

60. **Surface water.** Drainage system in and around Kolkata area mostly gravitated eastwards to Kulti River of Matla estuary system about 45 km downstream of Kolkata which ultimately meets with River Bidyadhari further at a distance of about 70 km. Department of Irrigation & Waterways manages the main drainage channels in EKW area namely dry weather flow (DWF), storm weather flow (SWF) and Fishery Feeding Canal (FFC). Fisheries get sewage from the intrinsic network of canals originating through these (DWF and FFC) channels. The maximum quantum of sewage generated from the KMC area flows into EKW where it is treated and utilized for fish and agricultural farming. Sewage generated from the study areas in Borough XII through Tollygunge – Panchannagram Basin is discharged through DWF system passing through East Kolkata Wetlands (EKW) to the Kulti River. The sewage receives partial treatment as it passes through the EKW, an extensive fishery occupying 12500 Ha of land to the east of the city. At present, 900 MLD sewage is treated naturally by EKW. However, given the fact that the Tollygunge – Panchannagram Basin and Topsia – Tangria Basin discharge directly into the SWF channel, which is then bypassed into the Kulti River, about 78% of the DWF emanating from the Kolkata city and its sub-urban areas is drained into the wetlands, and is available for nutrient recycling.

61. SWF generating from the sub-project area discharges into T.P basin via different canal networks for disposing into S.W.F system passing through EKW and gravitated towards Kulti river traversing through EKW area. The storm water flow is not perennial in nature. It is yielded only during the monsoon season, and the severity depends and varies with the intensity of storm water flow.

62. Due to inadequate S&D networks water logging phenomenon are common at RR Plot, along Anandapur main road, Anandapur East Kolkata Township (EKTP), Kasba Industrial Park area and in front of CISF Headquarter after any event of moderate to high intensity rainfall occurrence (Figure 7). A part of storm runoff generated from these areas is proposed to be disposed of to different canals (D-D1 and T.P canal) flowing along the boundary of the project area at various locations by six nos. gravity outfalls with sluice gates arrangement. Four outfalls on D-D1 Lead Channel connecting to T.P canal and two outfalls in T.P Main Canal under TP Basin are proposed. There is only one fishery pond (bheri) found beside D-D1 Channel. There is earthen embankment between the storm water canal and the bheri. The drain has enough width to carry SWF discharged from 1000 dia pipe. The carrying capacity of the channel is 3.8 m³/s while the maximum velocity of the flow through outfall structure is estimated as 0.9 m³/s. Thereby chance of overflow of water is practically nil. Moreover, sewer feed fish culture is a common practice prevalent in these areas. Therefore, no impact is anticipated.

63. No site-specific surface water quality data is available. Therefore, surface water quality monitoring shall be conducted for D-D1 Lead channel and TP canal during pre-construction phase by the contractor. The Irrigation Department oversees the maintenance of canals, including regular dredging to ensure a free flow of water. To evaluate the canals' carrying capacity for the KSHARP, a joint survey with the Irrigation Department and KMC is currently underway. The results from this survey will be incorporated into the updated Initial Environmental Examination (IEE).

64. **Groundwater.** The aquifers that are tapped for ground water in Kolkata are under confined condition because of the presence of a thick clay layer near the surface. Such aquifers occur at various depths separated by other clay layers. Generally, the first aquifer is encountered at a depth of about 15 m followed by other aquifers with a principal one at about 90 m depth. The shallow aquifer is not used for bulk water tapping purposes and is generally only tapped for spot supply of through hand pumps. A further deep aquifer occurs at depths approximately between 150 and 200 m, and majority of deep tube wells tap this aquifer. The confined aquifers in this area are classified into two groups, spanning from the northern to the southern extremities. The upper group, located at depths between 20 meters and 160 meters, is characterized by a notable sandy gravel layer at its base, functioning as a distinctive marker bed. 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. Groundwater level varies between 1.70 m below ground level (bgl) and 6.00 m bgl during pre-monsoon period and from 0.50 m to 5.80 m bgl 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/h, with drawdown ranging from 2.3m to 16.5m (CGWB Report on North and South 24 Parganas and Howrah districts, West Bengal, 2021)

65. In the Eastern part of the city where the sub-project area is located, the groundwater in shallow zones occurs under unconfined conditions. Here shallow aquifers occur within 12 meter below ground level as thin lenses and groundwater occurs under unconfined condition. The groundwater in these areas including adjoining EKW region is available from an average depth from the surface at 4-8 m in pre monsoon, 1-9 m in the monsoon and 1-10 m in the post monsoon periods. Due to the shallow levels of groundwater, an alluvial media and a hydraulic conductivity, fluctuations between the groundwater levels at shallow ranges are highly variable.

66. Ground water in KMC area occurs under two principal types, viz. Bicarbonate type and Chloride type. Ground Water in the area west of a line connecting BBD Bag, Park Street and Jadavpur is of bicarbonate type whereas in the area east of this line (where current project is proposed) ground water is of chloride type. The two anionic types were further subdivided each into two types on the basis of predominance of cation concentration. These are (i) calcium–magnesium bicarbonate, (ii) sodium bicarbonate; (iii) calcium–magnesium chloride; and (iv) sodium chloride. Detailed study of baseline groundwater quality monitoring shall be conducted during pre-construction phase (service Improvement Period) by the contractor and results will be appended in the updated in IEE.

C. Ecological Resources

67. **Flora.** In KMC area, except a small part falling under East Kolkata Wetland, located in the eastern fringes, naturally found vegetation is scarce. The sub-project area is highly urbanized area, therefore natural vegetation is only found in few comparatively undisturbed patches such as along Canal Banks Road. Roadside plantation orchards within the residential area offer more varied vegetation. There is no forest area within or close to subproject area. Few commonly found tree species are given below:

Table 11: Tree Species available within Subproject Area

Sr.no	Name	Scientific Name	IUCN Status
1	Coconut	(<i>Cocos nucifera</i>)	Not Evaluated
2	Mango	(<i>Mangifera indica</i>)	Data Deficient
3	Gulmohar	(<i>delonix regia</i>)	Least Concern
4	Jarul	(<i>Lagerstroemia speciosa</i>)	Not evaluated
5	Sajina	(<i>Moringa oleifera</i>)	Least Concern
6	Kadam	(<i>Neolamarckia cadamba</i>)	Not Evaluated
7	Neem	(<i>Azadirachta indica</i>)	Least Concern

68. **Fauna.** The sub-project site is highly residential and urbanized area; therefore, no protected category faunal species are found in this area. Few commonly found species are:

Table 12: Fauna available within Sub-project Area

Sr.no	Name	Scientific Name	IUCN Status
1	Small Indian civet cat	(<i>Viverricula indica</i>)	Least Concern
2	Mongoose	(<i>Herpestes edwardsii</i>)	Least Concern
3	House rat	(<i>rattus rattus</i>)	Least Concern
4	Mice	(<i>mus musculus</i>)	Least Concern
Reptiles			
5	Garden lizards	(<i>Calotes versicolor</i>)	Least Concern
6	Snakes	(<i>Natrix sp., Viper sp.</i>)	Least Concern
7	Kraits	(<i>Bungarus caeruleus</i>)	Least Concern
Birds			
8	House crows	(<i>Acridotheres tristis</i>)	Least Concern
9	House sparrows	(<i>Paser domesticus</i>)	Least Concern
10	Pigeons	(<i>Coluamba livia</i>)	Least Concern
Amphibians			
11	Indian bullfrogs	(<i>Rana tigrina</i>)	Least Concern
Arthropods			
12	Butterflies(plain tiger)	(<i>Danaus chrysippus</i>)	Least Concern
13	Ants	(<i>Tapinoma sessile</i>)	Not Evaluated

69. **Aquatic Flora and Fauna.** Anchored, free floating and submerged hydrophytes like Kachuri pana (*Eichhornia crassipes*), Azolla (*Azolla pinnata*), Sagittaria (*Sagittaria sp.*), Hogla (*Typha angustifolia*) etc can be seen in open water bodies around the project area. Such water bodies often contain fishes such as Rohu (*Labeo rohita*), Catla (*Catla catla*), and Bata (*Labeo bata*). Phytoplankton like *Spirogyra sp.*, *Zygnema sp.*, *Navicula sp.*, *Nostoc sp.*, *Hydrodistyom sp.*, etc. and zooplankton like *Cyclops sp.*, *Paramecium sp.*, *Euglena sp.*, *Diaptomus sp.*, larvae of *Culex sp.* etc. are ubiquitous. There is only one fishery pond in the project area. No endangered species of aquatic flora or fauna reported from project area.

70. **Phytoplankton and Zooplankton species found in canals of Kolkata and EKW area:** Several phytoplankton species are present in main sewage canals of city of Kolkata including T P canal and passing through the East Kolkata Wetland. Out of all species *Microcystis sp.* and *Oscillatoria sp.* are showing their dominance. Other class of phytoplankton species are – *Bacillariophyceae*, *Chlorophyceae*, *Dinophyceae*, *Euglenophyceae*, *Myxophyceae*, *Rhodophyceae*, *Xanthophyceae* etc. Zooplankton species found are *Rotifera*, *Copepoda* and *Cladocera*.

71. **Protected areas.** As per IBAT screening report (Appendix 4) nearest notified protected area is East Kolkata Wetland (EKW), Ramsar wetland, located 1km from the proposed Anandapur pumping station and 700m from the nearest subproject boundary (Figure 19 and 20) and intervening area is highly residential urbanized area. No work is proposed within EKW area. Sundarban Biosphere Reserve, the UNESCO world heritage site is located within 50 km from the project area. There is no threatened or endangered flora and fauna in the subproject area. The sub-project will pose no risk or impact on biodiversity and natural resources.

72. **East Kolkata wetlands.** The East Kolkata Wetlands (EKW), located on the eastern fringes of Kolkata city, is a part of the extensive inter-distributary wetland regimes formed by the Gangetic delta. The EKW located on the eastern fringes of Kolkata city is and is distributed across the part of three districts covering 37 mouzas/villages (30 full), seven Gram Panchayats and two municipal corporations and is spreads over an area of 12 ,500 ha. It is a mosaic of water bodies, agricultural land and settlement areas largely under private ownership. It has more than 260 water bodies of varying sizes. It supports a resident population of over 120 ,000 and pisciculture and agriculture provide major livelihood avenues to them. Only a small part of KMC area falls within the limits of EKW.

73. The EKW area includes one of the largest assemblages of sewage fed fish ponds. The importance of this wetland lies in the fact that these sustain the world's largest and oldest integrated resource recovery practice based on a combination of agriculture and aquaculture, and provide livelihood support to a large, economically underprivileged sizeable population depends upon various wetland products, primarily fish and vegetables for sustenance. Based on its immense ecological and socio-cultural importance, East Kolkata Wetlands is declared as Wetland of International Importance under Criteria 1 under Ramsar Convention in 2002.⁹ EKW is a classic example of harnessing natural resources of the wetland system for fisheries and agriculture through ingenuity of local communities with their traditional knowledge. The wetland has been included by the Ramsar Convention as one of the 17 case studies on wise use of wetlands at the global level. The wetland provides strong arguments for integration of traditional knowledge of local communities into conservation and management practices.¹⁰ At least 380 species under major flora including 93 plant families, 10 amphibians, 29 reptiles, 123 birds, 79 fish, 24 crustaceans, and 13 mammal species have been recorded from these wetlands. The traditional waste recovery practice provides subsistence opportunities for a large, economically underprivileged population of 0.15 million living in the 37 revenue villages (locally called mouza) within its boundaries. EKW is also one of the few natural habitats providing recreational space for the urban and peri-urban population.

74. Over 260 shallow fish ponds, in the EKW receive over 900 MLD pre-settled sewage from the Kolkata Metropolitan region through a network of locally excavated secondary and tertiary canals, which is used to produce fish, vegetables and irrigate 2850 ha of paddy lands. As the nutrient-rich effluent moves through the system, it is progressively cleaned, and nutrients are redirected to the growth of algae or agricultural products grown along the pond edges and agricultural lands. Algae and other aquatic plants are used to feed up to 17 species of fish cultured in these ponds, which in turn create nitrogen and phosphorus-rich water to irrigate the adjacent rice fields. The traditionally evolved natural water purification waste recovery practice saves much

⁹ The Ramsar Site was designated in 2002 with the name "East Calcutta Wetlands" and remains so in the Ramsar database. In 2001, the Government of West Bengal decided to change the name of its capital city to Kolkata. The Rules governing the wetland is titled ' East Kolkata (Conservation and Management) Rules, 2006' and the Authority as East Kolkata Wetlands Management Authority.

¹⁰ Integrated Management Plan of East Kolkata Wetlands (Management Action Plan 2021 – 2026)

of treatment cost. These wetlands also lock in over 60% of carbon from wastewater, thus reducing harmful Green House Gas emissions from the region.

75. The East Kolkata Wetlands (EKW) is the vital component of the friendly water regime. It provides three basic securities towards (i) the fish ponds ii) paddy field and iii) garbage farms which are critical for the population. But, such securities for the foods, cannot be provided without the input of the sewage water. The basic line input to the EKW system is the sewage laden water, which passes through (DWF) channels, throughout the year, irrespective of the seasons and having with more or less with same flowing capacity.¹¹ It is pertinent to mention that the Dry weather flow is made available throughout the year, whereas the storm water flow is not perennial in nature.

76. **The ecology of the EKW** area has undergone a dramatic change since the beginning of the 19th century due to cessation of tidal (brackish water) influx from Bidyadhari and Matla rivers into the then saline marshy area with brackish water fisheries. The change is not only due to natural causes like siltation but also due to developmental activities and hydrological interventions. The brackish water fisheries of earlier years were converted into sewage fed fisheries bringing in a changed ecosystem and establishing a new biodiversity in the EKW areas. Wastewater undergoes solar purification and natural oxidation, creating an environment suitable for algae and plankton, serving as the primary feed for fish. EKW offers a cost-effective, efficient, and eco-friendly solid waste and sewer treatment system for Kolkata. It serves as a habitat for waterfowl and hosts diverse flora and fauna.

77. There is no forest patch within EKW. There are no endangered species but there are a number of rare mammals, reptiles, fish and bird species. According to the Ramsar information database, there are rare mammals such as Marsh mongoose, small Indian mongoose, Palm civet and small Indian civet included in the schedule II of Indian Wildlife Protection Act, 1972 (Table 13). The representative aquatic flora and fauna of the EKW are listed in Table 13 and Table 14, respectively.

Table 13: Representative List of Mammals from EKW

Taxa	Occurrence	IUCN Status
Order Carnivora		
Family Viverridae		
1. Asian Palm Civet <i>Paradoxurus hermaphrodites</i> (Pallas, 1777)	Rare	LC
Family Herpestidae		
2. Bengal Marsh Mongoose <i>Herpestes palustris</i> Ghose, 1965	Rare	LC
Family Canidae		
3. Asiatic Jackal <i>Canis aureus</i> Linnaeus, 1758	Rare	LC
Order Rodentia		
Family Sciuridae		
4. Northern Palm Squirrel <i>Funambulus pennantii</i> Wroughton, 1905	Common	LC
Family Muridae		
5. Greater Bandicoot Rat <i>Bandicota indica</i> (Bechstein, 1800)	Common	LC
6. Common House Rat <i>Rattus rattus</i> (Linnaeus, 1758)	Common	LC
7. House mouse <i>Mus musculus</i> Linnaeus, 1758	Common	LC
Order Eulipotyphla		
Family Soricidae		
8. Asian House Shrew <i>Suncus murinus</i> (Linnaeus, 1766)	Rare	LC

¹¹ The report of school of Water Resources Engineering, Jadavpur University, Kolkata -700032, prepared for Kolkata Environmental Improvement Project, in 2006.

Taxa	Occurrence	IUCN Status
Order Chiroptera		
Family Pteropodidae		
9. Indian Flying Fox <i>Pteropus giganteus</i> (Brünnich, 1782)	Common	LC
10. Greater Short nosed Fruit Bat <i>Cynopterus sphinx</i> (Vahl, 1797)	Common	LC
11. Lesser Short nosed Fruit Bat <i>Cynopterus brachyotis</i> (Müller, 1838)	Common	LC
12. Leschenault's Rousette <i>Rousettus leschenaultii</i> (Desmarest, 1820)	Common	LC
Family Vespertilionidae		
13. Indian Pipistrelle <i>Pipistrellus coromandra</i> (Gray, 1838)	Common	LC
*NE: Not Evaluated, DD: Data Deficient, LC: Least Concern, NT: Near Threatened, VU: Vulnerable, EN: Endangered, CR: Critically Endangered, EW: Extinct in the Wild, EX:Extinct		

Data Source – Chandra, Raghunathan, and Mao 2020. Biodiversity Profile of East Kolkata Wetlands (https://ekwma.in/ek/new_release/East%20Kolkata%20Wetlands%20Management%20Action%20Plan%202021-2026.pdf)

Table 14A: Representative Aquatic Flora of the EKW

Type of Flora	Species
Free floating forms	Eichhornia sp., Spirodella sp., Pistia sp., Ceratophyllum/Utricularia sp., Axolla sp.,
Fixed anchored forms	Vallisneria sp., Hydrilla sp., Najas sp., Nymphaea sp., Nymphoides sp
Emergent amphibious forms	Marsilea sp., Impomoea sp., Enhydra sp., Colocasia sp.,
Facultative forms	Typha sp., Cyperus sp.,
Algal forms	Synandra sp., Spirogyra sp., Zygnema sp., Nitelea sp.,

Source: Utilization scenario of Kolkata Wetlands (1996) 2. Urban Ecology, Ghosh A.K 1988.; https://ekwma.in/ek/new_release/East%20Kolkata%20Wetlands%20Management%20Action%20Plan%202021-2026.pdf

Table 14B: Representative Fauna of the EKW

Type of Fauna	Species
Water fowl	Phalacrocorax niger, Ardeola gravis; Babulcus ibis; Egretta garzatta
Waders	Tringa hypoleucos; Calidris minuta
Kingfisher	Ceryle rudies; Alcedo atthis; Pelargopsis capensis; Halcyon Smyrnesis
Aquatic reptiles	Lissemys punctata, Enhydra enhydra, xenochrophis piscator
Amphibians	Rana cyanophytis; Rana tigerina, Rana limnocharis, Microphyla ornata; Bufo melanostictus
Fish	Catla catla; Labeo rohita; L.calbasu; L.bata; Cirrhinus mrigala, Hypophthalmich thysmolitrix, Microvertebrates Puntius sarana, P.ticto, Amblypharygodon mola; etc.
Mollusca	Mollusca Bellamyia bengalensis; Pila globosa; Diagnostoma sp., Lymnea sp., Gyrulus sp., Thiara sp., etc.
Annelida	Oligochaeta; Brachyura; Limno drilus sp., Hirudines – Glassophonia sp.,
Insecta	Hemiptera: Anisops sp., Limnogonus sp., Plea sp., Hydrometra sp., Micronecta sp.,

Source: Utilization scenario of Kolkata Wetlands (1996) 2. Urban Ecology, Ghosh A.K 1988.; https://ekwma.in/ek/new_release/East%20Kolkata%20Wetlands%20Management%20Action%20Plan%202021-2026.pdf

78. The EKW faces threats from urbanization, changes in waste quality and quantity, and anthropogenic activities. The East Kolkata Wetlands Management Authority (EKWMA). formed under the East Kolkata Wetlands (Conservation and Management) Act, 2006, is entrusted with the statutory responsibility for conservation and maintenance of the EKW area. The main task of the authority is to maintain the existing land use practices along with its unique wastewater recycling activities. EKWMA prepared Integrated Management Plan of East Kolkata Wetlands

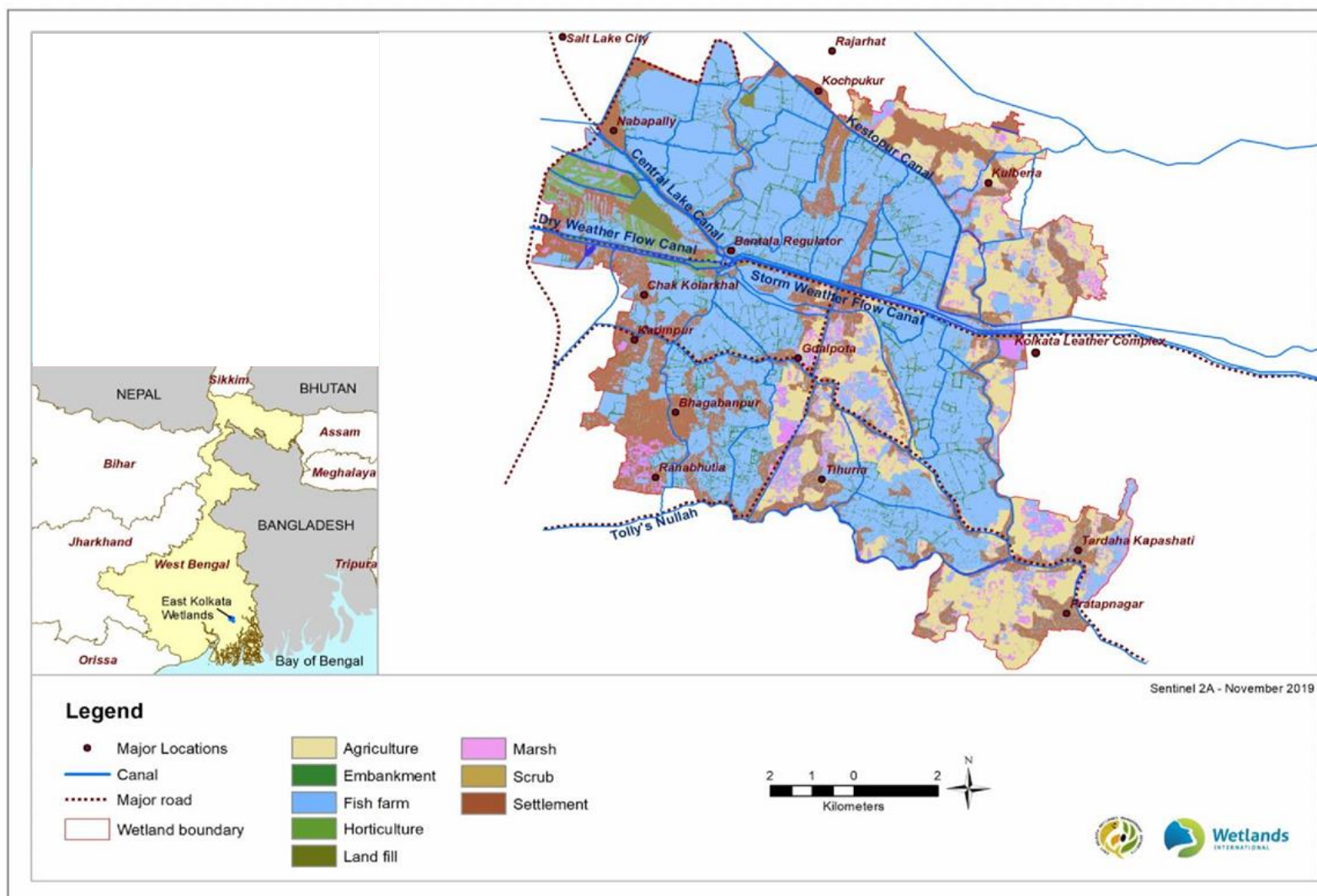
Management Action Plan 2021 – 2026

(https://ekwma.in/ek/new_release/East%20Kolkata%20Wetlands%20Management%20Action%20Plan%202021-2026.pdf)

79. To manage the East Kolkata Wetlands effectively and ensure regulatory compliance, the wetland will be divided into four major zones (Figure 17), while acknowledging their interdependence and the goal of sustainable use. The unique character of the wetlands, dependent on sewage water, will be considered in the zoning plan which will guide management interventions. The zones are:

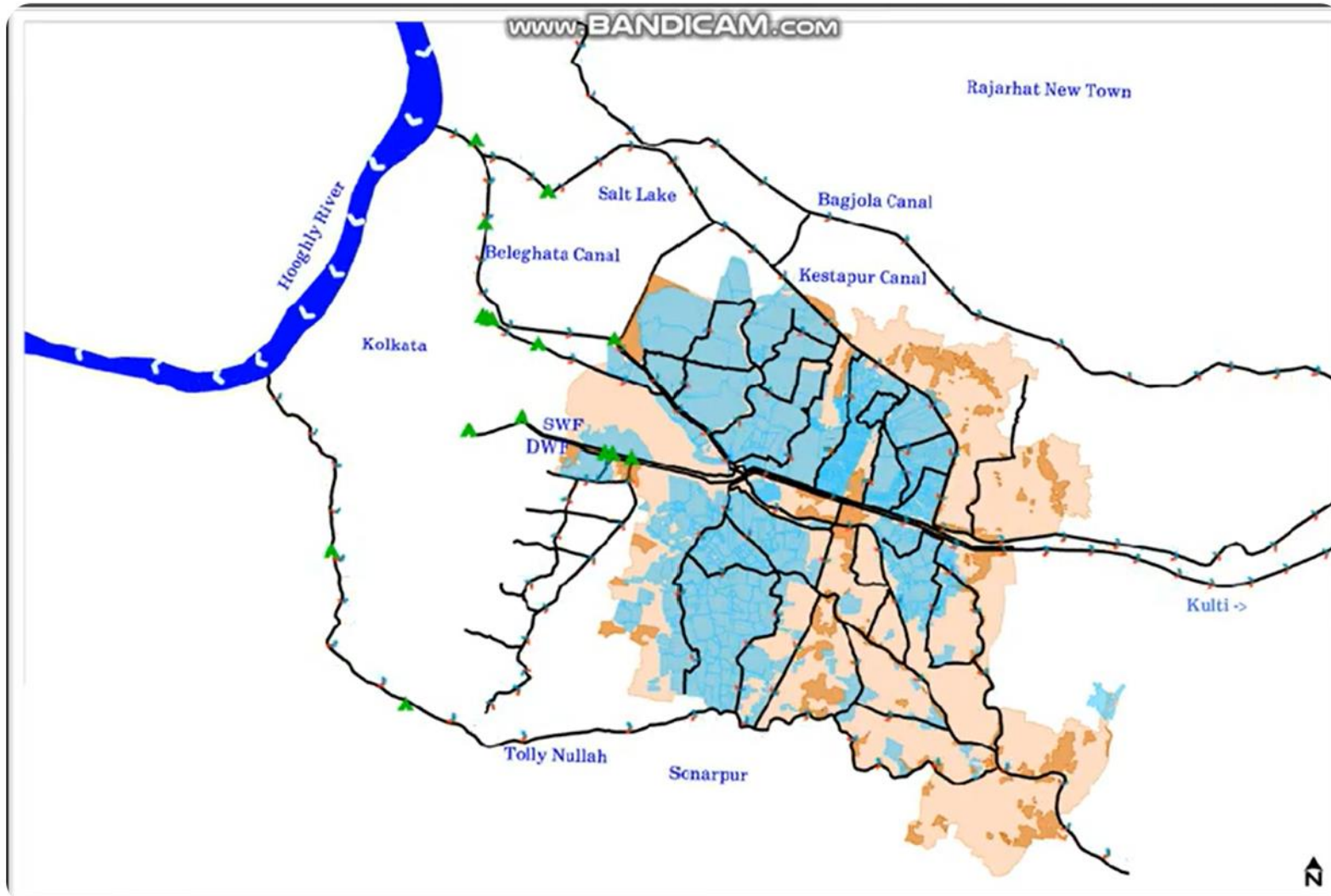
- (i) **Fishery Zone:** Used for fish cultivation with sewage water, also serving to absorb storm water, store flood water, and recharge groundwater.
- (ii) **Agriculture Zone:** Permanently used for rice and crop cultivation, with potential for flood water storage, stormwater infiltration, and attracting waterbirds if farmed organically. Rainwater harvesting will enhance freshwater availability.
- (iii) **Horticulture Zone:** Located in the solid waste dumping area, converted for vegetable cultivation and waste recycling. Recommended practices include composting, biomethanation, material recovery, and sanitary landfilling.
- (iv) **Nature Protection Zone:** High in biodiversity, supporting migratory species and serving as a buffer for species movement. It also has potential for recreation and ecotourism under existing wetland conservation regulations.

Figure 17: East Kolkata Wetland



Source: EKWMA and WISA,2021

Figure 18: Drainage systems in EKW area leading to Kulti River



Source: <https://ekwma.in/ek/>

Figure 19: EKW and Proposed Anandapur subproject area boundary

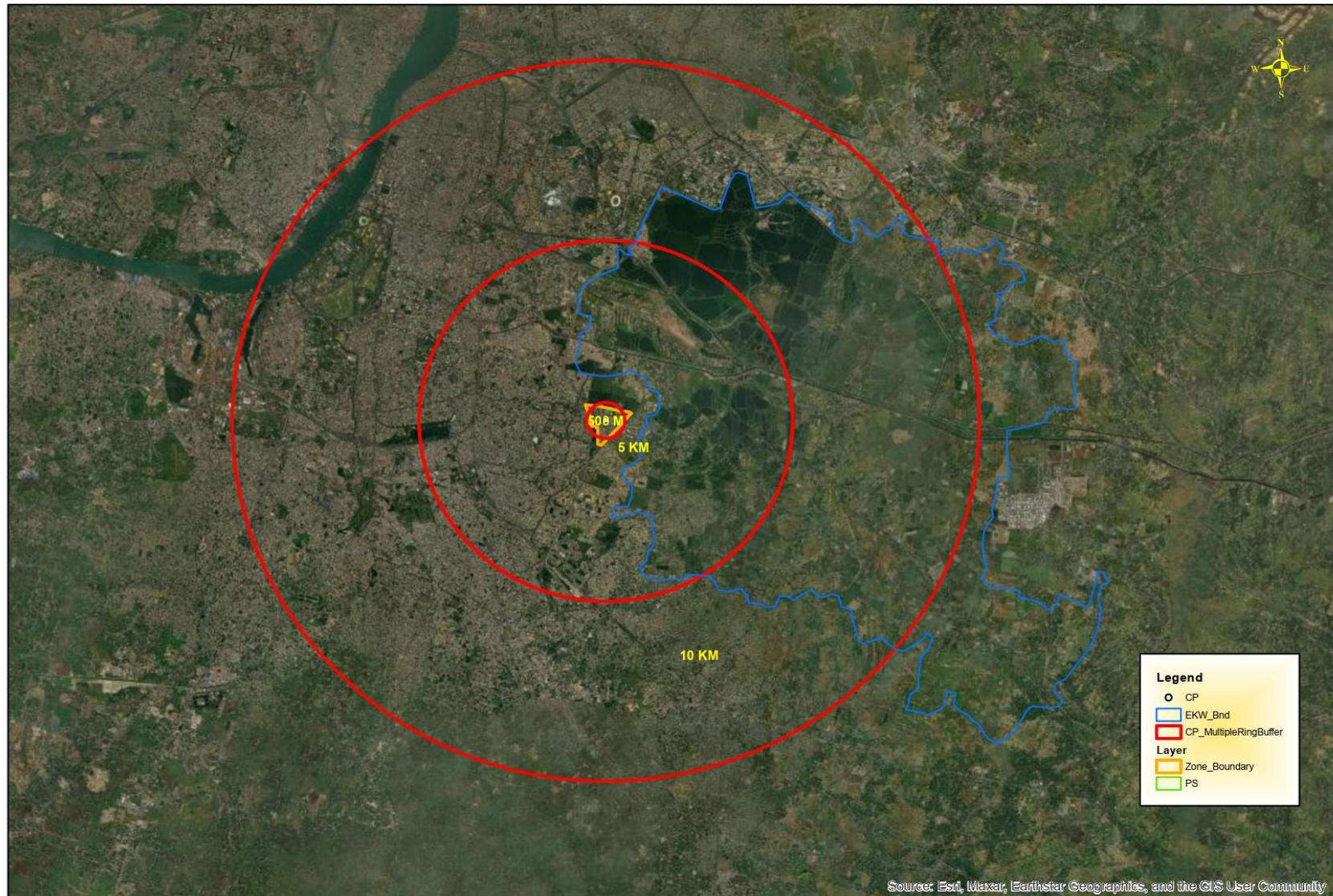


Figure 20: Distance of EKW Boundary from the proposed Pumping Station Site and S&D Pipe laying Alignment

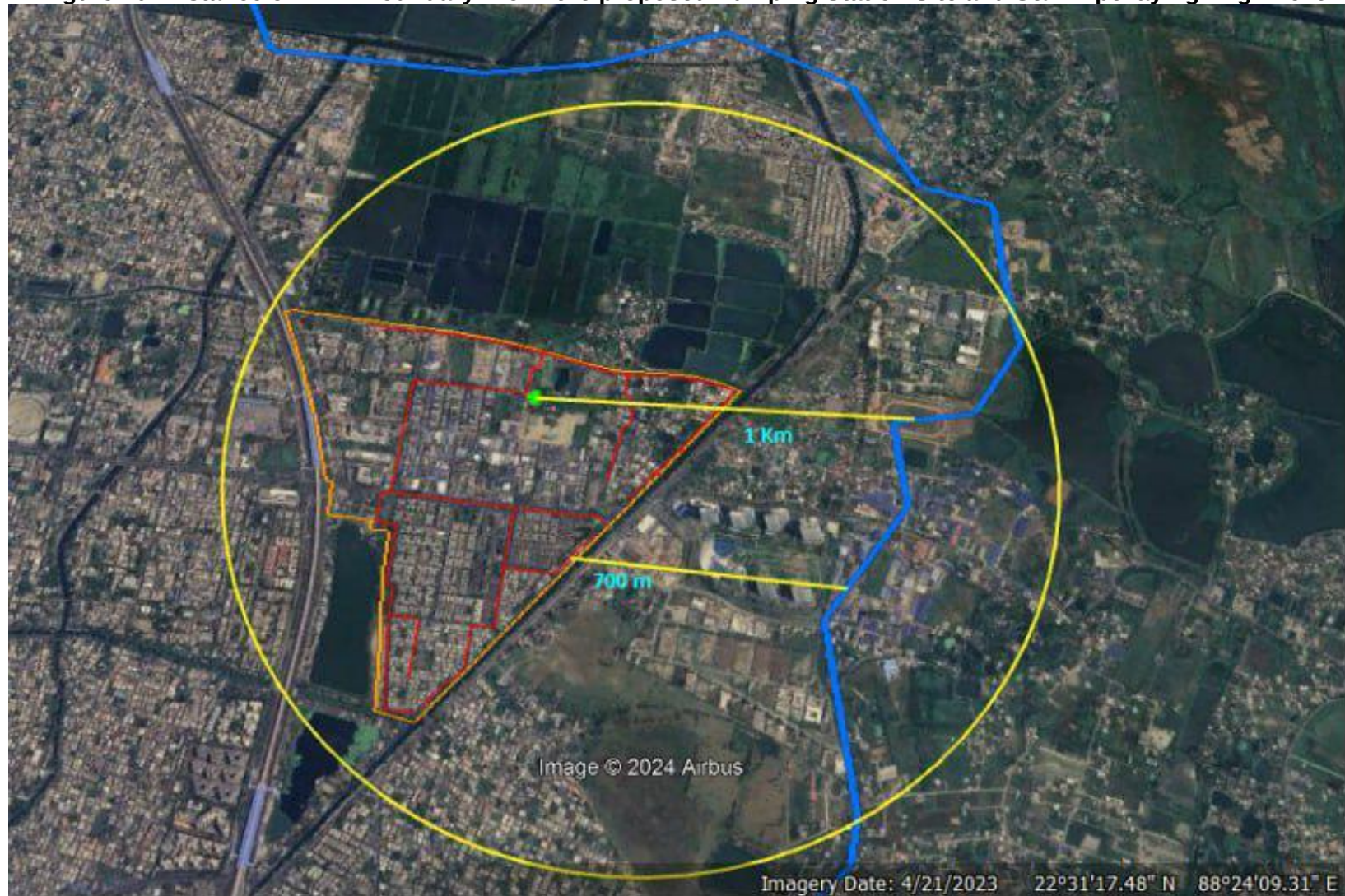
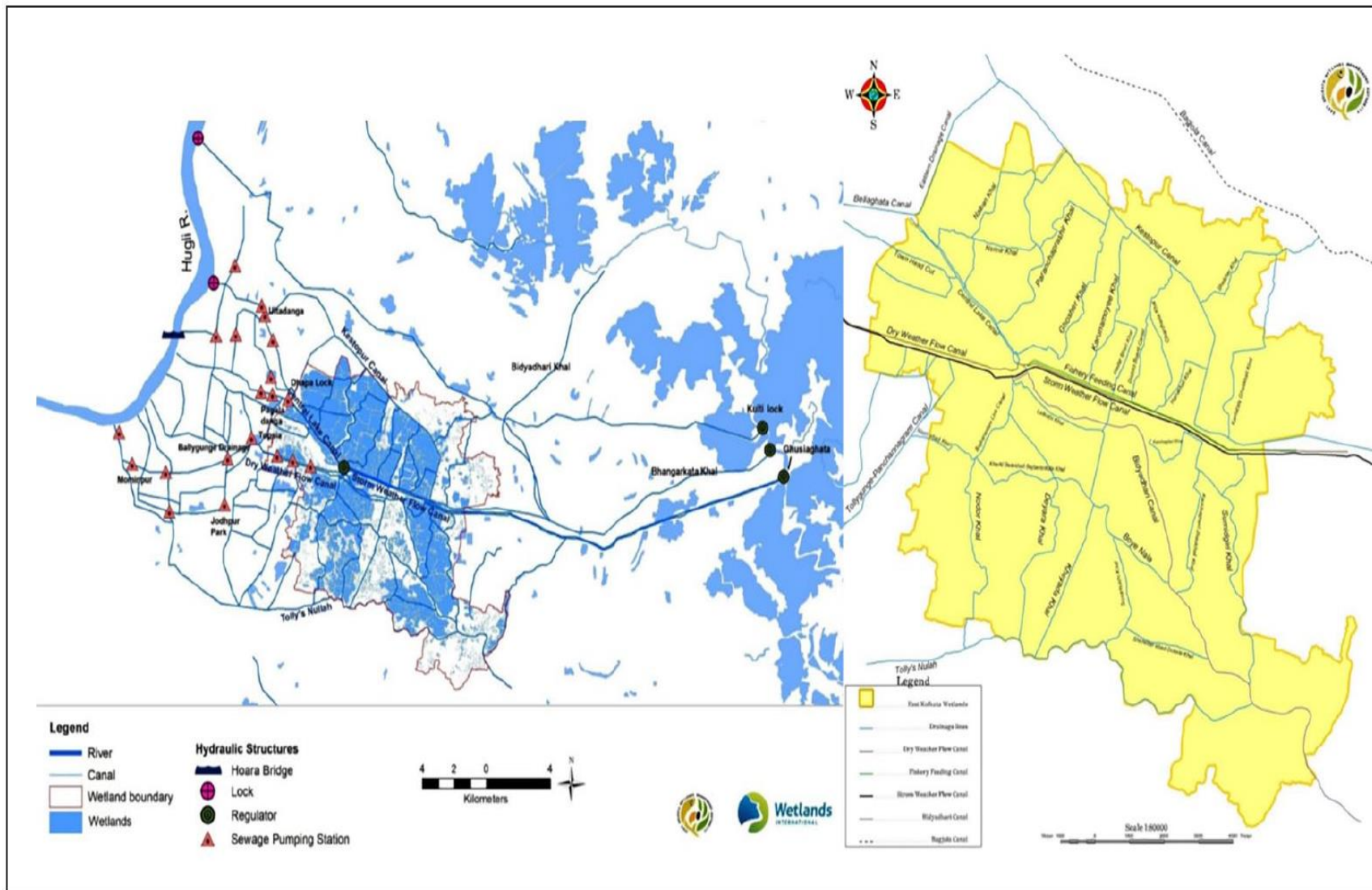


Figure 21: Hydraulic structure in East Kolkata Wetland Basin (left) and the canal system of EKW (right)



Source: EKWMA and WISA, 2021

D. Economic resources

80. **Land use.** The land use pattern in the subproject area is predominantly residential with some commercial activities. Commercial activities are observed in KMC constructed market area in Anandapur. There is one fishery pond (bheri) located beside D-D1 channel. No other waterbodies found in the project area. Agricultural practice is absent here. Urban planning is one of the responsibilities of the KMC. The KMDA also has a role in land planning, with a broader geographic scope than KMC.

81. **Industrial facilities.** Major industrial activity in the sub-project area found in Kasba Industrial Estate I, II and III, situated in East Kolkata township, Anandapur. Sewer pipe laying is proposed along the Kasba Industrial Estate Phase I and III, and at the backside of Kasba Industrial Park phase II. Main type of industries here includes engineering, fabrication, printing, synthetic fishing net, food industries, leather products.

82. **Existing water supply system.** The water supply system of Kolkata is very old, operated from 1865. The present average per capita supply is 134 lpcd, which is very near to desired supply of 150 lpcd. But the supply is very uneven, ranging from 40 lpcd to 310 lpcd. Unaccounted for water (UFW) is 40%. Average supply period is 8 hours a day. Residual pressure is very low. About 10% of supply in Kolkata is from ground water. The source is affected by arsenic in some locations and TDS and Fe values are often above permissible values. From quality and health point of view the ground water source needs to be replaced. The water supply is being improved under KEIP and the water supply rate in the project area is expected to be 150 lpcd.

83. **Transportation.** Subproject area is located within the Kolkata metropolis. Howrah railway station, located 10 km away, serves as the nearest railway hub, while the Netaji Subhas Chandra Bose International Airport, situated 15 km away, caters to air travel needs. The proposed Garia to Dum Dum Airport Metro line, running close to the project site along the EM Bypass, adds another convenient option for travelers. Major roads in the project include Anandapur main road, RR Plot Road, Anandapur high road, and Anandapur East Kolkata Township (EKTP) road. Road widths typically range from 5m to 10m within the sub-project area, with roads like RR Plot Road and Anandapur Main Road having widths between 7m and 10m. However, narrower lanes such as Anandapur EKTP road, canal roads, and the road behind the passport office have widths ranging from 5m to 6m. All the roads in the area are constructed with bituminous material and are under the jurisdiction of KMC, PWD and KMDA.

84. **Solid waste management.** Project area is being served by door-to-door solid waste collection system provided by KMC. However, open dumping of waste in the vacant land and beside the canal bank is also observed. Per KMC estimates only 3% of waste generated is not collected but (illegally) disposed in channels, vacant land and used for infill. KMC has two waste disposal sites. The Garden Reach dumping ground is a small facility with little remaining capacity. It receives waste mainly from borough XV nearby. The main dumping ground is at Dhapa in the east of KMC at approximately 8 km from the sub-project area. This dump site is nearing its maximum capacity. Currently, there is hardly any processing and treatment of MSW generated in the city apart from compost plants. The city is dumping approximately 4,902 MT/day of solid waste (year 2018) at the Dhapa disposal site. The mechanical compost plant set up in 2000 has a design capacity of 700 MT/day. It is adjacent to the waste dumping ground.

85. **Common Hazardous Waste Management.** West Bengal has one Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) at Haldia (about 100 km south of Kolkata) that commenced operations in May 2006. The facility was jointly developed by the Haldia

Development Authority and the Hyderabad based private company, M/s Ramky Enviro Engineers Ltd. who formed a joint venture company named M/s West Bengal Waste Management limited (WBWML) for the development and operation of the facility. The CHWTSDf at Haldia operated by M/s WBWML has completed almost eighteen years of operation. The facility caters to units in the entire state of West Bengal.

E. Social and Cultural Resources

86. **Communities and Population.** The population of the KMC area is 4.45 million. Demographic details of the subproject area is given below:

Particulars	KMC	Ward 108
Population	4,496,694	64,777,
Area	205 square km	2.02 square km
Households	972,264	15,854
Density	24,783 persons/sq.km	32,067 persons/sq.km
Growth rate (2001-11)	-1.93%	-
Sex ratio	908 Female per 1000 male	937 Female per 1000 male
Literacy (male) %	88.3%	54.8%
Literacy (female) %	84.1%	45.1%
SC%	5.38 %	-
ST%	0.23%	-

Source: 2011 Census data

87. **Religion.** In the project area about 93 % are Hindus. Most belong to general castes (84%), with the balance belonging to scheduled caste or scheduled tribes. There are significant concentrations of Muslims in the bustees.

88. **Languages.** The mother tongue reported by 74% of the population is Bengali, with Hindi and Urdu represented by 14% and 12% of the population respectively.

89. **Religious & Cultural Resources.** There are no religious, historical or cultural resources of national/ heritage importance within subproject area. There are few temples and mosques scattered over the area.

F. Environmental Settings of Investment Program Component Sites

90. Subproject components are located in the urbanized area, therefore, there is no natural habitat. The proposed sewer network will be laid in the middle of the existing roads owned by KMC/ PWD/KMDA. Pump house is proposed in vacant land within the existing pump house campus of KMDA. No tree cutting is envisaged for the project. There are no protected areas, forests, mangroves or estuaries in or near the project locations. No work is proposed within EKW area. No notable wildlife is also present.

91. Site environmental features of all subproject sites and photographs are presented in the following table.

Table 15: Site Specific Environmental Features

Subproject component	Environmental Features of the Site	Photographs
Sewer and Drainage Network in Anandapur	Sewers will be laid through the middle of the roads to avoid any impact to existing water pipelines. No tree felling is required for pipe laying activities. Diameters of pipelines to be laid are proposed in the range of 300 mm to 2000 mm, depending on road widths that vary between 5m to 10 m Combined sewer network of about 5.1 km is proposed to be laid along major RR Plot, Anandapur Main Road and Anandapur EKTP Road etc. under KMC/ PWD/PWD ownership having enough road width (7-10m) thereby having no impact. Laying of pipelines in narrow roads (5-6m width) in commercial areas (such as behind the Passport Office, KMC market area at RR Plot, D-D1 AND T.P canal side roads) will be carried out in phased manner, upon due consultation with residents/shopkeepers. One fishery pond (bheri) is beside D-D1 channel. There is earthen embankment between the storm water drain and the fishery pond. The drain has enough width to carry SWF discharged from 1000 dia pipe. The carrying capacity of the channel is 3.8 m³/s while the maximum velocity of the flow through outfall structure is estimated as 0.9 m³/s. Thereby chance of overflow of water is practically nil. Moreover, sewer feed fish culture is a common practice prevalent in these areas. Based on transect walks along the proposed alignment/route, it is confirmed that there will be no loss of tree, structure, common property resources (CPRs) or other relocation impacts during laying of trunk mains pipelines. There are no environmentally, archeologically sensitive or protected areas in the proposed sewer network alignment. The nearest EKW boundary is about 700m distance from the project boundary and intervening area is highly residential urbanized area. There are six number of gravity outfall structures are proposed on D-D1 Lead channel and T.P main canal with sluice gate arrangement to avoid back flow of water. The SWF generated from the entire catchment will be disposed of to these two canals. It shall be ensured that outfall structure invert level shall be above high flood level of the receiving water body. At every outfall point, provision of providing a silt trap and trash screen are proposed to prevent floating matters and silt discharging to rivers/water body.	
		R.R. Plot Road Anandapur
		
		Anandapur Main Road
		
		Anandapur EKTP Road
		
		T.P. Canal side road D-D 1 Canal side road
		 Anandapur Road

Subproject component	Environmental Features of the Site		Photographs
			
		Fishing Pond (Bheri) beside D-D1 channel	TP canal
			
	D-D1 Channel outfall	Outfall near Sanchi International	Outfall near Anandapur Nabarun Sangha
			
	Outfall beside Adrija apartment	Outfall beside Sefali Bhavan	Outfall near Gongotri apartment
Pumping Station (PS)	One new pumping station is proposed within the premises of existing Anandapur PS of KMDA. This existing pumping station is in dilapidated condition and has already exceed its design life and proposed to be dismantled after construction and operation of a new pumping station in the same premises under KSHARP. Land around proposed PS is vacant land with green tree cover (10 non-scheduled trees) at the boundary. There are bushes and overgrowths of vegetations in the site Within 50m buffer there is Kasba Industrial estate and few government offices, and Anandapur main road. Nearest commercial complex (Leather house) is about 35m from the boundary of the PS land and from wet well location the distance of nearest commercial building is about 65 m. No residential buildings within close proximity (Figure 9). Boundary of EKW area is located at a distance of approximately 1 km from the proposed Anandapur pumping station.		 Proposed Anandapur Pumping Station Site Vacant land with overgrowth of vegetation and 10 trees are along the boundary of the plot.

Subproject component	Environmental Features of the Site	Photographs
	No notable trees are there and no tree cutting will be required as these are located along the boundary of the plot . Bushes and overgrowth of vegetation inside the premises required to be cleared before construction. There are no environmentally, archeologically sensitive or protected areas in the proposed pumping station location.	 Existing Anandapur PS of KMDA is proposed for demolition

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

92. ADB SPS requires the assessment of potential impacts during different phases of the sub project including project planning and Design, Pre-Construction, Construction and Operation & Maintenance phases and the formulation of corresponding mitigation measures to avoid, minimize or offset environmental impacts.

A. Impact Assessment

93. **Methodology.** Potential environmental impacts were identified on the basis of (i) the review and analysis of the primary and secondary data or information, (ii) Initial environmental screening using ADB's Rapid Environmental Assessment (REA) checklist (Appendix 1), (iii) consultation with the design team on the proposed infrastructure design and plan (iv) discussions with KMC, PMU, DSC, community people and other stakeholders' and (v) several field visits to the sites. In order to sketch out the potential impacts posed by the project interventions; it was necessary to single out every activity under the project; thereafter a detail understanding of the existing environmental and socio-economic settings of the project area was made. The significance of potential impacts was assessed using the criteria and methodology given below.

94. **Impact Magnitude.** All the interventions associated with this project can be grouped into two major types- (i) construction of sewer network across project area, which mainly involves earth excavation along the existing roads, laying pipelines in the middle of the road, and backfill the earth on top of the pipelines; earthworks of similar types will also be practiced in proposed pumping station (PS) site and (ii) civil and electromechanical works for the construction of PS. Electromechanical works may pause some risks of accident and disruptions, but not so naively cause any detrimental impacts on immediate surrounding environment.

95. The potential impacts of the project have been categorized as major, moderate, minor or negligible based on consideration of the parameters such as: (i) duration of the impact (short, medium, or long term); (ii) spatial extent of the impact; (iii) reversibility; (iv) likelihood; and (v) legal standards and established professional criteria. These likelihood and magnitude categories are defined in the below Table 16 A and 16 B respectively

Table 16A: Likelihood of Impacts from Occurrence

Likelihood	Definition
Certain	Occurs under typical operating or construction conditions.
Likely	Occurs under worst case (negative impact) or best case (positive impact) operating conditions.
Occasional	Occurs under abnormal, exceptional or emergency conditions.
Unlikely	Unlikely to occur.

Source: Analysis by the environmental consultant, DSC (2024).

Table 16B: Parameters for Determining Magnitude

Parameter	Major	Medium/ Moderate	Minor	Negligible
Duration of potential impact	Long term (more than 35 years)	Medium Term Lifespan of the subproject (5 to 15 years)	Limited to construction period	Temporary with no detectable potential impact

Parameter	Major	Medium/ Moderate	Minor	Negligible
Spatial extent of potential impact	Widespread far beyond subproject boundaries	Beyond immediate subproject components, site boundaries or local area	Within subproject boundary	Specific location within subproject component or site boundaries with no detectable potential impact
Reversibility of potential impact	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Baseline requires a year or so with some interventions to return to baseline	Baseline returns naturally or with limited intervention within a few months	Baseline remains constant
Legal requirements	Breaches national standards and or international guidelines/obligations	Complies with limits given in national standards but breaches international lender guidelines in one or more parameters	Meets minimum national standard limits or international guidelines	Not applicable
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions (Certain)	Occurs under worst case (negative impact) or best case (positive impact) operating conditions (Likely)	Occurs under abnormal, exceptional or emergency conditions (occasional)	Unlikely to occur

Source: Analysis by the environmental consultant, DSC (2024).

96. **Sensitivity of Receptor.** The sensitivity of a receptor has been determined based on review of the population (including proximity/numbers/vulnerability) and presence of features on the site or the surrounding area. Each detailed assessment has defined sensitivity in relation to the topic. Criteria for determining receptor sensitivity of the project's potential impacts are outlined in the following Table.

Table 16C: Parameters for Determining Sensitivity

Sensitivity Determination	Definition
Very severe	Vulnerable receptor with little or no capacity to absorb proposed changes
Severe	Vulnerable receptor with little or no capacity to absorb proposed changes or limited opportunities for mitigation
Mild	Vulnerable receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good capacity to absorb proposed changes or/and good opportunities for mitigation

Source: Analysis by the environmental consultant, DSC (2024).

97. **Assigning Significance.** Following the determination of impact magnitude and sensitivity of the receiving environment or potential receptors, the significance of each potential impact has been established using the impact significance matrix shown below in the table.

Table 16D: Significance of Impact Criteria

Magnitude of Potential Impact	Sensitivity of Receptors			
	Very severe	Severe	Mild	Low
Major	Critical	High	Moderate	Negligible
Medium/Moderate	High	High	Moderate	Negligible
Minor	Moderate	Moderate	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Source: Analysis by the environmental consultant, DSC (2024).

98. **Summary of Impacts Rating for the Subproject.** The subproject's potential impacts on the key environmental parameters have been assessed and their significance determined using the methodology described above. A summary of the potential impacts of the subproject on the key environmental parameters and significance of these impacts are presented in the following table.

Table 16E: Summary of Rating of Potential Impacts – S& D network

Activity/ Impact	Duration of Impact	Spatial Extent	Reversible or not	Likelihood	Magnitude	Sensitivity	Significance Prior to Mitigation	Significance after Mitigation
Design and Pre-Construction phase								
Approval of Consents, Permits and Clearances	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
EHS officer/supervisor designation and EMP implementation training	Short term	Local	Reversible	Certain	Minor	Mild	Low	Negligible
Compliance with ADB Loan Agreement and SPS	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impact due to lack of environmental quality baseline monitoring	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Updating of IEE and EMP and preparation of SEMP, including SDP, TMP, etc. based on final design	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Tree Removal	Long term	Local	Reversible	Unlikely	Minor	Mild	Moderate	Negligible
Community Awareness Program	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impacts due to construction camps or workers' accommodation, construction camps, stockpile areas and storage sites and disposal areas	Short term	Local	Reversible	Likely	Minor	Mild	Low	Negligible
Sources of Materials	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Construction Phase								
Impact on working on sensitive areas (schools, religious places, hospitals etc.)	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Demolition and dismantling works	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impacts due to disruption of existing utilities and services	Short term	Local	Reversible	Likely	Minor	Mild	Low	Negligible
Impact to ambient air quality	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impact to noise and vibration level	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impact to surface water, Soil and Groundwater Pollution	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Impact due to lack of disposal of construction wastes/spoil at site	Short term	Local	Reversible	Occasional	Medium	Mild	Moderate	Negligible
Accessibility and traffic management	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible

Activity/ Impact	Duration of Impact	Spatial Extent	Reversible or not	Likelihood	Magnitude	Sensitivity	Significance Prior to Mitigation	Significance after Mitigation
Socio-Economic – disturbance to businesses and livelihood activities	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Socio-economic status- employment	Short term	Local	Reversible	Certain	Medium	Mild	Positive	Negligible
Impact to occupational Health and Safety	Short term	Local	Reversible	Certain	Medium	Major	Moderate	Negligible
Impact to community health and safety	Short term	Local	Reversible	Certain	Major	Major	Moderate	Negligible
Worker health and safety and Workers Facilities	Short term	Local	Reversible	Certain	Major	Major	Moderate	Negligible
Impact on Social and Cultural Resources	Short term	Local	Reversible	Certain	Minor	Mild	Low	Negligible
Monsoon preparedness	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Site Reinstatement	Short term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Operation Phase								
Maintenance and operation of the S&D network	Long term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Leakage and Overflows	Long term	Local	Reversible	Likely	Medium	Mild	Moderate	Negligible
Odor Generation and Air Emission	Long term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible
Community and Occupational Health and Safety	Long term	Local	Reversible	Certain	Medium	Mild	Moderate	Negligible

Source: Analysis by the environmental consultant, DSC (2024).

B. Design and Planning Phase Impact

99. **Integration of EMP in bidding documents and contracts.** Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-integration of EMP in the design. The PMU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document. Once the contractor is selected, the PMU with support from PMDSC will inform contractors of their responsibilities in EMP implementation, in compliance with ADB and government requirements, self-monitoring and reporting procedures.

100. **Selection of Pipe laying Alignment and Pumping Station site:** The proposed Anandapur pumping station will be constructed in the vacant land of existing pump house of KMDA. Land around proposed PS is vacant land with green tree cover at the boundary. There are bushes and overgrowths of vegetations in the site. The nearest house is about 70 m from the pumping station. Kasba Industrial estate and few government offices are about 50 m away. The boundary of EKW area is at a distance of approximately 1 km. The road in front of pumping station has enough road width (about 10m). There will be no need for access road construction. No tree cutting will be required at the proposed site, only some bushes and overgrowths of vegetation will be cleared off. There are trees at the boundary which will act as a visual shield and minimize the odour problem. The combined sewer line will be laid through existing roads under the ownership of KMC/ PWD/KMDA with sufficient road width, The pipeline will be laid underground in the middle of the road to avoid impact on existing water pipelines.

101. Combined sewer network is proposed to be laid along major roads, RR Plot, Anandapur Main Road and Anandapur EKTP Road etc. under KMC/ PWD/PWD ownership having enough road width (7-10m), thereby no impact envisaged. However, there are certain locations, where, proposed pipe laying alignment will pass through busy narrow roads in commercial areas such as behind the Regional Passport office and KMC market area, near Ruby Hospital and Desun Hospital, behind the Passport office and along D-D1 and T.P canal side roads for laying of pumping mains (width 5m to 6m). Therefore, certain impacts are anticipated during construction phase in narrow roads. Construction contractors therefore should follow mitigation measures before start of work at those places.

- (i) Laying of pipeline in those areas in a phased manner the start due consultation with local shop owner/ street vendors and local authority,
- (ii) Material stacking, establishment of labour camp or hot mix plant will be strictly prohibited in front of playground and parks.
- (iii) Traffic management plan will be prepared by the contractor in co-ordination with local traffic police before onset of work. Diversion route will be clearly marked.
- (iv) Site safety arrangement such as barricading and caution board will be implemented.
- (v) Road restoration will be done immediately after completion of the work.

102. **Impact on East Kolkata Wetlands.** No components are proposed within EKW area. The boundary of EKW area is approximately 1 km from the proposed Anandapur pumping station and 700m from the proposed pipeline alignment. The intervening area is highly urbanized. As per management zoning map prepared by EKWMA, the agricultural zone has the potential to attract winter waterbirds however this zone is far away from the subproject area. Subproject area and surroundings are highly urbanized. There will be also no discharge of wastewater (combined or treated sewage) into the EKW from the subproject area. The DWF collected from the catchment will be treated at the proposed STP at Hossainpur and surplus treated effluent after reuse will be

discharged in the T.P canal complying with CPCB discharge standards (2015 and order of National Green Tribunal (NGT) dated 30th April 2019). SWF from the project area will be disposed into TP main canal that will discharge into SWF canal, which ultimately flows into Kulti River, about 45 km from the project area. Although SWF passes through the EKW, this is channelized, and do not discharge water into EKW, but it bypasses the EKW, and flows directly into Kulti River. Therefore, subproject activities do not interfere with the EKE system and is not anticipated to have any adverse impact on the local flora, fauna, or fishing ponds in EKW area. The following precautionary measures are suggested to avoid any adverse impacts during the construction works:

- (i) No labour camps or construction facilities, storage areas, shall be established within 250 m from the boundary of EKW area
- (ii) no debris/waste disposed within EKW or within 250 m of EKW area
- (iii) Prohibit employees and workers from poaching animals and cutting of trees for firewood.

103. Tree cutting at project sites. Proposed S & D pipelines will be buried at the middle of the road. There are no notable trees in the alignment. There are overgrowths of vegetation and bushes observed at proposed Anandapur pumping station site which need to be cleared off before construction. No notable wildlife is reported at the sites. If any tree felling is required based on survey by the contractor during SIP at outfall locations near canal sides, following measures will be implemented to minimize and/or compensate for the loss of tree cover:

- (i) Minimize removal of trees by adopting to site condition and with appropriate layout design or any other site with trees
- (ii) Obtain prior permission for tree cutting at sites that may require tree cutting finalized during detailed design
- (iii) Plant and maintain 5 trees for each tree that is felled. as per KMC policy

104. Chance find/ Social and Cultural Resources. There are no notable or significant archeological places or protected monuments or areas in and around project area. Therefore, no impacts envisaged but risk of discovering any archeological remains during the excavations cannot be ruled out completely. Construction contractors therefore should follow the below measures in conducting any excavation work:

- (i) Strictly follow chance find procedures (Appendix 5 by coordinating immediately with PMU and Archaeological Department for any suspicion of chance finds during excavation works;
- (ii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (iii) Stop work immediately to allow further investigation if any finds are suspected.
- (iv) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ

105. Design of Sewer and Drainage System: The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15 years in general while designing the systems for sewerage components and 30 years for sewer network considering replacement difficulties. The design period for sewerage and drainage networks are decided that the systems operate for many years after their completion. The gestation period of subprojects

under KSHARP is to be considered as 5 years thus completed by 2028 AD. Accordingly, the project horizon is considered as year 2058 AD, considering 30 years design period. The design norms adopted for preparation of various components of subproject area are in line with CPHEEO Manual, KMC and other standard practices.

106. As mentioned in baseline in detail the proposed system has been developed essentially as a combined network to carry dry weather flow (DWF) and storm water flow (SWF) generated from the catchment area. In this system the sewage as well as the storm water flows through the same conduit. As quantum of storm water flow is several times greater than the dry weather flow, the system carries an insignificant flow for major period of a year. DWF generated from the subproject area is proposed to be collected at Anandapur PS. From the pumping station, DWF is proposed to be conveyed to the proposed S&D network in Hossainpur PS by dedicated pumping main for onward transmission to proposed Hossainpur PS. From Hossainpur PS, DWF will be transmitted to proposed STP at Hossainpur for treatment. SWF from the Anandapur PS will be disposed off to the D-D1 & TP main canal by two dedicated pumping mains at two separate locations to avoid discharging of enormous flow in a single location, thereby reducing chances of overtopping of the canal from that particular stretch. In addition, six Gravity outfall arrangements are proposed for S&D network at suitable locations for discharging SWF from the different zones to the respective canals. It is suggested that each outfall is necessary to be equipped with sluice gate structure / flap gate as per site condition.

107. Following environmental measures are already included in the project to avoid and/or minimize adverse impacts and enhance positive benefits:

- (i) A combined system has been proposed by considering narrow road width in the sub project areas.
- (ii) To integrate the climate change impact following design measures are considered - Design is proposed by considering the predominant storm water runoff coefficient; during heavy rainfall event, in order to avoid over loading in STP, bypass arrangement has been proposed at strategic locations to divert excess flow through the outfall structures.
- (iii) Storm water flow from the S&D network is proposed to be disposed of to the canals by gravity outfalls (GOF) to optimize the overall energy usage.
- (iv) To prevent backflow of water, the invert level of the outfalls are proposed to be fixed at the FDL of the canal. Sluice gates are also proposed as controlling arrangement at GOF.
- (v) Avoiding usage of asbestos containing materials.
- (vi) Reducing the incidence of water borne diseases by providing 100% population including urban poor with improved sanitation facility.
- (vii) Adopting a combined approach of sewerage system to cover a sizeable population of the project area with safe collection, conveyance, treatment/ disposal of the sewage generated in the catchment area.
- (viii) Providing appropriate personal protection equipment to the workers and staff.

108. **Sewerage and Storm Water Collection and Conveyance:** The proposed system has been developed essentially as a combined network to carry dry weather flow (DWF) and storm water flow (SWF) generated from the subproject area. Combined sewers are proposed to collect storm water and sanitary wastewater from households. This will improve environmental condition and water logging situation of the area. To maximize the benefit of the project KMC should ensure that all existing septic tanks in areas will be connected with the sewer network in phased manner. Accumulation of silt in sewers in over time, overflows, blockages, power outages, harmful working

conditions for the workers cleaning sewers etc. are some of the issues that needs to be critically looked into during design of sewer system. A properly designed system is a must for system sustainability. Measures such as the following shall be included in sewer system design to ensure that the system provides the benefits as intended:

- (i) Limit sewer depth where possible. Sewers shall be laid away from water supply lines and drains (at least 1 m, wherever possible).
- (ii) In all cases, the sewer line should be laid deeper than the water pipeline (the difference between top of the sewer and bottom of water pipeline should be at least 300 mm)
- (iii) For shallower sewers and especially in narrow roads, use small inspection chambers in lieu of manholes;
- (iv) Design manhole covers to withstand anticipated loads and ensure that the covers can be readily replaced if broken to minimize silt/garbage entry.
- (v) Ensure sufficient hydraulic capacity to accommodate peak flows and adequate slope and gas vents in gravity mains to prevent buildup of solids and hydrogen sulfide generation.
- (vi) Take necessary precautionary measures to protect sewer network, and to avoid disposal of solid wastes, debris, wastewater into newly laid sewers from the time it is constructed to the start of operation phase.

109. Design of Pumping Station: As discussed in baseline that construction of one new pumping station is proposed within the premises of existing Anandapur PS of KMDA. The combined flow generated from the catchment area will be conveyed to this proposed pumping station. It is proposed to provide submersible pumps in wet well type pumping station. Incoming combined flow shall be screened by mechanical coarse screens located upstream of PS and shall be pumped to the head works by DWF and SWF pumps. Odour is generated from the pumping station due to accumulation of obnoxious gases specially when sewage becomes stagnant, causing nuisance to the surrounding environment. As the proposed PS is not located in the residential area and surrounded by trees it will act as a visual shield and minimize the odour problem. Following environmental sensitive design measures are already included in the design to avoid and/or minimize adverse impacts on surrounding environment:

- (i) Provide low noise, efficient pumping systems
- (ii) Provide dedicated power supply to PS, if possible, otherwise DG set to be used during power failure, should be soundproof and having acoustic enclosures with low/permitted air emission standards
- (iii) Design PS with appropriate retention time, so as not to retain the sewage in the sump for long time to avoid generation of odorous gases.
- (iv) Plantations should be provided in the available space within boundary of the plot
- (v) Entry should be restricted through provision of gate and guard during the operation.

110. Discharge of DWF. As per the design, the DWF collected from the catchment will be treated at the proposed STP at Hossainpur under KSHARP. Proposed STP will be designed to meet the stringent CPCB discharge standards (of 2015 and order of National Green Tribunal (NGT) dated 30th April 2019). Treated wastewater will be reused for beneficial purposes, such as gardening, and surplus will be discharged in the T.P canal. The TP main canal will discharge into SWF canal, which ultimately flows into Kulti River, about 45 km from the project area. Although SWF passes through the EKW, this is channelized, and do not discharge water into EKW, but it bypasses the EKW, and flows directly into Kulti River. The treated wastewater disposal meeting

the standards unlikely to have any impact on the receiving water bodies. TP canal is mainly a storm water and combined flow channel, and therefore it is not used for any potable purposes.

111. Environmental due diligence of proposed Pump house and Sewerage Treatment Plant (STP) at Hossainpur under KSHARP. The DWF from the proposed Anandpur pumping station will be conveyed to proposed terminal pumping station (TPS) at Hossainpur, and then to the proposed 41 MLD Hossainpur STP. Both the TPS and STP at Hossainpur are proposed under the will be constructed under KSHARP in two separate packages (SD 04 and SD 05), which will be implemented along with this subproject. TPS and STP construction will be scheduled in such a way that STP is completed and operationalized prior to completion of S&D works. STP will be based on Sequential Batch Reactor (SBR) with primary and secondary treatment systems followed by disinfection through Chlorination (Appendix 6). Due diligence of these packages have been covered with separate IEEs, which will be submitted to ADB for clearance and disclosure, along with this IEE.

112. Disposal of SWF. During the rains, the combined flow (both the wastewater and storm runoff) will be diverted directly into TP canal partially from the pumping stations, and partially from the gravity outfalls proposed under the subproject. Since this is a combined system, the combined flows will not be subjected to treatment given the significant quantities of combined flow. As quantum of storm water flow is several times greater than the wastewater flow from the catchment area, the resulting combined flow is highly diluted. TP canal, as stated above, flows into SWF canal, which ultimately discharges into Kulti River. However, to ensure that system functions properly, and flow is not diverted improperly resulting in inadequate dilution, a standard operating procedure (SOP) are already available and followed at the diversion points (gravity outfalls and pumping station), operators will be trained in the SOP, and will be monitored. Water quality monitoring also will be conducted. The carrying capacity of the channels has been considered, and it is assessed that the channels have adequate capacity to carry the discharge. Moreover, in the existing condition the storm water runoff is also carried in the same canals. A hydraulic modelling study has been conducted to review the performance of outfalls and carrying capacity adequacy. No impact is envisaged as adequate dilution is ensured in the system for SWF discharge through (i) overflow structures level in gravity outfall ensures minimum dilution before bypassed into SWF channels, (ii) pumping from wet well to SWF is initiated only after attaining the requisite level and thus dilution, and (iii) standard operating procedures are already available and followed.

113. Mixing of industrial effluent in wastewater. One of the critical aspects in sewerage system operation is, change in raw sewage characteristics at inlet of pumping station and sewage treatment plant may affect the process and output quality. STP is designed for municipal wastewater, which does not include industrial effluent. Characteristics of industrial effluent widely vary depending on the type of industry, and therefore disposal of effluent into sewers may greatly vary the inlet quality at STP and will upset process and affect the efficiency. Mixing of industrial effluent will severely deteriorate the quality of treated wastewater, and therefore the proposed reuse plan. Reuse of such water may have significant impact on public health, and on land and water. Following measures should be incorporated to safeguard the sewerage system and the intended reuse:

- (i) No industrial wastewater shall be allowed to dispose into municipal sewers
- (ii) Ensure that there is no illegal discharge through manholes or inspection chambers
- (iii) Conduct public awareness programs in coordination with WBPCB
- (iv) Conduct regular wastewater quality monitoring (at inlet and at outlet of PS and STP) to ensure suitability of raw wastewater entering the STP and treated

wastewater quality meeting the discharge standards.

C. Pre-Construction Phase Impact

114. Consents, permits and clearances. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result in design revisions and work stoppage. All the necessary consents, permits, and clearances shall be obtained before the start of civil works.

115. **EHS officer/supervisor designation and EMP implementation training.** No designated of EHS officer/supervisor and lack of EHS training may lead to inadequate/failure in EMP implementation, resulting in EHS impacts. If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GOI environmental policies. Project manager and all key workers of contractors will be required to undergo EMP implementation training including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws etc.

116. **Updating of IEE and EMP and preparation of SEMP,** this draft IEE prepared based on the conceptual / preliminary designs, and the detailed site investigations and designs will be carried out by the contractor. Therefore, IEE needs to be updated to reflect the final project and changes if any and confirm and/or update the predicated impacts and EMP as necessary. A site-specific EMP needs to be prepared prior to start of construction works. Therefore, the following must be done before the start of construction:

- (i) Update IEE based on detailed designs, and submit to ADB for review, approval, and disclosure prior to commencement of work.
- (ii) Formulate SEMP during implementation and get approval from the PMU. The SEMP shall include (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, adequately record the condition of roads, agricultural land and other and other infrastructure prior to starting to transport materials and construction; (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation.
- (iii) No works can commence prior to approval of SEMP. The SEMP will include the following: (i) Construction Compound Management Plan; (ii) Construction Health and Safety Plan, and (iii) Emergency Incident Response Plan. Spoils Disposal Plan and Traffic Management Plan

117. **Environmental monitoring of baseline conditions of air, noise, water.** Baseline environmental quality must be determined to determine if a project has any impact on the environment. Contractor must conduct baseline environmental monitoring through NABL accredited laboratory before construction.

118. **Community Awareness on Project Activities and Impacts.** Lack of community awareness on project activities may result in potential community health and safety concerns and complaints. Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and try to come to a common understanding about the need for an improved drainage system and the sacrifices that need to be made to achieve it. To aid in the consultation process, it is important that the community should be made aware of the details

of project activities. Important information to be disseminated to the people are, among others, the following:

- (i) Overview and objectives of the proposed project;
- (ii) Preliminary and/or final detailed design of proposed project components;
- (iii) Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and
- (iv) Grievance redress mechanism and contact details of the project
- (v) Establish and maintain standards aimed at preventing sexual harassment, abuse, and exploitation and other forms of misconduct at work site. Zero tolerance to inaction on sexual exploitation, abuse, and harassment.¹²

119. Temporary construction facilities- Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Setting up of construction facilities in or near residential areas may endanger human environment (i.e., accident risks, health risks due to air and water pollution and dust, and noise, social conflicts, shortages of amenities, and crime). Similarly setting up of these are near environmentally sensitive land uses such as forest, eco-sensitive area (such as EKW) or water bodies may have adverse impacts on the local ecology and flora and fauna. Project area however is fully urbanized, and the EKW boundary is about 700 m away. Surplus soil generated from construction will be used at proposed Hossainpur STP site (under KSHARP) as filling material which is a low land. To avoid conflict with local community and to reduce environmental impacts the following measures are recommended to avoid impacts:

- (i) Do not consider residential areas for setting up construction facilities;
- (ii) Debris disposal site shall be at least 200 m away from surface water bodies;
- (iii) For aggregate storage area, hot mix plant, etc. no residential areas shall be located within 200 m downwind side of the site; Site should be at an adequate distance away from sensitive locations like settlements, ponds/lakes or other water bodies
- (iv) No camps or facilities shall be located within 250 m from EKW boundary

120. Sources of Construction 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. In this sub-project significant amount of construction material will not require as only pipelines of about 5 km and a Pumping station are proposed to be laid along with construction of manholes and outfall structures. 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

¹² The Asian Development Bank (ADB) has developed comprehensive guidelines to address Sexual Exploitation, Abuse, and Harassment (SEAH) in ADB-financed projects, particularly those involving civil works. These guidelines, found in the Good Practice Note on Addressing SEAH, aim to prevent, mitigate, and manage SEAH risks throughout the project lifecycle.

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 PMU;
- (ii) Material will be sourced from nearest existing licensed quarry site to the maximum possible extent
- (iii) Verify suitability of all material sources and obtain approval of PMU; and
- (iv) Submit to PMU on a monthly basis documentation of sources of materials. If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from WBPCB and will collect the copy of these certificates and submit to PMU/ PMDSC consultants.
- (v) 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 PMU.

D. Construction Phase Impact

121. **Construction Impacts** The civil works for the subproject includes construction of one Pumping Station at Anandapur within the premises of existing pump house of KMDA. This work will be confined to site, and construction will involve activities like site clearance, excavation for foundations, and creation of concrete structures etc. 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. Sub-project also includes linear works and the subproject will install a total of 7.8 km sewer pipes. Sewers will be laid by open cut method (2.2 to 6.2m depth based on topography). Work includes construction of circular manholes, gully pits (wide roads) and catch pits (in narrow roads. For guiding storm water to the gully pits / catch pits, Kerb channel of about 15 km is proposed to be provided on either side of the road.

122. Sewers will be laid in the centre of roads. The diameter of proposed sewer main is between 300 mm to 2000 mm and the road width on such locations where pipe laying is proposed ranges from 5 to 10 meter. Pipe laying activities involves quite simple techniques of civil work - excavation and back filling. Excavation will be done by earth cutting equipment supplemented by manual digging. 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. Trenches deeper than 1m will be protected by shoring/bracings (wooden/steel) to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Utmost care must be taken by contractor to keep the trench dry and barricade the same with hard barricading to avoid any accident. The normal working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. All excavated spoils to be removed and stacked near the trench to facilitate backfilling. As far as possible trench works and excavation works (pipe laying) during monsoon season will be avoided to prevent any water logging and accident due to it. If open trenches are not avoidable during monsoon all the mitigations measures will keep ready to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. Trench shall be kept dry by dewatering and removal of slush.

123. Road of about 7.8 km that will be excavated for pipelaying/construction activities will be rehabilitated by removing temporary barricades and any other materials placed in/or near to

trench. Restoration of roads in its original condition must be approved by the site engineer. All excavated roads shall be reinstated to original condition; fully reinstate pathways, other local infrastructure, and others land used for the project to at least their pre-project condition upon the completion of construction.

124. Work on Sensitive Areas (Schools, Religious places, Hospitals etc.). Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project locations in the built-up areas of the town where there are a variety of human activities, will result in impacts to the environment and sensitive receptors such as schools, religious places, hospitals and the community in general. Major impacts envisaged are increase in air quality, noise level and dust generation. All the identified impacts are temporary in nature and for short duration, require proper mitigation measures to reduce the significance to acceptable levels. Physical impacts will be reduced by the method of working and scheduling of work, whereby the project components will be (i) constructed by small teams working at a time; (ii) any excavations will be protected as per standard norms (iii) finish excavation, pipe laying and back filling of trench in the minimum time possible (iv) provide adequate barricades and road safety signage during pipe laying works in traffic areas (v) if night works are required all the mitigation measures to reduce impacts of disturbance to minimum level to nearby habitants and road users should be ensured by contractor, (vi) consult with business and institutions for work schedules. In critical areas such as schools or hospitals, operating hours are factored into work schedules and workforce is increased for speedy completion, (vii) all trench and pit excavations and other work shall be carried out during night time at busy road section. and (viii) pedestrian access to schools, public libraries, courts, doctor's chambers, pharmacists, and other premises frequently by the public will be maintained with the use of walking boards.

125. Demolition and Dismantling works. The existing pumping station (East Kolkata Sewage PS) which is in dilapidated condition will be dismantled once the new pumping station is constructed and become operational. It is estimated that about 49465 cum excavated soil and 2955 cum bitumen waste will be generated during pipe laying work. About 15150 cum excavated earth and 1290 cum of solid waste will be generated due to construction of Anandapur PS and demolishing of existing pumping station. Demolition works will be taken up with proper work plan and mitigation measures will be adopted for demolition works as per Construction and Demolition Act, 2016. A demolition plan will be prepared considering the local community and workers safety, emergency procedure, dust, noise, storage, transport and disposal of debris, site cleanup etc.

126. During the preparation of the Detailed Project Report (DPR) and from the preliminary survey and design conducted in January 2024, it has been confirmed that there is no presence of asbestos or asbestos-containing material (ACM) in the existing infrastructure and sewerage & drainage (S&D) networks. Monitoring reports from previous ADB-funded KEIP projects and ongoing KEIP projects have also confirmed that there are no ACM in the existing infrastructures. Appropriate site for storage and disposal of demolished materials should be selected prior to start of demolition activities with prior permission/approval of PMU/ULB. Debris generated due to the dismantling of the existing road need to be suitably reused in the road construction, subject to the suitability of materials and as follows:

- (i) Proper debris management plan to be prepared and followed.
- (ii) Spray water to keep debris moist.
- (iii) Segregate and recover reusable materials.
- (iv) Segregate waste into recyclable, non-recyclable parts and hazardous waste

- (v) The dismantled existing bitumen surface will be reused by melt-mixing and utilised for paving of crossroads, access roads, and paving works in construction sites and camps, temporary traffic diversions, haulage routes,
- (v) Unusable and non-bituminous debris materials should be suitably disposed of at pre- designated disposal locations, with approval of the concerned authority.
- (vi) Sub grade of the existing pavement shall be used as fill material.
- (vii) Existing base and sub-base material shall be recycled as sub-base of the haul road or access roads
- (viii) Contractor will suitably dispose of unutilized debris materials either through filling up of borrow areas located in wasteland or at pre-designated disposal locations

127. Damage / disturbance to existing utilities. Since the sewers are proposed in the centre of the road, the presence of utilities is minimal. However, in narrow roads, and for large sewers width of excavation will be significant. There are telephone lines, electric poles, underground cables, water lines, drains etc., along the roads, and these may fall within the alignment of proposed pipelines, and may be damaged / disturbed during the works. The utilities therefore need to be identified and avoided or shifted. Damage/disturbance and unplanned / unauthorized shifting pose safety risk to workers and local community, and consumers of utilities will also be affected. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with PMU and PMDSC will:

- (i) identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and
- (ii) prepare a contingency plan to include actions to be done in case of unintentional interruption of services.
- (iii) inform the local community in advance if utilities will be disrupted during construction).

128. Air Quality: Ambient air quality is mainly influenced by traffic movement through Anandapur Main Road and EM Bypass. Construction work, especially from earthwork activities, 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, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons. Increase in dust/ particulate matter in ambient air is detrimental and may have adverse impacts on people and environment. There will be greater impact on air quality from the inadequately managed or haphazard project activities. Demolition activities at existing pumping station site is likely to generate dust. To mitigate the impacts, construction contractors will be required to:

- (i) Contractor to implement all measures to prevent and control dust from construction activities, including the following:
- (ii) Plan the work sites properly, and demarcate the sites for stockpiling of, soils, gravel, and other construction materials away from the traffic, vehicle, general worker movement to avoid disturbance of loose materials
- (iii) Conduct work sequentially - excavation, pipe laying, backfilling; use the freshly excavated soil for back filling, it will avoid stocking of material and minimize the dust. Back to back road restoration shall be undertaken immediately, especially in front of Regional Passport Office and KMC market area at RR Plot.
- (iv) There are two hospitals near the sub-project area, pipe laying is proposed at the backside of Ruby and Desun hospitals. No stacking of soil or material is allowed

- near hospital area to avoid dust generation. Additional measures shall be taken to avoid any impact on these sensitive areas.
- (v) Provide dust screen around the sites prior to start of demolition works; provide temporary enclosure for dust-generating activities, wherever possible;
 - (vi) Damp down exposed soil and any stockpiled material on site by water sprinkling;
 - (vii) Use tarpaulins to cover sand and other loose material when transported by trucks;
 - (viii) Clean wheels and undercarriage of haul trucks prior to leaving construction site
 - (ix) use enclosers and sprinkle water during concrete road cutting works to lay pipelines; dampen the unpaved ground in the immediate vicinity, and the debris generated;
 - (x) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel
 - (xi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and limit idling time of construction vehicles to minimize local air pollution. Contractor's vehicles and equipment should compulsorily have PUC and submit PUC to PMU before deployment at site
 - (xii) Limit idling of vehicles on the construction sites to 3-5 minutes
 - (xiii) Obtain CTE and CTO for batching plant, hot mix plant, crushers etc. if specifically established for this project.
 - (xiv) If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from WBPCB and will collect the copy of these certificates and submit to PMU/consultants; PMU will approve the source only after all the certificates are submitted.
 - (xv) Strict prohibition of open burning of solid waste
 - (xvi) Regular inspection & maintenance of construction/transportation vehicles
 - (xvii) Supply of LPG to workers instead of allowing them to use firewood for cooking
 - (xviii) Restore the road surface as soon as possible after the refilling; in case of time delay, necessary measures are to be implemented to avoid traffic movement on loose soil surface; use of dust free crushed stone aggregates with appropriate binder as top layer on backfilled area may be considered
 - (xix) Conduct ambient air quality monitoring periodically as per Environmental Management Plan (EMP)

129. Noise and Vibration: Noise is one of the most ubiquitous disturbances to the environment particularly during the construction and operation phases. Being located mostly in the residential areas, the noise level in the sub project area is within the limit except in main roads (such as Anandapur Main Road and Canal Bank Road) and in commercial/market areas due to heavy vehicular movement. There are two hospitals located along the pipe laying alignment. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads, operation of construction equipment like concrete mixers, transportation of equipment and materials. The increase in noise level may be caused by building demolition activities proposed at existing pumping station. Use of power horns and movement of heavy vehicles can cause a serious disturbance to the community, educational institutes, hospitals/health centers and residences etc. The sensitive receptors are the general population in these areas. 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:

- (i) Contractor to implement all measures to control noise and vibration from construction activities, including the following:

- (ii) Conduct activities with the greatest potential to generate noise during periods of the day which will result in least disturbance; provide prior public information.
- (iii) Plan activities during daytime only near hospital area to avoid noise/ vibration generating activities as much as possible.
- (iv) There are two hospitals near the sub-project area, pipe laying is proposed at the backside of Ruby and Desun hospitals. Additional measures shall be taken to minimize noise and vibration in these sensitive areas.
- (v) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (vi) As far as possible use new construction machineries and keep all the old machineries in good and maintained state.
- (vii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor;
- (viii) Ensure proper training of construction workers on the safe usage of pneumatic drills and exposure limits per day; provide appropriate personal protection equipment - safety glasses or goggles/face shield, helmets, safety shoes or boots, hearing protection aids etc. Set up screens or shields in areas where nearby workers or community may be exposed to flying fragments, chips, dust and excessive noise.
- (ix) Maximum sound levels should not exceed the WHO guideline values for noise levels.
- (x) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (xi) Consult the custodians of important buildings, cultural and tourism authorities and 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.
- (xii) Ensure that the drilling rig, generator sets have acoustic hoods and noise dampers in place; provide prior information to local community about the drilling operation; workers shall be provided with appropriate PPEs
- (xiii) Conduct Noise monitoring according to the Environmental Management Plan (EMP).

130. **Surface Water, Soil and Groundwater Pollution.** Improper stocking and management of construction material, solid waste and debris, wastewater from construction camps and facility areas, and spillage and leaks from fuel, lubricants, and construction chemicals, etc. can contaminate soils, receiving water bodies, and may leach into will pollute soils, surface water and percolation of leachate through the soil strata can contaminate the groundwater. During the rains, storm water run-off from poorly managed construction areas, stockpiled materials and debris/waste, areas contaminated from fuels and lubricants spills and leaks, can lead to silting and pollution of drains and receiving water bodies, may percolate into the soil leading to groundwater pollution. A total quantity of 64,500 m³ of excavated soil will be generated during from the works, and most of which will be refilling the trenches after laying of pipes. The surplus soil will be used for raising the ground level of proposed STP site at Hossainpur as the area is low-lying and requires substantial filling material.

131. Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater collects in the voids. Here groundwater occurs in shallow water table condition (both unconfined and confined) and the proposed excavation depth is 2.2m to 6.2m. Rain is also high during monsoon season. To minimize the issue, the construction contractor will be required to conduct excavation works in non-monsoon season to the maximum

extent possible. All the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. to be adopted. During the rains there is a risk of runoff collecting in the pits and trenches. The water collected in excavated pits will contain silt and disposal of this in drainage channels lead to silting. Project area receives most of the rainfall monsoon months. Construction contractor will be required to:

- (i) Contractor to implement all measures to prevent and control land and water pollution
- (ii) Prepare and implement a construction waste management plan.
- (iii) Avoid stockpiling of soils especially during the monsoon season, if unavoidable, it should be covered by tarpaulins or plastic sheets, and protected by protection berms / bunds to avoid entry of runoff
- (iv) Create a temporary peripheral drainage channel around the work area to arrest the entry of runoff from upper areas into the work area;
- (v) Avoid locating construction camps and labour camps near to any water body and do not dispose any waste or sullage into any water body.
- (vi) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PMU on designated disposal areas;
- (vii) Inspect all the drainage lines / streams at work sites, construction site/construction camp/labor camp etc. and clear all the drainage lines so that no water stagnation/flooding may occur during heavy rainfall.
- (viii) Groundwater occurs in shallow water table condition (both unconfined and confined) and the proposed excavation depth is 2.2m to 6.2m. Rains are also high during monsoon season – ensure that water will not pond in pits and voids near project location by dewatering the accumulated water
- (ix) Avoid trenching and excavation works (pipe laying) during monsoon season
- (x) If open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc.
- (xi) 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;
- (xii) Consider safety aspects related to pit collapse due to accumulation of water.
- (xiii) Inspect and verify all the emergency measures and emergency control system before start of monsoon, keep the emergency response committee on high alert during monsoon/heavy rain fall
- (xiv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (xv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- (xvi) Contractor shall source water from surface sources as far as possible and obtain necessary permit to use groundwater or surface water for construction purposes.
- (xvii) Prevent pollutants from contaminating the soil and the groundwater; provide proper facilities for proper collection and treatment of sanitary waste in work facilities and workers accommodation
- (xviii) Store fuels and lubricants in double hulled tanks. Fuel and other petroleum products stored away from water drainage and protected by impermeable lining and bonded 110%;
- (xix) Conduct regular maintenance of machinery and vehicles, and avoid leakages;
- (xx) Enclose the construction area to prevent unauthorized access
- (xxi) Conduct surface quality monitoring according to the Environmental Management

Plan (EMP).

132. Generation and management 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. It is estimated that about 49465 cum excavated soil and 2955 cum bitumen waste will be generated during pipe laying work while 15150 cum excavated earth and 1290 cum of solid waste will be generated due to construction of Anandapur PS and demolishing of existing pumping station respectively. The excavated soil and the waste generated will be reused for backfilling and for area development purpose at the proposed STP site at Hossainpur as the area is low-lying and requires substantial filling material. Domestic solid wastes may also be generated from the worker's camp. Improper waste management could cause odour 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:

- (i) Prepare and implement a Construction Waste Management Plan;
- (ii) 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.;
- (iii) Avoid stockpiling any excess spoils at the site for long time. Excess excavated
- (iv) soils should be disposed of to approved designated areas immediately;
- (v) If disposal is required, the site shall be selected preferably from barren, infertile lands; site should locate away from residential areas, forests, water bodies and any other sensitive land uses;
- (vi) 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;
- (vii) establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, engine oils, used oils, etc. at the construction site;
- (viii) Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of through agencies authorized by WBPCB;
- (ix) Prohibit burning of construction and/or domestic waste;
- (x) 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;
- (xi) If temporary soil storage is adapted, such site should be properly demarcated by fencing and information board should be placed at entrance; soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission; soil should be levelled on daily basis and no heap or mound should be left at end of the day;
- (xii) Soil should be covered with tarpaulin sheets during the transportation.
- (xiii) Soil transportation should not be done during the peak hours and should avoid narrow and heavy traffic routes and important religious or tourist sites
- (xiv) Prior to the commencement of works, contractor will follow all the prescribed rules and shall identify a surplus soil and debris disposal site (temporary and final disposal) in consultation with the PMU/ULB and adhering to the EMP criteria¹³
- (xv) If any hazardous waste is generated, handled or managed during construction works contractor need to comply all the requirements of Hazardous and other

¹³ Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules

wastes (Management and Trans boundary Movement) Rules, 2016, The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility

- (xvi) Conduct site clearance and restoration to original condition after the completion of construction work; PMU to ensure that site is properly restored prior to issuing of construction completion certificate.

133. Accessibility and traffic management. Excavation along the roads, hauling of construction materials and operation of equipment on-site can cause traffic problems. A major portion of roads carry considerable traffic, mainly comprises buses, cars, bicycles, 2 wheelers, Mini trucks, Auto rikshaw etc. Sewer pipeline works will be conducted in the middle of the roads, which has potential to create accessibility issues to surrounding houses and business establishments and also affect the traffic movement. The temporary impact on permanent shops will be avoided in busy market areas by executing work during night hours and with proper safety measures. Laying of pipelines in narrow roads and commercial areas (at back side of Regional Passport Office Road, KMC market area at RR plot) will be carried out in phased manner, upon due consultation with shop owners. There is an existing Anandapur-Howrah bus terminus and auto stand near Ruby hospital where temporary impact is envisaged during pipe laying activities. Civil work will be completed in one section before commencing work on the next section. The contractor will ensure that noise levels are within limits. Hauling of construction material, equipment, construction waste, etc., to and from the work site may increase the road traffic on local roads, some of which are not in good condition. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Prepare and implement a Traffic Management Plan, ensure road traffic and pedestrian and traffic safety through proper safety measures
- (ii) Plan construction vehicle transportation routes properly so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (iii) Schedule transport and hauling activities during non-peak hours;
- (iv) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (v) Keep the site free from all unnecessary obstructions;
- (vi) Drive vehicles in a considerate manner;
- (vii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours;
- (viii) Notify affected sensitive receptors 1-week in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.
- (ix) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- (x) Confine work areas along the roads to the minimum possible extent; all the activities, including material & 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
- (xi) Provide pedestrian access in all the locations until normalcy is restored. Leave spaces for access between excavation and/or mounds of soil to maintain access to the houses / properties
- (xii) Provide wooden/metal planks over the open trenches at each house to maintain the access.

134. **Socio-Economic – disturbance to businesses and livelihood activities.** The project components will be located in government land and there is no requirement for land acquisition or any resettlement. Blocking of access to the business / livelihood activities, especially during pipeline laying along the narrow roads (owned by PMC/PWD /KMDA), may slightly impact the income of households and income loss of street vendors. The measures suggested above for ensuring accessibility during pipeline works, will minimize this impact. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to implement following measures to mitigate the impact:

- (i) Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;
- (ii) Consult businesses and institutions regarding operating hours and factor this in work schedules;
- (iii) Provide walkways and metal sheets where required to maintain access across the trenches for people and vehicles;
- (iv) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints and
- (v) Implement resettlement plan (RP) to address any issues related to livelihood impacts

135. **Socio-Economic – Employment.** Manpower will be required during the 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:

- (i) Employ local labour force as far as possible
- (ii) Secure construction materials from local market as far as possible
- (iii) Comply with labor laws

136. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Building demolition works pose significant safety risk if proper appropriate equipment and methods are not adapted and precautions are not taken. Trenches deeper than 1 m will be protected by shoring/bracings (wooden/steel) to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Utmost care must be taken by Contractor to keep the trench dry and provide hard barricade the same to avoid any accident. Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce, such as the COVID-19. The construction contractor will be required to:

- (i) Comply with all national, state and local labor laws
- (ii) Following best practice health and safety guidelines including IFC's General EHS Guidelines,¹⁴ Sector Specific (Water and Sanitation) Guidelines¹⁵ and any other guidelines and protocols issues by WHO, ADB or relevant government agencies for emerging situation like COVID-19,
- (iii) Develop and implement site-specific occupational health and safety (OHS) Plan which will include measures such as: (a) excluding public from the site; (b)

¹⁴<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

¹⁵<https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B%2BWater%2BAnd%2BSanitation.pdf?MOD=AJPERES>

- ensuring all workers are provided with and use personal protective equipment; (c) OHS Training¹⁶ for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (iv) Ensure that demolition works are properly planned and executed; competent engineer shall assess the buildings to be demolished and prepare a demolition plan duly considering the potential hazards, methods to be adapted, equipment to be used, and control of dust, noise and debris. Workers shall be trained, and an emergency plan shall be put in place.
 - (v) Provide dust screen around the sites prior to start of demolition works; provide temporary enclosure for dust-generating activities, where ever possible;
 - (vi) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and KMC shall be planned
 - (vii) Conduct work in confine spaces, trenches, and at height with suitable precautions and using standards and safe construction methods; do not adopt ad hoc methods; all trenches deeper than 1 m shall be provided with safety shoring/braces (wooden/steel);
 - (viii) As far a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it If open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc.
 - (ix) Adequate safety measures shall be implemented for excavation and construction of wet well at the proposed pumping station; the risk is high consider the depth of excavation, and high-water table.
 - (x) Provide hard barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches
 - (v) Ensure that qualified first aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
 - (vi) Provide medical insurance coverage for workers;
 - (vii) Secure all installations from unauthorized intrusion and accident risks;
 - (viii) The project area may experience extreme temperature during summer months of April and May occasionally, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:
 - Work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM)
 - Provide appropriate shade near the workplace; allow periodic resting

¹⁶ 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; (iv) 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.

- and provide adequate water
 - Provide necessary medicine and facilities to take care of dehydration related health issues
- (ix) Provide supplies of potable drinking water;
- (x) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (xi) Provide H&S 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;
- (xii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- (xiii) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xiv) Ensure moving equipment is outfitted with audible back-up alarms;
- (xv) 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; and
- (xvi) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
- (xvii) Conduct regular health check-ups for workers
- (xviii) Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites

137. **Asbestos Containing Materials.** No Asbestos containing material (ACM) is proposed to be used in the subproject construction. There are no ACM in the existing infrastructures. During the preparation of the Detailed Project Report (DPR) and from the preliminary survey and design conducted in January 2024, it has been confirmed that there is no presence of asbestos or asbestos-containing material (ACM) in the existing infrastructure and sewerage & drainage (S&D) networks. Monitoring reports from previous ADB-funded KEIP projects and ongoing KEIP projects have also confirmed that there are no ACM in the existing infrastructures.

138. Given the dangerous nature of this material for both workers and citizens, measures should be taken to protect the health of all parties in the event of any ACM (however unlikely) are encountered. For management of ACM, approach recommended by ADB for "protecting workplaces and communities from asbestos exposure risks (Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks¹⁷ (March 2022) and United States Environmental Protection Agency (USEPA)¹⁸ shall be adapted

139. **Community Health and Safety.** Hazards posed to the public, specifically in high pedestrian areas may include traffic accidents and vehicle collisions with pedestrians. Movement of construction vehicles and equipment on public roads also poses risk to pedestrians and traffic.

¹⁷ <https://www.adb.org/publications/good-practice-management-control-asbestos>

¹⁸ In the USA, standards and approaches for handling asbestos are prescribed by the Occupational Health and Safety Administration (OHSA) and the Environmental Protection Agency (EPA) and can be found at <http://www.osha.gov/SLTC/asbestos>

Due to land constraints, roads are narrow. There are also works located close to houses, businesses and establishments. These may pose significant safety risk from the presence of construction activities, machinery and materials to the local people and community. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Code of conduct for workers should be developed and implemented throughout the construction period;
- (ii) Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;
- (iii) Trench excavation and pipeline works shall be conducted in a safe manner; if allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned
- (iv) All trenches deeper than 1 m shall be provided with safety shoring/braces (wooden/steel);
- (v) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day
- (vi) Follow established community health and safety protocol on emerging infectious diseases such as COVID19.
- (vii) Implement measure to prevent proliferation of vectors of diseases at work site;
- (viii) Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (KSHARP);
- (ix) Schedule transportation activities by avoiding peak traffic periods;
- (x) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
- (xi) Educate drivers: limit speed not more than 30 km/h in settlements; ensure that drivers follow road safety rules, and employ traffic marshals in all construction vehicles on road to assist the driver
- (xii) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;
- (xiii) Provide prior information to local community, temples and other places of worship about work schedules;
- (xiv) Noise barriers must be installed in between the construction site and any community locations to reduce the noise level;
- (xv) Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site;
- (xvi) Provide hard barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches and
- (xvii) Ensure contractor has staff trained on emergency response

140. Operation of Construction Camps and Workers Facilities. It is likely that the contract may employ workers from outside the project area, and therefore may provide temporary workers accommodation during the construction phase. Proper provision and maintenance of facilities is necessary for proper living conditions and avoid health, environment, and safety issues. Operation of construction camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential

impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Ensure conditions of liveability 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 used as accommodation for workers; accommodation shall meet the IFC standards for workers accommodation¹⁹ which include: provision of safe housing, availability of electricity, plumbing, water and sanitation, adequate fire protection and dormitory/room facilities; accommodation shall be in the range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface) per worker, a minimum ceiling height of 2.10 meters; a reasonable number of workers are allowed to share the same room – (standards range from 2 to 8 workers); workers with accompanying families shall be provided with a proper and safe accommodation (IFC benchmark standards for workers accommodation is provided in Appendix 7). An emergency preparedness and response plan to guide personnel in an accident or emergency situation to prevent or minimize injury, damage and material loss and also to prevent or mitigate environmental impact from the accident or emergency has been provided in Appendix 8.
- (ii) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (iii) Recover used oil and lubricants and reuse or remove from the site;
- (iv) Safe distance of Petroleum, Oils and Lubricants (POL) is maintained from any point of ignition.
- (v) All workers and staff are familiarized with the firefighting system.
- (vi) Escape routes are well defined.
- (vii) The POL dumps and gas cylinders are barricaded.
- (viii) Fire extinguishers are refilled on time.
- (ix) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (x) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (xi) Report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work

141. Social and Cultural Resources. Schools, hospitals and religious places such as temples are present nearby the proposed alignment of pipe laying and contractor will require to follow the mitigation measures as given below-

- (i) Consult with concerned agency authorities and local community in pre-construction phase and explain the work method and duration of proposed works, take their suggestions and comments and incorporate in design the mitigation measures required
- (ii) Do not schedule the works at sensitive times; observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the

¹⁹https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-atifc/publications/publications_gpn_workers_accommodation

religious places and do not make any disturbance/hindrance/obstacles during such times

- (iii) Provide proper signage, barricades etc.
- (iv) Take special measures including posting security personnel at the work sites near the schools and hospitals, ensure safe entrance, and fully separated from the work site. Define clear pedestrian path with fully barricaded on both sides, and on the top if there is risk of falling objects.

142. **Night works.** Most of the construction works shall be undertaken only during day hours. Night works are required only in the extreme conditions such as road having heavy traffic in daytime and/or no alternate access can be provided for the road users, extreme climatic conditions (extreme hot during summers), religious fairs/celebrations in daytime etc. Contractors are required to take prior approval from PMU and concerned local authorities for night works. Contractors are required to adhere following conditions for night works including those prescribed by concerned authorities:

- (i) Prepare a night work protocol and obtain prior approval from PMU, and no night works shall be conducted without prior written approval of PMU
- (ii) No noisy works shall be conducted during the night; maintain noise levels within the standards prescribed by CPCB
- (iii) Maintain proper lighting and illumination of work site
- (iv) Workers engaged in night works should have: adequate rest/sleep in daytime before start of night works, and previous experience of night works and should be physically fit for such works including clear vision in night
- (v) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements
- (vi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests
- (vii) Workers / site staff should not shout or create noise / nuisance
- (viii) First aid and emergency vehicles should be available at site
- (ix) Emergency preparedness plan should be operative during night works
- (x) Old persons and pregnant women and women having small kids should not work in nighttime
- (xi) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
- (xii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works
- (xiii) PMU/PMDSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video graphic records as well as register the observations.
- (xiv) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
- (xv) After completion of night works all the site should be cleaned and maintained obstruction free for daytime movement of vehicles and pedestrians
- (xvi) Drivers and workers should be alert and responsive during night works
- (xvii) All the wages to workers working in night hours should be as per the applicable labour acts
- (xviii) Avoid any nuisance which may create problems to nearby habitants and work

- peacefully during night hours
- (xix) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

143. Post-construction clean-up and Reinstatement. The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The contractors' contract indicates no final payment will be disbursed until the PMU concurs that the post-construction clean-up and reinstatement are satisfactory. The following generic measures should be taken:

- (i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;
- (ii) All excavated roads shall be reinstated to original condition; fully reinstate pathways, other local infrastructure, and others land used for the project to at least their pre-project condition upon the completion of construction.
- (iii) All disrupted utilities restored;
- (iv) All affected structures rehabilitated;
- (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
- (vi) All hardened surfaces within the construction camp area shall be ripped;
- (vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;
- (viii) The contractor must arrange the cancellation of all temporary services;
- (ix) Request PMU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.

E. Operation and Maintenance Phase Impact

144. Operation and Maintenance of system will be carried out by the contractor for 5 years and then by KMC directly or through an external operator. The system has a design life of 30 years, during which major repairs or refurbishments will not require and operate with little maintenance beyond routine actions. The stability and integrity of the system will be monitored periodically to detect problems and allow remedial action if required. 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.

145. The main requirement for maintenance of the S&D conveyance system will be for the detection and repair of leaks. The general flat topography in the project area and the usage of good quality pipes will ensure minimum breakage and therefore, leaks would be mainly limited to joints between pipes. The recurrence of pipe bursting and leakage problems in sewerage system will be managed by the leak detection and water auditing surveys. The operating agency will be required to ensure that the leak detection and rectification time is minimized. Ensure adequate pumping to avoid water logging conditions during heavy rain.

146. Operation of pumping station will be mostly automated with less human intervention in the process, so scope for human error and its effect on efficiency is very limited. Emergency preparedness and response plan will to guide personnel in an accident or emergency situation to prevent or minimize injury, damage and material loss and also to prevent or mitigate

environmental impact from the accident or emergency. An emergency preparedness and response plan are provided in Appendix 8.

147. To continue pumping operation provision of one standby pump will be kept. Uninterrupted power supply with back-up generator facility will be there. Only Central Pollution Control Board (CPCB) approved generators will be procured from registered vendors with necessary pollution control devices/measures (Appendix 2, Table 5). Available standard operating procedure will be followed for discharge of SWF into D-D1 and TP canals.

F. Cumulative Impact

148. Cumulative impacts are those that result from the successive, incremental, and/or combined effects of a project or activity when added to other existing, planned, and/or reasonably anticipated future ones. The proposed sub-project is aimed towards providing basic civic facilities in the added area of KMC creating required new infrastructures. The construction works are fairly simple having no major impact on the surroundings. There are few temporary/ short term impacts anticipated during the construction phase as the roads are narrow and the project area is highly residential. The nearest environmentally sensitive protected area, EKW is about 700m from the sub-project boundary.

149. S&D works are proposed to be taken up simultaneously in the service area of subproject Part of Ward no 108 (Anandapur) which is a developing area congested with people, traffic and activities. There are sensitive places like hospitals, schools, and marketplaces. Works will be spread over the entire project area, covering all the roads and streets. Although no other notable public works are anticipated during the project implementation on public roads, there will be usual construction activities. However, certain collective impacts are anticipated as one STP and pumping station along with S&D networks are proposed in two different packages under KSHARP in Ward no.108. But their contribution during construction will not be very significant with the implementation of mitigation measures as discussed in this IEE report.

150. During the summer season (dry and windy weather conditions) dust generation from cumulative construction activities may be significant, and this may increase the particulate matter concentration in ambient air. Dust control measures suggested in the EMP aim to minimize the dust generation from the subproject construction activities. Road restoration works are to be implemented in project area; scheduling of works needs to be coordinated with the respective road agency (KMC/KMDA /PWD). The increase in road traffic, disturbance to traffic, public safety and workers safety issues, damage to existing utilities, influx of outstation workers, etc., due to various simultaneous construction works will be notable. However, the measures suggested in the EMP will minimize these impacts greatly, and therefore effective implementation of EMP must be ensured. Thus, the net impacts are unlikely to be significant.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Overview

151. The meaningful consultations and information disclosure program is an essential part of the environmental assessment process which enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, and the sharing of development benefits and opportunities, and implementation issues.²⁰ The process also helps avoid potential conflicts with stakeholders for smooth project implementation. The findings from the public consultations are documented and considered in the development of the EMP, especially in identifying the significant impacts of the proposed Project and developing the corresponding mitigation measures.

B. Public Consultation

152. During IEE preparation stage, public consultations were conducted near the locations of proposed S&D networks alignments and outfall locations. Local residents, business persons (vendors, hawkers, shopkeepers etc.), Government officials, women and residents were consulted during public consultations from November 2023 to February 2024. Total 6 stakeholder's consultations were held in which a total of 121 persons (41 male and 80 female) participated. Summary of consultation are given in Table 17 below and details of the same along with attendance sheet and photographs is attached in Appendix 9. These consultations provided insights into the present situation and needs of the communities. A community consultation with local public and ward representatives were held on 10th November 2023 at Ward office of 108 in which project scope and its benefits, type of temporary inconveniences and type of mitigation measures adopted during project implementation were discussed. A total of 63 persons (7 male and 56 female) participated.

Table 17: Details of Public Consultation in the project area

Sr . No	Date	Type of consultation	Location	Total No. of Participants	No. of Male Participants	No. of Female Participants
1	08.11.23	Public Consultation	Ward 108	63	7	56
	26.12.2023	FGD	Anandapur	21	13	8
2	07.02.24	FGD	Ward 108 (M. Daha channel road, Sector H)	8	3	5
3	07.02.24	FGD	Ward 108 (Kasba industrial Estate, Sector J)	8	7	1

²⁰ADB SPS requires meaningful consultation to be a process that (i) begins early in the project preparation stage and is carried out on as an ongoing process throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of any socio-economic and cultural etc. pressure ; (iv) is gender inclusive and responsive, and is responsive to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stake holders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Sr . No	Date	Type of consultation	Location	Total No. of Participants	No. of Male Participants	No. of Female Participants
4	07.02.24	FGD	Ward 108 (East Kolkata Township, Sector 2)	7	3	4
5	07.02.24	FGD	Ward 108 (Kasba industrial Estate, Phase 3)	6	5	1
6	07.02.24	FGD	Ward 108(Kasba industrial Estate, Sector I)	8	3	5
Total				121	41	80

153. The participants are aware of the project, and they expressed their willingness to provide support during the execution of the work. The participants informed that proposed work will be beneficial to their area as it will help to get rid of water logging issues during rainy seasons besides improving the living conditions and public health. They suggested that the detailed project information should be disseminated to the public. During public consultations with road-side shop owners, hawkers, vendors, they were informed that there would be only temporary impacts on their business during construction phase for limited period. The public expressed their concern regarding the nuisance and disturbance (dust, road closure and traffic management activities) during the construction stage which can have an impact on their day-to-day activities. The public demanded advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience. Public opined that an appropriate operation and maintenance system should be in place.

C. Future Consultation and Disclosure

154. Prior to start of construction, PMU with the assistance of PMDSC will conduct information dissemination sessions at major intersections and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various environmental issues. At ward/neighborhood level, focus group meetings will be conducted to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

155. A constant communication will be established with the affected communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. PMU with the help of PMDSC consultants will organize public meetings and will appraise the communities about the progress on the implementation of EMP. Meeting will also be organized at the potential hotspots/sensitive locations before and during the construction.

156. A matrix outlining indicative future consultations during the implementation stage of construction work is given in Table 18. It identifies key stakeholders and the nature of consultations at various points during the construction phase.

Table 18: Matrix of indicative consultations during implementation

Stakeholder	Initial Implementation	Mid-Implementation	Final Implementation
Local Community	Inform about project start, safety measures, and expected disruptions.	Update on progress, address concerns, manage any new disruptions.	Inform about nearing completion, address final concerns, prepare for transition to post-construction.
Local Government	Ensure compliance with permits, initial inspections, address any regulatory concerns.	Mid-project compliance checks, address any issues, update on progress.	Final inspections, ensure all regulations have been met, prepare for project handover.
Contractors/Subcontractors	Initial coordination meetings, detailed work schedules, safety protocols.	Regular progress meetings, address any issues, adjust schedules as needed.	Final project meetings, ensure all tasks are completed, address any last-minute issues.
Environmental Agencies	Initial environmental compliance checks, implementation of mitigation measures.	Ongoing monitoring, address any environmental concerns, report on compliance.	Final environmental impact review, ensure all measures have been effective, prepare final report.
Utility Companies	Coordination of initial utility work, schedule alignments.	Mid-project utility adjustments, ensure ongoing coordination, address any issues.	Final utility checks, ensure all services are operational, address any final adjustments.
Health and Safety Inspectors	Initial safety inspections, ensure all safety protocols are in place.	Ongoing safety checks, incident management, ensure compliance with safety standards.	Final safety inspection, review incident reports, ensure all safety measures have been effective.

157. This matrix helps ensure that all relevant stakeholders are kept informed and engaged throughout the construction implementation stage, facilitating smooth project progress and addressing any issues promptly.

D. Project Disclosure

158. Project related information shall be disclosed through public consultation and making relevant documents available in public locations. PMU and PMDSC shall provide relevant

safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used. Project summary in the local language and English will be made available at the Ward offices of KMC and PMU. Electronic version of the IEE in English and summary in Bengali will be placed in the official website of the KSHARP after approval of the IEE by Government and ADB. Per ADB requirements, IEE report, and environmental monitoring reports will be posted on ADB website.

159. Stakeholders will also be made aware of grievance register and redress mechanism, including contact information of project agency. During project implementation, relevant information about any major changes to project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

160. Public information campaigns via newspaper/radio/TV are proposed. Prior to start of construction, the PMU will issue a notification on the start date of implementation in local newspapers. A board showing the details of the project will be displayed at the construction site for the information of general public.

161. 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

A. Common Grievance Redress Mechanism

162. A project-specific grievance redress mechanism (GRM) was established under ongoing project (Loan number 3413 and 3689, Kolkata Environmental Improvement Investment Program (KEIIP)). The GRM for KEIIP, will be applicable and will be further strengthened for the proposed KSHARP.²¹ The grievance redress mechanism (GRM) will receive, evaluate, and facilitate the resolution of social, environmental or any other project-related grievances for KSHARP (along with the existing project). The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns of the project stakeholders.²² The multichannel, project-specific GRM functional for KEIIP and the positive features and learning from it will be adopted for the KSHARP.

163. A common grievance redress mechanism (GRM) will be in place to redress social, environmental or any other grievances related to project and/or respective subprojects. Implementation of the resettlement plan/resettlement and indigenous peoples plan (RIPP)/due diligence reports (DDRs)/ initial environment examination (IEEs) will follow the GRM described below. A public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated. The campaign will ensure that the poor, vulnerable and others are made aware of grievance redress procedures and entitlements per project entitlement matrix, and PMU will ensure that their grievances are addressed.

164. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that have already been installed by PMU or through toll-free telephone number “Didi Ke Bolo”²³ or talk to Mayor²⁴ or by e-mail, by post, or by writing in complaints register kept in PMU office or Kolkata Municipal Corporation (KMC) Borough offices or Contractor’s site offices. Appendix 10 has the sample grievance registration format. 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 will be undertaken. PMU Safeguard Officers will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party. The complainants/aggrieved persons will also be encouraged to seek a complaint registration number from the PMU.

²¹ The office order regarding GRC is placed in Appendix 11.

²² The project components under the KEIIP are water supply, sewerage and drainage, construction of STP and Pumping Stations. Similar project components have also been proposed in KURIP, except for water supply components, so it is expected that the nature of grievances which may arise during the implementation phase under KURIP will be similar in the nature of grievances that were received in KEIIP. During implementation of KEIIP, the grievances were mostly related to disruption in water supply services due to damages caused to existing pipelines during excavation work, minor damages caused to the property line during construction phase, damages to boundary walls, concrete ramps, water logging, delays in road restoration work, etc. The GRC in KEIIP has long standing experience for dealing and resolving the same kind of grievances within stipulated time. The GRM established in KEIIP is functioning effectively, hence adopting the same GRM structure of KEIIP is proposed in case of KURIP. Under KEIIP, the grievances are resolved on average between seven and fifteen days. The same grievance redress committee (GRC) will continue to function for KURIP.

²³ This is an initiative started by GoWB from 2019, that provides a platform for the people of West Bengal to directly lodge concerns or complaints to the state authority (Hon’ble Chief Minister GoWB). Official website: <https://www.didikebolo.com/>

²⁴ KMC initiated this unique public communication system through which citizens of the city can call on a designated number to register complaints in 2019. Talk to Mayor dial in at 18003451213.

165. The GRM provides an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project. A three-tier GRM is conceived for the proposed project, the first tier is being at field/ward/Borough level, the second tier at PMU level and the grievance redress committee is being the apex level. For the project level GRM, a Grievance Redress Committee (GRC) will be established at PMU; the safeguards officers of the PMU, supported by the social safeguards specialist of PMDSC will be 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 GRM. All expedient and minor grievances will be resolved at field/ward/Borough level; should any grievance fail to be resolved within the stipulated time period at the field level, the PMU will be consulted within specified time. PMU will also be 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 will be referred to the grievance redress committee (GRC).²⁵

166. 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 will be registered. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from the PMU supported by PMDSC will try to successfully resolve them in consultation with the Executive Engineer of KMC Borough offices. Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the GRC. The GRC for the project has been constituted, as per office order PMU/ 404 A/2023-24, dated 29 December 2023, issued by Project Director, KEIP/KMC. The GRC 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 may be referred by affected persons to appropriate courts of law. The multi-tier GRM for the project is outlined below (Figure 2.2), 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 will continue to function throughout the project duration. The PMU shall issue notifications to concerned Borough offices to establish field level GRCs, with details of composition, process of grievance redress to be followed, and time limit for grievance redress at each level.

167. **Grievance redress process.** In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and PMDSC on-site personnel will provide the most easily accessible for quick resolution of grievances. Contact phone numbers and names of the concerned PMU safeguard officers and contractors will be posted at all construction sites at visible locations. The PMU safeguard officers will be responsible to see through the process of redressal of each grievance.

- (i) **1st Level Grievance.** The first point of contact for people filing complaints will be the staff from the contractor designated for receiving grievances and kept in safe custody under supervision of Gender and Safeguards Unit (GSU) field workers assigned to the ward (who will be available at an appointed time at the sites(s))

²⁵ The GRC comprises the Administrative Officer, KURIP, Deputy Chief Engineer (I), KURIP/KMC, Social Safeguard Officer, KURIP, Environmental Officer KURIP, Social Safeguards Specialist, PMDSC, KURIP, Environmental Safeguards Specialist, PMDSC, KURIP. The Administrative officer, KURIP is the Convenor of the GRC.

and borough office) and the contractor's personnel. The phone number of the KMC Borough office should be made available at the construction site signboards. Registers for writing complaints will be available at borough offices. The contractors and GSU safeguard monitors can immediately resolve grievances on-site in consultation with each other and the area engineer and borough engineer, as required, and will be required to do so within 5 days of receipt of a complaint/grievance. Record of grievances received at field level will be conveyed once a week to the Environmental and Social Managers and Administrative Officer at PMU, to enable tracking.²⁶

- (ii) **2nd Level Grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the Grievance Redress Committee at PMU, headed by the Administrative Officer, assisted by the Safeguard Officers and concerned Deputy Chief Engineer, who will seek the advice of the Project Director, and Director General of PMU as necessary, and attempt to resolve the grievances within 10 days from the date of registration of complaint. The GRU of the PMU is already in place. If the PMU feels that the matter is beyond its jurisdiction, it will escalate the same to the Grievance Redress Committee (GRC).
- (iii) **3rd Level Grievance.** All grievances that cannot be resolved at PMU level will be referred to the GRC with support from PMU and PMDSC. GRC will attempt to resolve grievances within 5 days, 10 days and 15 days from the date of receipt of complaint from 1st level, 2nd level, and 3rd level respectively.

168. Besides the project's GRM, the Kolkata Municipal Corporation (KMC) also has a centralized public grievance redress monitoring system where the public can file grievances through a dedicated web portal.²⁷ The complainant or aggrieved persons can also lodge their complaints through this online portal.

169. **Court of Law.** Under the project specific GRM, 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. In case of grievance related to land acquisition, resettlement and rehabilitation, the affected persons will have to approach a legal body/court specially proposed under the RFCTLARRA, 2013.²⁸

170. **ADB Accountability Mechanism.** The People who may /are in future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach ADB accountability mechanism.²⁹

²⁶ In case of any impacts on indigenous people/scheduled tribe, in subproject areas, the grievance redress team must have representation of the affected indigenous people, the chief of the indigenous peoples group as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and/or an NGO working with indigenous peoples.

²⁷ <https://www.kmcgov.in/KMCPortal/jsp/ComplaintNew.jsp>

²⁸ The Authority admits grievances only with reference to the Land Acquisition and R&R issues under the RFCTLARRA, 2013.

²⁹ Accountability Mechanism. <http://www.adb.org/Accountability-Mechanism/default.asp>

171. **Areas of Jurisdiction.** The areas of jurisdiction of the GRC, headed by the Administrative Officer, KSHARP will be (i) all locations or sites within the KMC jurisdiction where subproject facilities are proposed, or (ii) their areas of influence within the KMC areas. The GRC will have jurisdictional authority across the KMC area (i.e., areas of influence of subproject facilities, if any).

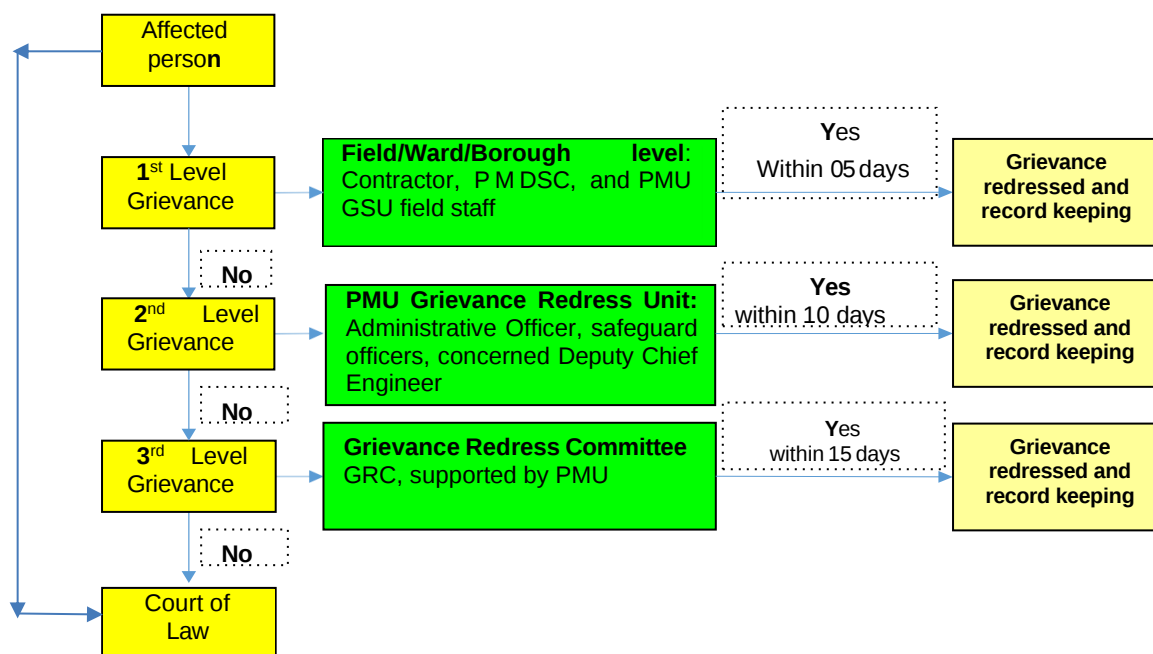
172. **Record-keeping.** Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions, the date these were affected and the final outcome will be kept by PMU (with the support of PMDSC). The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU office, the ward/borough office and on the web, as well as reported in the semi-annual environmental monitoring reports to be submitted to ADB.

173. **Information Dissemination Methods of the GRM.** The PMU, assisted by PMDSC will be responsible for information dissemination to affected persons on grievance redressal procedure. Subproject area/affected area-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the consultation and participation plan. A public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated. The environment and social safeguard officer will be assisted by PMDSC safeguards specialists with information/collateral/awareness material etc. and in conducting project awareness campaigns. The campaign will 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 will be documented and reported back to the affected persons. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU offices, Borough level 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 8.

174. **Periodic Review and Documentation of Lessons Learned.** The environment and social safeguard officer of PMU will periodically review the functioning of the GRM and record information on the effectiveness of the mechanism, especially on the PMU's ability to prevent and address grievances.

175. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by PMU. Cost estimates for grievance redress are included in resettlement cost estimates. The grievance redress process is shown in Figure 22.

Figure 22: Grievance Redress Mechanism (KSHARP)



PMDSC: Project Management and Design Supervision Consultant; PMU: Project Management Unit; GRC: Grievance Redress Committee; GSU: Gender and Safeguards Unit

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

176. An Environmental Management Plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to an acceptable level and monitoring the same. This is presented in the following tables (Tables 19 to 23) which shows the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring.

177. A copy of the EMP must be kept at work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will 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 constitutes a failure in compliance.

178. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate budget for compliance with these EMP measures, requirements and actions.

179. The contractor will be required to submit to PMU, 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. No works can commence prior to approval of SEMP.

Table 19: Pre-Construction Environmental Management Plan -Mitigation

Activities	Potential Impacts	Mitigation Measures	Cost and Source of Funds	Responsibility	
				Implementation	Supervision
Consents, permits and clearances	Environmental legal noncompliance may attract legal action. Failure to obtain necessary consents, permits, NOCs etc. can result to design revisions and /or stoppage of works	Ensure that all necessary approvals are obtained before start of construction.	Project cost	Contractor, PMU	PMU /PMDSC
EHS officer/supervisor designation and EMP implementation training	Non-designation of EHS officer/supervisor and lack of EHS training may lead to inadequate/failure in EMP implementation, resulting in EHS impacts. If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and Gol environmental policies	(i) Contractor to designate EHS officer/supervisor to ensure implementation of EMP (ii) Project manager and all key workers of contractors will be required to undergo EMP implementation training including spoils management, standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws etc. (iii) The capacity building program will be participatory to the extent possible to make it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.	Contractor	Contractor	PMU/ PMDSC
Updating of IEE and EMP and preparation of SEMP, including SDP, TMP, etc	Non implementation may result in significant environmental impacts and non-compliance with	(i) Update IEE based on detailed designs, and submit to ADB for review, approval, and disclosure prior to commencement of work.	PMU /Contractor	PMU and PMDSC Contractor	PMU

Activities	Potential Impacts	Mitigation Measures	Cost and Source of Funds	Responsibility	
				Implementation	Supervision
based on final design	ADB's environmental safeguards requirements	(ii) Formulate SEMP during implementation and get approval from the PMU. The SEMP shall include (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. (iii) No works can commence prior to approval of SEMP. The SEMP will include the following: (i) Construction Compound Management Plan; (ii) Construction Health and Safety Plan, and (iii) Emergency Incident Response Plan. (iv) Prepare Spoils Disposal Plan and Traffic Management Pla			
Environmental monitoring of baseline conditions of air, noise, water and soil	Baseline environmental quality must be determined if project has any impact on the environment. Contractor must conduct baseline environmental monitoring through NABL accredited laboratory before construction.	Conduct baseline environmental monitoring before commencement of construction.	Contractor	Contractor	PMDSC/PMU
Flora and fauna	Tree cutting	No tree cuttings are anticipated; however, during the preconstruction, if there are any trees identified on the sites / alignments, implement following measures	Contractor	Contractor	PMDSC/PMU

Activities	Potential Impacts	Mitigation Measures	Cost and Source of Funds	Responsibility	
				Implementation	Supervision
		• Avoid removal of trees by adopting to site condition and with appropriate layout design. • Obtain prior permission for tree cutting at sites that may require tree cutting finalized during detailed design • Plant and maintain 5 trees for each tree that is felled as per KMC policy. Conduct survey of trees for bird nests prior to cutting, if any active nests, ensure that trees are not disturbed until young birds fly away from the nests, do not cut trees during the breeding season;			
	Encroachment or disturbance to East Kolkata Wetlands	• No labour camps or construction facilities, storage areas, shall be established within 250 m from the boundary of EKW area • no debris/waste disposed within EKW of within 250 m from the boundary of EKW area • Prohibit employees and workers from poaching animals and cutting of trees for firewood.	Contractor	Contractor	PMU, PMDSC
Community Awareness on Project Activities and Impacts	Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.	(i) Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and try to come to a common understanding about the need for an improved drainage system and the sacrifices that need to be made to achieve it. To aid in the consultation process, it is important that the community should be made aware of the details of	Contractor/PMU	Contractor/PMU	PMU, PMDSC

Activities	Potential Impacts	Mitigation Measures	Cost and Source of Funds	Responsibility	
				Implementation	Supervision
		project activities. Important information to be disseminated to the people are, among others, the following: a. Overview and objectives of the proposed project; b. Preliminary and/or final detailed design of proposed project components; c. Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; (ii) Grievance redress mechanism and contact details of the project. (iii) Establish and maintain standards aimed at preventing sexual harassment, abuse, and exploitation and other forms of misconduct at work site. Zero tolerance to inaction on sexual exploitation, abuse, and harassment.³⁰			
Temporary construction facilities- Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas	Impacts to sensitive receptors such as flora and fauna, water bodies/natural drainage, settlements, etc.	(i) Do not consider residential areas for setting up construction facilities; (ii) Debris disposal site shall be at least 200 m away from surface water bodies; (iii) For aggregate storage area, hot mix plant, etc. no residential areas shall be located within 200 m downwind side of the site; Site should be at an adequate distance away from sensitive locations like	Contractor	Contractor	PMDSC/PMU

³⁰ The Asian Development Bank (ADB) has developed comprehensive guidelines to address Sexual Exploitation, Abuse, and Harassment (SEAH) in ADB-financed projects, particularly those involving civil works. These guidelines, found in the Good Practice Note on Addressing SEAH, aim to prevent, mitigate, and manage SEAH risks throughout the project lifecycle.

Activities	Potential Impacts	Mitigation Measures	Cost and Source of Funds	Responsibility	
				Implementation	Supervision
		settlements, ponds/lakes or other water bodies (iv) No camps or facilities shall be located within 200 m from EKW boundary			
Sources of Construction 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.	(i) Obtain construction materials only from government approved quarries with prior approval of PMU; (ii) Verify suitability of all material sources and obtain approval of PMU; and (iii) Submit to PMU on a monthly basis documentation of sources of materials. If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from WBPCB and will collect the copy of these certificates and submit to PMU/ PMDSC consultants. (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 PMU.	Contractor	Contractor	PMDSC/PMU
EMP Implementation Training	Lack of training on EMP implementation may lead to irreversible impacts to the environment, workers, and community.	Project manager and all key workers of contractors will be required to undergo EMP implementation training including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws etc.	PMU cost	Contractor, PMDSC	PMU/PMU

Table 20: Construction-stage Environmental Management Plan - Mitigation

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Work on Sensitive Areas	Dust generation, air, noise pollution	(i) constructed by small teams working at a time; (ii) any excavations will be protected as per standard norms (iii) finish excavation, pipe laying and back filling of trench in the minimum time possible (iv) provide adequate barricades and road safety signage during pipe laying works in traffic areas (v) if night works are required all the mitigation measures to reduce impacts of disturbance to minimum level to nearby habitants and road users should be ensured by contractor, (vi) consult with business and institutions for work schedules. In critical areas such as schools or hospitals, operating hours are factored into work schedules and workforce is increased for speedy completion, (vii) all trench and pit excavations and other work shall be carried out during night time at busy road section. and (viii) pedestrian access to schools, public libraries, courts, doctor's surgeries, pharmacists, and other premises frequently by the public will be maintained with the use of walking boards.	Contractor/ PMU	PMU	Project Cost
Demolition works	Dust, noise, demolition waste generation	(i) Prepare and implement a debris management plan (ii) Spray water to debris to keep it moist. (iii) Segregate and recover reusable materials. (iv) Segregate waste into recyclable, non-recyclable parts and hazardous waste (v) The dismantled existing bitumen surface will be reused and utilised for paving of crossroads, access roads, and paving works in construction sites and camps, temporary traffic diversions, haulage routes,	Contractor/ PMU	PMU	Project Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(vi) Unusable and non-bituminous debris materials should be suitably disposed off at pre- designated disposal locations, with approval of the concerned authority (vii) Sub grade of the existing pavement shall be used as fill material. (viii) Existing base and sub-base material shall be recycled as sub-base of the haul road or access roads (ix) Contractor will suitably dispose of unutilized debris materials either through filling up of borrow areas located in wasteland or at pre-designated disposal locations (x) All the safety measures should be adopted during demolition activities according to Construction and Demolition Waste Management Rules 2016.			
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area may require to be shifted	(i) identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and (ii) prepare a contingency plan to include actions to be done in case of unintentional interruption of services inform the local community in advance if utilities will be disrupted during construction)	Contractor/ PMU	PMU	Project Cost
Air Quality	Emissions from construction vehicles, equipment, and machinery used for bringing construction material, installation of pipelines resulting to dusts and increase	(i) Contractor to implement all measures to prevent and control dust from construction activities, including the following: (ii) Plan the work sites properly, and demarcate the sites for stockpiling of, soils, gravel, and other construction materials away from the traffic, vehicle, general worker movement to avoid disturbance of loose materials	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
	in concentration of vehicle-related pollutants such as carbon monoxide, sulphur dioxides, particulate matter, nitrous oxides, and hydrocarbons.	(iii) Provide dust screen around the sites prior to start of demolition works; provide temporary enclosure for dust-generating activities, wherever possible; (iv) Damp down exposed soil and any stockpiled material on site by water sprinkling; (v) There are two hospitals near the sub-project area, pipe laying is proposed at the backside of Ruby and Desun hospitals. No stacking of soil or material is allowed near hospital area to avoid dust generation. Additional measures shall be taken to avoid any impact on these sensitive areas. (vi) Use tarpaulins to cover sand and other loose material when transported by trucks; (vii) Clean wheels and undercarriage of haul trucks prior to leaving construction site. (viii) use enclosers and sprinkle water during concrete road cutting works to lay pipelines; dampen the unpaved ground in the immediate vicinity, and the debris generated; (ix) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel. (x) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly, and limit idling time of construction vehicles to minimize local air pollution. contractor's vehicles and equipment should compulsorily have PUC and submit to PMU before deployment at site. (xi) Limit idling of vehicles on the construction sites to 3-5 minutes (xii) Obtain, CTE and CTO for batching plant, hot mix plant, crushers etc. if specifically established for this project. (xiii) If contractor procures any material (such as ready-mix concrete, asphalt/ macadam, aggregates			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		etc.,) from third party agencies, contractor shall ensure that such agencies have all necessary clearances / permissions as required under the law; these include CTE/CTO from WBPCB, environmental clearance, etc., contractor shall collect the copy of these certificates and submit to PMU; PMU will approve the source only after all the certificates are submitted. (xiv) Strict prohibition of open burning of solid waste (xv) Regular inspection & maintenance of construction/transportation vehicles (xvi) Supply of LPG to workers instead of allowing them to use firewood for cooking (xvii) Conduct ambient air quality monitoring periodically as per Environmental Management Plan (EMP)			
Noise and Vibration Levels	Increase in noise and vibration levels due to earth-moving and excavation equipment and the transportation equipment, materials, people	(i) Contractor to implement all measures to control noise and vibration from construction activities, including the following: (ii) Conduct activities with the greatest potential to generate noise during periods of the day which will result in least disturbance; provide prior public information. (iii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iv) There are two hospitals near the sub-project area, pipe laying is proposed at the backside of Ruby and Desun hospitals. Additional measures shall be taken to minimize noise and vibration in these sensitive areas. (v) As far as possible use new construction machineries and keep all the old machineries in good and maintained state.	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(vi) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptor; (vii) Ensure proper training of construction workers on the safe usage of pneumatic drills and exposure limits per day; provide appropriate personal protection equipment - safety glasses or goggles/face shield, helmets, safety shoes or boots, hearing protection aids etc. Set up screens or shields in areas where nearby workers or community may be exposed to flying fragments, chips, dust and excessive noise. (viii) Maximum sound levels should not exceed the WHO guideline values for noise levels. (ix) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; (x) Consult the custodians of important buildings, cultural and tourism authorities and 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. (xi) Ensure that the drilling rig, generator sets have acoustic hoods and noise dampers in place; provide prior information to local community about the drilling operation; workers shall be provided with appropriate PPEs (xii) Conduct Noise monitoring according to the Environmental Management Plan (EMP).			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Surface Water, Soil and Groundwater Pollution	Works in rains/ Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality. Unscientific solid waste and construction waste disposal can lead to contamination of soil and ground water	(i) Contractor to implement all measures to prevent and control land and water pollution (ii) Prepare and implement a construction waste management plan. (iii) Avoid stockpiling of soils especially during the monsoon season, if unavoidable, it should be covered by tarpaulins or plastic sheets, and protected by protection berms / bunds to avoid entry of runoff (iv) Create a temporary peripheral drainage channel around the work area to arrest the entry of runoff from upper areas into the work area; (v) Avoid locating construction camps and labour camps near to any water body and do not dispose any waste or sullage into any water body. (vi) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PMU on designated disposal areas; (vii) Inspect all the drainage lines / streams at work sites, construction site/construction camp/labor camp etc. and clear all the drainage lines so that no water stagnation/flooding may occur during heavy rainfall. (viii) Groundwater occurs in shallow water table condition (both unconfined and confined) and the proposed excavation depth is 2.2m to 6.2m. Rains are also high during monsoon season – ensure that water will not pond in pits and voids near project location by dewatering the accumulated water	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(ix) Avoid trenching and excavation works (pipe laying) during monsoon season (x) If open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (xi) 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; (xii) Consider safety aspects related to pit collapse due to accumulation of water. (xiii) Inspect and verify all the emergency measures and emergency control system before start of monsoon, keep the emergency response committee on high alert during monsoon/heavy rain fall (xiv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (xv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (xvi) Contractor shall source water from surface sources as far as possible, and obtain necessary permit to use groundwater or surface water for construction purposes. (xvii) Prevent pollutants from contaminating the soil and the groundwater; provide proper facilities for proper collection and treatment of sanitary waste in work facilities and			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		workers accommodation (xviii) Store fuels and lubricants in double hulled tanks. Fuel and other petroleum products stored away from water drainage and protected by impermeable lining and bonded 110%; (xix) Conduct regular maintenance of machinery and vehicles, and avoid leakages; (xx) Enclose the construction area to prevent unauthorized access (xxi) Conduct surface quality monitoring according to the Environmental Management Plan (EMP).			
Generation and management of construction wastes	Improper waste management could cause odor and vermin problems, pollution and flow obstruction of nearby watercourses and could negatively impact the landscape and workers' health and safety.	• 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 of to approved designated areas immediately; • The excavated soil and material shall be reused for back filling of trenches. Surplus soil can be used at proposed Hossainpur STP site (under different package) as filling material which is a low land. • If disposal is required, the site shall be selected preferably from barren, infertile lands; site should locate away from residential areas, forests, water bodies and any other sensitive land uses;	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		- 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; - establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, engine oils, used oils, etc. at the construction site; - Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of in disposal sites approved by KMC; - 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; - If temporary soil storage is adapted, such site should be properly demarcated by fencing and information board should be placed at entrance; soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission; soil should be levelled on daily basis and no heap or mound should be left at end of the day; - Soil should be covered with tarpaulin sheets during the transportation.			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		• Soil transportation should not be done during the peak hours and should avoid narrow and heavy traffic routes and important religious or tourist sites • Prior to the commencement of works, contractor will follow all the prescribed rules and shall identify a surplus soil and debris disposal site (temporary and final disposal) in consultation with the PMU/ULB and adhering to the EMP criteria.³¹ • If any hazardous waste is generated, handled or managed during construction works contractor need to comply all the requirements of Hazardous and other wastes (Management and Trans boundary Movement) Rules, 2016, The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility • Conduct site clearance and restoration to original condition after the completion of construction work; PMU to ensure that site is properly restored prior to issuing of construction completion certificate.			
Accessibility and traffic management	Traffic problems and conflicts near project locations and haul road	(i) Plan water line works to minimize traffic disturbance / blockades; as the lines are to be laid in all the roads and streets in the town, work planning is crucial to minimize the inconvenience to public.	contractor	PMU, PMDSC	Contractor

³¹ Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(ii) Prepare and implement a Traffic Management Plan ensure road traffic and pedestrian and traffic safety through proper safety measures (iii) Plan construction vehicle transportation routes properly so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (iv) Schedule transport and hauling activities during non-peak hours; (v) Locate entry and exit points in areas where there is low potential for traffic congestion; (vi) Keep the site free from all unnecessary obstructions; (vii) Drive vehicles in a considerate manner; (viii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; (ix) Notify affected sensitive receptors 1-week in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (x) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. (xi) Confine work areas along the roads to the minimum possible extent; all the activities, including material & waste/surplus soil stocking should be confined to this area. Proper barricading should be provided;			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the as and when required (xii) Provide pedestrian access in all the locations until normalcy is restored. Leave spaces for access between excavation and/or mounds of soil to maintain access to the houses / properties (xiii) Provide wooden/metal planks over the open trenches at each house to maintain the access.			
Social and Cultural Resources	Ground disturbance can uncover and damage historical remains – chance finds	(i) Strictly follow chance find procedures (Appendix 7) by coordinating immediately with PMU and Archaeological Department for any suspicion of chance finds during excavation works (ii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; (iii) Stop work immediately to allow further investigation if any finds are suspected. (iv) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ	Contractor and PMU	PMU and PMSDC	Project costs
Socio-Economic - Income.	Impede the access of residents and customers to nearby shops	(i) Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools; (ii) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (iii) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		(iv) Provide all mitigation measures as given in resettlement plan (RP) prepared for the project to mitigate impacts on vendors and shopkeepers.			
Occupational Health and Safety	Construction activities could create health and safety risks to construction workers	(i) Comply with all national, state and local labor laws (ii) Following best practice health and safety guidelines including IFC's General EHS Guidelines³², Sector Specific (Water and Sanitation) Guidelines³³ and any other guidelines and protocols issues by WHO, ADB or relevant government agencies for emerging situation like COVID-19, (iii) 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 Training³⁴ for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (iv) Ensure that demolition works are properly	Contractor	PMU, PMDSC	Contractor

³²<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

³³<https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>

³⁴ 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; (iv) 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.

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		planned and executed; competent engineer shall assess the buildings to be demolished and prepare a demolition plan duly considering the potential hazards, methods to be adapted, equipment to be used, and control of dust, noise and debris. Workers shall be trained, and an emergency plan shall be put in place. (v) Provide dust screen around the sites prior to start of demolition works; provide temporary enclosure for dust-generating activities, where ever possible; (vi) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and KMC shall be planned (vii) Conduct work in confine spaces, trenches, and at height with suitable precautions and using standards and safe construction methods; do not adopt ad hoc methods; all trenches deeper than 1 m shall be provided with safety shoring/braces (wooden/steel); (viii) Adequate safety measures shall be implemented for excavation and			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		construction of wet well at the proposed pumping station; the risk is high consider the depth of excavation, and high water table. (ix) As far a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it If open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (x) Provide hard barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches (xi) Ensure that qualified first aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (xii) Provide medical insurance coverage for workers; (xiii) Secure all installations from unauthorized intrusion and accident risks; (xiv) The project area may experience extreme temperature during summer months of April and May occasionally, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following: a. Work schedule should be adjusted to			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		avoid peak temperature hours (12 – 3 PM) b. Provide appropriate shade near the workplace; allow periodic resting and provide adequate water c. Provide necessary medicine and facilities to take care of dehydration related health issues (xv) Provide supplies of potable drinking water; (xvi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (xvii) Provide H&S 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; (xviii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (xix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (xx) Ensure moving equipment is outfitted with audible back-up alarms; (xxi) 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			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xxii) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. (xxiii) Conduct regular health check-ups for workers (xxiv) Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites.			
Community Health and Safety	Construction activities could create health and safety risks to community people.	• Code of conduct for workers should be developed and implemented throughout the construction period; • Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities; • Trench excavation and pipeline works shall be conducted in a safe manner; if allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in	Contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned • All trenches deeper than 1 m shall be provided with safety shoring/braces (wooden/steel); • Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day • Follow established community health and safety protocol on emerging infectious diseases such as COVID19. • Implement measure to prevent proliferation of vectors of diseases at work site; • Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (KMC); • Schedule transportation activities by avoiding peak traffic periods; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; Educate drivers: limit speed not more than 30 km/h in settlements; ensure that drivers follow road safety rules, and employ traffic marshals in all construction vehicles on road to assist the driver			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		• Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement; • Provide prior information to local community, temples and other places of worship about work schedules; • Noise barriers must be installed in between the construction site and any community locations to reduce the noise level; • Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; • Provide hard barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches • Ensure contractor has staff trained on emergency response.			
Operation of Construction Camps and Workers Facilities	Proper provision and maintenance of facilities is necessary for proper living conditions and avoid health, environment, and safety issues. Operation of construction camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of	(i) Ensure conditions of liveability 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 used as accommodation for workers; accommodation shall meet the IFC standards for workers accommodation ³⁵ which include: provision of safe housing, availability of electricity, plumbing, water and sanitation, adequate fire protection and dormitory/room facilities; accommodation shall be in the range from 10 to 12.5 cubic meters (volume)	Contractor	PMU, PMDSC	Contractor

³⁵https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-atifc/publications/publications_gpn_workers_accommodation

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
	fuels, oils, solvents, and lubricants.	or 4 to 5.5 square meters (surface) per worker, a minimum ceiling height of 2.10 meters; a reasonable number of workers are allowed to share the same room – (standards range from 2 to 8 workers); workers with accompanying families shall be provided with a proper and safe accommodation (ii) Train employees in the storage and handling of materials which can potentially cause soil contamination; (iii) Recover used oil and lubricants and reuse or remove from the site; (iv) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (v) Remove all wreckage, rubbish, or temporary structures which are no longer required; and (vi) Report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work			
Social and Cultural Resources	Schools, hospitals and religious places such as temples are present nearby the proposed alignment of pipe laying and contractor will require to follow the mitigation measures	(i) Consult with concerned agency authorities and local community in pre-construction phase and explain the work method and duration of proposed works, take their suggestions and comments and incorporate in design the mitigation measures required (ii) Do not schedule the works at sensitive times; (iii) observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrance/obstacles during such times (iv) Provide proper signage, barricades etc. (v) Take special measures including posting of security personnel at the work sites near the	Contractor and PMU	PMU and PMSDC	Project costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		schools and hospitals, ensure safe entrance, and fully separated from the work site. Define clear pedestrian path with fully barricaded on both sides, and on the top if there is risk of falling objects.			
Monsoon preparedness	Disruption of utilities and water logging in trenches	(i) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it (ii) if open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc.	contractor	PMU, PMDSC	Contractor
Night Works	Accidents and disturbance to sensitive receptors may occur during night works	(i) Prepare a night work protocol and obtain prior approval from PMU, and no night works shall be conducted without prior written approval of PMU (ii) No noisy works shall be conducted during the night; maintain noise levels within the standards prescribed by CPCB (iii) Maintain proper lighting and illumination of work site (iv) Workers engaged in night works should have: adequate rest/sleep in daytime before start of night works, and previous experience of night works and should be physically fit for such works including clear vision in night (v) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements (vi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided	contractor	PMU, PMDSC	Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		all the protective aids (PPEs) including fluorescent/retro-reflective vests (vii) Workers / site staff should not shout or create noise / nuisance (viii) First aid and emergency vehicles should be available at site (ix) Emergency preparedness plan should be operative during night works (x) Old persons and pregnant women and women having small kids should not work in nighttime (xi) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise (xii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works (xiii) PMU/PMDSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video graphic records as well as register the observations. (xiv) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement (xv) After completion of night works all the site should be cleaned and maintained obstruction free for daytime movement of vehicles and pedestrians (xvi) Drivers and workers should be alert and responsive during night works (xvii) All the wages to workers working in night hours should be as per the applicable labour acts (xviii) Avoid any nuisance which may create problems to nearby habitants and work peacefully			

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
		during night hours (xix) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.			
Post-construction clean-up and reinstatement	Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; (ii) All excavated roads shall be reinstated to original condition; (iii) All disrupted utilities restored; (iv) All affected structures rehabilitated/compensated; (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up; (vi) All hardened surfaces within the construction camp area shall be ripped; (vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document; (viii) The contractor must arrange the cancellation of all temporary services; (ix) Request PMU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work. (x) The contractors' contract indicates no final payment will be disbursed until the PMU concurs that the post-construction clean-up and reinstatement are satisfactory.	Contractor	PMU, PMDSC	Contractor

Table 21: Operation-stage Environmental Management Plan - Mitigation

Activities	Potential Impacts	Mitigation Measures	Responsibility	
			Implementation	Supervision
Discharge of SWF from pumping station and gravity outfalls	Improper operational leading in inadequate dilution	- Ensure that no adhoc methods of operations are adapted by the operators or staff - Implement standard operating procedures with all technical specifications for bypass of SWF into canals - Train operators and staff in SOP - Conduct periodic monitoring of SWF discharge and receiving canal water quality	KMC	KMC
Detection and repair of leaks	Potential health hazard to nearby community, soil and groundwater contamination	- Ensure stability and integrity of the system by periodic monitoring to detect any problem and quick remedial action, if required. - Ensure adequate pumping to avoid water logging condition during heavy rain. - Any repairs will be small-scale involving manual, short duration works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts. - Restrict maintenance activities to reasonable working hours near sensitive receptors. Keep local communities informed about nature and duration of work and likely cause of disturbance. Provide sign boards displaying contact numbers for concerns/complaints. - Clearly demarcate working areas and maintain strict access control. - Adequate resources – technical and financial, has been taken into consideration into the project design. - Ensure compliance with all national and state laws during the O&M activities.	O&M Contractor	Environment Officer PMU
O&M of pumping station	Odour and noise impact, Potential health hazard to nearby community	- A Standard Operating Procedures (SoP) and operation manual will be prepared by the construction contractor. - Ensure operation and maintenance of PS as per the SoP to avoid over flows, blockages, etc. and immediately conducting the maintenance work in case of such occurrences. Ensure there is no overflow of sewers due to blockages or leaks in sewer network. - Ensuring uninterrupted power supply with back-up facility is a must.	O&M Contractor	Environment Officer PMU

Activities	Potential Impacts	Mitigation Measures	Responsibility	
			Implementation	Supervision
		• Ensure that all conditions/standards prescribed by WBPCB are complied duly. • Develop an Emergency Response System (ERS) to avoid any unprecedented incident. • Undertake preventive and periodic maintenance activities as required; • Conduct periodic training to workers; ensure that all safety apparatus at PS including personal protection equipment are in good condition all times; and are at easily accessible and identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations; • No wastewater from industrial premises (including domestic wastewater) shall be allowed to dispose into municipal sewers; monitor regularly and ensure that there is no illegal discharge through manholes or inspection chambers; conduct public awareness programs; in coordination with KMC.		
Leakage and Overflows	It may affect the sewer system, contaminate land, water and create public health issues	Effective operation to avoid and/or immediate clearance of such leaks, blockages; • Implementation of regular O&M schedules.	KMC or in association O&M contractor	PMU
Occupational health and safety	Accidents	Prepare and implement an Occupational Health and Safety Plan during operation stage that will cover all hazards and risks from the operation and maintenance of all facilities, including electrical, biological, chemical hazards and risks, etc.	KMC or in association O&M contractor	PMU

Table 22: Construction-stage Environmental Management Plan - Monitoring

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 12	Weekly during construction	Supervising staff and safeguards specialists	No costs required
Tree cutting (if required) and plantation in Pump house	Outfall locations / pipe laying sites and Pumping station	Obtain permission from concerned authority for any tree cutting and plant trees in the ratio of 1:5.	Continuous	Supervising staff and safeguards specialist	Contractor's cost
Ambient air quality	At 2 different locations to be decided by the Environment Specialist of PMDSC.	PM10, PM2.5 NO2, SO2, CO	Once before start of construction and quarterly during construction except monsoon period ³⁶	Construction Contractor	Cost for implementation of monitoring measures responsibility of contractor (22 samples x 6000 per sample = 1,32,000)
Ambient noise	At 2 different locations to be decided by the Environment Specialist of PMDSC.	Day time and night time noise levels	Once before start of construction and quarterly during construction except monsoon period	Construction Contractor	Cost for implementation of monitoring measures responsibility of contractor (22 samples x 1500 per sample = 33,000)
Surface water quality	At 2 different locations of D-D1	pH, TDS,TSS Oil and grease, Cl, F,	Once before start of construction and	Construction Contractor	Cost for implementation of monitoring measures

³⁶ The monsoon season can cause significant fluctuations in environmental parameters, which may lead to skewed or unrepresentative data. For example, heavy rains can dilute pollutant concentrations, giving a misleading impression of environmental quality. Environmental quality monitoring may be suspended during the monsoon season for several reasons (i) Safety Concerns,(ii)Accessibility Issues,(iii) Instrument and Equipment Damage. (iv) Data Reliability, (v) Sampling Challenges and (vi) Resource Allocation.

Monitoring field	Monitoring location	Monitoring Parameters	Frequency	Responsibility	Cost and Source of Funds
	canal and TP canal,	NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity, Phenolic compound	quarterly during construction (pre-monsoon, monsoon and post monsoon) period quarterly		responsibility of contractor (22 samples x 6000 per sample =1.32,000)
Sediment Quality	At 2 different outfall locations of D-D1 canal and TP canal to be decided by the Environment Specialist of PMDSC.	pH, Color, Texture (silt, clay, sand), Total Kjeldahl Nitrogen, Phosphorous, Sulphide, Particle Size, Mercury, Cadmium, Lead, Pesticide, Organic Matter, oil and grease	Once before start of construction and quarterly during construction (pre-monsoon, monsoon and post monsoon) period	Construction Contractor	Cost for implementation of monitoring measures responsibility of contractor (22 samples x 6000 per sample =132,000,000)

Table 23: Operation Stage Environmental Monitoring Plan - Monitoring

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost and Source of Funds
Monitoring of plantations at Pump house	Plantation's locations	Number of tree survived	Monthly	O&M contractor in association KMC	PMU
Monitoring at Outfall locations for discharge of combined flow	Drainage and sewer system	As per SOP	as per plan	O&M contractor in association KMC	PMU
Operation and maintenance of the drainage and sewer system	Drainage and sewer system	Contractor records (inspections, repairs and maintenance)	as per plan	O&M contractor in association KMC	PMU

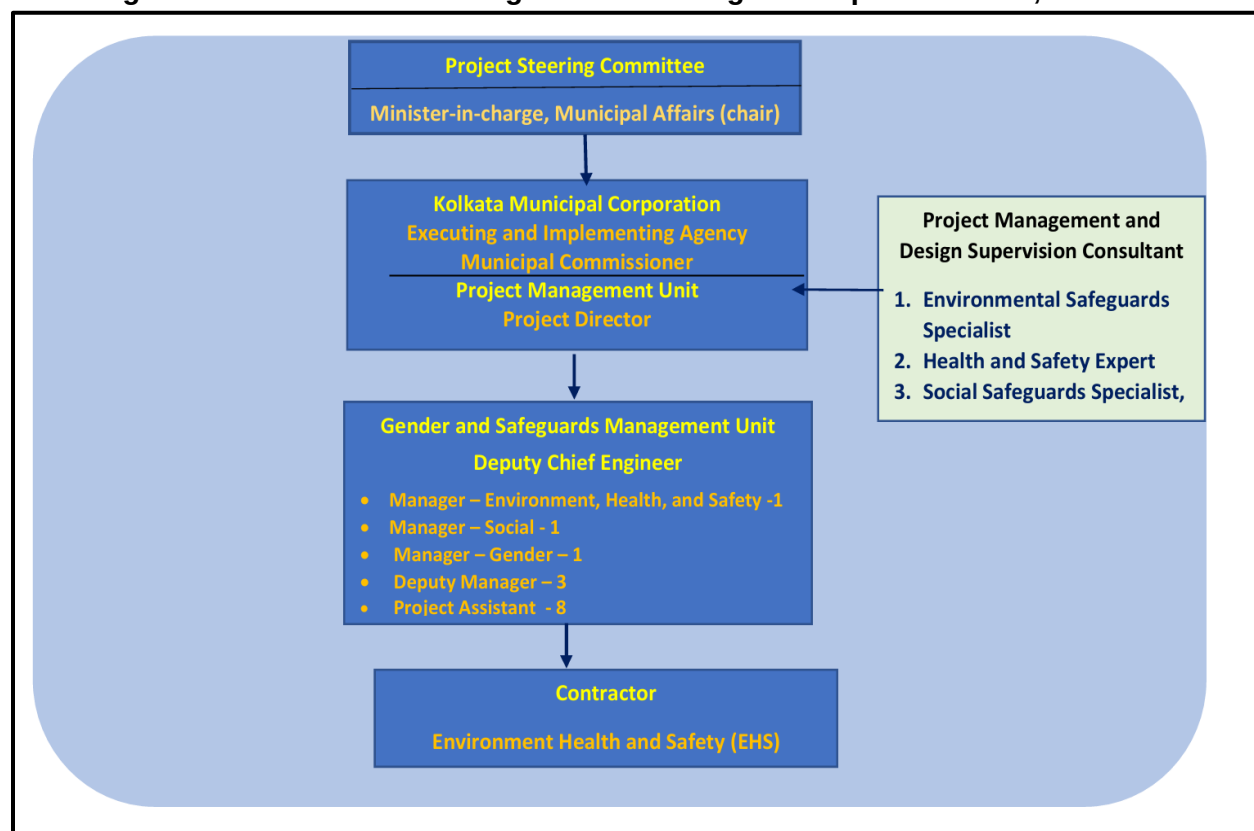
B. Institutional Arrangement

180. The Kolkata Municipal Corporation (KMC) will be the executing and implementing agencies, and the project management unit (PMU) established within KMC for the ADB-financed Kolkata Environmental Improvement Investment Program (KEIIP), will implement the project. The PMU, headed by a Project Director, will be strengthened and expanded to implement the project.

181. The Project Director will be supported by Director General - Project for procurement and contract management and Deputy Chief Engineer (DCE) for safeguards implementation. The DCE, supported by an Manager – Environment, Health and Safety and Manager - Social, will be responsible for environmental and social safeguards in compliance with project agreements, government requirements and ADB SPS, 2009. Gender, Safeguard management unit (GSMU) headed by DCE and staffed with 3 Managers, 3 Deputy Managers, and 8 project assistants to implement and monitor of gender action plan, EMP, resettlement plans, and with focus on community and occupational health and safety aspects³⁷

182. PMU will be supported by a Project Management and Design Supervision Consultant (PMDSC). The PMDSC will have an Environmental Safeguards Specialist (ESS) and an Health and Safety Expert to support in all tasks related to environmental safeguards. At contractor level, an Environment, Health and Safety (EHS) supervisor will be appointed on-site, one for each package, to assist in preparing and implementing site-specific EMP.

Figure 23: Institutional Arrangement for Safeguard Implementation, KSHARP



³⁷ The existing Social Safeguard Cell will function as the Safeguard and Safety Cell (SSC) for the project

183. Project Management Unit. The PMU will be responsible for planning, management, coordination, supervision and progress monitoring. PMU has the responsibility of fulfilling environmental requirements of the government and ensuring effective implementation of the environmental management provisions in the EARF, IEEs, EMPs and civil works contracts. Supported by PMDSC, the following are the key environmental safeguard tasks and responsibilities of the Manager (Environment, Health & Safety) at the PMU level:

- (i) ensure compliance with government and ADB's environmental safeguards;
- (i) review and approve the IEEs (for new packages) and updated/final IEEs;
- (ii) coordinate with design engineers, PMU and PMDSC to integrate environmental mitigation and enhancement measures and legal requirements in designs;
- (iii) ensure IEEs reflect final designs, and ensure prompt update to reflect any changes
- (iv) ensure that EMP and associated costs are included in bids and contracts;
- (v) review and approve the SEMP from the Contractor;
- (vi) establish a system to monitor and report on environmental safeguards;
- (vii) ensure legal requirements are met timely (consent, licenses, permissions etc.),
- (viii) oversee and ensure SEMPs and EMPs are implemented by contractors;
- (ix) Check effectiveness on SEMPs, and Health and Safety Plans implementation, and take actions to improve or correct the same;
- (x) Submit semi-annual environmental monitoring reports (SEMR) to ADB;
- (xi) assist in establishing and operating GRM and timely and effective redress of environmental safeguards-related complaints;
- (xii) confirm compliance with all measures and requirements in the IEEs, the EMPs and any corrective or preventive actions set forth in safeguard monitoring reports;
- (xiii) ensure timely disclosure of final EARF, IEEs, SEMRs, corrective plans etc.;
- (xiv) Oversee and ensure safeguards related loan covenants are complied with
- (xiv) organize capacity building and training programs on environmental safeguards.

184. Safeguard and Safety Cell (SSC), PMU. The existing Social Safeguard Cell will function as the Safeguard and Safety Cell (SSC) for the project covering environment, social and safety aspects. The SSC, in addition to social development, public awareness and social safeguard responsibilities, will also monitor EMP implementation including community health and safety aspects. The SSC staff, currently implementing the ongoing KEIP, are conversant with EMP, health and safety and ADB safeguard policies. Capacity building of the SSC staff will be facilitated by PMDSC. SSC field staff will report to the Manager (Environment, Health & Safety) and Manager (Social). The environmental safeguards responsibilities of SSC field staff include:

- (i) Monitoring of EMP/SEMP implementation and submit monitoring reports to PMU
- (ii) Review of contractor's site-specific health and safety plans
- (iii) Monitoring occupational and community health and safety measures
- (iv) Carryout site inspections to review health and safety on-site, submit reports
- (v) Ensure records of work-related accidents (on and off-site), ensure prompt reporting to PMU and undertaking corrective actions
- (vi) Engage with local communities to raise awareness about the project's health and safety impacts.
- (vii) Implement GRM; coordinate with contractor, PMDSC and PMU to promptly address community grievances and avoid undue escalations;
- (viii) Coordinate with elected representatives, district administration, line departments, PMUs, Contractor, PMDSC, and community for project activities;
- (ix) Facilities field data, reports and information for IEE updates and SEMRs
- (x) rapport-building and information dissemination to the public;

- (xi) database management on safeguard monitoring, grievances.

185. **Project Design Management and Supervision Consultant (PMDSC).** The PMDSC will have an Environmental Safeguards Specialist (ESS) and an Health and Safety Expert to support in all tasks related to environmental safeguards to PMU.

186. The PMU will be supported by PMDSC's Environmental Safeguards Specialist who will assist in preparing, updating, reviewing, implementing, monitoring, and reporting of all tasks related to environmental safeguards. Following are the key tasks of Environment Specialist of PMDSC:

- (i) Assist the PMU in screening project components and update ADB Rapid Environmental Assessment (REA) checklists and category per EARF, when necessary to reflect project changes based on the final detailed survey;
- (ii) Work closely with PMU and Contractor design teams to include environmental considerations in project location, design, and technical specifications;
- (iii) Identify statutory clearance / permissions / approvals required and assist the PMU in obtaining them;
- (iv) Assist in including standards/conditions of regulatory clearances and consents, if any, in the project design;
- (v) Assist the PMU in the review of Contractor' SEMP's;
- (vi) Carry out baseline environmental surveys and prepare updated/final IEEs and EMPs based on the Contractor's detailed design, SEMP's, and in accordance with country's environmental legal frameworks and ADB SPS 2009;
- (vii) Lead / assist PMU in public consultations and include inputs from the public consultation in the project design and EMP, and proper documentation in the IEEs;
- (viii) Advise / assist PMU in disclosing relevant information on safeguards to affected people and relevant stakeholders;
- (ix) Assist PMU in reviewing and approving contractor SEMP's, health and safety plan and any other associated plans as required
- (x) Assist the PMU in monitoring the implementation of EMP's/SEMP's and ensure compliance by the Contractors including subcontractors;
- (xi) Carry out site verification of EMP/SEMP implementation on a regular basis;
- (xii) Provide guidance on resolving issues pertaining to effective and efficient implementation of proposed environmental mitigation measures per EMP's/SEMP's during construction phase. Identify, non-compliance or unanticipated impacts, if any, and initiate corrective actions and report to PMU;
- (xiii) Assist the PMU in the review and approval of monthly monitoring reports submitted by Contractor;
- (xiv) Assist the PMU in consolidating and preparing quarterly Environmental Monitoring Reports (EMR) and submit to PMU;
- (xv) Assist the PMU in preparing semi-annual environmental monitoring report per the requirement of ADB;
- (xvi) Identify training needs and implement capacity building activities on environmental safeguards for the PMU, contractors, and other stakeholders;
- (xvii) Assist PMU in establishing GRM for the Project;
- (xviii) Assist PMU in grievance redress, advise the contractor on appropriate actions on grievances, ensure timely resolution and proper documentation;
- (xix) Support all other environmental safeguards-related activities and tasks of the PMU as may be needed.
- (xx) Support in implementation of gender equality and social inclusion related activities

187. Key roles and responsibilities for and Health and Safety Expert of PMDSC:

- (i) Establishing and maintaining overall project's health and safety systems, protocols, work permit methods and communication structures; expert will be responsible for ensuring safety culture at project sites
- (ii) Promoting safe practices on site and ensuring the safety induction training of workers
- (iii) Assessment and approval of contractor's site-specific health and safety plan
- (iv) Regular inspection of project sites to ensure a hazard-free environment and rectify potential safety issues.
- (v) Ensuring tools and equipment safety, third party audits/inspections etc.,
- (vi) Creating and enforcing safety guidelines and programs
- (vii) Plan and ensuring that contractor carrying out drills and exercises on managing emergency situations
- (viii) Conducting investigations on accidents and incidents and prepare reports on findings
- (ix) Responding to workers' safety concerns
- (x) Arrange evaluations of the sites and identify areas for improvement
- (xi) Coordinates all issues regarding hazardous materials
- (xii) Attending periodically project planning meetings and collaborating with construction managers to identify and address safety concerns
- (xiii) Continuous monitoring of all safety related documents, reports and issues to keep them updated.
- (xiv) Engage with local communities to raise awareness about the project's health and safety impacts. Address community concerns related to project activities.

188. The Contractor. Contractors will be required to appoint a full-time Environment, Health and Safety (EHS) supervisor on-site to implement the EMP. Prior to start of construction, Contractor will be required to prepare and submit to PMU, for review and approval, Site-specific EMP (SEMP) which includes (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 EMP in approved draft and final EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PMU. Contractors will carry out all environmental mitigation and monitoring measures outlined in EMP, approved SEMP and their contracts. The contractor will be required to undertake day to day monitoring of the SEMP implementation and submit reports to the PMU on a monthly basis. A copy of the EMP/approved SEMP will be always kept on-site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. Key responsibilities of the EHS Officer, in coordination with other contractors' personnel include:

- (i) Prepare SEMP including site-specific occupational health and safety plan and submit to PMU for approval prior to start of construction;
- (ii) Supervise work site safety, and provision of PPEs etc.,
- (iii) Ensure implementation of SEMP and report to PMU/PMDSC on any new or unanticipated impacts; seek guidance from the PMU/PMDSC to address the new or unanticipated impact in accordance with EARF and ADB SPS 2009;
- (iv) Ensure that necessary pre-construction and construction permits are obtained;

- (v) Conduct trainings,³⁸ orientation and daily briefing sessions to workers on environment, health and safety;
- (vi) Ensure that appropriate worker facilities are provided at the workplace and labor camps as per the contractual provisions;
- (vii) Carry out site inspections (Appendix 12) on a regular basis and prepare site-inspection checklists/reports;
- (viii) Record EHS incidents and undertake remedial actions;
- (ix) Conduct environmental monitoring (air, noise, etc.) as per the monitoring plan
- (x) Prepare monthly EMP monitoring reports and submit to PMU/PMDSC;
- (xi) Work closely with PMU Manager (Environment, Health & Safety) and PMDSC ESS to ensure communities are aware of project-related impacts, mitigation measures, and GRM; and
- (xii) Coordinate with the PMU and PMDSC on any grievances received and ensure that these are addressed in an effective and timely manner.

C. Institutional Capacity and Development

189. Executing and implementing agencies need to have a sustained capacity to manage and monitor environmental safeguards. Although specialist consultants support will be available to PMU, it is necessary to mainstream safeguards in day-to-day working. Therefore, PMU requires capacity building measures for (i) a better understanding of the project-related environmental issues; and (ii) to strengthen their role in preparation of IEE, implementation of mitigation measures, and subsequent monitoring. Trainings and awareness workshops are included in the project with the primary focus of enabling the PMU staff to understand impact assessments and carry out environmental monitoring and implement EMPs. After participating in such activities, the participants will be able to review environmental assessments, conduct monitoring of EMPs, understand government and ADB requirements for environmental assessment, management, and monitoring (short- and long-term), and incorporate environmental features into future project designs, specifications, and tender/contract documents and carry out necessary checks and balances during project implementation.

190. PMU Safeguards Officers will be trained by PMDSC safeguards experts on safeguards issues related to the project, GESI action plan and GRM. The EARF, RF, 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, and GESI action plan, (iii) review, updating and preparation of the IEEs, SEMRs, RPs, DDRs (as required) upon the completion of project detailed design; (iii) improved coordination within nodal departments; (iv) monitoring and reporting system; and (v) project GRM. Briefings on safeguards principles, GRM and GESI action plan will also be conducted to the contractors upon their mobilization by PMU Safeguard Officers supported by PMDSCs. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The suggested outline of the training program is presented in Table 24 below.

³⁸ 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; (iv) 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 and monitor to ensure that the training provided is relevant and effective.

Table 24: Training Program on Environmental Safeguards and Its Implementation

Description	Target Participants and Venue	Estimate (INR)	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, OH and S, 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 level	50,000 (LS)	PMU
2. Preparing and implementing SEMR (1/2 day - once at the beginning and at a frequency of once in six months during implementation) - site-specific mitigation & 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 (archaeological) protocol - AC pipe protocol - Traffic management plan - Waste management plan - Site clean-up & restoration	All staff and consultants involved in the project All contractors immediately after mobilization of the contractor At PMU level	100,000 (LS)	PMU
3. Contractors Orientation to Workers (1/2 day) - Environment, health and safety in project construction (O H and S, core labor laws, spoils management, etc.)	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)	50,000 (LS)	Contractor's cost

Summary of Capacity Building cost for EMP Implementation

- Contractor Cost - INR 50,000
- PMU Cost - INR 150,000
- **Total - INR 200,000**

D. Monitoring and Reporting

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

192. During construction, results from internal monitoring by the contractor will be reflected in their monthly EMP implementation reports to the PMU. PMDSC will review and advise contractors for corrective actions if necessary.

193. A quarterly report shall be prepared PMDSC and PMU and submitted to PMU for review and further actions.

194. Based on monthly & quarterly reports and measurements, PMU (assisted by PMDSC) will submit Semi-Annual Environmental Monitoring Report . Once concurrence from the ADB is received the report will be disclosed on ADB and KSHARP/PMU websites. The semiannual submission of Environmental Monitoring Reports (EMRs) will be required during both the construction and operation phases of the project.

195. ADB will review project performance against the project 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

E. EMP Implementation Cost

196. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. There are some of the provisions in bid documents like compliance of the requirements of health and safety during construction works as per applicable labour laws, labour insurance, equipment fitness, provision of labour welfare facilities, healthcare facilities etc. which are unanimously bound to contractor bidding for the project therefore it is understood that costs for such requirements are bound to contractor and no need to consider as cost of EMP implementation. Regardless of this, any costs of mitigation by the construction contractors or consultants are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation, that is the responsibility of PMU/ULB will be provided as part of their management of the project, so this also does not need to be duplicated here. Cost for the capacity building program is included as part of the project Cost of environmental management during construction phase are given in Table 25.

197. Operation Stage Environmental Monitoring Plan is provided in Table 25 and monitoring cost will be covered under separate O&M budget during O&M period.

Table 25: Indicative Costs of Environmental Management Plan

Table 201 Indicative Costs of Environmental Management Plan							
Sr. No	Particulars	Stages	Unit	Total No.	Rate (₹)	Indicative Tentative Cost (₹)	Costs Covered By
A. Implementation staff							
1	EHS officer*	Construction	per month	1 No.	50,000	2,100,000	Contractor's cost supported from Project cost
	Subtotal (A)	2,100,000					
B. Mitigation Measures							

Sr. No	Particulars	Stages	Unit	Total No.	Rate (₹)	Indicative Tentative Cost (₹)	Costs Covered By
1.	Consent for establishments and consent for operation from WBPCB for Hot mix plants, Crushers and Batching plants; Other statutory permissions	Pre-construction	Lump sum			50,000	Project costs
2.	Traffic management at work sites (Pavement Markings, Channelizing Devices, Arrow Panels and Warning Lights)	Construction	Lump sum	-	-	200,000	Contractor's cost supported from Project cost
3.	Civil Works (Water Sprinkling for dust suppression; Barricading; etc.)	Construction	Lump sum	-	-	400,000	Contractor's cost supported from Project cost
4.	Provision for PPEs for labors, safety equipment(barrier, poster, banner etc.), first-aid box, medical service and supervisory staff	Construction	lump sum	-	-	500,000	Contractor's cost supported from Project cost
5.	Development and maintenance of green buffer zone around Pumping Station	Post construction	Lump sum	-	-	500,000	Project cost
	Subtotal (B)					1,650,000	
C. Monitoring Measures							
1.	Pre-construction and construction phase environmental monitoring cost (air quality, noise level m, surface water and sediment analysis)	Refer Table 20				428,000	Contractor's cost supported from Project cost
	Subtotal (C)					428,000	
D. Capacity Building							
1	Introduction and sensitization to environment issues	Pre-construction	lump sum			50,000	PMU
2	EMP implementation	Construction	lump sum			100,000	PMU

Sr. No	Particulars	Stages	Unit	Total No.	Rate (₹)	Indicative Tentative Cost (₹)	Costs Covered By
3	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	lump sum			50,000	Civil works contract
	Subtotal (E)	200,000					
E. Grievance Redressal and public disclosure Mechanism							
1	Grievance Redressal Mechanism Resolutions	Construc tion			Lump Sum	100,000	Civil works contract
2	Public consultations on Environmental aspects	Construc tion	Lump sum	-	-	100,000	Civil works contract
	Sub Total (E)	200,000					
	Total (A+B+C+D+E)	4,578,000					

IX. CONCLUSION AND RECOMMENDATION

198. The process described in this document has assessed the environmental impacts of all elements of the specific sewerage and drainage subproject of KSHARP in Borough XII, part of ward 108. 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. Mitigation measures have been suggested to reduce all negative impacts to acceptable levels.

199. There are no notable impacts envisaged due to the location or design of the project. Kolkata has a combined sewerage system that caters to both municipal wastewater and storm run off (during rains). Therefore, the same is adapted in the subproject area. The dry weather flow (DWF, only wastewater) will be treated at the STP (proposed under the KSHARP) prior to discharge, therefore no impacts envisaged. Storm weather flow (SWF, combined wastewater and storm runoff), which will have high quantity and high dilution will be bypassed directly without treatment. Considering the high dilution, no adverse impacts envisaged. However, to ensure proper dilution in the system, implementation of already available standard operating procedure to be followed.

200. No tree felling is required, only the overgrowth of vegetation needs to be removed at the proposed Pumping station site. East Kolkata Wetlands (EKW), a Ramsar wetland, is located in the eastern fringes of Kolkata, which is a largest assemblage of sewage fish ponds and farm lands. The boundary of EKW is located about 500-1 km from the project boundary. Intervening area is highly residential urbanized area. No work is proposed within the designated area of EKW hence no impact on the EKW area is anticipated. There is no discharge of SWF or DWF proposed into EKW. There is no presence of any protected species in or near the project area.

201. During the construction phase, impacts mainly arise from the safety risk due to excavations and construction work in public roads, need to dispose waste soil; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. Temporary locational impacts were identified in busy narrow roads in commercial areas (such as behind the Passport Office and KMC market area at RR Plot). Since sewerage works are conducted along the town area roads, there is potential to create disturbance to traffic flow and accidents. To minimize this, the contractor should develop a traffic Management Plan, which should be approved by the PMU prior to start of work and should conduct the work strictly in line with the plan. Occupational and community health and safety risk will be significant during the construction phase as the works are conducted in urban areas congested with people, traffic and activities. Necessary measures included in the EMP and needs to be implemented effectively. Deep trenches created for sewers needs to be properly protected by shoring/bracings to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Contractors are required to carry out construction work in phased manner upon due consultation with local people/ concerned authorities.

202. Once the new system is operating, the facilities will operate with routine maintenance, which should not affect the environment. Improved system operation will comply with the operation and maintenance manual and standard operating procedures.

203. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures are implemented, and to determine whether the environment is protected as intended. This will include observations on-site and offsite, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the PMU.

204. Stakeholders were involved in developing the IEE through face-to-face discussions, on site meetings, and a city level consultation workshop, which was conducted for larger public participation in the project. Views expressed by the stakeholders were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations and will be disclosed to a wider audience via the PMU and ADB websites. The consultation process will be continued during project implementation to ensure that stakeholders are engaged in the project and have the opportunity to participate in its development and implementation. The project's grievance redress mechanism will provide the citizens with a platform for redressing their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

205. The sub-project will benefit the general public by contributing to the long-term improvement of sewerage and drainage system and community liveability in ward no 108 of KMC. The benefits arising from this subproject include: (i) better public health particularly reduction in waterborne and infectious diseases due to improved sewerage and drainage systems in project areas; (iv) relief from water logging conditions within the sub-project area and (vi) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

206. Based on the findings of the IEE, the project is classified as environmental Category B and does not require further environmental impact assessment. This IEE shall be updated by PMU during the detailed design phase to reflect any changes, amendments and will be reviewed and approved by ADB.

207. **Recommendations.** The following are recommendations applicable to the subproject to ensure no significant impacts:

- (i) Update this IEE during design verification, pre-construction and/or construction stage to reflect any changes in subproject design and submit to ADB for clearance and disclosure
- (ii) Contractor to prepare site specific environmental management plan (SEMP) based on the updated EMP, and approved by PMU; no works can commence under SEMP is approved
- (iii) Obtain all statutory clearances prior to start of construction works.
- (iv) Conduct baseline environmental quality monitoring prior to start of construction
- (v) Conduct safeguards induction to the contractor upon award of contract
- (vi) Strictly supervise EMP implementation
- (vii) Ensure contractor appoints qualified environment, health and safety (EHS) supervisors prior to start of works
- (viii) Document and report on a regular basis as indicated in the IEE
- (ix) Conduct continuous consultations with stakeholders and disclose information timely
- (x) Implement standard operating procedure for bypass and discharge of SWF from pumping stations and trunk sewers, and conduct water quality monitoring
- (xi) Ensure grievance redress mechanism is operationalized prior to start of works.
- (xii) This IEE is a document of the Borrower. The Borrower shall ensure that the preparation, design, construction, implementation, and operation of all project facilities comply with (i) all applicable laws and regulations of the Borrower and the State relating to environment, health, and safety. (iii) the Environmental Safeguards; and (iv) all measures, and requirements set forth in the IEEs and EMPs, and any corrective or preventative actions set forth in a safeguard monitoring report.
- (xiii) Since the pumping station (SPS) and sewage treatment plant (STP) proposed at Hossainpur are essential for operation of the S&D network to further convey, treat and dispose the sewage collected in Anandpur subproject area, the bidding, final designs, implementation and completion of works of all three packages (SD-03, SD-04 and SD-05) shall be synchronized.

Appendix 1: Rapid Environmental Assessment Checklist

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (SDES) for endorsement by the Director, SDES and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) 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 Title: KSHARP - Development of S&D Network including construction of pumping station in Anandapur area in Borough XII (Part of Ward 108)

Sector Division: Urban Development and Water Division

Screening Questions	Yes	No	Remarks
A. Project siting			
Is the project area			
Densely populated?	✓		Project site is located in urban areas and part of KMC Ward no 108.
Heavy with development activities?	✓		No negative impacts are envisaged as S&D pipe laying will be laid through center of the existing road alignment. Measures like best activity scheduling, traffic management, etc. will be employed to minimize the impact to acceptable levels.
Adjacent to or within any environmentally sensitive areas?	✓		The boundary of East Kolkata Wetland is located within 1 km from the proposed Pumping station site at Anandapur and 700m from the sub-project boundary.
Cultural heritage site		✓	
Protected area		✓	
Wetland	✓		East Kolkata Wetland is located within 1 km from the proposed Pumping station site at Anandapur and 700m from the sub-project boundary.
Mangrove		✓	
Estuarine		✓	
Buffer zone of protected area		✓	
Special area for protecting biodiversity		✓	
Bay		✓	
B. Potential Environmental Impacts			
Will the Project cause...			
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not anticipated.

Screening Questions	Yes	No	Remarks
Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts.
Dislocation or involuntary resettlement of people?		✓	No displacement of communities is required.
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Not applicable.
Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		✓	Collected sewage will be treated at the proposed STP at Hossainpur.
Overflows and flooding of neighboring properties with raw sewage?		✓	Project will improve current situation of discharging sewage to open drains and collected sewage will be treated at the proposed STP at Hossainpur.
Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		✓	Not applicable.
Noise and vibration due to blasting and other civil works?	✓		Increased noise is anticipated during construction activities. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?	✓		The EMP ensures occupational health and safety measures as included. Chemicals will not be used during construction and operation activities.
Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		✓	Not anticipated. The subproject sites are predominantly residential with few commercial areas. Thus discharge of hazardous materials into sewers is unlikely. Measures have been included in the design to prevent discharge of industrial and hazardous materials into the sewer network system
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		✓	S&D pipeline will be laid under the proposed project. The SWF will be pumped through proposed pumping station at Anandapur. Sufficient buffer areas considered for PS.
Road blocking and temporary flooding due to land excavation during the rainy season?	✓		Temporary road blockage would be required during construction phase with the permission of respective authority. Adequate pumping arrangement will be kept to avoid temporary flooding condition due to excessive rainfall.
Noise and dust from construction activities?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts.

Screening Questions	Yes	No	Remarks
Traffic disturbances due to construction material transport and wastes?	✓		Anticipated during construction activities near busy and congested road. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts. Construction contractors will be required to coordinate with the local traffic police and they will prepare Traffic Management Plan to avoid obstruction the entry and exit points, prior work scheduling should be planned.
Temporary silt runoff due to construction?	✓		Run-off during construction will be more. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts. Construction contractors will be prohibited from stockpiling loose materials along drain channels and will be required to immediately dispose any waste materials.
Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		✓	Not anticipated. Design life of the subproject is 30 years. Provision of periodic monitoring for detection and repair of leakage servicing and replacements of parts will be considered into the project design. Same will be ensure by KMC.
Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		✓	Not anticipated for S&D pipe laying projects.
Contamination of surface and ground waters due to sludge disposal on land?		✓	Not anticipated for S&D pipe laying projects.
Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and un-stabilized sludge?		✓	Not anticipated for S&D pipe laying projects.
Large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		✓	Not anticipated. Design life of 30 years is considered.
Social conflicts between construction workers from other areas and community workers?		✓	Priority in employment will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	Not applicable. Construction will not involve use of explosives and chemicals. Trenching will be done by excavator followed by manual digging
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community		✓	Operational area will be clearly demarcated and access will be controlled. Only worker and project concerned members will be allowed to visit the operational sites.

Screening Questions	Yes	No	Remarks
throughout project construction, operation and decommissioning?			

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: India/ Construction of Pumping stations and S&D network development

Sector: Urban Development

Subsector: Wastewater

Division /Department: Kolkata Municipal Corporation

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	The project area is not vulnerable to high risks of flooding.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	0	The increased frequency of heavy rainfall leads to severe flooding and water logging in the city. Impacts include increased flooding, increased siltation and blockage of drainage. Proposed sub project will not pass through major cross drainages and river. Pipes are designed to handle peak flow demands. Examples of measures adopted while designing the sewerage and drainage network, associated facilities such as pumping stations, and water supply system, include hydraulic modelling and sizing of systems using increased precipitation scenarios, prioritizing areas with higher risks of increased inundation, constructing all pipes below ground, avoiding flood plains for siting of any pumping stations or associated structures, among others.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	No significant effect

Screening Questions		Score	Remarks
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	No significant
Performance of project outputs	Would weather/climate conditions and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Blockage of drainage/sewage systems likely to become more frequent in the future due to increased flooding. Regular maintenance activities are incorporated in the EMP

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered **low risk project**. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a **medium risk** category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as **high-risk** project.

Result of Initial Screening (Low, Medium, High): Low

Prepared by: PMU, Kolkata Municipal Corporation

Annexure 1A: Eligible subprojects under KSHARP, KMC (Sector Loan)

Sl. No	Eligible subprojects
1.	Development of trunk S&D network and lateral sewers including house connections and construction of pumping stations in Suti Sub-Basin (part of wards 126 and 127)
2.	Development of trunk S&D network and lateral sewers including house connections and construction of pumping stations in Kalagachia Sub-Basin (part of wards 125 and 126)
3.	Development of trunk S&D network and lateral sewers including house connections in Bakrahat Road Catchment and Hanspukur Catchment (part of wards 125 and 144)
4.	Development of trunk S&D network and lateral sewers including house connections in Kabar Danga PS Catchment and construction of PS (part of wards 142 and 143)
5.	Development of trunk S&D network and lateral sewers including house connections in 22 Bigha PS Catchment and construction of PS in Borough XVI (part of wards 142 and 143)
6.	Development of trunk S&D network and lateral sewers including house connections in Julpia Road PS Catchment and construction of PS in Borough XVI (part of ward 142)
7.	Development of trunk S&D network and lateral sewers including house connections in Chowbhaga (East), Chowbhaga (west), and Nonadanga and including construction of 2 PSs in Borough XII (part of ward 108)
8.	Development of trunk S&D network and lateral sewers including house connections in Hossainpur & Anandapur PS in Borough XII (part of ward 108)
9.	Development of trunk S&D network and lateral sewers including house connections in Nayabad, Ajaynagar, Panchsayar, and Baishnabghata and augmentation of one existing PS in Borough XII (part of wards 109 and 110)
10.	Construction of Hossainpur & Hatisur STP
11.	Development of Trunk S&D network and lateral sewers including house connections in part of ward 139 and wards 140 and 141

PS = pump station, S&D = sewerage and drainage, STP = sewage treatment plant.

Appendix 2: Ambient Air Quality, Vehicle, Diesel Generator Emissions Standards, Noise Level Standards

Table 1: Applicable Drinking Water Quality Standards

Group	National Standards for Drinking Water ^a			WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b
	Parameter	Unit	Max. Concentration Limits ^d	
Physical	Turbidity	NTU	1 (5)	-
	pH		6.5 – 8.5	none
	Color	Hazen units	5 (15)	none
	Taste and Odor		Agreeable	-
	TDS	mg/l	500 (2,000)	-
	Iron	mg/l	0.3	-
	Manganese	mg/l	0.1 (0.3)	-
	Arsenic	mg/l	0.01 (0.05)	0.01
	Cadmium	mg/l	0.003	0.003
	Chromium	mg/l	0.05	0.05
	Cyanide	mg/l	0.05	none
	Fluoride	mg/l	1 (1.5)	1.5
	Lead	mg/l	0.01	0.01
	Ammonia	mg/l	0.5	none established
Chemical	Chloride	mg/l	250 (1,000)	none established
	Sulphate	mg/l	200 (400)	none
	Nitrate	mg/l	45	50
	Copper	mg/l	0.05 (1.5)	2
	Total Hardness	mg/l	200 (600)	-
	Calcium	mg/l	75 (200)	-
	Zinc	mg/l	5 (15)	none established
	Mercury	mg/l	0.001	0.006
	Aluminum	mg/l	0.1 (0.3)	none established
	Residual Chlorine	mg/l	0.2	5
Micro Germs	E-coli	MPN/100ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml		

^a Bureau of India Standard 10200: 2012.

^b Health-based guideline values.

^c Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

^d Figures in parenthesis are maximum limits allowed in the absence of alternate source.

A. Notification by Ministry of Environment and Forests, Government of India
Environment (Protection) Seventh Amendment Rules, 2009

Table 2: Surface Water Quality Classification Criteria

Designated-Best-Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6 mg/L or more Biochemical Oxygen Demand 5 days 20°C 2mg/L or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/L or more Biochemical Oxygen Demand 5 days 20°C 3mg/L or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4 mg/L or more Biochemical Oxygen Demand 5 days 20°C 3 mg/L or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4 mg/L or more Free Ammonia (as N) 1.2 mg/L or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max. 2250 Sodium absorption Ratio Max. 26 Boron Max. 2 mg/L

Source: Central Pollution Control Board

mg/L = milligram per liter, ml = milliliter, MPN = Most Probable Number

Table 3: Ambient Air Quality Standards

Parameter	Location ^a	India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)	
			Global Update ^c 2005	2021 Guidelines
PM ₁₀	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	5(Annual) 15 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	5(Annual) 15 (24-hr)

Parameter	Location ^a	India Ambient Air Quality	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)	
PM ₂₅	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	15(Annual) 45 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	15(Annual) 45 (24-hr)
SO ₂	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	40(Annual) 4 (24-hr)
	Sensitive Area	20 (Annual) 80 (24-hr)	20 (24-hr) 500 (10- min)	40(Annual) 4 (24-hr)
NO ₂	Industrial Residential, Rural and Other Areas	40 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	10(Annual) 25 (24-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	10(Annual) 25 (24-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	-	4 (24-hr)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)	-	4 (24-hr)
Ozone (O ₃)	Industrial Residential, Rural and Other Areas	100 (8-hr) 180 (1-hr)	100 (8-hr)	100 (8-hr)
	Sensitive Area	100 (8-hr) 180 (1-hr)	100 (8-hr)	100 (8-hr)
Lead (Pb)	Industrial, Residential, Rural and Other Areas	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)
Ammonia (NH ₃)	Industrial Residential, Rural and Other Areas	100 (Annual) 400 (24-hr)	-	-
	Sensitive Area	100 (Annual) 400 (24-hr)	-	-

Parameter	Location ^a	India Ambient Air Quality	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)	
Benzene (C_6H_6)	Industrial Residential, Rural and Other Areas	5 (Annual)	-	-
	Sensitive Area	5 (Annual)	-	-
Benzo(o)pyrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual)	-	-
	Sensitive Area	0.001 (Annual)	-	-
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual)	-	-
	Sensitive Area	0.006 (Annual)	-	-
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual)	-	-
	Sensitive Area	0.02 (Annual)	-	-

^a Sensitive area refers to such areas notified by the India Central Government.

^b Notification by Ministry of Environment and Forests, Government of India Environment (Protection) Seventh Amendment Rules, 2009

^c WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. *Global update 2005*. WHO. 2006

^d Air Quality Guidelines for Europe Second Edition. WHO 2000.

^e Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS

Table 4: Vehicle Exhaust Emission Norms

1. Passenger Cars

Norms	CO(g/km)	HC+ NO _x (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

**Table 5: Emission limits for New DG sets up to 800 KW
(As per Environment (Protection) (Third Amendment) Rules, 2013)**

TABLE				
Power Category	Emission Limits (g/kW-hr)			Smoke Limit (light absorption coefficient, m ⁻¹)
	NOx+HC	CO	PM	
Upto 19 KW	≤ 7.5	≤ 3.5	≤ 0.3	≤ 0.7
More than 19 KW upto 75 KW	≤ 4.7	≤ 3.5	≤ 0.3	≤ 0.7
More than 75 KW upto 800 KW	≤ 4.0	≤ 3.5	≤ 0.2	≤ 0.7

Note:

1. The abbreviations used in the Table shall mean as under: NO_x – Oxides of Nitrogen; HC – Hydrocarbon; CO – Carbon Monoxide; and PM – Particulate Matter.
2. Smoke shall not exceed above value throughout the operating load points of the test cycle.
3. The testing shall be done as per D2 – 5 mode cycle of ISO: 8178- Part 4.
4. The above mentioned emission limits shall be applicable for Type Approval and Conformity of Production (COP) carried out by authorised agencies.
5. Every manufacturer, importer or, assembler (hereinafter referred to as manufacturer) of the diesel engine (hereinafter referred to as 'engine') for genset application manufactured or imported into India or, diesel genset (hereinafter referred to as 'product'), assembled or imported into India shall obtain Type Approval and comply with COP of their product(s) for the emission limits which shall be valid for the next COP year or, the date of implementation of the revised norms specified above, whichever earlier.
Explanation.- The term 'COP year' means the period from 1st April to 31st March.
6. Stack height (in metres), for genset shall be governed as per Central Pollution Control Board (CPCB) guidelines.

DIESEL GENERATOR SETS : STACK HEIGHT

The minimum height of stack to be provided with each generator set can be worked out using the following formula :

$$H = h + 0.2 \times \sqrt{\text{KVA}}$$

H = Total height of stack in metre

h = Height of the building in metres where the generator set is installed

KVA = Total generator capacity of the set in KVA

Based on the above formula the minimum stack height to be provided with different range of generator sets may be categorised as follows:

For Generator Sets	Total Height of stack in metre
50 KVA	Ht. of the building + 1.5 metre
50-100 KVA	Ht. of the building + 2.0 metre
100-150 KVA	Ht. of the building + 2.5 metre
150-200 KVA	Ht. of the building + 3.0 metre
200-250 KVA	Ht. of the building + 3.5 metre
250-300 KVA	Ht. of the building + 3.5 metre

Similarly for higher KVA ratings a stack height can be worked out using the above formula.

Source : Evolved By CPCB
[Emission Regulations Part IV:COINDS/26/1986-87]

Table 6: Ambient Noise Level Standards

Receptor/ Source	India National Noise Level Standards ^a (dBA)		WHO Guidelines Value for Noise Levels Measured Out of Doors ^b (One Hour LA _q in dBA)		Applicable Per ADB SPS ^c (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial Area	65	55	70	70	65	55
Residential Area	55	45	55	45	55	45
Silent Zone	50	40	55	45	50	40

- a- Noise Pollution (Regulation and Control) Rules, 2002 as amended up to 2010.
- b- Guidelines for Community Noise. WHO. 1999
- c- Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Noise Limits for Diesel Generator Sets

Environment (Protection) Second Amendment Rules vide GSR 371(E), dated 17th May 2002 at serial no.94 and its amendments vide GSR No 520(E) dated 1st July 2003; GSR 448(E), dated 12th July 2004; GSR 315(E) dated 16th May 2005; GSR 464(E) dated 7th August 2006; GSR 566(E) dated 29th August 2007 and GSR 752(E) dated 24th October 2008; G.S.R. 215 (E), dated 15th March, 2011 under the Environment (Protection) Act, 1986)

Noise Limit for Generator Sets run with Diesel

1. Noise limit for diesel generator sets (upto 1000 KVA) manufactured on or after the 1st January, 2005

The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st January, 2005 shall be 75 dB(A) at 1 metre from the enclosure surface.

The diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself.

The implementation of noise limit for these diesel generator sets shall be regulated as given in paragraph 3 below.

2. Noise limit for DG sets not covered by paragraph 1.

Noise limits for diesel generator sets not covered by paragraph 1, shall be as follows:-

- 2.1 Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.
- 2.2 The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure/acoustic treatment. Under such circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably, in the night time). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure/ room, then averaged.
- 2.3 The DG set shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

2.4 These limits shall be regulated by the State Pollution Control Boards and the State Pollution Control Committees.

2.5 Guidelines for the manufacturers/ users of Diesel Generator sets shall be as under:-

01. The manufacturer shall offer to the user a standard acoustic enclosure of 25 dB (A) insertion loss and also a suitable exhaust muffler with insertion loss of 25 dB(A).
02. The user shall make efforts to bring down the noise levels due to the DG set, outside his premises, within the ambient noise requirements by proper citing and control measures.
03. Installation of DG set must be strictly in compliance with the recommendations of the DG set manufacturer.
04. A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

3.0 Limits of Noise for DG Sets (upto 1000 KVA) Manufactured on or after the 1st January, 2005

3.1 Applicability

01. These rules apply to DG sets upto 1000 KVA rated output, manufactured or imported in India, on or after 1st January, 2005.
02. These rules shall not apply to –
 - a) DG sets manufactured or imported for the purpose of exports outside India; and
 - b) DG sets intended for the purpose of sample and not for sale in India.

3.2 Requirement of Certification

Every manufacturer or assembler or importer (hereinafter referred to as the "manufacturer") of DG set (hereinafter referred to as "product") to which these regulations apply must have valid certificates of Type Approval and also valid certificates of Conformity of Production for each year, for all the product models being manufactured or assembled or imported from 1st January, 2005 with the noise limit specified in paragraph 1.

3.3 Sale, import or use of DG sets not complying with the rules prohibited

No person shall sell, import or use of a product model, which is not having a valid Type Approval Certificate and Conformity of Production certificate.

Appendix 3: Effluent Discharge Standards for STPs as per National Green Tribunal (NGT) order dated 30.04.2019

Sl. No.	Parameters	Parameters Limit
1	pH	5.5-9.0
2	BOD (mg/l)	Not more than 10 mg/l
3	COD (mg/l)	Not more than 50 mg/l
4	TSS (mg/l)	Not more than 20 mg/l
5	P-Total (mg/l)- for discharge into ponds/lakes	Not more than 1.0 mg/l
6	N-Total (mg/l)	Not more than 10 mg/l
7	Fecal Coliform (MPN/100ml)	Desirable- Less than 100 MPN/100ml Permissible- 230 MPN/100ml

Note: The standards recommended are applicable to entire country irrespective of Mega and Metropolitan Cities The standards will apply not only for new STPs but also for existing/under construction STPs without any delay

Appendix 4: IBAT Screening Checklist



Integrated Biodiversity Assessment Tool
World Bank Group Biodiversity Risk Screen

KURIP WARD NO 108_ STP SITE

- Country: India
- Location: [22.5, 88.4]
- IUCN Red List Biomes: Freshwater, Terrestrial
- Created by: Prabhatish Bhattacharya

Overlaps with:

Protected Areas	1 km: 0	10 km: 1	50 km: 1	2
World Heritage (WH)	1 km: 0	10 km: 0	50 km: 0	0

Key Biodiversity Areas	1 km: 0	10 km: 0	50 km: 0	0
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0

IUCN Red List	33
Critical Habitat	Likely



Displaying project location and buffers: 1 km, 10 km, 50 km

**WORLD BANK GROUP**
This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

**KNOW YOUR ENVIRONMENT**

**BirdLife International**

**IUCN**

**CONSERVATION INTERNATIONAL**

**UNEP WCMC**

KURIP WARD NO 108_ STP SITE | Page 1 of 12



About this report

The recommendations stated alongside any Protected Areas and Key Biodiversity Areas identified in this report are determined by the following:

Protected Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies a designation that includes either 'natural' or 'mixed world heritage site'.
- 'Assess for Critical Habitat' is stated if the report identifies a Strict Nature Reserve, Wilderness Area or National Park as coded by IUCN protected area categories Ia, Ib and II.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of protected area.

Key Biodiversity Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies an Alliance for Zero Extinction site.
- 'Assess for Critical Habitat' is stated if the report identifies Critically Endangered or Endangered species OR species with restricted ranges OR congregatory species as coded in the IUCN Red List of Threatened Species.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of Key Biodiversity Area.

IBAT provides initial screening for Critical Habitat values. Performance Standard 6 (PS6) defines these values for Critical Habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, Critical Habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see <https://www.ifc.org/ps6> for full details on PS6 and GN6.

This report identifies restricted range species according to the KBA Standard definition ([hyperlink KBA Standard https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf](https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf)):

Species having a global range size less than or equal to the 25th percentile of range-size distribution in a taxonomic group within which all species have been mapped globally, up to a maximum of 50,000 km². If all species in a taxonomic group have not been mapped globally, or if the 25th percentile of range-size distribution for a taxonomic group falls below 10,000 km², restricted range should be defined as having a global range size less than or equal to 10,000 km². For coastal, riverine and other species with linear distributions that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or equal to 500 km linear geographic span (i.e. the distance between occupied locations furthest apart).

Note, sites supporting restricted range species can qualify as KBAs under criterion B2. These are sites that hold a significant proportion of the global population size of multiple restricted-range species, and so contribute significantly to the global persistence of biodiversity at the genetic and species level.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts





- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of Critical Habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the [Sensitive Data Access Restrictions Policy for the IUCN Red List](#). This relates to sensitive Threatened species and KBAs triggered by sensitive species.

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Priority Species

Habitat of significant importance to priority species will trigger Critical Habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming known or likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest.
For the full IUCN Red List please refer to the associated csv in the report folder.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Batagur kachuga	Red-crowned Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Batagur dhongoka	Three-striped Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Pristis clavata	Dwarf Sawfish	CHONDRICHTHYES	CR	Decreasing	Marine, Freshwater
Pristis pristis	Largetooth Sawfish	CHONDRICHTHYES	CR	Decreasing	Marine, Freshwater
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Calidris pygmaea	Spoon-billed Sandpiper	AVES	CR	Decreasing	Terrestrial, Marine, Freshwater
Batagur baska	Northern River Terrapin	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater





Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Geoclemys hamiltoni</i>	Spotted Pond Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Hardella thurjii</i>	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Morenia petersi</i>	Indian Eyed Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Orcaella brevirostris</i>	Irrawaddy Dolphin	MAMMALIA	EN	Decreasing	Marine, Freshwater
<i>Nilssonina gangetica</i>	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Nilssonina hurum</i>	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Platanista gangetica</i>	Ganges River Dolphin	MAMMALIA	EN	Decreasing	Freshwater
<i>Heritiera fomes</i>		MAGNOLIOPSIDA	EN	Decreasing	Terrestrial, Marine, Freshwater
<i>Urogymnus polylepis</i>	Giant Freshwater Whipray	CHONDRICHTHYES	EN	Decreasing	Marine, Freshwater
<i>Tringa guttifer</i>	Spotted Greenshank	AVES	EN	Decreasing	Terrestrial, Marine, Freshwater
<i>Rynchops albicollis</i>	Indian Skimmer	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Sterna acuticauda</i>	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater





Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine
<i>Sonneratia griffithii</i>		MAGNOLIOPSIDA	CR	Decreasing	Terrestrial, Marine
<i>Gyps bengalensis</i>	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
<i>Sarcogyps calvus</i>	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
<i>Gyps tenuirostris</i>	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
<i>Gyps indicus</i>	Indian Vulture	AVES	CR	Decreasing	Terrestrial
<i>Chelonia mydas</i>	Green Turtle	REPTILIA	EN	Decreasing	Terrestrial, Marine
<i>Manis crassicaudata</i>	Indian Pangolin	MAMMALIA	EN	Decreasing	Terrestrial
<i>Panthera tigris</i>	Tiger	MAMMALIA	EN	Decreasing	Terrestrial
<i>Varanus flavescens</i>	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
<i>Aquila nipalensis</i>	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
<i>Ploceus megarhynchus</i>	Finn's Weaver	AVES	EN	Decreasing	Terrestrial

Restricted Range Species





Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Arius gogora</i>	Gogora Catfish	ACTINOPTERYGII	NT OR LR/NT	Decreasing	Freshwater
<i>Ctenops nobilis</i>		ACTINOPTERYGII	NT OR LR/NT	Decreasing	Freshwater
<i>Fejervarya moodiei</i>	Crab-Eating Frog	AMPHIBIA	LC OR LR/LC	Unknown	Terrestrial, Freshwater
<i>Chirixalus sinus</i>	Assam Asian Treefrog	AMPHIBIA	LC OR LR/LC	Decreasing	Terrestrial, Freshwater
<i>Salvinia natans</i>	Floating Fern	POLYPODIOPSIDA	LC OR LR/LC	Decreasing	Freshwater
<i>Ophisternon bengalense</i>	Bengal Mud Eel	ACTINOPTERYGII	LC OR LR/LC	Stable	Marine, Freshwater
<i>Bengala elanga</i>	Bengala Barb	ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
<i>Corica soborna</i>	The Ganges River Sprat	ACTINOPTERYGII	LC OR LR/LC	Unknown	Marine, Freshwater
<i>Xenentodon cancila</i>		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
<i>Batasio batasio</i>		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
<i>Oreochromis mossambicus</i>		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
<i>Oryzias latipes</i>	Indian Ricefish	ACTINOPTERYGII	LC OR LR/LC	Stable	Marine, Freshwater
<i>Pseudosphromenus cupanus</i>	Spiketail Paradise Fish	ACTINOPTERYGII	LC OR LR/LC	Stable	Freshwater





Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Oryzias latipes	Spotted Ricefish	ACTINOPTERYGII	LC OR LR/LC	Unknown	Marine, Freshwater
Macrobrachium scabriculum		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rube		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rosenbergii	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Leptocarpus fluminicola		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Acrocephalus orinus	Large-billed Reed-warbler	AVES	LC OR LR/LC	Unknown	Terrestrial, Freshwater
Anabas cobojus		ACTINOPTERYGII	DD	Unknown	Freshwater
Macrogomphus montanus		INSECTA	DD	Unknown	Terrestrial, Freshwater
Pseudolaguvia flavida		ACTINOPTERYGII	DD	Unknown	Freshwater
Ovozomus similis		ARACHNIDA	LC OR LR/LC	Unknown	Terrestrial
Fregetta tropica	Black-bellied Storm-petrel	AVES	LC OR LR/LC	Decreasing	Terrestrial, Marine



Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

The following protected areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IUCN Category	Status	Designation	Recommendation
East Calcutta Wetlands	10 km	Not Reported	Designated	Ramsar Site, Wetland of International Importance	 Assess for biodiversity risk
Sunderban	50 km	Not Applicable	Designated	UNESCO-MAB Biosphere Reserve	 Assess for biodiversity risk

Key Biodiversity Areas

There are no key biodiversity areas to show for this report.

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	91	21	5	7	9	4	65	1
CHONDRICHTHYES	4	4	2	1	1	0	0	0
AVES	341	21	6	6	9	25	295	0
MAMMALIA	66	10	0	4	6	4	52	0
MAGNOLIOPSIDA	130	5	1	1	3	3	115	7





Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
ACTINOPTERYGII	172	3	0	0	3	6	144	19
MALACOSTRACA	21	0	0	0	0	1	17	3
AMPHIBIA	17	0	0	0	0	0	17	0
INSECTA	105	0	0	0	0	0	102	3
GASTROPODA	68	0	0	0	0	0	58	10
POLYPODIOPSIDA	6	0	0	0	0	0	6	0
LILIOPSIDA	59	1	0	0	1	1	55	2
BIVALVIA	38	0	0	0	0	0	36	2
ARACHNIDA	3	0	0	0	0	0	3	0



Recommended citation

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Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or Critical Habitat (GN6: GN23). Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.

Birdlife Partners

URL: <https://www.birdlife.org/worldwide/partnership/birdlife-partners>

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: <https://www.iucn.org/commissions/ssc-groups>



Appendix 5: Sample Chance find Protocol

Purpose of the chance find procedure. The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure as described in international best practice like IFC Performance Standard 8 and is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

Scope of the chance find procedure. This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

Induction/Training. All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

Chance find procedure. If any person during construction work discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

- (i) Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
- (ii) Immediately notify the Site manager. The Site Manager will then notify the Construction
- (iii) Manager and the Environment Officer (EHS)/PMU/Environmental expert of Supervision consultant
- (iv) Record details in Incident. Report and take photos of the find;
- (v) When clearance and excavation take place artefacts 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).
- (vi) Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
- (vii) PMU/Consultants should inform in written to the Archaeological Department at the earliest with photographs and request to Archaeology Department to visit the site and hand over the chance finds to them.
- (viii) The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
- (ix) Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor.

Appendix 6: Environmental Due Diligence of Proposed Facility - Hossainpur STP

Location: Hossainpur at Ward 108, under Borough XII, KMC GPS Co-ordinate: GPS Coordinate: 22.5, 88.4 STP will be constructed in available government vested land under District Land and Land Reforms (DL&LR) Department adjacent to Anandapur High Road beside TP canal. ³⁹	
Proposed commencement year	2028
Owned by	Kolkata Municipal Corporation (KMC)
Capacity	41 MLD (upto mid horizon 2043), 55 MLD (Ultimate horizon 2055)
command area	Development of S&D network system in the command area of the proposed STP is considered under KSHARP. Total command area under Hossainpur STP is 811 Ha. For conveyance of the proposed system, the total command area has been divided into 5 zones viz. Hossainpur, Anandapur, Nonadanga, Chowbagha West and Chowbagha East as shown in figure below The entire DWF, generated from the said areas is proposed to be conveyed to proposed terminal pumping station at Hossainpur through an organized S&D network. From the said pumping station, DWF will be transmitted to the Inlet Chamber of the proposed STP through dedicated pumping main. Collection and transmission of the DWF is shown in figure below: 
Sewage treatment process	Sequential Batch Reactor (SBR) technology
	Treatment Process at STP: A typical sewage treatment process involves (i) screening/ primary mechanical removal of grit, debris, oil and grease from the influent at screen/ grit chamber; (ii) secondary biological and/or chemical treatment process;

³⁹ Total land area available at the site is about 75 acres, of which 5.62 acres is proposed for STP. Exact site for the STP is in process of allocation. At this feasibility stage, STP is planned based on the technical feasibility and access. After allocation of exact site for STP within the available land parcel, layout will be further reviewed and finalized, after which the due diligence will be updated.

(iii) disinfection; (iv) sludge dewatering and (v) disposal. For biological treatment of sewage, the STP will employ a sequential batch reactor (SBR) process which provides the highest treatment efficiency in a single step biological process. The incoming sewage will be fed into the cyclic activated sludge process and SBR process basins for biological treatment to remove biological oxygen demand (BOD), chemical oxygen demand (COD) and suspended solids. Thus, no additional settling unit, nor a secondary clarifier will be required. For disinfection, chlorine treatment will be used. The STP will be designed in a modular approach to optimize energy and resource consumption.

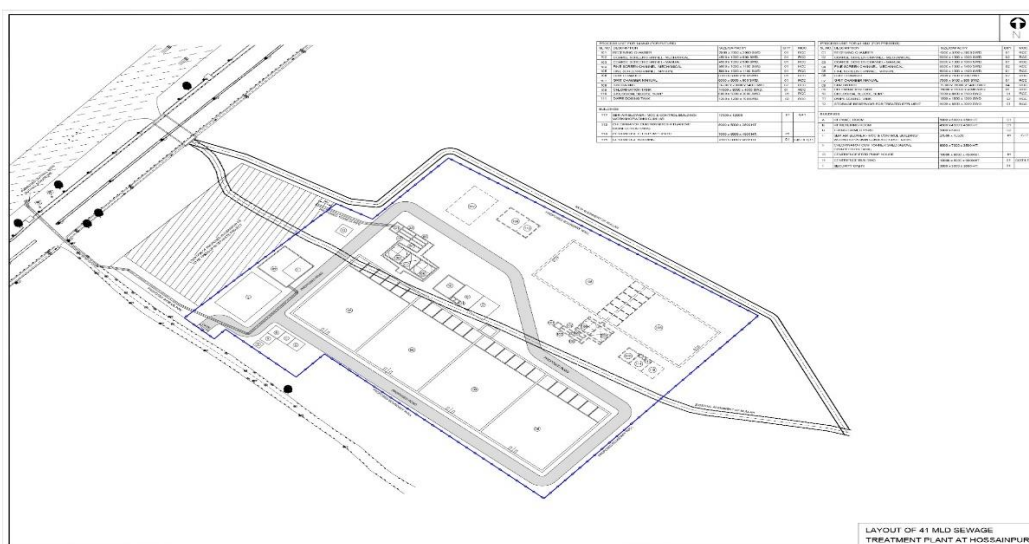
Process at proposed STP:



View of proposed STP Site



Layout Plan of Proposed STP



Sludge Management: For sludge treatment, a sludge sump will collect thickened sludge from SBR basins. Supernatant from the sump will be returned to inlet/equalization tank for treatment. Sludge from sump will be pumped to sludge thickener, and the thickened sludge will be pumped to mechanical sludge dewatering system (such as centrifuge). Dewatered sludge cake will further air dried in a sludge storage shed for 15 days. Sewage sludge generated from the SBR process will undergo sufficient treatment for stabilization and pathogen reduction. Hence, the sludge generated is of high quality that can be applied on land. Considering that the sludge from the SBR process is composed of both inorganic and organic materials, large concentration of some plant nutrients and much smaller concentrations of numerous trace elements and organic chemicals, the sludge can be used for fertilizer in agriculture land.

Any remaining can be disposed off to KMC owned landfill site at Dhapa (22°32'45.43" N and 88°25'1.98" E). Expected sludge generation is 5788.3 Kg/d approximately which shall be used as fertilizer in agriculture land after proper sun drying. A sludge reuse plan will be developed and implemented by the contractor in consultation with the municipality authorities.

Treated wastewater (effluent disposal): The treated effluent from the STP will be reused and any surplus will be discharged through 900 mm diameter and 150m MS pipe into nearby TP canal by gravity outfall (Latitude: 22.509515, Longitude: 88.406543) while conforming to national standard for discharge of treated effluent to inland water bodies. It is proposed to follow the latest discharge standards as suggested by CPCB in 2015 and order of National Green Tribunal (NGT) dated 30th April 2019 given below:

Recommended Standard of Treated Effluent

Sl No.	Parameters	Unit	Value
1	pH	-	5.5 to 9.0
3	Biochemical Oxygen Demand (BOD)	mg/l	10.0
4	Chemical Oxygen Demand (COD)	mg/l	50.0
5	Total Suspended Solids (TSS)	mg/l	20.0
7	Total Nitrogen (TN)	mg/l	10.0
8	Total Phosphorous (TP)	mg/l	1.0
9	Faecal Coliform	MPN/100 ml	Desireable-100, Permissible- 200

Legal	KMC will obtain Consent to Establish (CTE) before start of construction work and Consent to Operate (CTO) before operation from West Bengal State Pollution Control Board (WBSPCB).
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Appendix 7: IFC Benchmark Standards for Workers Accommodation

August 2009

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PART II: STANDARDS FOR AND MANAGEMENT OF WORKERS' ACCOMMODATION

I. Standards for workers' accommodation

This section looks at the principles and standards applicable to the location and construction of workers' accommodation, including the transport systems provided, the general living facilities, rooms/dormitories facilities, sanitary facilities, canteen and cooking facilities, food safety, medical facilities and leisure/social facilities.

A. National/local standards

The key standards that need to be taken into consideration, as a baseline, are those contained in national/local regulations. Although it is quite unusual to find regulations specifically covering workers' accommodation, there may well be general construction standards which will be relevant. These may include the following standards:

- **Building construction:** for example, quality of material, construction methods, resistance to earthquakes.
- **Housing and public housing:** in some countries regulations for housing and public housing contain requirements on issues such as the basic amenities, and standards of repair.
- **General health, safety and security:** requirements on health and safety are often an important part of building standards and might include provisions on occupation density, minimal air volumes, ventilation, the quality of the flooring (slip-resistant) or security against intrusion.
- **Fire safety:** requirements on fire safety are common and are likely to apply to housing facilities of any type. This can include provision on fire extinguishers, fire alarms, number and size of staircases and emergency exits, restrictions on the use of certain building materials.
- **Electricity, plumbing, water and sanitation:** national design and construction standards often include very detailed provisions on electricity or plumbing fixtures/fittings, water and sanitation connection/equipment.

Benchmark

1. The relevant national and local regulations have been identified and implemented.

B. General living facilities

Ensuring good standards in living facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of insects or rodents, as well as to maintain a good level of morale. The location of the facilities is important to prevent exposure to wind, fire, flood and other natural hazards. It is also important that workers' accommodation is unaffected by the environmental or operational impacts of the worksite (for example noise, emissions or dust) but is sufficiently close that workers do not have to spend undue amounts of time travelling from their accommodation to the worksite. Living facilities should be built using adequate materials and should always be kept in good repair, clean and free from rubbish and other refuse.

Benchmarks

1. Living facilities are located to avoid flooding and other natural hazards.
2. Where possible, living facilities are located within a reasonable distance from the worksite.
3. Transport from the living facilities to worksite is safe and free.
4. The living facilities are built with adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

Drainage

The presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others, and must be avoided.

Benchmarks

1. The building site is adequately drained to avoid the accumulation of stagnant water.

Heating, air conditioning, ventilation and light

Heating, air-conditioning and ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Benchmarks

1. For facilities located in cold weather zones, the temperature is kept at a level of around 20 degrees Celsius notwithstanding the need for adequate ventilation.
2. For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems are provided.
3. Both natural and artificial lighting are provided and maintained in living facilities. It is best practice that the window area represents not less than 5% to 10% of the floor area. Emergency lighting is provided.

Water

Special attention to water quality and quantity is absolutely essential. To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers should always have easy access to a source of clean water. An adequate supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet local or WHO drinking water standards⁷ and water quality must be monitored regularly. Depending on the local context, it could either be produced by dedicated catchment and treatment facilities or tapped from existing municipal facilities if their capacity and quality are adequate.

Benchmarks

1. Access to an adequate and convenient supply of free potable water is always available to workers. Depending on climate, weather conditions and accommodation standards, 80 to 180 litres per person per day are available.
2. Drinking water meets national/local or WHO drinking water standards.⁸
3. All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

4. Drinking water quality is regularly monitored.

Wastewater and solid waste

Wastewater treatment and effluent discharge as well as solid waste treatment and disposal must comply with local or World Bank effluent discharge standards⁹ and be adequately designed to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. Depending on the local context, treatment and disposal services can be either provided by dedicated or existing municipal facilities.

Benchmarks

1. Wastewater, sewage, food and any other waste materials are adequately discharged, in compliance with local or World Bank standards – whichever is more stringent – and without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.
2. Specific containers for rubbish collection are provided and emptied on a regular basis. Standards range from providing an adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents. In addition it is best practice to locate rubbish containers 30 metres from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odours associated with decaying organic materials.
3. Pest extermination, vector control and disinfection are carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis.

7. www.who.int/water_sanitation_health/dwg/en/
8. Ibid

9. As per the "Pollution Prevention and Abatement Handbook", World Bank Group, July 1998, available from www.worldbank.org

C. Room/dormitory facilities

The standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene. Overcrowding should be avoided particularly. This also has an impact on workers' productivity and reduces work-related accidents. It is generally acknowledged that rooms/dormitories should be kept clean and in a good condition. Exposure to noise and odour should be minimised. In addition, room/dormitory design and equipment should strive to offer workers a maximum of privacy. Resorting to dormitories should be minimised and single or double rooms are preferred. Dormitories and rooms must be single-sex.

Benchmarks

1. Rooms/dormitories are kept in good condition.
2. Rooms/dormitories are aired and cleaned at regular intervals.
3. Rooms/dormitories are built with easily cleanable flooring material.
4. Sanitary facilities are located within the same buildings and provided separately for men and women.
5. Density standards are expressed either in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).
6. A minimum ceiling height of 2.10 metres is provided.
7. In collective rooms, which are minimised, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.
8. All doors and windows should be lockable, and provided with mosquito screens where conditions warrant.
9. There should be mobile partitions or curtains to ensure privacy.
10. Every resident is provided with adequate furniture such as a table, a chair, a mirror and a bedside light.
11. Separate sleeping areas are provided for men and women, except in family accommodation.

Additional issue

Irrespective of whether workers are supposed to keep their facilities clean, it is the responsibility of the accommodation manager to ensure that rooms/dormitories and sanitary facilities are in good condition.

Bed arrangements and storage facilities

The provision of an adequate numbers of beds of an appropriate size is essential to provide workers with decent, safe and hygienic conditions to rest and sleep. Here again, particular attention should be paid to privacy. Consideration should be given to local customs so beds could be replaced by hammocks or sleeping mats for instance.

Benchmarks

1. A separate bed for each worker is provided. The practice of "hot-bedding" should be avoided.
2. There is a minimum space between beds of 1 metre.
3. Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimised. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from 0.7 to 1.10 metres.
4. Triple deck bunks are prohibited.
5. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.
6. Bed linen is washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).
7. Facilities for the storage of personal belongings for workers are provided. Standards vary from providing an individual cupboard for each worker to providing 475-litre big lockers and 1 metre of shelf unit.
8. Separate storage for work boots and other personal protection equipment, as well as drying/airing areas may need to be provided depending on conditions.

D. Sanitary and toilet facilities

It is essential to allow workers to maintain a good standard of personal hygiene but also to prevent contamination and the spread of diseases which result from inadequate sanitary facilities. Sanitary and toilet facilities will always include all of the following: toilets, urinals, washbasins and showers. Sanitary and toilet facilities should be kept in a clean and fully working condition. Facilities should also be constructed of materials that are easily cleanable and ensure privacy. Sanitary and toilet facilities are never shared between male and female residents, except in family accommodation. Where necessary, specific additional sanitary facilities are provided for women.

Benchmarks

1. Sanitary and toilet facilities are constructed of materials that are easily cleanable.
2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.
3. Sanitary and toilet facilities are designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.
4. Sanitary and toilet facilities are not shared between men and women, except in family accommodation.

Toilet facilities

Toilet arrangements are essential to avoid any contamination and prevent the spread of infectious disease.

Benchmarks

1. An adequate number of toilets is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.
2. Toilet facilities are conveniently located and easily accessible. Standards range from 30 to 60 metres from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins and be conveniently located. Toilets and other sanitary facilities should be ("must be" in cold climates) in the same building as rooms and dormitories.

Showers/bathrooms and other sanitary facilities

Hand wash basins and showers should be provided in conjunction with rooms/dormitories. These facilities must be kept in good working condition and cleaned frequently. The flooring for shower facilities should be of hard washable materials, damp-proof and properly drained. Adequate space must be provided for hanging, drying and airing clothes. Suitable light, ventilation and soap should be provided. Lastly, hand washing, shower and other sanitary facilities should be located within a reasonable distance from other facilities and from sleeping facilities in particular.

Benchmarks

1. Shower/bathroom flooring is made of anti-slip hard washable materials.
2. An adequate number of handwash facilities is provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap and hygienic means of drying hands.
3. An adequate number of shower/bathroom facilities is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.
4. Showers/bathrooms are conveniently located.
5. Shower/bathroom facilities are provided with an adequate supply of cold and hot running water.

E. Canteen, cooking and laundry facilities

Good standards of hygiene in canteen/dining halls and cooking facilities are crucial. Adequate canteen, cooking and laundry facilities and equipments should also be provided. When caterers are contracted to manage kitchens and canteens, special attention should be paid to ensure that contractors take into account and implement the benchmarks below, and that adequate reporting and monitoring mechanisms are in place. When workers can individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition. In addition, canteen, kitchen, cooking and laundry floors, ceilings and walls should be made of easily cleanable materials.

Benchmarks

1. Canteen, cooking and laundry facilities are built in adequate and easy to clean materials.
2. Canteen, cooking and laundry facilities are kept in a clean and sanitary condition.
3. If workers can cook their own meals, kitchen space is provided separate from sleeping areas.

Laundry facilities

Providing facilities for workers to wash both work and non-work related clothes is essential for personal hygiene. The alternative is for the employer to provide a free laundry service.

Benchmarks

1. Adequate facilities for washing and drying clothes are provided. Standards range from providing sinks or tubs with hot and cold water, cleaning soap and drying lines to providing washing machines and dryers.
2. When work clothes are used in contact with dangerous substance (for example, application of pesticide), special laundry facilities (washing machines) should be provided.

Additional issue

When workers are provided with facilities allowing them to individually do their laundry or cooking, it should be the responsibility of each worker to keep the facilities in a clean and sanitary condition. Nonetheless, it is the responsibility of the accommodation manager to make sure the standards are respected and to provide an adequate cleaning, disinfection and pest/vector control service when necessary.

Additional issue

When the employer provides family accommodation, it is best practice to provide each family with a private kitchen or the necessary cooking equipment to allow the family to cook on their own.

Canteen and cooking facilities

Canteen and cooking facilities should provide sufficient space for preparing food and eating, as well as conform to hygiene and safety requirements.

Benchmarks

1. Canteens have a reasonable amount of space per worker. Standards range from 1 square metre to 1.5 square metres.
2. Canteens are adequately furnished. Standards range from providing tables, benches, individual drinking cups and plates to providing special drinking fountains.
3. Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation.
4. Kitchens are provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.
5. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.
6. All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.
7. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable and washable surface.
8. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.
9. Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

F. Standards for nutrition and food safety

When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has a very direct impact on workers' productivity and well-being. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.¹⁰

Benchmarks

1. The WHO 5 keys to safer food or an equivalent process is implemented (see Box 6 below).
2. Food provided to workers contains an appropriate level of nutritional value and takes into account religious/cultural backgrounds; different choices of food are served if workers have different cultural/religious backgrounds.
3. Food is prepared by cooks. It is also best practice that meals are planned by a trained nutritionist.

Box 6 - Five keys to safer food

Keep clean

Wash your hands before handling food and often during food preparation.
Wash your hands after going to the toilet.
Wash and sanitise all surfaces and equipment used for food preparation.
Protect kitchen areas and food from insects, pests and other animals.

While most micro organisms do not cause disease, dangerous micro organisms are widely found in soil, water, animals and people. These micro organisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause food borne diseases.

Separate raw and cooked

Separate raw meat, poultry and seafood from other foods.
Use separate equipment and utensils such as knives and cutting boards for handling raw foods.
Store food in containers to avoid contact between raw and prepared foods.

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous micro organisms which may be transferred onto other foods during food preparation and storage.

Cook thoroughly

Cook food thoroughly, especially meat, poultry, eggs and seafood.
Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer.
Reheat cooked food thoroughly.

Proper cooking kills almost all dangerous micro organisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry.

Keep food at safe temperatures

Do not leave cooked food at room temperature for more than 2 hours.
Refrigerate promptly all cooked and perishable food (preferably below 5°C).
Keep cooked food piping hot (more than 60°C) prior to serving.
Do not store food too long even in the refrigerator.
Do not thaw frozen food at room temperature.

Micro organisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of micro organisms is slowed down or stopped. Some dangerous micro organisms still grow below 5°C.

Use safe water and raw materials

Use safe water or treat it to make it safe.
Select fresh and wholesome foods.
Choose foods processed for safety, such as pasteurised milk.
Wash fruits and vegetables, especially if eaten raw.
Do not use food beyond its expiry date.

Raw materials, including water and ice, may be contaminated with dangerous micro organisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Take care in selection of raw materials and implement simple measures such as washing.

Source: World Health Organization, Food Safety

www.who.int/foodsafety/publications/consumer/en/5keys_en.pdf

10. C. Wanjek (2005). "Food at Work - Workplace solutions for malnutrition, obesity and chronic disease", International Labour Organization, Geneva.

G. Medical facilities

Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighbouring communities and the availability of transport. However, first aid must always be available on site.

First aid facilities

Providing adequate first aid training and facilities can save lives and prevent minor injuries becoming major ones.

Other medical facilities

Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.

Benchmarks

1. A number of first aid kits adequate to the number of residents are available.
2. First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
3. An adequate number of staff/workers is trained to provide first aid.
4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery).

Box 7 - UK/HSE First Aid facilities

What should be in a first aid kit?

There is no standard list and it very much depends on the assessment of the needs in a particular workplace:

- a leaflet giving general guidance on first aid, for example HSE leaflet *Basic advice on first aid at work*
- individually wrapped sterile adhesive dressings (assorted sizes)
- two sterile eye pads
- four individually wrapped triangular bandages (preferably sterile)
- six safety pins
- six medium-sized (approximately 12 cm x 12 cm) individually wrapped sterile unmedicated wound dressings
- two large (approximately 18 cm x 18 cm) sterile individually wrapped unmedicated wound dressings
- one pair of disposable gloves.

What should be kept in the first aid room?

The room should contain essential first aid facilities and equipment. Typical examples of these are:

- a sink with hot and cold running water
- drinking water and disposable cups
- soap and paper towels
- a store for first aid materials
- foot-operated refuse containers, lined with disposable yellow clinical waste bags or a container for the safe disposal of clinical waste
- a couch with waterproof protection, clean pillows and blankets
- a chair
- a telephone or other communication equipment
- a record book for recording incidents where first aid has been given.

Source: UK Health and Safety Executive

H. Leisure, social and telecommunication facilities

Basic leisure and social facilities are important for workers to rest and also to socialise during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be considered, taking account of the local context and potential conflicts in certain situations.

Benchmarks

1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi-purpose halls to providing designated areas for radio, TV, cinema.
2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.
3. Workers are provided with dedicated places for religious observance if the context warrants.
4. Workers have access to public phones at affordable/public prices (that is, not inflated).
5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated.

Box 8 - Examples of social/leisure facilities

In Qatar there is a newly built 170-hectare complex which accommodates contractors and more than 35,000 workers for a project run by a major oil company. At the heart of this complex, the recreation area includes extensive sport facilities, a safety-training centre, an outdoor cinema and a park. The purpose of those facilities goes beyond providing adequate accommodation to the large numbers of contractors and workers on this project but is designed to provide the same level of services as a small town. The accommodation complex has a mayor, as well as a dedicated welfare team which is responsible for the workers' welfare, cultural festivals and also acts as the community's advocates.

II. Managing workers' accommodation

Once the living facilities have been constructed and are operational, effective ongoing management of living facilities is essential. This encompasses issues such as the physical maintenance of buildings, security and consultation with residents and neighbouring communities in order to ensure the implementation of the housing standards in the long term.

A. Management and staff

Worker camps and housing facilities should have a written management plan, including management policies or plans on health and safety, security, living conditions, workers' rights and representation, relationships with the communities and grievance processes. Part of those policies and plans can take the form of codes of conduct. The quality of the staff managing and maintaining the accommodation facilities will have a decisive impact on the level of standards which are implemented and the well-being of workers (for instance on the food safety or overall hygiene standards). It is therefore important to ensure that managers are competent and other workers are adequately skilled. The manager will be responsible for overseeing staff, for ensuring the implementation of the accommodation standards and for the implementation of the management plans. It is important the accommodation manager has the corresponding authority to do so.

If the facility is being managed by a contractor, as is often the case, the expected housing and management standards should be specified in the relevant contract, and mechanisms to ensure that those standards are implemented should be set up. As part of this process, the accommodation manager (or contractor) should have a duty to monitor the application of the accommodation standards and to report frequently on their implementation to the client.

Benchmarks

1. There are management plans and policies especially in the field of health and safety (with emergency responses), security, workers' rights, relationships with the communities.
2. An appointed person with the adequate background and experience is in charge of managing the workers' accommodation.
3. If contractors are being used, there are clear contractual management responsibilities and monitoring and reporting requirements.
4. Depending on the size of the accommodation, there is a sufficient number of staff in charge of cleaning, cooking and of general maintenance.
5. Such staff are recruited from the local communities.
6. Staff have received basic health and safety training.
7. Persons in charge of the kitchen are trained in nutrition and food-handling and adequately supervised.

B. Charging fees for accommodation and services

Charging fees for the accommodation or the services provided to workers such as food or transport should be avoided where workers do not have the choice to live or eat anywhere else, or if deemed unavoidable, should take into account the specific nature of workers' accommodation. Any charges should be transparent, discussed during recruitment and specified in workers' contracts. Any such charges should still leave workers with sufficient income and should never lead to a worker becoming indebted to an employer.

Benchmarks

1. When fees are charged, workers are provided with clear information and a detailed description of all payments made such as rent, deposit and other fees.
2. When company housing is considered to be part of workers' wages, it is best practice that workers are provided with an employment contract clearly specifying housing arrangements and regulations, in particular rules concerning payments and fees, facilities and services offered and rules of notice.
3. When fees are charged, the renting arrangements are fair and do not cost the worker more than a small proportion of income and never include a speculative profit.
4. Food and other services are free or are reasonably priced, never above the local market price.
5. The provision of accommodation or other services by employers as a payment for work is prohibited.

Additional issue

To avoid that fair renting arrangements turn into unfair ones, any deposit of advance should be set at a reasonable level and it is best practice that renting prices include a fixed fee covering the water needed and the use of the energy required to the functioning of the heating/cooling/ventilation/cooking systems. However, in such cases it might be necessary to raise workers' awareness to ensure that workers will use the facilities responsibly, particularly in areas where water is scarce.

C. Health and safety on site

The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical well-being and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fire regulations are respected for instance) and that adequate health and safety plans and standards are designed and implemented.

Benchmarks

1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.
2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.
3. An adequate number of staff/workers is trained to provide first aid.
4. A specific fire safety plan is prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills.
5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk-related activities is provided to workers. It is best practice to develop a clear policy on this issue.
6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.
7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.
8. Emergency plans on health and fire safety are prepared. Depending on the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes).

D. Security of workers' accommodation

Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks. Policies regarding the use of force (force can only be used for preventive and defensive purposes in proportion to the nature and the extent of the threat) should also be

carefully designed. To implement those plans, it may be necessary to contract security services or to recruit one or several staff whose main responsibility is to provide security to safeguard workers and property. Before making any security arrangements, it is necessary to assess the risks of such arrangements to those within and outside the workers' accommodation and to respect best international practices, including IFC PS4 and EBRD PR4 and applicable law.¹¹ Particular attention should be paid to the safety and security of women workers.

Benchmarks

1. A security plan including clear measures to protect workers against theft and attack is implemented.
2. A security plan including clear policies on the use of force has been carefully designed and is implemented.
3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders are recruited.
4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.
5. Security staff have received adequate training in dealing with domestic violence and the use of force.
6. Security staff have a good understanding about the importance of respecting workers' rights and the rights of the communities.
7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.
8. Security staff adopt an appropriate conduct towards workers and communities.
9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff.

11. See for instance the Voluntary Principles on Security and Human Rights, www.voluntaryprinciples.org/principles

E. Workers' rights, rules and regulations on workers' accommodation

Freedoms and human rights of workers should be recognised and respected within their living quarters just as within the working environment. House rules and regulations should be reasonable and non discriminatory. It is best practice that workers' representatives are consulted about those rules. House rules and regulations should not prevent workers from exercising their basic rights. In particular, workers' freedom of movement needs to be preserved if they are not to become effectively "trapped". To this end it is good practice to provide workers with 24/7 access to the accommodation and free transport services to and from the surrounding communities. Any restriction to this freedom of movement should be limited and duly justified. Penalties for breaking the rules should be proportional and implemented through a proper procedure allowing workers to defend themselves and to challenge the decision taken. The relationship between continuing employment and compliance with the rules of the workers' accommodation should be clear and particular attention should be paid to ensure that housing rules do not create indirect limitation of the right to freedom of association. Best practice might include a code of conduct relating to the accommodation to be signed together with the contract of employment.

Box 9 - Dole housing plantation regulation in Costa Rica

In every plantation there is an internal accommodation regulation that every worker is required to sign together with his/her employment contract. That document describes the behaviour which is expected from workers at all times and basic rules such as the prohibition of alcohol and the interdiction to make noise after a certain time at night. In case there is any problem concerning the application of those internal rules, a set of disciplinary procedures which have been designed with the workers' representatives can be enforced. Workers are absolutely free to enter or leave the site and do not have any restrictions in relation to accessing their living quarters. Families are not allowed in the living quarters unless they have been registered for a visit.

Benchmarks

1. Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement.
2. Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to and from local communities.
3. Withholding workers' ID papers is prohibited.
4. Freedom of association is expressly respected. Provisions restricting workers' rights on site should take into account the direct and indirect effect on workers' freedom of association. It is best practice to provide trade union representatives access to workers in the accommodation site.
5. Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.
6. Workers are made aware of their rights and obligations and are provided with a copy of the internal workers' accommodation rules, procedures and sanction mechanisms in a language or through a media which they understand.
7. Housing regulations, including those relating to allocation of housing, should be non-discriminatory. Any justifiable discriminatory rules – for example all-male dormitories – should be strictly limited to the rules which are necessary to ensure the smooth running of the worker camp and to maintain a good relationship with the surrounding communities.
8. Where possible, visitor access should be allowed.
9. Decisions should be made on whether to prohibit alcohol, tobacco and third party access or not from the camp and the relevant rules should be clearly communicated to all residents and workers.
10. A fair and non-discriminatory procedure exists to implement disciplinary procedures including the right of workers to defend themselves (see also next section).

F. Consultation and grievance mechanisms

All residents should be made aware of any rules governing the accommodation and the consequences of breaking such rules. Processes that allow for consultation between site management and the resident workers will assist in the smooth running of an accommodation site. These may include a dormitory or camp committee as well as formal processes that allow workers to lodge any grievances about their accommodation.

Benchmarks

1. Mechanisms for workers' consultation have been designed and implemented. It is best practice to set up a review committee which includes representatives elected by workers.
2. Processes and mechanisms for workers to articulate their grievances are provided to workers. Such mechanisms are in accordance with PS2/PR2.
3. Workers subjected to disciplinary proceedings arising from behaviour in the accommodation should have access to a fair and transparent hearing with the possibility to contest decisions and refer the dispute to independent arbitration or relevant public authorities.
4. In case conflicts between workers themselves or between workers and staff break out, workers have the possibility of easily accessing a fair conflict resolution mechanism.
5. In cases where more serious offences occur, including serious physical or mental abuse, there are mechanisms to ensure full cooperation with the police authority (where adequate).

Additional issue

Alcohol is a complex issue and requires a very clear policy from the workers' accommodation management. If a non-alcohol policy is taken, special attention should be paid to clearly communicate the interdiction, how it applies and the consequences for breaching this rule. Special attention should also be paid to enforce it adequately.

G. Management of community relations

Workers' living facilities have various ongoing impacts on adjacent communities. In order to manage these, it is good practice to design a thorough community relations management plan. This plan will contain the processes to implement the findings of the preliminary community impact assessment and to identify, manage, mitigate or enhance ongoing impacts of the workers' accommodation on the surrounding communities. Issues to be taken into consideration include:

- community development – impact of workers' camp on local employment, possibility of enhancing local employment and income generation through local sourcing of goods and services
- community needs – ways to identify and address community needs related to the arrival of specific infrastructures such as telecommunications, water sanitation, roads, health care, education, housing
- community health and safety – addressing and reducing the risk in the increase in communicable diseases, corruption, trade in illegal substances such as drugs, alcohol (in the Muslim context), petty crimes and other sorts of violence, road accidents
- community social and cultural cohesion – ways to mitigate the impact of the presence of large numbers of foreign workers, often males, with different cultural and religious background, ways to mitigate the possible shift in social, economic and political structures due to changes in access to income generation opportunities.

Benchmarks

1. Community relations plans addressing issues around community development, community needs, community health and safety and community social and cultural cohesion have been designed and implemented.
2. Community relations plans include the setting up of a liaison mechanism allowing a constant exchange of information and consultation with the local communities in order to identify and respond quickly to any problems and maintain good working relationships.
3. A senior manager is in charge of implementing the community relations management plan and liaising with the community.

-
4. The impacts of workers' accommodation on local communities are periodically reviewed, mitigated or enhanced.
 5. Community representatives are provided with an easy means to voice their opinions and to lodge complaints.
 6. There is a transparent and efficient process for dealing with community grievances, in accordance with PS1/PR10.

Box 10 - Examples of community relations management

Community consultation in the Baku-Tbilisi-Ceyhan (BTC) pipeline

The BTC pipeline's Environment and Social Management Plans incorporated a Worker Camp Management Plan to be implemented by the construction contractor. As part of ongoing community liaison over the project as a whole, community liaison officers were appointed for worker camps who were responsible for meeting regularly with communities, identifying issues and addressing community concerns. A particular responsibility was to review HR records and disciplinary logs at worker camps to assess that rules were being implemented effectively and that any community liaison after any incidents was effective.

Appendix 8: Emergency Preparedness and Response Plan

Approach

The aim of this emergency preparedness and response plan is to guide personnel in an accident or emergency situation to prevent or minimize injury, damage and material loss and also to prevent or mitigate environmental impact from the accident or emergency.

Emergency Preparedness facility

Following emergency preparedness facilities have been provided at the site:

- (i) All the buildings and structures are well supplied with firefighting devices.
- (ii) Proper security arrangements are functioning round the clock.
- (iii) There is quick and efficient transport as well as communication system.
- (iv) Smoking is prohibited throughout the flammable premises.
- (v) Water is kept available for firefighting purpose.
- (vi) Sufficient number of trained manpower is available to extinguish any fire and attend emergency.
- (vii) Sufficient number of Personal Protective Equipment like helmet and gloves are available & Audible emergency alarm/whistles are provided.
- (viii) First Aid Kit is available.
- (ix) All key personnel have been provided communication mean such as telephone / walkie-talkie / mobiles. Any message can be communicated immediately.
- (x) All work fronts / floating crafts will have emergency lights and Torches.
- (xi) All exit doors are kept unobstructed & It is ensured that access to fire extinguishers is not obstructed.
- (xii) Proper containers are used for flammable liquids.
- (xiii) Safe distance of Petroleum, Oils and Lubricants (POL) is maintained from any point of ignition.
- (xiv) Welding and cutting equipment is checked before and after use.
- (xv) Main electrical equipment is switched off when not in use.
- (xvi) All workers and staff are familiarized with the firefighting system.
- (xvii) Escape routes are well defined.
- (xviii) The POL dumps and gas cylinders are barricaded.
- (xix) Fire extinguishers are refilled on time.

Sr.no.	Item	Nos	Location
1	First aid kits	01 each	In all work fronts Store/workshop/office
2	Sand / Fire buckets	As required	container/ All diesel generator Rooms / casting Yard etc.,
3	Fire Extinguishers	As required	Store/workshop/office/ Site office container/ All diesel generator Rooms / casting Yard etc.,
4	Safety Helmets	Depends on no. of labor	Site Store
5	Safety Shoes Pairs	10 Nos. (Each sizes)	Site Store
6	Stretchers	4-6 Nos.	First Aid room / Ambulance / Store
7	Oil Spill Absorbent Materials (Hessian Cloth / Foam)	Sufficient Quantity	Site Store

Reporting System for Emergency

Important Telephone Numbers of Persons at Corporate /Division Level

Local Fire Station
Private Hospital
Police Station

Appendix 9: Ward Level Stake holder consultations, consultation with Affected Person and Focus Group discussion

Sr. No	Date	Place of Consultation	No. of Participants	Points Discussed	Photographs
1	8.11.23	Ward Office, Ward 108	Total Participants 63 Male: 7 (11%) Female: 56 (89%) Local residents, women SHG members, representatives of KMC Councilor of ward 109, Market association representatives	- Explaining about KSHARP as an initiative of The Kolkata Municipal Corporation funded by The Asian Development Bank, and its role for improving the S&D services in Ward no 108 and its adjoining areas - Need and scope of work and tentative commencement date for this package was elucidated. - Anticipated impacts during construction phase, .Only temporary livelihood loss has been assessed. Importance of public participation and public awareness was emphasized. - Technical information i.e. total length of work, diameter of pipes to be laid along the road, flow of water etc. were shared - Water logging problem of the area and reduction of flooding during monsoon after implementation of this project. - Existing water logging during heavy showers, back flow of water from adjoining area happens to be a persistent issue. - Choking of drains, latrines etc. during heavy showers. Provision of rain water harvesting. - It was informed that all the safety norms shall be used to avoid inconveniences during project implementation. Information shall be disseminating throughout the project. - People were happy to know about the Grievance Redress mechanism and process of lodging complaints. - Contact number of officials of project contractor, project implementation unit shall be provided to every one prior to start of works for lodging any grievances.	 

Stakeholders consultation at ward No. 108, dated 08.11.23(Mukunda bhaban) Attendance Sheet

Kolkata Urban Resilience Improvement Project (KURIP) Signature Sheet for Public Consultation

Date: 08/11/2023

Venue: Anandapur Ward 108

Sl. No.	Name	M/F	Address	Contact No.	Signature
1	Margala Mahal	F	Anandapur	9654521532	[Signature]
2	Tripti Mondal	F	V.I.P Nagar	933648215	[Signature]
3	Nitu Lal	F	V.I.P Nagar	867612470	Nitu Lal
4	Papya Das	F	V.I.P Nagar	8659246107	Papya Das
5	Bishko Majumdar	F	"	6790831429	Bishko Majumdar
6	Dipali Sinha	F	"	97495747426	Dipali Sinha
7	Munmun Sinha	F	"	8777319208	Mun Mun Sinha
8	Maya Neogi	F	Nonadanga	9051476746	Maya Neogi
9	Pratima Majumdar	F	"	8481025426	Pratima Majumdar
10	Kakoli Paul	F	West Chokpara	840902464	Kakoli Paul
11	Somali Chakraborty	F	Nonadanga	6291474823	Somali Chakraborty
12	Kakoli Mondal	F	V.I.P Nagar	7803066234	Kakoli Mondal

Kolkata Urban Resilience Improvement Project (KURIP) Signature Sheet for Public Consultation

Date: 08/11/2023

Venue: Anandapur Ward 108

Sl. No.	Name	M/F	Address	Contact No.	Signature
13	Rushpa Halder	F	Nonadanga	7123053255	[Signature]
14	Riya Halder	F	"	"	[Signature]
15	Dibakar Sarda	M	Mundapara	8334916852	Dibakar Sarda
16	Sanjib Chakraborty	M	"	9676242184	[Signature]
17	Animesh Mondal	M	"	7674430703	[Signature]
18	Amrit Mondal	M	Hossainpur	8420662472	[Signature]
19	Sanjit Malik	M	"	7003743127	[Signature]
20	Sudhakar Chakraborty	M	Nonadanga	8290819437	[Signature]
21	Rupa Mondal	F	"	9330271532	Rupa Mondal
22	Sukla Nayak	F	Nonadanga	7831557422	[Signature]
23	Gourab Das	M	Aranda-pur	9162687440	[Signature]
24	Biplab Nath	M	Maduradaha	8240234532	[Signature]

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Date: 08/11/23

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Sl. No.	Name	M/F	Address	Contact No.	Signature
25	Rina Jele	F	Anandapur	9163468811	Rina Jele
26	Suparna Biswas	F	"	80	Suparna Biswas
27	Dolan Jele	F	"	80	Dolan Jele
28	Suparna Bar	F	"	80	Suparna Bar
29	Dipali Hathi	F	"	80	Dipali Hathi
30	Poojanka Halder	F	Mundapara	830806464	Poojanka Halder
31	Roma Bapoi	F	"	80	Roma Bapoi
32	Gita Mondal	F	"	80	Gita Mondal
33	Nabita Chowdhury	F	"	80	Nabita Chowdhury
34	Rina Nayak Sanyal	F	Maduradaha	690690723	Rina Nayak Sanyal
35	Sila Gupta	F	"	767485980	Sila Gupta
36	Gouri Debta	F	R.RALOT	780255535	Gouri Debta

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Date: 08/11/23

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Sl. No.	Name	M/F	Address	Contact No.	Signature
37	Paranita Chakraborty	F	R.R. PLOT	9836226041	[Signature]
38	Soma Mondal	F	Pona Basti	8240988013	[Signature]
39	Swaga Pandey	F	VIP Nagar	80	Swaga Pandey
40	Laxmi Mondal	F	VIP Gagarani Colony	9798157180	[Signature]
41	Minu Mondal	F	VIP Gagarani Colony	80	Minu Mondal
42	Jharna Mazumdar	F	V.I.P Nagar	806215601	Jharna Mazumdar
43	Jharna Prasad	F	Rail Colony Nonadanga	8479070803	[Signature]
44	Urmila Mondal	F	Bhai Bhai Colony	7880107314	Urmila Mondal
45	Rina Das	F	Nonadanga	9088779117	Rina Das
46	Bhaskari Sarda	F	Maduradaha	80	[Signature]
47	Papya Ghosh	F	Ambedkar Abasam	689217455	Papya Ghosh
48	Bhikaspati Sarda	F	Maduradaha	80	[Signature]

Kolkata Urban Resilience Improvement Project (KURIP)

Signature Sheet for Public Consultation

Date: 08/11/23

Venue: 08/11/23 Anandapur Ward 108

Sl. No.	Name	M/F	Address	Contact No.	Signature
49.	Nilima Sanyal	F	9, Madhuradaha Road, P.O. EKIPD Kol-107	9007223116	Nilima Sanyal
50.	Sybil Sanyal	F	"	"	Sybil Sanyal
51.	Monidipa Basu	F	R.R. PLOT	6290272352	Monidipa Basu
52.	Pratima Mandal	F	"	905123409	Pratima Mandal
53.	Rita Haldar	F	"	9831316712 628553537	Rita Haldar
54.	Manu Sanyal	F	Madhuradaha	N/A	Manu Sanyal
55.	Mahata Sanyal	F	"	N/A	Mahata Sanyal
56.	Minu Bag	F	"	9831694279	Minu Bag
57.	Ashima Bagda	F	"	"	Ashima Bagda
58.	Ruman Sanyal	F	China Mandir	80	Ruman Sanyal
59.	Septanita Saha	F	"	80	Septanita Saha
60.	Soma Mondal	F	"	80	Soma Mondal

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Date: 08/11/23

Venue: Anandapur Ward 108

Sl. No.	Name	M/F	Address	Contact No.	Signature
61.	Shamita Sanyal	F	Madhuradaha	8444781896	Shamita Sanyal
62.	Ranmita Sanyal	F	"	7003232057	Ranmita Sanyal
63.	Shibani Chatterjee	F	V.I.P Nagar	7980224405	Shibani Chatterjee
64.	Arpita Das	F	Nono Sanyal	6289863129	Arpita Das
Organised and conducted by;					
1.	Haseenul Islam	M	DSC, KEIP	9051841215	Haseenul Islam
2.	Ratna Mukherjee	F	DSC, KEIP	8240225218	Ratna Mukherjee
3.	Anurupa Chakrabarty	F	DSC, KEIP	8961640900	Anurupa Chakrabarty
4.	RUNKINI GHOSH	F	PMU, KEIP	8910062516	RUNKINI GHOSH
5.	Indira Banerjee	M	SDU, KEIP	8017782128	Indira Banerjee

Summary of Stakeholder Consultation under KSHARP in the KMC Ward-108

Date	Location	No. of Participant	Participant Details	Key Discussions
26.12.2023	Ward 108 Anandapur	21	Local residents, shop owners, housewives, businessmen, Service men, representatives of PMU and team of consultants	✓ Need for and scope of work and tentative commencement date for this package was elucidated. ✓ No adverse impacts on structures, livelihoods anticipated. ✓ The subproject will provide a wastewater discharge in the canals and water bodies of Kolkata which will ensure improvement of living condition and overall environment
07.02.2024	Ward 108 (M Daha channel road, Sector H)	8	Local residents, shop owners, housewives, businessmen, Service men, representatives of PMU and team of consultants	✓ Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.
07.02.2024	Ward 108 (Kasba industrial Estate, Sector J)	8	Local residents, shop owners, housewives, businessmen, Service men, representatives of PMU and team of consultants	✓ Application of mitigation measures as per EMP to mitigate short term impact ✓ The project work will reduce environmental impact/ health problems that is caused by open discharge of domestic wastewater
07.02.2024	Ward 108 (East Kolkata Township, Sector 2)	7	Local residents, shop owners, housewives, businessmen, Service men, representatives of PMU and team of consultants	✓ It will be ensured that river Ganga is not polluted which is a priority of the state and national government. ✓ People may face some access disruption during construction work. Suitable measures will be taken to avoid or minimize any disruption. People's cooperation will be needed for successful implementation of the project.
07.02.2024	Ward 108 (Kasba industrial Estate, Phase 3)	6	Local residents, shop owners, housewives, businessmen, Service men, representatives of PMU and team of consultants	✓ Participants have shown their willingness to engage with the project. ✓ Discussed about safety issues of residents during construction period.
07.02.2024	Ward 108(Kasba industrial Estate, Sector I)	8	Local residents, shop owners, housewives, businessmen, Service men, representatives of	✓ Grievance Redressal mechanism will be in place to address the complaints and grievances of the community people and



KOLKATA URBAN RESILIENCE IMPROVEMENT PROJECT (KURIP) (Participants list of Improvment Consultation)			
Date:	26. 12. 23		
Place:	Anandapur World		
Sl. No	Name	Contact No.	Signature
1	Sukho Sarkar	8017011807	Sukho
2	Rabina Das	9834622103	Rabina
3	Poojit Das	98311406371	
4	Devin Mukherjee	9433265071	
5	Siddha Das	9330575232	
6	Goutam Kalay	9831377918	Goutam
7	Raman Mandal	7002183841	
8	Sanjay Das	7674263124	Sanjay
9	Rajeev Das	7218102160	Rajeev
10	Debasish Ghosh	8584011233	Debasish
11	Santanu Choudhury	762654154	Santanu
12	Anjali Bhattacharya	7059304317	Anjali
13	Sudhakar Das	3004972492	Sudhakar
14	Shilpa Das	9804933542	Shilpa
15	Subhojit Das	9432246281	Subhojit
16	Nayan Das		Nayan
17	Rishi Das		Rishi
18	Gourav Ghosh	8697658950	Gourav
19	Debabrata Ghosh	9836480346	Debabrata
20	Milan Das	9804889880	
21	Mandirika Das	9433377118	Mandirika

Community consultation at Anandapur ward No. 108, dated 26.12.2023



Kolkata Urban Resilience Improvement Project (KURIP)

Signature Sheet for Public Consultation

Date: 7/2/24

Venue: Anandapur (M. Laha Samal Road Sector 1A)

Sl. No.	Name	M/F	Address	Contact No.	Signature
1	Rajashankar				Rajashankar
2	Prasanna				Prasanna
3	Prasanna	F			Prasanna
4	Nayana Mondal	F			N. Mondal
5	Prasanna	F			Prasanna
6	Sayanta Chatterjee				Sayanta Chatterjee
7	Mallabika Sin				Mallabika Sin
8	Pinkini Ghosh	F			Pinkini

Community consultation at ward No. 108, dated 07.02.24(M. Daha Channel Road, Sector H)

[illegible]

KURLA
Anandapur
07.02.25 12:25
22.51475, 88.40397
P-1, Phase 2, Kasba Industrial Estate, Sector J, East Kolkata
Twp. Kolkata, West Bengal 700107

[illegible]

Community consultation at ward no. 108, dated 07.02.24(East Kolkata Town, Sector 2)

[illegible][illegible]

Community consultation at ward no. 108, dated 07.02.24 (Kasba industrial Estate, Sector I)

Appendix 10: Sample Grievance Registration Form

(To be available also in Bengali, Hindi)

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			
Contact Information/Personal Details					
Name		Gender	* Male * Female	Age	
Home Address					
Village / Town					
District					
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?					

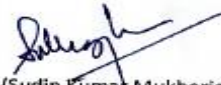
FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Signature

Position

Appendix 11: GRC Notification Office Order

 KOLKATA ENVIRONMENTAL IMPROVEMENT INVESTMENT PROGRAM (KEIP)	
 D.G. (P) KEIP	Ref: DSC/KEIP/DTL/2023-24/38840 December 29, 2023
Subject: Constitution of Grievance Redressal Committee of Kolkata Urban Resilience Improvement Project (KURIP)	
As per Social Safeguard and Environmental Policy of ADB, a Grievance Redressal Committee (GRC) is to be constituted for Kolkata Urban Resilience Improvement Project (KURIP). The details of Constitution of GRC is enclosed for approval of Project Director, KEIP.	
A draft copy of Office Order is enclosed for signature of Project Director, KEIP	
	  (Sudip Kumar Mukherjee) Dy. Team Leader DSC- KEIP
Encl. As stated above.	
A.O KEIP P.D DG(P) Dy. P.D for no H 30/12/23 26/1/24 Placed for approval. please. 30/12/23 26/1/24 Mr. Hasan SSE 02/01/24 02/01/24	
	

**Kolkata Environmental Improvement
Investment Program
(KEIP)**



The Kolkata Municipal Corporation
Kolkata Environmental Improvement Investment Program
206, A. J. C. Bose Road, Kolkata 700 017
Tel: (91) 2283 0544
Email ID: pdkeip@gmail.com
Website: www.keip.in

Ref: PMU/404A/2023-24.
Date 29.12.2023.

December 29, 2023

Office Order

It is considered necessary to constitute a Grievance Redressal Committee (GRC) on Kolkata Urban Resilience Improvement Project (KURIP) for redressing Social and Environmental or any other project related grievances for Kolkata Urban Resilience Improvement Project (KURIP), posed for funding from ADB.

Under the circumstances, a Grievance Redressal Committee (GRC) with the following members is constituted with immediate effect:

1. Administrative Officer, PMU, KURIP - Member Secretary (Convenor)
2. Dy. C.E. (I), CMU, KURIP
3. Social Safeguard Officer, PMU, KURIP
4. Environmental Officer, PMU, KURIP
5. Social Safeguard Specialist, PMDSC, KURIP
6. Environmental Specialist, PMDSC, KURIP


Project Director- KEIP

Project Director
K.E.I.I.P./K.M.C.

Copy to: 1) Director General (Project), KEIP
2) Administrative Officer, KEIP

CONSTITUTION OF GRIEVANCE REDRESS COMMITTEE (GRC) OF KURIP

- Display of address of Contractor's site office Complaint & Suggestion Books are to be made available for lodging any complaint. The concerned Executive Engineer of KURIP to periodically monitor these Books and take necessary actions for redressal with intimation to the complainant.
- At every Borough under which works are under progress, a Public Relation & Grievance Redressal Unit , comprising of KURIP staff to be established for availing detailed information of the works, registering of complaint and act as Liaison for its redressal under intimation to the complainant. A suggestion box will be kept at Borough office for lodging complaints/suggestions.
- In KURIP office at 206, A J C Bose Road, Kolkata – 700017, The Administrative Officer, KURIP will be In-charge of the grievance redressal matters under the Project Director.
- Complaints may be lodged by AhatsApp number/e-mail.
- Complaints may also be lodged through KURIP website and KMC website.
- A Grievance Redressal Committee (GRC) has been constituted consisting of :

1. Administrative Officer, KURIP	Member Secretary (Convener)
2. Dy. C.E.(I) KURIP	Member
3. Social Safeguard Officer, KURIP	Member
4. Environmental Officer, KURIP	Member
5. Social Safeguard Specialist, PMDSC, KURIP	Member
6. Environmental Specialist, PMDSC, KURIP	Member

Under the Project Director, KURIP for regular monitoring of the entire process.

Appendix 12: Sample Environmental Site Inspection Checklist

Project Name

Contract

Number

NAME: _____ DATE: _____

TITLE: _____ DMA: _____

LOCATION: _____ GROUP: _____

WEATHER: _____

	Projectt Activitt Stage	Survey	
		Design	
		Implementation	
		Pre-Commissioning	
		Guarantee Period	

Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)		Compliance
EHS supervisor appointed by contractor and available on site		
Construction site management plan (spoils, safety, schedule, equipment etc.,)prepared		
Traffic management plan prepared		
Dust is under control		
Excavated soil properly placed within minimum space		
Construction area is confined; no traffic/pedestrian entry observed		
Surplus soil/debris/waste is disposed without delay		
Construction material (sand/gravel/aggregate) brought to site as & when required only		
Tarpaulins used to cover sand & other loose material when transported by Vehicles		
After unloading , wheels & undercarriage of vehicles cleaned prior to leaving thesite		
No chance finds encountered during excavation		
Work is planned in consultation with traffic police		
Work is not being conducted during heavy traffic		
Work at a stretch is completed within a day (excavation, pipe laying & backfilling)		
Pipe trenches are not kept open unduly		
Road is not completely closed; work is conducted on edge; at least one line iskept open		
Road is closed; alternative route provided & public informed, information board provided		

Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)	
	Compliance
Pedestrian access to houses is not blocked due to pipe laying	
Spaces left in between trenches for access	
Wooden planks/metal sheets provided across trench for pedestrian	
No public/unauthorized entry observed in work site	

Children safety measures (barricades, security) in place at works in residential areas	
Prior public information provided about the work, schedule and disturbances	
Caution/warning board provided on site	
Guards with red flag provided during work at busy roads	
Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc)	
Workers conducting or near heavy noise work is provided with ear muffs	
Contractor is following standard & safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	
Drinking water provided at the site	
Monitoring Items	Compliance
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet & bath facilities provided	
Contractor employed local workers as far as possible	
Workers camp set up with the permission of PIU	
Adequate housing provided	
Sufficient water provided for drinking/washing/bath	
No noisy work is conducted in the nights	
Local people informed of noisy work	
No blasting activity conducted	
Pneumatic drills or other equipment creating vibration is not used near old/risky buildings	

Signature

Sign

off

**Name
Position**

**Name
Position**

Appendix 13: Photo Illustration of Project Location

 Latitude: 22.51249 Longitude: 88.409317 Elevation: 22.5149 m Accuracy: 27.8 m Time: 23-11-2023 13:16 Note: 108 anandapur khal	 Latitude: 22.513765 Longitude: 88.402763 Elevation: 23.621 m Accuracy: 3.9 m Time: 23-11-2023 12:37 Note: 108 ruby
TP Canal	Proposed pipe laying area backside of Ruby Hospital
 Latitude: 22.512976 Longitude: 88.404622 Elevation: 25.4241 m Accuracy: 3.9 m Time: 23-11-2023 12:34 Note: 108 hossainpur stp	 Latitude: 22.514023 Longitude: 88.403755 Elevation: 23.5241 m Accuracy: 3.9 m Time: 23-11-2023 12:40 Note: 108 ruby
Market area at Anandapur Main Road	Proposed pipe laying area beside Regional Passport Office
 Latitude: 22.515548 Longitude: 88.407 Elevation: 25.01474 m Accuracy: 7.1 m Time: 23-11-2023 12:54 Note: 108 anandapur ps	 Latitude: 22.515523 Longitude: 88.409808 Elevation: 23.194 m Accuracy: 18 m Time: 23-11-2023 12:54 Note: 108 anandapur ps
Existing Anandapur PS	Road in front of Pumping Station