

Initial Environmental Examination

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India: Tripura Urban and Tourism Development
Project – Design, Build and Operate Contract for
Comprehensive Water Supply Improvement Works
for Cluster IA Towns of Tripura

Package No: WS-01/P-01

Prepared by Tripura Urban Planning and Development Authority (TUDA), Urban Development
Department, Government of Tripura for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 21 Mar 2023)

Currency Unit	–	Indian rupee (₹)
₹1.00	–	\$0.01
\$1.00	=	₹82.66

ABBREVIATIONS

ADB	–	Asian Development Bank
CPCB	–	Central Pollution Control Board
CTE	–	Consent to establish
CTO	–	Consent to operate
DBE	–	Design Basis Earthquake
DBO	–	Design, build and operate
DHQ	–	Districts headquarter
DTW	–	Deep Tube Well
DWS	–	Drinking water & sanitation
EAC	–	Expert appraisal committee
EARF	–	Environmental assessment and review framework
EHS	–	Environment, health and safety
EIA	–	Environmental impact assessment
EMP	–	Environmental management plan
EMS	–	Environmental management specialist
EPC	–	Engineering, Procurement & Construction
GLSR	–	Ground level storage reservoir
GoT	–	Government of Tripura
GRC	–	Grievance redress committee
GRM	–	Grievance redress mechanism
IEE	–	initial environmental examination
IRP	–	iron removal plant
KMC	–	Khowai Municipal Council
MMC	–	Mohanpur Municipal Council
MoEFCC	–	Ministry of Environment, Forest and Climate Change
NWQMP	–	National Water Quality Monitoring Programme
TSPCB	–	Tripura State Pollution Control Board
NOC	–	No objection certificate
OHS	–	Occupational health and safety
PGA	–	Peak Ground Acceleration
PIU	–	project implementation unit
PMSC	–	Project management & supervision consultant
PMU	–	Project management unit
RFA	–	Recorded Forest Area
RMC	–	Ranirbazar Municipal Council
ROW	–	Right of way
SDCC	–	Sustainable Development and Climate Change Department
SGC	–	Safeguards and gender cell
SPS	–	Safeguard Policy Statement
TOR	–	Terms of Reference
TUDA	–	Tripura Urban Planning and Development Authority
TUTDP	–	Tripura Urban and Tourism Development Project

WHO	– World Health Organization
WTP	– Water treatment plant

WEIGHTS AND MEASURES

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

NOTE

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

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EXECUTIVE SUMMARY

Proposed Tripura Urban and Tourism Development Project (TUTDP) will improve the municipal infrastructure and public services and will lay the foundation for tourism development in the State of Tripura. Tripura is in the Northeast Region (NER) of India, covering an area of 10,490 square kilometers, with a population of 4.1 million (estimated 2022), and Agartala as the state's capital. The project targets key urban local bodies (ULBs) along the main national highways in Tripura, major infrastructure components of which include water supply, stormwater drainage, communal or neighborhood roads, and tourism development support.

The project is aligned with the following impact(s): clean and sustainable environment in ULBs achieved, and Tripura increasingly recognized in the India tourism industry as a new destination. The project will have the following outcome: Adequate, safe, and climate- and disaster-resilient, urban services (water, storm drainage, and municipal roads) provided and sustainable tourism improved in project areas. Project has four outputs: (i) Output 1: Municipal reforms and capacity of ULBs strengthened, (ii) Output 2: Urban infrastructure improved. The project will improve various public infrastructures, such as (i) water supply, (ii) stormwater drainage, and (iii) municipal roads, (iii) Output 3: Tourist destinations improved, and (iv) Output 4: Capacity of tourism corporation's operational services improved. The government of Tripura acting through Urban Development Department (UDD) will be the project executing agency. Tirupa Urban Development Authority (TUDA) and Tripura Tourism Development Corporation Limited (TTDCL) will be the implementing agencies.

Under phase 1 of project, 12 towns have been selected for improvement of Water Supply, Sewerage & Septage Management, Developments of Drains & Roadside Drains and Urban Transport. Tripura Urban and Tourism Development Project (TUTDP) will be implemented over a 5-year period. **Khowai, Mohanpur and Ranirbazar** are three project towns selected under this package (Cluster IA) Agartala will be the Cluster headquarter. Water supply improvement works are proposed in these three towns under the TUTDP. Following are the proposed components:

Khowai town - Subproject includes the following: (i) Construction of 2 nos. Deep Tube Well (DTW) with IRP at 2 different locations, (ii) Construction of 1 no. OHSR, 400 KL capacity near WTP Campus ward no. 12, (iii) laying of approx. 1.43 km transmission main, (iv) laying of Approx. 12.51 km (6.749 km remodelling & 5.766 km expansion) water distribution pipeline and (v) installation of bulk flow meter and consumer meter.

Mohanpur town - Subproject includes the following: (i) Construction of 5 nos. Deep Tube Well (DTW) at 5 different locations, (ii) Construction of 3 no. Iron Removal Plant (IRP) in 2 OHSR locations (iii) Construction of 2 nos. OHSR, one number 850 KL capacity at old MMC ward no. 15, another 750 KL capacity at Tulabagan, Ward No-12 (iv) laying of approx. 4.65 km transmission main (raw & clear) , (v) laying of Approx. 11.70 km (10.10 km remodelling & 1.60 km expansion) water distribution pipeline and (vi) installation bulk flow meter and consumer meter.

Ranirbazar town - Subproject includes the following: (i) Construction of 3 nos. Deep Tube Well (DTW) at 3 different locations, (ii) Construction of 1 no. Iron Removal Plant (IRP) with a GLSR, (iii) Construction of 2 nos. OHSR, one number 350 KL capacity near Anganwadi ward no. 13, one number 800 KL capacity at Krishna talli, ward no. 11, (iv) laying of approx. 3.95 km transmission main (2500 m raw water and 1450 m clear water main), (v) laying of Approx. 17.32 km (10.895 km remodelling & 6.426 km expansion) water distribution pipeline and (vi) installation bulk flow meter and consumer meter.

Screening and Categorization. assessment of potential impacts. Water Supply subproject of these towns is classified as environmental category B as per ADB's Safeguard Policy Statement (SPS), 2009, and accordingly this initial environmental examination (IEE) assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the subproject. As per the Government of India environmental impact assessment (EIA) Notification, 2006, this subproject does not require EIA study or environmental clearance. During the construction phase, subproject will require permission from respective road agencies (for those roads that are not under the jurisdiction of ULB), this will be obtained prior to start of construction. Similarly, in case works require shifting of utilities such as telephone and electricity lines, permission from respective agencies will be obtained.

Description of the Environment. The subproject towns Khowai, Mohanpur and Raninbazar are in Tripura state in northeast India. It is third-smallest state, bordered by Assam and Mizoram to the east and by Bangladesh to the north, south and west. Agartala is the capital and the largest city in the state. The whole of northeast India, including Tripura, falls under seismic zone V and is highly vulnerable to earthquakes. Proposed project components in urban areas of project towns. There are no forests or protected areas or archeologically or historically sensitive areas in or near project sites. Sites do not fall under any buffer or eco sensitive zone.

Khowai is the headquarter of Khowai district in western Tripura. Town is extended upto international border of Bangladesh in northwest direction. Located at 24° 3' 54" N and 91° 36' 18" E, it has mostly plain terrain, an average elevation of 23 m above mean sea level (MSL). Area of the town is 5.86 sqkm, divided into 15 municipal wards, and has a population of 18526 (2011 census). River Khowai passes through the town. Rainfall Khowai subdivision varies from 2,058 mm to 3,141mm. The proposed two tube well and iron removal plant sites are in ward 9 (near Jibanananda Vidyamandir School) and ward 10 (Dasaratha Deb Memorial College). The OHSR is proposed near WTP Campus (Ward no. 12). Water pipes will be laid along the existing town roads. Nearest forest area is Atharamura Kalajhari reserve forest located 16 km, nearest protected area is Rema Kalenga wildlife sanctuary, located within 5 km from the project area in Habiganj, Bangladesh.

The town **Mohanpur** is located in West Tripura district in western Tripura. Town is extended up to international border of Bangladesh in northwest direction. Located at 23° 57' 57" 26" N and 91° 22' 53" E., it is characterized by undulating hills, with the highest point in the area reaching an elevation of around 100 meters above sea level. The area of Municipal Council is 14.55 Sq km, divided into 15 wards and has a population of 16,722 (2011 census). Sonai River is the flows through the town. Yearly rainfall as recorded nearby station, Jirania varies between 1500 and 2507 mm. Proposed 5 tube wells and IRP sites are near Power station ward No.10, near Rabindra Palli - ward no.2, near Old MMC ward no. 15, near Bohemian Colony ward no. 13 and near Tula Bagan, ward no. 14 of the town. 2 nos. OHSR, one at old MMC ward no. 15, another at Tulabagan, Ward No-12 are proposed under the project. Water pipes will be laid along the existing town roads. The nearest protected area is the "Sepahijala Wildlife Sanctuary" is located within 33 km aerial distance in Sepahijala district, Tripura and near forest area Tulakona R.F. is at 18 km aerial distance from the project town.

The **Ranirbazar** is located in west Tripura in western Tripura. Town is situated at 23.83°N latitude and 91.37°E Longitude. The town is characterized by undulating terrain with hills, and plains. The town is surrounded by hills on three sides, namely the Jampui Hills to the north, the Atharamura Range to the east, and the Longtharai Range to the south. The area of the town is 11.72 sqkm, divided into 13 municipal wards, and has a population of 13104 (2011 census). River Haora is flowing in the western direction of town. Yearly rainfall as recorded nearby station varies between

1500 & 2507 mm. Proposed 3 tube wells are near Cattle market ward No.2, near Durgapur Kalli-Mandir ward no.1 and near Devi Nagar ward no. 9. 2 nos. OHSR, one near Aganbadi Nalgaria ward no. 13, another at Krishna talli, ward no. 11. Water pipes will be laid along the existing town roads. Nearest protected area is "Sepahijala Wildlife Sanctuary, located 21 km from the town in Sepahijala district, Tripura.

Potential Environmental Impacts and Mitigation measures. Environmental impacts due to the project design or location are not significant as various measures are already included in site planning and preliminary design. Source of water for all the 3 towns is ground water. Assessment confirms the ground water source sustainability to provide required water, and Water Resources Investigation Division (WRID) has provided permission for ground water extraction for all the 3 towns. 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. Tube wells, IRP and OHSR construction activities will be confined to the selected sites, while pipe works will be along the public. Construction impacts arise mainly from 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 in roads congested with people, activities, and traffic may have impacts arising mainly from the disturbance of residents, businesses, and traffic due to construction work; safety risk to workers, public and nearby buildings due to deep trench excavations in the road; access impediment to houses and business, disposal of large quantities of construction waste etc. Trenchless method will be adopted for water supply where required such as at main road crossings in traffic areas.

The project will utilize existing surface water-based system, including the water treatment plant (WTP), to meet part of the water demand. Preliminary audit of WTPs conducted during the IEE indicate no legal non-compliance, however, suggests improvements such as backwash and sludge management systems, chemical storage/handling etc., Detailed technical assessment will be conducted by DBO contractor during the detailed design, and PMU will ensure that necessary improvements are taken up by Department of Water Supply (DWS).

Environmental Management. An 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 design. During construction, the EMP includes mitigation measures such as (i) proper planning and scheduling of water line works to minimize public inconvenience; (ii) measures to avoid impacts on heritage building and chance find procedures (iii) barricading, dust suppression and noise control measures; (iv) traffic management measures for works along the roads and for hauling activities; (v) occupational and community health and safety, labour welfare, (vi) provision of walkways and planks over trenches to ensure access will not be impeded; (vii) reuse of excavated materials to extent possible, (viii) spill and sediment control measures to avoid water and soil pollution, etc. EMP will guide the environmentally-sound construction of the subproject. EMP includes a monitoring program to measure the effectiveness of EMP implementation and includes observations on- and off-site, document checks, and interviews with workers and beneficiaries. A copy of the updated EMP/ site environmental management plan (SEMP) shall be always kept on-site during the construction period. The EMP will be included in bids and contracts, and implementation shall be binding on contractors.

Implementation Arrangements. Urban Development Department (UDD) of Government of Tripura (GOT) is the executing agency, and the implementing agencies are Tripura Urban Planning and Development Authority (TUDA, for urban component) and Tripura Tourism Development Corporation Limited (TTDCL, for tourism component). A project management unit

(PMU) in Agartala and six project implementation units (PIUs, 3 urban and 3 tourism) will be established in Agartala, Udaipur and Kumarghat. Project management and supervision consultant (PMSC) will be engaged to assist PMU and the PIUs. At PMU, the project coordinator will be the nodal officer for environmental, social safeguards and gender and will be responsible for ensuring compliance with ADB's Safeguards Policy Statement (SPS), 2009. An environmental safeguards officer (ESO) will be engaged to support the project coordinator. Project manager or assistant project manager of PIU will be designated as safeguards focal in each PIU. PMSC team will include an Environmental Safeguards Specialist (ESS), and three support safeguards staff located in PIUs. Contractor will appoint an Environment, Health and Safety (EHS) supervisor.

Consultation, Disclosure and Grievance Redress. The stakeholders were involved in developing the IEE through FGD and public consultation at project area level, after which views expressed were incorporated into the IEE and in the planning and development of the project. FGDs and consultations have been conducted in three towns: Khowai - February and August 2022 with 100 participants (35 male and 65 female). Mohanpur: March and August 2022 with 106 participants (26 male and 80 female). Ranirbazar 95 participants (41 male and 54 female). All participants are expressed need for the project and willingness to take it up and stakeholders were very supportive for the project and promises to extend full cooperation during the construction phase as the activities are proposed to improve the water supply service levels and the living standards.

Monitoring and Reporting. The PMU, PIU and consultants will be responsible for monitoring and reporting. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports to the PIU. PIU with the assistance of PMSC, will monitor the compliance of contractor, prepare a quarterly environmental monitoring report (QEMR) and submit to PMU. 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 project websites.

Conclusions. The proposed 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 citizens of the Khowai, Mohanpur and Ranirbazar will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of these towns through provision of water supply. The benefits arising from this subproject include: (i) increased availability of potable water to all households including urban poor; (ii) reduced time and costs in accessing alternative sources of water; (iii) better public health particularly reduction in waterborne and infectious diseases and (iv) reduced risk of contamination of treated water supplies. 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). Existing WTPs require some improvements, these need to be taken up after detailed assessment part of detailed design. This IEE needs to be updated during the detailed design, reviewed, and approved by ADB, and disclosed prior to start of construction.

I. INTRODUCTION

A. Tripura Urban and Tourism Development Project (TUTDP)

1. The project is aligned with the following impact(s): clean and sustainable environment in ULBs achieved, and Tripura increasingly recognized in the India tourism industry as a new destination.¹ The project will have the following outcome: Adequate, safe, and climate- and disaster-resilient, urban services (water, storm drainage, and municipal roads) provided and sustainable tourism improved in project areas.²

2. **Output 1: Municipal reforms and capacity of ULBs strengthened.** The project will strengthen (i) the capacity of technical staff in project management and operation and maintenance (O&M) of urban infrastructure; (ii) ULB own-source revenue generation, financial management and accounting reforms; (iii) advisory support for city-wide inclusive sanitation for ULBs that complements government financing scheme;³ (iv) integration of climate change- and disaster resilience in urban planning with universal design consideration, and gender equality and social inclusion (GESI) analysis and (v) support to developing building regulations and building byelaws for the state.

3. **Output 2: Urban infrastructure improved.** The project will improve various public infrastructures, such as (i) water supply, (ii) stormwater drainage, and (iii) municipal roads.

4. **Output 3: Tourist destinations improved.** The project will strengthen public infrastructure that is vital for ecotourism such as (i) tourism destination development with climate resiliency and green infrastructure retrofitting; (ii) museum development at the Neermahal Palace (iii) Improved tourist accommodation and family oriented-Adventure Park; and (iv) Tourism-related goods and equipment for selected tourism destinations.

5. **Output 4: Capacity of tourism development corporation's operational services improved.** Tripura tourism through TTDCL will (i) develop a 10-year business plan including marketing and coordination with the private sector (including exploring outsourcing and O&M of tourism facilities and assets for local business, small and medium enterprise opportunities for women), (ii) demonstrating community-based tourism development (iii) stakeholder tourism capacity and skill development program, (iv) marketing and tourism promotion activities.

6. Under phase 1 of the project, 12 towns have been selected for improvement of Water Supply, Sewerage & Septage Management, Developments of Drains & Roadside Drains and Urban Transport. Tripura Urban and Tourism Development Project (TUTDP) will be implemented over a 5-year period. **Khowai, Mohanpur and Ranirbazar** are three project towns in this package (Package WS/01), improvement of water supply system in these three towns are proposed under the TUTDP.

7. Urban Development Department (UDD) of Government of Tripura is the executing agency. A Project Management Unit (PMU) is established under UDD, and jointly represented by the IAS of TUDA and Tripura Tourism Development Corporation Limited (TTDCL).

¹ Government of India, Ministry of Housing and Urban Affairs. 2015. Smart Cities Mission Guidelines. Delhi; Government of Tripura, Department of Tourism. 2020. Tourism Policy 2020–2025. Agartala.

² The design and monitoring framework is in Appendix 1.

³ ADB is working with Global Water and Sanitation Center under Bill and Melinda Gates Foundation to provide CWIS support preliminary study for 2 towns that would be potentially financed in the planned Phase 2.

B. Purpose of Initial Environmental Examination Report

8. As per ADB's Safeguards Policy Statement, 2009, ADB requires the consideration of environmental issues in all aspects of the Bank's operations. Using rapid environmental assessment (REA) checklist for 3 towns (Appendix 1), subproject is unlikely to cause significant adverse impacts, and classified as **Category B** and per ADB SPS requirements this IEE is conducted.

C. Scope of IEE

9. The subproject will be implemented under the design-build-operate (DBO) modality. Thus, this IEE is based on the preliminary project design report. The IEE is conducted mainly based on field reconnaissance surveys and secondary sources of information. Stakeholder consultation was an integral part of the IEE. This IEE will be updated by DBO contractor during the detailed design to reflect changes and submitted to ADB for approval. IEE will be further updated during implementation if there are any changes in project scope, design or sites updates will supersede the earlier version.

D. Report Structure

10. This Report contains the following sections:

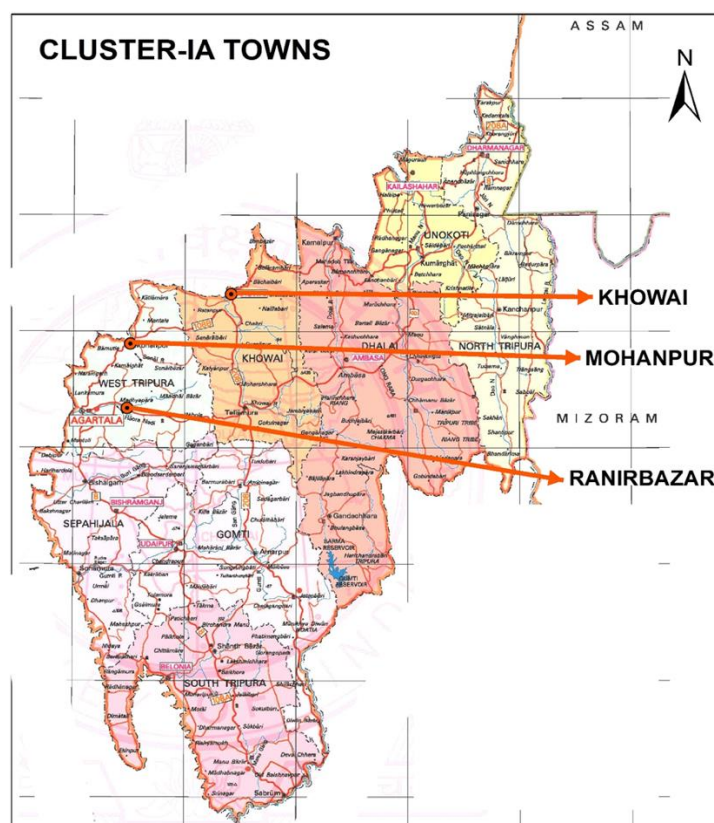
- (i) Executive summary;
- (ii) Introduction;
- (iii) Description of the project;
- (iv) Analysis of alternatives;
- (v) Policy, legal and administrative framework;
- (vi) Description of the environment;
- (vii) Anticipated environmental impacts and mitigation measures;
- (viii) Public consultation and information disclosure;
- (ix) Grievance redress mechanism;
- (x) Environmental management plan; and
- (xi) Conclusions and recommendations.

II. DESCRIPTION OF THE PROJECT

A. Project Location

11. Project towns Khowai, Mohanpur and Ranirbazar are located in Tripura state is in northeast India. It is bordered by Assam and Mizoram to the east and by Bangladesh to the north, south and west. Agartala is the capital and the largest city in the state. Khowai is a town located at 24° 3' 54" N and 91 36' 18" E and is about 55 km from Agartala. Town area is 5.86 sq. km divided into 15 wards. The population is 18526 (2011 census). **Mohanpur** is located at 23° 57' 57" 26" N and 91 22' 53" E, 21 km from Agartala. Town area is 14.55 sq. km divided into 15 wards. The population is 16722 (2011 census). **Ranirbazar** town is situated at 23.83°N land 91.37°E, 10 km from Agartala. Ranirbazar town area is 11.72 sq. km divided into 13 wards. The population is 13104 (2011 census). Figure 1 presents the location of subproject towns.

Figure 1: Geographical Location of Subproject towns on State map of Tripura



Source - <https://surveyofindia.gov.in>

B. Existing Water Supply Situation

12. **Khowai.** The present water supply to the town is from Khowai River (intake well) and ground water (deep tube wells). Surface is treated in water treatment plant. Groundwater has high iron content, iron removal plants (IRP) provided near working tube well. The distribution system covers about 49.74% of the population, and supply rate of 75.5 lpcd, supply frequency of 4-6 hours every day. Details of the existing system is given in **Table 1** and service level benchmarks in **Table 2**.

13. **Mohanpur.** The water supply in Mohanpur is from groundwater, which has high iron. The town has a total of 1400 domestic water connections. 30.56 % of the population is served with pipe water supply. Currently, water from the existing tube wells is directly supplied to the uncovered areas due to non-functioning of 3 IRPs. It also understood most of the DTWs are being constructed during the 1998- 2010 and yield from most of the DTW decreased appreciably. The distribution network is old and there are regular leakage complaints of the people. The present per capita supply of water is 51 lpcd. Details of existing system is given in **Table 1** and service level benchmarks in **Table 2**.

14. **Ranirbazar.** The present water supply to the town is from Haora River, and the water is treated in existing prior to supply. Besides this, a few shallow tube wells cater to the drinking water needs of the town. 32.2 % of the population is served with pipe water supply for 5 hours a day. The distribution network is old and there are regular leakage complaints from the people. The

present per capita supply of water is 91.4 lpcd. Details of existing system is given in **Table 1**, and service level benchmarks in **Table 2**.

Table 1: Summary of Existing Components in subproject towns

Component	Khowai	Mohanpur	Ranirbazar
Source - Ground water	0.45 MLD – 1 DTW at ▪ Near DC Office	1.45 MLD -20 DTW at ▪ Tulabagan Chowmuhan ▪ Rabindrapally Para ▪ Resident Doctor's Hostel Inside Boundary, Tilabari, Darpara ▪ Takka Nagar Scheme, Jagatpur ▪ 3 Nos. at Nayagao Para ▪ Gangagoti Pur, Jagatpur ▪ J B School ▪ Dakaipally, South Taranagar ▪ Electrical Sub Station, Taranagar ▪ Nabin Pally ▪ 2 Nos. at Bhumiheen Colony, Tulabagan, Swapan Debnath Para ▪ 2 Nos. at Tulabagan Office Tilla ▪ 8 No Tulabagan ▪ 2 Nos. at Tulabagan Office TillaKalibari, Near 4 No, Kalibari ▪ Tulabagan 11 No. colony	Nil
Surface water Source	3.78 MLD - Khowai River	Nil	2.5 MLD – Haora River
Total water production	4.23 MLD	1.45 MLD	2.5 MLD
Intake	▪ Diameter: 5 m ▪ Depth: 23.24 m ▪ Capacity: 3.78 MLD ▪ Pump Capacity: 3 nos. (2W+1S) @ 65000 gph/ 295.5 cum/hr each and head 50 m ▪ Pump Type: Vertical turbine pump ▪ Commissioning year: 2006	▪ Capacity: 1.45 MLD ▪ Pump Capacity: 20 HP ▪ Pump Type: Submersible pump ▪ Commissioning year: 1998-2010 for 20 nos.	▪ Diameter: 6 m ▪ Depth: 20 m ▪ Capacity: 2.5 MLD ▪ Pump Capacity: 2 nos. (1W+1S) @ 50000 gph/227.3 cum/hr each and head 50 m ▪ Pump Type: Vertical turbine pump ▪ Commissioning year: 2010
Raw water Transmission main - Transport of raw water from intake to Water Treatment Plant	4 km of 400 mm diameter of DI K-7	No raw water transmission system in existing system	300 mm dia DI pipe of 50 m length
Iron Removal plant for deep tube wells	No IRP available	Due to lack of maintenance, 3 IRPs non-functional IRPs.	No IRP available
Water Treatment plant (WTP)	▪ Capacity: 1 MGD~ 4.54 MLD	▪ No WTP in Existing System	▪ Capacity: 2.5 MLD

Component	Khowai	Mohanpur	Ranirbazar																																																
- Treatment of Raw water before storage and distribution	- Treatment Unit: Cascade aerator, Parshall Flume, Flash Mixer, Clariflocculator, slow sand filter, Chlorination and Clear water reservoir - Commissioning year: 2006		- Treatment Unit: Conventional WTP - Cascade aerator, Flash Mixer, Clariflocculator, slow sand filter, Chlorination and Clear water reservoir - Commissioning year: 2010																																																
Clear water reservoir (CWR) - Storage of treated water within WTP	Capacity – 60 m ³ Commissioning year: 2006 Pumps – 3 (2W+1S) VT pumps	No CWR	1 Nos. Underground CWR Capacity – 50m ³ Commissioning year: 2010 Pumps – 2 (1W+1S) VT pumps																																																
Clear water Transmission main - Transport of treated water from WTP to water storage reservoirs	200-300 mm dia. DI pipe of Length 3680 m.	Direct pumping method for water supply since there is no CWR.	300 mm DI pie of 1000 m length																																																
Overhead Water Storage Reservoir - Storage of treated water for distribution	3 Nos. Location and capacity in KL - Near DWS Office Complex – 273 (OHSR) - At Hospital Complex – 682 (OHSR) - At Puranbazar Area – 368 (GLSR) - Staging Height – 18 m	1 no. At Ward no 10 (Non- Functional due to dilapidated condition of the structure) Capacity: 0.4546 ML Staging Height- 18m	1 no. Near Nagar Panchayat Office Capacity: 450 KL Staging Height: 18m																																																
Distribution network - Supply of treated water to households	<table><tr><td>Dia in mm</td><td>Type</td><td>Length in m</td></tr><tr><td>90</td><td>uPVC</td><td>13588</td></tr><tr><td>110</td><td>uPVC</td><td>22957</td></tr><tr><td>140</td><td>uPVC</td><td>2462</td></tr><tr><td>150</td><td>DI</td><td>2601</td></tr><tr><td>200</td><td>DI</td><td>6597</td></tr><tr><td>250</td><td>DI</td><td>2318</td></tr><tr><td>300</td><td>DI</td><td>695</td></tr><tr><td></td><td>Total</td><td>51218</td></tr></table>	Dia in mm	Type	Length in m	90	uPVC	13588	110	uPVC	22957	140	uPVC	2462	150	DI	2601	200	DI	6597	250	DI	2318	300	DI	695		Total	51218	<table><tr><td>Dia in mm</td><td>Type</td><td>Length in m</td></tr><tr><td>125</td><td>PVC</td><td>49756</td></tr></table>	Dia in mm	Type	Length in m	125	PVC	49756	<table><tr><td>Dia in mm</td><td>Type</td><td>Length in m</td></tr><tr><td>100</td><td>uPVC</td><td>22890</td></tr><tr><td>150</td><td>CI</td><td>900</td></tr><tr><td>250</td><td>CI</td><td>7750</td></tr><tr><td></td><td>Total</td><td>31540</td></tr></table>	Dia in mm	Type	Length in m	100	uPVC	22890	150	CI	900	250	CI	7750		Total	31540
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Dia in mm	Type	Length in m																																																	
100	uPVC	22890																																																	
150	CI	900																																																	
250	CI	7750																																																	
	Total	31540																																																	
House Service connection	2669	1400	1120																																																

Source: Town DPRs

Table 2: Service Level Benchmark Status for Existing Water Supply for the towns

Service level indicators	Benchmarks	Khowai	Mohanpur	Ranirbazar
Coverage of water supply (%)	100	49.74	30.56	32.2
Per capita supply of water (lpcd)	135	75.53	51	91.4
Extent of metering of water connection (%)	100	0	0	0
Extent of non-revenue water (%)	20	60-70	60-70	60-70
Continuity of water supply (hours)	24	4-6	5	5
Quality of water supplied (%)	100	100 (except after supply from deep tube well source)	N/A	Not assessed
Efficiency in redressal of customer Complaints (%)	80	Data not available	N/A	Data not available
Cost recovery in water supply services (%)	100	20-30	20-30	30
Efficiency in collection of water related Charges (%)	90	60-70	60-70	60

Source: Town DPRs

C. Proposed Water Supply components

15. The objective of the proposed water supply scheme is to provide 24 x 7 water supply to the towns with sufficient pressure and minimum losses.

16. **Khowai.** For filling up the demand gap of 1.47 MLD, two new DTWs, with IRPs, are proposed under the project. OHSR-2 near DWS office Complex is not in good condition, so it will be discarded. For storage of additional water one OHSR has been proposed near WTP campus, ward no. 12. The whole municipal area divided into three zones served by two proposed OHSR and one existing GLSR. The proposed DTWs will feed the existing OHSR at Hospital Complex. 12.52 km long distribution network is proposed to cover maximum area of town (6.75 km is remodeling of existing network and the balance 5.77 km is for expansion). Transmission mains will be laid for new DTWs.

17. **Mohanpur.** Groundwater source will be continued. 5 new deep tubes wells with the provision of 3 new IRP has been proposed without considering the existing deep and shallow tube wells. Raw water transmission Main of 4.55 km has been designed from DTWs to IRPs. Taking the location of DTWs and the contour profile of the town into consideration, the area has been divided into two zones/DMA. Two OHSRs (one near Old MMC, ward no. 15 and other near Tula Bagan, Ward no. 12) proposed under the subproject. The newly formed DMA will have their independent OHSR. The OHSR-1 near old MMC of DMA-1 will be feed by proposed 3 DTWs covered 100% service area of their respective DMAs. The OHSR-2 at Tulabagan office Tilla of

DMA-2 will be feed by proposed 2 DTWs and supply water with 100% coverage of DMA-2. A total 11.70 km distribution network is proposed to cover maximum area of town, out of which 10.1 km is remodeling of existing network and the balance about 1.6 km is expansion.

18. **Ranirbazar.** To meet the projected water demand gap (for the year 2038) of 2.66 MLD, 3 nos. of DTWs with IRPs have been proposed. Two new OHSRs, 2.494 km raw water main, 1.422 km of clear water main proposed. The OHTs of DMA-1 & DMA-2 will be feed by existing WTP and covers 100% service area. The OHT of DMA-3 will be feed by proposed three DTWs with 100% coverage. 17.32 km distribution network is proposed to cover maximum area of town, out of which 10.9 km is remodeling of existing network and the balance 6.4 km is expansion.

1. Source sustainability

19. **Groundwater Source.** Groundwater is proposed in all three towns to meet the demand-supply gap of 2038. Joint meetings have been held between Urban Development Authority, DWS, Water resources Investigation Division and PDMC team for assessing water availability and obtaining approval of water withdrawal. An approval letter Vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala along with ground water potential map the state showing area wise yield. The document is attached in **Appendix 14**. While proposing the tube wells, the specified yield provided in the map has been taken into consideration.

20. **Khowai.** Water demand for Khowai town has been calculated based on 135 LPCD as per CPHEEO norms. Base year, intermediate year and ultimate year is estimated as 4.51 MLD (2023), 5.70 MLD (2038) and 6.93 MLD (2053). Existing WTP production will be continued and to meet the gap in supply of 1.47 MLD, two DTWs of capacity of 54.5 cum/hr with 18 hours operation proposed. Total production of water from 2 nos. of DTW will be 1.92 MLD. As per Appendix 14 the available ground water yield of Khowai town ranges from 100-150 m³/hr (high yield). The proposed two deep tube wells require a yield of about 54 m³/hr each which is less than the available yield.

21. **Mohanpur:** Base year, intermediate year and ultimate year water demand is estimated as 4.13 MLD (2023), 5.03 MLD (2038) and 5.95 MLD for 2053 respectively for Mohanpur town Since present tube wells will be not used, 5 new DTWs have been proposed to meet 2038 demand (5.03 MLD). Based on Aquifer Mapping and Management Plan of West Tripura District, Tripura, 2016-2017, hydrogeological map reflects that Mohanpur falls under large yield prospect i.e., 100 to 150 m³/hr. Therefore, it is proposed that the new tube wells (5 nos.) may withdraw water considering sustainable discharge with 60% safety.

22. **Ranirbazar.** Base year, intermediate year and ultimate year is estimated as 3.64 MLD (2023), 4.91 MLD (2038) and 6.31 MLD (2053). Supply from the existing source will continue. To meet the demand supply gap of 2038 (2.41 MLD), 3 nos. of DTWs with IRPs of 45.5 cum/hr capacity each have been proposed. While proposing the tube wells the specified yield provided in the map has been taken into consideration. The available ground water yield of Ranirbazar town ranges from 100-150 m³/hr. The proposed three deep tube wells require a yield of minimum 75.67 m³/hr in each, which is lies between the available yield.

23. **Surface water Source.** At present, Khowai River provides 3.78 MLD of water to Khowai, and Hoara River provides 2.5 MLD of water to Ranirbazar town. The existing river-based systems in both the towns consisting of river intake, transmission and WTP will be continued to use in the future, and the water abstraction and treatment capacity will remain the same. Rivers flows

predominantly south-north and intakes are in the south, and as per the local information, flow in river varies seasonally, and it carries high flows during the monsoon and post monsoon, and very low flows during the winters lean months (October to February), and medium flows in the in between months., Flow is able to meet demand for most part of the year, and during peak if the flow is insufficient to provide adequate water, gap in supply is being met by groundwater. Quality of water is suitable for drinking after conventional treatment.

24. Table 3 shows summary of proposed water supply components.

Table 3: Summary of Proposed water supply Components

Particulate	Khowai	Mohanpur	Ranirbazar
Population			
Commissioning Year (2023)	23309	21178	17737
Intermediate year (2038)	29818	26163	24393
Design year (2053)	36572	31172	31768
Water Demand in MLD			
Commissioning Year (2023)	4.51	4.13	3.64
Intermediate year (2038)	5.70	5.03	4.91
Design year (2053)	6.93	5.95	6.31
Source			
Source available (MLD)	River Khowai- Intake – existing (3.78 MLD) 1 no. DTW	20 Nos. DTWs – Direct pumping for distribution	Intake – Haora River (2.5 MLD)
Selected Source (MLD)	Existing Intake - River Khowai– (3.78 MLD) New DTWs- 2 Nos. - 1.92 MLD Total – 5.7	20 Nos. DTW will not be used. New DTWs – 5 nos. - 6.82 Total - 6.82	Existing Intake – Haora River (2.5 MLD) New DTWs- 3 nos. - 2.72 MLD Total – 5.22
From source to consumer supply	Raw water abstraction from selected source (River / DTWs) → raw water transmission (pumping) → treatment → clear water transmission (pumping) → storage → distribution → house connections with meters		
Raw water source- intake – Pumping of Raw water from source	Existing intake on River Khowai will be utilized in proposed scheme.	None	Existing Intake of 2.5 MLD – Haora River. DMA 1 & DMA 2 will be served by the WTP with capacity 2.5 MLD, which is in turn drawing water from Haora River intake.
Tube wells	Raw water source proposed- 2 Nos DTW 54 m ³ /hr (≈ 12000GPH) for 18 Hour centrifugal pump operation each which is equal to 0.96 MLD	Raw water source proposed- 5 nos. Deep Tube Well (DTW)- Tube well of 15,000 GPH (68.2 m ³ /hr) Production capacity in 20-hour operation submersible pumps Total generation – approx. 6.82 MLD from 5 DTWs	Raw water source proposed– 3 nos. Deep Tube Well (DTW) Bore well of 10,000 GPH (45.5 m ³ /hr) Production capacity in 20-hour operation Centrifugal pump set. Total generation= 2.72 MLD 3 Deep Tube Wells @ 10000 GPH discharge each (0.908 MLD each)

Particulate	Khowai	Mohanpur	Ranirbazar
	Total drawl from proposed DTW = $2 \times 0.96 \text{ MLD} = 1.92 \text{ MLD}$, i.e around 2 MLD. 2 Deep Tube Wells @ 12000 GPH discharge each • At Jibanananda Vidyamandir JB School. (DTW-1), ward no 9 • Near Dasaratha Deb Memorial College. (DTW-2), ward no 10	5 Deep Tube Wells @ 15000 GPH discharge each. Located at different wards of the town. • Near Power station ward No.10 (DTW-1) • Near Rabindra Palli - ward no.2 (DTW-2) • Near Old MMC ward no. 15 (DTW-3) • Near Bohemian Colony ward no. 13 (DTW-4) • Near Tula Bagan, ward no. 14 (DTW-5)	• Near Cattle market ward No.2 (DTW-1) • Near Durgapur Kalli-Mandir ward no.1 (DTW-2) • Near Devi Nagar ward no. 9 (DTW-3)
Raw water Transmission main - Transport of raw water from tube well to IRP	Raw water transmission main, RWTM- approx.60 m, 200 mm Dia DI K9 pipe	Raw water transmission main, RWTM Approx. 4.550 km length DI K9- 200 to 250 mm Dia.	Raw water transmission main- 2.494 km, 100-250 mm Dia DI K9 pipe
Iron Removal plant for deep tube wells	2 nos. – discharge capacity 20000 GPH • At Jibanananda Vidyamandir JB School. ward no 9 near DTW • Near Dasaratha Deb Memorial College., ward no 10 near DTW	3 nos. proposed • 2 IRP at OHT Location (Near Old MMC) of 2730 KLD (30000 GPH) & 1640 KLD (15000 GPH) • 1 IRP at OHT Location (Near Tula Bagan) of 2730 KLD (30000 GPH)	• 1 no @ 2500 KLD with GLSR (100 KL) • Located near OHSR – Krishna talli, Nilgaria, ward no. 11
Water Treatment plant (WTP) - Treatment of Raw water before storage and distribution	Rehabilitation of pump at WTP - Discharge: $148 \text{ m}^3/\text{hr}$, each pump (2W+1 S), Pump head: 50m and pumping hours:20 - at Hospital complex ward 13	No new WTP	No new WTP
Clear water reservoir (CWR) - Storage of treated water	No new CWR	No new CWR	GLSR (100 KL)
Clear water Transmission main - Transport of treated water from IRP to water storage reservoirs	Clear water transmission main, CWTM- approx. 1.373 km, 200 mm Dia. DI K9 pipe	Clear water transmission main, CWTM - Approx, 100 m length DI K9 300 mm dia	Clear water transmission main, CWTM -approx. 1.422 km, 200 – 250 mm Dia DI K9 pipe

Particulate	Khowai	Mohanpur	Ranirbazar
Construction of Overhead Water Storage Reservoir - Storage of treated water for distribution	1 no. • OHT-1: capacity 400 KL (18 m Staging height), • Near WTP Campus (Ward no. 12). Located at southeastern part of the town	2 nos. • OHT-1: capacity 850 KL (18 m Staging height) • Near Old MMC, ward no. 15 OHT-2: capacity 750 KL (18 m Staging height), • Near Tula Bagan, Ward no. 12	2 nos. • OHT-1: capacity 350 KL (18 m Staging height), • Near Aganwadi, Nilgaria ward no. 13 • OHT-2: capacity 800 KL (16 m Staging height), • Krishna talli, Nilgaria ward no. 11
Distribution network - Supply of treated water at households	Pipe material is taken HDPE PN-10 125 mm to 225 mm dia. and DI K7 250- 300 mm dia. To distribute water in the Khowai town approx. 12.515 km (6.749 km is Remodeling and 5.766 km is Expansion) Proposed – Total- 5.766 km • 125 mm Dia. HDPE– 426 m • 160 mm Dia. HDPE- 3226 m • 180 mm Dia. HDPE – 1672 m • 200 mm Dia. HDPE – 353 m • 300 mm Dia. DI K7 – 89 m Remodeling – Total- 6.749 km • 140 mm Dia HDPE- 1047 m • 160 mm Dia. HDPE – 1869 m • 180 mm Dia. HDPE – 1003 m • 200 mm Dia. HDPE- 2004 m • 225 mm Dia. HDPE –561 m • 250 mm Dia. DI K7 – 265m	Pipe material is taken HDPE PE63 PN6, 90 mm to 250 mm dia. and DI K7 250 - 350 mm dia. To distribute water in the Mohanpur town approx. 11.703 km (10.101 km is Remodeling and 1.602 km is Expansion) Proposed – Total- 1.602 km • 90 mm Dia. HDPE– 1036 m • 300 mm Dia. DI K7 –566 m Remodeling – Total- 10.101 km • 160 mm Dia. HDPE – 566 m • 200 mm Dia. HDPE- 1170 m • 225 mm Dia. HDPE –2777 m • 250 mm Dia. HDPE –1285 m • 250 mm Dia. DI K7 – 2219 m • 300 mm Dia. DI K7- 2034 m • 350 mm Dia. DI K7- 50 m	Pipe material is taken HDPE PN-10 110 mm to 250 mm dia. and DI K9 200 - 400 mm dia. To distribute water in the Ranirbazar town approx. 17.321 km (10.895 km is Remodeling and 6.426 km is Expansion) Proposed – Total- 6.426 km • 110 mm Dia. HDPE– 932 m • 140 mm Dia. HDPE- 1720 m • 160 mm Dia. HDPE – 1057 m • 180 mm Dia. HDPE – 1300 m • 200 mm Dia. HDPE – 243 m • 200 mm Dia. DI K9- 140 m • 250 mm Dia. DI K9- 822 m • 300 mm Dia. DI K9 – 212 m Remodeling – Total- 10.894 km • 110 mm Dia. HDPE– 3909 m • 140 mm Dia HDPE- 1437 m • 160 mm Dia. HDPE – 857 m • 180 mm Dia. HDPE – 1544 m • 200 mm Dia. HDPE- 1845 m • 250 mm Dia. HDPE –529 m • 250 mm Dia. DI K9 – 168 m • 300 mm Dia. DI K9- 485 m • 400 mm DI K9- 121 m
House Service connection	5730	4948	3700
Magnetic Bulk Flow Meters and consumer meters - Measurement of water flow	• Electro Magnetic Bulk Flow Meters: 6 nos.	• Electro Magnetic Bulk Flow Meters: 2 nos.	• Electro Magnetic Bulk Flow Meters: 3 nos.

Particulate	Khowai	Mohanpur	Ranirbazar
	• 5730 numbers of consumer water meters	• 4948 numbers of consumer water meters	• 3700 numbers of consumer water meters

D. Operation and Maintenance

25. The Operator will maintain the water supply project for a period of 5 years on behalf of local body collecting the tariff from the consumers as per the tariff fixed by the Government of Tripura and with the support of balance funding for O&M from GoT. This 5 years period will be utilized to establish an efficient O&M system and to give training to the staff of the Municipal Councils (MCs) on the project activities by enhancing their capacity on technical as well as on the administrative fields. This will enable the MCs to take over the responsibility of O&M from the Operator realizing their ownership of assets created and to render service to the public by themselves as per the powers conferred on them under 74th Constitutional Amendment.

E. Subproject Benefits

26. The subproject is primarily designed to improve environmental quality and living conditions of project towns through provision of water supply. The subproject is primarily designed to improve environmental quality and living conditions of these towns through provision of water supply. The benefits arising from this subproject include: (i) increased availability of potable water at appropriate pressure to all households including urban poor; and (ii) reduced time and costs in accessing alternative sources of water.

F. Implementation Schedule

27. Implementation of Package of cluster IA as DBO contract. Project will be implemented in 36 months (6 months for design and 30 months for construction). Bids to be invited for the package. It is assumed that the construction will be commenced from the 2nd quarter of financial year 2023-24 and will be completed by end-2026. After that 5 years O & M is considered.

28. Following Figure 2 - 14 shows existing and proposed water supply components in google map, proposed DTWs- IRP, Raw & Clear water Transmission main and OHSRs, and area with 100m surroundings of project towns of Khowai town. Figure 15-32 presents maps of existing and proposed components of Mohanpur town. Figure 32-47 presents maps of existing and proposed water supply components of Ranirbazar Town.

Figure 2: Existing water supply components in Khowai



Figure 3: Proposed water supply components



Figure 4: Existing Intake and surrounding 100 m in Khowai



Figure 5: Existing WTP and surrounding 100 m in Khowai



Figure 6: Proposed Clear water main, Raw water main Tube well and Reservoir Locations

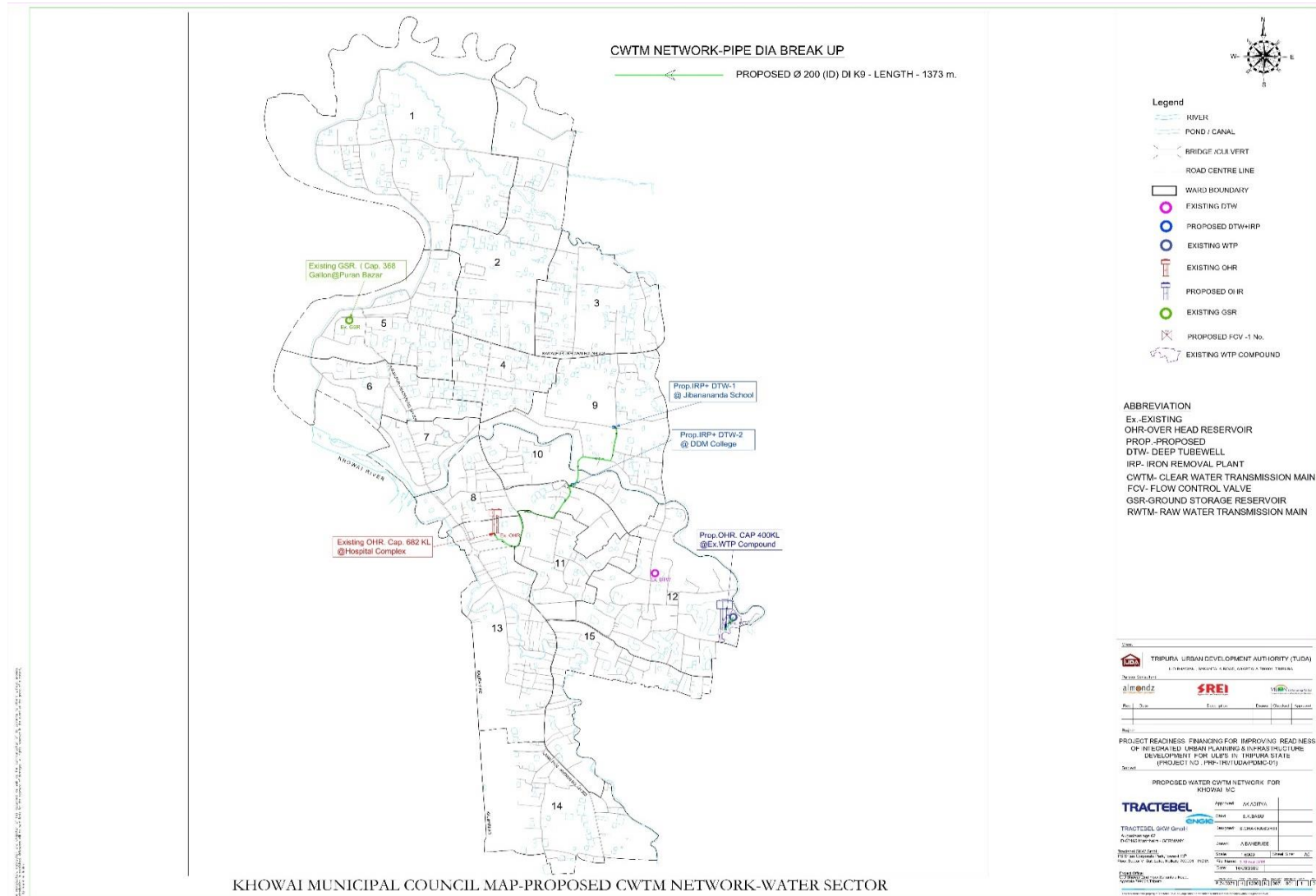


Figure 7: Proposed DTW & IRP 1- (Jibanananda Vidyamandir JB School., ward no. 9) location with 100m surroundings

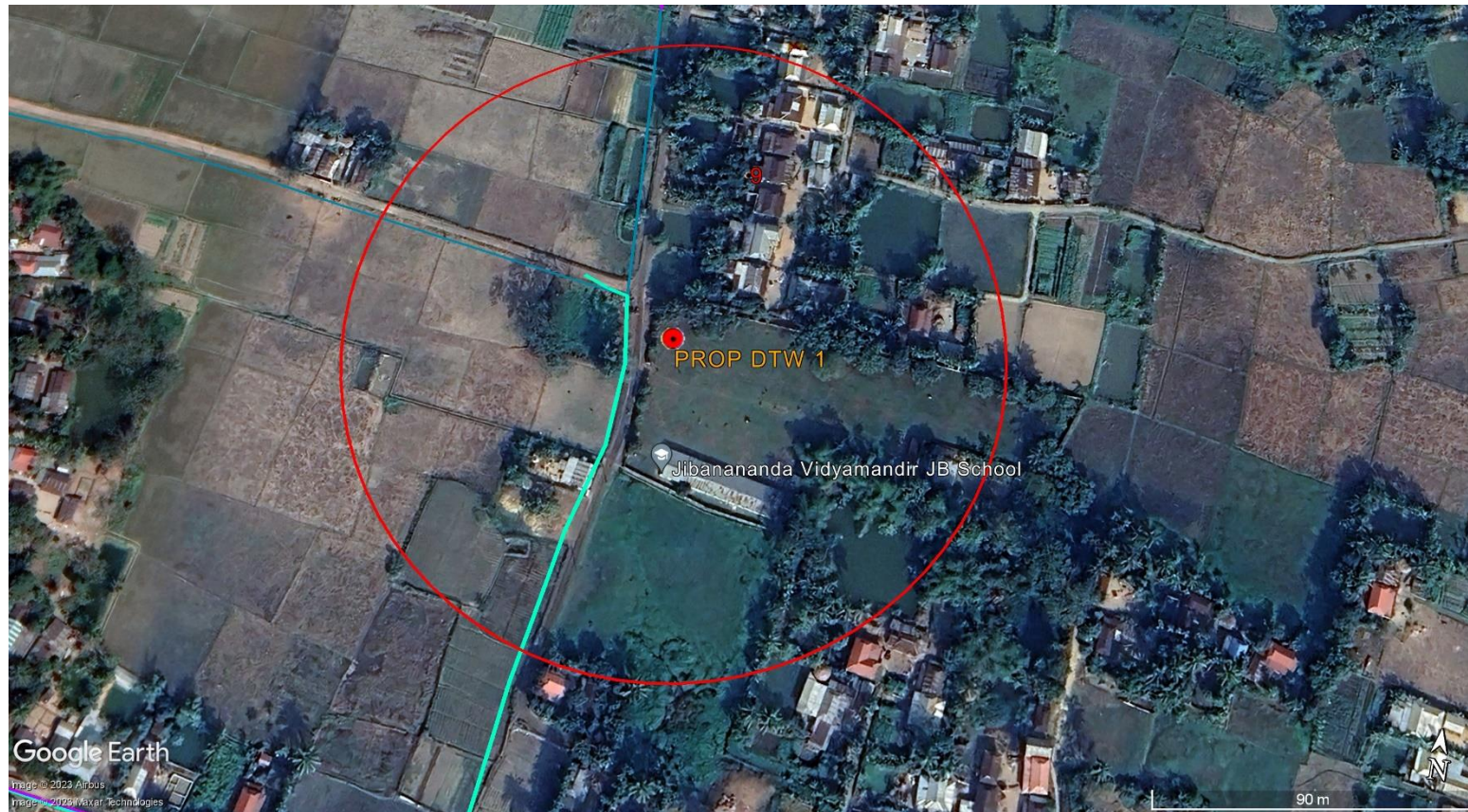


Figure 8: Proposed DTW & IRP 2- (Near Dasaratha Deb Memorial College., ward no.10) location with 100m surroundings

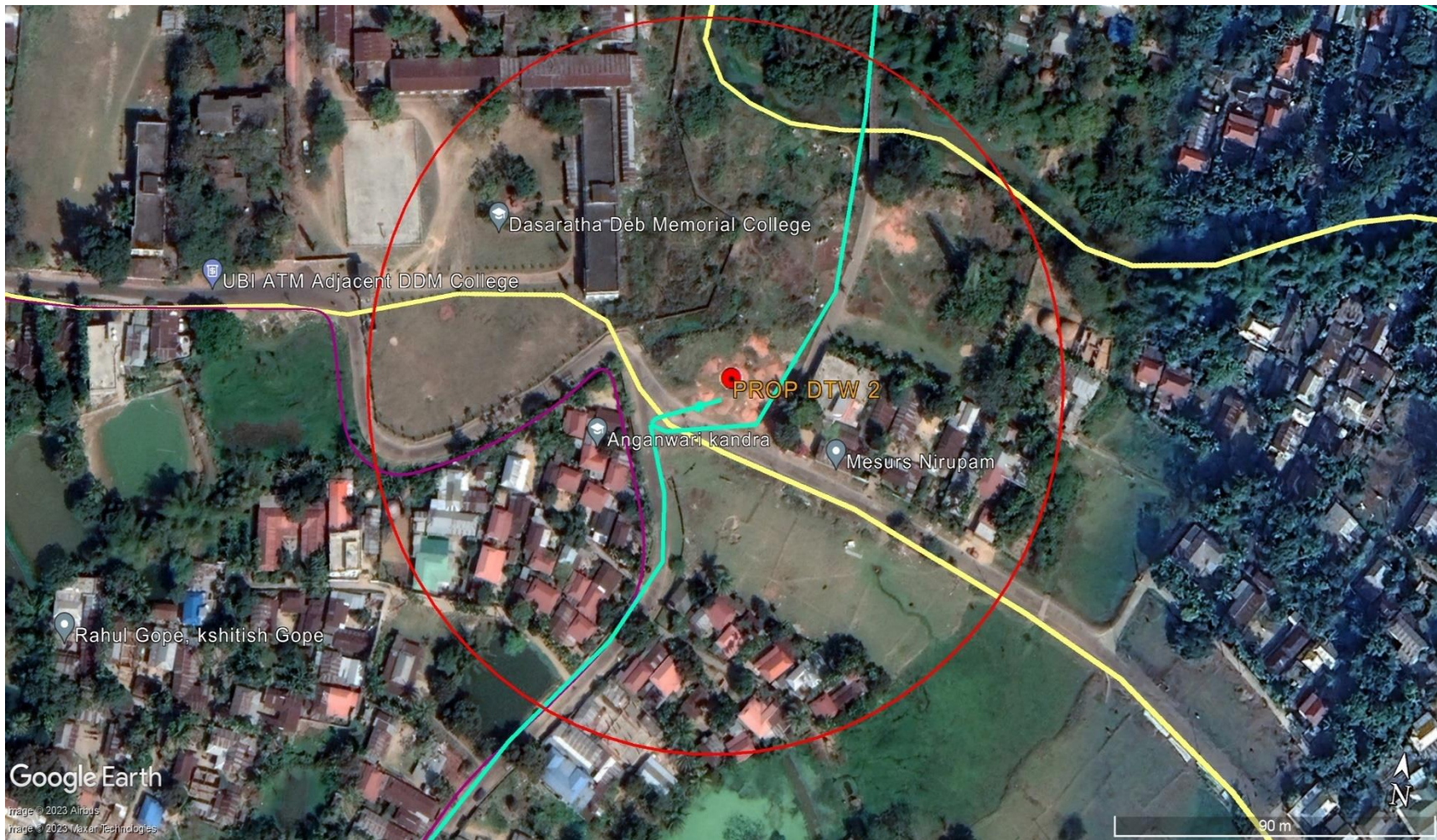


Figure 9: Proposed OHSR (Near WTP Campus, Ward no. 12)) location with 100m surroundings



Figure 10: Proposed DMA area of Khowai

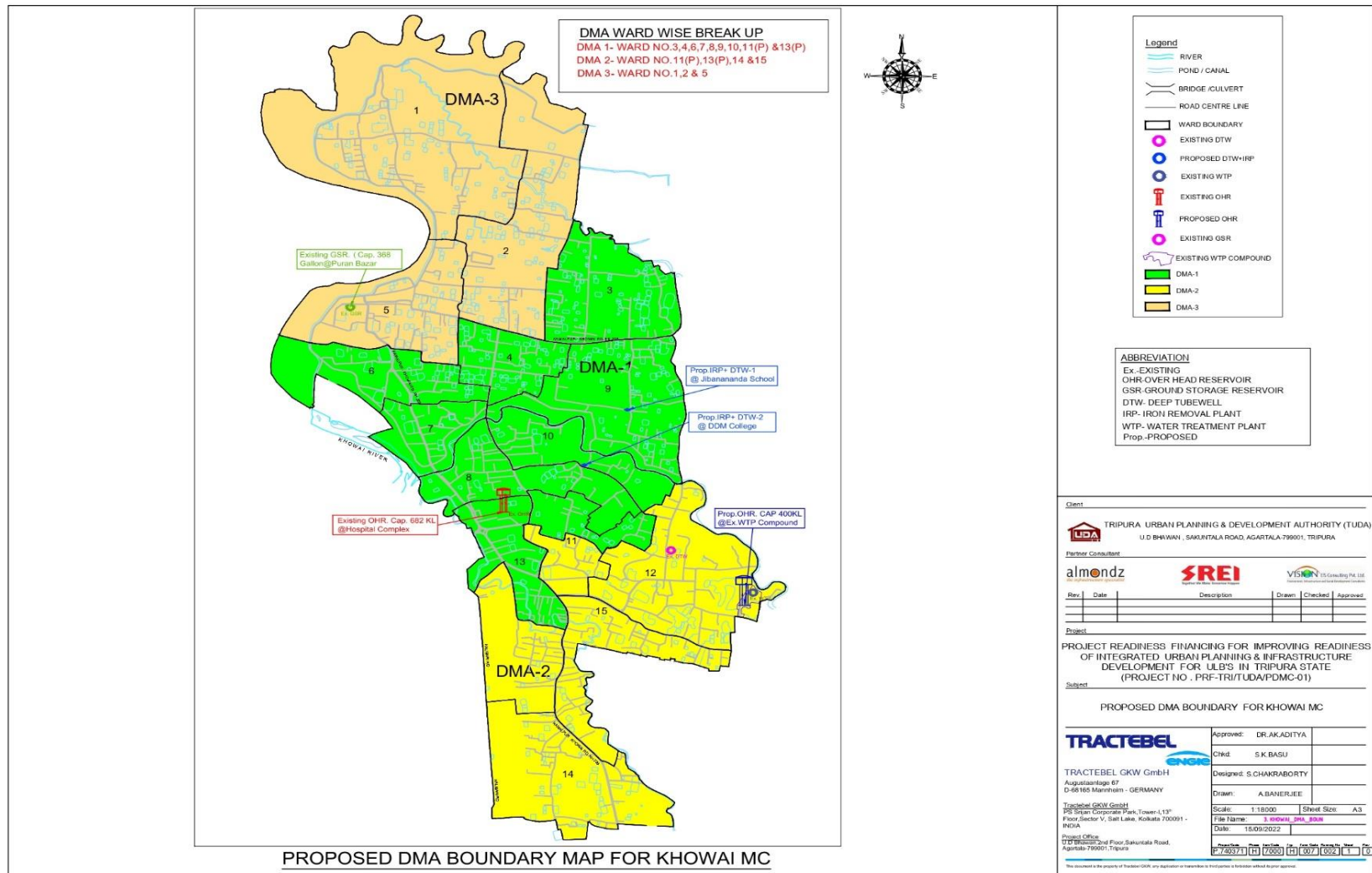


Figure 11: Water supply distribution network for Khowai town

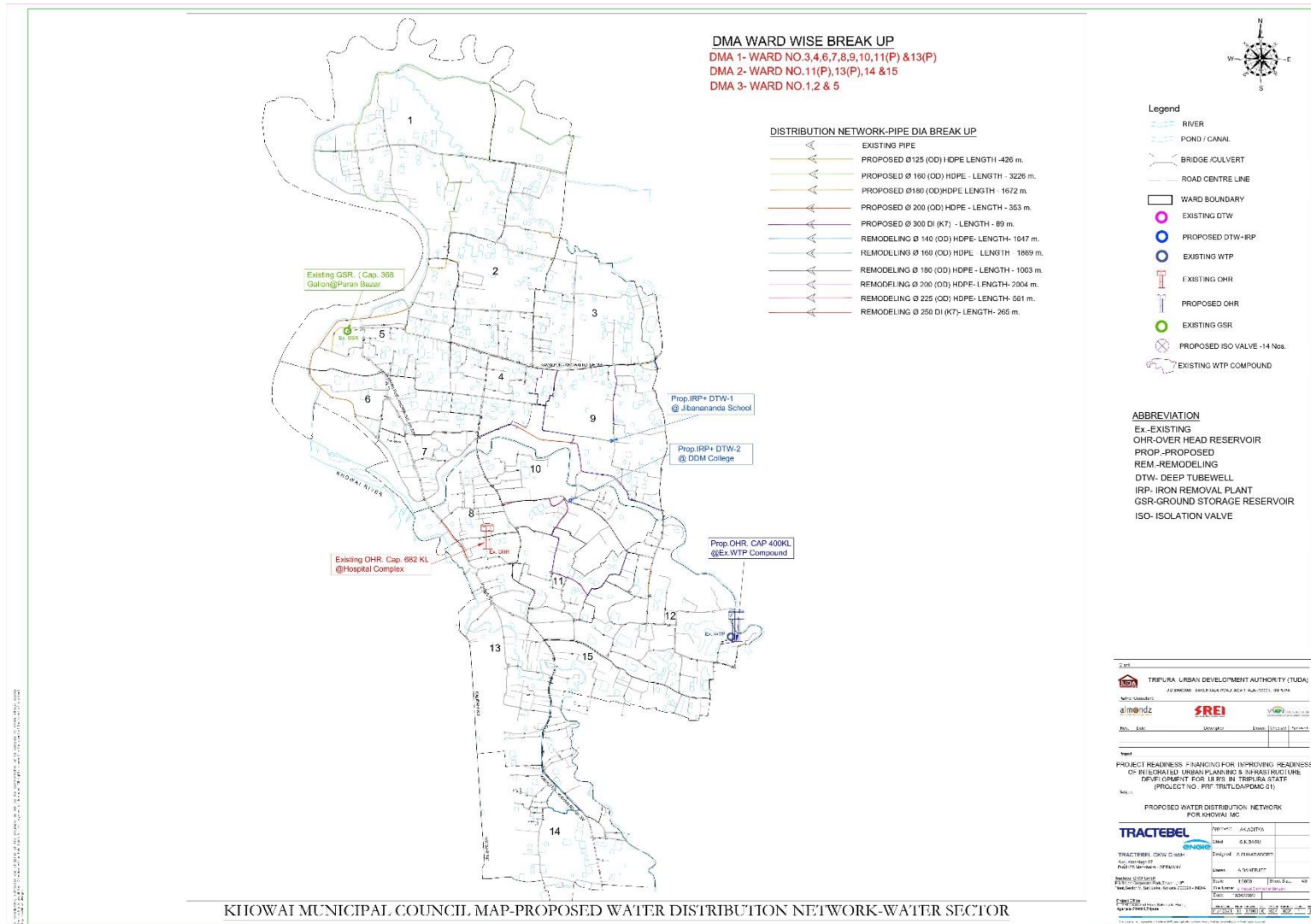


Figure 12: Layout plan of DTW-IRP at Jibanananda Vidyamandir JB School

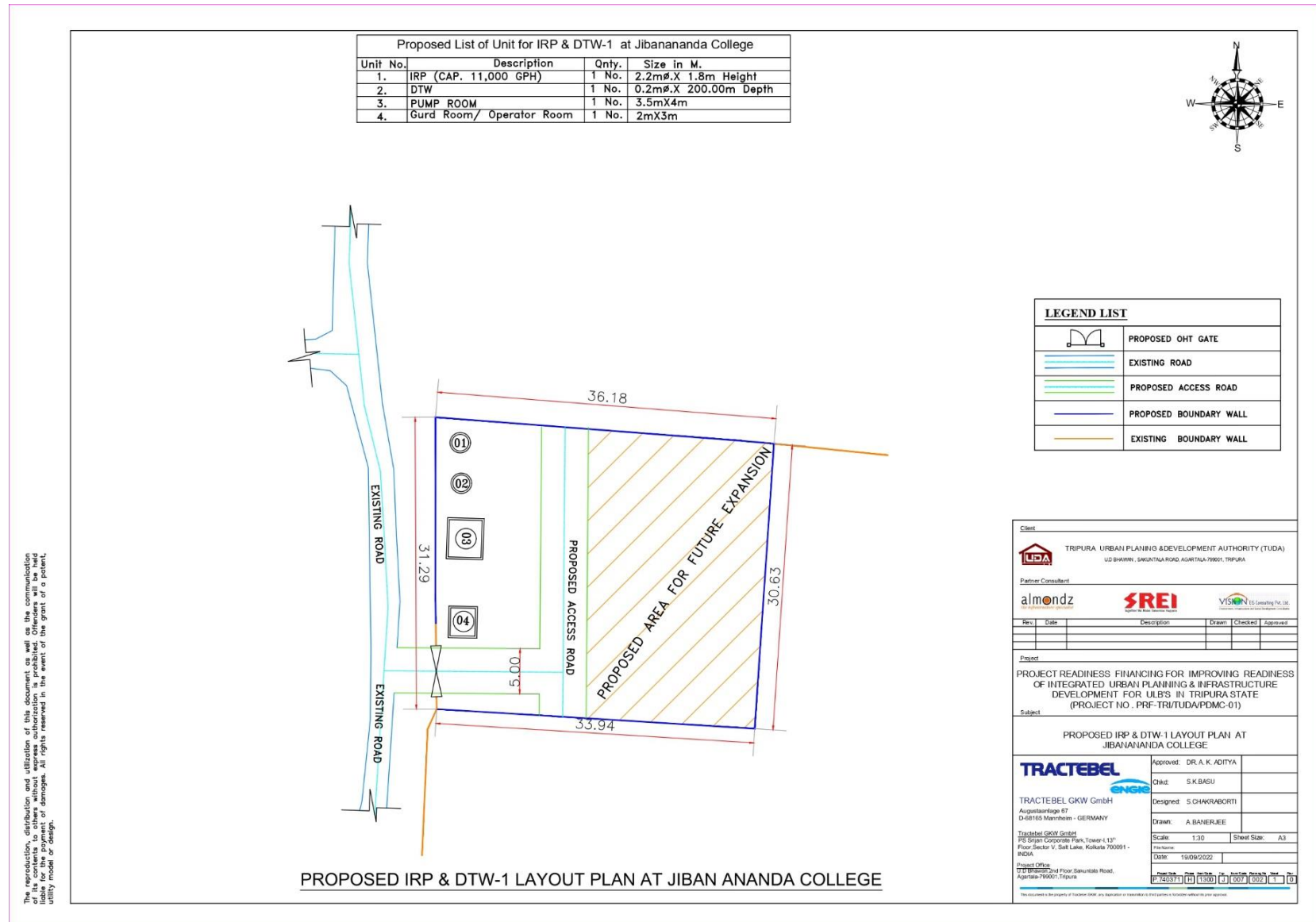


Figure 13: Layout plan of DTW-IRP at MND College

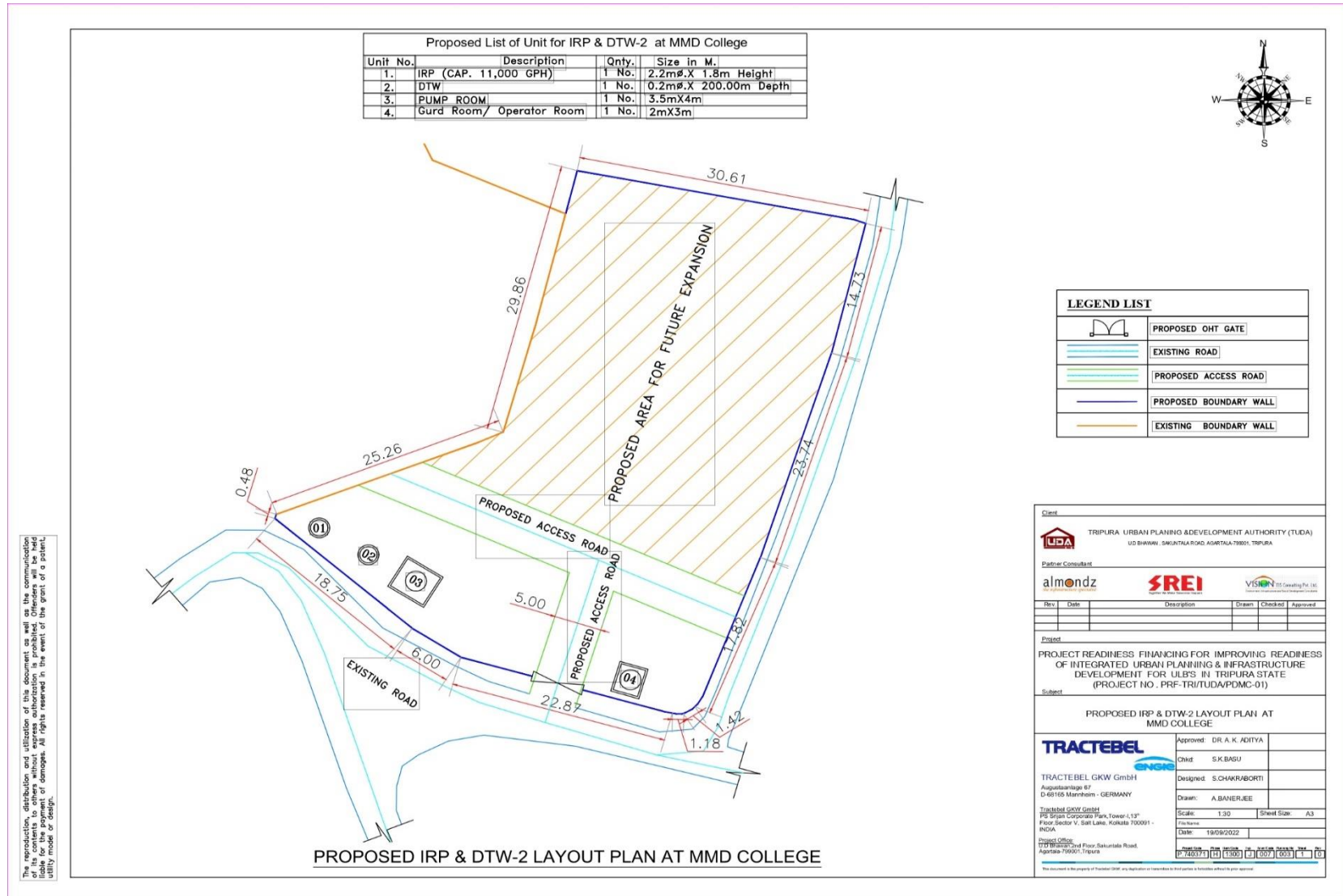


Figure 14: Layout Diagram of Proposed OHSR within the existing WTP campus

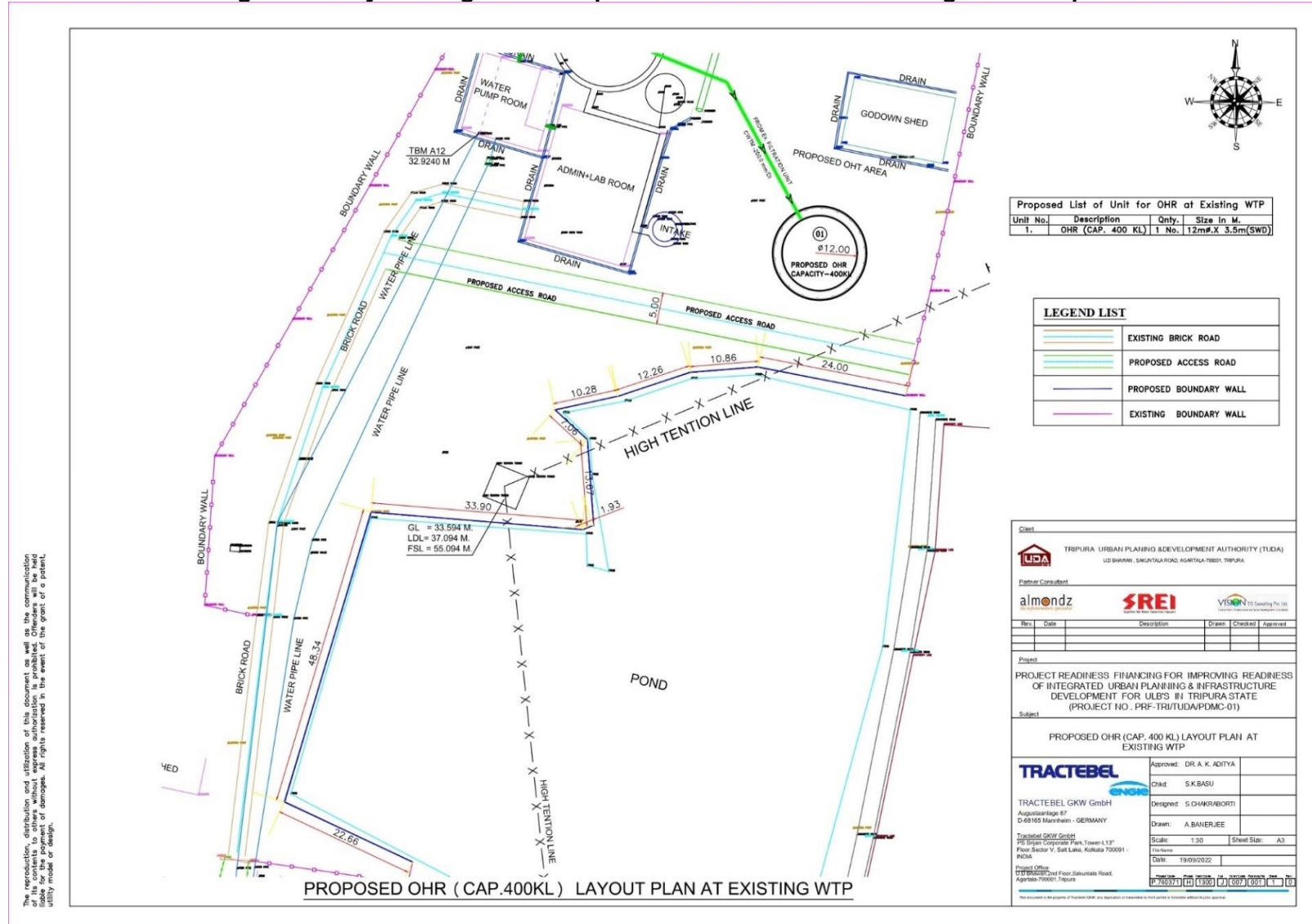
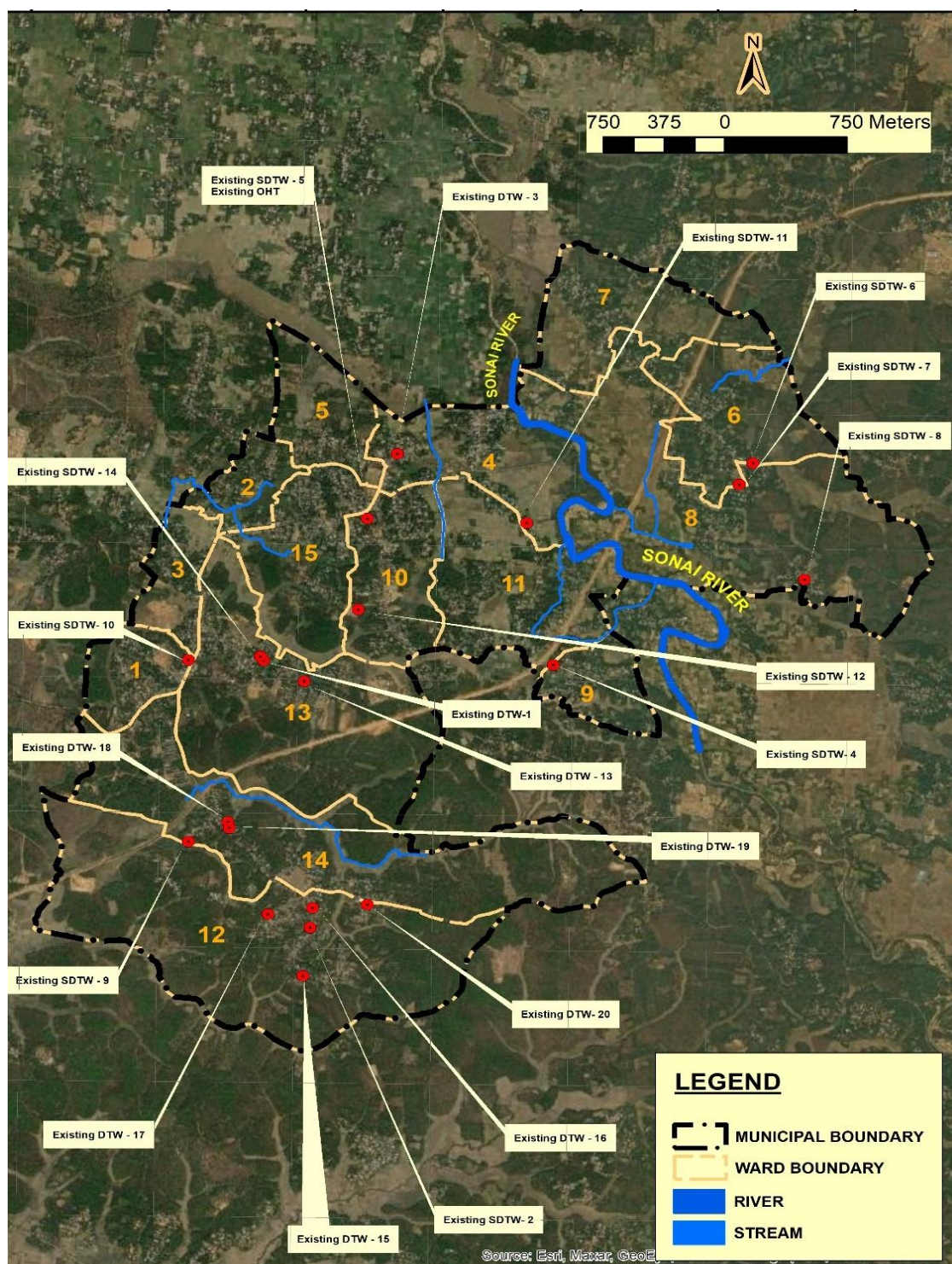


Figure 15: Existing water supply components in Mohanpur



Maps Showing existing and proposed components in Mohanpur Town

Figure 16: Proposed water supply components in Mohanpur

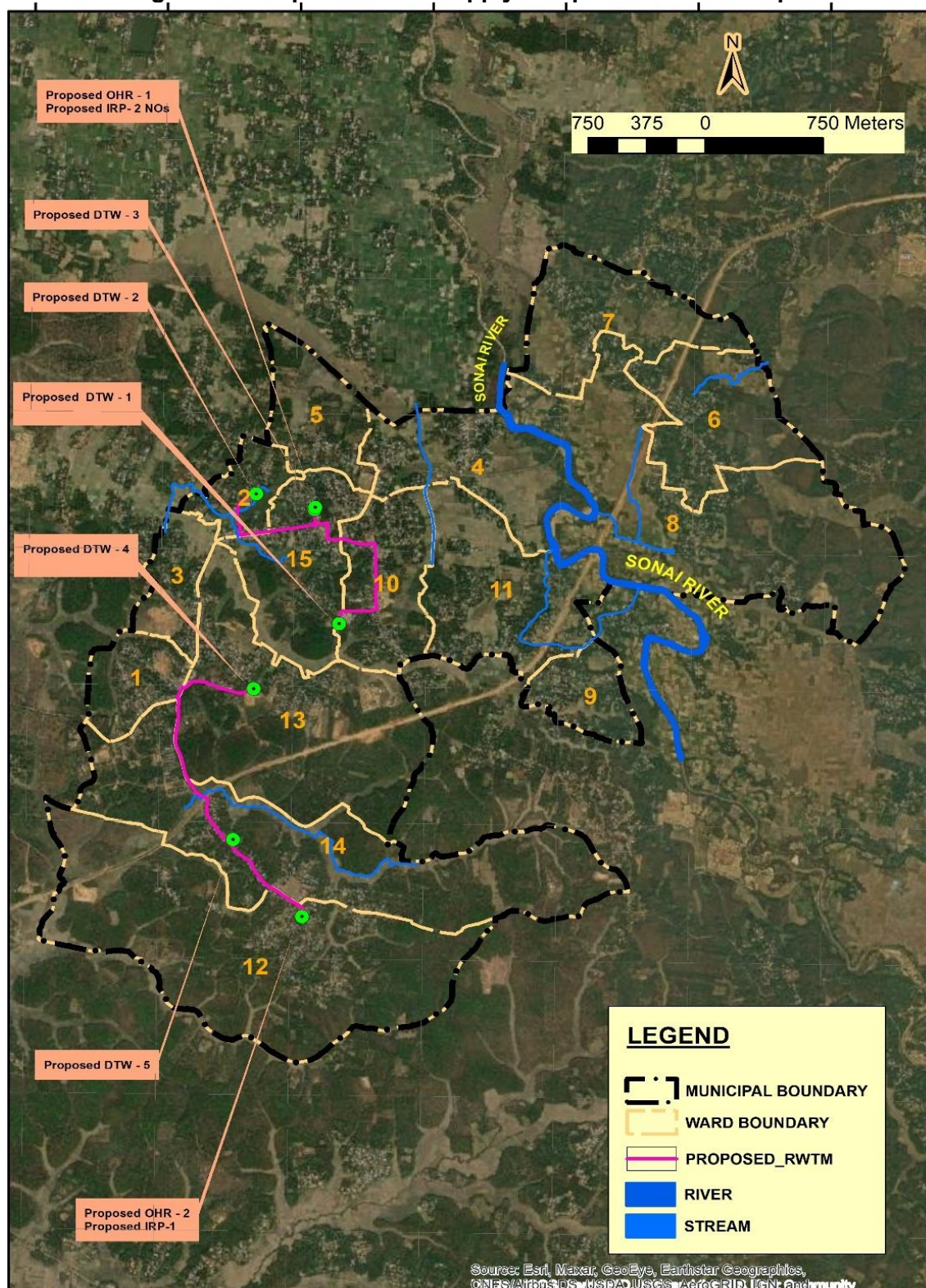


Figure 17: Proposed Clear water main, Raw water main Tube well and Reservoir locations

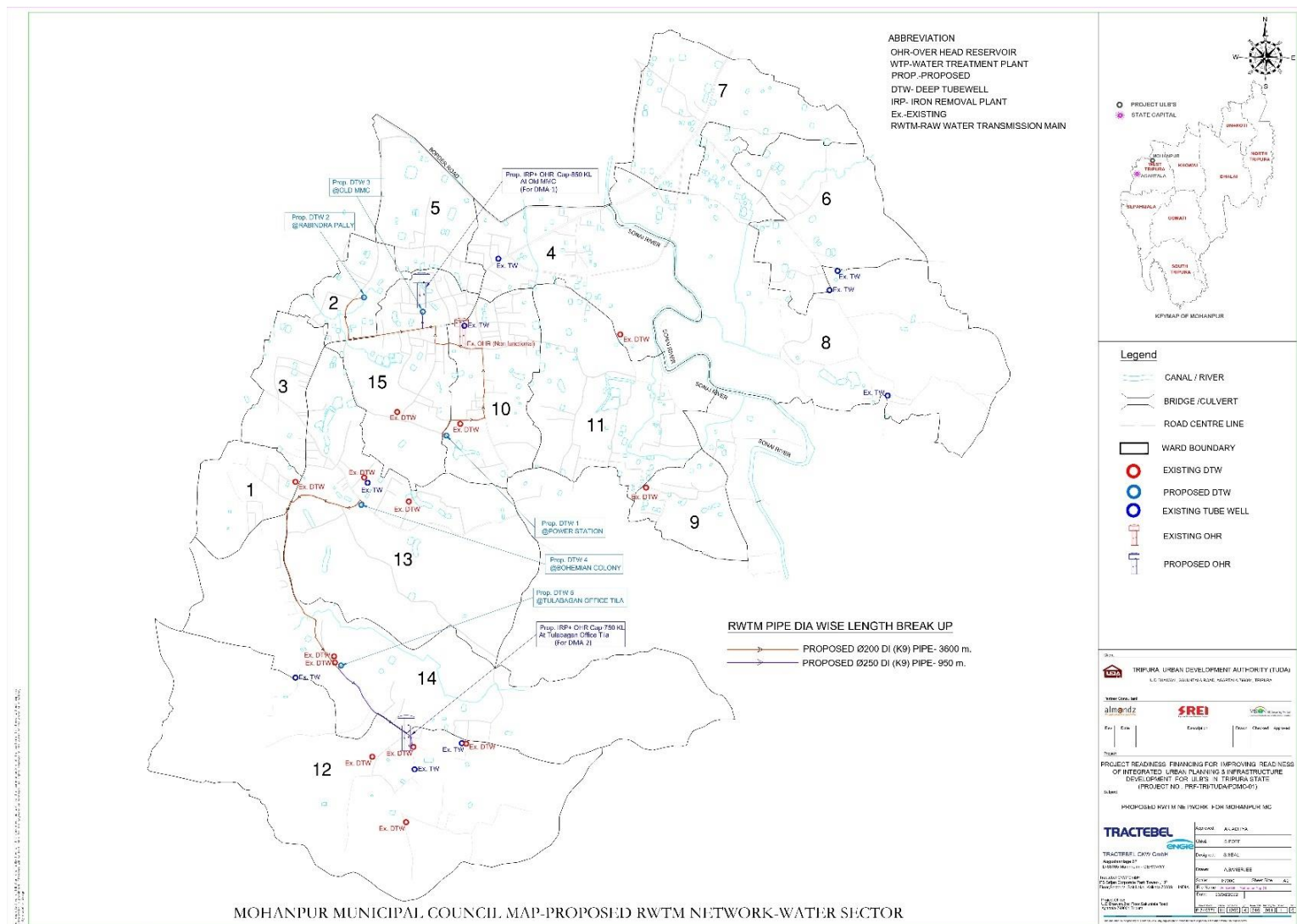


Figure 18: Proposed DTW-1 (Near Power station ward No.10) location with 100m surroundings



Figure 19: Proposed DTW-2 (Near Rabindra Palli - ward no.2) location with 100m surroundings



Figure 20: Proposed DTW -3 and Proposed OHSR (Near Old MMC, ward no. 15) location with 100m surroundings

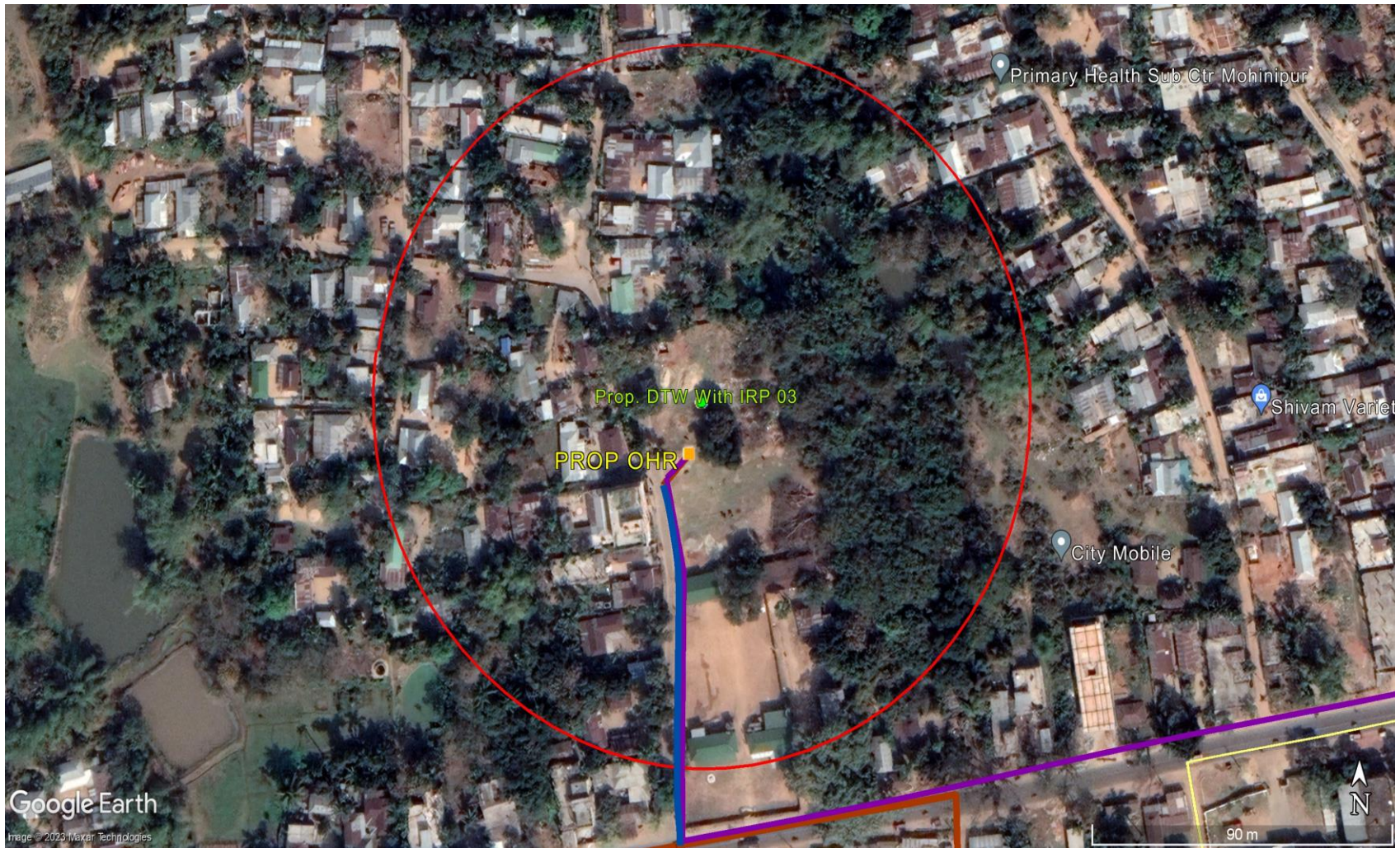


Figure 21: Proposed DTW-4 (Near Bohemian Colony ward no. 13) location with 100m surroundings



Figure 22: Proposed DTW (Near Tula Bagan, ward no. 14) location with 100m surroundings



Figure 23: Proposed OHSR and IRP (Near Tula Bagan, Ward no. 12)) location with 100m surroundings



Figure 24: Proposed DMA area of Mohanpur

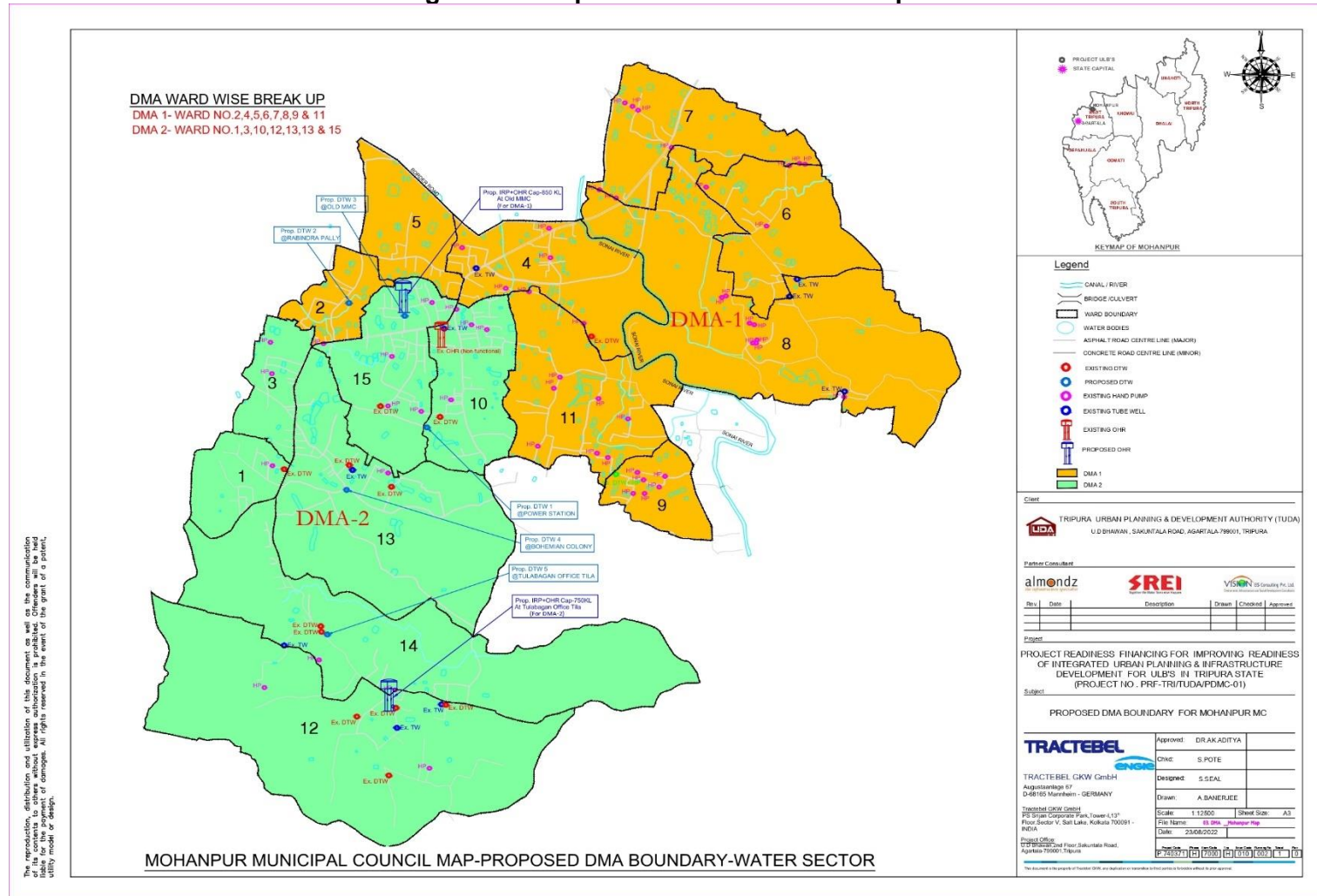


Figure 25: Water supply distribution network for Mohanpur town

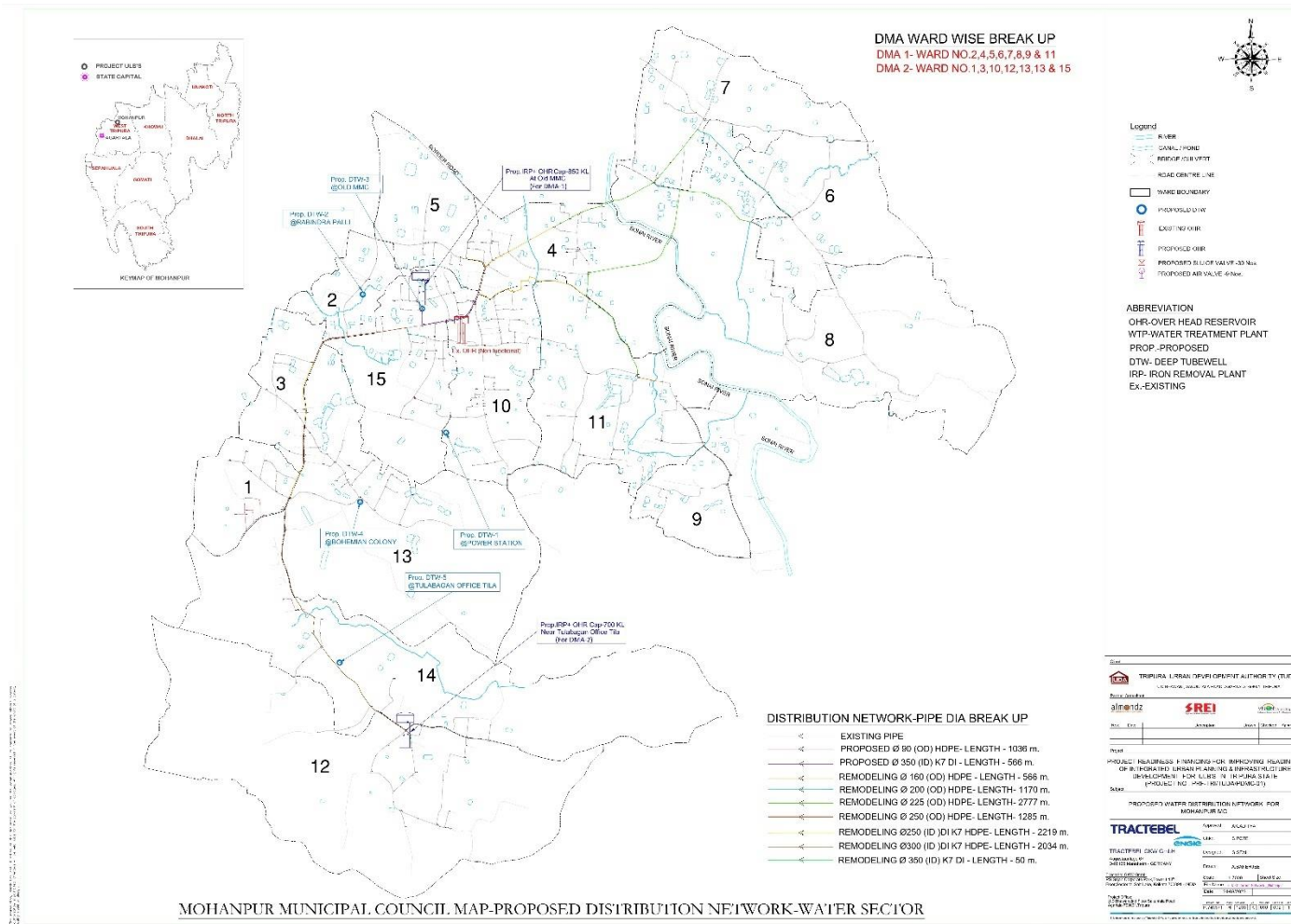


Figure 26: Layout plan of DTW -1 near power station

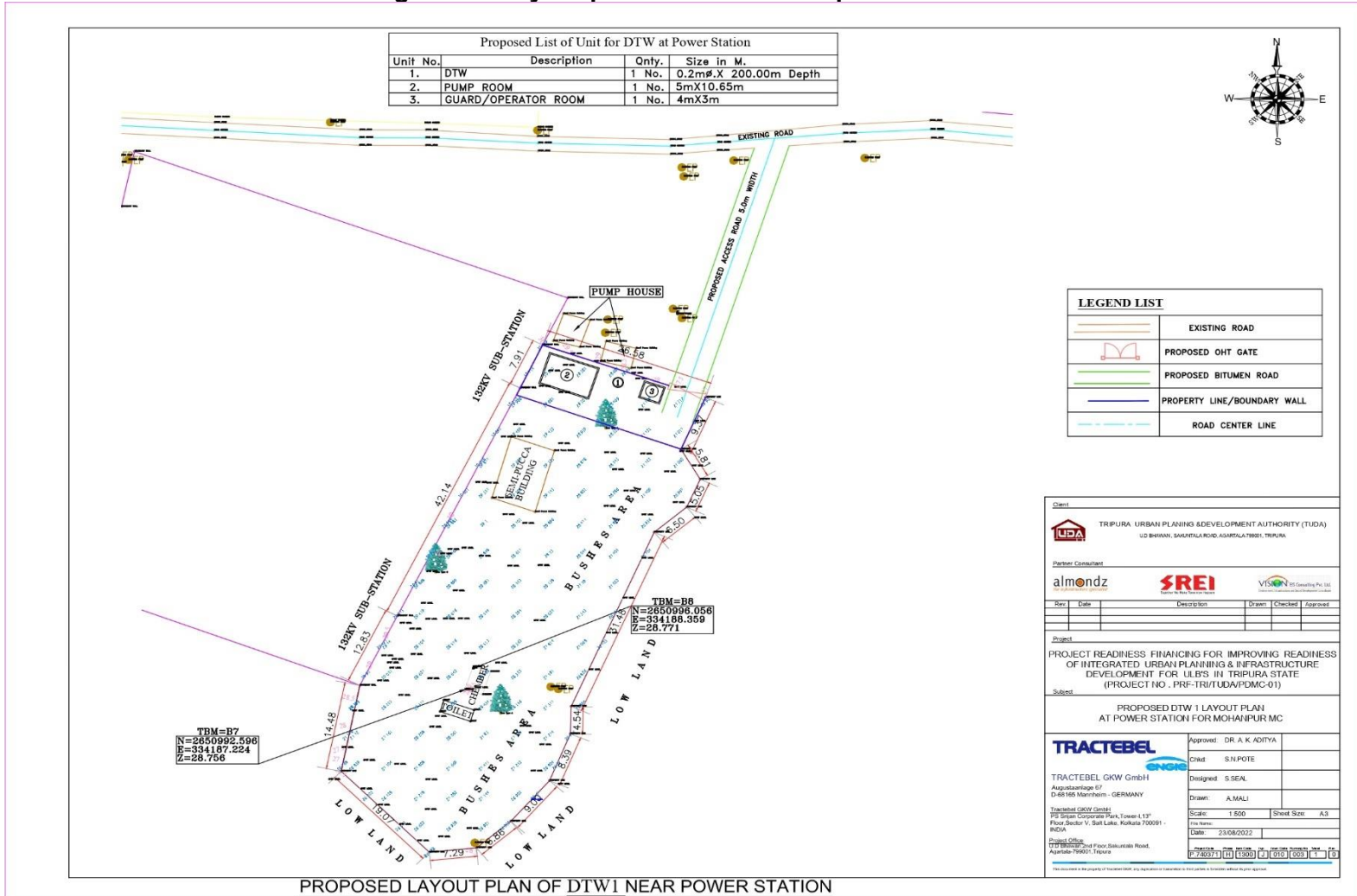


Figure 27: Layout plan of DTW -2 near Rabindra pally

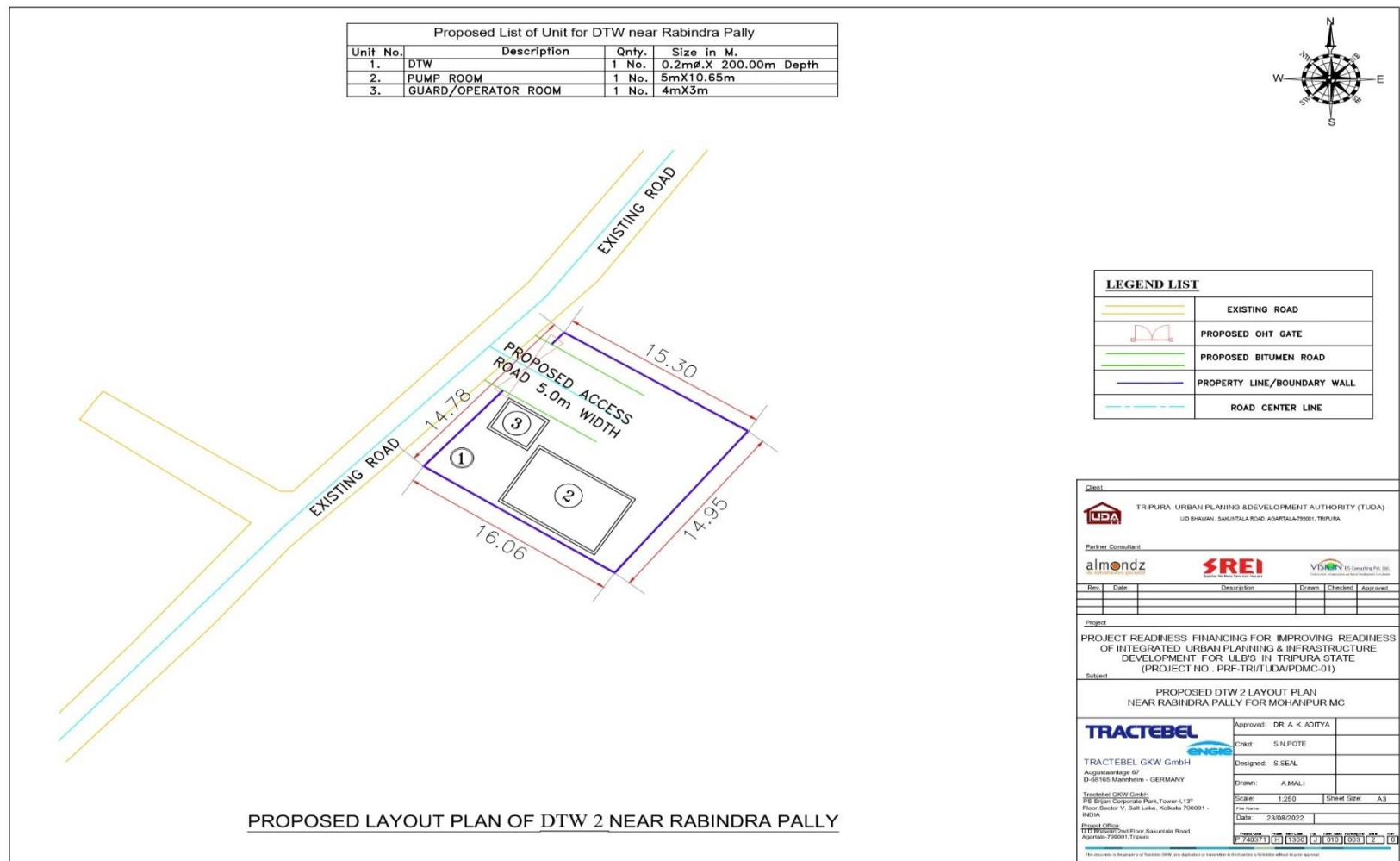


Figure 28: Layout plan of OHSR, DTW -3 and IRP near Old MMC

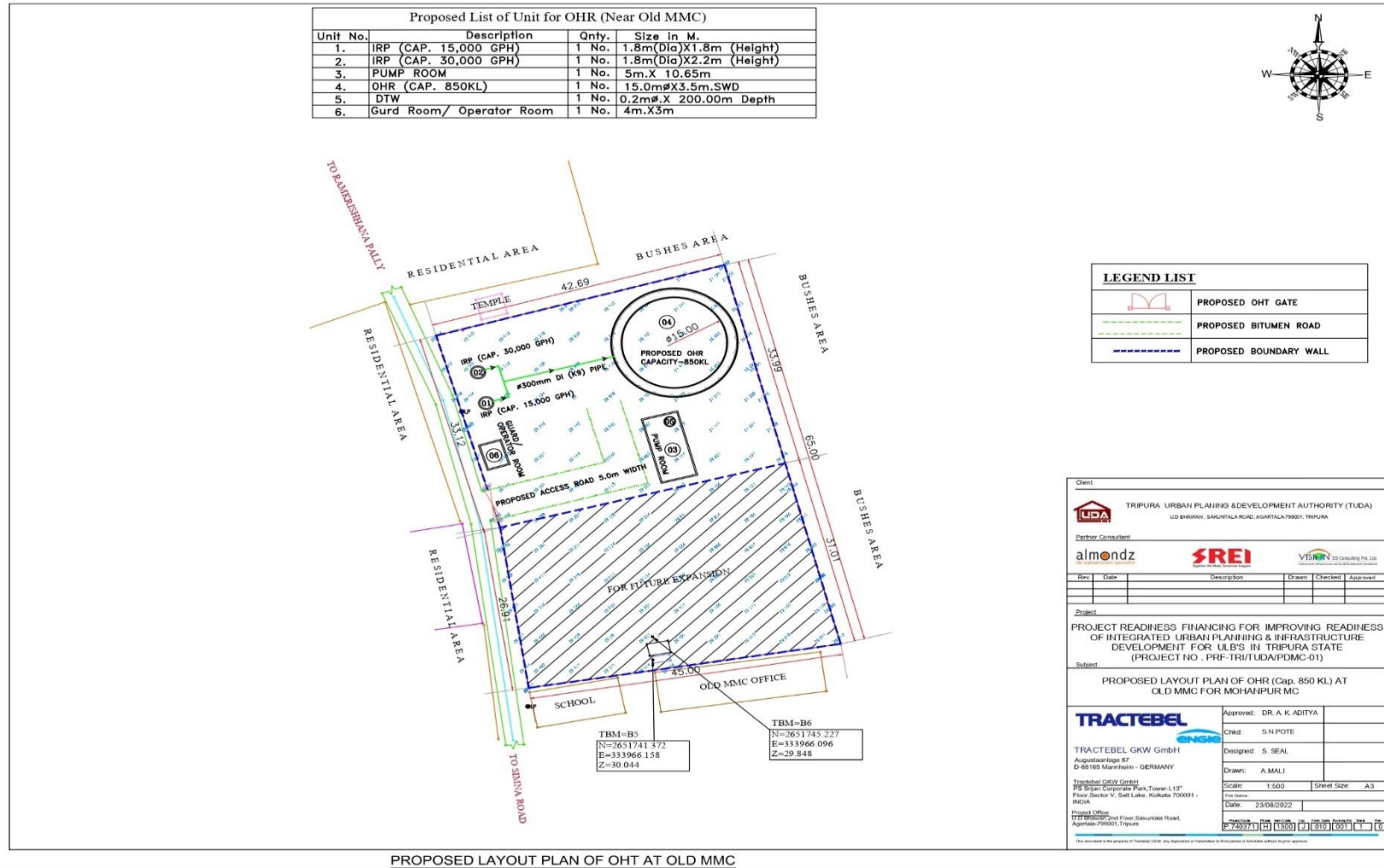


Figure 29: Layout plan of DTW-4 near Bohemian Colony

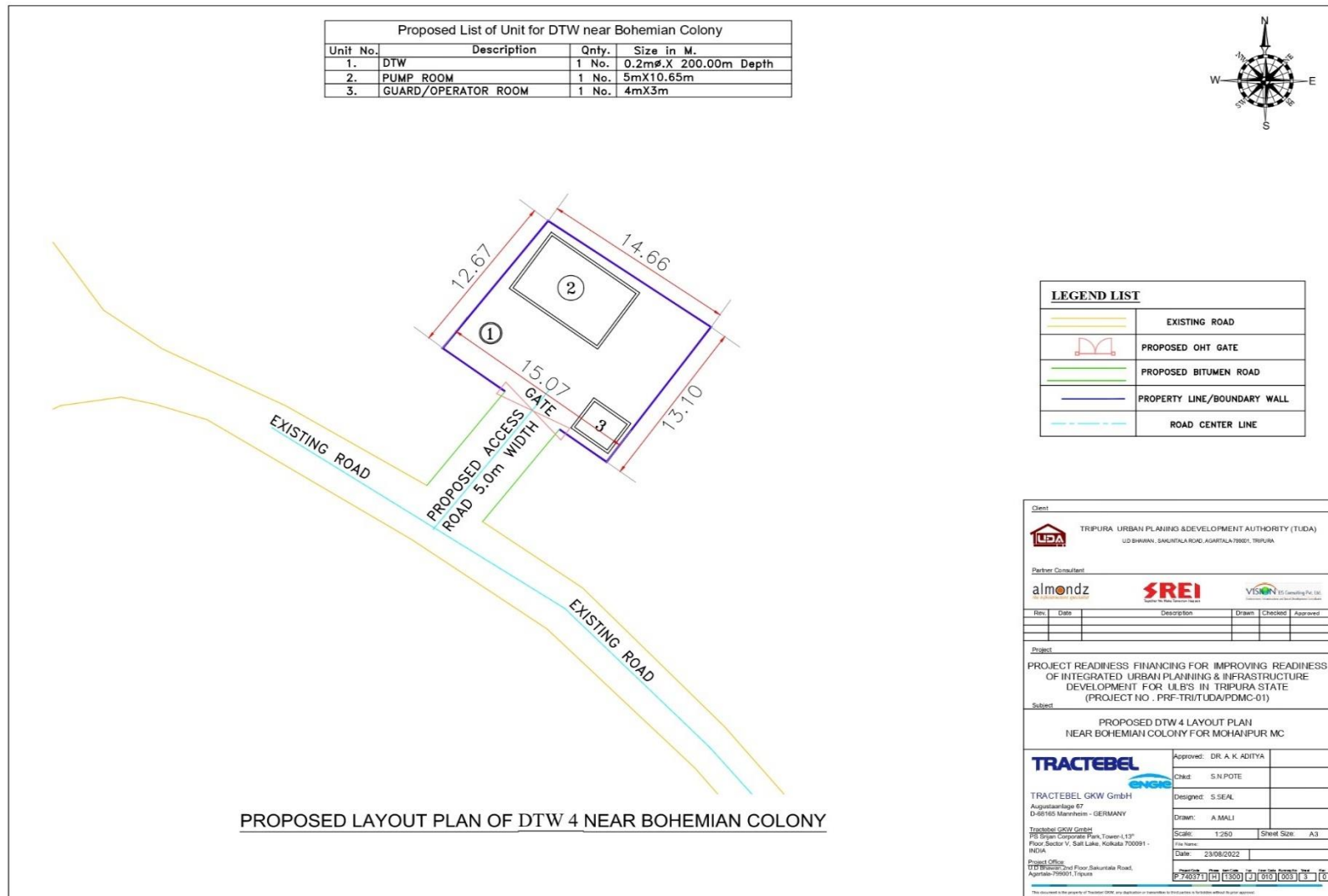


Figure 30: Layout plan of DTW-5 at Tulabagan Office Tila

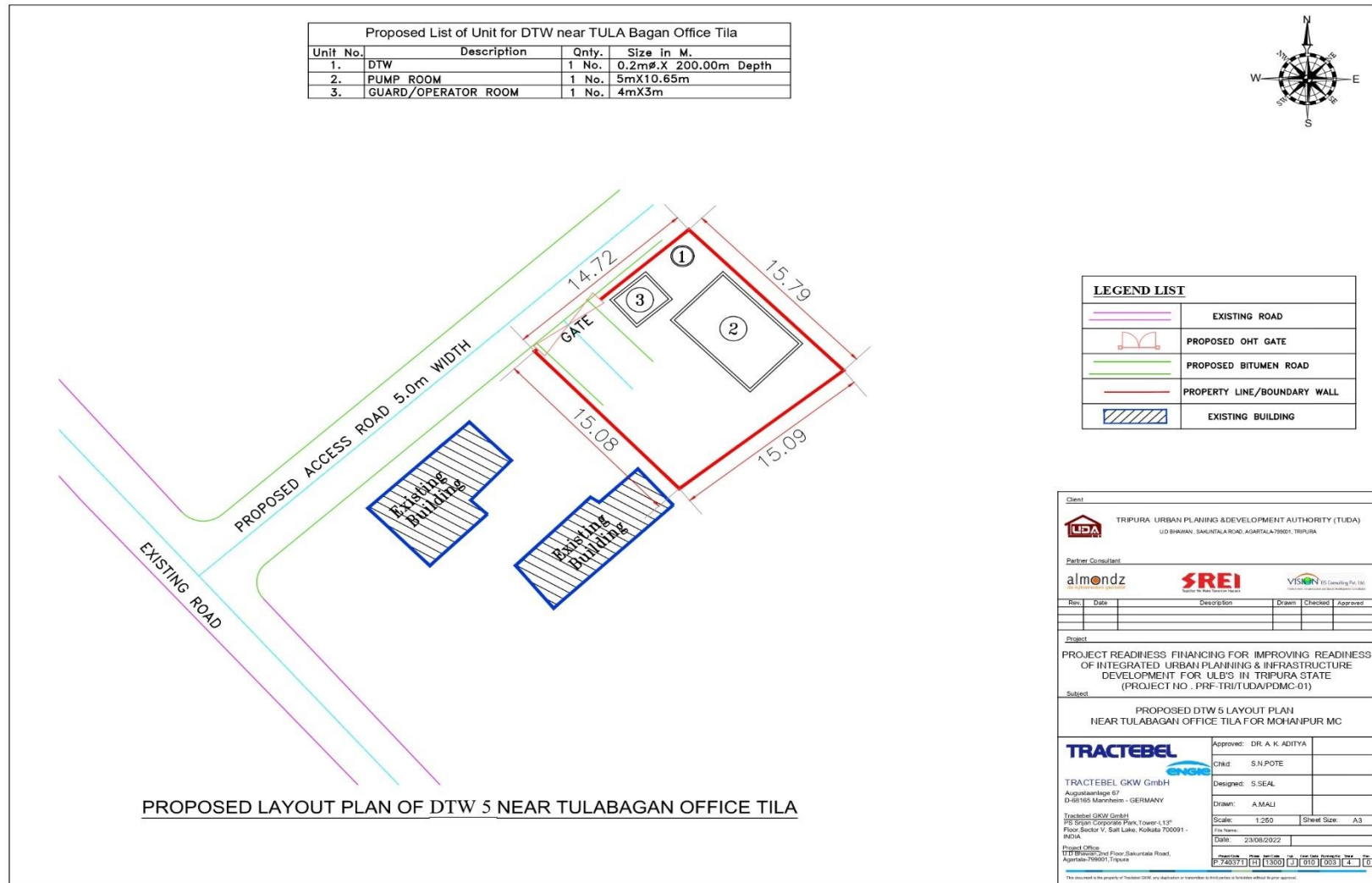


Figure 31: Layout Diagram of Proposed OHSR, IRP Near Tulabagan

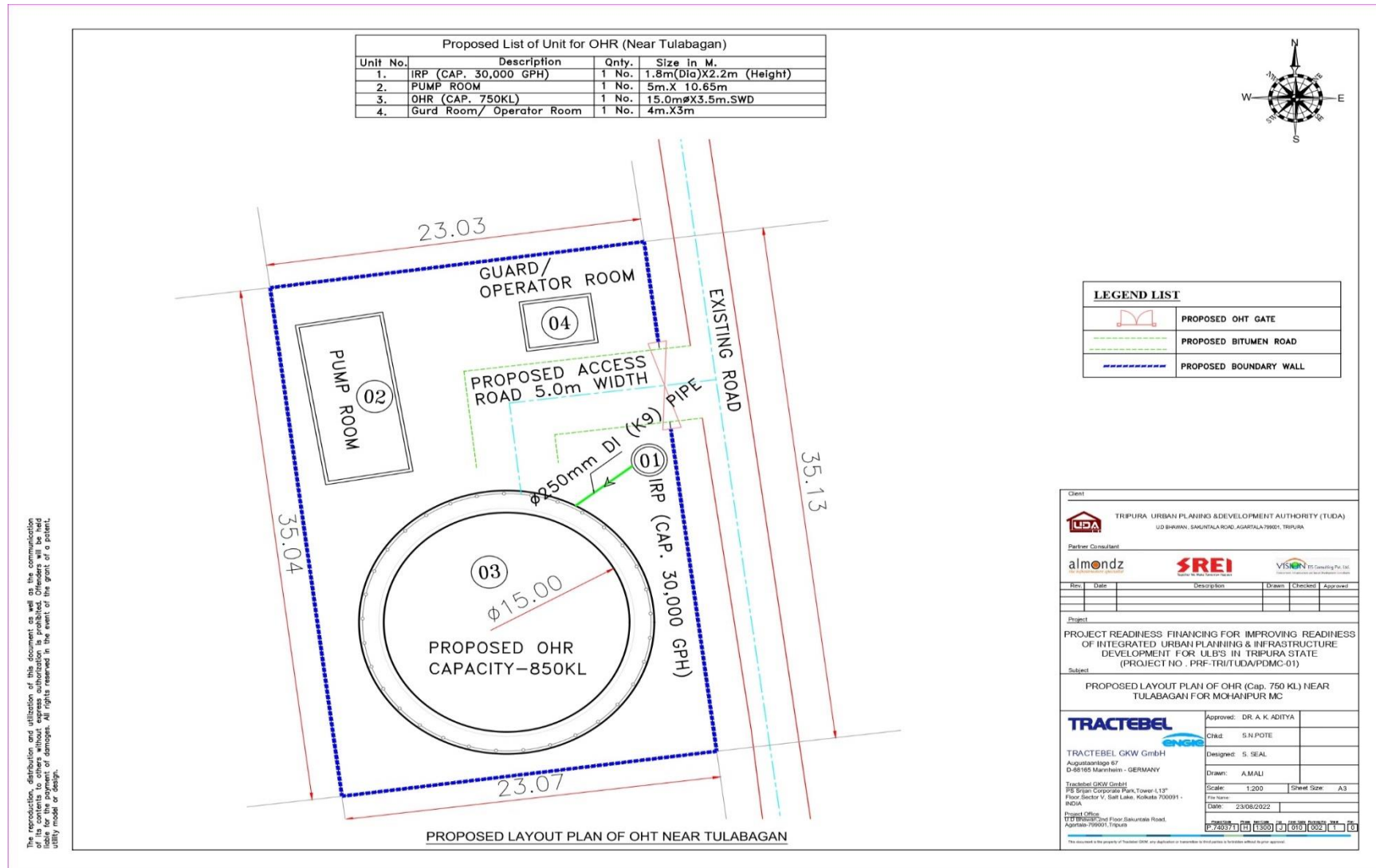
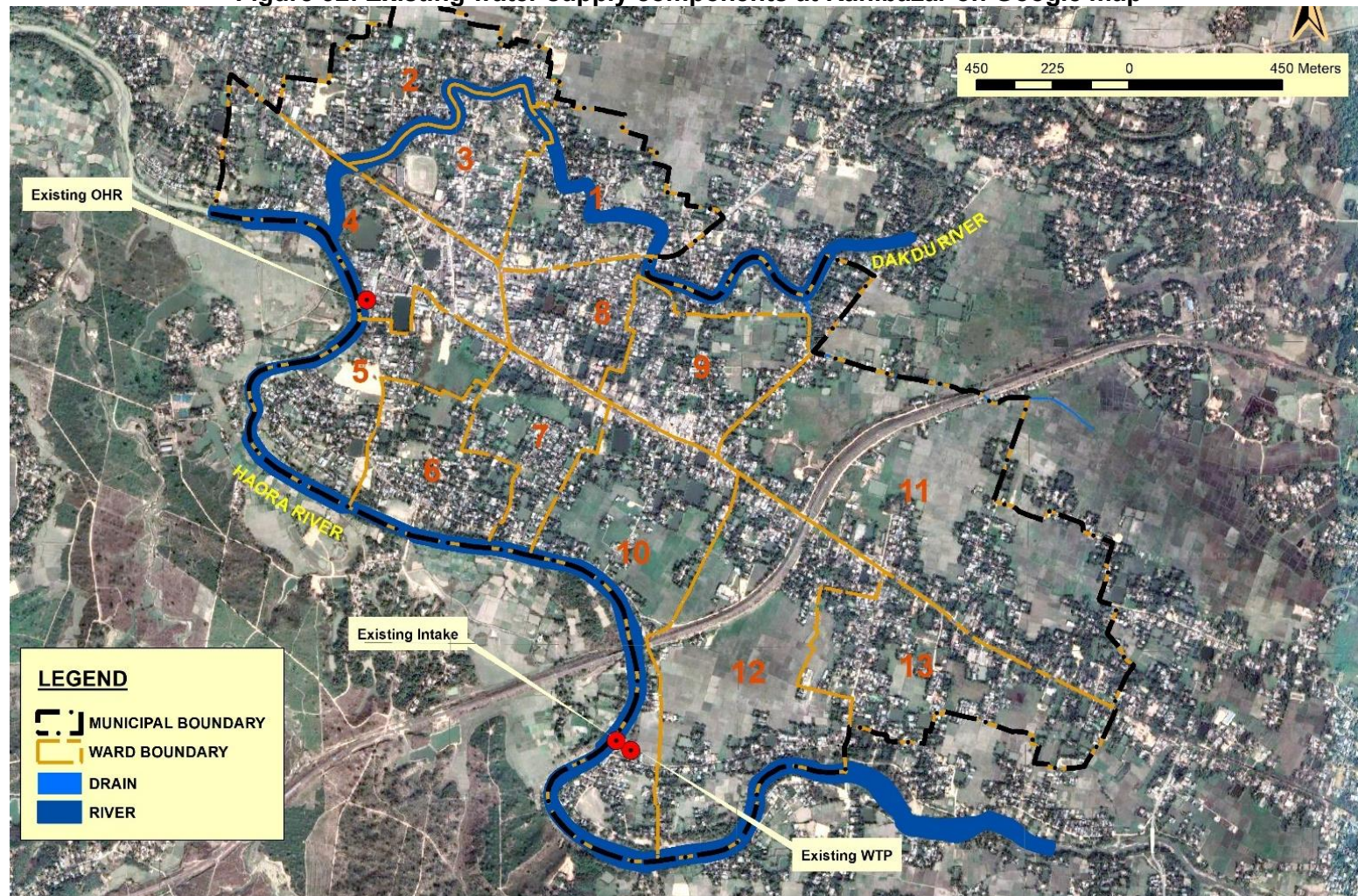


Figure 32: Existing water supply components at Ranibazar on Google map



Maps Showing existing and proposed components in Ranirbazar Town

Figure 33: Proposed water supply components at Ranirbazar on Google map

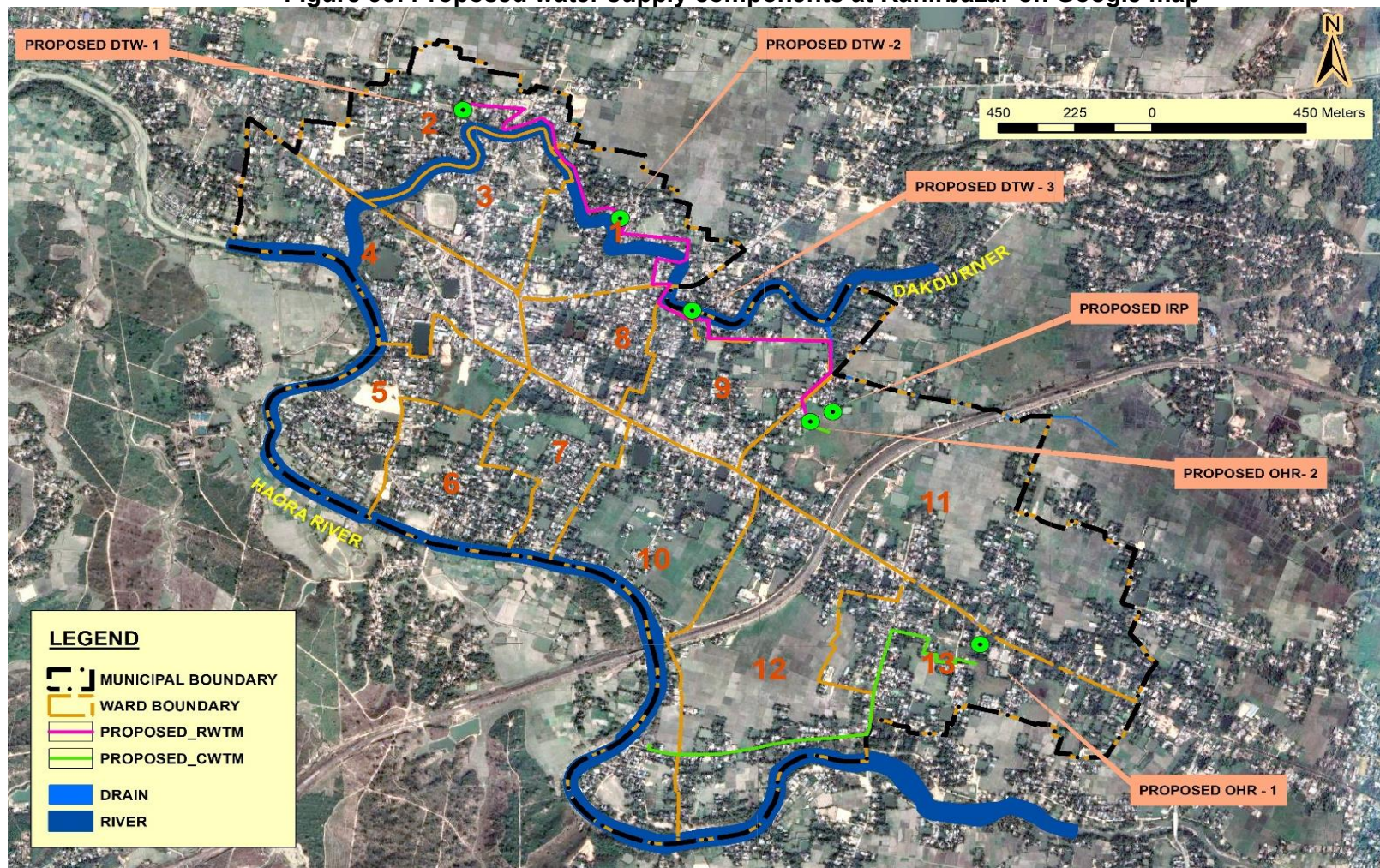


Figure 34: Existing Intake, WTP and surrounding 100 m of Ranirbazar

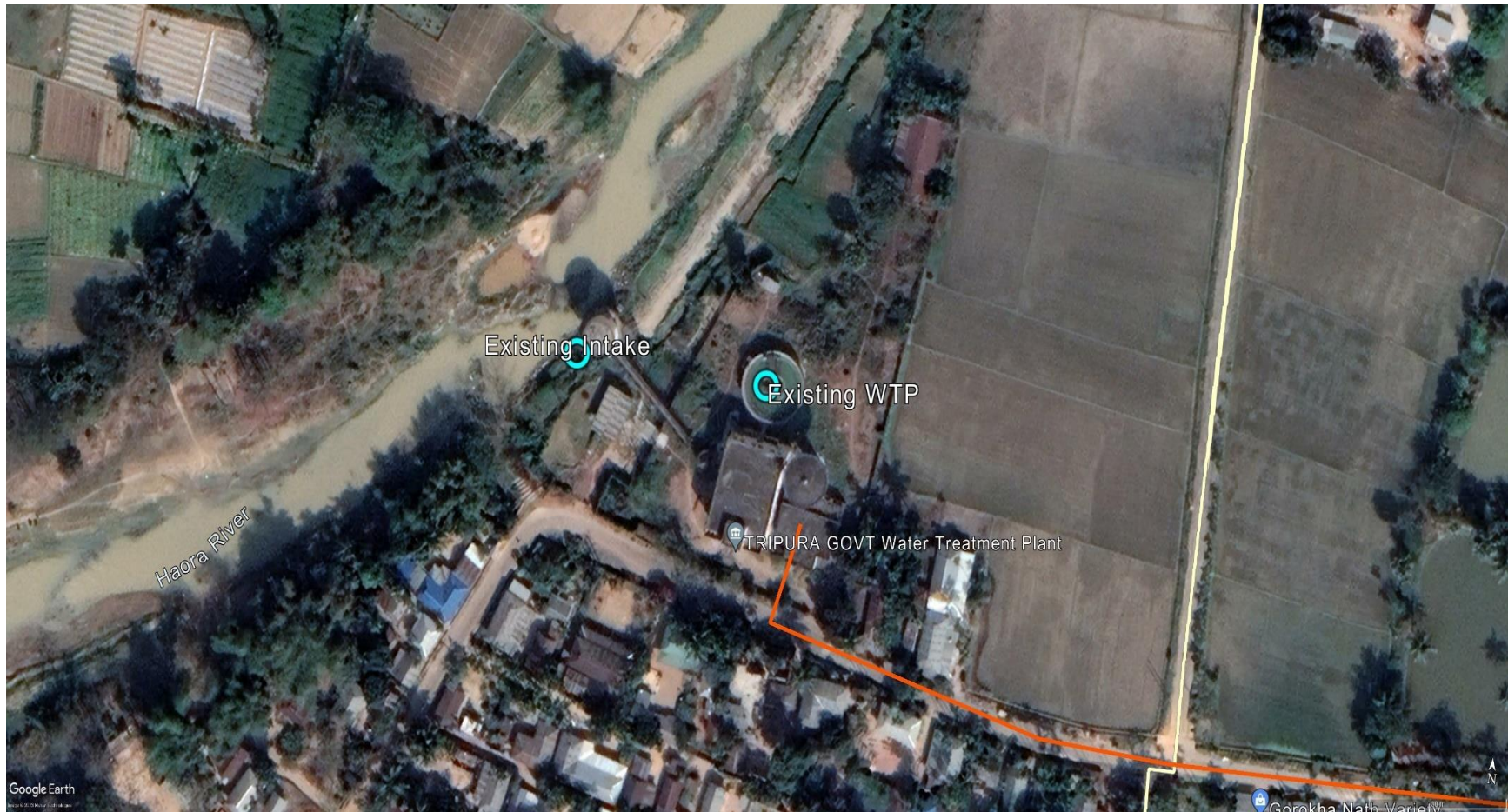


Figure 35: Proposed Clear water main, Raw water main Tube well and Reservoir locations

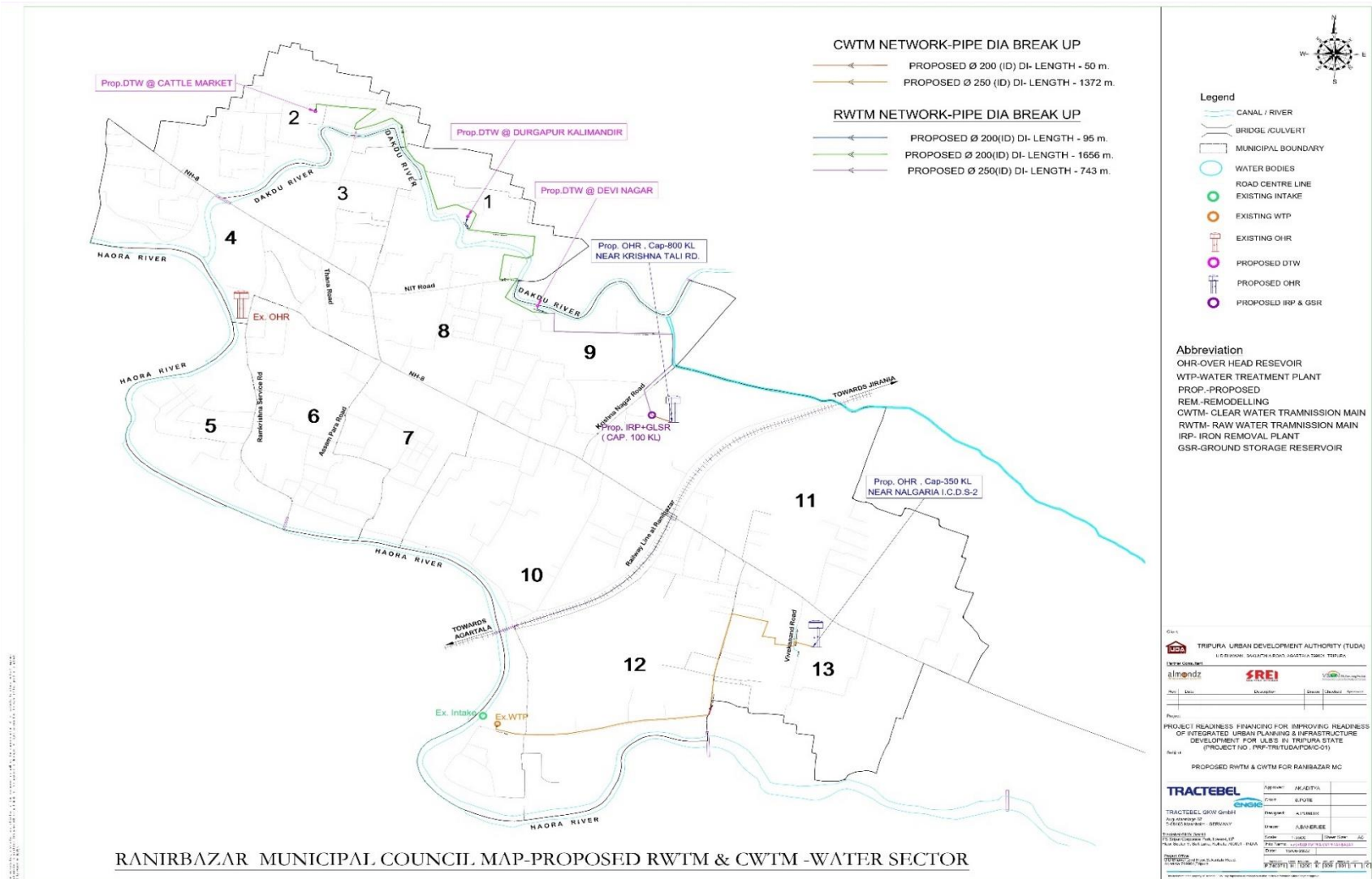


Figure 36: DTW -1 Near Cattle Market ward no. 2 on Google Earth

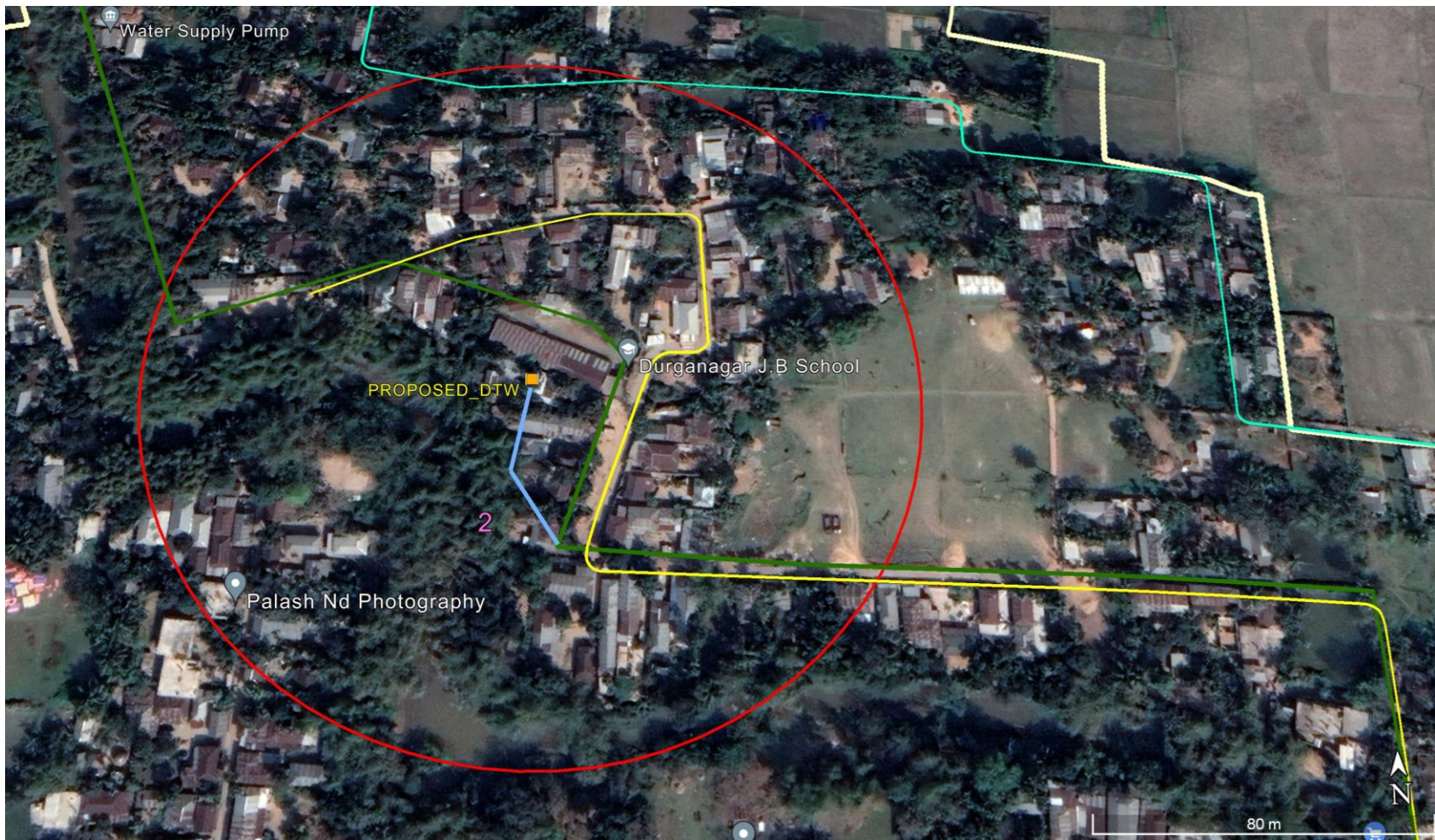


Figure 37: DTW -2 Near Durgapur Kalli-Mandir ward no 1



Figure 38: DTW -2 Near Durgapur Kalli-Mandir ward no 1



Figure 39: Proposed DTW -03 Devi nagar and OHSR locations with 100m surroundings



Figure 40: Proposed OHSR location with 100m surroundings OHSR -1 Near Anganwadi, Nilgaria ward no. 13



Figure 41: Proposed DMA area of Ranirbazar

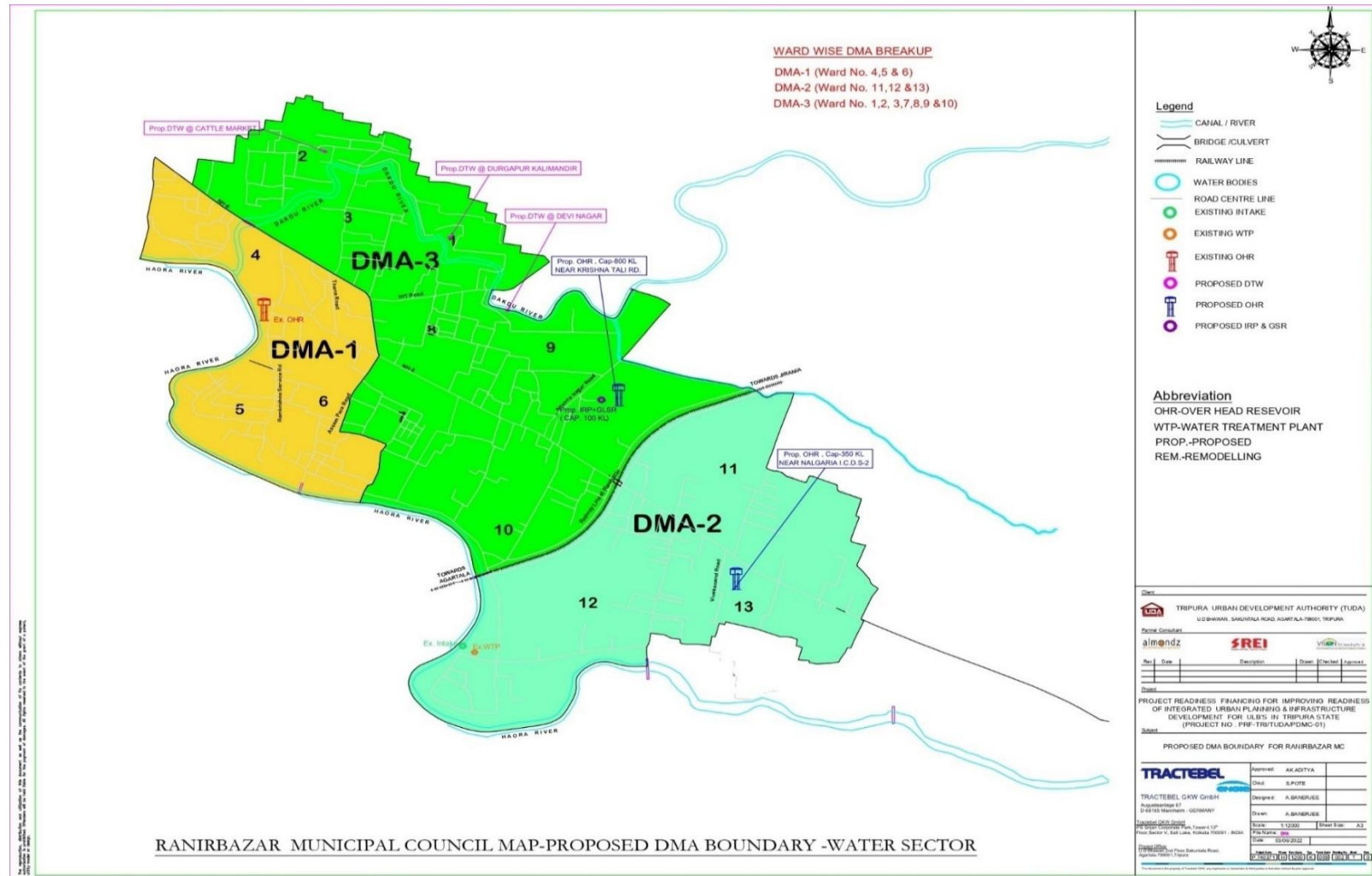


Figure 42: Water supply distribution network for Ranirbazar town

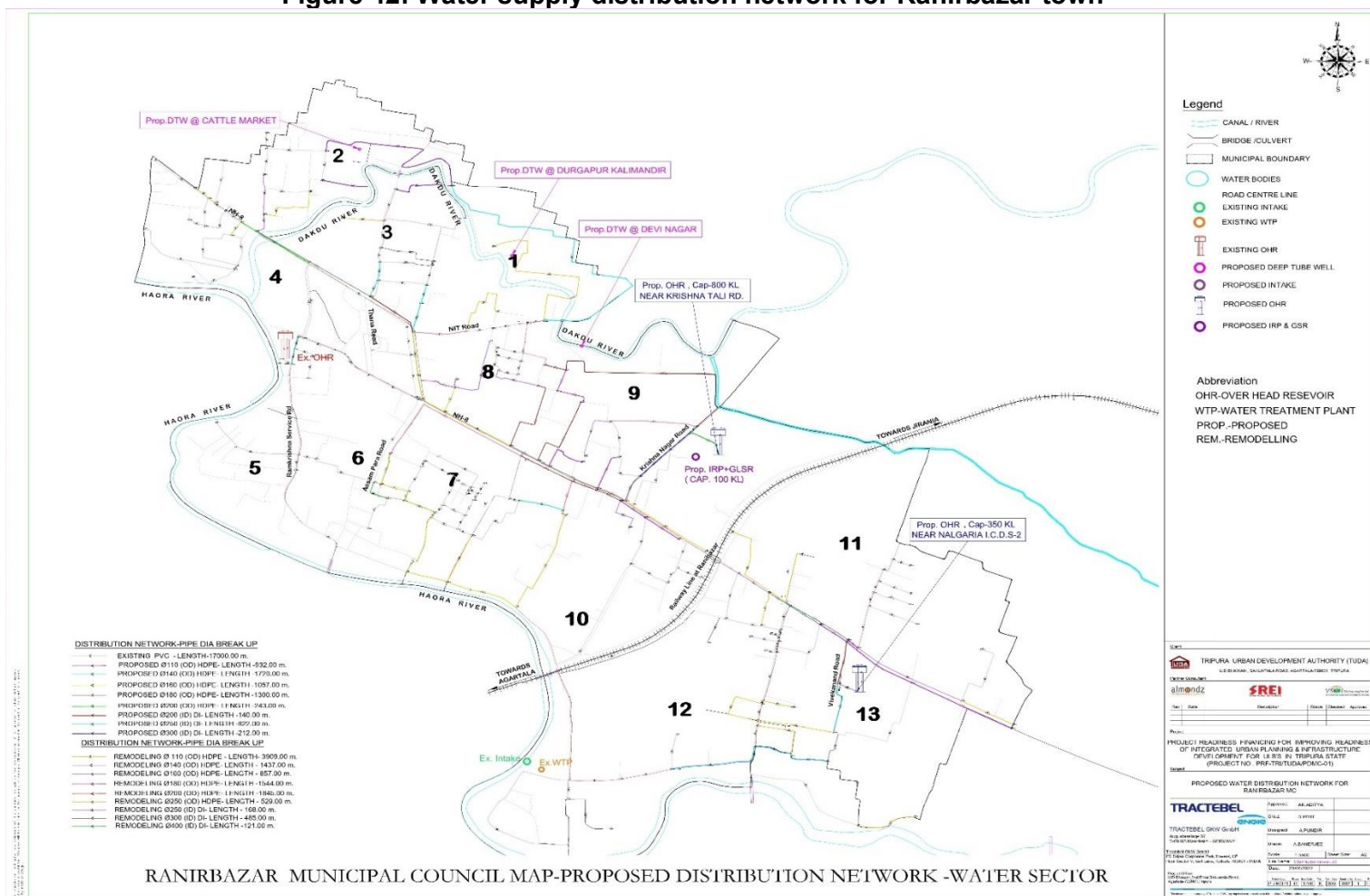


Figure 43: Proposed Layout Map of DTW-1 Near Cattle Market

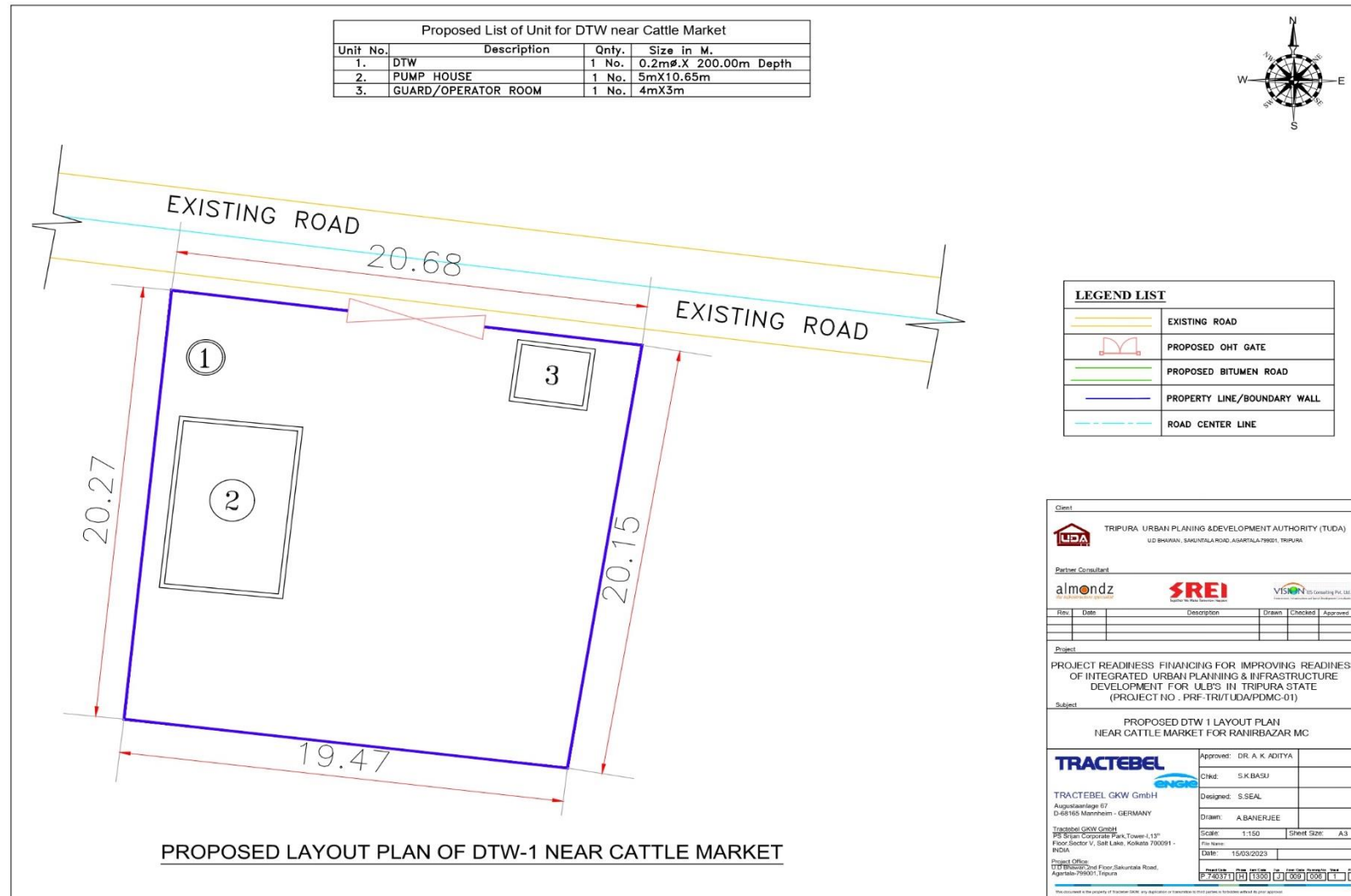


Figure 44: Proposed Layout Map of DTW-2 Near Durgapur Kalimandir

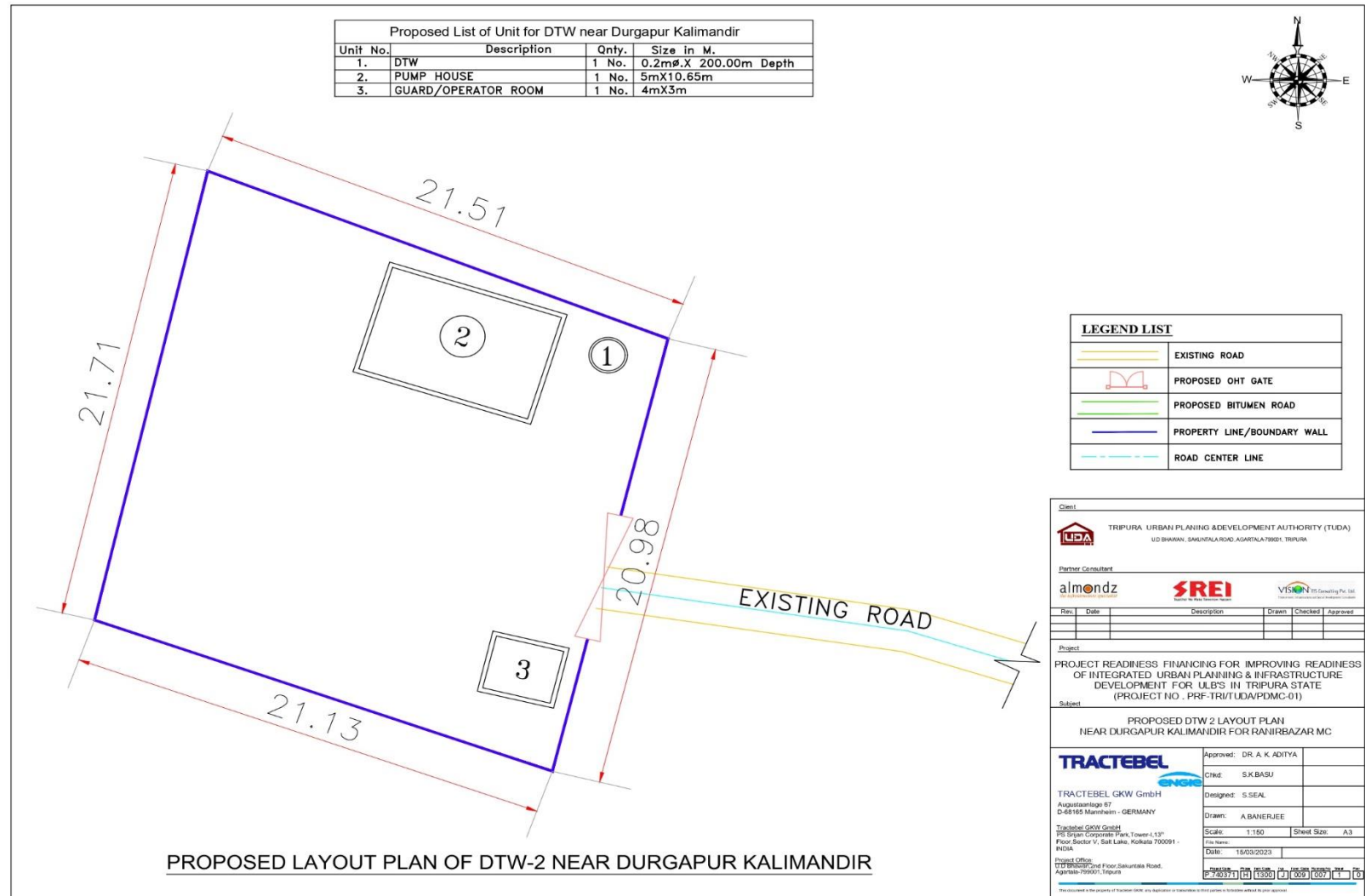


Figure 45: Proposed Layout Map of DTW-3 Near Devi Nagar

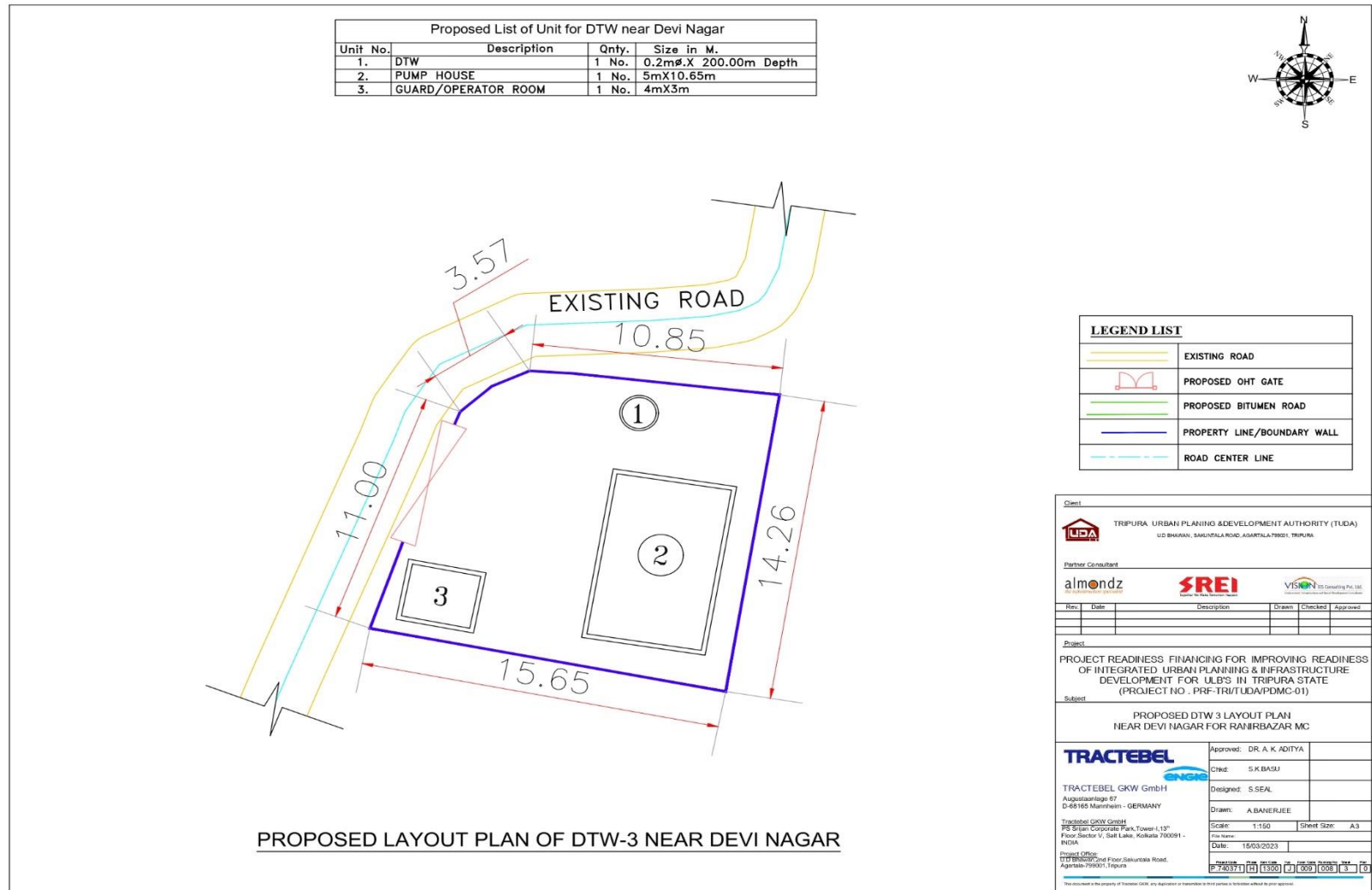


Figure 46: Layout Diagram of Proposed OHSR, IRP, GSR at Krishna Tali ward no 11

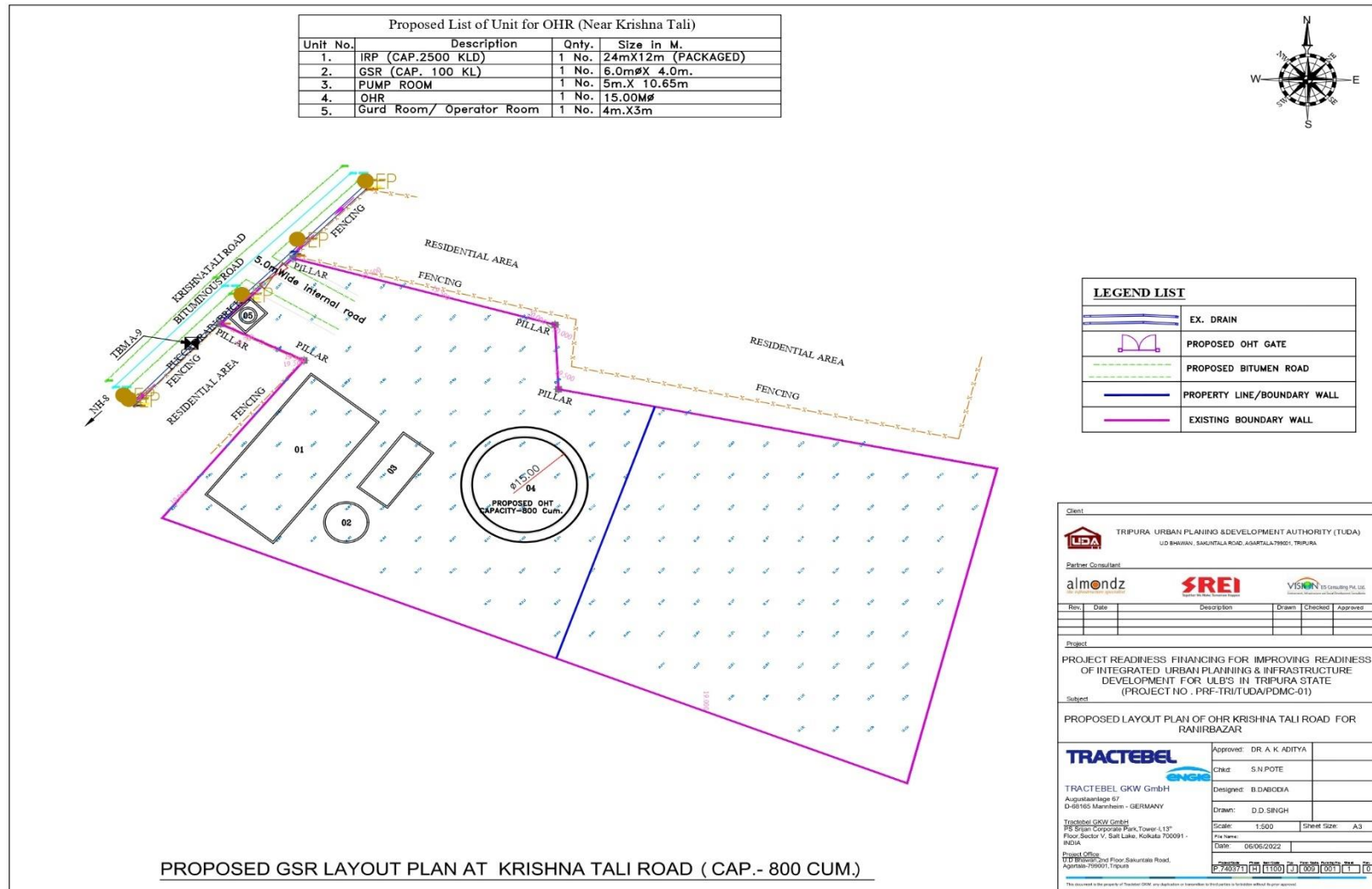
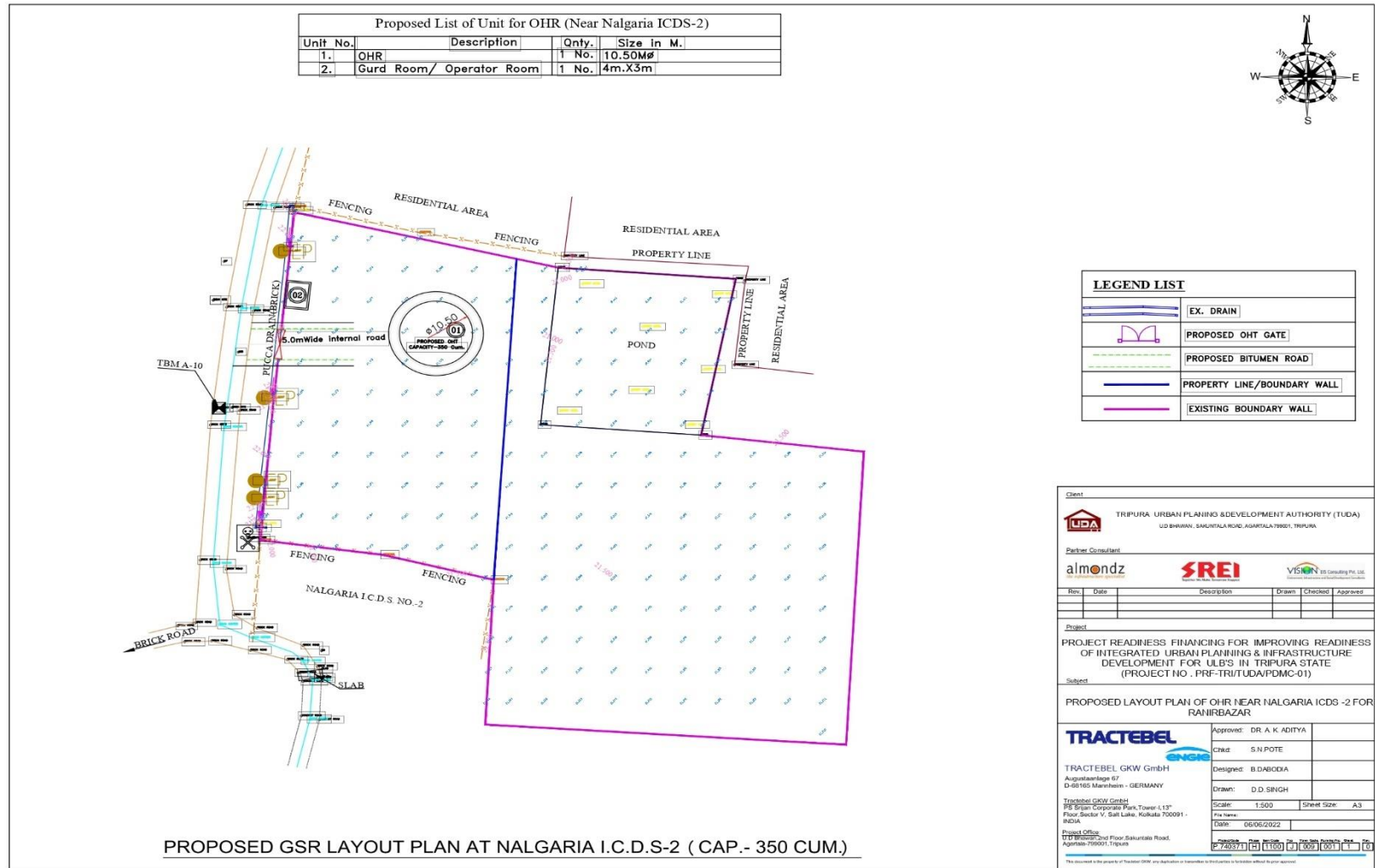


Figure 47: Layout Diagram of Proposed OHSR at Anganwadi – ICDS Nalgaria ward no. 13



III. ANALYSIS OF ALTERNATIVES

29. Descriptions of various alternatives considered for critical components such as water source, water treatment and distribution etc. are presented in the table below.

1.	Project Need – No Project Alternative
Type of alternative	‘No project’ / ‘with project’ alternative
Description of alternatives	No project alternative – At present water supply is being served only 51.1% of the total town area, under the sub project Some of existing civil structures such as storage reservoirs and other ancillary structures are not in good condition. Few reservoirs are not adequate to meet the ultimate water demand and those are meeting need repairing of civil structures. In present distribution network the tail end consumers are not getting the enough terminal pressure and discharge. Distribution of water is through distribution reservoir and only by gravity process. The schemes are manually operated and lacking in monitoring of real time quality and quantity of water supplied. Therefore, it could be stated that unaccountable flow of water in the system is very high. Living conditions due to absence of proper water supply, are unhealthy and unhygienic. Lack of infrastructure is also causing environmental pollution, overall poor quality of life. Poor environmental quality affects the urban poor people more. The project intends to provide following benefits to the people residing in the subproject area, and the “no project” alternative will deprive people of these benefits: • increased availability of potable water at appropriate pressure to all households including urban poor • reduced time and costs in accessing alternative sources of water. • better public health particularly reduction in waterborne and infectious diseases; • To ensure positive impact on social status and economic standard of the people of rural areas. • To automate the operation from source to sector tank with use of SCADA and water quality monitoring • Ensure that 100% households have a metered water connection, With project alternative- Since the existing water supply sources/systems are insufficient to accommodate growing population in the area, the proposed water supply subproject includes source augmentation to provide adequate water, water conveyance, treatment, storage and distribution. The successful implementation of the water supply project will result in better control over the drinking water management, improved monitoring system and overall demand management along with energy reduction. Overall, the ‘with project alternative’ will bring about improved public health and living environment that will contribute to improved quality of life in this area. Improved water supply system will create an enabling environment for local economic development.
Selected Alternative	“Without” subprojects would yield the project area to be continuously under-served 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 district and the

	defer commitments to improve the proportion of the population with sustainable access to clean water. Given the large-scale benefits to the population and environment, 'With Project' alternative is considered appropriate.
2.	Alternative source of water
Type of alternative	'Water source'
	<u>Khowai</u> Groundwater: Presently source of water at Khowai town is from Khowai River followed a water treatment plant and 1 no. Deep Tube well (DTW) are the main sources of piped water supply in the town. Presently total water abstracted from Tube Wells is approximately 0.45 MLD. Surface Water: At present there is a wet type of Intake well of utilized capacity 3.78 MLD (5 m dia., commissioned in 2006) located on Khowai River and approx. 4 km away from the 4.54 MLD capacity WTP to draw surface water. Khowai River is a semi perennial source of water. Due to low availability of water depending entirely on surface water supply is considered unsustainable. Combined ground and surface source – adoption of conjunctive use: Either the groundwater or surface water is not able to fulfil the projected town demand, and therefore it is designed to utilize both the source optimally. Given less than 100% dependability of Surface water, in the low rainfall years, the deficit from the river Khowai will be met by tube wells and accordingly the water abstraction from groundwater sources will be increased as required. <u>Mohanpur</u> Ground water source: The present water supply to the town is from 20 tube wells that are located across the town. Based on Aquifer Mapping and Management Plan of West Tripura District, Tripura, 2016-17, hydrogeological map reflects that Mohanpur falls under large yield prospect i.e., 100 m³/hr to 150 m³/hr. Therefore, it is proposed that the new tube wells may withdraw water considering sustainable discharge with 60% safety. As per the gap analysis additional 3.58 MLD of raw water is required for Mohanpur for the design year 2038. Since present tube wells will be not used in future to support the requirement generation of 5.03 MLD (2038) and 5.95 MLD (2053) will be required. Five nos. of new tube wells as proposed will generate about 6.82 MLD of water. The source of water systems is through 20 Deep tube wells and additional five (5) deep tube wells are proposed. But old 20 tube wells will be discarded along with development of 5 new DTWs. Site of the proposed works has been selected in such a way that all wards of the town will be specially those area which are not being served at present time will get the drinking water throughout the year including summer season. Total yield from 5 DTWs with 20 hours operation is 6.82 MLD > 5.03 MLD (Demand of DMA-1 & DMA-2 for 2038). New locations for proposed OHSRs (2 nos.) and DTWs are at suitable locations from where water can be supplied to households with sufficient pressure. All OHSRs will be constructed at Government or public land, so that NOC for the sites can be easily obtained from concerned agencies. Hence it can be concluded that the proposed sources are capable to meet projected water demand and sustainable for this proposed water supply project till ultimate design year (2053). Water quality test reports recommends that the available water is fit for

	<u>Ranirbazar</u> Groundwater: Presently source of water at Ranirbazar town is intake point on Haora River, the main sources of piped water supply in the town. Groundwater has high iron contents. There is no designated ground water source in this town. Surface Water: Existing intake of 2.5 MLD on Haora River performing well as per DWS. The source of the water systems is managed through one intake well on the river Haora. The total length of raw water transmission main is 20m of 250 mm diameter of DI K-7 pipe from intake to WTP (capacity 2.5 MLD) which was commissioned in the year 2010. Water demand in the town estimated as 4.91 MLD (design year 2038) and 6.31 MLD (design year 2053). Depending entirely on surface water supply is considered unsustainable. Hence, to mitigate the water demand in the year 2038 gap of 2.66 MLD, 3 nos. of DTW with IRP having capacity of 10000 GPH/ 45.45 cum/hr each has been proposed. Total production of water from 3 nos. of DTW with IRP will be 2.67 MLD. Combined ground and surface source – adoption of conjunctive use: Either the groundwater or surface water is not able to fulfil the projected town demand, and therefore it is designed to utilize both the source optimally. Given less than 100% dependability of Surface water, in the low rainfall years, the deficit from the River Haora will be met by tube wells and accordingly the water abstraction from groundwater sources will be increased as required.
Selected Alternative	Selected source: Combined ground and surface source- Existing intake wells and WTP + Proposed DTW are selected for Khowai and Ranirbazar town For Mohanpur only ground water source – DTWs will be utilized to meet the water requirement for the town.
3.	Project Locations
Description of alternatives	Location of DTWs and Service reservoirs: Location selection is guided by technical feasibility and system hydraulics and obviously DMA distribution. Water Pipeline Network: The proposed transmission and distribution network pipelines to convey water to habitations are proposed within the ROW of government owned roads.
Selected Alternative	Vacant Govt. land is selected for DTWs and Service reservoirs no alternatives are considered. Water Pipes will be laid at most the locations along the existing rising mains and along the roads. Distribution lines will be laid from service reservoirs to the land settlement patches. Pipes will be laid at most the locations along the existing distribution lines and at some places along the <i>katcha</i> path and ULB roads within RoW. No land acquisition is required for laying of pipes. Water supply pipes will be laid on one or either side of the roads. There are no eco-sensitive or protected areas within the proposed project activity areas. No wildlife is also reported in the project area. During water supply pipe laying works tree cutting is not envisaged as per design.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

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

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

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

32. **Environmental Management Plan.** An environmental management plan (EMP), which addresses the potential impacts and risks identified by the environmental assessment, has been prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions are commensurate with the project's impact and risks.

33. **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.

34. **Public Disclosure.** ADB posts the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

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

35. **Consultation and Participation.** ADB SPS require borrower to conduct meaningful consultation⁴ with affected people and other concerned stakeholders, including civil society, and

⁴ As 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; (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.

facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

36. **Grievance Redress Mechanism.** ADB SPS require borrowers to establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the subproject's performance. The grievance redress mechanism shall be scaled to the risks and adverse impacts of the subproject.

37. **Monitoring and Reporting.** Borrower shall monitor, measure, and document the implementation progress of the EMP. If necessary, the borrower shall identify the necessary corrective actions, and reflect them in a corrective action plan. Borrower shall prepare and submit to ADB semi-annual environmental monitoring reports (including COVID 19 compliance) that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis until ADB issues a project completion report.

38. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, ADB SPS 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.

39. **Occupational Health and Safety.** ADB SPS 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.

40. **Community Health and Safety.** ADB SPS 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.

41. **Physical Cultural Resources.** Borrower is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. ADB SPS requires that such resources likely to be affected by the subproject are identified, and qualified and experienced

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.

experts assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures included in the EMP.

42. **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 PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

B. National Environmental Laws

43. **Environmental Assessment.** The Government of India EIA Notification of 2006 replacing the EIA Notification of 1994, sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance is required for specified activities / projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts. None of the components of subproject proposed for this Package falls under the ambit of the EIA Notification 2006, and therefore EIA Study or environmental clearance is not required for the subproject.

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

Sr. No.	Law	Description	Applicability in the project
1.	EIA Notification	The EIA Notification of 2006 set out the requirement for environmental assessment in India. Environmental Clearance is required for certain defined activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence.	No project water supply components attract provisions of EIA notification 2006 and its amendment till date. Sand mining for construction works (if required), requires environment clearance under EIA act. (list of already approved sand mines in Tripura is available on TSPCB website ⁹) PIU/PMU has to ensure that contractor is procuring mining material from approved mines only or get EC for new mines.
2.	Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments (1987)	Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, by Central and State Pollution Control Boards and for conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Such projects have to obtain Consent to Establish (CTE) under Section 25 of the Act from Tripura State Pollution Control Board (TSPCB) before starting implementation and Consent to Operate (CTO) before commissioning.	No project water supply components attract provisions of Water act and not requiring CTE and CTO from TSPCB.

⁹ <https://tspcb.tripura.gov.in/sand-mining-ec/>

Sr. No.	Law	Description	Applicability in the project
3.	Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards.	Following will require CTE and CTO from TSPCB: Establishment of DG sets more than 1 MVA. Batching Plant, and Hot mix plants, if any If ready mix concrete and hot mix bitumen is procured from third party, contractor must ensure that the plants, from where material is being purchased is having valid CTE & CTO and copy should be collected from third party and submitted in PIU
4.	Environment (Protection) Act, 1986 and CPCB Environmental Standards. (National Ambient Air Quality Standards 2009 and amendments)	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards.	Ensure applicable standards for ambient air quality. Ensure Emission Limits standards for New DG Sets Ensure stack height standards Requirement for DG Sets. Appendix 2 provides applicable standards for ambient air quality. Appendix 4 provides vehicular emission norms
5.	Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Ensure applicable noise standards and noise limits for DG sets. Appendix 3 provides applicable noise standards
6.	Central Motor Vehicle Act Central Motor Vehicle Rules and (Amendment) Rules (1988 and amendment thereafter)	Objective of this Act is to check vehicular air and noise pollution. Vehicles to be used for construction and other purposes need to meet the standards and certificates prescribed as per the Rules, 1989 to control noise, pollution, etc.	Ensure vehicle exhaust emission standards.
7.	Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 Tripura Ancient Monuments and Archaeological Sites and Remains Act 1997	The Act designates areas within 100 meters (m) of the "protected monument/area" as "prohibited area" and beyond that up to 200 m as "regulated area" respectively. No "construction" is permitted in the "prohibited area" and any construction activity in the "regulated area" requires prior permission of the Archaeological Survey of India (ASI).	No ASI Monuments falls under impact area of any of the component of this package and no clearance from ASI is required.

Sr. No.	Law	Description	Applicability in the project
8.	The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013	Whereas sexual harassment results in violation of the fundamental rights of a woman to equality under article 14 and 15 of the Constitution of India and her right to life and to live with dignity under article 21 of the Constitution and right to practice any profession or to carry on any occupation, trade or business which includes a right to safe environment free from sexual harassment	Applicable
9.	Labor Laws upto 2019	The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the employment relationship upon equal opportunity and fair treatment and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type.	Applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works. Appendix 5 provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.
10	Biodiversity Act of 2002	The Biodiversity Act 2002 primarily addresses access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of benefits arising out of the use of these resources and knowledge to the country and the people.	Not applicable
11	Wildlife Protection Act, 1972 amendment 1991	This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations.	None of the components of the subproject are located within the protected Area. Therefore, this act is not applicable.

Sr. No.	Law	Description	Applicability in the project
12	The Indian Forest Act, 1927; Forest (Conservation) Act, 1980, amended 1988; Forest (Conservation) Rules, 1981 amended 1992 and 2003; and Guidelines for Diversion of Forest Lands for Non-Forest Purpose under the Forest (Conservation) Act, 1980	The Forest (Conservation) Act prevents the use of forest land for non-forest uses without the clearance from Ministry of Environment, Forests and Climate change (MoEFCC), Govt. of India For tree felling NOC will be required	Not applicable; none of the components of the subproject are in forest.
13	Wetlands (Conservation and Management) Rules, 2010 & 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.	No sub project components will be planned nearby the designated wetland
14	Solid Waste Management Rules 2016	Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing, and disposal Responsibility of Solid Waste Generator: Segregate and store the waste generated in three separate streams namely bio- degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.	Solid waste to be generated at proposed facilities shall be managed and disposed in accordance with the MSWM Rules Contractor to follow all the rules during construction works.
15	Construction and Demolition Waste Management Rules, 2016	Rules to manage construction and to waste resulting from construction, remodeling, repair, and demolition of any civil structure. Rules define “construction waste” as waste comprising of building materials, debris resulting from construction, re-modeling, repair, and demolition of any civil structure.	Construction and demolition waste generated from the project construction shall be managed and disposed as per the rules

Sr. No.	Law	Description	Applicability in the project
16	Hazardous Waste Rules 2016	The occupier of Hazardous waste shall be responsible for safe and environmentally sound management of hazardous and other wastes. As described in rules, including (a) prevention; (b) minimization; (c) reuse, (d) recycling; (e) recovery including co-processing; (f) safe and legal disposal.	Contractor to comply all the requirements of this Act during construction works.
17	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.
18	Notification from Ministry of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation), central ground water authority on 20 th September 2020. Guidelines to regulate and control groundwater extraction in the country	No Objection Certificates for ground water extraction to industries or infrastructure projects or Mining Projects etc.- All new/existing industries, industries seeking expansion, infrastructure projects and mining projects abstracting ground water, unless specifically exempted, will be required to seek No Objection Certificate from Central Ground Water Authority or, the concerned State/ UT Ground Water Authority as the case may be.	Applicable for all the sub project town – Proposed new tube wells will require permission for groundwater withdrawal from CGWA.
International treaties			
19	Ramsar Convention, 1971	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. India is one of the signatories to the treaty. The Ramsar convention made it mandatory for the signatory countries to include wetland conservation in their national land use plans.	No Ramsar protected area near proposed project towns

Sr. No.	Law	Description	Applicability in the project
20	Wetlands (Conservation and Management) Rules, 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.	Not applicable as subprojects components of different sectors are not located within any designated wetland area.
21	Montreal Protocol 1992	India is a signatory of this convention which aims for reduction in the consumption and production of ozone-depleting substances (ODS), while recognizing differences in a nation's responsibilities. Ozone depleting substances are divided in two groups Chlorofluorocarbons (CFCs) and Hydro chlorofluorocarbons (HCFCs).	Not applicable in this project as no ODS are involved in construction works.
22	Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes.	Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of hazardous waste emerged during construction works.
23	Convention on Migratory Species of Wild Animals (CMS), 1979 (Bonn convention)	CMS, also known as Bonn convention was adopted in 1979 and entered into force on 1 November 1983, which recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.	Not applicable to this project as no migratory species of wild animals are reported in the project areas.

Table 5: List of NOC Required for Safeguarding the Project

S. No	Construction Activity	Statute under which Clearance is Required	Implementation
1.	Land for project activity	Allotment and approval for specific land use	ULB
2.	Road cutting for pipe laying works	Permission from ULB and PWD (where applicable)	PIU
3.	Establishment of construction camps	Allotment and approval for specific land use from ULB	Contractor
4.	NOC for disposal of excess	Construction & Demolition Waste	Contractor

S. No	Construction Activity	Statute under which Clearance is Required	Implementation
	Earth	Management Rules, 2016	
5.	Tree Cutting	State forest department/Revenue as per requirement	PIU
6.	Hot mix plants, Crushers, Batching plants and DG Set	Consent to establish and consent to operate under Air Act, 1981 from TSPCB	Contractor
7.	Storage, handling, and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules, 2016 Manufacturing, Storage, and Import of Hazardous Chemicals Rules, 1989 from TSPCB	Contractor
8.	New Sand mining, quarries and borrow areas	Environmental clearance under EIA Notification 2006	Contractor/ Third Party
9.	Use of vehicles and equipment	Pollution under control certificate (PUC) form RTO/ Pollution Control Board	Contractor
10.	Temporary traffic diversion measures	Temporary traffic diversion measure including use of alternate road from District traffic police	Contractor
11.	Use of highway ROW for construction area/ crossing	National Highway Authority of India	PIU
12.	NOC for construction of DTW in Khowai, Mohanpur and Ranirbazar	Notification from Ministry of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation), central ground water authority on 20 th September 2020.	Project Executing Agency - TUDA received permission from Water Resource Investigation Division, Govt. of Tripura for withdrawal of ground water Further permission from central Ground Water Authority will be applied and taken before construction of new tube well after finalization of DTW location and capacity by DBO contractor.

45. PMU will be overall responsible for supervision in getting all clearances and provide details to ADB through semi-annual report. PMU will ensure availability of all necessary regulatory clearances and approvals are obtained prior to commencement of works. Respective PIUs, with support of project consultants and DBO contractors, are responsible for obtaining the clearances/permits and ensuring conditions/specifications/provisions are incorporated in the subproject design, costs, and implementation. The PIUs shall report to PMU the status of compliance to clearances/permits as part of the regular progress reporting.

V. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for Baseline Study

46. **Data Collection and Stakeholder Consultations.** Data for this report has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed subproject sites.

47. The literature survey broadly covered the following:

- (i) Project details, reports, maps, and other documents prepared by the Govt. of Tripura
- (ii) Discussions with Technical experts of the PDMC team, municipal and Nagar Panchayat authorities, relevant government agencies like Tripura State Pollution Control Board (TSPCB) etc.
- (iii) Secondary data from previous project reports and published articles, and
- (iv) Literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and other planning documents collected from Government agencies and websites.

B. Physical Resources

48. Project towns are in western part of Tripura State, in the northeastern part of India. It is bordered to the north, west, and south by Bangladesh, to the east by t Mizoram, and to the northeast Assam. It is third smallest India in India. The capital is Agartala. Baseline status of the 3 project towns is given below.

Table 6: Baseline- Physical Characteristic of project towns

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
Location	Khowai is a town, located at 24° 3' 54" N and 91° 36' 18", on the banks of Khowai river. The Khowai district is flanked by Bangladesh on the north, Amarpur and Gandacharra on the south, Kamalpur & Ambassa on the east and Mohanpur and Jirania Sub Division on the west.	Mohanpur Town is located at 23° 57' 57" 26" N and 91° 22' 53" E, 20 km north of Agartala. Mohanpur is surrounded by Hezamara Block towards East, Mandwai Block towards South, Agartala Block towards South, Padmabil Block towards East	Ranirbazar is situated at 23.83°N and 91.37°E in under West Tripura district, which is bounded by Bangladesh in the north and west and Khowai district in the east and by Sepahijala district in the south.
Area	Khowai town covers an area of 5.86 sq. km and is divided into 15 wards.	Area of Mohanpur Municipal Council is 14.55 Sq km, and is divided into 15 wards	Area of Ranirbazar Municipal Council is 11.72 sq km, and is divided into 13 wards
Connectivity	Khowai is connected to Agartala, Kamalpur and Kailasahar through State Road. Khowai is located about 54 km from Agartala. Nearest airport is at Agartala. Khowai is also linked through railway.	National Highway 208 (NH 208) passes through Mohanpur town, connecting it to the nearby cities of Agartala and Udaipur. Nearest railway station and airport is at Agartala, 27 km.	Ranirbazar is about 10 km away from Agartala. It is well connected by Road and Rail network. Ranirbazar is located on NH 208. Nearest railway station is at Jogendra Nagar and the major

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
	Teliamura is the nearest railway station.		railway station is at Agartala. Nearest airport is Agartala Airport.
Topography	The town is situation on the bank of Khowai river, between river in east and Kailashahar range hills in the west. Terrain is comprises partly plain and partly undulating landing, sloping towards the river.	The topography of Mohanpur is characterized by undulating hills, with the highest point in the area reaching an elevation of around 100 meters above sea level.	The topography of Ranirbazar is characterized by undulating terrain with hills, and plains. The town is surrounded by hills on three sides, namely the Jampui Hills to the north, the Atharamura Range to the east, and the Longtharai Range to the south.
Soils	Soils of Khowai town are acidic in nature. Soil type of this area is red loam and sandy loam type. At few areas reddish yellow brown sandy soils is noted. Due to loamy characteristics of the soil texture, most of soils are well drained. Most of the part of Khowai town have deep soil depth.	Soil of Mohanpur town is predominantly clayey loam and sandy loam. The soil is rich in organic matter and has a slightly acidic pH. The major soil groups found in the area are red-yellow podzolic soil, alluvial soil, and lateritic soil.	Soil in Ranirbazar town is mainly composed of red laterite soil. This type of soil is common in areas with high rainfall and warm temperatures.
Seismicity	Entire north-eastern region of India extending to the Himalayan arc in the north and Burmese arc to the east is among the most seismically active regions of the world. The whole of Tripura State falls under seismic zone V and is highly vulnerable to earthquakes. Hilly areas are highly vulnerable to earthquake. Areas along the river in Khowai are flood prone. River causes floods during the monsoon. Hilly areas are landslide prone.		
Climatic conditions	The climate in Tripura displays characteristics that are typical of the hilly and mountainous region. Tripura records a low average temperature of 10 degree Celsius in the winter season which rises to a maximum average of 35 degree Celsius in the summer. The altitude of the state also influences the climatic conditions. January is the coldest while July is the hottest. Humidity is generally high throughout the year. In the summer season the relative humidity is varied from 50 percent to 74 percent whereas in the rainy season it is over 85 percent. Rainfall varies not only from place to places. Average annual rainfall of Tripura is 2200 mm, and generally increases from southwest part of the state to northeast. The northeastern part of the state gets maximum rainfall. Rainy season generally starts by about the end of May, but thundershowers usually occur from about April to the break of the monsoon. The rainy season continues up to September. The maximum rainfall is usually recorded during the month of June – July. The months of October and November constitute the post monsoon season. Highest rainfall is recorded in between month of May & July. Project towns has almost similar climatic conditions and rainfall. The Graphs below showing rainfall in project town. There is no weather station in Mohanpur and Ranirbazar. Jirania is adjacent town to Mohanpur & Ranirbazar and both towns have same weather conditions. Figure 48 below shows month wise rainfall for Khowai and Jirania town. Figure 49 shows month-wise rainy days.		

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
Surface water	The State of Tripura is well endowed with surface water resources. As many as ten major rivers are reported to generate an annual flow of 793 million m³ of water. All rivers are rain-fed and ephemeral in nature. All major rivers originate from hill ranges and show a typical drainage pattern called trellis, except a few instances of dendrite pattern. Rivers in the project towns are described below. Besides, there are numerous small ponds and water bodies within the towns. Khowai River. Khowai River passes along boundary of Khowai town. This is a trans-boundary river that originates in the eastern part of the Atharamura Hills of Tripura and enters Bangladesh at Balla in Habiganj District. Khowai River is second longest river of Tripura with a length of 166 km. Its total catchment area is 1,328km². Haora River. The primary water source of West Tripura is Haora River. It is called Saidra in Kokborok by the indigenous tribes of the state. Apart from this there are many streams and cherras. Haora river originates from the Baramura range and its tributaries are Dowaigang, Ghoramara, Debda on the right and Charupanadi, Dhobatilachhera and Bangeswargangon the left bank. The length of the river is 53 kms, and it flows towards west and passes through major towns like Champaknagar, Jirania, Khumulwng, Khayerpur, Ranirbazar and last Agartala before it enters and empties into the Titas in Bangladesh.¹⁰ Haora River passes through Ranirbazar western boundary. Sonai River. The main water course of Mohanpur is Sonai River. Beside these there are many Cherras. After Haora (46 km), Sonai Gang (22.31 km) is the second longest river in West Tripura District which is affected by bank erosion hazard. The five sites namely, Chandpur, Barkanthalia, Ailaghat, Trishghar and Mohanpur Bazar have been identified as most vulnerable places to bank erosion. Figure 50 below shows the watershed map of Tripura and townwise water bodies maps are shown in Figure 51 and Figure 53. Water quality. As per the Annual report 2020-2021 of TSPCB, the Haora River water quality parameters of TDS, DO, BOD, Total Hardness, and Lead are within permissible limits.		
Groundwater	The State of Tripura is occupied by the rocks ranging in age from Upper Tertiary to Quaternary. Mobile trough geosynclinal deposition of Barail group followed by flysch type of Surma & Tipam sediments, overlain by Dupitila formation, is noticed in the State. Most of the longitudinal synclinal valleys of the state are the basins of deposition of recent formation. Recent alluvium occurs along the streams and the flood plains of major rivers. Ground water occurs under unconfined condition in Dupitila, Recent & Tipam formations. Besides, it also occurs under confined to semi-confined conditions in Tipam formation at considerable depth. Recharge areas for the deeper aquifer lies in the adjacent anticlinal hills. Wherever a good thickness of impermeable clay beds underlie & overlie the saturated granular zones, auto flow artesian conditions have been found in the valleys, which are the discharge area. The artesian flowing conditions occur in patches both at shallow depth and at deeper depth. The auto discharge of the flowing wells in the State ranges from 100 to 6000 lph, the maximum auto discharge from deep tube well to the extent of 54000 lph has been		

¹⁰ District Survey Report 2018, West Tripura

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
	found in Khowai valley near Khowai town, where the piezometric head rose up to 7 m above ground level. Ground water resources have been assessed block-wise for recharge worthy area. Total Annual Ground Water Recharge of the State has been assessed as 1.31bcm and Annual Extractable Ground Water Resource as 1.06 bcm. The Annual Ground Water Extraction is 0.103 bcm and Stage of Ground Water Extraction is 9.7 %. All the 59 assessment units have been categorized as 'Safe'. As compared to 2020 assessment, there is no significant change in ground water recharge and ground water extraction in the State. Groundwater quality. Water Quality of groundwater in the project area of existing DTW is tested by DWS. It can be seen from table that the except iron content, all tested parameters are within the limit of Indian standard and WHO acceptable standards.		
Air quality	There are no data on ambient air quality of Project towns, which is not subject of monitoring by the Tripura State Pollution Control Board (TSPCB) because there are no major industries located in and around. Baseline air quality will be established at specific project locations before start of the construction, this is included in the SEMP. Table 10 shown detailed results of Ground water quality analysis. Baseline monitoring will be conducted by the contractor prior to start of construction by engaging a government approved laboratory.		
Noise levels	TNPCB conducted noise level monitoring in the month of December 2020 is presented in Table 11. In Khowai at all the zones during both day and night noise level is within the standards. In Mohanpur during day time noise always above the National standard irrespective of zones. In daytime noise level exceed WHO standard at residential & salient zones. During nighttime noise level at residential zone exceeds both the standards. In Ranirbazar the values of noise level noted in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. It has been observed during monitoring, that the noise level during daytime at silent zone exceeded the prescribed National standard but below the WHO standard. But at nighttime noise level at silent zone always above both the standards. Baseline noise quality will be established at specific project locations before start of the construction, this will be included in the SEMP. Baseline monitoring will be conducted by the contractor prior to start of construction by engaging a government approved laboratory.		
Ecological resources	Tripura a small state of North-east of India having rich content of floral and faunal diversity. Total area of the state is 10,491.69 sq km in which forest area is 6294.29 sq km. Among the forest area percentage of Protected Areas (Pas) in Tripura is about 9.59%. There are 6(six) PAs throughout state which includes 4(four) Wildlife Sanctuary and 2(two) National Parks. There are no protected areas, wetlands, mangroves, or estuaries in or within the subproject towns. Figure 54 and Figure 55 shows Forest maps of Khowai and West Tripura districts. There is no forest area nearby Khowai, Mohanpur and Ranirbazar town. Nearest forest to Khowai is is Atharamura Kalajhari reserve forest located 16 km, nearest protected area is Rema Kalenga wildlife sanctuary, located within 5 km from the town in in Habiganj, Bangladesh. The nearest protect area to Mohanpur is the "Sepahijala Wildlife Sanctuary" is located within 33 km aerial distance in Sepahijala district, Tripura and near forest area Tulakona R.F. is at 18 km aerial distance from the project town. Nearest nearest forest area to Ranirbajar is		

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
	Baramura¹¹ Eco Park, Teliamura at 21 km distance and protected area to Ranirbazar is "Sepahijala Wildlife Sanctuary, located 21 km from the town in Sepahijala district, Flora. Nearby the project sites of Ranirbazar trees are mainly Rubber Tree (<i>Hevea brasiliensis</i>), Ba rak (<i>Bambusa balcooa</i>), Bombash (<i>Bambusa</i> spp.), Betel nut (<i>Areca catechu</i>) and bamboo. Common species noted in and around Khowai and Mohanpur town, Teak (<i>Tectona grandis</i>), Sal (<i>Shorea robusta</i>), Gamar (<i>Gmelina arborea</i>), Chamal (<i>Artocarpus chaplasi</i>), Garjan (<i>Dipterocarpus turbinatus</i>), Koroi (<i>Albizia procera</i>), Sundi (<i>Michelia montana</i>) and Rubber Tree (<i>Hevea brasiliensis</i>). Common Bamboo species recorded across all the subproject towns are Ba rak (<i>Bambusa balcooa</i>), Bari (<i>Bambusa polymorpha</i>), Mritinga (<i>Bambusa tulda</i>), Muli (<i>Melocanna baccifera</i>), Kai (<i>Bambusa nutans</i>), Paora (<i>Bambusa teres</i>), Rupai (<i>Dendrocalamus longispathus</i>), Dolu (<i>Neohouzeaua dulloo</i>), Makal (<i>Bambusa pallida</i>), Pecha (<i>Dendrocalamus hamiltonii</i>), Kailiyai (<i>Oxytenanthera nigrociliata</i>), Kanak kaich (<i>Bambusa offinis</i>), Lanthi bans (<i>Dendrocalamus strictus</i>), Tetua (<i>Bambusa</i> spp.), Ish (<i>Bambusa</i> spp.), Jai (<i>Bambusa</i> spp.), Bombash (<i>Bambusa</i> spp.), Sairil/Wadu bamboo (<i>Melocalamus compactiflorus</i>), Bosai (<i>Bambusa</i> spp.). Fauna. The subproject locations are in and around urban areas, and lands converted long ago for urban and agricultural purposes. Therefore, existence of wild fauna is not reported. Only domestic animals such as pigs, dogs, cows, buffalos, cats, and goats are present in the subproject areas. Fauna in and around forest area are, Palm civet cat (<i>Paradoxurus hermaphroditus</i>), Jungle cat (<i>Felis chaus</i>), Barking Deer (<i>Muntiacus muntjak</i>), Common langur (<i>Presbytis entellus</i>), Rhesus Macaque (<i>Macaca mulata</i>), Phayre's leaf Monkey (<i>Trachypithecus phayrei</i>), Spectacle Langur (<i>Tachypithecus obscurus phayrei</i>). There are 8 numbers of fish species are found in Khowai River, (<i>Anguilla bengalensis</i>, <i>Labeonandina</i>, <i>Hypophthalmichthys molitrix</i>, <i>Chitalachitala</i>, <i>Ompok bimaculatus</i>, <i>Ompok pabda</i>, <i>Wallago attu</i>, and <i>Ailia coila</i>) and 12 in Haora River (<i>Lepidocephalus guntea</i>, <i>Rasbora daniconius</i>, <i>Amblypharyngodon mola</i>, <i>Puntius conchoni</i>, <i>Puntius chola</i>, <i>Puntius sophore</i>, <i>Acanthocobitis botia</i>, <i>Mystus vittatus</i>, <i>Exostoma berdmorei</i>, <i>Mastacembelus armatus</i>, <i>Colisa lalia</i>, <i>Channa punctatus</i>). As per local information, no commercial fishing activities are reported near towns and intake points of Rivers.		

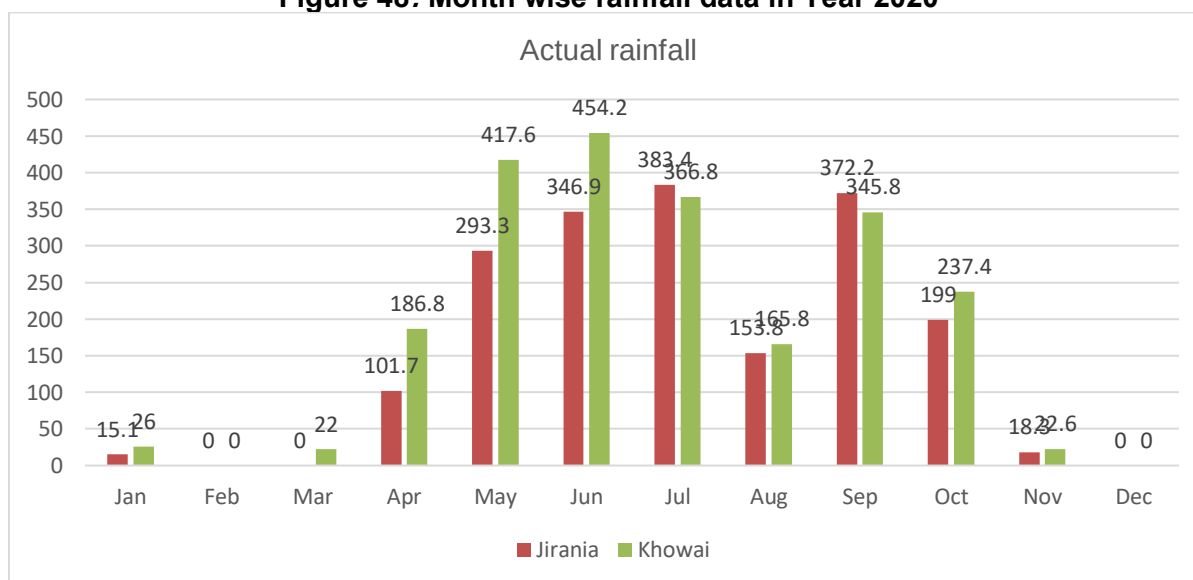
¹¹ International Journal of Current Research Vol. 7, Issue, 04, pp.15342-15349, April 2015

Baseline Characteristic	Khowai	Mohanpur	Ranirbazar																																																
IBAT screening	There is 1no. of protected area, Rema-Kalenga Wildlife Sanctuary and 1no. of key biodiversity area (KBA) Rema-Kalenga Wildlife Sanctuary in Bangladesh is within 5 km from the town and subproject components. There are 75 International Union for the Conservation of Nature (IUCN) Red List threatened species within 50 km area. Out of 75 IUCN red list (VU, CR and EN) species reported within 50km radius., 40 species are classified as vulnerable (VU), 10 species are classified as Critically Endangered (CR) and 25 species are Endangered (EN). Among CR and EN Birds are common which includes 23 species (VU-9, CR-6, EN-8), 19 reptile (VU-8, CR- 3, EN-8), 25 mammals (VU-15, CR- 1, EN-09).	No protected area or KBA is within the 10 km area from project site. 2nos. of protected area and 4nos. of key biodiversity area within the buffer of 10 to 50km radius of the subproject components. 71 International Union for the Conservation of Nature (IUCN) Red List threatened species are within 50 km area from the project site Out of 71 IUCN Red List (Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species are reported within 50km radius. Out of these 35 IUCN Red listed species, 37 species are classified as Vulnerable, 11 species are classified as Critically Endangered (CR) and 23 species are Endangered (EN). Majorly Birds are common species which includes 20 species (VU-8,CR-6, EN-6), 15 Reptiles (VU-6, CR- 3, EN-6), 25 Mammals (VU-15 CR- 1, EN-09).	No protected area or KBA is within the 10 km area from project site. 2nos. of protected area and 5nos. of key biodiversity area within the buffer of 10 to 50km radius of the subproject components. 72 International Union for the Conservation of Nature (IUCN) Red List threatened species are within 50 km area from the project site Out of 72 IUCN red list (VU, CR and EN) species reported within 50km radius. Out of these 72 IUCN red list species, 38 species are classified as Vulnerable, 10 species are classified as Critically Endangered (CR) and 24 species are Endangered (EN). Mammals are common species which includes 25 species (VU-15, CR-1, EN-09), 17 reptile (VU-07,CR- 03, EN-06), 20 birds (VU-08, CR- 05, EN-07)). Biodiversity Assessment Report (IBAT Analysis).																																																
	Figure 56 to figure 58 presents project town and surrounding 10 km area, showing Key biodiversity areas and Protected areas, Appendix 13 provides detailed IBAT checklist.																																																		
Economic development	Land use. <table><tr><th rowspan="2">S. No</th><th rowspan="2">Land Use Category</th><th colspan="3">Percentage</th></tr><tr><th>Khowai</th><th>Mohanpur</th><th>Ranirbazar</th></tr><tr><td>1</td><td>Residential</td><td>35</td><td>64</td><td>40</td></tr><tr><td>2</td><td>Commercial</td><td>1</td><td>0.98</td><td>10</td></tr><tr><td>3</td><td>Industrial</td><td>0</td><td>21</td><td>22.32</td></tr><tr><td>4</td><td>Public and Semi-Public</td><td>3</td><td>0.04</td><td>0.21</td></tr><tr><td>5</td><td>Mixed Use</td><td>1</td><td>0.02</td><td>1.21</td></tr><tr><td>6</td><td>Recreational</td><td>5</td><td>0.14</td><td>0.8</td></tr><tr><td>7</td><td>Transportation and Communication</td><td>18</td><td>0.001</td><td>0.06</td></tr><tr><td>8</td><td>Primary Activity</td><td>10</td><td>5</td><td>12</td></tr></table>			S. No	Land Use Category	Percentage			Khowai	Mohanpur	Ranirbazar	1	Residential	35	64	40	2	Commercial	1	0.98	10	3	Industrial	0	21	22.32	4	Public and Semi-Public	3	0.04	0.21	5	Mixed Use	1	0.02	1.21	6	Recreational	5	0.14	0.8	7	Transportation and Communication	18	0.001	0.06	8	Primary Activity	10	5	12
S. No	Land Use Category	Percentage																																																	
		Khowai	Mohanpur	Ranirbazar																																															
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8	Primary Activity	10	5	12																																															

Baseline Characteristic	Khowai		Mohanpur		Ranirbazar	
	9	Protective and Undevelopable Zone	21	10	13	
	10	Others	6	5	0.4	
		Total	100	100	100	
	Source: GIS base Master plans of towns					
Industries. Industrial development project towns is very limited. Table 12-14 lists, industries near project towns). Town Map showing land use pattern are presented in Figure 59 - 61						
Demographic parameters	Parameter	Khowai	Mohanpur	Ranirbazar		
	House holds	4681	-	3305		
	Population	18526	16722	13104		
	Male	9256	8484	6719		
	Female	9229	8238	6385		
	Children under the age of 0-6	1500	1922	1265		
	No of Wards	15	15	13		
	Schedule Caste (% of total Population)	11 %	30.8%	18.87%		
	Schedule Tribe (% of total Population)	6.43 %	16.8%	0.24%		
	Hinduism (% of total Population)	98.09%	96.41%	98.69%		
	Islam (% of total Population)	1.19%	0.47%	1.16%		
	Others (Buddhism, Christianity, Sikhism and Jainism) (% of total Population)	Less than 1 %	Christianity (2.88%), Sikh (0.07%), Buddhist (0.03%), Jain (0.01%), Others (0.0), Not Stated (0.03%)	Less than 1 %		
	Sex ratio (female per 1000 males	993	1014	950		
	Total literacy rate	97.39%	93.61 %	92.64%		
	Male literacy rate	98.3	96.50 %	95.39%		
Female literacy rate	96.47	93.15 %.	89.74%			
History and tourism	Khowai. There is predominance of both the Kokborok and Bangla languages in Khowai. The main festivals of the town are Durga Puja, Kharchi, Garia Pooja, and Tring (Tripuri New Year). In Khowai the places of Interest are Baramura Eco Park, Chakmaghat Park at Teliamura, Banabithi		Mohanpur has a historical background. The ancient capital of the princely State ‘Swadhin Tripura’ was at Rangamati (Udaipur, South Tripura) by the bank of the river Gomti and in 1760 A.D., it was shifted by the Maharaja Krishna Manikya to the site of old Agartala by the bank of river Haora and was named ‘Haveli’. The Capital city of Agartala		Major tourism places near Ranirbazar are Mekhlipara (lush green forests and hills and Matarbari temple), Ranirbazar park and Haveli Museum.	

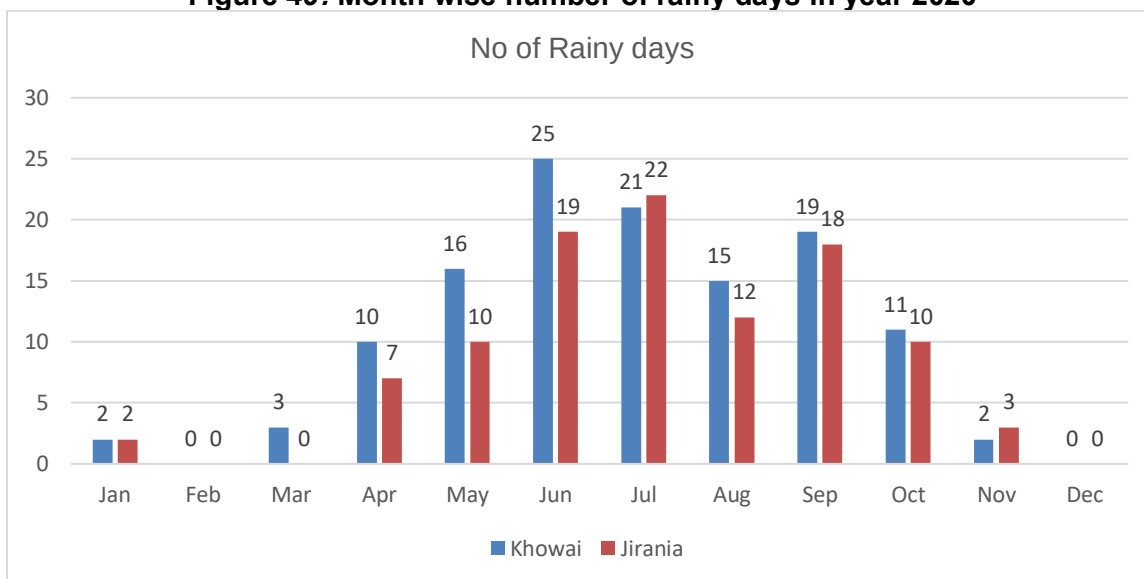
Baseline Characteristic	Khowai	Mohanpur	Ranirbazar
	Ecopark at Padmabil and Jangal Mahal. ¹²	was founded in 1838 AD by Maharaja Krishna Kishore Manikya (1830-49 A.D.). In Mohanpur town every year one significant fair is organized, namely Brahmakunda fair which is mainly religious in nature. Many pilgrims take part in the fair. This traditional Brahmakunda fair generally held during the auspicious occasion of "Ashokastami". The festival has a great significance as people from different parts of the state arrive here to attend the fair to offer "obeisance" to their ancestors.	

Figure 48: Month wise rainfall data in Year 2020



Source: https://www.agri.tripura.gov.in/sites/default/files/Station_wise.pdf

¹² Official website of Khowai district

Figure 49: Month wise number of rainy days in year 2020

Source: https://www.agri.tripura.gov.in/sites/default/files/Station_wise.pdf

Figure 50: Watershed Map of Tripura watershed showing important rivers and Bangladesh International Boarder

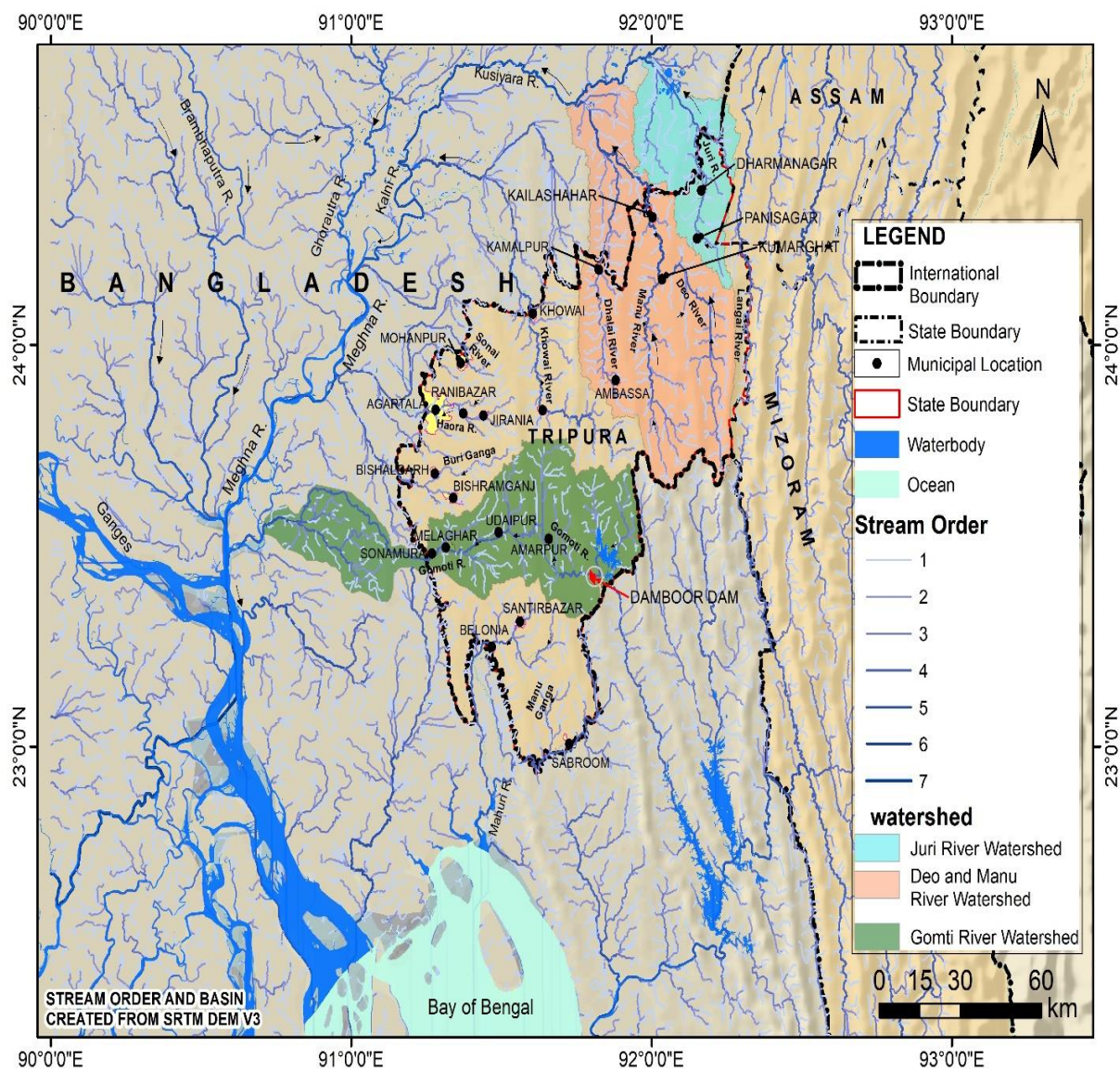


Figure 51: Waterbody Map of Khowai MC

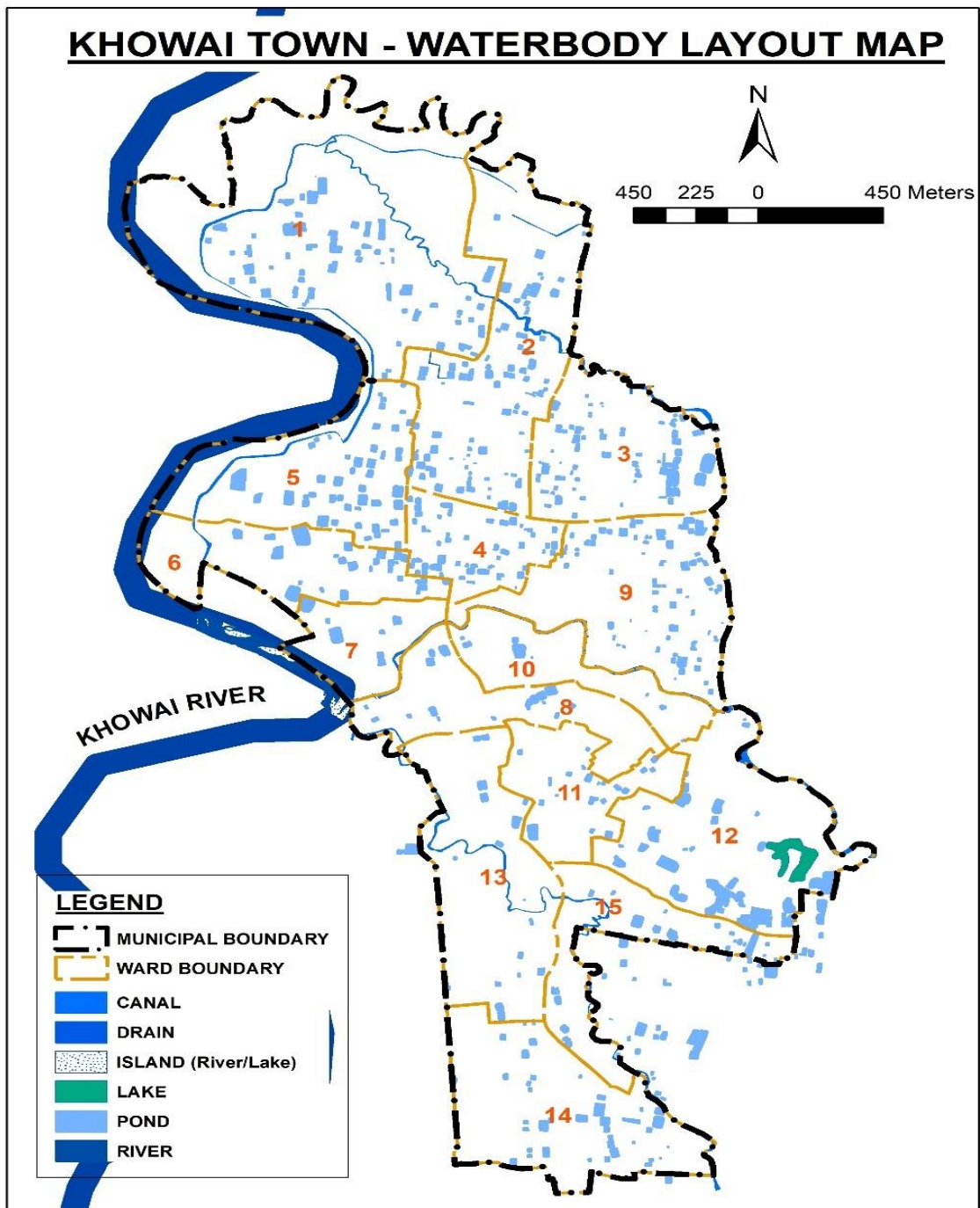


Figure 52: Waterbody Map of Mohanpur MC

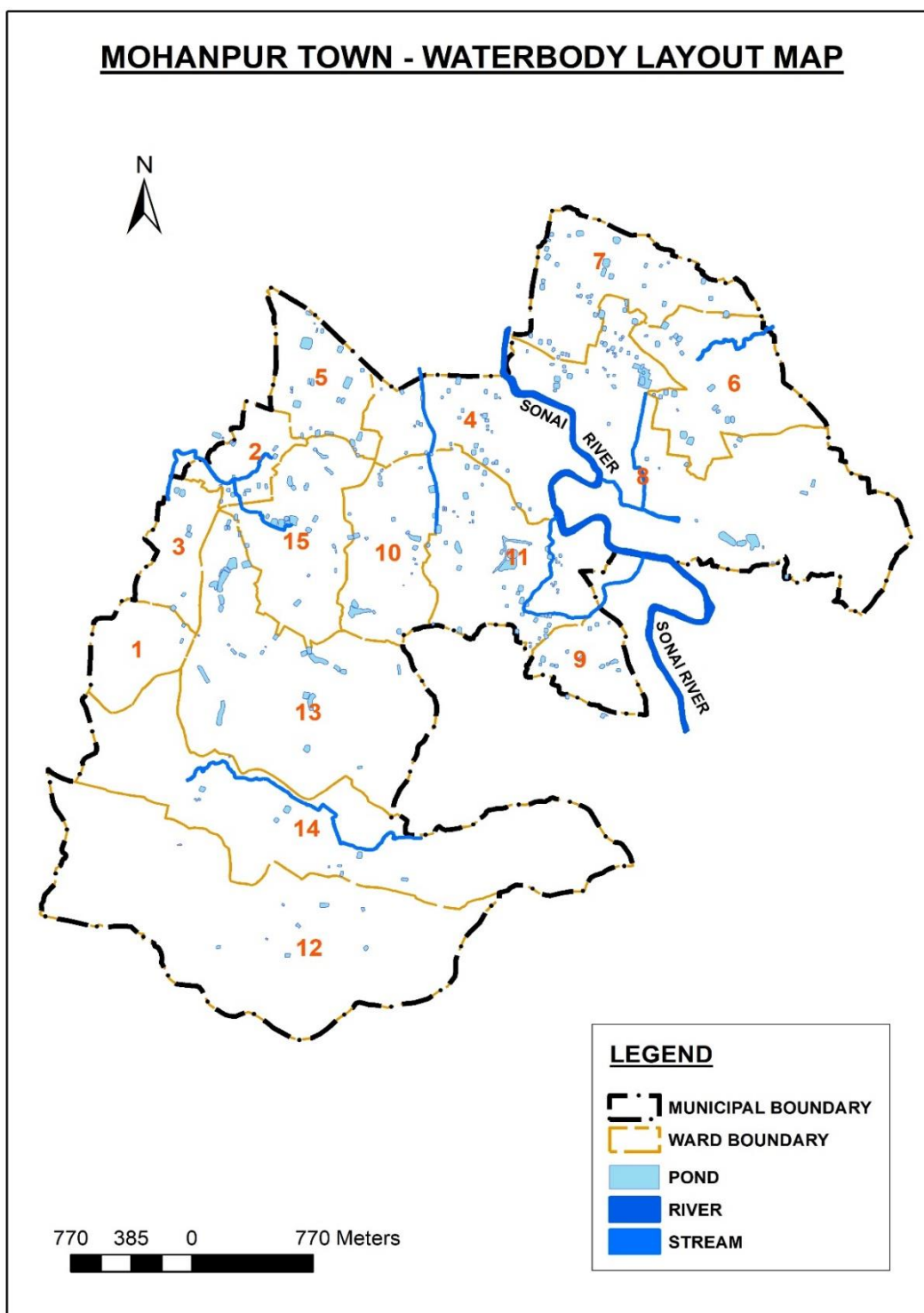


Figure 53: Waterbody Map of Ranirbazar MC

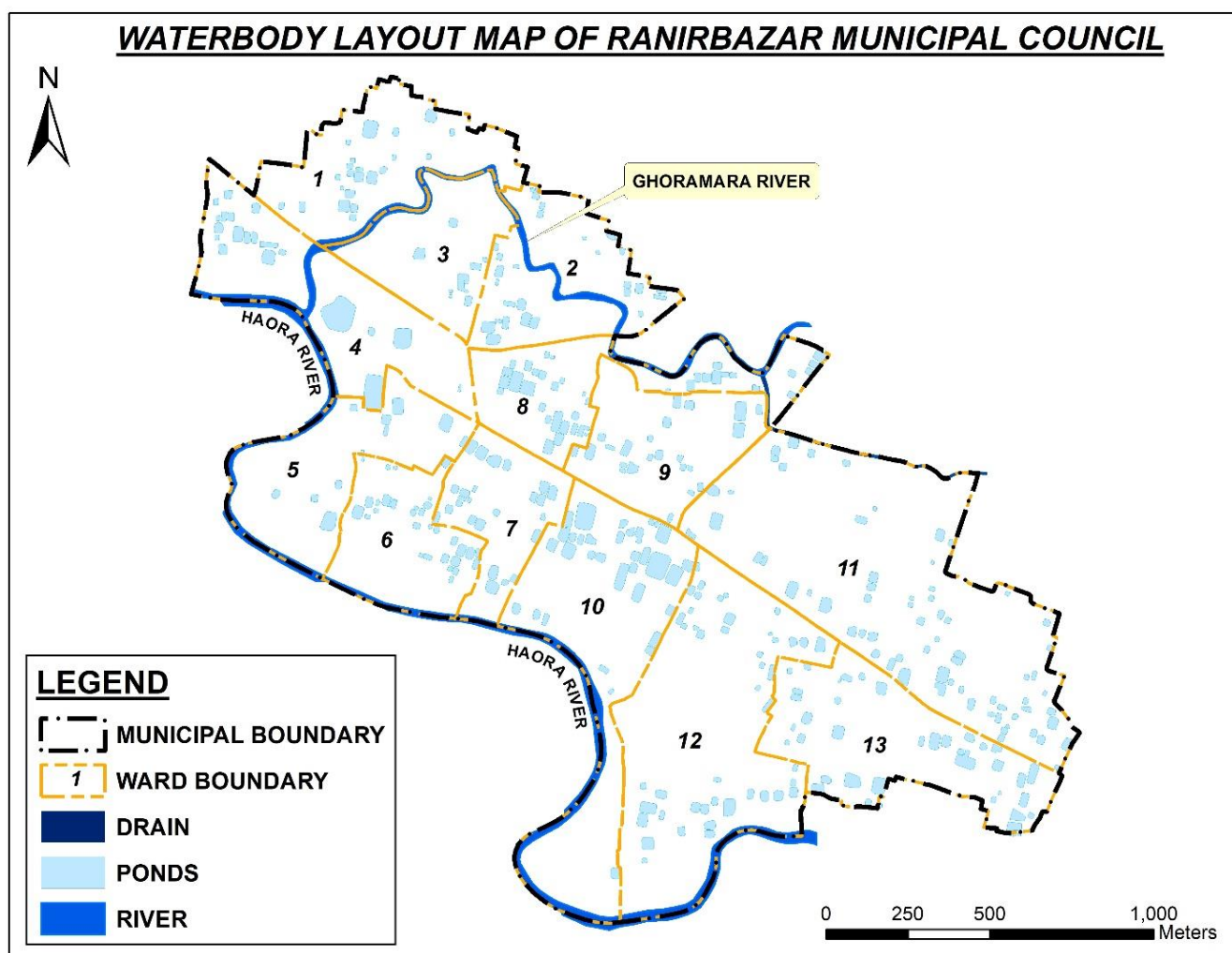


Table 7: Khowai river water quality and treated water quality from Water Treatment Plant

Sr No.	Date	Parameters of Raw Water			Parameters of Treated Water					
		Physical Appearance	Turbidity (NTU)	pH	Physical Appearance	Turbidity (NTU)	pH	Residual Chlorine as Cl in mg/l (ppm)	Total Iron as Fe in mg/l	Bacteriological Test
1	26.12.2022	Hazy	41.2	7.88	Clear	2.89	7.6	0.5	0.01	<2MPN
2	27.12.2022	Hazy	39.05	7.8	Clear	2.8	7.5	0.5	0.012	<2MPN
3	28.12.2022	Hazy	40.57	7.92	Clear	2.84	7.7	0.5	0.011	<2MPN
4	29.12.2022	Hazy	38.4	7.5	Clear	2.8	7.58	0.5	0.013	<2MPN
5	30.12.2022	Hazy	39	8.05	Clear	2.81	7.6	0.5	0.01	<2MPN
6	31.12.2022	Hazy	40.21	7.8	Clear	2.79	7.56	0.5	0.012	<2MPN
7	01.01.2023	Hazy	38.4	7.75	Clear	2.8	7.72	0.5	0.014	<2MPN
8	02.01.2023	Hazy	39.05	7.9	Clear	2.81	7.68	0.5	0.013	<2MPN
9	03.01.2023	Hazy	40.27	7.95	Clear	2.78	7.68	0.5	0.012	<2MPN
10	04.01.2023	Hazy	40.53	8.1	Clear	2.76	7.6	0.5	0.016	<2MPN
Average			39.668	7.5-8.1		2.808	7.5-7.72	0.5	0.0123	
National Standards for Drinking Water^a						1(5)	6.5-8.5	0.2(1.0)	0.3(0.3)	
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011^b								5.0		

Source- DWS, Water Treatment Plant laboratory

^a Bureau of India Standard 10500: 2012.

^b Health-based guideline values.

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

Table 8: Analytical results of water samples collected from Haora River, Ranirbazar

Sl.No.	Parameters	Average value	CPCB Standard for Source**	Indian Standard for Drinking Water*
1.	pH	7.45	6-9	6.5-8.5
2.	Turbidity (NTU)	61.50	-	1
3.	Total dissolved solids (mg/L)	95.33	-	500
4.	Dissolved oxygen (mg/L)	5.96	>4	-
5.	Bio-Chemical Oxygen Demand (mg/L)	2.25	<3	-
6.	Total Hardness (mg/L)	33.01	-	200
7.	Lead (mg/L)	0.018	0.1	0.01

Source: Annual Report 2020-2021, Tripura State Pollution Control Board, *IS 10500:2012 **IS 2296:1992

Table 9: Chemical Analysis of Treated Water from Haora – Ranirbazar

Sl.no	Date	pH	Physical Appearance	Turbidity (NTU)	Total Alkalinity(mg/l)	Total Hardness (mg/l)	Chloride(mg/l)	Iron (mg/l)	Residual Chlorine(mg/l)
1	03-01-2023	7	Clear	0.11	54	76	16	0.027	0.2
2	04-01-2023	7	Clear	0.1	52	78	15	0.027	0.2
3	05-01-2023	7	Clear	0.13	54	76	14	0.025	0.2
4	06-01-2023	7	Clear	0.1	56	78	17	0.025	0.2
5	07-01-2023	7	Clear	0.1	58	78	16	0.027	0.2
6	09-01-2023	7	Clear	0.11	56	74	15	0.027	0.2
7	10-01-2023	7	Clear	0.14	58	78	17	0.029	0.2
8	11-01-2023	7	Clear	0.11	56	76	16	0.027	0.2
9	12-01-2023	7	Clear	0.1	58	72	15	0.028	0.2
10	13-01-2023	7	Clear	0.09	56	76	17	0.03	0.2
Average		7		0.109	55.8	76.2	15.8	0.0272	0.2
National Standards for Drinking Water^a		6.5-8.5		1(5)	200 (600)	200 (600)	250 (1000)	0.3 (0.3)	0.2 (1.0)
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011^b							200-300		5.0

Source: DWS of respective towns; Source- DWS, Water Treatment Plant laboratory; ^a Bureau of India Standard 10500: 2012.; ^b Health-based guideline values.;^c Figures in parenthesis are maximum limits allowed in the absence of alternate source.

Table 10: Groundwater quality results of project town

DWT at	Physical Appearance	Turbidity (NTU)	pH	Total Alkalinity (mg/l)	Total Hardness as CaCO ₃ (mg/l)	Calcium as Ca. (mg/l)	Magnesium as Mg. (mg/l)	TDS (mg/l)	Chloride as Cl (mg/l)	Total Iron (mg/l)	Arsenic(mg/l)	Fluoride (mg/l)	Residual Chlorine (mg/l)	Nitrate (NO ₃) (mg/l)	Total coliform	Fecal Coliform
Khowai- 2022 Jan																
Paharmura	Clear	1.42	7	-	-	-	-	-	-	1.208	-	-	-	-	-	-
Sipaibour	Clear	0.84	7	-	-	-	-	-	-	0.728	-	-	-	-	-	-
Samatal Padmabil	Clear	1.2	6.8	-	-	-	-	-	-	0.618	-	-	-	-	-	-
Mohanpur- 2020 Dec																
Mohanpur	-	BDL	6.52	-	-	20	2.43	210.8	42.49	0.38	-	0.17	-	2.5	-	-
Indian drinking water standards Acceptable limit and (Permissible limit)	Clear	5	6.5-8.5	200 (600)	200 (600)	75 (200)	30 (100)	500 (2000)	250 (1000)	<0.3		1 (1.5)	0.2 (1.0)		0	0
WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b												1.5	5		0	0

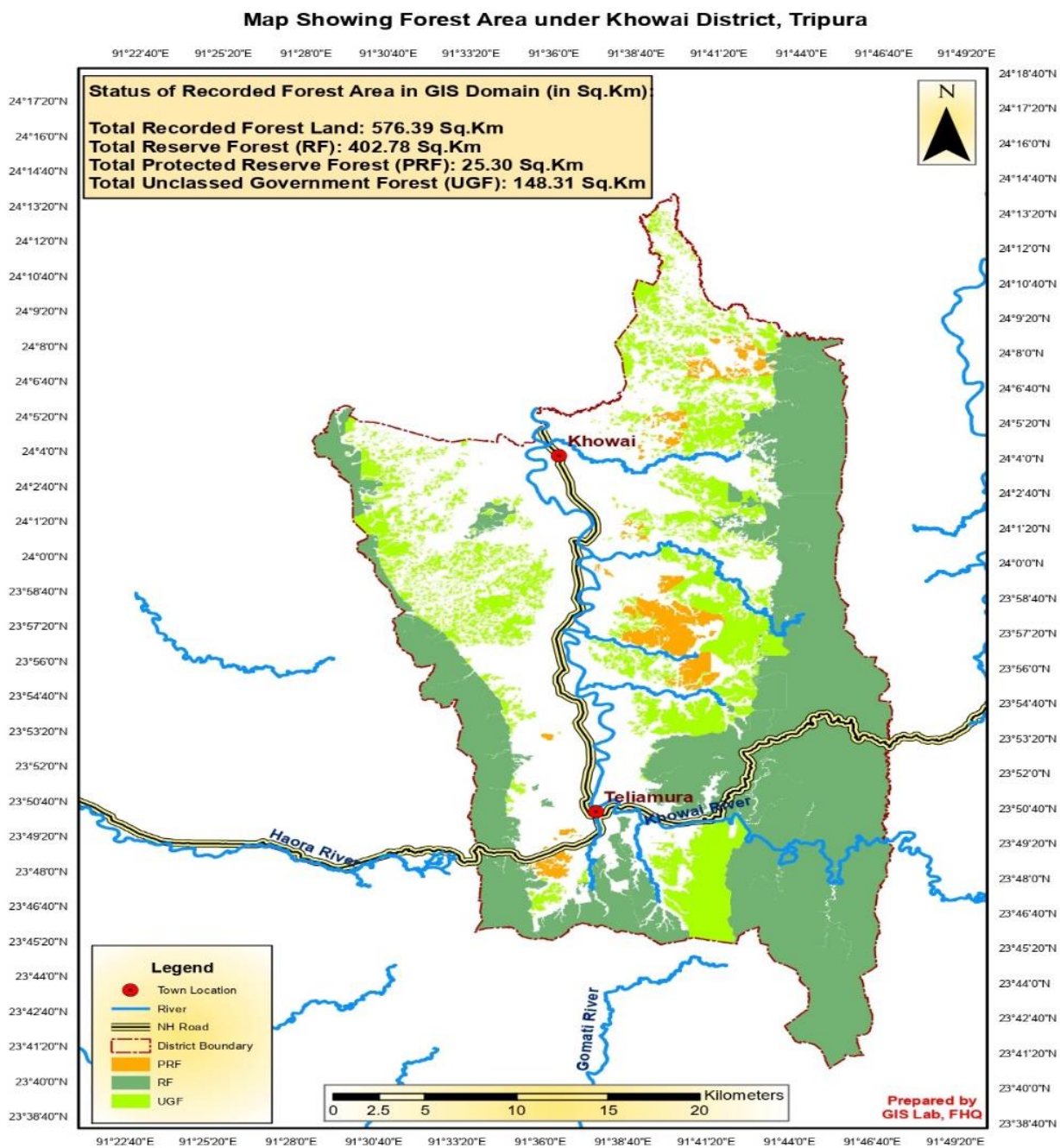
Source: DWS respective towns

Table 11: Noise level data of Project towns during December 2020

Type of area	Location	Day time Measured value in dBA			Day Time Standards		Night time Measured value in dBA			Nighttime Standards		Activities around monitoring locations
		Lmin	Lmax	Leq	Indian	WHO Guidelines	Lmin	Lmax	Leq	Indian.	WHO Guidelines	
Khowai												
Commercial	Khowai Motor Stand	59.28	61.64	60.67	65	70	36.9	39.16	38.24	55	55	-
	Khowai Market	59.6	61.54	60.73	65	70	36.72	38.48	37.67	55	55	-
	Kalyanpur Market	59.28	61.0	60.24	65	70	36.5	38.3	37.47	55	55	-
Residential	Durganagar	50.30	52.28	51.5	55	55	36.5	38.3	37.42	45	45	-
	Khowai Office lane area	51.02	52.62	51.97	55	55	36.76	38.78	37.85	45	45	-
Silent	Khowai District Hospital	48.74	50.82	49.95	50	55	36.66	37.92	37.41	40	40	-
Mohanpur												
Commercial	Mohanpur Bazar	60.28	68.92	65.59*	65	70	46.24	49.16	48.26	55	55	Vehicular movement, public noise.
	Manipuri Chowmuha ni	61.56	66.4	-	65	70	38.82	40.72	40.0	55	55	
Residential	College Road	51.78	58.94	57.20*	55	55	45.2	47.84	47.05*	45	45	
Silent	Mohanpur Hospital	52.76	57.06	55.98*	50	55	38.7	40.88	40	40	40	Ambulance and Public movement public noise.
Ranirbazar												
Commercial	Jirania Bazar	56.92	60.66	58.88	65	70	51.28	52.62	52.22	55	70	-
Residential	Kalimura, Subash Nagar	50.78	53.92	52.74	55	70	45.4	47.58	47.78*	45	55	-
Industrial	Saha & Saha Industries (SSI Brick)	50.48	53.74	53.43	75	55	38.56	40.8	39.9	70	45	-
Silent	In front of Jirania Hospital	48.96	53.98	51.81*	50	55	45.84	49.2	47.7*	40	40	-

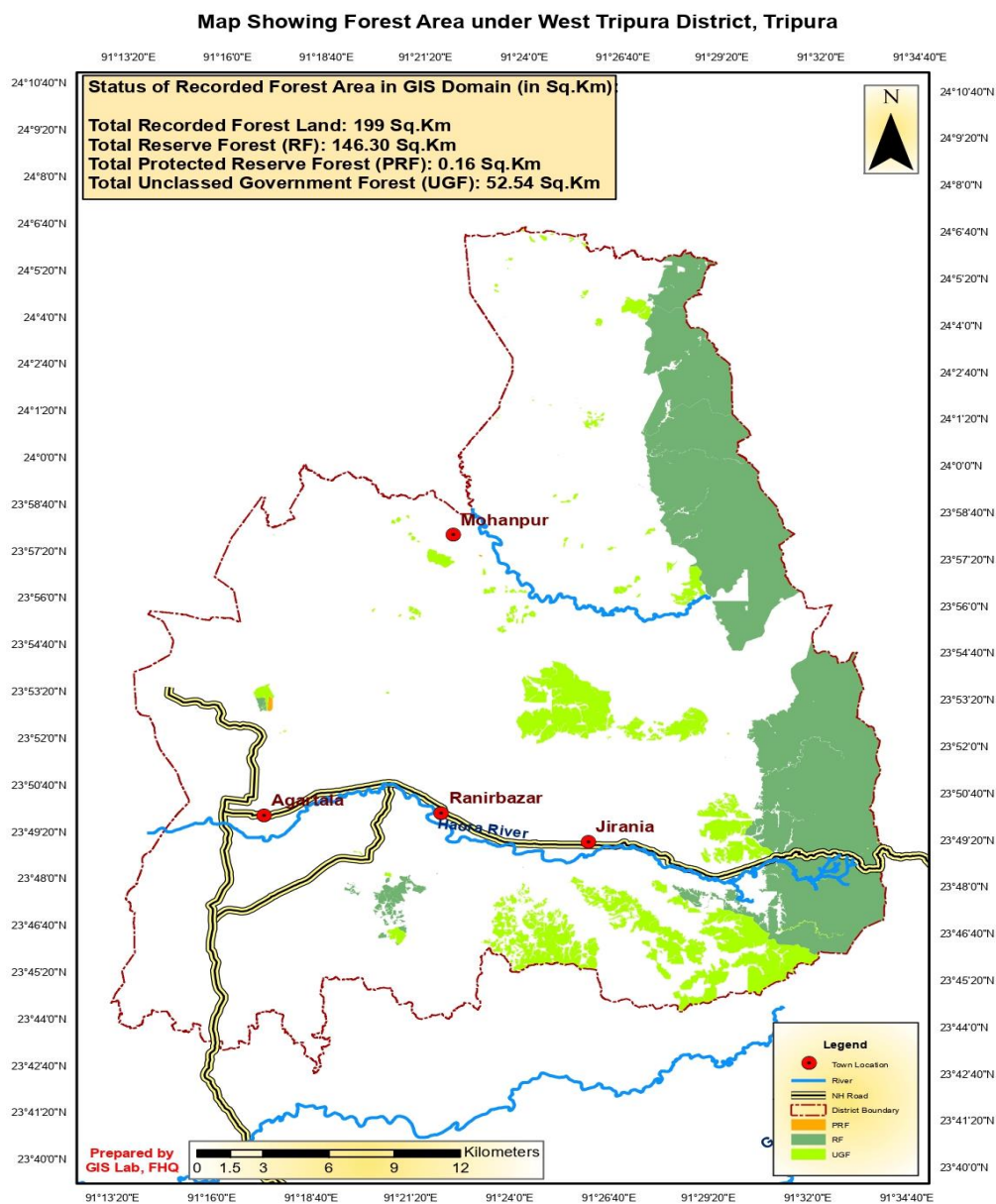
Source: TSPCB Report

Figure 54: Forest map of Khowai district



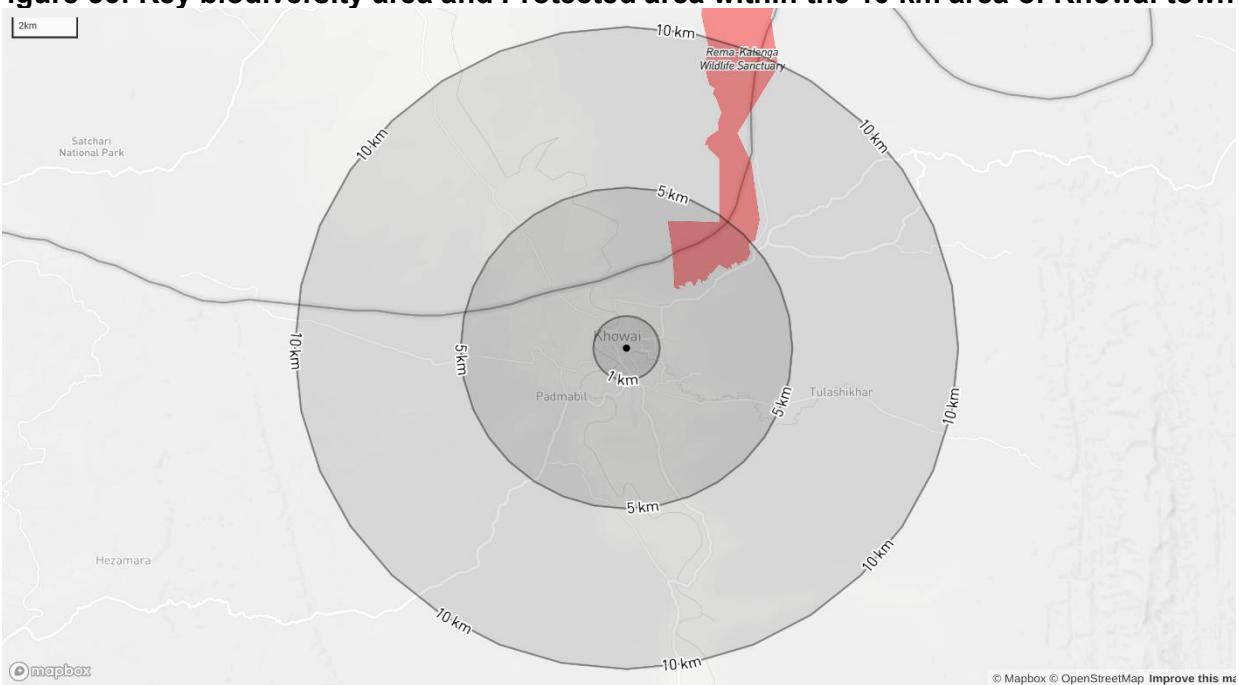
(Source: Forest Dept; Govt. of Tripura)

Figure 55: Forest map of West Tripura district (Ranirbazar and Mohanpur towns)



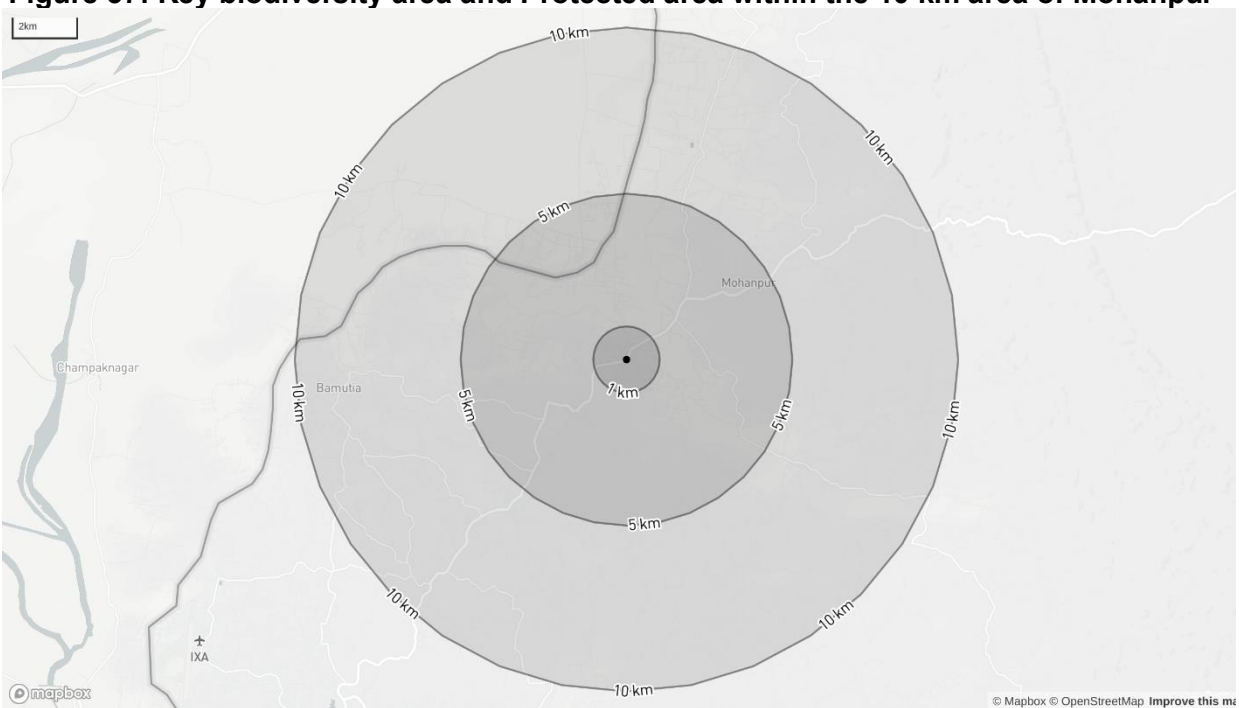
(Source: Forest Dept; Govt. of Tripura)

Figure 56: Key biodiversity area and Protected area within the 10 km area of Khowai town



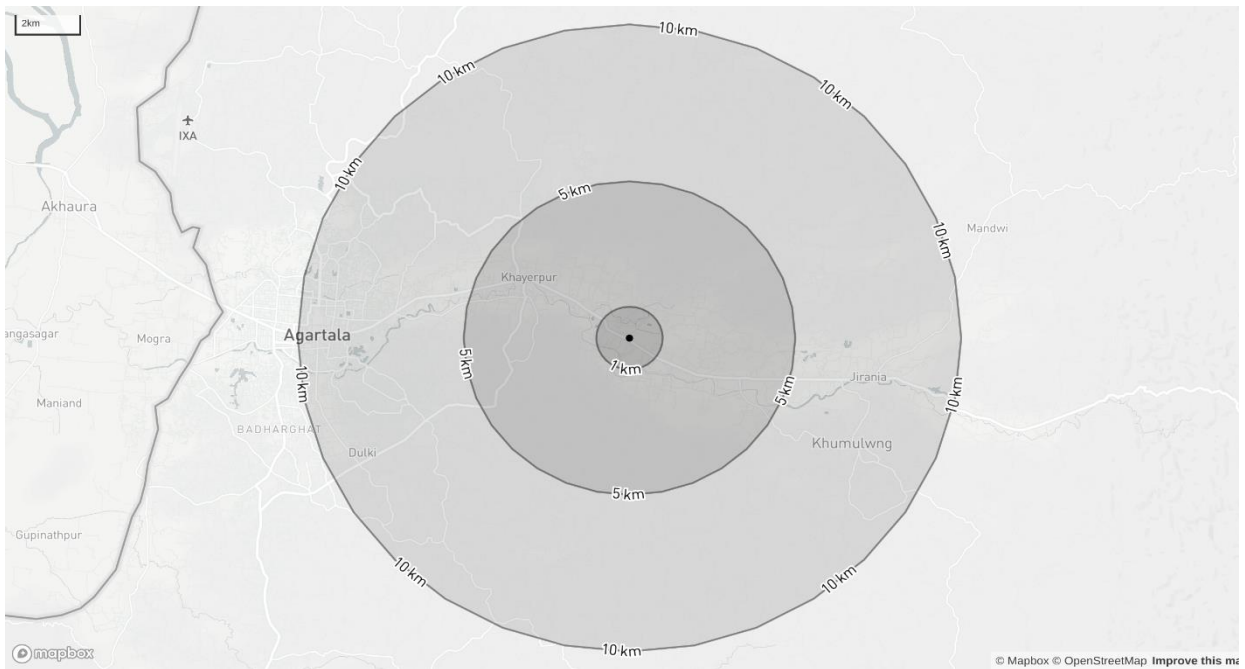
(Source IBAT)

Figure 57: Key biodiversity area and Protected area within the 10 km area of Mohanpur



(Source IBAT)

Figure 58: Key biodiversity area and Protected area within the 10 km area of Ranirbajar



(Source IBAT)

Figure 59: Land use map of Khowai town

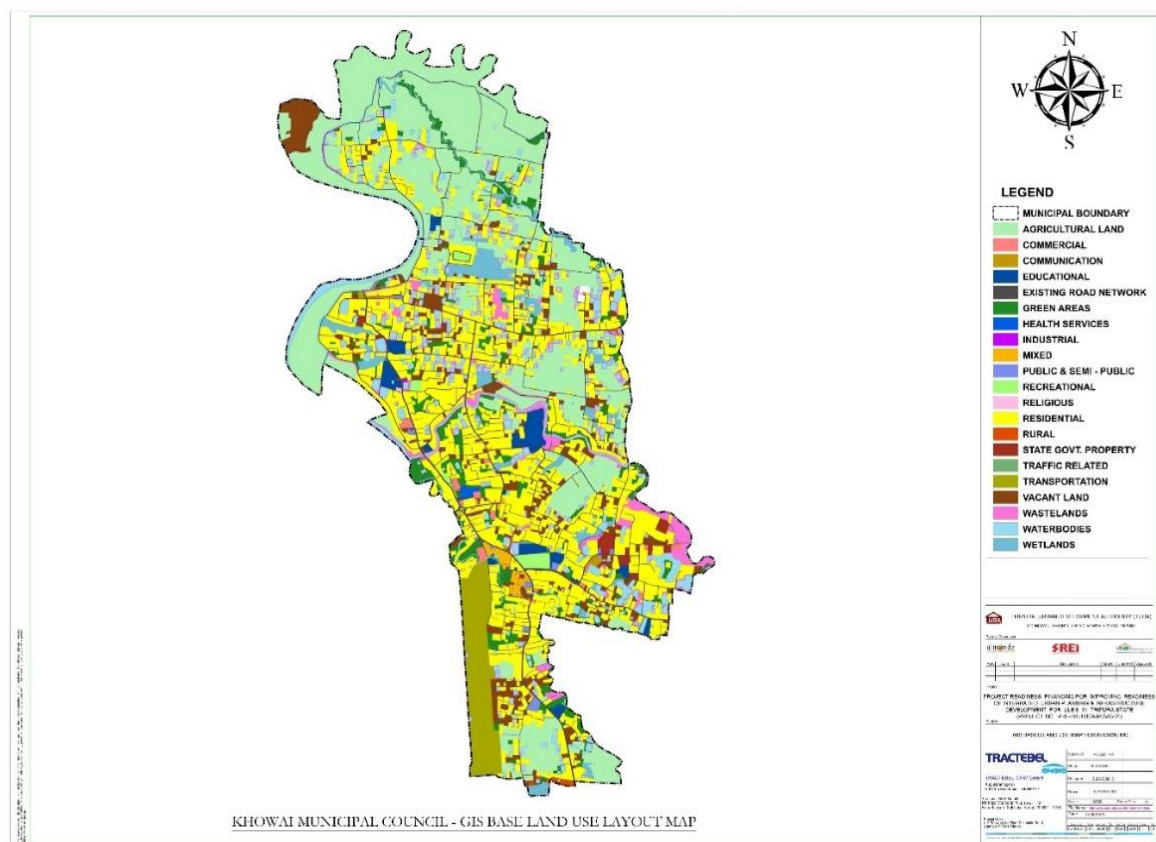


Figure 60: Land use map of Mohanpur town

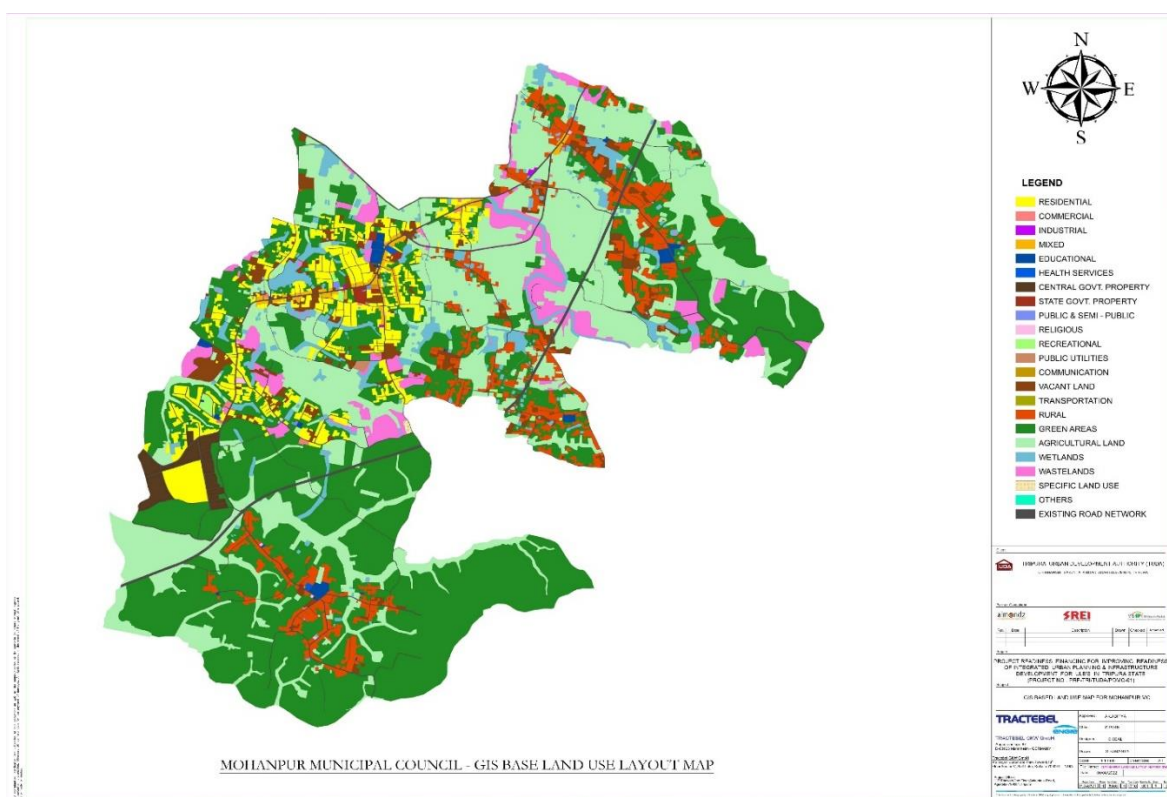


Figure 61: Land use map of Ranirbazar town

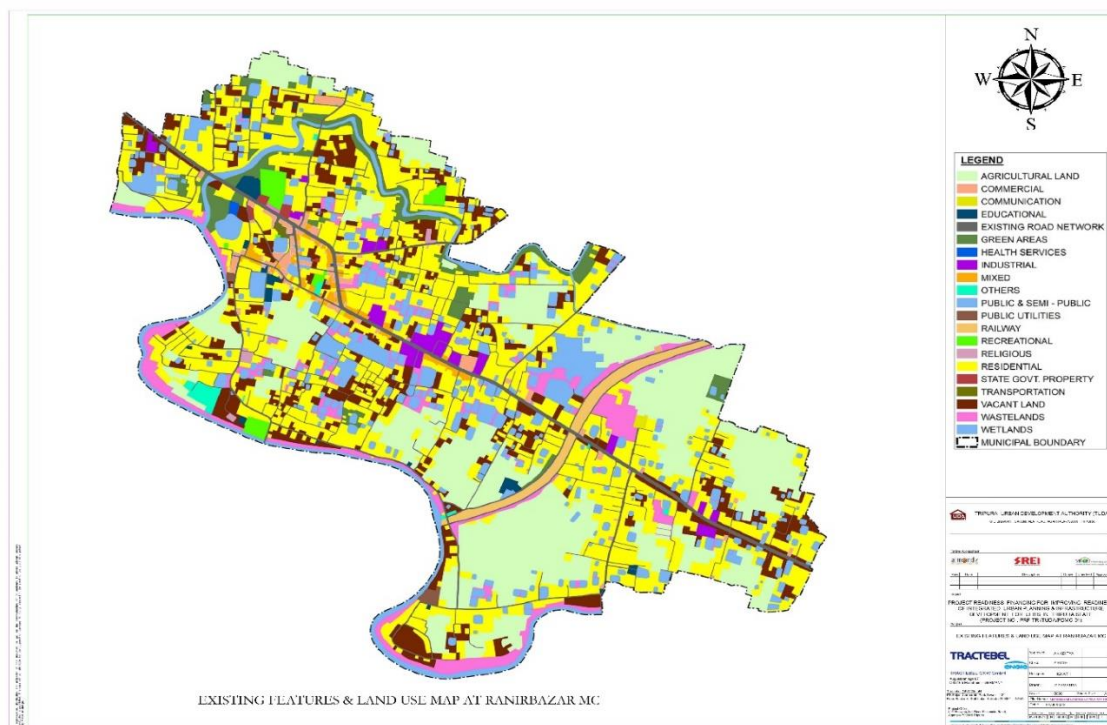


Table 12: List of industries in and around Khowai

Sl. No.	Industrial Estate	Types of Industry
1.	Tea Estate	Functioning -02 i) Kalyanpur Tea Estate, P.O. Baganabazar, Tripura ii) Khowai Tea Estate Post, Khowai, Tripura
2.	Bamboo Cluster Incense Stick	Rolled Agarbatti /Bamboo stick
3.	Bamboo Cluster	Handicraft Items
4.	Cold Storage (Potato, Fruits & Vegetable)	Cold Storage of capacity 1000 MT
5.	Rubber Plantation	Rubber
6.	Natural Gas based thermal power plant	Bara Mura in Khowai district

(Source: ULB)

Table 13: List of Industries in and around Mohanpur

Sl. No.	Industrial Estate	Types of Industry
1.	Name of the Tea Estate, and Address (No factory)	i. Adarni Tea Estate, Lembucherra, west Tripura ii. Binodini Tea Estate, Chechoria, West Tripura iii. Brahmakunda T.E, Sundartilla, Agartala iv. Durgabari T.E, Tebaria, Agartala. v. Fatichera T.E, Fatichera, West Tripura vi. Gopal Nagar T.E, Taranagar, West Tripura vii. Harendranagar T.E, Harendranagar, Agartala viii. Haridaspur T.E ix. Kalacharra T.E, Kalacharra, West Tripura x. Meghibundh, Sidhai Mohanpur
2.	Name of the Tea Factory	i. Harendragar Tea Estate ii. Central Tea Processing iii. Fatikcherra Tea Estate iv. Durgabari Tea Estate v. Narendrapur Cha Bagan vi. Brahmakunda Tea Processing Factor
	Bamboo Cluster Incense Stick	Rolled Agarbatti
	Bamboo Cluster	Bamboo Plantation (Mohanpur) Bamboo Plantation (Hezamara)
	Bamboo Cluster	Furniture/ Handi craft (Bamutia) Furniture (Katlamara- Simna)

Source: MMC and Economic Review of Tripura 2019

Table 14: List of Industries in Ranirbazar

Sl. No.	Industrial Estate	Types of Industry
1.	Bamboo Cluster	Handicraft Items

Source: RMC and Economic Review of Tripura 2019.

C. Subproject Site Environmental Features

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

Table 15: Site Environmental Features – Khowai

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1	OHSR-1 at Office Tilla near existing WTP, Ward No-11 (Lat: 24.066702° Long: 91.616008°)	The proposed OHSR land (400 sq m required for reservoir) is located at office tilla, which is near the existing WTP. No trees are available on the land which requires to fell for the construction activity. Vegetation needs to be cleared Commercial area noted outside the campus. The nearest settlement is approximately 40 m from the proposed site. High tension line is passing near the proposed land. But no impact is expected since sufficient land is available for construction of OHSR. One pond is also noted beside the proposed land which is 10m away the proposed site. There is a bitumen road near the proposed site. Access roads are available within the campus. For the construction of OHT will need approx. 400 m² of land. No sensitive receptor exists closer/within the proposed site. Proposed OHSR site is located southern part of the town. Soil type of this area is red loam and sandy loam soils. Common floral species near the proposed site are <i>Albizzia procera</i>, <i>Annona squamosa</i>, <i>Artocarpus chaplasha</i>.	 Latitude: 24.067011 Longitude: 91.615971 Elevation: 57.41512 m Accuracy: 9.2 m Time: 08-08-2022 12:13 Note: Khowai ex wtp 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
2.	Deep Tube Well + IRP in Lal Chara Ghosh Para (Durga Nagar) (Ward no. -9) (Lat: 24.076967° Long: 91.609968°)	The proposed Deep Tube Well with IRP will be installed on Jibanananda Vidyamandir JB School ground. At a distance of 50 m from Anganwadi School. The land parcel is flat and open, used as a school playground. Measures should be taken during the construction because DTW 1 and IRP location near the sensitive receptor and habitation exists closer to the proposed site. There is a small pond 50 m away from proposed site. The proposed site is located eastern side of the town. Few numbers of rubber trees are observed behind the proposed site. Proposed DTW will be installed in flat terrain. Natural drainage is towards small pond. Soil type of this area is sandy loam soils. No tree felling is required for construction activity. Utility shifting is not required for the construction activity. Access is available to site. Land use around the site is residential and agricultural. There is no protected area nearby the site.	 Latitude: 24.07659 Longitude: 91.610534 Elevation: 29.27441 m Accuracy: 6.1 m Time: 27-10-2022 11:47 Note: Proposed DTW, Lal Chara, Ghosh Para, Durga N Powered by NoteCam
3.	Deep Tube Well + IRP in Lal Chara. (Ward no. -10) (Lat: 24.074051° Long: 91.607823°)	Deep Tube Well with IRP will be installed beside Dasaratha Deb Memorial College. One no. of small tree is present near the site. The land is vacant with full of vegetation/ scrub. Some part of land is undulating. Access needs to be developed in available space. Cleaning of the scrub is required. There is no waterbody near the proposed site. Soil type of proposed site is Reddish yellow brown sandy soils. The nearby settlement is approximately 50 m from the site. There is no nearby forest area and no wildlife has been reported in and around the site. Land use around the site is mostly residential with patches of agricultural land nearby.	 Latitude: 24.07444 Longitude: 91.608038 Elevation: 38.6748 m Accuracy: 12.9 m Time: 27-10-2022 12:19 Note: dtw2 lal chara ward 10 Powered by NoteCam

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
			
4.	Water Distribution Network near Dasaratha Deb Memorial College, Lal Chara.	Water supply pipelines will be laid within the RoW of PWD roads. Land use of the area is mainly commercial, with presence of houses adjacent to the shops. Series of shops are present beside the road. There are no trees along the road. Few shops are closer to the road, access may be affected during the construction period.	 Latitude: 24.074091 Longitude: 91.606247 Elevation: 44.14512 m Accuracy: 9.7 m Time: 27-10-2022 12:47 Note: network College k pas Revised by: MRCam

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
5	Water Distribution Network near Lal Chara, Ward 10.	Pipes will be laid within the road and within the carriageway in narrow roads. There are no trees along the road. One house under construction is within 1 meter of the road. Land use of this area is residential. Measures should be taken as during the construction period to protect this structure from being damaged.	 Latitude: 24.075391 Longitude: 91.60814 Elevation: 40.01±12 m Accuracy: 13.4 m Time: 27-10-2022 12:17 Note: network
6	Water Distribution Network near Lal Chara, Ghosh Para (Durga Nagar)	Pipes will be laid within the road and within the carriageway in narrow roads, mostly passing near agricultural lands. There are no trees along the road. Land use of this area is majorly agricultural and residential. Distribution lines passing through near agricultural fields requires NOC from concerned authorities.	 Latitude: 24.076205 Longitude: 91.610063 Elevation: 28.27±6 m Accuracy: 7.0 m Time: 27-10-2022 11:51 Note: network

Table 16: Site Environmental Features – Mohanpur

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1	OHSR-1 With 2 numbers of IRP and a DTW-3 at Old MMC, Ward No-15 (Lat: 23.969167° Long: 91.367986°)	The proposed OHSR capacity of 850 KL with 2 nos. of IRP and a DTW land is located at old MMC, which is open flat land. Approximately 750m² land will require to construct IRP and DTW. 4 numbers of Sal (<i>Shorea robusta</i>) and Teak (<i>Tectona grandis</i>) trees are available on the land which may be impacted during construction. Weedy shrubs on site needs to be removed before start of contraction. The proposed site is surrounded by residential area. One school is located nearby the site. The nearest settlement is approximately 20 m from the proposed site. Access is available to site. There is no waterbody near the proposed OHSR site. Proposed OHSR is situated northeastern part of the town. Proposed project site is in flat terrain. There is no drainage line near the proposed site. The texture of soil is mostly clayey loam. No protected area, forest nearby the proposed site. Land use around the site is residential	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
2.	OHSR-2 with IRP at Tulabagan Office Tilla 10 no. Para, Ward No-12 (Lat: 23.944254° Long: 91.367511°)	The proposed OHSR (capacity 750 KL) and IRP site located at Tulabagan office Tilla. Approximately 600m² land will require to construct IRP and OHSR. The proposed OHSR land is located southern part of the town. Site is vacant, few numbers of abundant residential structure is located about 10-15 m from the proposed site. The site is a lowland area and swampy ground-. The proposed OHSR site is surrounded by few numbers of Gamar (<i>Gmelina arborea</i>) and Koroi (<i>Albizia procera</i>) tree. Nearest waterbody is located 125m away from the proposed project site. No tree felling is required for construction activity. Utility shifting is not required for the construction activity. The nearby settlement from the proposed land is approximately 10 m. Access to site is available but widening is required Red loam and sandy loam soils is found at the proposed OHSR site. Land use around the site is residential.	
3	Deep Tube Well-1 near to Power Station (Ward No. 10) (Lat: 23.962202° Long: 91.369606°)	DTW will be installed near to Power Station. The proposed 400 sqm DTW land is located western part of the town. Proposed site is an open area surrounded by greenery and few numbers of rubber trees. Cleaning of vegetation may be required. Access road needs to be developed; space available. There is no major waterbody near the proposed site. Soil type of proposed site is Reddish yellow brown sandy soils. Land is undulated, and power station is 20m away from the proposed project site. There is no notable or significant archeological places or protected monuments or areas in and around project area. Access needs to be constructed to site	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
4.	Deep Tube Well-2 at Rabindra Pally (Ward no. 02) (Lat: 23.970079° Long: 91.364305°)	Deep Tube Well will be installed at Rabindra pally. The proposed site is surrounded by residential area. There is no tree available on the site and hence no tree felling is required. Proposed project site is located in flat terrain. The proposed DTW land is located western part of the town. Proposed site is surrounded by few numbers of Chamal (<i>Artocarpus chaplasi</i>) and Ba rak (<i>Bambusa balcooa</i>) tree. There is no major waterbody near the proposed site. Access road needs to be developed; space available. The land requirement is 500m² for the installation of deep tube. Soil type of proposed site is Reddish yellow brown sandy soils. One Temple is situated near the proposed DTW site, which is 10 meters away from the proposed site. One high tension line passing nearby the land. Those will be not affected. There is no nearby forest area and no wildlife has been reported in and around the site. Land use around the site is residential. Proper access needs to be constructed at tube well site	
5.	Deep Tube Well-4 at Bohemian Colony (Ward no. 13) (Lat: 23.958163° Long: 91.364292°)	Deep Tube Well will be installed at Bohemian Colony. The land is surrounded by a plantation which is not the part of the proposed site. Some tree of Betel nut (<i>Areca catechu</i>) and Teak (<i>Tectona grandis</i>) are near the proposed site. One number of Mango tree felling may be required for construction activity. Cleaning of vegetation will be required. Proposed project site is located in flat terrain. There is no water body near the project location. The proposed DTW land is located southwestern part of the town. The proposed project site is covered by <i>Colocasia esculenta</i>. Soil type of proposed site is Reddish brown sandy soils. There is no nearby forest area in and around the proposed project site. There is no notable or significant archeological places or protected monuments or areas in and around project area. Proper access needs to be constructed at tube well site	 Latitude: 23.958217 Longitude: 91.364341 Elevation: 27.4348 m Accuracy: 10.0 m Time: 14-10-2022 13:23 Note: DTW with IRP 04 Bohemian Colony Powered by Notepad

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
6.	Deep Tube Well-5 at Tulabagan Office Tilla 4no. Kalimandir (Ward no. 14) (Lat: 23.948927° Long: 91.363121°)	DTW will be installed at Tulabagan Office Tilla. Proposed site is an open area surrounded by residential area. One Anganwadi Centre is located near the proposed site which is approx. 15 meters away from the proposed site. Mitigation measure should be taken up during the construction phase. The proposed DTW land is located southwestern part of the town. There are few numbers of <i>Cocos nucifera</i> and Teak (<i>Tectona grandis</i>) are found behind the proposed location. There is no major water body near the proposed location. There is an access road near the proposed site but need to improved. Soil type of proposed site is Reddish brown sandy soils. One temple is present within 20 meters from the proposed site. Land use around the site is residential. Proper access needs to be constructed at tube well site	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
6	Water Distribution Network near Tulabagan Office Tilla 10.no Para (Ward-12)	Water supply pipelines will be laid within the RoW of PWD roads. Land use of the area is mainly commercial with presence of houses adjacent to the shops. Series of shops are present beside the road. Few shops are closer to the road, access may be hampered during the construction process.	 Latitude: 23.944862 Longitude: 91.367419 Elevation: 36.84±100 m Accuracy: 5.0 m Time: 29-10-2022 12:44 Note: Tulabagan Office Tilla Powered by NoteCam
7.	Water Distribution network near Oiran Chowmuhan (Ward-5)	Water supply pipelines will be laid within the RoW of PWD road. Land use of the area is mainly commercial. Market area with temporary vendors as well as permanent shops. Few shops are closer to the road, access may be hampered during the construction process. Temporary shifting is required for shops along the road.	 Latitude: 23.970544 Longitude: 91.371595 Elevation: 32.89±5 m Accuracy: 21.9 m Time: 29-10-2022 14:04 Note: Oiran Chowmuhan Powered by NoteCam

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
8.	Water Distribution network near Mohanpur Bazar (Wad no. 2)	Water supply pipelines will be laid within the RoW of PWD roads. Land use of the area is mainly commercial. Market area with temporary vendors as well as permanent shops. Access may be hampered during the construction process. Others may require to shift for few days.	 Latitude: 23.96892 Longitude: 91.370892 Elevation: 83.98113 m Accuracy: 24.8 m Time: 29-10-2022 13:53 Note: Market, W-2 Powered by NoteCam
9.	Water Distribution network at Tulabagan 1no. Colony (Ward no. 14) Road Crossing	Water supply pipelines will be laid within the road crossing of PWD roads. Land of the area is mainly commercial, while residential area is present nearby. EMP, particularly traffic management plan should be applied to avoid social impact and disturbance in vehicular movement.	 Latitude: 23.957507 Longitude: 91.359412 Elevation: 30.26194 m Accuracy: 3.9 m Time: 29-10-2022 13:04 Note: Road Crossing Tulabagan, 1 no Colony, Ward-14 Powered by NoteCam

Table 17: Site Environmental Features - Ranirbazar

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1	OHSR-1 beside Nalgaria ICDS centre, Ward No-13, (Lat: 23.825107° Long: 91.381414°)	The site is a lowland area and covered by <i>Colocasia esculenta</i>. OHR will be constructed on the available vacant and unused Government land. The land is under the ownership of Ranirbazar Municipal Council. The proposed site is located on southeastern part of RMC. There is no permanent or temporary structure on the proposed land. The nearby Anganwadi center from the proposed land is less than 30 m. No tree felling is required for construction activity. There is no waterbody near the project location. Soil type of the project location is Red loam and sandy loam soils. Utility shifting is not required for the construction activity. The nearby settlement from the proposed land is approximately 20 m. ASI protected area is located about 34.5 km (aerial distance) from Ranirbazar. Land use around the site is residential. Road available upto the site. Internal road needs to be constructed.	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
2	OHSR-2 With IRP and GLSR (100KL) at Krishnatali, Ward No-11 (Lat: 23.831818° Long: 91.377089°)	The proposed OHSR with IRP land is located at Krishnatali, which is open flat land and covered by <i>Colocasia esculenta</i>. The site is connected with BT road. The barren land is under the ownership of Ranirbazar Municipal Council. The proposed OHT site is located eastern side of the RMC. No trees are available on the land which requires to fell for the construction activity. There are few numbers of banana tree (<i>Musa sp.</i>). There is no major water body near proposed project location. The proposed site is surrounded by residential and agricultural area. Cleaning of vegetation is required. The nearest settlement is approximately 20 m from the proposed site. No sensitive receptor exists closer/within the proposed site. Land use around the site is residential. Road available upto the site. Internal road needs to be constructed.	 Latitude: 23.832122 Longitude: 91.376913 Elevation: 17.5383 m Accuracy: 9.5 m Time: 19-09-2022 14:18 Note: Ranirbazar OHT V7 Powered by NoteCam

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
3.	Deep Tube Well-1 near Ranirbazar cattle market (Ward no. 02) (Lat: 23.84048° Long: 91.366333°)	Deep Tube Well will be installed near Ranirbazar cattle market. Presently scrub is noted, which needs to be removed before construction. The nearby area is agriculture land which is not the part of the proposed site. There is no tree available on the site and hence no tree felling is required. Proposed project site is located in flat terrain. There is no water body near the project location. The proposed DTW land is located north eastern part of the town. Behind the proposed land, paddy field observed. The nearby settlement is approximately 50m from the site. There is no nearby forest area and no wild life has been reported in and around the site. Land use around the site is residential. Access to be constructed.	 Latitude: 23.841359 Longitude: 91.368365 Elevation: 13.8644 m Accuracy: 7.3 m Time: 19-09-2022 15:00 Note: Ranirbazar DTW Debi
4	Deep Tube Well-2 at Durgapur near Kalimandir (Ward no. 01) (Lat: 23.837374° Long: 91.370894°)	Deep Tube Well will be installed in Durgapur near Kalimandir. The proposed site is surrounded by residential area. There is very little place for the construction of DTW. The settlement is adjacent to the proposed site. Proposed project site is located in flat terrain. There is an existing waterbody near the project location which is 115m away from the project location. The proposed DTW land is located northern part of the town. Soil type of the project location is red loam and sandy loam soils. Kali temple is nearly the proposed site which is 10 m away from the proposed site. Mitigation measures will be applied during implementation of the project. There is no nearby forest area in and around the proposed project site. Other than Kali mandir no sensitive area is nearby Land use around the site is residential. Access is available at site.	 Latitude: 23.837063 Longitude: 91.371165 Elevation: 9.4523 m Accuracy: 34.5 m Time: 19-09-2022 15:09 Note: Ranirbazar DTW Durgapur

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
			
5	Deep Tube Well-3 at Devi Nagar (Ward no. 09) (Lat: 23.834716° Long: 91.373°)	Deep Tube Well will be installed at Devi Nagar. The nearby area of the land is a Bamboo plantation. Bamboo species are Bari (<i>Bambusa polymorpha</i>), Muli (<i>Melocanna baccifera</i>), Kai (<i>Bambusa nutans</i>), Paora (<i>Bambusa teres</i>). No tree felling is required for construction activity. Proposed project site is located in flat terrain. There is no existing waterbody near the project location. The proposed DTW land is located eastern part of the town. Soil type of the project location is Red loam and sandy loam soils. There is an earthen access road near the proposed site. There is no nearby forest area in and around the proposed project site. Nearby College building is more than 50 meters away from the proposed site. There is no notable or significant archeological places or protected monuments or areas in and around project area.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
6	CWTM in Nalgaria (Proposed 250 DI)	250 Dia CWTM pipelines will be laid within the RoW of a brick road. Existing road is quite narrow and land use of this area is residential. There are no trees along the road. No sensitive receptor exists closer/within the proposed site.	 Latitude: 23.824478 Longitude: 91.380478 Elevation: 6.9343 m Accuracy: 8.3 m Time: 19-09-2022 14:10 Note: Ranibazar OHT W13 down
7.	Water Distribution Network near DTW (remodeling of 200 mm HDPE)	Pipes will be laid within the road right of way (ROW) - in road's earthen shoulder in wider roads, and within the carriageway in narrow roads, where there is no space. There are no trees along the road. There is no notable or significant archeological places or protected monuments or areas in and around project area. Land use of this area is residential.	 Latitude: 23.832253 Longitude: 91.376437 Elevation: 13.684 m Accuracy: 5.6 m Time: 19-09-2022 14:37 Note: Ranibazar DTW W7 rem
8.	Proposed RWTM in Krishnatali (200 mm DI)	Pipe line passing through a congested area. There is foot track. There are 10 numbers of betel nut trees are observed during the site inspection. These trees may be felled for the pipe line laying works. No environmentally sensitive areas in or near the alignment of distribution network lines are proposed.	 Latitude: 23.834534 Longitude: 91.372811 Elevation: 25.24832 m Accuracy: 7.7 m Time: 19-09-2022 16:38 Note: Ranibazar distribution network

Table 18: Sensitive Receptors in the Project Influence area – Khowai

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1.	School	Lal Chara Ghosh Para (Durga Nagar)	Within 30 meters	
2.	Anganwari School	Lal Chara Ghosh Para (Durga Nagar)	Within 50 meters	
3.	College	Lal Chara	Within 20 meters from the college boundary wall	

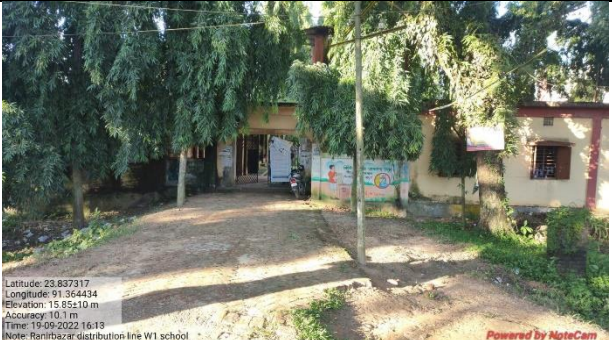
Table 19: Sensitive Receptors in the Project Influence area –Mohanpur

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1.	Anganwanwadi School	Tulabagan Office Tilla 4no. Kalimandir	Within 15 meters	 Latitude: 23.948997 Longitude: 91.36263 Elevation: 23.95412 m Accuracy: 12.1 m Time: 14-10-2022 13:32 Note: DTW with IRP-05 tulabagan
2.	Temple (Kalimandir)	Tulabagan Office Tilla 4no. Kalimandir	Within 20 meters	 Latitude: 23.948725 Longitude: 91.362655 Elevation: 27.06816 m Accuracy: 8.8 m Time: 14-10-2022 13:37 Note: DTW with IRP-05 tulabagan
3.	Temple (Kalimandir)	Rabindra Pally	Within 20 meters	 Latitude: 23.970309 Longitude: 91.364021 Elevation: 16.7648 m Accuracy: 8.7 m Time: 14-10-2022 13:11 Note: DTW with IRP-02 rabindra pally
4.	Temple (Shani Mandir)	Bohemian Colony	Within 40 meters	 Latitude: 23.958291 Longitude: 91.264141 Elevation: 22.5512 m Accuracy: 8.5 m Time: 14-10-2022 13:26 Note: DTW with IRP 04 Bohemian colony

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
5.	Temple (Kalimandir)	Old MMC	Within 30 meters	 Latitude: 23.969254 Longitude: 91.367766 Elevation: 21.1182 m Accuracy: 32.1 m Time: 14-10-2022 13:03 Note: rd03 d MMC pic 4
6.	Temple (Shani Mandir)	Tulabagan office Tilla 10 no. para	Within 30 meters	 Latitude: 23.944274 Longitude: 91.367849 Elevation: 33.0434 m Accuracy: 19.5 m Time: 28-10-2022 12:34 Note: Shani Temple, Tulabagan

Table 20: Sensitive Receptors in the Project Influence area – Ranirbazar

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1	Ranir Bazar PHC	Debinagar, Ward no 8	Less than 10 m from the road	 Latitude: 23.835459 Longitude: 91.372023 Elevation: 25.2434 m Accuracy: 19.5 m Time: 19-09-2022 16:32 Note: Ranirbazar distribution line WB PHC
2	Angonwadi	Ward no 10	Less than 10m	 Latitude: 23.833943 Longitude: 91.373406 Elevation: 25.2434 m Accuracy: 14.9 m Time: 19-09-2022 16:41 Note: Ranirbazar distribution line W10 Angonwadi

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
3	Angonwadi	Nalgaria Ward No-13, near OHSR	Less than 30 m	 Latitude: 23.824648 Longitude: 91.380866 Elevation: 26.42±25 m Accuracy: 12.0 m Time: 19-09-2022 14:04 Note: Ranibazar OHT W13 angonwadi Powered by NoteCam
4	School	Ward no 1 near main road	More than 30 m	 Latitude: 23.836927 Longitude: 91.385105 Elevation: 21.84±7 m Accuracy: 5.8 m Time: 19-09-2022 16:14 Note: Ranibazar distribution line W1 school Powered by NoteCam
5	School	Ward no 1 near main road	Less than 30 m	 Latitude: 23.837317 Longitude: 91.364434 Elevation: 15.85±10 m Accuracy: 10.1 m Time: 19-09-2022 16:13 Note: Ranibazar distribution line W1 school Powered by NoteCam
6	Temple	Durgapur near DTW location	5m	 Latitude: 23.837077 Longitude: 91.371166 Elevation: -3.57±5 m Accuracy: 9.4 m Time: 19-09-2022 15:10 Note: Ranibazar DTW Durga nagar W1 Powered by NoteCam

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
7	Temple	Ward no. 8	Adjucent to the road	 Latitude: 23.83515 Longitude: 91.370175 Elevation: 24.4420 m Accuracy: 4.8 m Time: 19-09-2022 16:27 Note: Ranibazar distribution line W10 temple Powered by NoteCam
8	Eidgah masjid	Ward no. 8	Adjucent to the road	 Latitude: 23.833946 Longitude: 91.373361 Elevation: 25.24254 m Accuracy: 12.9 m Time: 19-09-2022 16:40 Note: Ranibazar distribution line W10 temple Powered by NoteCam
9	Temple with religious tree	Ward no. 8	Less than 5m	 Latitude: 23.83172 Longitude: 91.37091 Elevation: 22.2324 m Accuracy: 14.6 m Time: 19-09-2022 17:07 Note: Ranibazar distribution line temple with tree Powered by NoteCam

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

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

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

- (i) **Location impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.
- (ii) **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughout, waste production, discharge specifications, pollution sources and ancillary services.
- (iii) **Pre-construction impacts** include impacts which are anticipated during construction works but planning is required for proposed mitigation measures before start of construction works i.e., during SIP period such as taking consents from various departments, planning for construction and workers camps, deployment of safety officer, arrangement of required barricades and caution boards etc.
- (iv) **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles, and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.
- (v) **O&M impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

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

53. This section of the IEE reviews possible project-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks will be analysed during pre-construction, construction, and operational stages in the context of the project's area of influence, which is geographical area of respective project towns. The ADB Rapid Environmental Assessment Checklist (Appendix 1) has been used to screen the project for environmental impacts and to determine the scope of the IEE.

B. Design and Location Impacts

54. **Design and Location of the Proposed Components.** Technical design of the (i) Overhead Storage Reservoir; (ii) DTW, (iii) IRP; (iv) transmission & distribution network, connections, flow meters, etc. follows the relevant national planning and design guidelines, focusing on providing a robust system which is easy to operate, sustainable, efficient, and economically viable. Following environmental considerations are included in the sub- project:

- (i) Improving water supply system with ground water based sources (Deep Tube Wells) in Khowai, Mohanpur and Ranirbazar towns to meet the present and projected water demand
- (ii) Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage;
- (iii) Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies;
- (iv) Preparation and implementation of a water quality surveillance program to ensure that supplied water meets the drinking water standards;
- (v) Using low-noise and energy efficient pumping systems;
- (vi) Installing low noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and maintaining adequate buffer to the nearby inhabited areas;
- (vii) Provision of appropriate personal protection equipment to the workers and staff.

1. Water Source Sustainability

Khowai

55. The proposed project is to augment and improve the water supply system in Khowai MC using deep tube wells as water source. Khowai is a small town which accommodates a total population of 23,309 no. for the year 2023. The present water supply to the town is from the Khowai river (intake – 3.78 MLD) and 1 no. Deep Tube well.

56. Water supply at Khowai town is through piped system using ground water and as well as surface water. At present river water intake from Khowai river and 1 no. of deep tube well is the main source of the system. The existing water treatment plant is not capable to cater the required amount of water. Hence additional deep tube wells have been proposed with IRP.

57. An approval letter vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala where they have provided a ground water potential map for the state of Tripura where yield wise areas have been marked. The detailed report is attached in **Appendix 14**.

58. While proposing the tube wells the specified yield provided in the map has been taken into consideration. As per Annexure I of permission letter the available ground water yield of Khowai town ranges from 100-150 m³/hr. The proposed 2 Nos DTW 53.33 m³/hr ($\approx$ 12000GPH) for 18 Hour centrifugal pump operation each which is equal to 0.96 MLD, which is less than the available yield. Total drawl from proposed DTW = 2 x 0.96 MLD = 1.92 MLD, i.e around 2 MLD.

59. After the analyzing the existing water supply system, it has been noticed that the present DWS water supply scheme is not efficient to supply water with adequate pressure in Khowai town and existing distribution network cover approx. 49.74 % of the town area. For Independent Water supply scheme, it is decided to construct the 2 DTWs with IRPs & 1 OHSR with detention time of 12 hrs. and water shall be supplied to consumer through distribution network of HDPE and DI K9/ K7 pipe. The proposed system is pumping system therefore one number of OHSR has been proposed to make possible to run the pump at uniform rate. The provision of reservoir will result in an overall reduction in size of pump & pipes and helps in maintain the constant pressure in distribution mains. The filtered water (after passing through IRP) will be stored in the overhead reservoir and finally distributed to consumers by gravity.

Mohanpur

60. The proposed project is to augment and improve the water supply system in Mohanpur MC using deep tube wells as water source. Mohanpur is a small town which accommodates a total population of 21,178 no. for the year 2023. Water supply Mohanpur town is through piped system through ground water and surface water. At present there are 20 numbers of existing DTW (Submersible pump 20 HP Capacity each) produced 1.45 MLD which is not capable to cater the required amount of water. Since most of the tube wells are old and yield reduced, in future these tube wells will be not used for new water supply scheme.

61. An approval letter vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala where they have provided a ground water potential map for the state of Tripura where yield wise areas have been marked. The detailed report is attached in **Appendix 14**.

62. While proposing the tube wells the specified yield provided in the map has been taken into consideration. As per Annexure I of permission letter the available ground water yield of Mohanpur town ranges from 100-150 m³/hr (high yield).

63. After the analyzing the existing water supply system, it has been noticed that the present DWS water supply scheme is not efficient to supply water with adequate pressure in Mohanpur town and existing distribution network cover approx. 71.5 % of the town area. The proposed project at Mohanpur envisages drawing of water from Deep Tube well (5 nos.). Water shall be treated with packaged Iron Removal Plants (planned 3 nos. new IRPs). The treatment will have simple iron removal. 5 nos. Deep Tube Well (DTW) have 15,000 GPH / 68.2 cum/hr production capacity in 20-hour operation submersible pumps. Total generation from 5 tube wells is approx. 6.82 MLD.

64. The proposed system is pumping system therefore two numbers of OHSR has been proposed to make possible to run the pump at uniform rate. The provision of reservoir will result in an overall reduction in size of pump & pipes and helps in maintain the constant pressure in distribution mains. The filtered water (after passing through IRP) will be stored in the overhead reservoir and finally distributed to consumers by gravity. The reservoir shall be designed for 15 years design period with 850 KL OHSR (OHT-1) and 750 KL OHSR (OHT-2) capacity by considering the 12 hrs. water demand for the projected year 2038.

Ranirbazar

65. The proposed project is to augment and improve the water supply system in Ranirbazar MC using deep tube wells as water source. Ranirbazar is a small town which accommodates a total population of 17,737 no. for the year 2023. The present water supply to the town is from the Haora River only (intake – 2.55 MLD).

66. Water supply at Ranirbazar town is through piped system using surface water only. At present river water intake from Haora River is the main source of the system. The existing water treatment plant is not capable to cater the required amount of water. Hence new deep tube wells have been proposed with IRP.

67. An approval letter vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala where they have provided a ground water

potential map for the state of Tripura where yield wise areas have been marked. The detailed report is attached in **Appendix 14**.

68. While proposing the tube wells the specified yield provided in the map has been taken into consideration. As per Annexure I of permission letter the available ground water yield of Ranirbazar town ranges from 100-150 m³/hr (high yield).

69. After the analyzing the existing water supply system, it has been noticed that the present DWS water supply scheme is not efficient to supply water with adequate pressure in Ranirbazar town and existing distribution network cover approx. 32.2 % of the town area. The proposed project at Ranirbazar envisages drawing of water from Deep Tube well (3 nos.). Water shall be treated with packaged Iron Removal Plants (planned 1 no. new IRP near one OHSR). The treatment will have simple iron removal. 3 nos. Deep Tube Well (DTW) have 10,000 GPH (45.5 cum/hr) production capacity in 20-hour operation submersible pumps. Total production of water from 3 nos. of DTW will be 2.67 MLD.

70. The proposed system is pumping system therefore two numbers of OHSR have been proposed to make possible to run the pump at uniform rate. The provision of reservoir will result in an overall reduction in size of pump & pipes and helps in maintain the constant pressure in distribution mains. The filtered water (after passing through IRP) will be stored in the overhead reservoir and finally distributed to consumers by gravity. The reservoir shall be designed for 15 years design period with 350 KL OHSR (OHT-1) and 800 KL OHSR (OHT-2) capacity by considering the 12 hrs. water demand for the projected year 2038.

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

72. **Design Period:** The design period adopted for the Water Supply system is 30 years for mechanical component, and 15 years for OHSR and distribution system.

2. Environmental Audit of Existing Infrastructure

73. It is designed to utilize existing water supply infrastructure like WTP (at Khowai & Ranirbazar), clear water reservoirs, pump houses etc. with necessary improvements. As per the ADB SPS 2009, these are associated facilities and therefore the component operation shall comply with the ADB and applicable environmental laws of India. Besides, ADB SPS lays emphasis on impacts and risks on biodiversity and natural resources, pollution prevention abatement including hazardous waste, occupational health and safety, community health and safety, and physical cultural resources. A primary environmental audit is conducted to (i) assess the compliance of the existing infrastructure with environmental legislations and (ii) improve environmental performance to minimize future potential liabilities. Detailed shall be carried out during detailed design stage (to be done by DBO contractor).

74. All the existing infrastructure facilities are in urban areas within towns. There are no environmentally sensitive or protected areas in or near the vicinity of the sites. **Table 21** below shows summary of audit for existing components that will be used in new water supply scheme. **Appendix 6** shows preliminary environment audit of existing WTPs at Khowai and Ranirbazar.

Table 21: Environmental Audit of Existing water supply components

Infrastructure	Details	Proposed repair and rehabilitation under the project	Compliance with environmental regulatory framework	Environmental Concerns
Khowai				
4.54 MLD WTP	Existing WTP of capacity 4.54 MLD treated Khowai River water	No Change in existing WTP Under the project clear water pump will be repaired	Yes “Consent to establish under water and air act before start of construction and Consent to operate before start of operation is not required under Air and water act”	Backwash wastewater from the process is recovered and recirculated partly in the WTP, rest discharged on nearby Lal cherra <i>nallaha</i> Sludge from WTP is dewatered, stored within campus for a short period and finally utilize/ disposed off. Needs improvement to prevent discharge of partial backwash water, and also in sludge handling
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested – turbidity and chlorine. Turbidity is slightly higher than the desirable limited, but within the acceptable limit.
Deep tube well and Iron removal plant	There is 1 deep Tube Well, IRP is not functioning properly	Ground water source will be not utilized in future. Present repairing of IRP will be done from DWS	No requirements under existing laws	Backwash is discharged into drains.
Intake well cum raw water pumping station	- Pump Capacity: 3 nos. (2W+1S) @ 65000 gph (295.5 m³/ hr) each and head 50 m. - Pump Type: Vertical turbine centrifugal pump	No rehabilitation work required and performance is satisfactory as per DWS and AMC	No requirements under existing laws	Poor housekeeping (handling of oils, lubricants etc., spillage noticed) Requires improvement in occupational health and safety and waste management
Ranirbazar				
2.5 MLD WTP	Existing WTP of capacity 2.5 MLD near Haora River. Treated water	No Change in existing WTP	Consent to establish under water and air act before start of construction and Consent to operate	Backwash wastewater from the process is recovered and recirculated partly in the WTP, rest discharged on nearby.

Infrastructure	Details	Proposed repair and rehabilitation under the project	Compliance with environmental regulatory framework	Environmental Concerns
Khowai				
	from River Haora.		before start of operation is not required under Air and water act. Back wash and sludge management	Haora River- downstream of intake point. Chemical storage in WTP is not properly maintained and Alum and bleaching powder are laying on floor. The sludge from WTP is stored at WTP low laying area of WTP. Waste from dewatering is disposed in downstream of intake in river. Needs improvement to prevent discharge of partial backwash water, and also in sludge and chemical handling
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested – turbidity and chlorine.
Intake well cum raw water pumping station	- Pump Capacity: 3 nos. @ 60000 GPH/ 273 m3 per hour - Pump Type: Vertical turbine centrifugal pump	No rehabilitation work required and performance is satisfactory as per DWS and RMC	No requirements under existing laws	Poor handling of oils, lubricants etc., spillage noticed Requires improvement in occupational health and safety and waste management

3. Corrective Actions

75. The environmental concerns are mainly related to occupational health and safety, oils, fuels and chemical handlings, waste management etc. wastewater (backwash and clarifier water) and sludge management systems of WTP are not functional properly, it needs upgradation. No new works are proposed in existing WTP, except replacement of one pump under Khowai town project.

76. The DBO contractor will conduct technical assessment WTP during the detailed design phase including quality of treated water, backwash and sludge handling system, chemical handling etc., and prepare a service improvement plan and based on the requirement the

Department of water supply (DWS) will upgrade these systems as required and report to PMU, PMU will ensure that necessary corrective actions are taken.

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

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

78. **Environmental sensitive features and Tree Cutting at Selected Project Sites.** There are no notable environmentally sensitive features in or around the project areas, therefore no impacts envisaged. Nearest wildlife sanctuary is within 5 km of Khowai, none of the components are located close to the sanctuary, and therefore no interference with the sanctuary envisaged. At Ranirbazar 10 number of betel nut trees may be impacted for proposed raw water transmission line and at Mohanpur preliminary estimate indicates that 5 number of Sal (*Shorea robusta*) and Teak (*Tectona grandis*) trees need to be felled but final number will be depending on final design of DBO contractor. Following measures need to be implemented to compensate for the loss of any tree cover.

- (i) Minimize removal of trees by adopting to site condition and with appropriate layout design;
- (ii) Obtain prior permission for tree cutting;
- (iii) Plant and maintain 5 trees for each tree that is removed.

79. **Structure in seismic zone V- Design impact & mitigation:** While a structure is designed all possible load combination are considered those may come into structure. This includes seismic load also. In zone V the ground vibration is maximum. Corresponding to this the Peak Ground Acceleration (PGA) is provided in the relevant code for seismic design (Indian Standard, IS 1893: 2002, 2016). As per this PGA and the seismic acceleration response curve is given in the code and other factors like Response Reduction Factor and Importance Factor as per the same code the seismic analysis is done and structures are designed accordingly. As the ground acceleration is maximum in zone V, the cost of the structure also becomes high for provision of higher reinforcement etc. As per the seismic design philosophy laid in IS: 1893- 2002 and 2016, the structure is designed such a way that it can withstand all Design Basis Earthquake (DBE) which are basically minor and medium ground shaking and it should not collapse but have cracks which are repairable during Maximum Considered Earthquake (MCE) which are basically major shaking. Thus, as per the provision of the seismic code the structure is designed in such a way that in no case it will collapse. The present structures are also designed in line with the above provision of the IS 1893.

80. **Design Period.** The design period adopted for the Water Supply system is 30 years for pumping main and distribution system and 15 years for pumping machinery and OHSRs.

C. Pre-construction Impacts

81. **Utilities.** Telephone lines and wires, water lines within the proposed subproject locations may require to be shifted in few cases. Mitigation of adverse impacts due to relocation of the utilities, contractor will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; (ii) provide prior notice (at least one week in advance) to affected areas and (iii) require DBO Contractors to prepare and implement a contingency plan to include actions to be done in case of unintentional interruption of services.

82. **Physical Cultural Resources.** There are no notable or significant archeological places or protected monuments or areas in and around the project locations in the project towns. Therefore, no impacts envisaged but risk of uncovering archaeological remains, given the long history of town, during the excavations cannot be ruled out completely. DBO Contractors therefore should follow the below measures in conducting any excavation work. Works near local religious and cultural places may inconvenience the local community. Measures suggested below shall be implemented.

1. Chance find procedure

- (i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (ii) Stop work immediately to allow further investigation if any finds are suspected;
- (iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol

2. Works near local religious / cultural places

- (i) Consult with concerned religious authorities, nearby people and devotees 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) Adjacent to religious/ social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building.
- (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 time to the religious places,
- (iv) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.

83. **Site selection for equipment lay-down and storage area.** Improper selection will effect local environment and inconvenience public. Priority is to locate these near the subproject locations. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation and drinking water supply systems. Residential areas are not considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Disposal sites shall not be located near water bodies or in areas which are inconvenience the community. Following mitigation measures are to be implemented:

- (i) Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.
- (ii) Storage areas shall be secure to minimize the risk of crime. They shall also be safe from access by children or animals etc.
- (iii) Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.
- (iv) Equipment lay-down and storage areas must be designated, demarcated, and fenced if necessary.
- (v) Fire prevention facilities must be present at all storage facilities.
- (vi) Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas.
- (vii) These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
- (viii) Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.
- (ix) Staff dealing with these materials or substances must be aware of their potential impacts and follow the appropriate safety measures.

84. **Sources of Materials.** Since the construction work is not heavy, moderate amount of sand and coarse aggregate will be required for this sub-project, which will be sourced from quarries. Quarries inevitably cause few 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. Contractor should avoid new borrow pits/quarries as far as possible, if necessary, all the permissions, including conduct of environmental assessment, and environmental clearance as necessary shall be obtained prior to start of quarrying activity. The contractor should also make a concerted effort to re-use as much excavated material from this sub-project as possible. It is the DBO Contractor's responsibility to verify the suitability of all material sources and to obtain the approvals prior to procurement of material. The DBO Contractor will be required to:

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

85. **Maintaining Core Labor Standard.** The Contractor and PMU/PIU are responsible for ensuring that international CLS¹³ as reflected in national labor laws and regulations are adhered

¹³ Core Labor Standards (CLSs) are a set of four internationally recognized basic rights and principles at work: (i)

to. PIU is ultimately responsible for monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. ADB will carry out due diligence – during loan review missions - to ensure that executing and implementing agencies and contractors comply with applicable (national) core labor standards and labor laws. PMU or PIU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. These will be monitored as part of the project's safeguards reporting requirements.

D. Construction Impacts

1. Construction methodology of production tube well – Khowai, Mohanpur and Ranirbazar

- (i) Drilling work of pilot hole is to be taken up and completed up to recommend depth at respective point
- (ii) After the completion of pilot hole drilling, it is to be electrically logged, in order to identify the promising aquifers for screening it. Based on the physical observation of formation material (drill cuttings) and the Electro logging Test Results, corrected lithological log is to be prepared for recommending lowering of well pipe Assembly. Based on the study of Mechanical Analysis of Aquifer material for grain size distribution, the slot size & gravel size should be selected and recommended.
- (iii) On confirmation of well pipe Assembly, Pilot hole is to be reamed (enlarged) to 500 mm diameter for lowering 250 mm pipe diameter or hole diameter of 600 mm for lowering 300 mm pipe diameter, as the case may be, up to the total recommended depth of tube well.
- (i) On lowering the pipe assembly into the enlarged hole, space between the (slotted & blank) pipe and enlarged hole should be packed with proper size gravel from the bottom of well up to the bottom of clay packing below ground level.
- (ii) From the top of the gravel packing, up to the ground level, perfect clay packing between Pipe and Hole is to be provided, for sanitary as well as water quality protection of well.
- (iii) Well, is to be developed through backwashing prior to compressor development test.
- (iv) Production tube well is to be developed using Airline pipe by using appropriate capacity of compressor for getting sand free discharge (or Well is to be developed at least for 40 to 50 hours whichever is less). Water samples should be collected for analyzing chemical and biological parameters.
- (v) Production tube well is to be developed (10 to 15 hours depending on the observation of sand free discharge it is indicative) through over pumping before conducting Pump Test. Thereafter Pump Test is to be conducted for yield test (5-to-6-hour continuous pumping) to recommend appropriate size & capacity of pump to be installed before putting the well. Water samples should be collected for analyzing chemical and biological parameters.

freedom of association and the right to collective bargaining; (ii) elimination of all forms of forced or compulsory labor; (iii) effective abolition of child labor; and (iv) elimination of discrimination in respect of employment and occupation.

86. **Beside DTW or OHSR Iron Removal Plant (IRP) will be installed.** The Iron Removal Filters are designed to remove the Excess Iron content present in the feed water with minimum pressure drop. Most iron filtration systems operate on the principal of oxidizing the iron (oxidation) to convert it from a ferrous (dissolved or soluble) to a ferric or undissolved state. Iron removal plants can be based on different filtration media, depending on the iron and manganese concentration, the oxygen level, CO₂ content and hardness of the water. As per the certification of CSIR-IMMT Bhubaneswar that Iron Removal Plant (IRP) of Resin based ion exchange technology is capable to remove high Iron contented ground water of DTW to acceptable limit as per BIS standard. Therefore, it is proposed to install resin-based Iron Removal Plant for Khowai MC (2 nos.), Mohanpur MC (3 nos.) and Ranirbazar MC (1 no.) . The plant should be capable of treating water from maximum level of contamination 10.00 ppm for iron in raw water of DTWs bored at different sites up to 0.3 ppm and be able to purify in the specified standards for Iron, Manganese & Bacteriological contamination as per BIS standard.

87. Other civil works in the subproject include OHSR, GLSR (small at OHSR- IRP site, Ranirbazar) pump room, guard room and laying of pipes etc. at the identified sites. Present construction works are confined to sites, and construction includes general activities like site clearance, excavation for foundations, and creation of concrete structures, etc. Since these works are confined to the boundary of identified sites, there is no direct interference of construction work with the surrounding land use. However, construction dust, noise, use of local roads for transportation of construction material, waste, labour camps etc., will have negative impacts, which needs to be avoided or mitigated properly.

88. Open cut trenching method of pipe laying involves excavation for laying pipes along the roads, placing pipes in the trench, jointing, and testing, and refilling with the excavated soil. Pipes are normally placed by approx. 1 to 1.2 m below the existing ground level or road level and a clearance of 200 mm is left between the pipe and each side of the trench to allow backfilling. Trenches will be around 1 – 1.2 m deep and 500-800 mm wide. Earthwork excavation is being undertaken by machine (backhoe excavator) or manually, while pipe laying works include laying pipes at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness. Sufficient care is being taken while laying so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. As trenches are only 1-1.2 m deep, there risk of collapse of trenches or damage to surrounding buildings is minimal. However, necessary precautions are being taken depending on the soil conditions, and if required measures such as bracing or shoring in the trench will be provided. Once they are laid, pipes will be joined as per specification and then tested for any cracks or leakages. About 85%-95% of the excavated soil will be used for refilling the trench after placing the pipe and the residual soil of 5-15% will be disposed of. Therefore, residual soil after pipe laying and refilling is not significant.

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

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

91. **Physical Cultural Resources.** There are no notable or significant archeological places or protected monuments or areas in and around the project locations in the project towns. Therefore, no impacts envisaged but risk of uncovering archaeological remains, given the long

history of town, during the excavations cannot be ruled out completely. DBO Contractors therefore should follow the below measures in conducting any excavation work:

- (i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (ii) Stop work immediately to allow further investigation if any finds are suspected;
- (iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol.

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

93. For all construction works

- (i) Provide a dust screen around the construction sites at OHSR, IRP and DTW. Extra protection is required near sensitive receptors like school, Anganwadi, religious places located nearby the construction site.
- (ii) Damp down the soil and any stockpiled material on site by water sprinkling;
- (iii) Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks;
- (iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site/quarry;
- (v) Control dust generation while unloading the loose material (particularly aggregate, soil) at the site by sprinkling water and unloading inside the barricaded area;
- (vi) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition
- (vii) Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization;
- (viii) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process;
- (ix) Cover the soil stocked at the sites with tarpaulins;
- (x) Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation
- (xi) Ensure that all the construction equipment and machineries are fitted with pollution control devises, which are operating correctly, and have a valid pollution under control (PUC) certificate.

94. For pipeline works

- (i) Barricade the construction area using caution tape and hard barricading.

- (ii) Initiate site clearance and excavation work only after barricading of the site is done;
- (iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded/demarcated area;
- (iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area;
- (v) Carry out work in night time at the places having sensitive receptor for less disturbance of traffic activity.
- (vi) Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded;
- (vii) Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done;
- (viii) Tree cutting must be avoided and if un-avoidable then 1:5 ratio for plantation must be maintained with proper channels.
- (ix) Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for backfilling, use the freshly excavated soil for backfilling, this will avoid stocking of material, and minimize the dust;
- (x) Water bodies must not be disturbed, for passing pipeline
- (xi) Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Road restoration shall be undertaken immediately.

95. **Noise and Vibration Levels.** OHSR, IRP and DTW site are in isolated areas, and pipeline networks are located predominantly in a rapidly developing urban area. Pipeline sites are located close to habitation areas, where there are houses, religious places and businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads for laying of pipeline, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity will have impact on nearby buildings. This impact is negative but short-term, and reversible by mitigation measures. The DBO Contractor will be required to:

- (i) Plan activities in consultation with Cluster-PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- (ii) 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 like school, religious places;
- (iii) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s;
- (iv) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (v) Near school, Anganwadi, religious places and health center work need to be completed in shorter period. Noise generation should be restricted near the above sensitive receptors. Work should be carried out during day time only and non-school hours.
- (vi) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural

festivals.

96. **Surface Water Quality.** Run-off from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate downstream surface water quality of the streams. It is important that runoff from the construction areas, which may contain silt and chemical traces do not enter these water bodies. Impact will be temporary, and may not be significant, but needs to be mitigated. DBO Contractor will be required to:

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

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

- (i) Create a temporary drainage channel around the work area to arrest the entry of runoff from upper areas into the work area
- (ii) 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
- (iii) Consider safety aspects related to pit collapse due to accumulation of water

98. **Storage and Disposal of excavated earth.** A large quantity of soil will be excavated for pipe laying, construction of OHSR, pump house and others. Some part of this excavated soil will be reused for backfilling and/or surface levelling; rest of the soil will need to be disposed in other locations. Proper storage and disposal plan from contractor is required before start of the work. Prior permission from landowner/concerned authority for storage and disposal of excess earth is required. Prior to the commencement of works, contractor will follow all the prescribed rules¹⁴ and shall identify a debris disposal site in consultation with the PIU/ULB and adhering to following criteria:

¹⁴ Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules

- (i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected for temporary storage, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any activities.
- (ii) Debris disposal site shall be at least 200 m away from any surface water body.
- (iii) No residential areas shall be located within 200 m downwind side of the site.
- (iv) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
- (v) The local governing body and community shall be consulted while selecting the site.
- (vi) Contractor is required to prepare plan for disposal of construction and demolition waste including excavated earth in the designated site/sites and submit the plan in PIU. Which to be approved by Municipal Council as per Construction and Demolition Waste Rules 2016
- (vii) Soil storage site should be properly demarcated by fencing and information board should be placed at entrance
- (viii) At soil storage site, soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission
- (ix) At soil disposal site the disposed soil should be levelled on daily basis and no heap or mound should be left at end of the day.

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

- (i) Prepare and implement a Construction Waste Management Plan;
- (ii) As far as possible utilize the debris and excess soil, river bed earth 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 soils should be disposed at approved designated areas immediately;
- (iv) Not to store any spoil materials nearby the sensitive receptors;
- (v) If temporary storage /disposal is required, the site shall be selected preferably from barren, infertile lands; site should be located away from residential areas, few water bodies and any other sensitive land uses;
- (vi) During construction of tube well – wastewater generate from construction activity will be channelized to pit and later muck will be collected from the pit for disposal;
- (vii) 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;
- (viii) Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of in disposal sites approved by TSPCB;
- (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) Conduct site clearance and restoration to original condition after the completion of

construction work; Cluster-PIU to ensure that site is properly restored prior to issuing of construction completion certificate.

100. Management Plan for Night works (if required). Following requirements should be fulfilled for construction works at night hours-

- (i) Night works should be avoided at construction sites specially in residential areas and should be performed only when day works are not possible due to excessive traffic/public/pedestrian movement, site of cultural or religious importance, where there is huge crowd during day hours or any other unavoidable circumstances.
- (ii) Limit construction activities at night. When necessary, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures. Consult community regarding appropriate timing of noisy activities and avoid noisy activities at night. Use noise-control methods (barriers/ shelter/ muffling devices) and maintain a buffer zone if possible. Minimize project transportation, particularly heavy vehicles, through residential areas. Use of high noise generating equipment shall be stopped during night time.
- (iii) Safety gear can greatly affect worker visibility. The decision and maneuver distance – how long it takes a driver to notice the worker and make any path or speed changes – is over 5 times greater with reflective clothing than with regular, dark-colored – or even orange-colored – clothes. With this increased decision and maneuver distance, workers, motorists, and equipment are much less likely to have a collision – chances of damage, injury, or death are reduced.
- (iv) Reflective clothing is not the only available technique to increase visibility at night. Flashing lights on a worker's body or clothing, reflective tape on equipment, and especially proper work area lighting are all good ways to increase visibility.
- (v) Proper lighting at night includes several different levels and designations of lighting. In order to understand appropriate lighting levels for night work, we first need to talk about how it is measured. Lighting is typically measured by what are called "foot-candles". One foot-candle is the luminance cast on a 1 square foot surface by a single candle's light.
- (vi) Visibility & Training: There are two main ways to ensure that motorists and workers experience the safest possible night-time work zone. First is proper safety training, and second is improving visibility throughout the work zone and especially at critical areas like traffic control workers' stations and on any people or equipment.
- (vii) Through proper training and lighting, night time construction can happen as safely as construction in the daytime. This allows contractors and agencies to take advantage of working with fewer delays for the travelling public and for construction workers to work more safely in lower volume traffic.
- (viii) Preferably electrical connections are available for running equipment otherwise sound proof/super silent Diesel Generator set should be available
- (ix) Sound level should not increase as per following-

Type of area of work	Maximum noise level dB(A)
Industrial	70
Commercial	55
Residential	45
Silence zone	40

- (x) Illumination should be as follows-

Minimum illumination (lx)	Areas to be illuminated	Type of work activity
54	Illumination throughout the work area	General work area lighting, and performance of visual tasks of large size, or medium contrast, or low require accuracy
108	Illumination of work area and areas adjacent to equipment	Performance of visual tasks of medium size, or low to medium contrast, or medium required accuracy
216	Illumination of task	Performance of visual tasks of small size, or low contrast or high required accuracy or fine finish

- (xi) As far as possible ready-mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site;
- (xii) All the noise activity like hammering, cutting, crushing, running of heavy equipment should be done in day time and avoided in night time;
- (xiii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works;
- (xiv) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night;
- (xv) 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;
- (xvi) 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;
- (xvii) Horns should not be permitted by equipment and vehicles;
- (xviii) Workers should not shout and create noise;
- (xix) First aid and emergency vehicles should be available at site;
- (xx) Emergency preparedness plan should be operative during night works;
- (xxi) Old persons and pregnant women and women having small kids should not work in night time;
- (xxii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise;
- (xxiii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works;
- (xxiv) PIU site engineers and contractors' safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and videographic records as well as register the observations;
- (xxv) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement;
- (xxvi) After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians;
- (xxvii) Drivers and workers should be alert and responsive during night works;
- (xxviii) All the wages to workers working in night hours should be as per the applicable labour acts;
- (xxix) Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours; and
- (xxx) Night works should not be conducted near hospitals and during peak seasons such

as peak tourist season, students' exam times etc.

101. **Accessibility.** Excavation along the roads for laying of distribution and transmission pipeline, hauling of construction materials and operation of equipment on-site can cause traffic problems. Roads connecting sites are narrow and carry considerable local traffic, mainly comprise bicycles, 2 wheelers, Mini trucks, auto rickshaws, buses etc., Works related to all the remaining components will be confined to the selected sites, therefore there is no direct interference of these works with the traffic and accessibility. Hauling of construction material, equipment, construction waste, etc., to and from the work site may increase the road traffic on local roads, which are not in good condition. This will further inconvenience the local community and road users. Potential impact is negative but short term and reversible by mitigation measures. Particularly separate demarcated access will be temporarily arranged for nearby sensitive receptors like school. Anganwadi, religious places & health center located adjacent to the proposed construction areas. Accordingly, Traffic Management Plan (TMP) be prepared covering requirement of traffic diversion or control The DBO Contractor will be required to:

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

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

103. Pipeline works:

- (i) Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading / use of caution tape should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the site as and when required
- (ii) In case of presence of community structures, health facility or religious places, plan work activity in the night time using proper equipment's and alternative access should be provided.
- (iii) Leave spaces for access between mounds of soil to maintain access to the houses/ properties
- (iv) Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.
- (v) Inform the affected local population, sensitive receptors 1-week in advance about the work schedule
- (vi) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
- (vii) Keep the site free from all unnecessary obstructions;
- (viii) Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours.

104. **Socio-Economic – Income.** All the project components are located on government lands and there is no requirement for land acquisition or any resettlement. Resettlement and social issues are being studied in a parallel resettlement planning study of this subproject. Blocking of access to the business / livelihood activities, especially during pipeline laying along the roads, may impact the income of households. However, access will be maintained during pipeline works, no notable impact is envisaged. The DBO Contractor will be required to:

- (i) Prepare and implement spoils management plan;
- (ii) Leave spaces for access between mounds of soil;
- (iii) Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- (iv) Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;
- (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules;
- (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- (vii) Notify community/ water users in advance about likely interruptions in water supply.
- (viii) Provide alternate sources of clean water until water supply is restored.

105. **Socio-Economic – Employment.** Manpower will be required during the 24-months construction stage. This can result in generation of temporary employment and increase in local revenue. Thus, potential impact is positive and long-term. The DBO Contractor will be required to employ local labor force as far as possible.

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

- (i) Comply with all national, state, and local labour laws (**Appendix 5**);
- (ii) Develop and implement site-specific occupational health and safety (OHS) Plan along with COVID-19 SOP 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 Training¹⁵ including COVID 19 for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (iii) Ensure availability of first aid box at work site;
- (iv) Ensure the workers follow COVID 19 SOP and implement accordingly (COVID 19 SOP guideline attached in **Appendix 11**);

¹⁵ Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

- (v) Provide medical insurance coverage for workers
- (vi) Maintain Safe distance at work and use of Mask should be encouraged for safeguard from COVID-19
- (vii) Secure all installations from unauthorized intrusion and accident risks;
- (viii) Provide health and safety orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- (ix) Make sure vaccination against COVID-19 is done for the labourers
- (x) Ensured the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xi) Ensured moving equipment is outfitted with audible back-up alarms;
- (xii) 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;
- (xiii) 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.
- (xiv) Provide supplies of potable drinking water;
- (xv) Provide clean eating areas where workers are not exposed to hazardous or noxious substances.

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

- (i) Restrict construction vehicle movements to defined access roads and demarcated working areas (unless in the event of an emergency);
- (ii) Restrict meetings in crowded places and follow COVID-19 SOP for safeguarding against COVID-19
- (iii) Enforce strict speed limit (20-30 kmph) for playing on unpaved roads, construction tracks;
- (iv) Restrict speed of the vehicle and equipment near sensitive receptors
- (v) Night-time driving will be by exception only, as approved by the PIU to minimise driving risk and disturbance to communities;
- (vi) Adopt standard and safe practices for micro tunneling;
- (vii) Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions;
- (viii) All drivers will undergo safety and training; along with COVID-19 awareness
- (ix) Public access to all areas where construction works are on-going will be restricted using barricading and security personnel;
- (x) Separate barricading needs to be provided near adjacent sensitive receptors like school, Anganwadi, health center and religious places;
- (xi) Warning signs, blinkers will be attached to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation;
- (xii) The period of time when the pipeline trench is left open will be minimized through careful planning;
- (xiii) Control dust pollution – implement dust control measures as suggested under air

- quality section;
- (xiv) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure;
- (xv) Provide road signs and flag persons to warn of on-going trenching activities.

108. **Social and Cultural Resources.** Significant negative social impacts in project are not anticipated. Site of social/cultural importance (schools, hospitals, and religious places) may be distributed by noise, dust, safety risks and impeded access. There are schools located close to the project sites, and these may pose safety risks to school children, staff and visitors. This short-term impact, mitigated by the following mitigation measures.

- ✓ Avoiding working at sensitive times,
- ✓ Limiting dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering soil and sand when carried on trucks;
- ✓ Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensuring they are maintained to manufacturers' specifications.
- ✓ Implement community health and safety measures recommended above; isolate work site from the school access road; provide proper barricading to prevent entry of children / public into work site; create awareness

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

- (i) As far as possible locate the camp site within the work sites; if any camp to be established outside these, then select a camp site away from residential areas (at least 50 m buffer shall be maintained)
- (ii) Avoid tree cutting for setting up camp facilities
- (iii) Ensured that a proper compound wall is provided, and erect a wind/dust screen around
- (iv) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas
- (v) Construction camp must be safeguarded from COVID -19 including safe eating area, maintaining Hygiene inside camp, ensure physical distancing measures
- (vi) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit
- (vii) Provide proper temporary accommodation with proper materials, adequate lighting and ventilation, appropriate facilities for winters and summers; ensure conditions of livability at work camps are always maintained at the highest standards possible;
- (viii) Consult cluster-PIU before locating project offices, sheds;
- (ix) Minimize removal of vegetation and disallow cutting of trees
- (x) Ensure conditions of livability at work camps are always maintained at the highest standards possible; living quarters and construction camps shall be provided with

standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be allowed as accommodation for workers

- (xi) Camp shall be provided with proper drainage, there shall not be any water accumulation
- (xii) Ensure COVID vaccination is done for all the labours involved in the work
- (xiii) Provide drinking water, water for other uses, and sanitation facilities for employees
- (xiv) Prohibit employees from cutting of trees for firewood; contractor should be provided proper facilities including cooking fuel (oil or gas; fire wood not allowed)
- (xv) Train employees in the storage and handling of materials which can potentially cause soil contamination
- (xvi) Recover used oil and lubricants and reuse or remove from the site
- (xvii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for biodegradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market
- (xviii) Remove all wreckage, rubbish, or temporary structures which are no longer required

110. At the completion of work, camp area shall be cleaned and restored to pre-project conditions and submit report to PIU; PIU to review and approve camp clearance and closure of work site Guidelines for setting up camp is attached as **Appendix 10**.

E. Operation and Maintenance Impacts

111. Operation and Maintenance of the water supply system will be carried out by DBO contractor for first 5 years, after which DWS, either directly or through an external operator, will operate the system. Operation will involve withdrawal of ground water through deep tube well, removal of iron through iron removal plant, pumping of clear water to water storage reservoir and finally distribution of water at DMA areas.

112. Following measures are suggested for implementation/ compliance during the operation phase:

- (i) Ensure that water supplied to the consumers at all times meet the drinking water standards (Appendix 7); carry out regular sampling and testing, and disseminative information.

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

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

115. **Iron Removal Plant (IRP) - Resin Based Technology.** The material of the INDION ISR resin is designed in such a manner that the precipitated Iron from the water does not get deposited

or get coated over the resin surface, hence the Iron precipitates can be easily washed off by backwash flow (INDION ISR Treated Water). If the water contains impurities other than Iron like Turbidity, COD, Oil and Grease, acidic pH (< 7), Heavy metals, Chlorine, Hydrogen Sulphide, etc. then it will hamper INDION ISR performance gradually. The parameters should be NIL in water before passing through INDION ISR. Considering the above factors, the replacement frequency can be considered as 3 years for inlet Iron content > 3 ppm and 4 to 5 years for inlet Iron content < 3 ppm.

116. Waste generation during operation and disposal of sludge/other waste generated during operation. Basic theory of conversion of dissolved Iron with iron specific resin is as follows: Iron Specific Resin has manganese dioxide as a catalytic moiety which works as a catalyst to promote iron oxidation. Basically, iron and oxygen are attracted to manganese dioxide where dissolved iron (Fe^{+2}) converts to insoluble iron (Fe^{+3}) which can be filtered through the resin. During backwash, the surface of resin is scoured, converting it to manganese dioxide, which is further used for oxidation of iron. Back wash water is nontoxic and less in volume can be discharged safely. Backwash water will be temporarily stored in a tank and clarified water will be discharged into drains, and the sediment will be disposed off along with solid waste.

117. Repairs and Maintenance of water supply system. Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, health services, religious places, tourist sites etc., so the same precautions as employed during the construction period should be adopted. All MC needs to require its O&M contractor to:

- (i) Consult the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (ii) Complete work in these areas quickly;
- (iii) Consult MC authorities, 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.
- (iv) Extra precaution to be taken during any repairing work near sensitive receptors. All mitigation measures as mentioned in construction phase, same will be applicable for O & M phase.

118. Increase wastewater generation and safe disposal. With enhanced water supply in three project towns, volume of wastewater will be increased. As per generic consideration, about 80% of water is generated as wastewater. At present there is no sewerage system in these towns. Individual households discharge sewage into septic tanks, and gray water (from kitchen and bath) is discharged into open drains. To an extent, there is also direct discharge of sewage and disposal of supernatant from septic tanks into open drains. Open drains are intended for surface runoff during rains, and discharge of wastewater into these drains is polluting the receiving waters and also creating unhealthy conditions. Considering this, Government of Tripura proposed to implement a project under AMRUT program of Government of India.

119. This project includes interception of major drains in the core area and the collection and conveyance of the intercepted wastewater to the final intercepting point by gravity sewer and collection of wastewater in the collection well at the final intercepting point. From the final intercepting point the wastewater will be conveyed by means of 200 mm DI K9 mains through pumping to the proposed STP. At STP, the wastewater will be treated by Moving Bed Bioreactor (MBBR) technology and septage as collected from septic tanks will be cotreated in the same STP, and treated wastewater meeting the discharge standards. The treated effluent shall be discharged

into the river or to the land for agriculture purpose depending upon the need of public in the nearby area.

120. Major drains in the core area of the towns are identified for interception and diversion to the proposed STP site. Other drains are far away from the core area, and it may not be feasible to tap the wastewater in the drains for conveying them to the STP site due to fund constraints. Interception and treatment details of 3 project towns under cluster IA is given below. Tendering has been done for “proposed interception and diversion of major drains of core areas and providing STP & Co-treatment of septage and disposal” packages for the towns and construction will be started around June 2023 and expected to be commissioned by May 2025

121. **Project Benefits.** The citizens of the Khowai, Mohanpur and Ranirbazar municipal areas will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better-quality water, piped into their homes. This should improve the environment, should deliver major improvements in individual and community health and well-being. Diseases due to poor quality water, such as diarrhea and dysentery, should be reduced, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

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

B. Public Consultation

1. Consultation during Project Preparation

123. Institutional consultations were conducted with the project agencies, and Government Departments of Tripura, Tripura State Pollution Control Board, etc. The subproject proposal is formulated in consultation with the local bodies in the project area to suit their requirements. The following methodologies have been used for carrying out public consultation:

- (i) Local communities, individuals affected and owners and employees of affected commercial establishments who are directly or indirectly affected were given priority while conducting public consultation.
- (ii) Walk-through and informal group consultations in the proposed subproject area.
- (iii) The local communities had been informed through public consultation about the project and its benefits.
- (iv) The environmental concerns and suggestions made by the participants were listed and discussed. The suggestions were incorporated in the EMP.

124. The main objectives of the consultation programs were to inform stakeholders on adverse environmental & social impacts, efforts to minimize and mitigate negative impacts while making people aware of the Water supply project benefits. Different techniques of consultation with stakeholders were used during project preparation (interviews, official meeting, public meetings,

etc.). A socio-economic household survey has been conducted in the project area, covering sample households, to understand the household characteristics, health status, and the infrastructure service levels, and also the demand for infrastructure services. General public and the people residing along the project activity areas were also consulted during visits to the project sites. The stakeholders were involved in developing the IEE through focus group discussions (FGD) and public consultation at project area level, after which views expressed were incorporated into the IEE and in the planning and development of the project.

125. A workshop on Environment and Social safeguards has been arranged on 19th-20th December 2022 at Agartala for all the ULBs (main stakeholders) and project executing and implementation agencies. The primary intent of the orientation workshop was to enhance the knowledge base of the ULB officials, TUDA officials and officials of UDD on the mentioned disciplines. Focus Group Discussions (FGD) have been carried out at different locations (wards) of the project area. In **Khowai** Stakeholder Consultation has been carried out at 3 locations: with 41 nos. of participants. Among 41 participants, female no. covers 29%. FGD has also been carried out with 59 persons, out of which almost 90% are female. In **Mohanpur** Stakeholder Consultation has been carried out at 3 locations; with 32 nos. of participants (Female- 31%). In FGDs Total 74 persons participated in discussion, out of which almost 95% are female. In **Ranirbazar** Stakeholder consultation was attended by 31 stakeholders (19% female) FGDs was conducted along the project alignment in the months of March and October 2022 with 64 participant (75% female). Important issues or concerns that were raised by the stakeholders during consultations along with photographs and attendance sheets are provided in **Appendix 8**. All participants are expressed need for the project and willingness to take it up and stakeholders were very supporting of the project and promises to extend full cooperation during the construction phase as the activities are proposed to improve the water supply service levels and the living standards. Quality of supplied water is more or less good, only concentration of iron is high. Further a project-level consultation meeting will also be conducted in the project area.

126. **Summary of Stakeholder Consultation.** It was observed that people are willing to extend their cooperation as the proposed activities are to enhance the infrastructure service levels and the living standard of the public. The public expressed their concern regarding the nuisance and disturbance (dust, road closure and traffic management activities) during construction. Team explained about EMP which will be implemented during construction. Following are the observations made by the stakeholders. Project team responded to the queries.

- (i) The project area has insufficient and inadequate drinking water supply. Households are facing severe water crisis during the summer season when the ground water level drops.
- (ii) High iron content in drinking water.
- (iii) The representative from community raised issue regarding the existing water supply quality is not up to the mark. People are concerned about the poor supply (two times in a day for 1 -2 hour each time) and quality of water.
- (iv) People are supportive of the project and understand that proposed works will improve health and environmental conditions of town and chances of waterborne diseases will be mitigated.
- (v) Women had heard about the proposed project and welcomed it as women are facing many problems in fetching water for hours.
- (vi) Aware of short-term impacts during the works such as dust generation, noise level, access problem, inconvenience for public and movement of vehicle. People demanded for the measures of dust suppression such as water sprinkler to control dust and noise during construction phase. Project team informed stakeholders of

- the proposed mitigation measures.
- (vii) It was also informed no road closures anticipated due to this work, and if needed during the construction phase, alternative access will be provided. Short term impact explained to local public and it assured that the measures will be included in the Environment Management Plan.
- (viii) Stakeholder expressed their concern regarding water charges, affordability, disturbance, and loss of business due to the work in market areas, dust, road closure etc.).
- (ix) Stakeholders also indicated that a public notice on works, and awareness programs to be conducted
- (x) The project team explained the proposed mitigation measures to mitigate / minimize such issues. Attention of stakeholders drawn to the EMP, and explained to them how the construction phase issues by avoided, minimized, or mitigated and managed.

2. Consultation during Implementation

127. Prior to start of construction, PIU in coordination with the local bodies will conduct information dissemination sessions at various places and solicit the help of the local community, leaders/ prominent for the project work. Focus group meetings will be conducted to discuss and plan construction work (mainly pipeline work) with local communities to reduce disturbance and other impacts and regarding the project grievance redress mechanism. A constant communication strategy will be established with the affected communities to redress the environmental issues likely to surface during construction phase. Consultation will continue during implementation and reported through environmental monitoring reports to ADB, semiannually during construction and annually during operation until project completion.

C. Information Disclosure

128. Executive summary of the IEE will be translated in Bengali (local language) and will be made available at the offices of PMU, PIU, Nagar Panchayet and will be displayed on the notice boards. Hard copies of the IEE will be accessible to citizens to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE in English and Executive Summary in Bengali will be placed in the official website of the TUDA (PIU), UDD (PMU) after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

129. Public information campaigns to explain the project details to a wider population is being conducted. Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plan. Prior to start of construction, the cluster- PIU will issue 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.

130. 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.

VIII. GRIEVANCE REDRESS MECHANISM

A. Common Grievances Redress Mechanism

131. A common grievance redress mechanism (GRM) will be in place to receive, evaluate, and facilitate the resolution of social, environmental or any other project related grievances. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The public awareness campaign will generate awareness of the project and its grievance redress procedures. The campaign will ensure that the poor, vulnerable, and others know about the GRM.

132. The GRM will provide an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to facilitate and address grievances at each stage. ULB-wide public awareness campaigns will ensure that awareness of grievance redress procedures is generated through the campaign. The project coordinator (urban and tourism), supported by independent consultants (social and environment), will be responsible for timely grievance redress on environmental and social safeguards issues.

133. Besides the project's grievance redress mechanism, the state also has a centralized public grievance redress monitoring system (CPGRMS) where the general public can file grievances through a dedicated web portal (grievance.tripura.gov.in). The general administrative (administrative reforms) department is the nodal agency, and an officer of the rank of joint secretary is responsible for its functioning. Each department of the state has nominated officers to receive the grievances. TUDA and DOT have nominated officers of the rank of Deputy Director as nodal officers, whose names and contact details are provided on its website. The affected persons can also lodge their complaints through this online portal.

134. **Information to the stakeholders about the GRM:** The stakeholders, including affected persons, will be informed about the GRM under the project and of the state through public consultations, disclosures, and distribution of public information booklets (PIB). In the case of illiterate DPs, the information will be provided verbally during meetings with them.

135. **Who can complain:** A complaint can be registered by stakeholders directly or indirectly affected by the project. A representative can register a complaint on behalf of the affected person or group, provided that the affected person or group identifies the representative and submits evidence of the authority to act on their behalf.

136. **What the Grievance/Complain should contain:** Any comments, complaints, queries and suggestions pertaining to safeguard compliance - environment, involuntary resettlement, and indigenous people, design-related issues, compensation, service delivery or any other issues or concerns related to the project. The complaint must contain the complainant's name, date, address/contact details, location of the problem area, and the problem. A sample grievance registration form is provided in Appendix 9.

137. **Where and How to file a Complaint:** The complaint can be filed both online and offline. The people can submit their complaints at the contractor's site office or at PIU/PMU office. In

138. **Documentation:** PMU, with the support of PIUs, will be responsible for the timely registration of grievances, related disclosure, and communication with the aggrieved party. PMU will also ensure that all the details from submission to resolution are well recorded and documented.

139. **Grievance/Problem Redress through Participatory Process:** The PMU and PIUs must make efforts to resolve the problems and conflicts amicably through a participatory process with the community and the ULBs. In case of immediate and urgent grievances in the complainant's perception, the contractor and supervision personnel from the PIU will provide the most easily accessible or first level of contact to resolve grievances quickly. Contact phone numbers and names of the concerned staff and contractors will be posted and displayed at all construction sites.

140. **Grievance Redressal Committee:** The GOT will establish the grievance redressal committees at the site, PIU and PMU levels to provide a mechanism to mediate conflict and disputes concerning compensation payments and cut down on lengthy litigation. The following will be the composition of the GRCs.

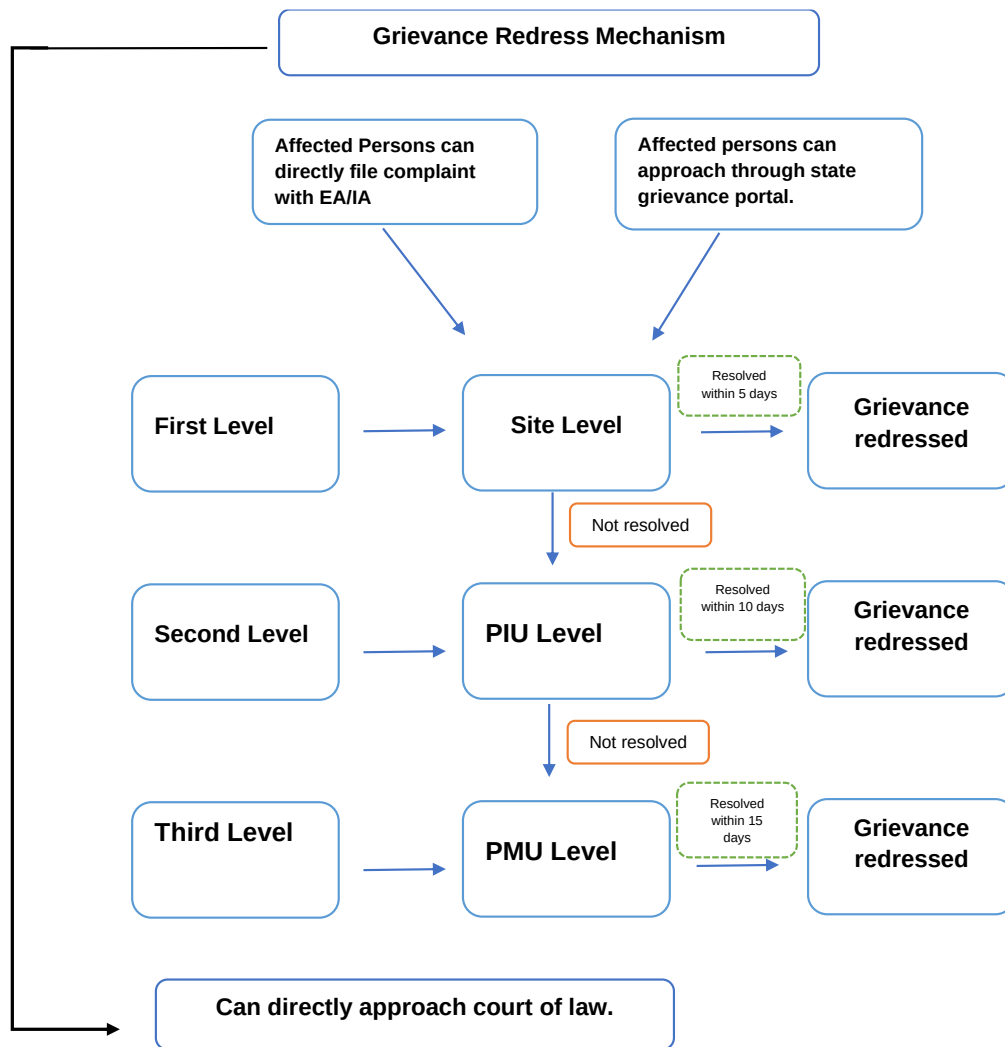
- (i) **Site Level GRC (1st level):** The site-level GRC will comprise a Junior Engineer, PIU, a field engineer of PSMC, safeguard support staff of PSMC, a social supervisor of the contractor and a representative from the affected community (as and when required). The effort will be made to resolve issues on-site, in consultation with each other and within five days of receipt of a complaint/grievance.
- (ii) **PIU Level GRC (2nd level):** All grievances that cannot be redressed within five days at the field level will be brought to the notice of the PIU-level GRC established in each PIU. The PIU-level within two days of receipt of the complaint to determine the merit of each grievance brought to the committee. GRC at the PIU level will be headed by Project Manager (executive/ assistant engineer)- focal for safeguards, and include the construction manager of PSMC, safeguards specialists of PSMC, and the Project Manager of the concerned contractor as members. The PIU-level GRC will also co-opt the representative of line departments (PWD, ULB) and a representative from the affected community, as and when required, including indigenous peoples communities or CSO working with indigenous peoples, as and when required.¹⁶
- (iii) **PMU / State Level GRC (3rd level):** In case the grievances are not addressed at the PIU level within 10 days of receipt, the same shall be brought to the notice of the PMU-level GRC. The PMU-level GRC will comprise of Project Director as chairman, a Co-Project Director as co-chairman, a Project Coordinator (Urban and Tourism) as member secretary, environment safeguards officer of PMU and social, gender officer of PMU, women representatives from the line departments (ULB, PWD, Environment and Forests) and representative of affected community (including indigenous people community)¹⁷. The committee can co-opt any other member required for the resolution of the grievances. The GRC at the PMU level will resolve the grievance within 15 days of receiving the complaint.

¹⁶ In case of any components with impact on indigenous people, GRC will have representative from affected indigenous people community or NGO working with indigenous people groups.

¹⁷ In case of any components with impact on indigenous people GRC will have representative from affected indigenous people community, including at least one female indigenous person or NGO working with indigenous people groups.

141. The complainant will be informed in writing about the resolution of their complaint or the decision of the grievance redress committees. The complainants are free to approach the court of law at any time of their own will 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.

Figure 62 below shows Grievance Redressal Mechanism for the project.

Figure 62: Grievance Redressal Mechanism (GRM)

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

142. An environmental management plan (EMP) is being developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

143. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between Project Management Unit (PMU), Project Implementation Unit (PIU) / TUDA, ULBs (Nagar Panchayat/ Municipal Council), Consultants and Contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the sub project; and (v) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

144. The DBO Contractor will submit to Cluster - PIUs, 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. The approved Site-Specific Environmental Management plans will be disclosed in the project website & website links will be provided in Semi- annual Environment Monitoring Report.

145. A copy of the EMP/approved SEMP will be always kept on site during the construction period. The approved EMP to be included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

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

147. The following tables show the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring.

Table 22: Design Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for monitoring	Cost and Source of Funds
Location impacts of proposed components	Nearby community may be affected due to increased pollution during construction and operation	(i) sites should be selected so that nearby community may have no or minimum impact due to proposed works (ii) Mitigation measures are prepared and included in design and EMP is attached with contract documents	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
Seismic sensitivity	Damage to infrastructure and potential risks: project area in High earthquake risk zone (Zone V)	(i) Designs of project component structures shall comply with relevant codes of design such as Bureau of Indian Standard (BIS) specifications for earthquake resistant design (IS: 1893: Criteria for earthquake resistant design of structures).	DBO Contractor	PMU	Project Costs
Groundwater source	Groundwater contamination	(i) Prevent flow of untreated wastewater in the drains (ii) Measures should be taken to control the open defecation, and to close all unsafe latrines (for example pit latrines). (iii) Awareness programs shall be conducted regarding the sanitation practices and its effect on groundwater quality	PIU	PMU	PMU costs
Existing WTPs	Environment and health impacts due to improper disposal of wastewater and sludge, poor chemical handling, waste management and occupational health and safety	(i) Conduct detailed technical assessment of WTP during the detailed design phase and identify the improvements required. (ii) Conduct raw and treated water quality monitoring (at inlet and outlet) (iii) Undertake necessary improvements at the WTPs either part of the project or through DWS (iv) Ensure that WTPs are improved as required, and ensure that treated water quality meets the drinking water standards, and waste management, material management and health and safety practices are improved	PIU / DWS	PMU	DWS / PMU costs

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for monitoring	Cost and Source of Funds
Design of water supply system	Source sustainability and efficiency	(iii) Select sustainable water source (iv) The entire system is designed to maintain optimal flow and terminal pressure, and optimizing the overall energy usage (v) To meet the drinking water standards, implementation of a water quality surveillance program (vi) Using low-noise and energy efficient pumping systems (vii) Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas (viii) Provision of appropriate personal protection equipment to the workers and staff	Contractor / Cluster-PIUs	PMU	Project Costs
Layout plan of OHSR, DTW	Tree cutting	(i) Minimize removal of trees by adopting to site condition and with appropriate layout design of OHSR and location of DTW- IRP- GLSR (ii) Obtain prior permission for tree cutting, if any (iii) Plant and maintain 5 trees for each tree that is removed	Contractor / Cluster-PIUs	PMU	Project Costs
Energy Efficiency	Loss of natural resources	(i) Use energy efficient electrical equipment Provision of use of energy efficient equipment in contract agreements and BOQ	Contractor / cluster-PIUs/ PIU	PMU	No cost required
Incorporating EMP and Health and Safety requirements into Contractor Bid Document	Implementation of the EMP	(i) The EMP should be included in the Bid Document so that the selected Contractor understands the issues and makes necessary plans to prepare and implement the EMP (ii) Health and safety requirements should be incorporated as part of the contract bid	Contractor / cluster-PIUs/ PIU	PMU	Project Costs

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for monitoring	Cost and Source of Funds
		document so that the selected Contractor understands the issues and makes necessary plans to prepare and implement the health and safety requirements.			
Physical Cultural resource	Encroachment/ damage to protected monuments and chance finds	(i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work (ii) Stop work immediately to allow further investigation if any finds are suspected (iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol	Contractor / cluster-PIUs/ PIU	PMU	Project Costs

Table 23: Pre-Construction Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
Legal compliance - Consents, permits, clearances, NOCs, etc.	Environmental legal non-compliance may attract legal actions Failure to obtain necessary consents, permits, NOCs etc. can result to design revisions and/or stoppage of works	▪ All necessary consents, permits, clearance, NOCs, etc. prior to award of civil works must be obtained ▪ All necessary approvals for construction will be obtained by contractor before start of construction ▪ It is acknowledged in writing and report on compliance of all obtained consents, permits, clearance, NOCs, etc. are provided. ▪ Detailed design drawings and documents are included.	Cluster-PIUs, PIU and PMSC	PMU	Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PIU./ Cluster-PIU

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
Environmental monitoring of baseline conditions of air, noise, water and soil	To establish base line environmental conditions	Environmental monitoring through NABL approved laboratory	DBO Contractor	PMSC and PIU	Contractor
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area	- Operators of these utilities have been preliminary identified and included in the detailed design documents to prevent unnecessary disruption of services during construction phase; - DBO Contractor will prepare and implement a contingency plan to include actions to be taken in case of unintentional interruption of services. - Consult and provide prior information to affected households and business (at least 1 week prior) on the intended utility shifting and likely disruptions in services	Contractor in collaboration with Cluster-PIUs, and with approval of PMSC/ PIU	PMSC and PIU	Project Cost
Construction work camps, stockpile areas, storage areas, and disposal areas.	Conflicts with local community; disruption to traffic flow and sensitive receptors	(i) Construction camp to be set up near major work site DTW and OHSRs (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems (iii) Do not consider residential areas (iv) Extreme care will be taken in selecting sites to avoid direct disposal waste/ excess earth near water body which may inconvenience the community. If required, for excess spoil disposal, (a) sites will be selected from barren, infertile lands. In case agricultural land	Contractor to finalize locations in consultation and approval of Cluster-PIUs, PMSC	PMSC and PIU	Project Cost

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
		selected, written consent will be taken from landowners; (b) debris disposal site will be selected 200 m away from surface water bodies; (c) no residential areas be located within 50 m downwind side of the site; and (d) site will be selected 100 m away from sensitive locations like settlements, ponds/lakes or other water bodies.			
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	- Construction materials are obtained only from government approved quarries with prior approval of cluster-PIUs/ PIU - Cluster-PIUs ensured that quarry sources have all necessary clearances/ permissions in place prior to approval - Contractor submits to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) - Creation of new borrow areas, quarries etc., to be avoided for the project (work is small); if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance prior to approval by PIU	Contractor	PMSC and PIU	Project Cost
Social and Cultural Resources	Risk of archaeological chance finds Works near local religious / cultural places may inconvenience	Chance finds (i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; (ii) Stop work immediately to allow further investigation if any finds are suspected; (iii) Inform local Archaeological Department if a find is suspected and take	DBO Contractor	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
	local community	any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol Works near religious / cultural places (iv) Consult with concerned religious authorities, nearby people and devotees 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 (v) Adjacent to religious/ social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building. (vi) 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 time to the religious places, • Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.			

Table 24: Construction Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Environmental Management Plan (EMP) Implementation Training along with COVID 19 safety	Irreversible impact to the environment, workers, and community, Impact due to effect of COVID 19				

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		19(SOP), core labor laws, applicable environmental laws, etc.			
Air Quality	Emissions from construction related vehicles, equipment, machinery, resulting to dusts and increase in concentration of vehicle related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons	For all construction works ▪ The soil and stockpiled material are damped down on site by water sprinkling ▪ Tarpaulins are used to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks; ▪ A dust screen around the construction sites specifically at OHSRs site to be provided. Extra protection is required near sensitive receptors like school, Anganwadi, religious places located nearby the construction site. ▪ Wheels and undercarriage of haul trucks are cleaned prior to leaving construction site/quarry ▪ Sprinkling water and unloading inside the barricaded area will be made to Control dust generation while unloading the loose material (particularly aggregate, soil) at the site ▪ Water is used to maintain soils in a visible damp or crusted condition for temporary stabilization ▪ Water to be used prior to leveling or any other earth moving activity to keep the soil moist throughout the process ▪ Tarpaulins are used to cover the soil stocked at the sites ▪ Access to be controlled to work area, preventing unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance to minimize dust generation	DBO Contractor	PMSC and PIU	Cost for implementation of

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		- All construction equipment and machineries should be fitted with pollution control devices and have a valid pollution under control (PUC) certificate <u>Pipeline works</u> - Barricading the construction area using barricade or use of caution tape - Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.), to the barricaded/ demarcated area - Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area - Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded - Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done. - Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for backfilling, this will avoid stocking of material, and minimize the dust. - Backfilled trench at any completed section after removal of barricading will be the main source of			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		disposed of through approved vendors of Pollution Control Board; (x) Burning of construction and/or domestic waste are prohibited; (xi) Wastes will be not haphazardly dumped/ thrown within and around the project site and adjacent areas; proper collection bins to be provided, and awareness to be created to use the dust bins. (xii) Site clearance and restoration will be done immediately after the completion of construction work to restore to the original condition; cluster-PIU ensures that site is properly restored prior to issuing of construction completion certificate.			
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Prepare a list of affected utilities and operators if any; and (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Ecological Resources Terrestrial	Loss of vegetation and tree cover	(i) Minimize removal of vegetation and disallow cutting of trees; (ii) If tree-removal will be required, obtain tree-cutting permit and (iii) Plant 5 native trees for every one that is removed.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Accessibility	Traffic problems and conflicts near project locations and haul road Impact on access to house and road user particularly	Hauling (material, waste/debris and equipment) activities (i) Transportation routes to be planned so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites (ii) Transport and hauling activities will be scheduled during non-peak hours;	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	during laying of pipes	(iii) Entry and exit points will be in areas where there is low potential for traffic congestion; (iv) Vehicles to be driven in a considerate manner (v) Affected public will be notified by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (vi) Separate demarcated access will be temporarily arranged for nearby sensitive receptors like school. Anganwadi, religious places & health center located adjacent to the proposed construction areas. Pipeline works (i) Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the as and when required (ii) Leave spaces for access between mounds of soil to maintain access to the houses / properties (iii) Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(iv) Inform the affected local population 1-week in advance about the work schedule (v) Avoid work during day time when community facilities such as educational institutes, healthcare centres, religious places, markets will be operating. Also provide alternative access. (vi) Plan and execute the work in such a way that the period of disturbance/ loss of access will be minimum. (vii) Keep the site free from all unnecessary obstructions; (viii) Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours			
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan . Contractor to Implement RP and to follow mitigation measures prescribed such as- (ii) Leave spaces for access between mounds of soil; (iii) Provide walkways and metal sheets where required for people; (iv) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	DBO Contractor	PMSC and PIU	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Socio-Economic - Employment	Generation of temporary employment and increase in local revenue	(i) Employ local labor force as far as possible; and (ii) Comply with labor laws (Appendix 5)	DBO Contractor	PMSC and PIU	Contractor costs
Occupational Health and Safety	Occupational hazards which can arise during work, safe from COVID 19	(i) All national, state and local core labor laws to be complied with (Appendix 5). Labour license and Workmen Compensation policy to be obtained by contractor before start of construction (ii) Develop and implement site-specific occupational health and Site-specific occupational health and safety (OHS) Plan and Supplementary H & S plan for COVID 19 to be developed and implemented (Appendix 11 shows COVID 19 SOP guideline) which included measures such as: (a) excluding public from the site; (b) maintaining social distancing for protection from COVID 19 infection; (c) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask, face mask and ear plugs; (d) OHS Training and COVID 19 awareness H & S training for all site personnel; (e) complete COVID 19 vaccinations for workers, (f) documented procedures to be followed for all site activities including follow of SOP for COVID 19 to be developed for the project and H & S plan; and (g) documentation of work-related accidents;	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(iii) Availability of First aid box/ facility throughout the project period; (iv) Medical insurance and tie-up with local hospitals to be provided for workers; (v) All installations will be secured from unauthorized intrusion and accident risks; (vi) Potable drinking water to be provided for the workers; (vii) Clean eating areas to be provided where workers are not exposed to hazardous or noxious substances; (viii) To provide health and safety orientation training including COVID 19 risk and mitigation 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; (ix) Visibility of workers to be ensured using high visibility vests when working in or walking through heavy equipment operating areas; (x) Moving equipment will be outfitted with audible back-up alarms; (xi) Sign boards will be provided for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage is in accordance with international standards and are well known to, and easily understood by workers, visitors, and the general public as appropriate; (xii) Workers will be disallowed exposure to noise level greater than 85 dB (A) for a duration of more than 8 hours per day			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		without hearing protection. The use of hearing protection shall be enforced actively. (xiii) Standard Operating Procedure (SOP) for the project and Supplementary H & S plan for COVID 19 will be prepared which cover, (xiv) General instruction to follow to prevent the spread of COVID-19 in construction workplace (xv) Worksite prevention practice at work site, office, during meeting, travelling, etc. (xvi) Precaution to be taken at workmen habitat/ camp (xvii) Use of PPEs: face mask – hand gloves, maintaining social distancing, disinfection, requirement of awareness covered under the H & S plan.			
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation and pipe laying work	(i) Movements of construction vehicles are restricted to defined access roads and demarcated working areas (unless in the event of an emergency) (ii) Strict speed limit (20-30 kmph) is enforced for plying on unpaved roads, construction tracks (iii) Night-time haulage is by exception only, as approved by the cluster-PIU to minimize driving risk and disturbance to communities (iv) Safe practices are adopted for micro tunneling- (in case of major road crossing) (v) Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions	DBO Contractor	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(vi) Restrict speed of the vehicle and equipment near sensitive receptors (vii) Separate barricading needs to be provided near adjacent sensitive receptors like school, Anganwadi, health center and religious places; (viii) All drivers should pass through safety and training sessions (ix) Public access will be restricted through the use of barricading and security personnel at pipe laying work locations (x) Warning signs, blinkers will be attached to the barricading to caution the public about the hazards associated with the works, (xi) The period of time when the pipeline trench is left open will be minimized through careful planning (xii) Control dust pollution –dust control measures will be implemented as suggested under air quality section (xiii) Vehicles will be regularly maintained and manufacturer- approved parts will be used to minimize potentially serious accidents caused by equipment malfunction or premature failure. Road signs and flag persons will be there to warn of on-going trenching activities. (xiv) Road signs and flag persons will be provided to warn of on-going trenching activities.			
Safety of sensitive groups (children, elders etc.) and	Trench excavation in narrow streets will pose high risk to	(i) Provide prior information to the local people about the nature and duration of work	DBO Contractor	PMSC and PIU	Cost for Implementation of mitigation measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
others pedestrians in narrow streets	children and elders in the locality	(ii) Conduct awareness program on safety during the construction work (iii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day (iv) Provide barricades, and deploy security personnel to ensure safe movement of people and to prevent unnecessary entry and to avoid accidental fall into open trenches, (v) Implement additional safety features for working near the schools; isolate work site from the school access road; provide proper barricading to prevent entry of children / public into work site; create awareness among school children and staff on construction safety			responsibility of contractor.
Work Camps and worksites	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Unsanitary and poor living conditions for workers	(i) Camp site will be established near major construction i.e DTW, OHSRs site (ii) No Tree will be cut for settling of camp. (iii) Camp site will not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas (iv) The workers living areas and material storage areas will be separated clearly (v) Proper temporary accommodation with proper materials, adequate lighting and ventilation to be provided, appropriate facilities will be provided for winters and summers; conditions of livability at work camps	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		should be ensured and maintained at the highest standards possible at all times; (vi) Cluster-PIU should be consulted before locating project offices, sheds, and construction plants; (vii) Removal of vegetation is minimized and cutting of trees disallowed without permission from concerned authorities (viii) Camp should be protected from COVID 19 health risk. All Health and safety procedure to be followed for operation of camp (H & S plan for COVID 19 will be used as ref. document) during stay, cooking, eating, use of toilet-common space etc. (ix) Self- hygiene, regular disinfection of entire camp and toilet, maintaining of social distancing to be continued for protection from COVID 19 infection (x) Unknown person will be not allowed within the camp (xi) Camps will be provided with proper drainage, without any water accumulation (xii) Maintenance of hygienic environment at staying area, cooking area and toilet (xiii) Drinking water, water for other uses, and sanitation facilities for employees to be provided (xiv) Employees will be prohibited from cutting of trees for firewood; contractor provided proper facilities including cooking fuel (oil or gas; fire wood not allowed)			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(xv) Employees will be trained in the storage and handling of materials which can potentially cause soil contamination (xvi) Used oil and lubricants will be recovered and removed from the site (xvii) Solid waste to be managed according to the following preference hierarchy: reuse, recycling, and disposal to designated areas; provide a compost pit is provided for biodegradable waste, and non-biodegradable / recyclable waste are collected and sold in local market (xviii) All wreckage, rubbish, or temporary structures which no longer required should be removed (xix) At the completion of work, camp area will be cleaned and restored to pre-project conditions, and report will be submitted to Cluster-PIU; they will review and approve camp clearance and closure of work site Guideline for worker's camp attached as Appendix 10.			
Impacts due to night works (if required as per nature of works and feasibility at site)	Occupational hazards which can arise during work at night in extreme and unavoidable cases	(i) Contractors should have hand held noise level meter for measurement of noise during night hours (ii) Contractors should have hand held lux meter for the measurement of illumination during night hours (iii) Preferably electrical connections are available for running equipment's otherwise sound proof/super silent Diesel Generator set should be available (iv) Sound level should not increase as per EMP (v) Illumination should be adequate as required according to nature of works	DBO Contractor	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(vi) As far as possible ready-mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site (vii) All the noise activity like hammering, cutting, crushing, running of heavy equipment's should be done in day time and avoided in night time (viii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works (ix) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night (x) 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 (xi) 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 (xii) Horns should not be permitted by equipment and vehicles (xiii) Workers should not shout and create noise (xiv) First aid and emergency vehicles should be available at site (xv) Emergency preparedness plan should be operative during night works			

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(xvi) Old persons and pregnant women and women having small kids should not work in night time (xvii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise (xviii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night work.			
Social and Cultural Resources	Risk of archaeological chance finds Works near local religious / cultural places may inconvenience local community	Chance finds (i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; (ii) Stop work immediately to allow further investigation if any finds are suspected; (iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol Works near religious / cultural places (iv) Consult with concerned religious authorities, nearby people and devotees 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 (v) Adjacent to religious/ social sites, undertake excavation and construction work in such a way that no structural	DBO Contractor	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		damage is caused to the religious building. (vi) Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrances/obstacles during such time to the religious places, (vii) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works. (viii) Ensure proper traffic management planning to minimize the disruption to the normal traffic flow in the area and ensure the safety of the people. (ix) Clear the work site of unnecessary material, equipment and debris / surplus soil; do not stock material / soil at the sites (x) Conduct continuous consultations with the local people during the works (xi) Implement additional safety features for working near the schools; isolate work site from the school access road; provide proper barricading to prevent entry of children / public into work site; create awareness among school children and staff on construction safety			
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	DBO Contractor		Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (iii) Guidelines for safety during monsoon is attached as Appendix 14.			
Chance Finds	There are no protected properties in the subproject sites. However, in case of chance finds, contractors will be required to follow a protocol as defined in the mitigation measures.	(i) Consult local Archaeological or museum Department to obtain an expert assessment of the archaeological potential of the site (ii) In case of chance finds, works must be stopped immediately until such time chance finds are cleared by experts	PIU- PMU		
Submission of EMP implementation report	Unsatisfactory compliance to EMP	(i) Appointment of Environment, Health, and Safety (EHS) Supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures	DBO Contractor		Contractor cost
Post- construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) after completion of work; (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities will be restored (iv) All affected structures will be 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) The contractor must arrange the cancellation of all temporary services.	DBO Contractor		Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(vii) Request Cluster-PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.			

Table 25: Operation Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Existing WTPs	Environment and health impacts	(i) Ensure WTPs are delivering water quality meeting drinking water standards (IS 10500-2012) (ii) Ensure that backwash water and sludge is managed properly; no untreated discharge/disposal into environment (iii) Ensure proper chemical handling, overall housekeeping, and health and safety practices	Operator / DWS	PMU	Operating costs
Operation of DTW & IRP, pumping of water	Public health, safety, and environmental impacts • Over abstraction of groundwater through tube well resulting land subsidence • Contaminated groundwater from nearby polluted sources • Noise from pumping will be nuisance to surrounding receptors • Discharge of backwash water from IRP	(iv) Over pumping should be avoided. (v) Conduct water quality monitoring at strategic points in the distribution system (vi) Ensure standard water quality (surveillance procedures and protocols as a key obligation of the contractor with third party checks (vii) Nearby polluted sources should be checked and avoided. (viii) Maintain the mechanical parts as per the maintenance plan to avoid any hazards (ix) Follow MoUD's CPHEEO Manual on Operation and Maintenance of Water Supply Systems (x) Prevent, minimize, and control potential impacts associated with the storage, handling and use of disinfection chemicals (xi) Backwash water from IRP shall be temporarily stored, and clarified water disposed to drains and settled matter to solid waste sites	Operator/DBO contractor	ULB- MC	Operating costs
Check for blockage and leakage problems reducing the water losses	Loss of water, increased demand and inconvenience to consumers and general public	Effectiveness of leak detection and water auditing to reduce the water losses	Operator/DBO contractor	ULB- MC	Operating costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Monitoring of Plantation	Loss of Trees	(i) Monitoring of survival of trees should be done at regular interval and suitable mitigation measures should be taken to protect the trees. (ii) Efforts will be made for proper maintenance of planted trees, shrubs and grasses to maintain greenery and aesthetics (iii) Planted tree should be covered with fence or net	Operator/DBO contractor	PMU	Operating costs
Construction disturbances, nuisances, public & worker safety	All work sites	Implementation of dust control, noise control, traffic management, & safety measures. Extra precaution to be taken during any repairing work near sensitive receptors. All mitigation measures as mentioned in construction phase, same will be applicable for O & M phase. Site inspection checklist to review implementation is appended at Appendix 15.	Operator/DBO contractor	ULB- MC	No cost required
Routine maintenance of DTW and other facilities to ensure delivery of safe drinking water	Health impact due to supply of unsafe drinking water in the system	(i) Ensure periodical maintenance and cleaning of OHSRs, DTW, IRP to ensure delivery of safe drinking water Periodical testing of treated water to ensure treated water quality meets the required standards	Operator/DBO contractor	ULB- MC	O&M Contractor
Occupational health and safety	Health, social and economic impacts on the workers	(i) Provide appropriate PPE and training on its proper use and maintenance. (ii) Provide specific training on COVID 19 issues and availability of relevant specific PPEs for protection (COVID 19 H & S plan as ref material) (iii) Strictly follow H & S protocol as developed for COVID 19 pandemic during operation and maintenance (iv) Use fall protection equipment when working at heights. (v) Maintain work areas to minimize slipping and tripping hazards. (vi) Prohibit eating, smoking, and drinking except in designated areas.	Operator/DBO contractor	ULB- MC	Operating costs
Asset management	Reduction in NRW Increased efficiency of the system	(i) Preparation and implementation of O&M Manual	Operator/DBO contractor	PMU	To be identified
Increased in sewage generation	Water pollution, and impacts on public health and	Sanitation and sewerage/septage facilities needs to be improved/provided in the project area to suit the increased sewage generation	ULB- MC	PMU	To be identified

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	environment	Under AMRUT and Tripura Govt. State fund interception of wastewater from drain and treatment in the STP has been planned. Major drains running the core area of the town with enhance load are identified for interception and diversion to the proposed STP site. Work will be commenced very soon.			

Table 26: Construction Stage Environmental Monitoring Plan

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Surface water	Khowai River and Hoara River (intake, WTP inlet and WTP outlet)	pH, TDS, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity, including other essential parameters as per drinking water standards IS 10500-2012	Once during detailed design for assessment of WTPs	DBO Contractor	PMSC and PIU	Project costs
Groundwater	All three towns – selected DTWs	Essential parameters as per drinking water standards IS 10500-2012	Once during detailed design for assessment of WTPs	DBO contractor	PMSC and PIU	Project costs
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 be developed	Weekly during construction	Supervising staff and safeguards specialists	PMSC, PIU and ULB	No costs required
Tree cutting	DTW, OHSR, Pipe laying, construction/labour camp	Tree cutting permit taken, Tree cutting done	Continuous	Supervising staff, EHS officer and safeguards specialists	PMSC, PIU and ULB	Contractor
Construction, Labour Camp, storage yard Management	Construction, Labour Camp, storage yard sites	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor
Solid waste management	Construction, Labour Camp, storage yard Management	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Construction and demolition waste management	All construction site	As per SEMP and applicable rules and regulations	Monthly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor
Consent to establish of batching plants, crusher, hot mix plant. DG sets etc.	Batching plants, crusher, hot mix plants etc.	Copies of Consents	Periodically	EHS officer, Environment Specialist of consultant	PMSC and PIU	No cost required for monitoring cost for obtaining CTE/CTO from PMU and for others from Contractor
Ambient air quality	Khowai 3 locations, (OHSR and pipe line) critical areas Mohanpur 3 locations, (OHSR and pipe line) critical areas Ranirbazar 3 locations, (OHSR and pipe line) critical areas	PM ₁₀ , PM _{2.5} NO ₂ , SO ₂ , CO	(i) Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2-years period considered)	DBO Contractor	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor
Ambient noise level	Khowai 3 locations, (OHSR and pipe line) critical areas Mohanpur 3 locations, (OHSR and pipe line) critical areas Ranirbazar 3 locations, (OHSR and pipe line) critical areas	Day time and nighttime noise levels	(i) Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2-years period considered)	DBO Contractor	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Surface water quality	One no. for each town if required (suspected water body contamination)	pH, TDS, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity	(i) Once before start of construction (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2-years period considered)	DBO Contractor	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor

Table 27: Operation Stage Environmental Monitoring Plan

Monitoring Field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Monitoring of quality of water supplied to consumers	Consumer end-random sampling in all zones	pH, Nitrite, Nitrate, Turbidity BOD, residual chlorine, Total Alkalinity, Total coliform and Faecal coliform	Quarterly once	Contractor / ULB	ULB/ DWS	O&M costs (water quality will be tested at the internal laboratory part of WTP)
Raw and treated water quality WTPs	Inlet and outlet of WTPs	Essential parameters as per drinking water standards	Prior to start of operation of improved distribution system	Operator / DWS	ULB	O&M costs
Water quality	On 10 DTW locations in 3 towns	pH, Cl, F, NO3, TC, FC, Hardness, Turbidity, DO, Total Alkalinity, heavy metals	Yearly twice (pre and post monsoon)	Contractor / ULB	ULB	O&M costs

B. Implementation Arrangements

148. Urban Development Department (UDD) of Government of Tripura (GOT) is the executing agency, and the implementing agencies are Tripura Urban Planning and Development Authority (TUDA, for urban component) and Tripura Tourism Development Corporation Limited (TTDCL, for tourism component). A Project Management Unit (PMU) will be established with the secretary, UDD as the project director and secretary, Department of Tourism (DOT), GOT, as co-project director. The PMU will also include two additional project directors (one each for urban and tourism), a project coordinator, and an additional project coordinator. Six project implementation units (PIUs) will be established to cover urban and tourism components separately and will be located at Agartala, Udaipur and Kumarghat. Project Management & Supervision Consultant (PMSC) will be engaged to assist PMU and the PIUs for project implementation of the project.

149. At PMU, the project coordinator at PMU will be the nodal officer for environmental, social safeguards and gender and will be responsible for ensuring compliance with ADB's Safeguards Policy Statement (SPS), 2009, during the project implementation, including the monitoring and reporting. PMU will engage a qualified and experienced consultant, designated as environmental safeguards officer (ESO), to support project coordinator in environmental safeguards tasks. Project manager or assistant project manager of PIU will be designated as safeguards focal in each PIU. PMSC team will include an Environmental Safeguards Specialist (ESS), and three support safeguards staff, located in PIUs and will provide all necessary support and expert guidance to PMU and PIUs. Contractor will appoint an Environment, Health and Safety (EHS).

150. **Project Management Unit (PMU).** The PMU will be responsible for planning, management, coordination, supervision and progress monitoring. The PMU has the responsibility of fulfilling environmental requirements of the government and ensuring effective implementation of the environmental management provisions in the IEEs, EMPs and civil works contracts. The following are the key environmental safeguard tasks and responsibilities of the ESO at the PMU:

- (i) ensure project compliance with the statutory environmental requirements, ADB SPS 2009, and loan covenants
- (ii) ensure that draft IEEs prepared based on preliminary designs are updated to reflect the final subproject detailed designs, and are approved by ADB and disclosed prior to bid invitation (for works contracts) and commencement of works (for design-build contract)
- (iii) ensure that IEEs including EMPs are included in bidding documents and contracts
- (iv) Ensure that baseline monitoring as suggested in the EMPs are conducted and base values established prior to commencement of works
- (v) Ensure that detailed environmental audit conducted for existing facilities and corrective actions are included in project for implementation
- (vi) coordinate with design engineers to avoid potential environmental impacts
- (vii) ensure that SEMPs are submitted by contractor and cleared by PIU prior to commencement of works
- (viii) ensure that construction works are not commenced until all applicable government clearances, permits (including those required by construction contractor) are obtained;
- (ix) Oversee and ensure that contractors and their subcontractors comply with labor laws and rules
- (x) ensure that the IEEs including EMPs are updated in case of any change project scope, design or location during implementation

- (xi) confirm compliance with all measures and requirements set forth in the IEEs, the EMPs and any corrective or preventive actions set forth in safeguard monitoring reports;
- (xii) finalize environmental sections quarterly progress reports, and environmental monitoring reports for submission to ADB
- (xiii) ensure availability of budget for safeguards activities
- (xiv) ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
- (xv) assist in setting up of grievance redress mechanism (GRM), identifying grievance redressal committee (GRC) members and developing capacity of GRC members, PIUs, consultants, and contractors in addressing environmental safeguards-related issues/concerns/complaints;
- (xvi) ensure any grievances brought about through the GRM are redressed in a timely manner;
- (xvii) organize periodic capacity building and training programs on safeguards for PMU, PIUs and contractors.

151. Project Implementation Units. The PIUs will be responsible for the day-to-day activities of project implementation in the field and will have direct supervision of all contractors. PIUs will oversee and monitor the day-to-day progress and implementation including environmental safeguards. The following are the key environmental safeguard tasks and responsibilities of the SO safeguards focal at the PIU with the PMDC's support environmental engineer:

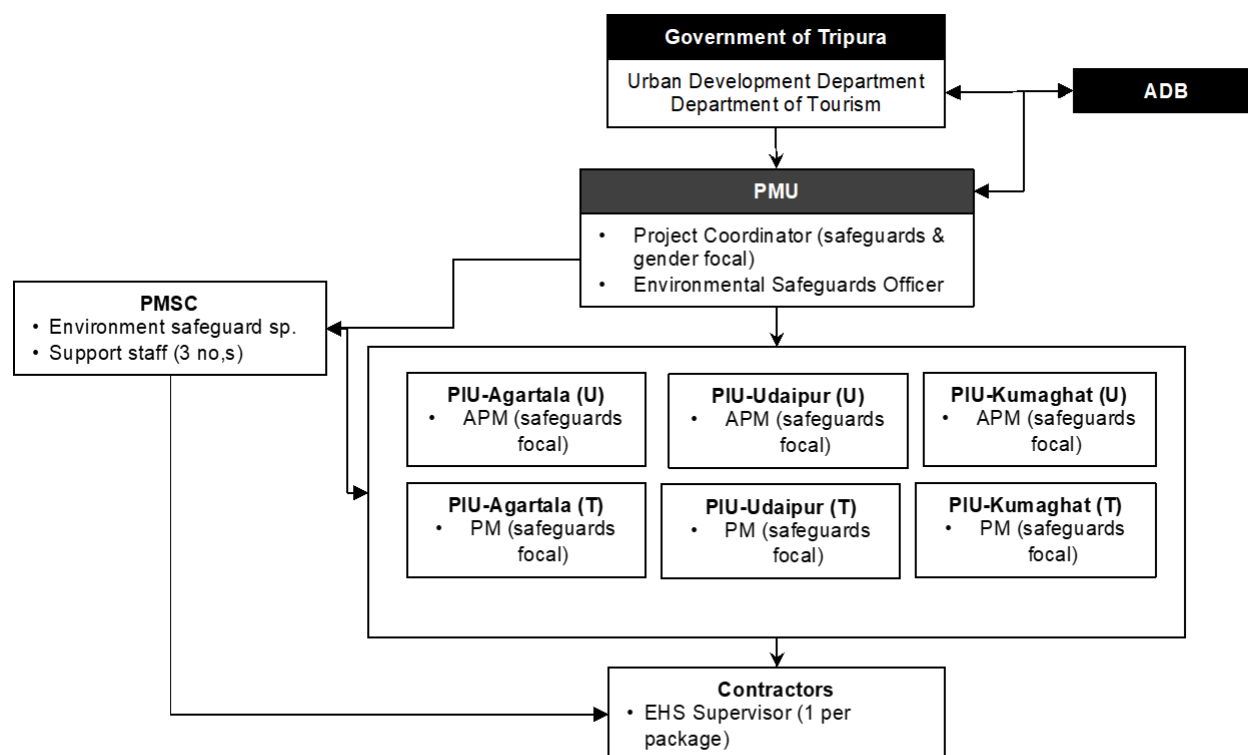
- (i) Promptly report to PMU on any changes in project design / location / scope during the design verification and implementation phase and coordinate with PMC to update IEEs and EMPs
- (ii) Liaise with local offices of regulatory agencies and ensure that clearances /approvals are obtained timely;
- (iii) Take necessary action for obtaining right-of-way prior to start of works;
- (iv) Review and approve contractor SEMP's;
- (v) Oversee implementation of SEMP's by contractors
- (vi) Ensure that contractors and their subcontractors comply with labor legislations and standards; ensure that workers are accommodated, paid and treated according to the requirements
- (vii) ensure strict implementation of occupational health and safety requirements
- (viii) Review monthly reports from contractors on EMP implementation, and support PMU in preparing quarterly reports and SEMRs
- (ix) Ensure continuous public consultation and awareness;
- (x) Coordinate grievance redress process and ensure timely actions by all parties; and
- (xi) Support all other environmental safeguards-related activities and tasks of the PMU as may be needed.
- (xii) recommend issuance of construction work completion certification to the contractor upon verification of satisfactory post-construction clean-up.

152. Project Management and Supervision Consultant. The PMU and PIUs will be supported by PMSC's Environmental specialist and three support environmental engineers. Key tasks of will include, but not limited to, the following:

- (i) Assist in preparing, updating, reviewing, implementing, monitoring, and reporting of all tasks related to environmental safeguards as required
- (ii) Monitoring of EMP implementation, regulatory compliance, grievance redress, reporting etc.,
- (iii) Provide all necessary support and expert guidance to ESO and SO in managing environmental safeguards tasks
- (iv) Work closely with design teams to include environmental considerations in subproject location, design and technical specifications
- (v) Update IEEs and EMPs as needed to reflect detailed designs, changes in design verification and/or implementation phase of subprojects
- (vi) Assist in public consultations, feedback and reporting
- (vii) Ensure that the relevant provisions of EMPs, including costs of implementing the EMPs, are fully included in bid and contract documents, particularly in the bill of quantities and cost line items;
- (viii) Identify statutory clearances / permissions / approvals required and assist in obtaining them;
- (ix) Assist in including standards/conditions of regulatory clearances and consents, if any, in the project design;
- (x) Conduct training, capacity building activities for PMU, PIU and contractors
- (xi) Ensure compliance with ADB's disclosure requirements as per the SPS;
- (xii) Assist PMU/PIUs in reviewing and approving contractor SEMP, and other associated plans
- (xiii) Carry out site verification, and monitor the EMP implementation and ensure compliance by the contractors and subcontractors;
- (xiv) Ensure that contractors and their subcontractors comply with labor legislations; ensure that workers are paid and treated according to the labor legislations
- (xv) Identify any non-compliances or unanticipated impacts and recommend corrective actions
- (xvi) Prepare environmental safeguards section in quarterly reports
- (xvii) prepare semiannual environmental monitoring reports
- (xviii) Assist in operating GRM effectively
- (xix) Advise contractor on appropriate actions on grievances, ensure timely resolution and proper documentation; and
- (xx) Support all other environmental safeguards-related activities and tasks of the PMU and PIUs as may be needed.

153. **Contractor.** The approved draft IEEs and EMPs are to be included in bidding and contract documents. The PMU and PIUs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable laws and regulations relating to environment, health and safety; (ii) reinstate pathways, other local infrastructure, and agricultural land to at least to their pre-project condition upon the completion of construction; (iii) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation, international treaties for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; (c) no discrimination in respect of employment and occupation; (d) allow freedom of association and effectively recognize the right to collective bargaining, and (e) elimination of forced labor; and (iv) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites. The contractor will be required to appoint a full time Environment, Health and Safety (EHS) supervisor on-site to implement the EMP. EHS supervisor will assist contractor in the following:

- (i) Prepare SEMP and submit to PMU/PIU for approval prior to start of construction
- (ii) Comply with the measures forth in the IEEs, the EMPs, and SEMRs
- (iii) Ensure implementation of SEMP and report to PIU/PMC on any new or unanticipated impacts
- (iv) Ensure that necessary pre-construction and construction permits are obtained
- (v) Ensure to adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and
- (vi) Conduct orientation, daily briefing sessions, toolbox talks, to workers on environment, health and safety;
- (vii) provide appropriate worker facilities at the workplace and labor camps as per the requirements and contractual provisions;
- (viii) Carry out site inspections on a regular basis and prepare site-inspection checklists/reports;
- (ix) Record EHS incidents and undertake remedial actions;
- (x) Conduct environmental monitoring (air, noise, etc.,) as per the monitoring plan
- (xi) Prepare monthly EMP monitoring reports and submit to PIU
- (xii) Comply with labor legislations, and ensure that subcontractors also implement labor legislations requirements, through cascading of requirements to subcontractors—HR policy, labor management requirements, any worksite specific grievance redress mechanism.
- (xiii) Work closely with PIU and PMC to ensure communities are aware of project related impacts, mitigation measures, and GRM; and
- (xiv) Receive, record, and redress grievances in an effective and timely manner.
- (xv) Provide the PIU/ PMU with a written notice of any unanticipated environmental, impacts that arise during construction, implementation or operation of the Project that were not considered in the IEE, the EMP;
- (xvi) Reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction;
- (xvii) Site clearance and restoration after the completion of works

Figure 63: Implementation arrangement for Environment and Social Safeguard

ADB = Asian Development Bank; APM = Assistant project manager; EHS = Environment, Health & Safety; IA – Implementing Agency; PIU = Project Implementation Unit; PMSC = Project Management and Supervision Consultant; PMU = Project Management Unit; PM = project manager

C. Capacity Building and Training

154. Safeguard focal of PIU will be trained by Environmental Safeguard Specialist by PMSC on safeguards issues related to the project, EMP, SEMP and GRM. The SEMP, IPPF and GESI action plan will provide 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 EMP, SEMP, IPPF and GESI action plan, (iii) review, updating and preparation of the IEEs, SEMP, RPs, DDRs and IPPs (as required) upon the completion of project detailed design; (iv) improved coordination within nodal departments; (v) monitoring and reporting system; and (vi) project GRM.

155. The estimated cost is ₹3,00,000 (excluding trainings of contractors which is the part of EMP implementation cost during construction) to be covered by the project's capacity building program. The detailed cost and specific modules are being customized for the available skill set after assessing the capabilities of the target participants and the requirements of the project by the Environment Safeguard specialist (ESS) of PMSC.

Table 28: Outline Capacity Building Program on EMP Implementation

Description	Participants and Venue	Estimate (Rs)	Cost and Source of Funds
1. Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement - Government of India and Tripura state applicable safeguard laws, regulations and policies including but not limited to core labor standards, OHS, etc. - Incorporation of EMP into the project design and contracts - Monitoring, reporting and corrective action planning	All staff and consultants involved in the project At PIU-PMU (combined program for all subprojects in one cluster)	150,000	Included in the overall program cost
2. EMP implementation (1/2 day) - EMP mitigation and monitoring measures - Roles and responsibilities - Public relations, - Consultations - Grievance redress - Monitoring and corrective action planning - Reporting and disclosure - Construction site standard operating procedures (SOP) Health & safety, specifically health risk from COVID 19. -- Chance find (archeological) protocol -Traffic management plan Waste management plan - Site clean-up and restoration	All Cluster-PIU staff, contractor staff and consultant involved in the subproject At PIU- cluster- PIUs	150,000 (Lump sum)	Included in subproject cost estimates
3. Contractors Orientation to Workers (1/2 day) - Environment, health and safety in project construction -Health impact and protection from COVID 19	Once before start of work, and thereafter regular briefing every month once. Daily briefing / tool box talk on safety prior to start of work All workers (including unskilled laborers)	100,000	Contractor's cost

D. Monitoring and Reporting

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

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

158. Based on monthly and quarterly reports and measurements, PMU/PIU (assisted by PMSC) is required to submit semi-annual environmental monitoring report (SEMR). Once concurrence from the ADB is received the report will be disclosed on TUDA/PMU websites.

159. ADB will review project performance against the TUTDP 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.

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

E. Environmental Management Plan Implementation Cost

161. Most of the mitigation measures require the contractors to adopt good site practices, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. The costs which are specific to EMP implementation and are not covered elsewhere in the projects are given below. **Table 29** indicates cost estimate to implement EMP.

Table 29: Cost Estimates to Implement the Environmental Management Plan

Sr. No.	Particulars	Stages	Unit	Total No.			Rate INR	Cost INR	Costs Covered By
				Khowai	Mohanpur	Ranirbazar			
A.	Implementation staff								
1	Environment, Health, and Safety Supervisor	Construction	Per month (Effective work period for the town)	24 months	24 months	24 months	70,000.00	50,40,000.00	DBO contractor
	Subtotal (A)							50,40,000.00	
B.	Mitigation Measures								
1	Consent for establishments and consent for operation from TSPCB	Pre construction – not applicable	-	-	-	-	-	-	NA for construction of DTWs, OHSR, pipe laying work
2	Provision for tree cutting and compensatory plantation measures (1: 5 ratio replantation) and buffer zone around OHT /DTW sites	Construction	Per tree	30	100	100	1,000	2,30,000.00	Contract
3	Traffic management at work sites (Pavement Markings, Channelizing Devices, Arrow Panels and Warning Lights)	Construction	Lump sum	To be done	To be done	To be done	80,000.00	2,40,000.00	Contract
4	Provision for COVID-19	Construction	Lump sum	To be done	To be done	To be done	50,000.00	1,50,000.00	Contract

Sr. No.	Particulars	Stages	Unit	Total No.			Rate INR	Cost INR	Costs Covered By
				Khowai	Mohanpur	Ranirbazar			
	preventive measures e.g., mask, sanitizer, etc.								
	Subtotal (B)							6,20,000.00	
C.	Monitoring Measures								
1	Air quality monitoring	Construction	per sample	21	21	21	10,000.00	6,30,000.00	Contract
2	Noise levels monitoring	Construction	Per sample	21	21	21	1500.00	94,500.00	Contract
3	Surface water monitoring	Construction	Per sample	7	9	9	8,000.00	1,84,000.00	Contract
4	Source water quality, water at consumer end	Operation	Lumpsum / year	40,000.00	40,000.00	40,000.00		1,20,000.00	Contract
5	COVID-19 health monitoring at operating sites	Construction	Per thermal gun	5	5	5	5000.00	75,000.00	Contract
	Subtotal (C)							1,087,500.00	
D.	Capacity Building								
1	Introduction and Sensitization to Environmental Issues	Pre-construction	Lump sum	1,50,000	1,50,000	1,50,000	Lumpsum	4,50,000.00	PIU
2	EMP implementation	Pre-construction	Lump sum	1,50,000	1,50,000	1,50,000	Lumpsum	4,50,000.00	PIU
3	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	Lump sum	1,00,000	1,00,000	1,00,000	Lumpsum	3,00,000.00	Contract
	Subtotal (D)							12,00,000.00	
E	Civil Works								

Sr. No.	Particulars	Stages	Unit	Total No.			Rate INR	Cost INR	Costs Covered By
				Khowai	Mohanpur	Ranirbazar			
1	Water Sprinkling for dust suppression	Construction	KL	2000	2000	2000	120	7,20,000.00	Civil works contract under DBO Contractor
2	Rainwater Harvesting for water conservation	Construction at proposed WTP sites	Nos.	1	1	1	4,38,819.00	13,16,457.00	Civil works contract under DBO Contractor
	Subtotal (E)							20,36,457.00	
F	Barricading								
1	Providing and fixing Barricading using 40 mm dia M.S. pipe vertical and horizontal posts	Construction	m	Already included in Civil cost					Civil works contract under DBO Contractor
2	Providing and fixing using 40 mm dia M.S. pipe ("B" class) as vertical post and PVC tape	Construction	m	Already included in Civil cost					Civil works contract under DBO Contractor
G	Grievance Redressal Mechanism			350000	350000	350000	Lumpsum	10,50,000.00	
	Total (A+B+C+D+E+F+G)						INR	1,10,33,957.00	
Contractor Cost							INR	1,01,33,957.00	
PIU Cost							INR	9,00,000.00	
Total							INR	1,10,33,957.00	

X. CONCLUSION AND RECOMMENDATIONS

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

163. The main design impacts of water supply system in general are due to abstraction of ground water. In Tripura, sufficient groundwater is available, and entire state is designated as “safe” in terms of state of groundwater development. Ground water withdrawal permission has already been obtained. Water supply is also provided partly from surface water sources in Khowai and Raninbazar. The existing surface water based systems, including the water treatment plants (WTP) will be used to meet part of the water demand. Preliminary audit of WTPs conducted during the IEE indicate no legal non-compliance, however, suggests improvements such as in backwash and sludge management systems, chemical storage/handling etc., Detailed technical assessment will be conducted by DBO contractor during the detailed design, and PMU will ensure that necessary improvements are taken up by Department of Water Supply (DWS).

164. Locations for subproject components are selected on Government land. There are no environmentally, or historically or archeologically sensitive or protected areas within or adjoining the project sites. Nearest protected area to Khowai town is at 5 km, located in Bangladesh.

165. Construction activities will be confined to the selected sites, and the interference with the general public and community around will be minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste, and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupation health and safety aspects including COVID 19 risks and prevention. During the construction phase of pipeline work along the public roads, impacts will arise from the construction dust and noise; from the disturbance of residents, businesses, traffic by the construction work, and from the need to dispose of moderate quantities of waste soil. The social impacts (access disruptions) due to construction activities are expected to be minimal. Trenchless technology will be suggested at critical sections where pipeline crosses the main transportation corridors. These are all general impacts of construction in urban and habitation areas, and there are well developed methods of mitigation that are suggested in the EMP.

166. Anticipated impacts of water supply during operation and maintenance will be related to ground water withdrawal, storage, and distribution. Water supply system will be operated using the standard operating procedures following an operating manual, which will be prepared by the Contractor. Thus, considering the design and proposed operational procedures, it is unlikely that there will be any significant negative impacts due to operation of water supply system. The Contractor / Operator will implement the operation stage EMP.

167. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation. The project’s grievance redress mechanism will provide the citizens with a platform for redress their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints.

168. The EMP will assist the project agencies and contractor in mitigating the environmental impacts and guide them in the environmentally sound execution of the proposed project. A copy of the EMP/approved SEMP shall be always kept on-site during the construction period. The EMP shall be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

169. The project will benefit the general public by contributing to the long-term improvement of water supply system and community livability in the project area, Khowai, Mohanpur and Ranirbazar towns. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.

170. **Conclusion.** Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government guidelines. As per requirement, this IEE shall be updated after finalization of design by DBO contractor and later in case of change in location or scope of the package during implementation. Report will be reviewed and approved by PIU/PMSC before sending to ADB.

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

- (i) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design;
- (ii) Include this IEE in Bid and contract documents;
- (iii) PMU to ensure that detailed technical assessment of existing WTPs in Khowai and Mohanpur conducted during detailed design, and necessary improvements are undertaken by DBO contractor or Department of Water Supply (DWS) prior to start of operation of improved water supply
- (iv) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location;
- (v) Conduct safeguards induction to the contractor upon award of contract;
- (vi) Ensure that the construction and demolition waste generated from demolition is existing structure to be reused and disposed as per guidelines stipulated in Construction and Demolition Waste Management Rules 2016
- (vii) Ensure contractor appointed qualified environment, health, and safety (EHS) officers prior to start of works;
- (viii) Timely disclosure of information and establishment of GRM;
- (ix) Involvement of contractors, including subcontractors, in first level GRM;
- (x) Strictly supervise EMP implementation;
- (xi) Continuous consultations with stakeholders;
- (xii) Documentation and reporting on a regular basis as indicated in the IEE.
- (xiii) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

Appendix 1: REA Checklist

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST- KHOWAI

Country/Project Title: India/ Tripura Urban & Tourism Development Project
Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
Densely populated?		✓	Khowai is not densely populated. The subproject area comprises different part of the town, Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The areas comprise of residential structures, commercial establishments, and open area. The developmental activities such as construction works are ongoing at an average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within the already developed urban area of Khowai town.
Cultural heritage site		✓	Shyamsundar Ashram Tila, a brick-built Buddhist monastic complex archaeological site preserved by ASI located about 37.2 km (aerial Distance) from Khowai. Water supply project components are not located nearby the ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of any protected area
Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity
Bay		✓	Not Applicable
SCREENING QUESTIONS	Yes	No	REMARKS
B. Potential Environmental Impacts			
Will the Project cause...			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	No excessive pumping of ground water is planned. DTW will be constructed at different areas of the town, and only permissible amount of water will be pumped out for water supply.
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw		✓	No new surface water intake is planned.

SCREENING QUESTIONS	Yes	No	REMARKS
water for water supply with other beneficial water uses for surface and ground waters?			There will be ground water abstraction through deep tube well as a part of this sub project. No conflicts expected.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Raw water is ground water from deep tube well and will be passed through IRP. After release from IRP water will be stored for distribution. Ground water generally free from pathogens and satisfactory for distribution. Water quality testing should be done before storage and distribution.
Delivery of unsafe water to distribution system?		✓	Raw Ground water will be passed through IRP and distribution of unsafe water not expected.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Over pumping will be not allowed
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project town. The major drains running the core area of the town are identified for interception and diversion to the proposed STP site. Sewerage system has been designed considering water supply at the rate of 135 lpcd, keeping in mind for future wastewater discharge. These components are proposed to be funded under AMRUT scheme of GOI
Inadequate disposal of sludge from water treatment plants?		✓	No new water treatment plant considered under the project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	No new treatment plant constructed under the project
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the new transmission line routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	No separate chlorine storage is considered
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged

SCREENING QUESTIONS	Yes	No	REMARKS
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	Chlorine will be not used separately
Excessive abstraction of water affecting downstream water users?		✓	No abstraction of surface water.
Competing uses of water?		✓	Adequate capacity of ground water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage is planned under separate scheme under Government's fund.
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Improved sanitation and sewerage are required. As part of a separate project supported by the Gol's AMRUT scheme, additional wastewater as well as the proper sludge treatment (septage management) and disposal facility are planned.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No as such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as		✓	No as such impact anticipated

SCREENING QUESTIONS	Yes	No	REMARKS
explosives, fuel and other chemicals during operation and construction?			
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 throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST- MOHANPUR

Country/Project Title: India/ Tripura Urban & Tourism Development Project

Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
Densely populated?		✓	Mohanpur is not densely populated. The subproject area comprises different part of the town, Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The areas comprise of residential structures, commercial establishments, and open area. The developmental activities such as construction works are ongoing at an average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within the already developed urban area of Mohanpur town.
Cultural heritage site		✓	Gunavati Group of Temples, A group of three brick-built temples lies adjacent to each other at the ancient capital of Tripura at 'Udaipur'. This ASI protected site is located about 49.15 km (aerial Distance) from Mohanpur. Chaturdasa Devata, ASI protected area is also located about 48.87 km (aerial distance) from Mohanpur. Ancient Remains, Boxanagar, ASI protected site is situated 44.60 km (aerial distance) from Mohanpur. Water supply project components are not located nearby the ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of protected area
Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity Sepahijala wildlife sanctuary is located about 33.19 km

SCREENING QUESTIONS	Yes	No	REMARKS
			(aerial distance) from Mohanpur town.
Bay		✓	Not Applicable
SCREENING QUESTIONS	Yes	No	REMARKS
B. Potential Environmental Impacts			
Will the Project cause...			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	No excessive pumping of ground water is planned. DTW will be constructed at different areas of the town, only permissible amount of ground water will be pumped out for water supply.
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	No surface water intake is planned. There will be ground water abstraction through deep tube well as a part of this sub project. No conflicts expected.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Raw water is ground water from deep tube well and will be passed through IRP. After release from IRP water will be stored for distribution. Ground water generally free from pathogens and satisfactory for distribution. Water quality testing should be done before storage and distribution.
Delivery of unsafe water to distribution system?		✓	Raw Ground water will be passed through IRP and distribution of unsafe water not expected.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Over pumping will be not allowed
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project town The major drains running the core area of the town are identified for interception and diversion to the proposed STP site. Sewerage system has been designed considering water supply at the rate of 135 lpcd, keeping in mind for future wastewater discharge. These components are proposed to be funded under AMRUT scheme of GOI
Inadequate disposal of sludge from water treatment plants?		✓	Other than IRP no water treatment plant is considered within the project. Small amount of sludge will be generated and which will be dispose
Inadequate buffer zone around pumping and		✓	No new treatment plant will be constructed under the project

SCREENING QUESTIONS	Yes	No	REMARKS
treatment plants to alleviate noise and other possible nuisances and protect facilities?			
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the new transmission line routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	No chlorine storage is required
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Chlorine will be not used directly
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	Chlorine will be not used directly
Excessive abstraction of water affecting downstream water users?		✓	No abstraction of surface water.

SCREENING QUESTIONS	Yes	No	REMARKS
Competing uses of water?		✓	Adequate capacity of ground water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage is planned under separate scheme under Government's fund.
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Improved sanitation and sewerage are required. As part of a separate project supported by the Gol's AMRUT scheme, additional wastewater as well as the proper sludge treatment (septage management) and disposal facility are planned.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No as such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
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 operation and construction?		✓	No as such impact anticipated
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 throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST- RANIRBAZAR

Country/Project Title: India/ Tripura Urban & Tourism Development Project

Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the project area...			
Densely populated?		✓	Ranirbazar is not densely populated. The subproject area comprises different part of the town, Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The areas comprise of residential structures, commercial establishments, and open area. The developmental activities such as construction works are ongoing at an

SCREENING QUESTIONS	Yes	No	REMARKS
			average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within the Ranirbazar town.
Cultural heritage site		✓	Gunavati Group of Temples, A group of three brick-built temples lies adjacent to each other at the ancient capital of Tripura at 'Udaipur'. This ASI protected temple is located about 35.7 km (aerial Distance) from Ranirbazar. Chaturdasa Devata, ASI protected area is also located about 34.5 km (aerial distance) from Ranirbazar. Water supply project components are not located nearby the ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of protected area
Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity. Sepahijala wildlife sanctuary located about 21.02 km (aerial distance) from Ranirbazar town.
Bay		✓	Not Applicable
SCREENING QUESTIONS	Yes	No	REMARKS
B. Potential Environmental Impacts Will the Project cause...			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	No excessive pumping of ground water is planned. DTW will be constructed at different areas of the town and only permissible amount of water will be pumped out for water supply.
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	No new surface water intake is planned. There will be ground water abstraction through deep tube well as a part of this sub project. No conflicts expected.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Raw water is ground water from deep tube well and will be passed through IRP. After release from IRP water will be stored for distribution. Ground water generally free from pathogens and satisfactory for distribution. Water quality testing should be done before storage and distribution.
Delivery of unsafe water to distribution system?		✓	Raw Ground water will be passed through IRP and distribution of unsafe water not expected.

SCREENING QUESTIONS	Yes	No	REMARKS
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Over pumping will be not allowed
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project town with local governments owned fund The major drains running the core area of the town are identified for interception and diversion to the proposed STP site. Sewerage system has been designed considering water supply at the rate of 135 lpcd, keeping in mind for future wastewater discharge. These components are proposed to be funded under AMRUT scheme of GOI
Inadequate disposal of sludge from water treatment plants?		✓	No water treatment plant considered under the sub project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	No new treatment plant will be constructed under the sub project
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the new transmission line routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Measures for safe handling, storage and usage of chlorine are included.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed. Measures for safe handling, storage and usage of chlorine are included.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference

SCREENING QUESTIONS	Yes	No	REMARKS
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	No chlorine gas will be used in DTW
Excessive abstraction of water affecting downstream water users?		✓	No abstraction of surface water.
Competing uses of water?		✓	Adequate capacity of ground water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage is planned under separate scheme under Government's fund.
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Improved sanitation and sewerage are required. As part of a separate project supported by the Gol's AMRUT scheme, additional wastewater as well as the proper sludge treatment (septage management) and disposal facility are planned.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No as such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
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 operation and construction?		✓	No as such impact anticipated
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		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

SCREENING QUESTIONS	Yes	No	REMARKS
their failure could result in injury to the community throughout project construction, operation and decommissioning?			

Appendix 2: National Ambient Air Quality Standards

Parameter	Location ^a	India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)			Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$)
			Global Update ^c 2005	Second Edition 2000 ^d	Air Pollution Guideline 2021	
PM ₁₀	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-	15 (Annual) 45 (24-hr)	20 (Annual) 50 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-		20 (Annual) 50 (24-hr)
PM ₂₅	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	-	05 (Annual) 15 (24-hr)	10 (Annual) 25 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)			10 (Annual) 25 (24-hr)
SO ₂	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-	40 (24-hr) 500 (10-min)	50 (Annual) 20 (24-hr) 500 (10-min)
	Sensitive Area	20 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-		20 (Annual) 20 (24-hr) 500 (10-min)
NO ₂	Industrial Residential, Rural and Other Areas	40 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-	10 (Annual) 25 (24-hr) 200 (1-hr)	40 (Annual) 80 (24-hr) 200 (1-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-		30 (Annual) 80 (24-hr) 200 (1-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	4 mg/ m ³ (24-hr) 10 mg/ m ³ (8-hr)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	35 mg/ m ³ (1-hr) 100 mg/ m ³ (15-minute)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
Ozone (O ₃)	Industrial Residential, Rural and Other Areas	100 (8-hr) 180 (1-hr)	100 (8-hr)		60 (peak season) 100 (8-hr)	100 (8-hr) 180 (1-hr)
	Sensitive Area	100 (8-hr) 180 (1-hr)	100 (8-hr)			100 (8-hr) 180 (1-hr)
Lead (Pb)	Industrial, Residential, Rural and Other Areas	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)		0.5 (Annual) 1.0 (24-hr)
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)		0.5 (Annual) 1.0 (24-hr)
Ammonia (NH ₃)	Industrial Residential, Rural and	100 (Annual) 400 (24-hr)				100 (Annual) 400 (24-hr)

Parameter	Location ^a	India Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) ^b	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$)			Applicable Per ADB SPS ^e ($\mu\text{g}/\text{m}^3$)
			Global Update ^c 2005	Second Edition 2000 ^d	Air Pollution Guideline 2021	
	Other Areas					
	Sensitive Area	100 (Annual) 400 (24-hr)				100 (Annual) 400 (24-hr)
Benzene (C ₆ H ₆)	Industrial Residential, Rural and Other Areas	5 (Annual)				5 (Annual)
	Sensitive Area	5 (Annual)				5 (Annual)
Benzo(o)p yrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual)				0.001 (Annual)
	Sensitive Area	0.001 (Annual)				0.001 (Annual)
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual)				0.006 (Annual)
	Sensitive Area	0.006 (Annual)				0.006 (Annual)
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual)				0.02 (Annual)
	Sensitive Area	0.02 (Annual)				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 As 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

Appendix 3: 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 (dBA)^c	
	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

Note-

^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 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.

Appendix 4: Vehicle Exhaust Emission Norms

1. Passenger Cars

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

2. Heavy Diesel Vehicles

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

Source: Central Pollution Control Board

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

Appendix 5: Labour Laws

Salient Features of Major Labor Laws Applicable to Establishments Engaged In Construction Of Civil Works

- (i) Workmen Compensation Act, 1923 - The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (ii) Payment of Gratuity Act, 1972 - Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days' wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (iii) Employees' PF and Miscellaneous Provisions Act, 1952 - The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are: (a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.
- (iv) Maternity Benefit Act, 1951 (as amended up to 2017) - The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (v) Contract Labour (Regulation and Abolition) Act, 1970 - The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.
- (vi) Minimum Wages Act, 1948 - The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.
- (vii) Payment of Wages Act, 1936 - It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (viii) Equal Remuneration Act, 1979 - The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (ix) Payment of Bonus Act, 1965 - The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.
- (x) Industrial Disputes Act, 1947 - The Act lays down the machinery and procedure for

resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

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

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

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

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

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

Appendix 6: Audit Report of Existing Wtps and Intakes

INTRODUCTION

It is proposed to develop water supply system in Khowai, Mohanpur and Ranirbazar towns. Since existing WTPs at Khowai and Ranirbazar are working fine it is proposed to utilized the existing Intakes and WTP for the project towns. Sustainability of new water supply infrastructure of intended purpose and benefits (improved environmental conditions, public health etc.) would accrue only with a properly functioning treatment facility. Therefore, the existing WTPs and Intake are an associated facility as per the ADB Safeguard Policy Statement 2009. Compliance with the environmental safeguards will ensure the subproject sustainability.

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Khowai, Tripura	0.55 MGD/ 2.5 MLD Water Treatment Plant, Ranirbazar, Tripura
1. Capacity:	1 MGD/ 4.54 MLD	0.55 MGD
2. Technology:	Conventional Water Treatment Plant: Cascade aerator, Flash Mixer, Clariflocculator, Slow sand filter, Chlorination and Clear water reservoir	Conventional Water Treatment Plant: Cascade aerator, Flash Mixer, Clariflocculator, Slow sand filter, Chlorination and Clear water reservoir
3. Executing agency:	Khowai Municipal Council	ULB
4. Implementing agency:	DWS, Khowai, Tripura	DWS, Ranirbazar, Tripura
5. Asset owner	DWS Khowai, Tripura	DWS, Ranirbazar, Tripura
6. Project name under which this WTP was constructed:	Construction of 1 MGD Water Treatment Plant in the town of Khowai, Tripura.	Not available
7. Date of start of the construction of WTP:	2002	2007
8. Status of work progress of WTP: (completed/ uncompleted components with %)	Completed in 2006	Completed in 2010
9. Nos., locations and capacities of Pumping station	3 nos. (2W+1S) @ 65000 gph each and head 50 m	3 nos' (2W+1S) @ 60000 gph each head 50 m
10. Areas of different units of plant (sq. m):	Aerator: 18 m ² , Clariflocculator: 456 m ² , Filter beds and disinfection unit: 368 m ² , Backwash Tank: 119 m ² , CWPS with reservoir: 286 m ² , Administrative Building: 380 m ²	Aerator: 14 m ² , Clariflocculator: 350 m ² , Filter beds and disinfection unit: 330 m ² , Backwash Tank: 100 m ² , CWPS with reservoir: 240 m ² , Administrative Building: 310 m ²
11. Total Area of land used for WTP:	2.47 Acre	2 Acre
12. Land ownership details: (Khasra nos.)	ULB	ULB
13. O&M period of contract:	Information not available	Information not available

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Khowai, Tripura	0.55 MGD/ 2.5 MLD Water Treatment Plant, Ranirbazar, Tripura
14. Status of Consent to Establish (CTE) from Pollution Control Board: obtained/not obtained (attach copy)	Not required	Not required
15. Validity of CTE:	Not applicable	Not applicable
16. Status of Consent to Operate (CTO) from Pollution Control Board: obtained/not obtained	Not applicable	Not applicable
17. Validity of CTO:	Not applicable	Not applicable
18. Details of total covered area with this WTP: (ward nos.)	Ward 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15	1,2,3,4,5,6, 7,8,9,10,11,12,13,14,15
19. Total Population covered (number and %):	49.74 % of town population	32.2%
20. Whether trail run completed, if yes give date, if no give tentative date:	2006	10 February 2010 completed
21. Treatment Efficiency	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500 Treated water of Khowai river shows that turbidity is above the acceptable limit and below the permissible limit. Also, residual chlorine is above the acceptable limit and below the permissible limit as per Indian Drinking water standards a .	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500 The raw water quality and treated quality results shows the WTP is treating raw water as per required standards and all parameters tested are within the drinking water standards. prescribed limits.
22. Is there facility of laboratory for testing these parameters, if yes, give details	Yes	Yes

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Khowai, Tripura	0.55 MGD/ 2.5 MLD Water Treatment Plant, Ranirbazar, Tripura
23. What are the proposals/methods for reuse/disposal of treated sludge from WTP:	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river after circulation	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river after circulation, No proper sludge disposal.
24. Is this plant anywhere related/ dependent on proposed WTP.	Yes	Yes
25. Status and type of electricity connection: (connection number and approved load, KW)	Available- 500 KVA	Available
26. Whether DG set installed, if yes give capacity and type of DG set:	No	No
27. Numbers of employees proposed for operation of plant (designation wise numbers of employees):	Pump operator (Govt.): - 02 Helper: -08 Pump Operator (Agency):- 02	Total 11 numbers of Staff
28. Is rainwater harvesting system established, if yes, provide details, drawing and cost of rainwater harvesting	No	No
29. Power generation system installed, if yes, give details:	No	No
30. Is O&M manual prepared by contractor (submitted/ approved):	Yes	Yes
31. Is Emergency operating system prepared for O&M:	No	No

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Khowai, Tripura	0.55 MGD/ 2.5 MLD Water Treatment Plant, Ranirbazar, Tripura
32. Whether provisions for odour control taken in design, if yes, give details:	No	No
33. If provisions taken to protect inconvenience to nearby habitants, give details:	No nearby habitation.	No nearby habitation. Plantation in and around WTP
34. Any other related information	NA	NA

Details of Existing intake

Town name	Khowai	Ranirbazar
Source of raw water	Khowai River	River Hoara
Location of intake	Ward-12, KMC	On Hoara river
Capacity of intake	4.5 MLD	2.5 MLD
Year of construction	2006	2010
Average hours of operation/day	22	18
Existing Conditions	Operational	Operational
Type of pumps	Vertical Turbine Centrifugal Pumps	Vertical turbine centrifugal pump
Electric Consumption	No separate record	No separate record
Numbers of employees for operation and maintenance of Intake (designation wise numbers of employees)	2 Operators in 2 shifts	2 Operators in 2 shifts
Proposal under present scheme (/repair/additional intake/no change):	No Change	No Change

Khowai river water quality and treated water quality from Water Treatment Plant

Sr No.	Date	Parameters of Raw Water			Parameters of Treated Water					
		Physical Appearance	Turbidity (NTU)	pH	Physical Appearance	Turbidity (NTU)	pH	Residual Chlorine as Cl in mg/l (ppm)	Total Iron as Fe in mg/l	Bacteriological Test
1	26.12.2022	Hazy	41.2	7.88	Clear	2.89	7.6	0.5	0.01	<2MPN
2	27.12.2022	Hazy	39.05	7.8	Clear	2.8	7.5	0.5	0.012	<2MPN
3	28.12.2022	Hazy	40.57	7.92	Clear	2.84	7.7	0.5	0.011	<2MPN
4	29.12.2022	Hazy	38.4	7.5	Clear	2.8	7.58	0.5	0.013	<2MPN
5	30.12.2022	Hazy	39	8.05	Clear	2.81	7.6	0.5	0.01	<2MPN
6	31.12.2022	Hazy	40.21	7.8	Clear	2.79	7.56	0.5	0.012	<2MPN
7	01.01.2023	Hazy	38.4	7.75	Clear	2.8	7.72	0.5	0.014	<2MPN
8	02.01.2023	Hazy	39.05	7.9	Clear	2.81	7.68	0.5	0.013	<2MPN
9	03.01.2023	Hazy	40.27	7.95	Clear	2.78	7.68	0.5	0.012	<2MPN
10	04.01.2023	Hazy	40.53	8.1	Clear	2.76	7.6	0.5	0.016	<2MPN
Average			39.668	7.5-8.1		2.808	7.5-7.72	0.5	0.0123	
National Standards for Drinking Water^a						1(5)	6.5-8.5	0.2(1.0)	0.3(0.3)	
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011^b								5.0		

Source- DWS, Water Treatment Plant laboratory

^a Bureau of India Standard 10500: 2012.

^b Health-based guideline values.

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

Results show that Turbidity in Treated water is above the acceptable limit but below the permissible limit.

Chemical Analysis of Treated Water from Haora – Ranirbazar

Sl.no	Date	pH	Physical Appearance	Turbidity (NTU)	Total Alkalinity(mg/l)	Total Hardness (mg/l)	Chloride(mg/l)	Iron (mg/l)	Residual Chlorine(mg/l)
1	03-01-2023	7	Clear	0.11	54	76	16	0.027	0.2
2	04-01-2023	7	Clear	0.1	52	78	15	0.027	0.2
3	05-01-2023	7	Clear	0.13	54	76	14	0.025	0.2
4	06-01-2023	7	Clear	0.1	56	78	17	0.025	0.2
5	07-01-2023	7	Clear	0.1	58	78	16	0.027	0.2
6	09-01-2023	7	Clear	0.11	56	74	15	0.027	0.2
7	10-01-2023	7	Clear	0.14	58	78	17	0.029	0.2
8	11-01-2023	7	Clear	0.11	56	76	16	0.027	0.2
9	12-01-2023	7	Clear	0.1	58	72	15	0.028	0.2
10	13-01-2023	7	Clear	0.09	56	76	17	0.03	0.2
Average		7		0.109	55.8	76.2	15.8	0.0272	0.2
National Standards for Drinking Water ^a		6.5-8.5		1(5)	200 (600)	200 (600)	250 (1000)	0.3 (0.3)	0.2 (1.0)
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011^b							200-300		5.0

Source : DWS of respective towns ; Source- DWS, Water Treatment Plant laboratory; ^a Bureau of India Standard 10500: 2012.; ^b Health-based guideline values.;^c Figures in parenthesis are maximum limits allowed in the absence of alternate source.

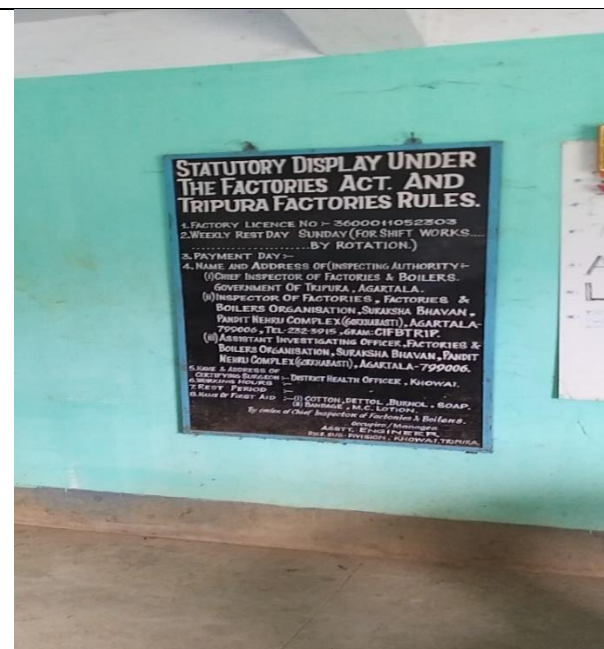
Treated water from Haora River indicates that all parameters are within the standard permissible limits .

Khowai- Intake & WTP

Existing Khowai River Intake and surroundings 100 m



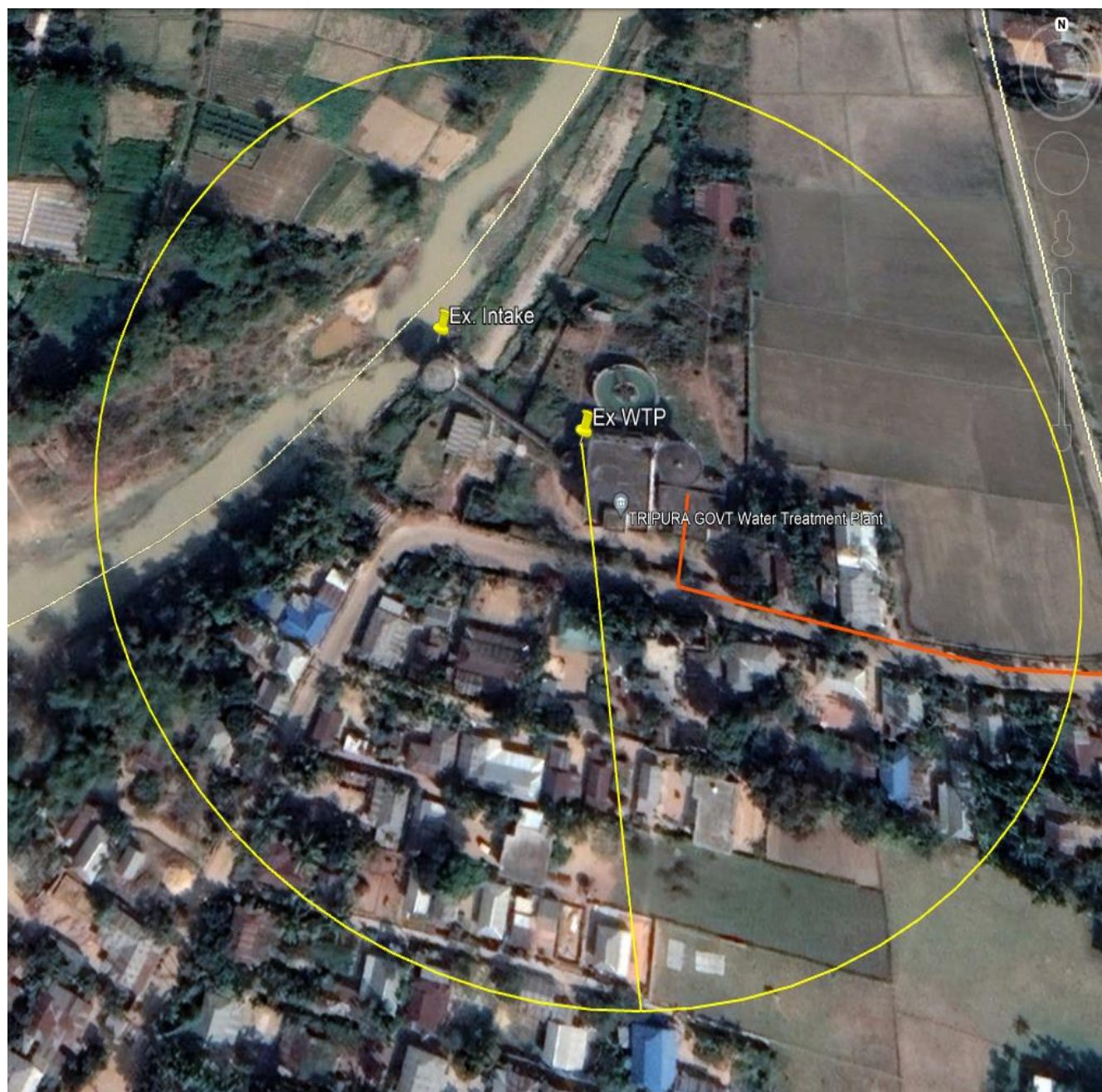
Existing WTP and surrounding 100 m of Khowai



Khowai WTP

Ranirbazar – Intake & WTP

Existing Intake and surrounding 100 m of Ranirbazar



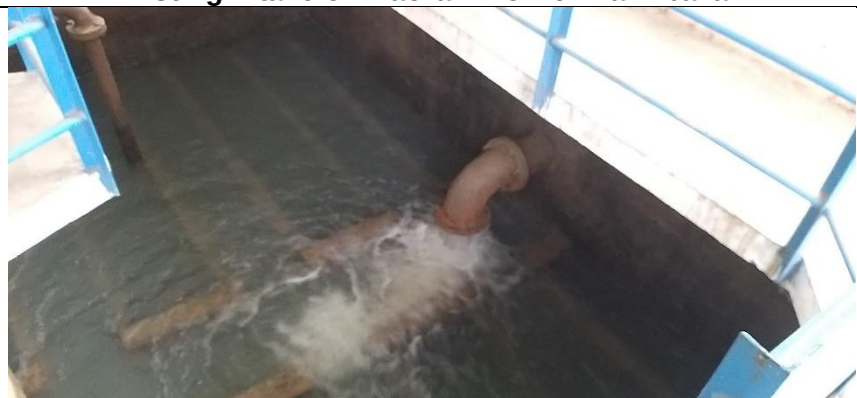
Existing WTP and surrounding 100 m of Ranirbazar



Existing intake on Haora River for Ranirbazar



Intake Raw water pump



Filter bed - WTP



Cascade Aerator – WTP



Location of WTP beside intake

Alum storage in WTP

Compliance Status

Law, Rules, and Regulations	Description and Requirement	WTP at Khowai and Ranirbazar
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ¹⁸ N/A = not applicable (state justification)
EIA Notification	The EIA Notification of 2006 states that environmental clearance is required for certain Defined activities/projects.	N/A Environmental clearance is not Required as WTPs are not listed in the EIA Notification's "Schedule of Projects Requiring Prior Environmental Clearance"
Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989	Storage of chlorine (threshold quantity greater than 10 tons but less than 25 tons) in WTPs will require clearance from PESO	N/A Less than 10 tons of Chlorine is stored at WTP required no permit
Water (Prevention and	Consent to operate from TSPCB	N/A

¹⁸Compliant = There is sufficient and appropriate evidence to demonstrate that the particular regulatory requirement has been complied with; non-compliant = clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

Law, Rules, and Regulations	Description and Requirement	WTP at Khowai and Ranirbazar
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ¹⁸ N/A = not applicable (state justification)
Control of Pollution) Act of 1974, Rules of 1975, and amendments		CTE and CTO is not required in Tripura for WTP
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	Consent to operate from TSPCB	NA
Environment (Protection) Act, 1986 and CPCB Environmental Standards	Emissions and discharges from the facilities to be created, refurbished, or augmented shall comply with the notified standards. a. Wastewater disposal standards	N/A
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010	Applicable ambient noise standards with respect to noise for different areas/zones	Y No source of noise
National Institute of Occupational Safety and Health (NIOSH) Publication No. 2002-149	Compliance with NIOSH Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids	N Training and proper PPEs are required
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.	N/A No Component of WTP is in forest land,
Ancient Monuments and Archaeological Sites and Remains Rules of 1959	No development activity is permitted in the “protected area,” and all development activities likely to damage the protected property are not permitted in the “controlled area” without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State	N/A

Law, Rules, and Regulations	Description and Requirement	WTP at Khowai and Ranirbazar
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ¹⁸ N/A = not applicable (state justification)
The Child Labor (Prohibition and Regulation) Act, 1986	Department of Archaeology. 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 are present.	Y No children are engaged at WTP site.

Corrective Action Plan

The environmental concerns are mainly related to occupational health and safety, public safety, disposal of debris, discarded materials etc. The sludge management systems of WTP are very old and not functional properly, its need to upgradation. Treated water quality results shows that Turbidity in treated water is exceeding the acceptable limit of Indian standard but below the permissible limit for Khowai WTP.

For existing WTP at Khowai replacement of pump is considered under the project. The DBO contractor will prepare a service improvement plan and based on the assessment of existing system and the Department of water supply will update these systems including WTP, Intake and report to PMU the Department of water resource will update the systems and report to PMU, PMU have ensure all systems are working properly for existing WTPs. A work specific environmental management plan will be prepared in these aspects.

Appendix 7: Drinking Water Standards

Group	National Standards for Drinking Water ^a			WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b	Applicable Per ADB SPS ^{c, d}
	Parameter	Unit	Max. Concentration Limits ^d		
Physical	Turbidity	NTU	1 (5)	-	1 (5)
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	Hazen units	5 (15)	none	5 (15)
	Taste and Odor		Agreeable	-	Agreeable
	TDS	mg/l	500 (2,000)	-	500 (2,000)
	Iron	mg/l	0.3	-	0.3
	Manganese	mg/l	0.1 (0.3)	-	0.1 (0.3)
	Arsenic	mg/l	0.01 (0.05)	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.05	none	0.05
	Fluoride	mg/l	1 (1.5)	1.5	1 (1.5)
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	0.5	none established	0.5
Chemical	Chloride	mg/l	250 (1,000)	none established	250 (1,000)
	Sulphate	mg/l	200 (400)	none	200 (400)
	Nitrate	mg/l	45	50	45
	Copper	mg/l	0.05 (1.5)	2	0.05 (1.5)
	Total Hardness	mg/l	200 (600)	-	200 (600)
	Calcium	mg/l	75 (200)	-	75 (200)
	Zinc	mg/l	5 (15)	none established	5 (15)
	Mercury	mg/l	0.001	0.006	0.001
	Aluminum	mg/l	0.1 (0.3)	none established	0.1 (0.3)
	Residual Chlorine	mg/l	0.2 (1.0)	5	0.2
Micro Germs	E-coli	MPN/100ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml			

Note-

^a Bureau of India Standard 10500: 2012. Value within bracket indicated values permissible limits in absence of alternative source

^b Health-based guideline values.

^c Per ADB SPS, the government shall achieve whichever of the 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.

Appendix 8: Stakeholder Consultations

Summary of Consultation with Stakeholders- Khowai

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
27 th October 2022	Lal Chara Ghosh Lane- Ward no. 09	6 M=1 F=5	Community members	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 2 hours of supply per day - Briefing on project objectives probable implementation procedures - Potential positive and negative impacts due to project implementation - Relevant information of the upcoming project and benefits of the project. - No adverse impacts on structures, livelihoods anticipated. - People are willing to cooperate by all means to implement the project successfully	- The area has insufficient and inadequate drinking water supply. The people of Lal Chara Ghosh lane area face severe water crisis during the Rainy season when the ground water contaminated. - High iron content in drinking water. - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. - Waste water discharge in low lying area.
19 th November 2022	Near Swapnopuri Hotel-Ward no. 13	4 M=4 F=0	Community members	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 1 hours of supply per day - Briefing on project objectives probable implementation procedures - Potential positive and negative impacts due to project implementation - Relevant information of the upcoming project and benefits of the project.	- The area has insufficient and inadequate drinking water supply. The people of Ward no. 13 area face severe water crisis during the summer season when the ground water level drops. - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. - Waste water discharge in low lying area.

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
				- No adverse impacts on structures, livelihoods anticipated. - People are willing to cooperate by all means to implement the project successfully	
23 rd March 2023	Khowai Municipal Council	19 M =18, F=1	ULB official – Khowai	- Briefing on project objectives probable implementation procedures - No adverse impacts on structures, livelihoods anticipated. - Availability of water for 24X7 - People are willing to cooperate by all means to implement the project successfully	- The objective of the proposed water supply scheme is to provide 24 x 7 water supply to the town of Khowai with sufficient pressure and minimum losses. - Location of all DTWs should be justified - Water quality- supplied water should be free of iron. - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.
23 rd March 2023	Khowai Municipal Council	12 M=6 F=6	Community members	- Briefing on project objectives probable implementation procedures - Minimum supply of water only 2 hours specifically during summer - Availability of more iron in supplied water particularly during monsoon	- Availability of quality water 24X7 - Development of area with satisfactory availability of water



Stakeholder Consultation at Lal Chara Ghosh Lane



Stakeholder Consultation near Swapnopuri Hotel



Consultation at ULB office- ADB team



Community consultation at ULB

Consultation coverage in Newspaper

ADB representatives visits Khowai Municipal Council area

• By Tripuranewsline • 24 Mar 2023

A team of representatives comprising 12 members including the officials of Tripura Urban Development Authority under the leadership of Kalishankar Ghosh of Asian Development Bank paid a visit to Khowai Municipal Council area yesterday for implementation of different developmental works in the area.

Chairperson of Khowai Municipal Council Debashish Nath Sharma and CEO of the Municipal Council Hemanta Dhar were present during their visit.

The team of representatives visited deep tube well nearby Purnima School, deep tube well water source located at Office Tilla, site nearby Subhash Park Jeep Stand, road nearby Subhash Park Vivekananda Statue, drainage nearby District Hospital and the site nearby Dasarath Deb Memorial College.

After their visit, Chairperson of Khowai Municipal Council Debashish Nath Sharma informed that to provide clean drinking water in the Municipal Council area a ground water treatment plant will be set up in first phase at the cost of 15 crore 60 lakh rupees, total 1.5 km road from CNG station to Layapara, Nripen Chakraborty Avenue via Swapanpuri Guest House will be constructed, 1 km 700 m long cover drain will be constructed in the municipal area including footpath and urban beautification. This will cost total 15 crore rupees.

খোয়াই পুর
এলাকা
পরিদর্শনে
এশিয়ান
ডেভেলপমেন্ট
ব্যাঙ্কের
প্রতিনিধি

প্রেস রিলিজ, খোয়াই, ২২ মার্চ।।
খোয়াই পুর এলাকায় বিভিন্ন
উন্নয়নমূলক কাজ বাস্তবায়নের
লক্ষ্যে আজ এশিয়ান
ডেভেলপমেন্ট ব্যাঙ্কের প্রতিনিধি
কালিশঙ্কর ঘোষের নেতৃত্বে ও
ত্রিপুরা আরবান ডেভেলপমেন্ট
অথরিটির আধিকারিকগণ সহ
মোট ১২ সদস্যের এক
প্রতিনিধিদল খোয়াই পুর এলাকা
পরিদর্শনে আসেন।
পরিদর্শনকালে উপস্থিত ছিলেন
খোয়াই পুর পরিষদের
চেয়ারপার্সন দেবাশিস নাথ শর্মা,
পুর পরিষদের উপমুখ্যনির্বাহী
আধিকারিক হেমন্ত ধর প্রমুখ।
পরিদর্শনকালে প্রতিনিধি দলটি
পুর এলাকার পূর্ণিমা স্কুল সংলগ্ন
ডি পি টি উ ব ওয়েল,
অফিসটিলাহিত ডিপ টিউবওয়েল
জলের উৎস, সুভাষপার্ক জীপ
স্ট্যান্ড সংলগ্ন স্থান, সুভাষ পার্ক
বিবেকানন্দ স্টাচু সংলগ্ন রাস্তা,
জেলা হাসপাতাল সংলগ্ন নালা,
দশরথদেব মেমোরিয়াল কলেজ
সংলগ্ন স্থান সরেজমিনে পরিদর্শন
করেন। পরিদর্শন শেষে পুর
পরিষদের চেয়ারপার্সন দেবাশিস
নাথ শর্মা জানান, পুর এলাকায়
পরিষ্কৃত পানীয় জল প্রদান করার
লক্ষ্যে প্রথম পর্যায়ের ১৫ কোটি ৬০
লক্ষ টাকা ব্যয়ে গ্রাউন্ড ওয়াটার
ট্রিটমেন্ট প্ল্যান্ট, সিএনজি স্টেশন
থেকে লায়াপাড়া, নুপেন চক্রবর্তী
এভিনিউ জায়গা স্বপনপুরী গেট
হাউস মোট ১.৫ কিলোমিটার
রাস্তা নির্মাণ, ফুটপাথ ও শহর
সৌন্দর্যায়ণ সহ পুর এলাকায় ১
কিমি ৭০০ মিটার কভার ড্রেন
নির্মাণ করা হবে। এতে বার হবে
মোট ১৫ কোটি টাকা।

List of Participants in Consultation Meeting at Lal Chara Ghosh Lane

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Khowai

Ward No: 9

Place: - Lal Chara Ghosh Lane

Date: - 27/10/2022

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1.	Soma Gupte	8974562305	Soma Gupte
2.	Supriya Ghosh	8575633869	Supriya Ghosh
3.	Mishita Ghosh	70037427991	Mishita Ghosh
4.	Shilpi Ghosh	8575633869	Shilpi Ghosh
5.	Sephali Gupte		Sephali Gupte
6.	Kamini Sushila Das	7308119643	Kamini Sushila Das

:

List of Participants in Consultation Meeting Swapnopuri Hotel

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Khowai

Ward No: 13

Place: - Swapnopuri

Date: - 19/11/22

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
①	Pratibha Debbarma	9862724299	Pratibha Debbarma
2	Dayamoy Debbarma	9866972175	Dayamoy Debbarma
3	Jayanta Tarafder	9436919693	Jayanta Tarafder
4	Mangeshree Debbarma	9366745478	Mangeshree Debbarma

:

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN
LOCAL BODIES IN TRIPURA

Name of the Town: - Khowai

Ward No: - 07

Place: - Khowai ULB Office

Date: - 22-03-2023

Sl. No.	Name (CAPITAL LETTER)	Male / Female	Contact NO.	Signature
①	Debasish Nath	Male	9436126382	
②	Mamsha Telang	Female	9426808906	
③	Hemanta Kumar	Male	9077128928	
④	En Rajib Debbarma JE KMC	Male	8416048223	
⑤	En. Saugad Chakraborty SBM EXPERT, KMC	Male	8951326373	
⑥	Soujit Bhattacharya	Male	7005221987	
⑦	Vipin Negi	M	9690057783	
⑧	Sourav Seal	M	7980272820	
⑨	Smriti Patil	M	9932313841	
⑩	P. S. Bhattacharya	M	8794243534	
⑪	Sujoy Chakraborty	M	9862246728	
⑫	DR. ARDHENDU MITRA	M	9830415953	
⑬	KALYAN ASIS DAS	M	9836328867	
⑭	P. S. Ghosh	M	9837317118	
⑮	Arvind Singh Rathore	M	9560967524	
⑯	Pranab Kumar	M	9436134168	

Place- Khowai Municipal Council Office, Dated- 22-03-2023

**LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN
LOCAL BODIES IN TRIPURA**

Name of the Town: - Khowai

Ward No: -

Place: - Khowai ULBO Office

Date: - 22-3-2023

Sl. No.	Name (CAPITAL LETTER)	Male / Female	Contact NO.	Signature
①	Mamtha Telang	F	9425600906	Mamtha
②	K.S. Githoi	M	9831317118	
③	Gaurind Singh Rathore	M	9560967524	
④	Ratna Rani Kar	F.	8014747135	
⑤	Mousumi Majumdar	F.	9436919348	
⑥	Sinnu Deb Paul	F	9436796389	
⑦	Sanehita Baidya	F	9436514044	
⑧	Suibani Paul	F.	6033066926	
⑨	Jayanta Chakraborty	M	8761805667	
⑩	Sourav Seal	M	7980272820	
11	P. S. Bhowmik	M	8794243534	
12	Kalyan Biswas	M	9836328867	

Place- Khowai Municipal Council Office, Dated- 22-03-2023

Summary Outcome of Consultations- Focus group discussion – Khaowai

Sl. No	Date	Type of consultation	Location	Total No. of Participants	No. of Male Participants	No. of Female Participants
1	24.02.2022	Focus Group Discussion	Ward No- 05	16	01	15
2			Ward No- 10	10	00	10
3			Ward No-01	15	00	15
4	25.02.2022		Ward No-13	10	01	09
5	05.08.2022		Barobil	08	04	04
Total				59	06	53

Summary Outcome

Sl no.	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of Consultations
1.	24.02.2022 Ward No- 05	16	Discussed about present water supply system, hours of supply and quality of water. They were explained about the proposed works and its advantages. They were also informed about the temporary inconveniences during the laying of pipeline, contractors' cooperation.	- The local people are concerned about the supply hours and pressure of water mostly, in maximum Wards as water quality is good. - People demand 24x7 supply connections to be provided to their area under the proposed project. - The willingness of the people for the proposed projects was appreciated.
2.	24.02.2022 Ward No- 10	10	Present status of water supply in the town. The quality of water provided presently, and the duration of supply. Proposed works under this project. Environment and Health impacts of proposed project.	- The people are concerned about the duration of supply and the pressure of water. - People are in support of the proposed project. - They expressed their willingness with the proposed water supply works, as they are aware that this will improve health and environmental conditions of the town.
3.	25.02.2022 Ward No- 01	15	Present Status of Water Supply in the town and proposed project. Environment & Health impacts of proposed project	- The participants informed that they know about this project and sub projects, and they are willing to provide all types of support during execution of work, as they are aware this will improve the quality of life of the people. - They shared the details of the water supply issues, mainly duration of supply being the main concern.
4.	25.02.2022 Ward No-13	10	Drinking water problem and discussion about possibility of local disturbances due to Project Construction Work.	- During consultation it has come out that water quality is good, but pressure of water is less in most of the wards under Khowai MC. - Some of wards under KMC

Sl no.	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of Consultations
			Water logging and drainage problem if any.	get 30 mints of water supply per day which is not sufficient to fulfill their daily needs as pressure of water is also very less. • They expressed their positive participation during the project construction period. • Appreciated the drainage part of the project and voiced it as relevant.
5.	05.08.2022 Barobil,	8	Present Status of Water Supply in the town and proposed project. Environment & Health impacts of proposed project. Possibility of Local disturbances due to Project Construction Work Water logging and drainage problem.	• Water quality of the town area is good, problems with pressure and duration of water supply. • They are well versed about the advantages of the project and improvement in health and environment. • Ready to cooperate during the construction period.

Photographs of Key Informants Interview and Focus Group discussion



Ward No-05, Dated-24-02-2022



Ward No- 10, Dated- 24-02-2022



Ward No- 01, Dated- 25-02-2022



Ward No- 13, Dated- 25-02-2022



Barobil, Dated- 05-08-2022

Attendance Sheet of Focus Group Discussion (FGD)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Khowai

Ward Nos. :- 5

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
	শ্রীমতী মল্লিক	5	9612984482	F	শ্রীমতী মল্লিক	
	Manita Deb Barman (Kahar)	5	9612048186	F		
	Mousumi Acharjee (C)	5	9436479839	F	Mousumi Acharjee (C)	
	Shilpa Deb Nath	5	9436351131	F	Shilpa Deb Nath	
	Mina Des Banik	5	8729899986	F	Mina Des Banik	
	শ্রীমতী মল্লিক (গুহা)	5				
	শ্রীমতী মল্লিক (গুহা)	5	9436734432	F	শ্রীমতী মল্লিক (গুহা)	
	রূপা গুহা	5	8778354323	F	রূপা গুহা	
	সীমা দেব	5	6033236835	F	সীমা দেব	
	Sima Deb	5	9402333599	F	Sima Deb	
	Swapna Datta	5	6033027065	F	S Datta	
	Soma Shil (Ghosh)	5	730036515	F	Soma Shil (Ghosh)	
✓	Nijati Rani Das	5			Nijati Rani Das	
	Kalyani Bhattacharjee	5	9436319845	F	Kalyani Bhattacharjee	
	Ruma Ghosh	5	9436798699	F	Ruma Ghosh	
	Chandona Bhattacharjee	5	6033062770	F	Chandona Bhattacharjee	
	শ্রীমতী মল্লিক	5	9131042806	M	শ্রীমতী মল্লিক	
		5		F		

Signature of the respective Surveyor

[Signature]

Swapna Datta

Smt. Swapna Datta
Member
Khowai Municipal Council
Khowai Tripura.

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Verified By the respective ULB staff

Name :- Rajib Debbarma
Junior Engineer
Designation :- Municipal Council
Khowai, Tripura.

Signature with Seal :-

Ward No-05 (24-02-2022)

Name of the ULB / G.P. :- Khodai

Ward Nos. :- / /

[illegible]

RAJ KUMAR Malakar
Signature of the respective Surveyor

Verified By the respective ULB staff

Name: -

Rajib Debbarma
Designation: **Junior Engineer**
Khowai Municipal Council
Signature with Seal: **Seal, Tripura**

realme Shot on realme C35

Ward No- 11 (24-02-2022)

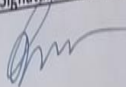
Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Khoulai

Ward Nos. :- 01

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Aparna Khutun		936775633	F		
2	Kalpna Shili (Deb)		8794888294	F		
3	Rupai Das		6033220158	F		
4	Debani Roy		9436735753	F		
5	Sima Sarkar		8731929738	F		
6	Rina Singha (Banik)			F		
7	Aneeta Gope		6033150258	F		
8	Gopa Begam		9485472993	F		
9	Rakhi Bala Deb		7085677789	F		
10	Usha Rani Palu		9436325989	F		
11	Lima Deb Nath		9402132639	F		
12	Sangita Deb Nath		9436921545	F		
13	Sangita Nana Das		9436743617	F		
14	Payel Deb Nath		9362821648	F		
15	Usha Rani Singha		708522993	F		

Signature of the respective Surveyor



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Verified By the respective ULB staff

Name :- Rajib Debbarmia
Junior Engineer
Municipal Council
Khoulai, Tripura.

Signature with Seal :-

Ward No- 01 (25-02-2022)

Summary of Consultation with Stakeholders- Mohanpur

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
29 th October 2022	Tulabagan 10 no. Para -Ward no. 14	6 M=6 F=0	Community members	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 1 hours of supply per day - Potential positive and negative impacts due to project implementation - Relevant information of the upcoming project and benefits of the project. - No adverse impacts on structures, livelihoods anticipated. - People are willing to cooperate to implement the project successfully	- The area has insufficient and inadequate drinking water supply. The people of Tulabagan area face severe water crisis during the summer season when the ground water level drops. - Iron content in the ground water is very high - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. - Waste water discharge in low lying area.
22 nd March 2023	Mohanpur Municipal Council office	11 M=10, F=1	Stakeholder consultation	- Relevant information of the upcoming project and benefits of the project. - Potential positive and negative impacts due to project implementation - Relevant information of the upcoming project and benefits of the project.	The proposed sub-project has been identified for improving the water supply system within existing Right of Way (RoW) of improving the water supply system. As per technical analysis water supply project is adjoined to few residential/commercial structures, and it is almost fully a built-up area for the entire course of water supply project. Call for attention on the improving the water supply system
22 nd March 2023	Tulabagan	15 M=6, F=9	Community members	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 1-2 hours of supply per day - Quality of water – high iron content	- Supply of 24X7 drinking water - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.



Stakeholder Consultation at Tulabagan 10 no. Para



Stakeholder consultation at Mohanpur MC



Community consultation at Tulabagan

List of Participants in Consultation Meeting at Tulabagan 10 no. Para

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Mohanpur .

Ward No: 14

Place: - Tulabagan 10 no. Para .
(Office Tiller)

Date: - 29/10/2022

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1.	Nurinal Sarker.	8787857808	Nurinal Sarker
2.	Ratan Debnath.	8787483088	Ratan Debnath
3.	Abhijeet Gupta.	7629885862	Abhijeet Gupta
4.	Shamal Das.	7445436274	Shyamal Das
5.	Mithun Debnath.	8787498098	Mithun Debnath
6.	Aripadhi Banik	9856125857	Aripadhi Banik

Attendance Sheet

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN
LOCAL BODIES IN TRIPURA

Name of the Town: - Mohanpur

Ward No: -

Place: - Mohanpur ULBO Office

Date: - 22-3-2023

Sl. No.	Name (CAPITAL LETTER)	Male / Female	Contact NO.	Signature
①	STIKANTA Choudhary	M	9366603021	STIKANTA Choudhary
②	Govind Singh Reddy	M	9560967524	Govind Singh Reddy
③	K.S. Choudhary	M	9831317118	K.S. Choudhary
④	Ardhendu Mitra	M	9830415953	Ardhendu Mitra
⑤	P.S. Bhattacharya	M	8794243534	P.S. Bhattacharya
⑥	Sudhansu Paul	M	993231384	Sudhansu Paul
⑦	Kalyan ASIS Das	M	9836328867	Kalyan ASIS Das
⑧	Manmohan Jaiswal	F	9425600906	Manmohan Jaiswal
⑨	Soumitra Seal	M	7980272820	Soumitra Seal
⑩	Sujoy Chakraborty	M	9862246728	Sujoy Chakraborty
⑪	Pradip P. Saha	M	8707001669	Pradip P. Saha

Place- Mohanpur Municipal Council Office, Dated- 22-03-2023

**LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN
LOCAL BODIES IN TRIPURA**

Name of the Town: - Mohanpur

Ward No: -

Place: - Tulabagan

Date: - 22-03-2023

Sl. No.	Name (CAPITAL LETTER)	Male / Female	Contact NO.	Signature
①	Gaurind Singh Rathor	M	9560967124	Gaurind
②	Mamsha Telang	F	9425800906	Mamsha
③	Aradhendu Mibz	M	9830415952	Aradhendu
④	K.S. G. A. S. S. S.	M	9831317778	K.S.
⑤	Kundun Biswal	F	9936925347	Kundun
⑥	Kangal Deb	m	9862904110	Kangal
⑦	সিদ্ধান্ত মন্ডল	m	9366992349	সিদ্ধান্ত মন্ডল
⑧	Ratna Das	F	9366322486	Ratna Das
⑨	Maloti Biswas	F		Maloti
⑩	মল্লিকারাম	F	9077678546	মল্লিকারাম
⑪	pampi Deb	F	9615171916	pampi Deb
⑫	বনেন্দ্র চন্দ্র বসু	F		বনেন্দ্র চন্দ্র বসু
⑬	Pradina Deb	F	9862076832	Pradina Deb
⑭	Soma Sarkar	F	9856555434	Soma Sarkar
⑮	সত্যনাথ সান্নাল			সত্যনাথ সান্নাল

Place- Tulabagan, Dated- 22-03-2023

Summary of Focus Group discussion

Summary of Focus Group discussion						
Sl. No	Date	Type of consultation	Location	Total No. of Participants	No. of Male Participants	No. of Female Participants
1	09.03.2022	Focus Group Discussion	Ward No- 06,10,13	20	00	20
2			Ward No- 06,08,10,11	20	00	20
3			Ward No-10,11,16	11	00	11
4			Ward No- 03,06,10,11,13,15	19	00	19
5	05-08-2022		Karaimura, Tulabagan	04	04	00
Total				74	4	70

Summary Outcome

Sl No.	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of Consultations
1.	09.03.2022 Ward No- 06,10,13	20	During consultation, the people were made aware of the sub-projects and the extent of project impact and development. Discussions were made about quality of water and duration of water supply. Advantages of the project was discussed, and possibility of local disturbances due to project construction work were also placed and discussed.	- During consultation, participants informed that they know about this project and sub projects, and they are willing to provide all types of support during execution of work. - People responded that they get 1 hour (1times/day) of water supply per day which is not sufficient to fulfil their daily needs and iron content is very high which is not suitable for drinking.
2.	09.03.2022 Ward No- 06,08,10,11	20	Present status of water supply in the town. The quality of water provided presently. Proposed works under this project. Environment and Health impacts of proposed project.	- The people are concerned about the duration of supply and the quality of water. The water has high iron content which makes it difficult to drink or use it for other household purposes. - They are well aware of the sub-projects and are happy to cooperate during the execution process.
3.	09.03.2022 Ward No- 10,11,16	11	Discussion was done regarding the sub-projects and the extent of project impact and development. Discussions about quality of water and duration of water supply. Advantages of the project was discussed, and possibility of local disturbances due to project construction work were also placed and discussed.	- People responded that some of the wards under KMC get 30 mints of water supply per day which is not sufficient to fulfil their daily needs as pressure of water is also very less. - The quality of water is also unfit for drinking and other household purposes, as iron content is very high. - They are well aware of the sub-projects, and its advantages and ready to cooperate with the

Sl No.	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of Consultations
				developmental activities.
4.	09.03.2022 Ward No-03,06,10,11,13,15	19	Present Status of Water Supply in the town and proposed project. Environment & Health impacts of proposed project. possibility of local disturbances due to Project Construction Work. They were also informed about the temporary inconveniences during the laying of pipeline, contractors' cooperation.	• People are in support of the proposed project. There willingness for the developmental activities were witnessed. • People are concerned about the quality of water and the duration of supply. People demand 24x7 supply connections to be provided to their area under the proposed project. • They are ready to cooperate with the upcoming activities, as they believe this would improve their lifestyle.
5.	05-08-2022 Karaimura, Tulabagan	04	Discussed about present water supply system, hours of supply and quality of water. They were explained about the proposed works and its advantages. They were also informed about the temporary inconveniences during the laying of pipeline, contractors' cooperation. Environment and Health impacts of proposed project. Water logging and drainage problem.	• People responded that they get 1 hour (1times/day) of water supply per day which is not sufficient to fulfill their daily needs and iron content is very high which is not suitable for drinking, so they are in favour of the proposed sub-projects. • Appreciated the drainage part of the project and voiced it as relevant. • People are in support of the proposed project, and thus ready to cooperate with the temporary inconveniences caused due to the laying of pipes and other developmental activities.

Photographs of Key Informants Interview and Focus Group discussion



Ward No-06,10,23, Dated-09-03-2022



Ward No- 06,08,10,11, Dated- 09-03-2022



Ward No- 10,11,16, Dated- 09-03-2022



**Karaimura, Tulabagan,project site,
Dated- 25-02-2022**

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Moham Puri

Ward Nos. :- 6, 10, 13

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Parbati Nag	13	6909388068	F	Parbati Nag	
2	Champa Ghosh	13	6009907123	F	Champa Ghosh	
3	Malati Nag	13	8415053732	F	Malati Nag	
4	Samipa Ghosh	13	8257905348	F	Samipa Ghosh	
5	Api Rani Deb Dhan	13	8798113369	F	Api Rani Deb (Deb Nath)	
6	Padma Rani Subradhan	10	9615280078	F	Padma Rani Subradhan (Vankar)	
7	Laxmi Rani Subradhan	10		F	Laxmi Rani Subradhan	
8	Usha Sarkar	10		F	Usha Sarkar	
9	Anita Das Debnath	11	7005947829	F	Anita Das (Debnath)	
10	Ananya Debnath	11	6009890311	F	Ananya Deb Nath	
11	Dipika Debnath	6	9366154995	F	Dipika Debnath	
12	Sumiti Nath Sarkar	6	9862929939	F	Sumiti Nath Sarkar	
13	Mina Chakraborty	6	9862800884	F	Mina Chakraborty	
14	Rupa Debnath	2	9366286528	F	Rupa Debnath	
15	Soma Subradhan	6	8794183192	F	Soma Subradhan	
16	Mamta Debnath	6	9366386050	F	Mamta Debnath	
17	Mamata Debnath	6	8974172488	F	Mamata Debnath	
18	Swarna Debnath	6		F	Swarna Debnath	
19	Lipika Subradhan	6	9862713597	F	Lipika Subradhan	
20						

Signature of the respective Surveyor

[Signature]

Verified By the respective ULB staff

Name :-

Sajal Debnath (TCS)
Dy. Chief Executive Officer
Moham Puri Municipal Council
Moham Puri, West Tripura

Signature with Seal

Ward No- 06,10,13 (09-03-2022)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- MohamPUN

Ward Nos. :- 6,8,10,11

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1.	Pinki Debnath.	6	9366941816		Pinki Debnath	
2.	Ruma Debnath.	11	9436182940		Ruma Debnath.	
3.	Sima Das. / Deb	6	9862901599		Sima Das (Deb)	
4.	Rakhi Debnath.	11	9362960695		Rakhi Debnath	
5.	Swarna Debnath.	11	8131952888		Swarna Debnath	
6.	Anuma Biswas (Deb)	6	7088312235.		Anuma Biswas (Deb)	
7.	Mandira Debnath.	11				
8.	Gita Pal	10				
9.	Rita Rani Pal	10	8731856088			
10.	Anchana Pal	10				
11.	Abhina Debnath.	8	9862630874			
12.	Dipa Deb (Ghosh)	8				
13.	Anita Rani Gope	11	6009033036			
14.	Mamata Sutradhar	11				
15.	Kabita Debnath.	11	883705410			
16.	Nani Deb Nath / Sarker	11	8794333296		Nani Sarker (Debnath)	
17.	Anita Debnath.	11	8414914644		Anita Debnath	
18.	Bina Sutradhar	6	8132828805		Bina Sutradhar	
19.	Maya Sutradhar	6	8414905201		Maya Sutradhar	
20.						

Signature of the respective Surveyor

[Signature]

Verified By the respective ULB staff

Name :-

[Signature]
 Name :- Sejal Debnath (TCS)
 Designation :- Dy. Chief Executive Officer
MohamPUN Municipal Council
MohamPUN West Tripura
 Signature with Seal

Ward No- 06,08,10,11 (09-03-2022)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Mohampur

Ward Nos. :- 3, 6, 10, 11, 13, 15

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Ujjwala Sankar	15	9856229239	F	Ujjwala Sankar	
2	Kalpna Das	15		F	Kalpna Das	
3	Sikha Sankar	15		F	Sikha Sankar	
4	Gita Sankar	15		F	Gita Sankar	
5	Anita Sankar	15		F	Anita Sankar	
6	Anima Sankar	15		F	Anima Sankar	
7	Sabitri Sankar	13	9615072579	F	Sabitri Sankar	
8	Urka Sankar	11		F	Urka Sankar	
9	Sabita Biswas	11		F	Sabita Biswas	
10	Anjana Biswas	11		F	Anjana Biswas	
11	Uma Acharyee	3	8787647940	F	Uma Acharyee	
12	Chandria Paul	10	9600993305	F	Chandria Paul	
13	Parthana Deb Nath	6	7005716419	F	Parthana Deb Nath	
14	Anjali Deb Nath	15	8994524992	F	Anjali Deb Nath	
15	Aruna Das (Sankar)	15	8794392853	F	Aruna Das (Sankar)	
16	Gita Rani Paul	10	9856755571	F	Gita Rani Paul	
17	Laxmi Das	13	7005314672	F	Laxmi Das	
18	Pinki Deb Nath	6	9366418905	F	Pinki Deb Nath	
19	Arundha Sankar	15		F		

Signature of the respective Surveyor

Verified By the respective ULB staff

Name :-

Sajal Debnath (TCS)

Designation: Chief Executive Officer

Mohamur Municipal Council

Signature with Seal of Tripura

Ward No- 03,06,10,11,13,15 (09-03-2022)

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Moharpur -

Ward No:

Place: - Karimnagar, Telangana

Date: -05/08/22

[illegible]

Karaimura, Tulabagan (05-08-2022)

Summary of Consultation with Stakeholders- Ranirbazar

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
19 th September 2022	Krishna Tali-Ward no. 07	5 M=5 F=0	Community members	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 1 hours of supply per day - Potential positive and negative impacts due to project implementation - Relevant information of the upcoming project and benefits of the project. - No adverse impacts on structures, livelihoods anticipated. - People are willing to cooperate by all means to implement the project successfully	- The area has insufficient and inadequate drinking water supply. The people of Krashna tali area face severe water crisis during the summer season when the ground water level drops. - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. - Waste water discharge in low lying area.
19 th September 2022	Ranirbazar Dhan Chowmoni Ward no. 05	5 M=4 F=1	Community members	- Briefing on project objectives probable implementation procedures - Relevant information of the upcoming project and benefits of the project. - Present drinking water supply source and its condition- only half an hours of supply per day - Potential positive and negative impacts due to project implementation - Area to be covered under this project	- The area has insufficient and inadequate drinking water supply. The area faces severe water crisis during the summer season when the ground water level drops. - Pond water uses for the domestic use purpose. - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. - No adverse impacts on structures, livelihoods anticipated.

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
17 th March 2023	Ranirbazar Municipal Council Office	19 M=16 F=3	Stakeholder consultation	- Briefing on project objectives probable implementation procedures - Present drinking water supply source and its condition- only 1 -2 hours of supply per day - Potential positive and negative impacts due to project implementation	- Availability of quality water – 24X7 after completion of project - No impacts on structures, livelihoods anticipated- assurance given - Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.
17 th March 2023	Krishnatalli, Near Proposed Overhead Reservoir	02 F=2	Community consultation	- Briefing on project objectives probable implementation procedures - Relevant information of the upcoming project and benefits of the project. - No impact on structure	- Application of mitigation measures in case of impacts - Availability of quality water – 24X7 after completion of project



Stakeholder Consultation at Krishna Tali



**Stakeholder Consultation at
Ranirbazar Dhan Chowmoni**



Stakeholder consultation at ULB



Public consultation Krishnatalli

List of Participants in Consultation Meeting at Krishnatali

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Ranirbazar

Ward No: 07

Place: - Krishnatali.

Date: - 19/07/22

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1	Santu Rangan Das	7029096989	Santu Rn Das
2	Rabindra Chandra Das	-	Rabindra Chandra Das
3	Nihar Das	8794658690	Nihar Das
4	Sunil Chandra Das	9862391326	Sunil Ch. Das
5	Prasenjit Das	9258811902	Prasenjit Das

: List of Participants in Consultation Meeting at Ranirbazar Dhan Chowmoni

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA

Name of the Town: - Ranirbazar

Ward No: 5

Place: - Ranirbazar Dhan Chowmoni

Date: -

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
	Sunil Debnath	9862164099	Sunil Debnath
2	Nitgoran Das	9259951569	Nitgoran Das
3	Raimu Modak	7005754169	Raimu Modak
4	Pintu Das	9862122743	Pintu Das
5	Netri Saha	9862595321	Netri Saha
	Shankar Das		

**LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF
INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL
BODIES IN TRIPURA**

Name of the Town: - Ranirbazar

Ward No: 03

Place: - Ranirbazar ULB Office

Date: - 17/03/23

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1.	Goutam Leijender	8787898095	
2.	Saroj Kumar Bora	9830439554	
3.	Ex. Swapan Chatterjee	7005278180	
4.	DR. ARDHENDU MITRA	9830415953	
5.	Sudashan Sengupta	9774896279	
6.	Mamsha Telang	942560906	
7.	Gowind Singh Rathore	9560967524	
8.	Sachin Paul	9932313841	
9.	Kalyan A. S. Das	983632889	
10.	Jayanta Chakraborty	8761808667	
11.	Vipin Negi	9690057783	
12.	Susmita Bera	8121049733	
13.	Sujoy Chakraborty	986246728	
14.	Ampita Sarkar	7005012215	
15.	Rancho P. Sengupta	870700667	
16.	Sourav Seal	7980272820	
17.	Pradip K. Das (EE)	8258066142	
18.	Samir M. Das (J.O.)	9436188274	
19.	K. S. GHOSH	9831317118	

Place- Ranirbazar Municipal Council Office, Dated- 17-03-2023

Summary of Focus Group discussion held at Ranirbazar

Focus-group discussions with affected persons and other stakeholders were conducted to learn their views and concerns. General public and the people residing along the project activity areas were also consulted during visits to the project sites.

Summary Outcome of Consultations

Sl. No	Date	Type of consultation	Location	Total No. of Participants	No. of Male Participants	No. of Female Participants
1	17.03.2022	Focus Group Discussion	Ward No- 1,2,3,4,5,6,9,10,11,13	17	00	17
2			Ward No- 3,4,6,7,9,10,12	11	00	11
3			Ward No- 6,12,7,8	09	00	09
4			Ward No- 3,5,6,7,10,11	11	00	11
5	19.09.2022		Mohespur	06	06	00
Total				64	16	48

Photographs of Key Informants Interview and Focus Group discussion



FGD at Ranirbajar



Maheshpur, Dated- 19.09.2022

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Ranir Bazar

Ward Nos. :- 1,3,2,5,6,9,4,10,11,13

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Bari Dhar (Pall)	6	9366746288		Bari Dhar (Pall)	
2	Pina Loh Datta	6	9077380790		Pina Loh Datta	
3	Panna Majumder Chowdhury	13	8837308995		Panna Majumder Chowdhury	
4	RAKH / Shil	6	8974265459		RAKH / Shil	
5	Kalpana Debnath (Das)	11	8730852891		Kalpana Debnath (Das)	
6	Sartada Surbadhan	10	9362240295		Sartada Surbadhan	
7	Jharna Chakraborty (Sharma)	2	8494585328		Jharna Chakraborty (Sharma)	
8	Sukh Rishi Paul	5	8787480820		Sukh Rishi Paul	
9	Gita Rishi Paul	5	9080885399		Gita Rishi Paul	
10	Maya Rami Debnath	5	9485325787		Maya Rami Debnath	
11	Gita Rami Ghosh (Dey)	3	7308673370		Gita Rami Ghosh (Dey)	
12	Gita Baishnab	1	7005897860		Gita Baishnab	
13	Ruma Rami Saha	9	7630847193		Ruma Rami Saha	
14	Sabita Das	10	7630846263		Sabita Das	
15	Mani Shiv (Debnath)	13	8862229792		Mani Shiv (Debnath)	
16	Silika Deb	11	6009670059		Silika Deb	
15	Rishi WBS	10	9366798160		Rishi WBS	
16	Kabita Saha	21	6009213957		Kabita Saha	
	Rinkusana	4	6009213957		Rinkusana	

Signature of the respective Surveyor

[Signature]

Verified By the respective ULB staff

Name:-

Designation:-

Signature with Seal:-

[Signature]
Er. Manuj Debbarna
 Jr. Engineer (Civil)
 Ranirbazar Municipal Council
 West Tripura.

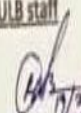
Ward No- 1,2,3,4,5,6,9,10,11,13

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Ranir Bazar **Ward Nos. :-** 6/12/7/8

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
	Sandana Majumder	10	6900072124			
	Purnima Deb Nath	8	9426555497			
	Anchana Bhownik (Nath)	7	8131055706			
	Kavika Bin (Chowdhury)	7	9612636260			
	ANIMA DATTA SAHA	5	9366825290		ANIMA DATTA SAHA	
	সৌম্য সান্নিধ্য	6	8730856041		সৌম্য সান্নিধ্য	
	Shikha Deb Nath	12	8794375027		Shikha Deb Nath	
	Jayanti Deb Nath	12	8914988820		Jayanti Deb Nath	
	সৌম্য সান্নিধ্য	6	9862982996		সৌম্য সান্নিধ্য	

Signature of the respective Surveyor


Verified By the respective ULB staff
 Name: - 
 Designation: - **Er. Manuj Dabbarma**
Jr. Engineer (Civil)
 Signature with Seal of Ranir Bazar Municipal Council
 West Tripura.

Ward No- 6,12,7,8

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the ULB: - Ranibazar

Ward No:

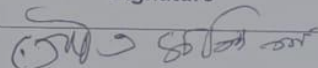
Place: - Moheshpur

Date: - 19/09/22

Today on dated a public consultation was held at ward No The consultation was carried out with the community people regarding proposed septage Treatment plan and existing situation. Community people shared their views on existing situation and proposed projects.

Key Points of the Consultation:

1. Awareness activities were conducted to people of about adverse impacts of open defecation through the consultation.
2. Common practice for sanitation and availability of septic tanks
3. Sharing the information on sanitation status in and its impact
4. Benefits of the proposed FSSTP

Sl. No.	Name (CAPITAL LETTER)	Contact No.	Signature
1	Giontom Shill	-	
2	Haripada Sharma	7640544699	- Haripada Sharma
3	Anil Debnath	-	-
4	Kartik Das	6909679303	Kartik Das
5	Tapas Barik	8979047337	Tapas Barik
6	Arnal Kanti Das	8799368613	Arnal Kanti Das

Moheshpur, Dated- 19-09-2022

INTERACTIVE WORKSHOP – ENVIRONMENT , SOCIAL SAFEGUARD- PART OF PRF Tripura Urban and Tourism Development Project (TUDDP)

Report of Orientation Workshop on ADB Safeguards Policy- Finance – Procurement – Institutional Arrangements for the Officials of Tripura Urban Planning and Development Authority (TUDA) & Project ULBs

Introduction

Government of Tripura initiated the Project Readiness Financing (PRF) of Integrated Urban Planning & Infrastructure Development for Urban Local Bodies in 20 towns¹ of the State under the loan no. 6037-IND assisted by the Asian Development Bank (ADB). The aim of the project is to plan, develop, implement and manage project activities and infrastructure assets for sustainable development and economic growth of the state as a whole. The project has two components viz URBAN and TOURISM. Urban infrastructure is looked after by TUDA whereas the Tourism part is under the TTDCL. The Urban Infrastructure Development subprojects are spread over 5 major components like Water supply, Storm water drainage, Septage management, Roads and Urban Amenities.

To achieve the project objectives efficiently, capacity building of the engineering and other non-engineering stakeholders is an inevitable part of the project. In the initial stage of preparation of DPR, Bid document and prior to the floating of tenders, DPR preparation and floating of tender documents, the technical and non-technical stakeholders, who are supposed to be directly or indirectly involved the Subprojects at all level needs to be oriented on the project prerequisites like, Safeguards Policy and measures to be followed, Financial modalities of externally aided projects, Procurement, Institutional arrangement structure etc. so as to enable project executing staffs to have a better understanding in discharge their roles and duties in a better way for assured quality services.

In this regard, a two days' workshop was organized with the joint effort of TUDA and PDMC where officials from all twenty project towns, TUDA and UDD have participated. The primary intent of the orientation workshop was to enhance the knowledge base of the ULB officials, TUDA officials and officials of UDD on the mentioned five disciplines, namely, a) Social safeguard, GRM and Gender, b) Environmental safeguards c) Financial modalities of externally aided projects, d) Procurement procedures, and e) Institutional arrangements.

Objective of the workshop

The specific objective of the workshop is to raise awareness on risks/issues, implications and arrangements of this project across various disciplines and creating a pathway to establish safeguard framework/plan and application of tools customizing to local conditions.

- ❖ The participants from ULBs and TUDA have a better understanding of the prerequisite parameters of an externally aided project
- ❖ Participants will be able to learn the process of continuous monitoring of the prerequisite parameters of safeguards, procurement process, contract management, financial implications, and institutional arrangements
- ❖ Avoid adverse impacts resulting from the project on environment and affected people, where ever possible
- ❖ Minimizing, mitigate and / or compensate for adverse project impacts on the environment and persons affected if efforts to avoid adverse impacts if not possible
- ❖ Helping borrowers / clients to strengthen the safeguard systems and build the capacity to manage social and environmental risks
- ❖ Reflect on their own supervision approach in a comprehensive perspective
- ❖ Exchange experiences or new ideas for guidance and suggestions to be used in the project

- ❖ Other objectives for the Orientation Workshop are to make the organization for creating a Field of Preparation.

Location and period of the workshop

The mentioned workshop was a residential workshop and was organized at Gitanjali Guest House, Bholagiri, Agartala. The workshop was organized for two days 19th and 20th December 2022

Total number of participants

The total number of participants were approximately 52 for the two days orientation workshop, comprising of 2 officials each from 20 ULBs and officials from TUDA/UDD.

Methodology of the workshop

The proposed orientation workshop has been conducted mostly in an interactive communication mode. The methodology followed during the orientation workshop are as under:

- ❖ Lecture
- ❖ Presentation
- ❖ Group discussions
- ❖ Subject related learning games etc.

Training Team & Organizing Team

The members of the organizing team comprised of Subject Experts and other support staffs of TUDA – PDMC including Social Safeguard Expert, Environmental Expert, Institutional Expert, Procurement and Finance Expert.

Outcome

The outcome of the two days “Orientation Workshop” related to the understanding of the participants. The outcomes are as under:

- Participants understood the different policies, procedures of Social & Environmental Safeguards
- Importance of social and environmental safeguards,
- Why gender in projects and basics of gender,
- Participants could also have an idea of the modalities of Institutional setups within the project
- Municipal Administration System
- Overview of urban scenario in Tripura
- Participants have learned Project accounting system under ADB and disbursement modalities
- Participants were made aware of the various Stages of procurement
- Types of procurement
- Methods of procurement under ADB project

Session Details – Day One

Session 1: Opening Session

The opening session is intended to welcome the participants and the trainer and the participants to get to know each other. The opening session was addressed by Dr. Tamal Majumder (TCS), Director, UDD, in which he welcomed all the participants and explained the importance of orientation workshop and the specific subjects as well. The opening session was followed by an address regarding the importance and prerequisites in ADB funded projects by Dr. A.K. Aditya, Team Leader, PDMC. After the opening session, participants were addressed and educated regarding ADB Protocols and Guidelines by Mr. M. K. Gop. The session also provided a brief overview of the whole designed workshop schedule - the back ground, objectives, content and schedule of the course and highlights about the training methodology. The session was conducted in an interactive in nature.

manner and was more oriented towards learning from each other. The course handouts and reading materials are disseminated.

Session 2: Development Induced Social Issues, Social Safeguards & Impacts

The second session was intended to create an understanding of social impacts in implementation of urban infrastructure and development projects in urban areas and their positive and negative implications. It also aimed planners, implementors and decision makers to understand how and when to diagnose the social issues in the process of planning and designing infrastructure projects. The session was designed to assist the participants in distinguishing between “project benefitted people” and “project affected people” through discussions based on identified possible social issues due to urban infrastructure projects based on their experience. During the session, presentations were made deriving from national experience to supplement the learning efforts. It was discussed that development induced social issues will be inevitable unless appropriate social safeguards are not included into infrastructure development plans. This session was the foundation to understand the concept of social safeguards, grievance redressal mechanism and gender related issues and mainstreaming. The said session was so designed that a high level of active participation of the participants was observed although the session. The topics discussed under the session are as under:

- Understanding of Social Safeguard and its principles
- ADB’s Safeguard Policy, 2009 & Scope of application
- Safeguard requirements 2 and safeguard requirements 3
- Policy Objectives & Scope of Policy application
- Understanding Involuntary Resettlement
- Eligible displaced persons & types of displacements
- Basic IR Principles
- Negotiated Land Acquisition
- Categorization of Projects
- IR Impacts, types and categorization of the same
- Who are Indigenous People (IP)
- Safeguards Compliance Flowchart
- IR impacts – what to consider?
- Grievance Redressal Mechanism (GRM / GRC) Structure & ADB’s Accountability Mechanism
- Project stages for preparation of safeguard documents
- Case sharing for best practices of safeguard application in the field
- Consequences of not following safeguard norms on time
- Preparation of DDR and RP
- Process of land donation or negotiated land purchase
- Checklist for social safeguard and gender while visiting sites
- Gender – meaning, understanding and key concepts
- Considering gender in project designing and implementation
- Gender equality and equity
- Common perception regarding gender

Session 3: Environmental Safeguards and its applications

During the session in the respective subject matter, Environmental Safeguard Team– PDMC made an effort to make the participants understand that Environment Safeguards aims at minimizing environmental impacts while executing the project activities in the field. Process of doing the same was discussed through implementation of Environmental Management Plan (EMP) proper awareness, and taking required mitigative measures. It was also shared with the participants that contractor has to continually comply with EMP strictly, proper solid waste/ waste water management, use of personal protective equipment’s (PPE),

continued supply of potable drinking water and First aid kits to workers/staffs and proper Health and Safety Plan (OHSP).

The report summarizes how ADB is structured and how it operates. ADB aims to improve environmental conditions of the rural and urban poor to enhance their chances for a better quality of life. We do this by working with governments and the private sector to fund land and water management systems; better resource management systems; cleaner energy production; expanded water supply, sanitation, and waste management services; and much more.

ADB's current strategies emphasize infrastructure investments with new approaches to focus on sustainability of their economic development. The impact of poor environmental quality and degraded resources on individuals, families, and communities poses a threat to the poor and increases the strain on those living on the margins of poverty. Most of the poor live in rural areas where they are highly dependent on ecosystems for their needs. Yet unsustainable exploitation and conversion is severely straining the forests, coastal systems, and lands from which they make their livings. And the very poorest tend to depend on the most marginal of areas, often contributing to resource degradation just to survive. As rural ecosystems become degraded, they lose their life-supporting functions—which sustain not only rural communities but urban populations. All queries of the respective ULBs were satisfactorily resolved regarding environmental concerns.

Topics discussed under Environment Safeguards are:

- Safeguard Requirement (ADB's Safeguard Policy Statement 2009)
- Importance of Safeguards (Prevent and mitigate harm to people and environment)
- Environmental Safeguards Policy Principles and requirements-ADB
- Major Rules and regulations for compliance
- Environmental Safeguard-Schedule and time frame of activities
- Details of Environmental Management plan (EMP)
- Activities during pre-construction phase (Statutory clearance, consent, NOC, Utility Shifting, selection of location, stockpile areas, disposal areas, material etc.)
- Environment safeguard requirement before start of project implementation
- Environment safeguard requirement during project implementation
- Project Implementation Phase EMP-site Environment Compliance
- Environmental Safeguard -Reporting

Session 4: Institutional Setups in Urban Scenario and Municipal Administration

This Session was focused on the urban scenario related to ULBs. Tripura urban sector has been facing crucial challenges like all other northeastern Indian cities. Geographical location and limited connectivity with India's main land are some permanent challenges. But those challenges can convert as value addition by improvement of governance efficiency. Natural resources, historical and tourist attractions are investment values for the urban sector. Those can be optimally utilized by attracting new urban investments and building new urban infrastructure. A few issues and challenges are mentioned below.

- Urban investments and improvement in the Physical Infrastructure of Cities.
- Reform linked investment strategy.
- Creating a self-sustainable service delivery mechanism and augmenting resources.
- Implementation of urban reforms addressing the causes and problems of the cities in the implementation of the reforms and suggest measures.

In addition to it the key objectives of creating Tripura Municipal Services were also discussed during the said session. In context of the same, the present scenario of ULBs, its staffing, institutional setting at ULBs, urban governance and administrative framework and the way forward was also a part of session.

Opening session

The opening session is starting with greeting of the guest of honour: -

- 1) Dr. Tamal Majumdar, Director of Urban Development,
- 2) Mr. Mihir Kanti Gop , Cheif planner TUDA & Project Coordinator PMU, TUDA , ADB project ,
- 3) Dr. Anup Kumar Aditya, Team Leader, PDMC.

After that the Expert of PDMC and the participants of the ULBs to get to know each other. The introduction will cover the background, work related to infrastructure development of the participants. In the of the workshop Dr. Tamal Majumder (Director of UDD) give his valuable inaugural speech related to ADB project followed Mr. Mihir Kanti Gop , Cheif planner TUDA & Project Coordinator PMU, TUDA , ADB project & Dr. Anup Kumar Aditya ,Team Leader , PDMC.

Orientation workshop session

Training/ Learning Objectives	Session Mode	Duration	Resource Person
Day One- 19.12.2022			
Registration for the Workshop cum training		Mins	
Welcome address to the participants and introductory session		Mins	Dr. Tamal Majumder (TCS), Director, UDD
Orientation on ADB Guidelines and Protocol	• Lecture • Discussion • Power Point presentation through Projector	Mins	Mr. M.K. Gop, Chief Planner, TUDA
Social Safeguards ➤ Orientation on the basic Safeguard Principles ➤ Project Categorizations ➤ Social Safeguard Reports and documentations ➤ Social Safeguard Requirements for project implementation ➤ Difference of DDR with RP/ IPP & SSMR ➤ Good practices of safeguard ➤ Consequence of bad safeguard practices	• Lecture • Discussion • Power Point presentation through Projector	120 Mins	Jayanta Chakraborty, Safeguard Expert, PDMC
➤ Uses & Importance of GRM & GRCs at various levels. ➤ Gender Equality & Social Inclusion	• Lecture • Discussion • Power Point presentation through Projector	60 Mins	Jayanta Chakraborty, Safeguard Expert, PDMC
Environmental Safeguards ➤ Orientation on the basic Safeguard Principles ➤ Project Categorizations ➤ Environmental Safeguard Reports and documentations ➤ Environmental Safeguard Requirements for project implementation ➤ Different types of reports – IEE, SEMP & SEMR	• Lecture • Discussion • Power Point presentation through Projector	120 Mins	hendu Mitra, nment Safeguard Expert, PDMC

➤ Good practices of safeguard ➤ Consequence of bad safeguard practices			
Feedback from participants		30 Mins.	All participants
Day Two- 20.12.2023			
Topic: ➤ Municipal Administration and overview of urban scenario in Tripura ➤ ULB governance/administration in Tripura and the role of urban staff in urban development and infrastructure ➤ Discussion follows with participants to share their existing scenario in respective ULBs. ➤ Discussion constitution/statutory obligations with reference to 74th CAA and Tripura Municipal Act, ➤ ULB as organisation, powers and functions of ULB and role of various functionaries ➤ Urban governance reforms – way forward	• Lecture • Discussion • Power Point presentation through Projector	2 Hours	Institutional Expert, PDMC
Finance: ➤ Modalities of project fund disbursement ➤ Project Accounting System	• Lecture • Discussion • Power Point presentation through Projector	2 Hours	Finance Expert, PDMC
➤ Procurement & its principles ➤ Various stages of procurement ➤ Types of procurement ➤ Procurement Methods ➤ Procurement Checklist ➤ Basics of contract management	• Lecture • Discussion • Power Point presentation through Projector	2 Hours	Procurement Expert, PDMC
Feedback from participants		15 Mins	All participants
Valedictory Session		5 Mins.	Official from TUDA

Closing session

After complete all the session by the experts of PDMC, Certificates are distribute to all them participants per procuration Mr. Mihir Kanti Gop , Chief planner TUDA & Project Coordinator PMU, TUDA , ADB project & Dr. Anup Kumar Aditya ,Team Leader , PDMC. And close up the workshop with vote of thanks by means of Mr. Mihir Kanti Gop , Chief planner TUDA & Project Coordinator PMU, TUDA , ADB project.





Attendance Sheet

ORIENTATION WORKSHOP ON SAFEGUARDS, FINANCE, PROCUREMENT & INSTITUTIONAL
ARRANGEMENTS - 2022

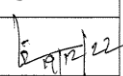
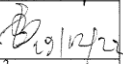
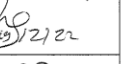
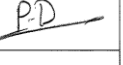
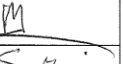
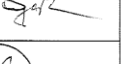
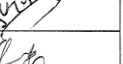
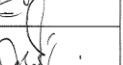
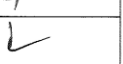
PDMC (TUDA)

Venue - Geetanjali State Guest House.

DATE- 19.12.2022

Sl./No	Name	Designation & ULB Name	Sex (Male / Female)	Contact No.	Signature.
1	Ratish Ch. Debbarma	Jr. Ex., Bishalgarh M.C.	M	8974093128	
2	Subha Droni	Asst. DMC	m	5362122801	
3	Fatuekh Hossain	C.O., BMC	m	7005693783	
4	Prinsyit Bhattacharya	Deputy Comm. Bulbani M.C.	M	9485067001	
5	En. Depankar Sharma	J.E., Ambikapur M.C.	M	7005353201	
6	En. Ananta Debnara	J.E., Chaitanya R.D. Block	F	9974579116	
7	Somali Paul	LDC, Chaitanya R.D. Block	F	9383133641	
8	Bishal Deb	Account Section	M	8787352526	
9	En. Subrata Chandra	J.E., Mohanpur M.C.	M	9436484762	
10	En. Abhijit Debnath	J.E., Jindania N.P.	M	7005639026	
11	Biswajit Das	Asstt. Manager (Finance), JEP	M	7005248629	
12	En. Ananta Debnara	Junior Engineer, Ambikapur M.C.	M	9436505127	

Sl./No	Name	Designation & ULB Name	Sex (Male / Female)	Contact No.	Signature.
13	Abhijit Dasgupta	Accounts Secy, Ambikapur M.C.	M	8014477123	
14	En. Swapan Choudhury	J.E., Raipur M.C.	M	7005278180	
15	En. Shubhjit Paul	Technical Section, R.M.C.	M	6009576328	
16	En. Gulab Ch. Choudhury	J.E., Kamulpur M.C.	M	9436584433	
17	Parimal Chandra Das	Accountant, Belur M.C.	M	9802610248	
18	En. Kamalesh Das	J.E., Belur M.C.	M	7627966564	
19	Gopendra Biswas	Deputy Comm., Teliamura Municipal Council	M	9436488944	
20	En. Biju Bora	J.E., Teliamura Municipal.	M	7005553306	
21	En. Pratikam Saha	J.E., Melaghar Municipal.	M	9774119382	
22	En. Pranjit Das	J.E., Sonamug Nager, Melaghar	M	8837210671	
23	En. Chandra	Asstt. Comm., Sonamug Nager	M	9612472435	
24	Keshavram Saha	Accounts Incharge, SNP	(M)	9436517198	
25	Ruma Pal Deb	Asstt. Comm. - Charge, SNP	(F)	9485062654	
26	Subrata Deb	J.E., Kailashahar M.C.	(M)	8415861186	
27	Priny Blusha Paul	J.E., Kumail M.C.	M	8837233816	
28	Prabulla Kumar Das	Asstt. Comm., Asstt. J.C. Kailashahar M.C.	(M)	9402355912	
29	Raj Kanta Debnara	LDC, Cam. Cam.	(M)	8787761715	
30	Ananta Das	J.E. (U.M.C.)	(M)	8259093314	

Sl./No	Name	Designation & ULB Name	Sex (Male / Female)	Contact No.	Signature.
31	Tapan Sarkar	AW UMC	Male	7629041426	
32	Saikat Roy	Actt. Khosai MC	Male	9436514027	
33	Subhojit Roy	Actt. DMC	Male	9862122801	
34	Prasenjit Deb	Office Assistant (TUDA)	Male	8837341214	
35	Mumoni Das	JE, TUDA	Female	7005282094	
36	Sujoy Chakraborty	Social Safeguard (Suby)	Male	9862246728	
37	Rita Mandal	Environment Safeguard (Support)	Female	9851749939	
38	Pradeep Sanyal	Social Safeguard	Male	8707001669	
39	Jayanta Chakraborty	Social Safeguard & Gender Expert	M	8761805667	
40	Atanu Chakraborty	Office Assistant, DMC	M	8787832479	
41	Susmita Dasgupta	Socio-Economic Surveyor (TUDA)	F	8132049723	
*42	Rupak Deb	CMU (TUDA), Panisagar NP	M	8118937105	
*43	Prasanta Das	SOM Expert Panisagar NP	M	8131971297	

Sl./No	Name	Designation & ULB Name	Sex (Male / Female)	Contact No.	Signature.
13	Parimal Chandra Saha ✓	Acctt. Belowe M.C.	M	9862610248	
14	Abhisit Dasgupta ✓	Account Sec Amarpur M.P.	M	8014437123	
15	P. J. Banerjee ✓	Q/R	M	7005583306	
16	Gopabandha Biswas ✓	Deputy Secy/Tellamua M.C.	M	8887068546	
17	Abhijit Debnath ✓	Junior Engineer JNP	M	7005639006	
18	Sourajit Das ✓	Asstt. Manager/Finance	M	7005243629	
19	Fazrukh Hossain ✓	CO, Bishalganj M.C.	M	7005693783	
20	Subhojit Das ✓	Acctt. UMC	M	9862122801	
21	Tapan Sarkar ✓	Acctt. UMC	M	7627041426	
22	Ngay Chakrabarty ✓	Cashier SMC	M	9612472425	
23	Rajkumar Debbarma ✓	Deputy M.C. Cashier	(M)	8787761715	
24	Amanjit Ban. ✓	J.E., UMC	(M)	8259093214	
25	Subrata Deb ✓	JE, Kankasahar M.C.	(M)	815861186	
26	Bijay Kumar Barui ✓	JE, Kankasahar M.C.	(M)	8837235816	
27	Bafulla Kumar Deb ✓	Envier, I/C Accts Sec KSC M.C.	(M)	9402355912	
28	Ruma Pal Deb ✓	Acctt. in-charge Heli Sec.	(F)	9485062654	
29	Ratheshyamm Saha ✓	Acctt. in-charge	(M)	9426517198	
30	Pranajit Barui ✓	J.E. Sonamug, Nagan Ranchayal	(M)	8837210671	

Sl./No	Name	Designation & ULB Name	Sex (Male / Female)	Contact No.	Signature.
31	Er. Arinam Saha ✓	J.E. Melagham M.C.	M	9774119382	Saha
32	Sri P.K. Karm ✓	Sr. ADO / TUDA	M	9436122820	Karm
33	Ratish Ch. Debbarma ✓	Jr. Er, Bishalgarh M.C.	M	8974073128	Debbarma
34	Saikat Roy ✓	Asst. Khowai M.C.	M	9426514028	S.
35	Prasenjit Deb	Office Assistant	M	8837341214	P.D.
36	Mousumi Das.	Junior Engg, TUDA	F	7005282004	m.
37	Sujoy Chakraborty	Social Safetyworks (Support)	M	7862246728	Sujoy
38	Rita Mandal.	Environment Engineer (Support)	F	9051747937	Rita
39	Pradeep Singh	Social Safetyworks	M	8707001669	Pradeep
40	Jayanta Chakraborty	Social Safetyworks & Gender Expert	M	8761805667	Jayanta
41	Atanu Chakraborty ✓	Office Assistant, PDMC	M	8787832479	Atanu
42	Dr. K. Sriyam	Urban General Engineer TUDA	M	9440136718	Dr. K.
43	Bilashu Dasgupta	FM Support, PDMC, TUDA	M	9830154226	Bilashu
44	Pavan Paveek	Frse TUDA & TTDCL	M	9314660411	Pavan
45	Susmita Bhowmik	Socio Economic Survey - PDMC	F	8132040780	Susmita
46	En. Dipankar Sharma ✓	J.E., Ambala	M	7005353201	Dipankar
47	Er. Kaam Nag ✓	J.E. Baroni	M	7600966564	Kaam
48	Er. Rajob Deb Barma	J.E. Khawai	M	8416048223	Rajob

Appendix 9: Sample Grievance Form

(To be available in Bengali and English)

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

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

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

FOR OFFICIAL USE ONLY

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

অভিযোগ নিবন্ধন ফর্মের নমুনা

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

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

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

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

Office ব্যবহারের জন্যঃ

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

Appendix 10: Guidelines for Workers Camps

(Based on IFC benchmark standards for workers accommodation)

Guidelines for Workers' Accommodation

1. Availability of sufficient number of clean rooms for the workers with adequate facilities of ventilation, Drinking water, Electricity/fan/light (natural and artificial lighting) etc. in each room.
2. Camps should not be subjected to periodic flooding nor located within 200 feet of swamps, pools, sink holes or other surface collections of water. All sites should be graded, ditches and rendered free from depressions in which water may become a nuisance.
3. Accessibility to an adequate and convenient supply of potable water to the workers. Depending upon the climate, weather conditions and accommodation standards, 80 to 180 litres per persons per day water should be available and drinking water should meet the national/WHO drinking water standards.
4. Camp site should be adequately drained to avoid the accumulation of stagnant water.
5. All tanks used for the storage of drinking water should be constructed and covered as to prevent water stored therein from becoming polluted or contaminated.
6. All sites should be adequate in size to prevent overcrowding of necessary structures.
7. Camps should have Crèche facility for children with necessary arrangements.
8. The grounds and open areas surrounding the shelters should be maintained in a clean and sanitary condition free from rubbish, debris, waste papers, garbage or other refuse.
9. Beds, cots, or bunks, and suitable storage facilities such as wall lockers for clothing and personal articles should be provided in every room used for sleeping purposes.
10. A separate bed for each worker should be provided. Double deck bunks are not advisable for the safety and hygiene reasons and their use should be minimized. If they are used there must be enough clear space between the lower and upper bunk of the bed. Standard range is 0.7 to 1.10 meters. Triple deck bunks are prohibited.
11. All heating, cooking, and water heating equipment should be installed in accordance with State and local ordinances, codes, and regulations governing such installations. If a camp is used during cold weather, adequate heating equipment should be provided.
12. If food is provided, it should cater for different cultural needs. Kitchens should be 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 hygiene drying.
13. All kitchen floors, ceiling and wall surface adjacent to or above food preparation and cooking areas should be built using durable, non-absorbent, easily cleanable, non-toxic materials.
14. No person with any communicable disease shall be employed or permitted to work in the preparation, cooking, serving, or other handling of food, foodstuffs, or materials used therein, in any kitchen or dining room operated in connection with a camp or regularly used by persons living in a camp.
15. There should be recreation facilities for the camp workers i.e. TV/sports/newspaper/magazine etc.
16. There should be facility of mosquito's prevention and control i.e. use of mosquito net/coil/electric repellent/pesticide etc.
17. Sanitary and toilet facilities should be constructed of the materials that are easily cleanable. Standard range of the toilets varies from 1 unit for 6 persons to 15 persons. For urinals, standards are 1 unit for 15 persons.
18. There is no need to provide separate urinals in any place where less than 50 workers are

- employed or where the latrines are connected to water borne sewage system.
19. Sanitary and toilet facilities should be designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
 20. Separate toilet and bathing facilities should be available for Men and women. These facilities shall be distinctly marked "for men" and "for women" by signs printed in English and in the native language of the persons using the facilities, and/or marked with easily understood pictures or symbols.
 21. Workers' gender, religious, cultural, and social backgrounds should be respected. Workers should be provided with the possibility of celebrating religious holidays and observances.
 22. No pets, birds or livestock should be kept or fed unless approved by management or camp operator.
 23. There should be proper arrangement of colour coded dustbins i.e. Green for wet/biodegradable wastes, blue for dry/non-biodegradable waste and red for safe disposal of domestic hazardous waste i.e. sanitary napkins and diapers.
 24. There should be adequate facility for waste water management (i.e. septic tanks/soak pits) and for disposal of Municipal solid waste (i.e. composting).
 25. The person in charge of managing the accommodations has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and any other important casualties.
 26. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk, concerns related to HIV/AIDS and other health risk related activities should be provided to the workers through group/individual orientations and should also be displayed at camps as visual boards.
 27. Workers should have easy access to medical facilities and medical staff where possible female doctors/nurses should be available for female workers. Regular health check up should be done for the workers. First-AID Kit/Health care facilities should be available in the camps. There should be proper demarcation/display of First Aid facility and First Aider.
 28. A specific fire safety plan should be prepared including training of fire wardens, periodic testing and monitoring of fire safety equipment.
- All key contacts, emergency contact number, including nearby hospital should be posted in a prominent place and in all languages present e.g. at camp gate and throughout the camp.

Appendix 11: Guidelines for Prevention and Control Of Covid-19

Introduction:

Construction worksite and other workplaces are relatively close settings, with shared spaces like work area, pathways, Worker camp, Site office and material handling area etc. and COVID-19 infection can spread relatively fast among workers, staffs and visitors.

There is a need to prevent spread of infection and to respond in a timely and effective manner in case suspect case of COVID-19 is detected in these settings, so as to limit the spread of infection.

Principles of Worker Protection:

- Consistently practice social distancing.
- Cover coughs and sneezes.
- Maintain hand hygiene.
- Clean surfaces frequently.

Maximum Precaution for Persons/Labourers Reporting To Work:

- IF SICK, STAY HOME!
- IF SICK, GO HOME!
- IF SOMEONE SICK, SEND THEM HOME!

Covid-19 Typical Symptoms:

- Fever
- Cough
- Shortness of Breath
- Sore Throat

Morning and evening temperature screening of all persons at the worksite is done by EHS officer with Infrared Thermometer and register was also maintained.

Self-Attestation By Persons/Labour Prior To Work:

Prior to starting a work, each labour /worker will self-attest to the supervisor and the documents is collected by EHS Officer. It consists the following points,

- No signs of COVID-19 symptoms within the past 24 hours.
- No contact with an individual diagnosed with COVID-19. (contact means living with a positive person, being within 6 ft. of positive person OR sharing things of positive person).
- Not undergone quarantine or isolation (in case of any labourer /worker who has been quarantined or isolated previously, the engagement shall be only after obtaining the requisite clearance from trained and registered medical practitioner).

The self-attestation would be verified by EHS officer deployed at site through discussions with laborers /workers and/or preliminary checks such as temperature checks, etc. prior to their engagement at site.

Persons/Labourers showing COVID-19 symptoms or not providing self-attestation will be directed to leave the work site and report to the fever clinic/quarantine Centre immediately. Labour not to return to the work site until cleared by fever clinic/quarantine Centre.

General Guidelines:

- No handshake is permissible at site, office.
- Non-essential physical work that requires close contact between workers will not be carried out.
- Hand sanitizer is used before entry of the site.
- No unauthorized person will enter the work site other than mentioned by supervisor during start of work.
- All individual work group meetings/ talks will follow social distancing.
- Worksite had COVID-19 safety guidelines.
- All restroom /toilet facilities will be properly cleaned, and hand washing facilities provided with soap, hand sanitizer.
- Water bottle present at site will not be shared.
- Social Distancing will be maintained during breaks and lunch.
- Coughing or sneezing must cover with a personal handkerchief and then wash hands. Coughing or sneezing in hands was avoided.
- Avoid touching eyes, nose, and mouth with hands.
- If family member is feeling ill, stay home.
- Separate disposal bins were placed for collection of used masks/used hand tissues, etc.
- Spitting will be strictly prohibited.

Work-Site Prevention Practices:

- At the start of each day, confirmation will be taken from all employees that they are healthy and all workers will be informed about reusable and disposable PPE.
- Outside person(s) will be strictly prohibited at worksite.
- Use of eye protection (reusable safety goggles/face shields) is recommended.
- In work conditions where required **social distancing is impossible** to achieve, such employees will be supplied with appropriate PPE's.
- All employees will drive to work site in a single occupant vehicle.
- Workers will maintain separation of 6 feet from each other wherever possible.
- High contact surfaces will be properly disinfected in order to minimize the spread of germs in the areas that people touch frequently.
- The contactless temperature checks was done for the workers prior to site entrance and after site works to identify persons showing signs of being unwell with the COVID-19 symptoms.

Washing Facility:

- Worksites already have access to toilet and hand washing facility.
- At entrances and exits hand cleaning facilities is provided.
- All onsite workers help to maintain and keep work area clean.

Labour Camp

- follows a zero-tolerance policy on wearing of masks.
- Masks provided to all the persons/labourers for use at the camp site as well as at the worksite.

Toilet Facility

- The number of people using Toilet facility will be limited at any one time.
- Hands washing must be done before and after using the facilities.

Eating/snacks Arrangements

- Dedicated eating areas is marked on camp and workers also instructed to reduce food waste and contamination.
- Hand cleaning facilities or hand sanitizer is available at the entrance of worker dining room.
- Workers seated at a distance of 2 meters apart from each other while eating.
- Drinking water provided with proper cleaning measures and consists of tap mechanism.
- All areas used for eating is thoroughly cleaned at the end of each break and shift.

EHS Officer will ensure compliances with prevention issues at the labour camp.**Training**

- All workers get training by EHS officer on above requirements before start of any construction activities.
- During construction period frequent visual and verbal reminders will be given to workers for improving compliance with hand hygiene practices and thus reduce rates of infection.

Emergency Contact

- Emergency contact number(s) at work site and labour camp for reporting COVID-19 symptoms is provided.
-

COVID-19 Safety Coordinator(s)		
Name	Title/Facility Location	Contact Information (office location, phone, email address)

Sequence of operation performed regarding COVID-19 safety performed at site:-

- Before entering the worksite for the first time the workers must fill and sign the self-declaration form and also submit the vaccination certificate.
- Before starting each day work the workers body temperature is monitored. If workers body temperature was found higher, then he was not allowed to work at site and he will be consult with doctor as per guidelines.
- Along with body temperature measurement workers hand also sanitized with hand sanitizer.
- With face mask workers, supervisors & officials were only allowed at worksite.
- If any situation suffocation problem is arise then the worker is instructed to maintain proper distance from others and work individually.
- During the work wherever possible social distance was maintained. But during construction activities where social distancing is not possible to maintain, there proper PPE's was used.

- During lunch or tiffin time the worker was instructed to clean his hand with hand wash and water.
- Worker camp areas and work location were disinfected time to time.
- Before leaving the worksite the workers body temperatures was again measured and noted on the register.

Appendix 12: Ground Water Extraction Permission

F.1(40)/EE/ WRID/TECH/2020/.....⁵⁸⁻⁶⁰
 Government of Tripura
 Office of the Executive Engineer
 Water Resource Investigation Division
 Kunjaban:Agartala



Dated 8th April, 2022

To
 The Chief Planner,
 Tripura Urban Planning & Development Authority
 (Project Coordinator, PMU,ADB Project)
 Agartala-799001.

Sub: - Loan 6037 IND : Tripura Urban & Tourism Development Project (TUTDP): Regarding Water allocation permission and sustainability of water supply source permission for 20 towns in Tripura State.

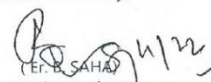
Ref: - Letter No. F.03(09-TUDA/ Project/2021/P-I/2995-97 dtd. 25/03/2022 of Tripura Urban Planning and Development Authority (TUDA).

Sir,

1. Kindly refer to the above on the subject at issue. In this connection , I am directed to inform you that according to dynamic ground water resources estimation report of 2020, the Groud Water availability for future uses for 16 towns as stated in the under reference's letter is in safer side. So, there is no bar for extraction of Ground Water.
2. The proposed water supply scheme based on surface water resources from river Juri, Manu and Gumati through intake well for Dharmanagar, kailashahar, Kumarghat and Udaipur is insignificant in lean period. A calculation sheet of runoff of the each river along with monthwise percentage of rainfall is enclosed herewith which may kindly be seen.
3. Regarding Water resource data like HFL, LWL, Discharge of 3 rivers as stated above and rainfall data from 2009-2018 of different sub-Divisions are enclosed herewith.
4. The Deep Tube Well yield map of Tripura is enclosed herewith.

Encls: As Stated Above(34 no pages).

Yours faithfully,


 (E. P. SAHA)

Executive Engineer
 Water Resource Investigation Division
 Kunjaban , Agartala

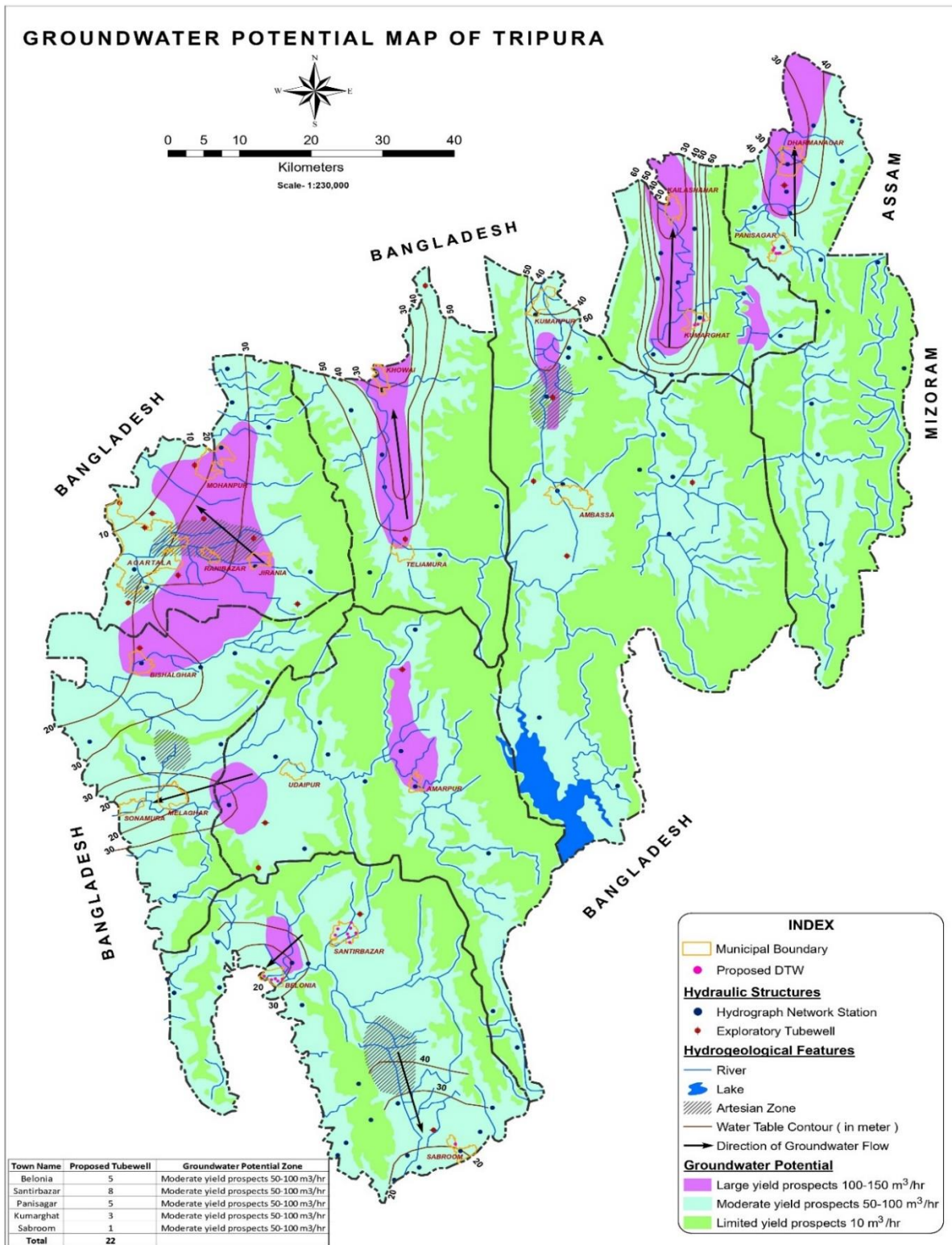
Copy to :-

1. The Chief Engineer, PWD, WR, Tripura, Visvesaraya Complex, Kunjaban, Agartala, Tripura(W) for favour of his kind information please.
2. The Superintending Engineer, O/O the Additional Chief Engineer, P&DUnit, PWD(WR) Visvesaraya Complex, Kunjaban, Agartala, Tripura(W) for favour of his kind information please.

Executive Engineer
 Water Resource Investigation Division
 Kunjaban , Agartala

① TL, PDMC
 ② TR-1
 for Yta Pl.

 11/4/22



Appendix 13: IBAT Assessment Checklists Of Project Towns

KHOWAI



Integrated Biodiversity Assessment Tool

PROXIMITY REPORT

KHOWAI SUBPROJECT

Country: India

Location: [24.1, 91.6]

Date of analysis: 13 January 2023 (GMT)

Buffers applied: 1 km | 10 km | 50 km

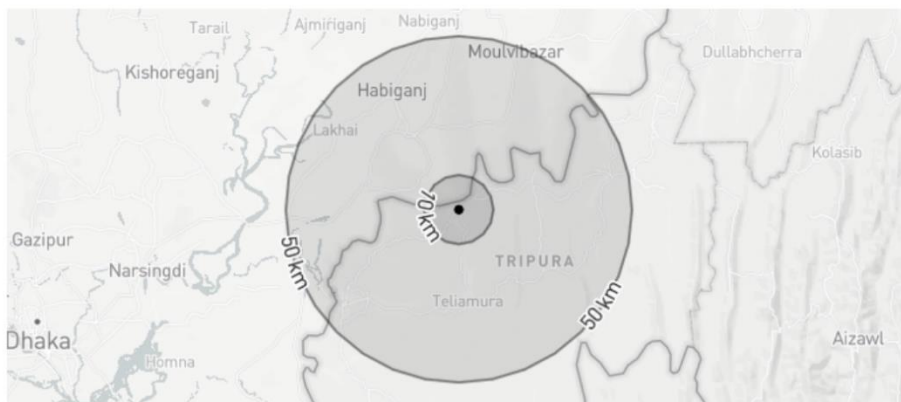
IUCN Red List Biomes: Marine, Freshwater, Terrestrial

Generated by: Govind Rathore

Organisation: ADB

Overlaps with:

Protected Areas	4
Key Biodiversity Areas	5
IUCN Red List	75



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



Protected Areas

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

Area name	Within buffer of
Rema Kalenga	10 km
Barshijora Eco-Park	50 km
Lawachara	50 km
Satchari	50 km

Key Biodiversity Areas

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

Area name	Distance
Rema-Kalenga Wildlife Sanctuary	10 km
Gumti Wildlife Sanctuary	50 km
Hail Haor	50 km
Lawachara / West Bhanugach Reserved Forest	50 km
Rajkandi Reserved Forest	50 km

IUCN Red List of Threatened Species

The following threatened 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.

MOHANPUR



Integrated Biodiversity Assessment Tool
PROXIMITY REPORT
MOHANPUR SUBPROJECT

Country: India
Location: [24, 91.4]
Date of analysis: 13 January 2023 (GMT)
Buffers applied: 1 km | 10 km | 50 km
IUCN Red List Biomes: Marine, Freshwater, Terrestrial
Generated by: Govind Rathore
Organisation: ADB

Overlaps with:

Protected Areas	2
Key Biodiversity Areas	4
IUCN Red List	71



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



Protected Areas

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

Area name	Within buffer of
Rema Kalenga	50 km
Satchari	50 km

Key Biodiversity Areas

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

Area name	Distance
Gumti Wildlife Sanctuary	50 km
Hail Haor	50 km
Rema-Kalenga Wildlife Sanctuary	50 km
Sepahijala	50 km

IUCN Red List of Threatened Species

The following threatened 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
Nilssononia nigricans	Black Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater



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RANIRBAZAR



Integrated Biodiversity Assessment Tool PROXIMITY REPORT RANIRBAZAR SUBPROJECT

Country: India

Location: [23.8, 91.4]

Date of analysis: 13 January 2023 (GMT)

Buffers applied: 1 km | 10 km | 50 km

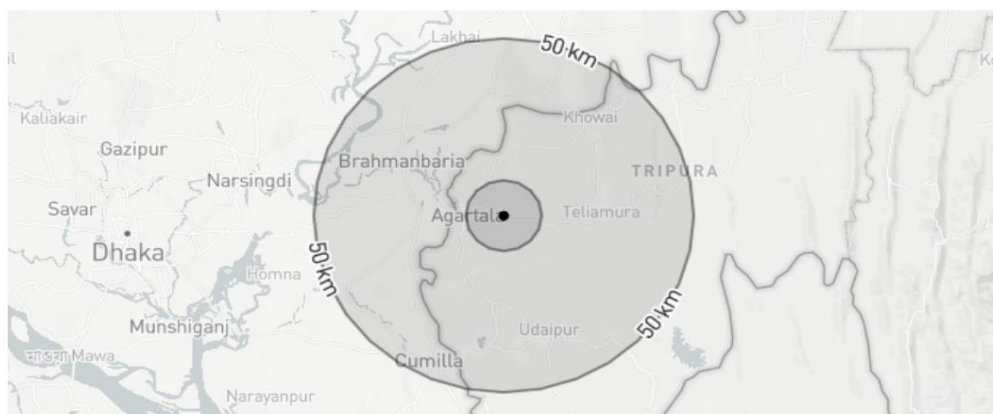
IUCN Red List Biomes: Marine, Freshwater, Terrestrial

Generated by: Govind Rathore

Organisation: ADB

Overlaps with:

Protected Areas	3
Key Biodiversity Areas	5
IUCN Red List	72



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



Protected Areas

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

Area name	Within buffer of
Rema Kalenga	50 km
Rudrasagar Lake	50 km
Satchari	50 km

Key Biodiversity Areas

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

Area name	Distance
Gumti Wildlife Sanctuary	50 km
Rema-Kalenga Wildlife Sanctuary	50 km
Rudrasagar Lake	50 km
Sepahijala	50 km
Trishna Wildlife Sanctuary	50 km

IUCN Red List of Threatened Species

The following threatened 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.



Appendix 14: Sample Environmental Site Inspection Report

Project Name Contract Number

NAME: _____ DATE: _____ TITLE: _____ DMA: _____ LOCATION: _____ GROUP: _____

WEATHER:	Project Activity Stage	Survey	
		Design	
		Implementation	
		Pre-Commissioning	
		Guarantee Period	

	Compliance
Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)	
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 the site	
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 is kept open	
Road is closed; alternative route provided & public informed, information board provided	
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	

	Compliance
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	
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

 Name
 Position

 Name
 Position