

Initial Environmental Examination

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India: Rajasthan Secondary Towns Development Sector Project – Additional Financing (PART A)

Bharatpur Wastewater Works

Prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited- External Aided Project (RUDSICO-EAP) for the Asian Development Bank (ADB). This is an updated version of the draft originally posted in February 2023 available on <https://www.adb.org/projects/documents/ind-42267-034-iee-5>

CURRENCY EQUIVALENTS

(as of 07 February 2024)

Currency unit	–	Indian rupee (₹)
₹1.00	=	\$0.012
\$1.00	=	₹ 82.95

ABBREVIATIONS

ADB	–	Asian Development Bank
BOCW	–	Building and other Construction Workers
CLC	–	City level committee
CPCB	–	Central pollution control board
CPHEEO	–	Central Public Health and Environmental Engineering Organization
CWR	–	Clear water reservoir
DBO	–	Design-build-operate
DPR	–	Detailed project report
EHS	–	Environmental health and safety
EIA	–	Environmental impact assessment
EMP	–	Environmental management plan
FCO	–	Fertilizer control ordinance
FSSM	–	Faecal Sludge and Septage Management
IEE	–	Initial environmental examination
IFC	–	International Finance Corporation
LSGD	–	Local Self Government Department
MOEFCC	–	Ministry of Environment, Forest and Climate Change
PHED	–	Public Health Engineering Department
PIU	–	Project implementation unit
PMU	–	Project management unit
PWD	–	Public Works Department
REA	–	Rapid environmental assessment
ROW	–	Right-of-way
RSPCB	–	Rajasthan State Pollution Control Board
RSTDSP	–	Rajasthan Secondary Towns Development Sector Project
RUDSICO-EAP	–	Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited-Externally Aided Projects
RUDSICO	–	Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation
SBR	–	Sequential batch reactor
SPS	–	Safeguard Policy Statement, 2009
STP	–	Sewage treatment plant
TEER	–	Treated effluent elevated reservoir
TESR	–	Treated effluent storage reservoir
ULB	–	Urban local body
WHO	–	World Health Organization

WEIGHTS AND MEASURES

m ³	–	cubic meter
dB	–	decibels
°C	–	degree centigrade
dia	–	diameter
kg	–	kilogram
kl	–	kiloliter
km	–	kilometer
kmph	–	kilometer per hour
KLD	–	kiloliters per day
ha	–	hectare
HP	–	horsepower
LPCD	–	liters per capita per day
lps	–	liters per second
m	–	meter
mg	–	milligram
mm	–	millimeter
MCM	–	million cubic meter
MLD	–	million liters per day
km ²	–	square kilometer

NOTE

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

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Appendix C1 – C24 – common appendices, attached separately, provide statutory standards, guidelines, reporting templates etc. are applicable to all subproject IEEs

EXECUTIVE SUMMARY

ADB approved a loan for the Rajasthan Secondary Towns Development Sector Project (RSTDSP, Loan 3972: IND) in September 2020. This is currently under implementation and will close by May 2028. The additional financing (the project) will expand the improved access to WSS services in at least ten urban local bodies (ULBs), benefiting 1.2 million people. Important value addition of the proposed project to the ongoing project is that it will provide innovative solutions to address climate change to respond to the growing climate risks and vulnerability and also to improve liveability and prosperity through enhancing natural and/or built heritage at least ten ULBs in Rajasthan, benefiting 1.0 million people. The overall project is aligned with the following impacts: (i) access to potable, affordable, reliable, equitable, environmentally sustainable drinking water supply in all urban areas of Rajasthan improved, (ii) health status of urban population, especially the poor and under-privileged improved, and (iii) productivity, liveability and prosperity for the citizens in Rajasthan cities and towns enhanced. Reflecting the additional measures to enhance climate resilience and heritage-sensitive urban development of the project, impact statement (iii) was added; the outcome statement is modified as quality, reliability, equity, and sustainability of urban assets and services in project towns of Rajasthan improved; and additional output was also added, resulting in four outputs.

Bharatpur is one of the project towns, and improvement of sewerage system in Bharatpur is proposed under the RSTDSP-AF. Following are the proposed components:

New sewage treatment plant (STP) 9.4 MLD; treated effluent elevated reservoir (TEER), treated effluent storage reservoir (TESR); three new sewerage pumping stations (SPS) 0.81 MLD for Zone -1, 1.64 MLD for Zone-3, and 2.23 MLD for Zone -4 ; 81.53 km sewer lines including 11.6 km missing links, sewer networks; 3946 manholes and 3210 house sewer connections

Screening and Categorization. assessment of potential impacts. Bharatpur town Sewerage subproject is classified as environmental category B 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, subproject do not require environmental clearance.

Description of the Environment. Subproject components are in Bharatpur City and in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at the proposed subproject sites. The subproject sites are located in existing road right of way (RoW) and government-owned lands. Proposed SPSs will be constructed on vacant lands and STP will be constructed in existing STP campus. There are no trees on the site and is surrounded mostly by agricultural areas. Nearest wildlife protected area is the Keoladeo National Park (KNP), KPN was declared as World Heritage Site by UNESCO under the World Heritage Site Convention. KNP is situated in southern direction of town and all proposed components are proposed in northern direction of town. The nearest component to KNP is SPS1 about 2 km from boundary of national park. There are 5 ASI protected monuments in Bharatpur town which are: 1. Fateh Burj near Anah Gate, 2. Moat surrounding the fort wall comprising part of Khasra No. 1881, 3. Fort walls including Chowburja gate and approach bridges at the Chowburja and Ashtadhatu gates together with adjacent land comprised in part of survey plot No. 1881. 4. Jawahar Burj and Ashtadhatu Gate and 5. Delhi Gate (Outside fort). The nearest significant ASI site is the Moth wall Surrounding the fort at 572 m from SPS 1 and 450 m from sewer laying site, rest all protected monument are situated more than 500 to 5700 m distance from proposed subproject components.

Similarly, there are 11 State protected sites in Bharatpur. No project components are proposed near these protected monuments, nearest state protected monument is Chandpole gate and Goverdhan gate situated about 200 m and 310 m from sewer networks in zone 3. All other components are situated more than 600 m from monuments.

Potential Environmental Impacts and Mitigation measures. In this IEE, negative impacts were identified in relation to location, design, construction and operation of the improved infrastructure. Environmental impacts as being due to the project design or location were not significant as various measures are already included in site planning and preliminary design. No impacts on forests or archaeological resources envisaged. Temporary measures suggested to avoid any disturbance / damage to heritage buildings during laying of sewer networks in nearby roads. New STP of 9.4 MLD will employ sequential batch reactor (SBR) technology to meet stipulated discharge standards. SBR will involve aerobic treatment, with minimum odour potential. Sludge management is included in the STP, properly dried sludge will be reused as manure in agricultural fields.

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. Except laying of sewers, all other construction activities will be confined to the selected sites and the interference with the general public and community around is minimal. In these works, the temporary negative impacts arise mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupational health and safety (OHS) aspects. Pipe laying works will be conducted along public roads in an urban area congested with people, activities and traffic. Therefore, these works may have adverse, but temporary 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 sewers deeper than 3.5 m and also at main road crossings in traffic areas. Subproject also includes adding missing links in the existing sewer system and may involve working on existing operational sewage lines. These works may present harmful working conditions due to accumulation of sewage, sludge and gases. Appropriate measures suggested including no manual working, supervisory control, safety equipment etc.,

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 sewer 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 include 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 kept on-site during the construction period at all times. The EMP will be included in bids and contracts, and implementation shall be binding on contractors. As per the findings of

the audit conducted on the existing STP, there are no regulatory non-compliance issues identified within the infrastructure of the 8 MLD existing STP Plant, where both the Consent to Establish (CTE) and Consent to Operate (CTO) have already been obtained. An online monitoring system, as recommended in the CTO, has been successfully installed at the STP. Furthermore, health and safety training for contractors' staff at the existing STP has been scheduled, and the monitoring of sludge quality has commenced as per the conditions of CTO. The proposed STP is designed to incorporate sludge drying beds for both new and existing STPs, with the layout of the STP depicting the proposed sludge drying bed provided in Appendix 5. It is imperative to ensure regular compliance measures are adhered to against the general and specific conditions stipulated in the CTO clearance of the STP.

Implementation Arrangements. The executing and implementing agencies will remain unchanged from the current project, which are Government of Rajasthan's Local Self Government Department (LSGD) and Rajasthan Urban Drinking Water, Sewerage and Infrastructure Corporation (RUDSICO), respectively. The AF project retains the project management unit (PMU) at the implementing agency, as well as the two Zonal Offices in Jaipur and Jodhpur. Project implementation units (PIUs) have been established in project towns. A total of eight PIUs will manage 18 ULBs under the AF Project. Consultants will support the PMU and PIUs. Project Officer (Environment) at PMU and Safeguard and Safety Officer at each of the PIUs will be responsible for environment management and monitoring activities and will be supported by Safeguard support staff from Supervision Consultant, town staff/team and Environment Safeguard Specialist of Supervision Consultants. Contractor personnel will also include an Environment, Health and Safety (EHS) Engineer in the project construction team.

Consultation, Disclosure and Grievance Redress. The stakeholders were involved in developing the IEE. Informal and formal consultation are conducted with local population of the area at 6 places along with proposed alignment with about 70 persons in month of December 2021 and May 2022. A City Level Committee (CLC) was held and CLC has appreciated and approved the subproject. The draft IEE was made available at public locations and this updated IEE will also be disclosed to a wider audience via the ADB and RUDSICO websites. Consultation process will continue during project implementation. A grievance redress mechanism (GRM) was established to redress public grievances.

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 CMSC, 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 RUDSICO 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 Bharatpur will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of Bharatpur town through provision of sewerage. The benefits arising from this subproject include: (i) better public health particularly reduction in waterborne and infectious diseases; (ii) reduced risk of groundwater contamination; (iii) reduced dependence on freshwater resource due to reuse of treated wastewater, and (iv) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

Based on the findings of the IEE, the classification of the project as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006). To conform to government guidelines, the STP requires consent to establishment (CTE) and consent to operate (CTO) from Rajasthan Pollution Control Board. CTE will be obtained prior to construction, as the detailed designs will be undertaken by contractor. PMU needs to ensure that CTO is obtained for the proposed STP before operation. Draft IEE of this subproject was prepared and approved by ADB based on Feasibility/Preliminary designs and included in Bid and contract of DBO Package, The IEE needs to be updated during the detail design reviewed and approved by ADB and disclosed prior to start of construction. The IEE is now updated to reflect updated designs /Layout plans of proposed 9.4 MLD STP, sewage pumping station –1, 0.81 MLD, sewage pumping station –3, 1.64, sewage pumping station –4 2.23 MLD, and sewerage network in zone1,3 and 4.

I. INTRODUCTION

A. Rajasthan Secondary Town Development Section Project – Additional Financing

1. Sector Project (RSTDSP, Loan 3972: IND) from its regular ordinary capital resources on 25 September 2020 and became effective on 4 January 2021. The closing date of the current project is 31 May 2028. This project is on track and has performed well consistently since the first quarter of 2021. Under this project, water supply systems are being improved in eight urban local body (ULB) towns (Output 1), and sanitation systems in 13 ULBs (Output 2). During the implementation, an additional 13 ULBs were added to the project for fecal sludge and septage management system development. Under Output 3, capacity building and training activities on sustainable and resilient water supply and sanitation (WSS) operations, hygiene, gender equality and social inclusion conducted.

2. The additional financing (the project) will expand the improved access to WSS services in at least ten urban local bodies (ULBs), benefiting 1.2 million people. Important value addition of the proposed project to the ongoing project is that it will provide innovative solutions to address climate change to respond to the growing climate risks and vulnerability and also to improve liveability and prosperity through enhancing natural and/or built heritage at least ten ULBs in Rajasthan, benefiting 1.0 million people. The overall project is aligned with the following impacts: (i) access to potable, affordable, reliable, equitable, environmentally sustainable drinking water supply in all urban areas of Rajasthan improved, (ii) health status of urban population, especially the poor and under-privileged improved, and (iii) productivity, liveability and prosperity for the citizens in Rajasthan cities and towns enhanced. Reflecting the additional measures to enhance climate resilience and heritage-sensitive urban development of the project, impact statement (iii) was added; the outcome statement is modified as quality, reliability, equity, and sustainability of urban assets and services in project towns of Rajasthan improved; and additional output was also added, resulting in four outputs.

- (i) **Output 1: Resilient water supply systems developed or improved.** By 2028, the project will (i) At least 1,300 km of water supply pipelines will be commissioned through a district-metered area approach for effective non-revenue water (NRW) management, (ii) at least 79,000 households will be connected to an improved water supply system, including at least 95% below poverty line households, with 100% functional meters allowing for the introduction of volumetric billing, (iii) three new water treatment plants (WTPs) will be commissioned with a total capacity of at least 24 million liters per day (mld).
- (ii) **Output 2: Resilient and inclusive sanitation systems developed or improved.** By 2028, (i) at least 500 km of sewers will be constructed; (ii) seven sewage treatment plants (STPs) with co-treatment of wastewater and fecal sludge and with a total capacity of at least 30 mld will be commissioned and one existing STP with 10 mld capacity will be upgraded to meet current effluent standards; and (iii) at least 54,000 new household connections (including at least 95% below poverty line households) to the sewer system will be installed.
- (iii) **Output 3: Urban assets to enhance climate resilience and heritage living developed or improved.** By 2028, (i) at least 50 km of drainage networks will be constructed in five ULBs; (ii) at least five either kunds or baories rehabilitated and/or reconstructed in three ULBs that were heritage structures built for drainage, rainwater harvesting, and reuse, but currently are not properly functioning; (iii) five water parks rehabilitated in one ULB to enhance water retention and storage capacity and/or to improve people's well-being, both residents and visitors; and (iv)

at least four heritage structures are refurbished in five ULBs to improve the living environment and attract more tourists.

- (iv) **Output 4: Institutional and human capacities strengthened for sustainable service delivery, gender equality, and improved public health.**

3. The executing and implementing agencies will remain unchanged. GOR's Local Self Government Department (LSGD) is executing agency and the Rajasthan Urban Drinking Water, Sewerage and Infrastructure Corporation (RUDSICO) is implementing agency.

4. **Bharatpur sewerage subproject.** This is one of the subprojects proposed under RSTDSP-AF. It will improve water supply and sewerage systems in the town.

B. Purpose of Initial Environmental Examination Report

5. 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 (Appendix 1), subproject is unlikely to cause significant adverse impacts, and classified as category B and per ADB SPS requirements this IEE is conducted. Subproject selection confirms with EARF environmental criteria (**Appendix 2**)

C. Scope of IEE

Draft IEE of this subproject was prepared and approved by ADB based on feasibility/preliminary designs and included in bid and contract of DBO package, The IEE needs to be updated during the detailed design reviewed and approved by ADB and disclosed prior to start of construction. The IEE is now updated to reflect updated designs /layout plans of proposed 9.4 MLD STP, sewage pumping station –1, 0.81 MLD, sewage pumping station –3, 1.64, sewage pumping station –4 2.23 MLD and Network for zone-1,3 and 4.

D. Report Structure

6. 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 PROJECT

A. Project Location

7. **Bharatpur Town:** Bharatpur, also known as 'Eastern Gate of Rajasthan', is located in the Braj region 180 km away from Delhi. Geographically, the district is situated between 26° 22' and 27° 83' N and 76° 53' and 78° 17' E and its average height above sea level is around 183 m. Bharatpur city is the district headquarters and is also known by the name of Lohagarh. It is situated very close to the main cities of Rajasthan and other states. Distance between Jaipur and Bharatpur is around 178 km whereas Agra lies at a distance of 55 km from the district. Mathura is located at a distance of 34 km. Bharatpur touches Gurgaon of Haryana in the north, Mathura in the east, Agra of Uttar Pradesh and Dholpur of Rajasthan in the south and Dausa and Alwar in the west.

B. Existing Sewerage System

1. Sewerage Network

8. At present, most of the Bharatpur town is covered with sewage networks and house service connections are being done for most of the house. Two projects have already been executed in town, one under RUIDP, Phase-2 (Funded by ADB) and other under the government-funded Atal Mission for Rejuvenation and Urban Transformation (AMRUT). Details of the coverage under both the schemes are as below.

9. **Sewer lines laid under RUIDP Phase-2.** This was the first sewerage project in town. Executing agency for this project was Rajasthan Urban Infrastructure Development Project (RUIDP) with external funding from ADB. This project was already completed and commissioned, with the following components:

- (i) Laying of sewerage network laterals and main line in core and densely populated areas of the city. It is intended that areas located between circular road and Sujana Ganga are covered in the phase 1 full or part of municipal ward no Ward No 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, will be covered. Population residing in and around Anah Gate, Khumer Gate, Patpara Mohalla, Neem Darwaja, Neemda Gate, Laxman Mandir, Atal Bandh, Ahir Mohalla, Radha Krishna Colony, Jama Masjid, Ganga Mandir, Mathura Gate, Sirki Wale Hanumanji, BeNarain Gate, Chaudah Mahadev Madir, Gulal Kund, Suraj Pole Chauraha, Girls College, Museum, Fort, Nadia Mohalla, Namak Katara, Jayanti Nagar, Delhi Gate, Red Cross Circle, Sahyog Nagar, Govardhan Gate, Gopah Gharh, Jagina Gate has benefitted from this RUIDP Phase-2 project;
- (ii) Laying of Outfall Sewer and Trunk Mains of sizes ranging from 700 mm to 1900 mm dia. and aggregate length of 11,962 m;
- (iii) Laying of Sub-Mains and laterals of sizes ranging from 200 mm to 600 mm dia. and aggregate length of 65,977 m. This also includes 3,865 nos. of property connections;
- (iv) Laying of 900 mm dia. pumping main of GRP for a length of 1,100 m from sewage pumping station to 8 MLD STP;
- (v) Construction of one module (out of 2 modules) of sewage pumping station with capacity of 24 MLD near hotel The Bagh;

- (vi) Construction of 8 MLD Sewage Treatment Plant (STP) based on SBR process; and
- (vii) Catchment coverage of approximately 1,137 Ha area (out of 5614 Ha).

10. **Sewer lines laid under AMRUT 1.0.** The second sewerage project executed in Bharatpur is under the AMRUT Scheme. Executing agency for this project is the Municipal Corporation, Bharatpur and coverage under this project is as follows:

- (i) Laying sewerage network for areas that are not covered under RUIDP, Phase-2, This includes covering partly or fully Ward Nos. 9, 19, 20, 36, 37, 38, 39, 40, 41, 42, 43, and 44;
- (ii) Installation of 15,186 nos. house sewer connections, out of which 5,415 nos. has been connected to sewerage network while the balance is still to be completed; and
- (iii) Construction of 5 MLD capacity Sewage Treatment Plant based on SBR process near Village Ikran adjacent to existing STP that was constructed under RUIDP Phase-2.

2. Sewerage Treatment

11. There are 2 nos. existing STPs with capacity of 5 & 8 MLD capacity based on SBR technology. 8 MLD STP was constructed in RUIDP Phase-II while 5 MLD STP was constructed in AMRUT Phase-I. 2 new STPs of 9.4 MLD and 7.7 MLD are proposed in RUIDP, Phase-IV and AMRUT 2.0 respectively. Thus, there will total capacity of STPs up to the year of 2040 will be 30.1 MLD (8+5+9.4+7.7).

C. Proposed Subproject

12. **Sewerage Works.** Under RSTDSP-AF, it is proposed to develop a sewerage system in Bharatpur town to collect, treat, and dispose/reuse the domestic wastewater safely. The proposal includes a combination of underground sewerage system/network, sewage treatment plant (STP), and Fecal Sludge and Septage Management (FSSM) system in areas that are not fully developed at present and not feasible to provide sewer network. The objectives of the proposed sewerage works are:

- (i) Construction of sewerage network, including house sewer connection and collection of wastewaters from point of generation;
- (ii) Construction of energy efficient and mechanized STP and electromechanical machinery;
- (iii) Septage management and decentralized wastewater treatment systems in suitable areas;
- (iv) Provision for reuse of treated effluent etc.;
- (v) To ensure 100% house service connections for wastewater collection; and
- (vi) To ensure sustainability of the project by implementing a comprehensive asset management plan focusing on an integrated approach to operation and maintenance to minimize lifecycle costs.

13. The sewer system will be designed as a separate sewer system that carries only the domestic/municipal wastewater. The open drain system that exists in the town will cater to storm runoff. No industrial wastewater will be allowed into the sewers. This subproject complies with the

environmental subproject selection criteria agreed between the government and the ADB.

14. **Proposed Components.** The proposed subproject will have the following components:

- (i) Laying of sewer network with total length of 81.53 km pipe diameters in the range of 200 mm to 400 mm, including 11.6 km missing links, 6.0 km trenchless sewer lines of HDPE PN6 & HDPE DWC SN8 pipes; construction of 3,946 nos. manholes; and installation of 3,210 nos. house sewer connections;
- (ii) Laying of pumping mains of 1,870 m length;
- (iii) Construction of three sewage pumping stations (SPS) with capacities of 0.81 MLD for Zone -1, 1.64 MLD for Zone-3, and 2.23 MLD for Zone -4;
- (iv) Construction of new STP with capacity of 9.4 MLD employing SBR technology; and
- (v) Setting up of fecal sludge and septage management (FSSM) for low density population areas.

1. Sewer Network

15. Based on the site feasibility and town topographical survey done by the Municipality, the estimated aggregate length required for the sewer network is about 81.53 km, including 11.6 km missing links, 6.0 km trenchless laying sewer lines in Bharatpur Town. New networks are proposed for Zone 1,3, and 4. The proposed sewer network will be laid on government-owned lands. No alignment will pass through forest land or private land that would require land acquisition.

Table 1: Details of Proposed sewer networks

Sewer Pipe Dia	Type of Pipe	Length (m) Depth wise					Total Length (m)
		up to 1.5	1.5 -3.0	3.0 - 4.5	4.5 - 6.0	6.0 - 7.5	
200 MM	HDPE DWC SN8	39586.80	30342.60	4130.80			74060.20
250 MM	HDPE PE-100/PN-6			3093.10	304.10	37.30	3434.50
250 MM	HDPE DWC SN8		299.90	594.10			894.00
300 MM	HDPE DWC SN8			70.50			70.50
315 MM	HDPE PE-100/PN-6			766.90	986.80	53.40	1807.10
400 MM	HDPE PE-100/PN-6			241.30	530.20		771.50
Total		39586.80	30642.50	8896.70	1821.10	90.70	81037.80

2. Sewage Pumping Station (SPS) and Pumping Main

16. There are three nos. sewage pumping station (SPS) that will be built under the subproject. These SPSs will have capacities of 0.81 MLD, 1.64 MLD and 2.23 MLD.

17. SPS-1 is proposed for Zone-1. It will have a capacity of 0.81 MLD and will be constructed on a government-owned land near Nai Mandi circular road Tiraha. This land has an area of 4700 m², and the pumping station will occupy about 500 m² of this area. The site is surrounded by Ranjeet Nagar Flood Canal and houses on north and Mathura- Bharatpur Road on south.

18. SPS-3 is proposed for Zone 3. It will have a capacity of 1.64 MLD and will be constructed on a land owned by the Urban Improvement Trust (UIT) near Mukherjee Nagar Pulia, abundant PNT Qrarters, Bharatpur. The land has an area of 6,800 m², and the pumping station will occupy 600 m² of this area.

19. SPS-4 is proposed for Zone-4. It will have a capacity of 2.23 MLD and will be constructed at Deeg road workshop yojna in front of Vaishali agency, Bharatpur. The land is likewise owned by the Urban Improvement Trust (UIT). The site is accessible through Bharatpur Marg and Mathura Bypass Road.

Table 2: Details of Proposed SPS

SPS	2025	2040	2055	Zone &Node No.	Incoming Sewer Dia	IL(m)	GL(m)
SPS-1	0.46	0.63	0.81	ZONE-1, PMP-1	400 mm, HDPE	166.54	172.23
SPS-3	0.94	1.29	1.64	ZONE-3, PMP-3	400 mm, HDPE	167.41	172.12
SPS-4	1.26	1.74	2.23	ZONE-4, PMP-4	400 mm, HDPE	167.03	172.57

3. Pumping Mains

20. The proposed pumping mains will transfer sewerage from SPS to STP. Details are provided in table below.

Table 3: Proposed Pumping Mains

Origin	Diameter	Length (m)	Discharge Zone No.	GL of Discharge Point (m)	Sewer Dia at Discharge Point
SPS-1	200 mm DI K-9	50	ZONE-1, OUTLET PMP-1	174.86	1400 mm RCC
SPS-3	250 mm DI K-9	820	ZONE-3, OUTLET PMP-3	174.95	1400 mm RCC
SPS-4	300 mm DI K-9	1000	ZONE-4, OUTLET PMP-4	175.36	1100 mm RCC

4. Sewage Treatment Plant (STP)

21. Presently, there are two STPs in operation. These are the 8.0 MLD and 5.0 MLD STPs constructed under previous phases of RUIDP. These are located at Ikran Village in Bharatpur town. For the subproject, additional new STP of 9.4 MLD capacity based on SBR process is proposed. This new proposed STP will be constructed along with TESR and TEER with 22 m staging land in the same campus/compound of the existing STPs. The land is a government-owned land under ownership of Nagar Nigam and has an area of 7,300 m². The proposed STP will occupy about 7,000 m². The site is accessible through the Agra- Bharatpur state highway.

Table 4: Sewage Generation for Different Horizon Years (under Proposed AMRUT 2.0 area including existing area & RUIDP Phase-IV area)

Population (Number)		Projection	Sewage Generation (MLD)			Location of STP	Incoming Sewer Dia at STP
2025	2040	2055	2025	2040	2055		
229259	265516	302399	26	30.1	34.3	At Campus of Existing STP near Village Ikran	1600 mm, RCC

22. Currently, there is a total of 13 MLD sewage treatment capacity for the town. But per estimate, the town will require sewage treatment capacity of 26 MLD by the year 2025 and 30.1 MLD by 2040. The proposed 9.4 MLD STP will partially fill the envisaged capacity deficit. Accordingly, AMRUT Phase 2 is also preparing to build a new 7.7 MLD STP to fully satisfy the ultimate total capacity requirement by 2040.

23. At present, sewage in 24 MLD PTU is coming through 900 mm GRP pumping main from 24 MLD SPS nearly 1000 m away from the existing STP location.

5. House Sewer Connections

24. The subproject will also include the installation of 6,027 nos. of house sewer connections (3210: Phase-IV Area + 2817: RUIDP, Phase-II Area), including pre-cast RCC M-40 grade circular roadside inspection chambers outside building line and 110 mm and 160 mm dia PVC-U pipeline for collection of sewage from roadside inspection chambers outside building line to street manhole. A total 6460 nos. house connections are proposed.

6. Manholes

25. Manholes provide access to sewers for inspection and cleaning. Manholes are located at every change of alignment, grade, or diameter, at the head of all sewers and branches and at every junction of two or more sewers. Spacing of manholes depends upon type of sewer cleaning equipment and on the methodology of whether manual cleaning or use of mechanical devices is needed. On sewers, which are to be cleaned manually but could not be physically accessed for cleaning or inspection, the maximum distance between manholes have been adopted as per the CPHEEO manual. Total number of proposed manhole is 3,946.

Table 5: Depth wise details of Manholes

Sewer Dia	Type of Pipe	up to 1.5 m	1.5 -3.0 m	3.0 - 4.5 m	4.5 - 6.0 m	6.0 - 7.5 m	Total MH (Nos)
200 MM	HDPE DWC SN8	1907	1488	202			3597
250 MM	HDPE PE-100/PN-6			154	16	2	172
250 MM	HDPE DWC SN8		17	28			45
300 MM	HDPE DWC SN8			4			4
315 MM	HDPE PE-100/PN-6			38	52	2	92
400 MM	HDPE PE-100/PN-6			11	25		36
Total		1907	1505	437	93	4	3946

26. **Reuse of treated effluent.** The Rajasthan State Sewerage and Wastewater Policy, 2016, promotes the reuse of treated sewage for non-potable applications, and also to make sewerage projects environmentally sustainable. This policy:

- (i) aims to ensure improved health status of urban population, specially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment;
- (ii) promotes the reuse and provides guidance on the same;
- (iii) prioritizes reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry and non-potable domestic reuse;
- (iv) requires monitoring of treated wastewater quality, soil quality etc.;
- (v) prohibits artificial recharge of aquifers using treated wastewater, and promotes construction of storage tanks to store treated wastewater to facilitate reuse;
- (vi) prescribes that the detailed project report (DPR) of a sewerage project should clearly define the best reuse option specific to the town and prepare a reuse action plan part of the DPR duly following the water quality norms and legal implications; and
- (vii) suggests use of sludge produced from the treatment as fertilizer and soil conditioner after processing.

27. To further the implementation of the Policy, promote the reuse of effluent, and provide guidance to the stakeholders, the LSGD is currently in the process of publishing “Guidelines for Reuse of Treated Wastewater in Rajasthan, 2019. These guidelines:

- (i) promote the use the treated wastewater and envisages to maximize the collection and treatment of sewage generated and reuse of treated wastewater on a sustainable basis, thereby reducing dependency on freshwater resources; and
- (ii) promotes the use of treated wastewater as an economic resource.

28. Under the subproject, following the State Policy, treated effluent will be reused in applications such as agriculture, horticulture, development of urban forestry and industry, as appropriate. A Treated Effluent Reuse Plan will be prepared by the DBO Contractor during the detailed design phase as envisage by the State Policy, and reuse modalities will be firmed up. To facilitate reuse and supply of treated effluent, a TESR, effluent pumping station and a TEER are proposed at the STP in the subproject. Total storage capacity of TESR and TEER at each STP is 15% of respective STP treatment capacity. Treated effluent will be chlorinated prior to its entry into TESR/TEER.

29. **Discharge of Treated Effluent:** For storage of treated water TESR of Capacity 770 KI and TEER of Capacity 385 KI at 22 m Staging will be developed. During rainy season and in case of low demand for treated effluent reuse, remaining effluent will be disposed by gravity nearby into “Bharatpur City Flood Control Drain. This flood control drain is 500m away from STP site.

30. **Sludge treatment and disposal.** A Sludge Sump shall be provided to collect thickened sludge from SBR basins. Supernatant from the sump will be returned to inlet/equalization tank for treatment. Sludge from sump will be pumped to sludge thickener, and the thickened sludge will be pumped to mechanical sludge dewatering system (such as centrifuge). Dewatered sludge cake will further air dried in a sludge storage shed for 15 days and disposed in an identified site. More specific discussion on sludge treatment process and disposal scheme are included in Section V of this IEE report.

7. Fecal Sludge and Septage Management

31. Fecal Sludge and Septage Management (FSSM) is to provide low costs sanitation where sewer network is not an immediate requirement and make its collection, treatment, and effluent management environment friendly. Rajasthan Urban Infrastructure Development Project (RUIDP) has proposed to implement non-sewer sanitation solution to some selected pockets of the towns through Faecal Sludge and Septage Management. These pockets /areas are having the population density less than the density required to generate the sewage in sufficient quantity for piped sewer network. However, sewer network has been designed including these areas so that in future whenever required sewer network can be laid.

32. Under the FSSM, faecal sludge / septage will be collected from the household level septic tanks using truck mounted mobile desludging equipment and transported to STP for treatment. STP will have necessary provisions to receive and treat the septage along with the wastewater received via sewer network. STP will be designed accordingly by the successful bidder during the detailed design phase to comply with the treated effluent discharge standards specified in the bidding documents.

33. **Municipal Area Proposed Under Septage Management.** It is proposed to provide FSSM system in areas where the population density is low (less than 100 persons per hectare) and will not generate sewage in adequate quantity to convey by sewer network. FSSM will provide low-cost sanitation in areas where sewer network is not an immediate requirement, will make septage collection, treatment and effluent management environment- friendly. Details of area covered in FSSM is given below.

Table 6: Details of Proposed FSSM in town

Ward No.	Total Area	Habitation Area*	Other than Habitation Area	Census Population	Projected Population			Density per hectare on Total Area		Other than Habitation Area		
	Ha.	Ha.		2011	2040	2055	2025	2040	2055	2025	2040	2055
8	483.69	59.88	423.81	3309	8747	11632	12	18	24	99	146	194
46	99.84	64.58	35.26	3853	8890	11562	63	89	116	97	138	179
49	484.48	186.04	298.44	4623	16716	23131	21	35	48	56	90	124
51	263.58	78.38	185.2	4318	9773	12666	26	37	48	88	125	162
57	104.24	66.54	37.7	3595	9157	12108	60	88	116	94	138	182
58	1166.1	244.33	921.77	4558	20667	29212	11	18	25	50	85	120

34. **Table 7** shows the nature and size of the various civil works components of this sewerage subproject in Bharatpur Town. Google Coordinates of proposed work sites are given in **Table 8**. Locations of subproject components on Google Map and Topo Sheet are shown in **Figures 1 to 13** and conceptual layout plans and network alignments.

35. Operation and maintenance (O&M) of FSSM. The DBO contractor will operate and maintain the system for a period of 10 years. This will include the following:

- (vii) Desludging the septic tanks / pits from the individual houses using mobile truck mounted desludging equipment
- (viii) Transportation of the vehicle to STP, dispose-off septage to Inlet chamber/screen chamber of STP,
- (ix) Cleaning of the tank, and proper garaging of the vehicle at designated place.

Table 7: Proposed Scope of Work in Bharatpur Town

Component	Function	Description	Location & Ownership
Sewer Collection networks including Manholes and House sewer connections	Collect wastewater from houses and convey by a combination of gravity and pressure pumping to pumping station and ultimately to the STP	Laying of total 81.53 km length of 200 mm to 400 mm dia including 11.6 km missing links, 6.0 km trenchless sewer lines HDPE PN6 & HDPE DWC SN8 pipes Manholes 3946nos House sewer connections (3210 numbers)	Sewers will be laid underground in the roads and internal streets in the town. Sewers will be located in the centre of the road. The existing/proposed water pipes are/will be located on one or either side of the roads, and therefore sewers will be laid in the centre without distributing the water pipes.
Pumping Main	Conveyance of wastewater from pumping station to existing main trunk line , which will finally carry waste water to STP through gravity	New - Total length: 1870 m SPS1 - 200 mm DI K-7 dia, 50 m SPS3- 350 mm DI K-7 dia 820m SPS4 350 mm DI K-7 dia 1000 m	Within existing ROW
Sewage Pumping Station (SPS)	Sewer pumping stations are used to move wastewater to higher elevations in order to allow transport by gravity flow until the sewage reaches treatment plant.	Construction of 3 nos. of SPS. 0.81 MLD Zone 1 1.64 MLD Zone 3 2.23 MLD Zone 4	Location: Zone – Zone 1,3 & 4 Ownership: Nagar Parishad

Component	Function	Description	Location & Ownership
Sewage Treatment Plant (STP-01) (Including provision of Co-treatment of Faecal Sludge)	Treatment of collected wastewater to meet stipulated discharge standards	1. New – STP 2. 9.4 MLD 3. 4. Components 5. SBR (sequential batch reactor) based STP with primary, secondary, tertiary treatment 6. Disinfection of treated wastewater for reuse – chlorination tank 7. sludge management (sludge collection, thickening, dewatering and disposal) 8. Laboratory, and online testing facilities for BOD, COD, TSS etc.,) 9. Instrumentation, automation, SCADA etc Truck-mounted mobile desludging equipment with a capacity of 4000 L will be utilized to collect wastewater from houses, conveying it via a combination of gravity and pressure pumping to the pumping station, and ultimately to the STP. The vehicle is to be parked in the designated parking area at the STP premises and will be managed by the contractor for 10 years, followed by the ULB for operation and maintenance thereafter. Discharge of Treated Effluent: For storage of treated water TESR of Capacity 770 KI and TEER of Capacity 385 KI at 22 mtr Staging will be developed. In rainy season of in case of low demand remaining effluent will be disposed by gravity nearby into “Bharatpur City Flood Control Drain” which is 500 m away from STP site.	Location: 9.4 MLD- near Ikran Village Ownership: Nagar Parishad

Component	Function	Description	Location & Ownership
Pipe networks for transfer of treated effluent	Collect wastewater from houses and convey by a combination of gravity and pressure pumping to pumping station and ultimately to the STP	10.0 km pipe networks for distribution of treated effluent for reuse such as in agriculture- Material- HDPE PE-100/PN6 200 dia- 10 km	Within existing road ROW
FSSM			
Truck mounted mobile desludging equipment	Desludging of septage from household pits/ septic tanks, transportation, and discharge to STP	Mobile tankers with suction and discharge arrangements – number of tankers to be procured will be estimated during the detailed design	Mobile equipment Truck-mounted mobile desludging equipment with a capacity of 4000 L will be utilized to collect wastewater from houses, conveying it via a combination of gravity and pressure pumping to the pumping station, and ultimately to the STP. The vehicle is to be parked in the designated parking area at the STP premises and will be managed by the contractor for 10 years, followed by the ULB for operation and maintenance thereafter.

Table 8: Coordinates of Sub Project Locations

COMPONENTS	Latitude	Longitude
Proposed STP 9.4 MLD site, Nagla Gopal	27°12'17.14"N	77°32,47.57" E
Proposed SPS site	SPS-1: 27°13'38.9" N SPS-3: 27°13'39.57" N SPS-4: 27°13'28.95" N	77°29'59.86" E, Zone-1 77°29'29.97" E, Zone-2 77°28'57.39" E, Zone-3
Discharge/Disposal Point of Treated Wastewater from proposed STP site	27°12'24.65"N	77°32'43.72"E

36. Operation & maintenance of sewerage system. The DBO contractor will operate and maintain the system for a period of 10 years after completion of construction and commissioning the new system. This will include the following:

- (i) Sewage pumping system to pump sewage to STP including maintenance of entire system and maintaining the infrastructure (power charges to be paid by the Employer);
- (ii) STP including maintenance of entire system and maintaining the infrastructure (power charges to be paid by the Employer);

- (iii) Managing the sewerage network for collection of sewage including maintenance of entire system from property chambers up to disposal outfall of Sewage to STP;
- (iv) Sampling treated effluent to ensure that it meets the guaranteed treatment parameters;
- (v) Provide house connections for collection of sewage from house properties on approval or sanction by Employer;
- (vi) Contractor will provide continuous on-the-job trainings that will start from the day the contractor gets mobilized, and other capacity building programs by the contractor as important regular activities for staff of the Employer, PHED and Municipal Council / Corporation Bharatpur; and
- (vii) Maintaining environmental norms at entire system components.

37. **Existing Facilities:** The collected sewage will be transferred from SPS to STP campus via existing pumping mains. This collected sewer will get treated at existing STP of 8 MLD and newly proposed STP of 9.4 MLD. The existing 8 MLD STP is based on SBR and treating sewerage as per latest government requirement. The Environmental Audit report of Existing 8 MLD STP is presented in Appendix 5 of this IEE.

Figure 1: Location of Proposed STP (9.4 MLD) site, Nagla Gopal near Ikran village in Google Earth



Figure 3: Location of Proposed SPS's Locations at Bharatpur in Google Map

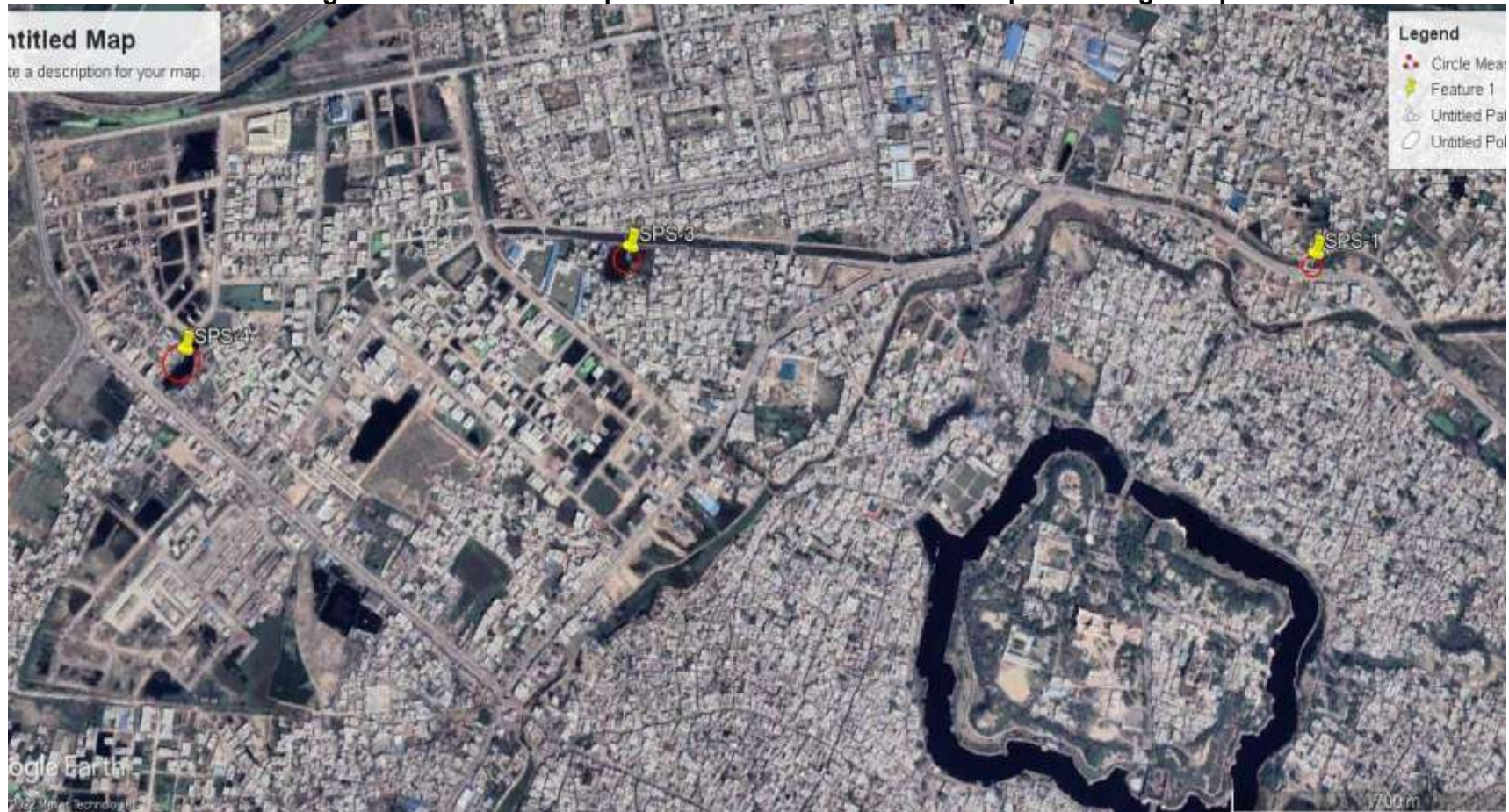


Figure 4: Location of Proposed SPS 1 Locations Google Map



Figure 5: Location of Proposed SPS 3 Locations Google Map



Figure 6: Location of Proposed SPS 4 Locations Google Map



Figure 7: Proposed Sewer Zone in RUIDP Phase 4 (Zone -1 in blue ink, Zone-3 in Yellow Ink and Zone 4 in Green Ink)

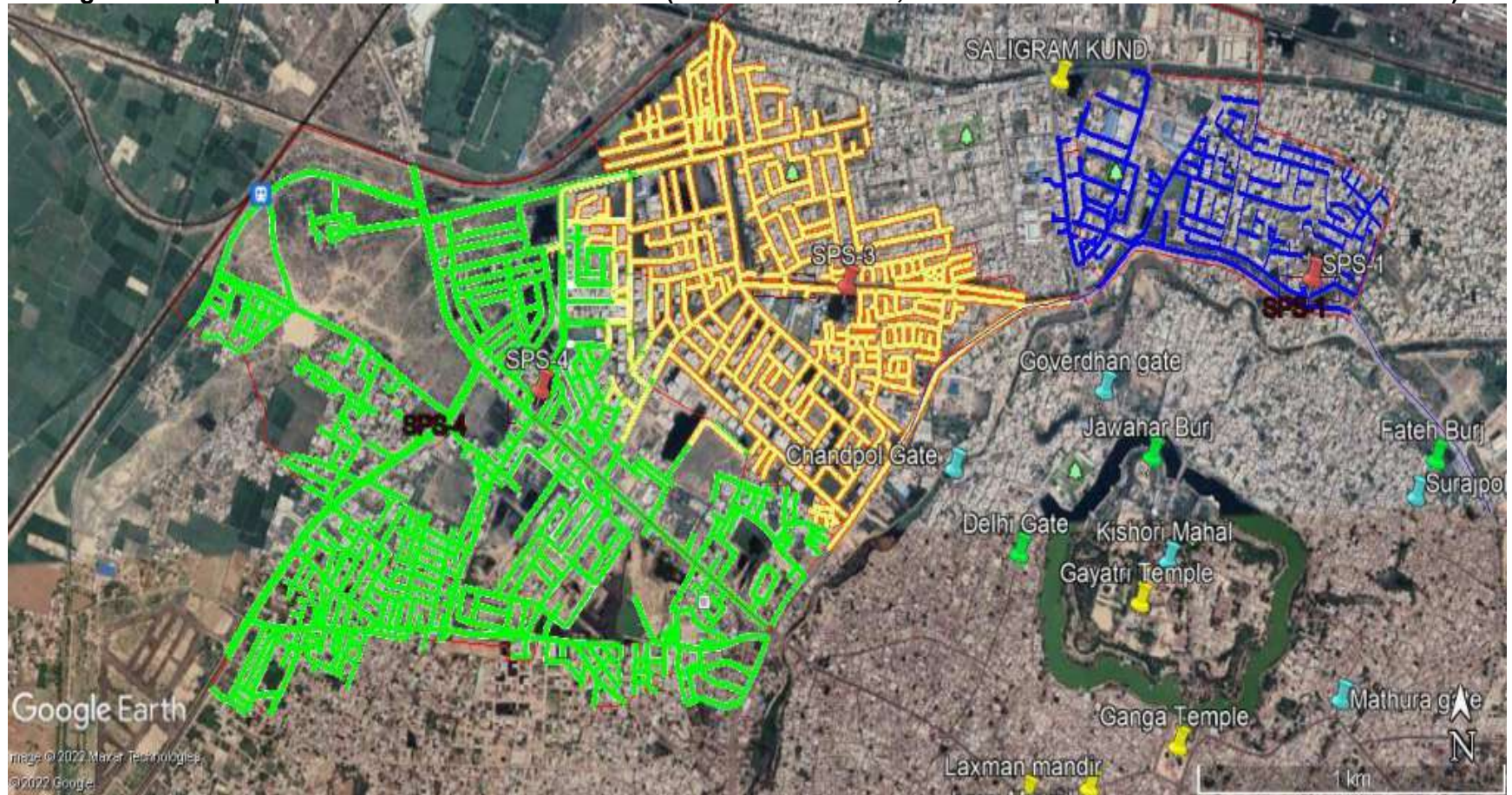


Figure 8: Layout of Proposed Sewer Networks and FSSM areas

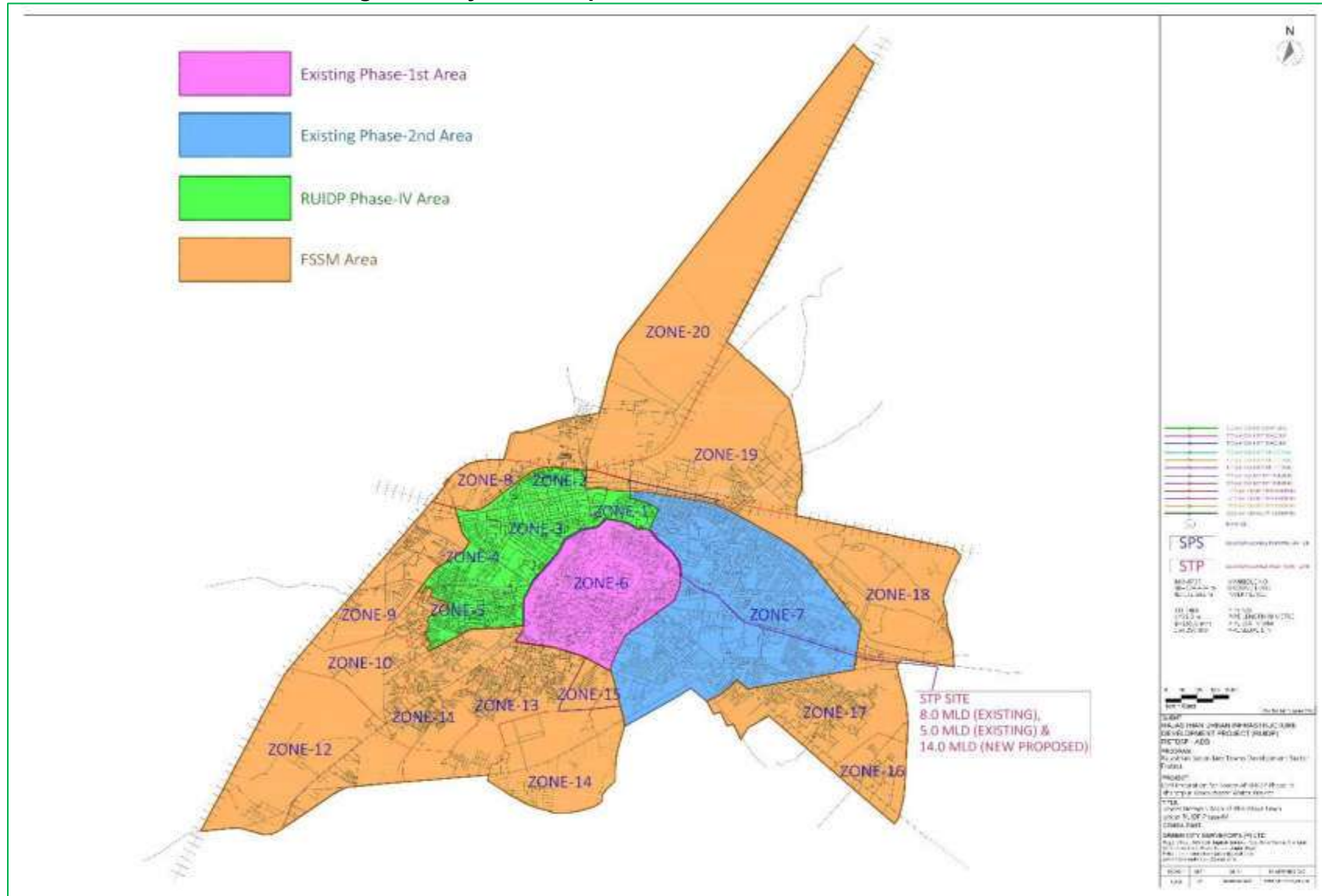


Figure 9B: Approved Structural Drawings of SPS 1 :0.81 MLD

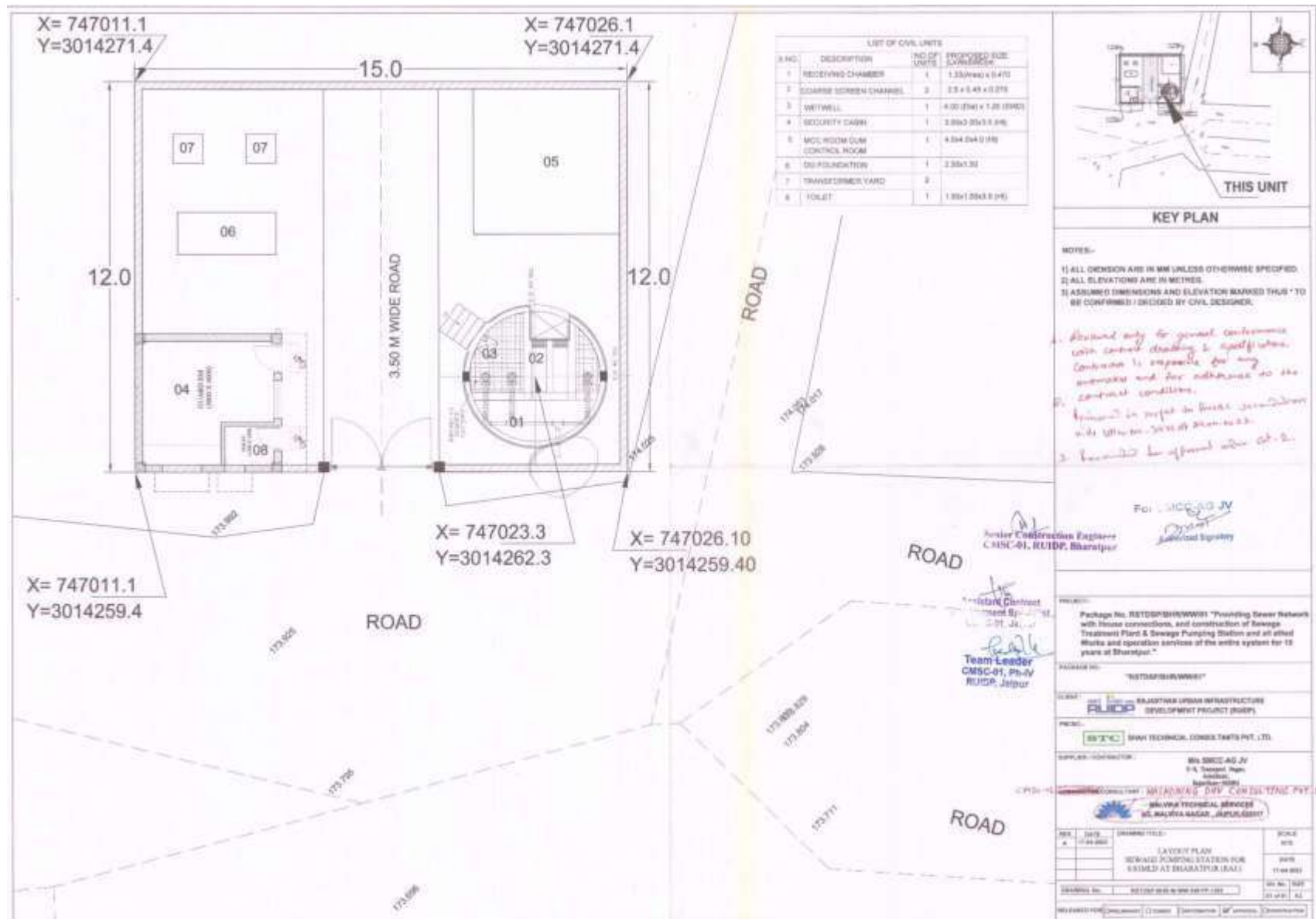


Figure 9C: Approved Structural Drawings of SPS 3 :1.64 MLD

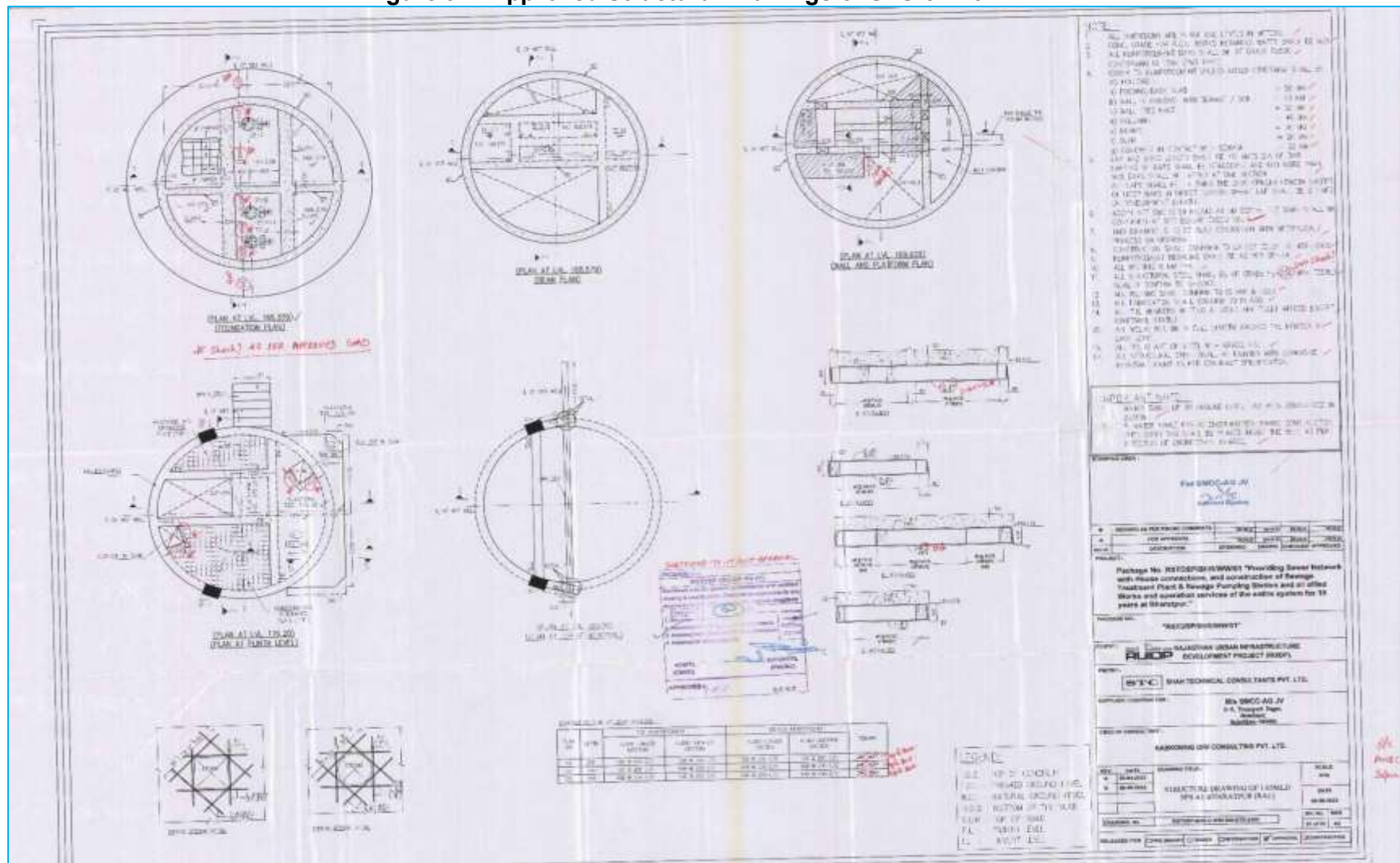


Figure 9D: Approved Structural Drawings of SPS 3 :1.64 MLD

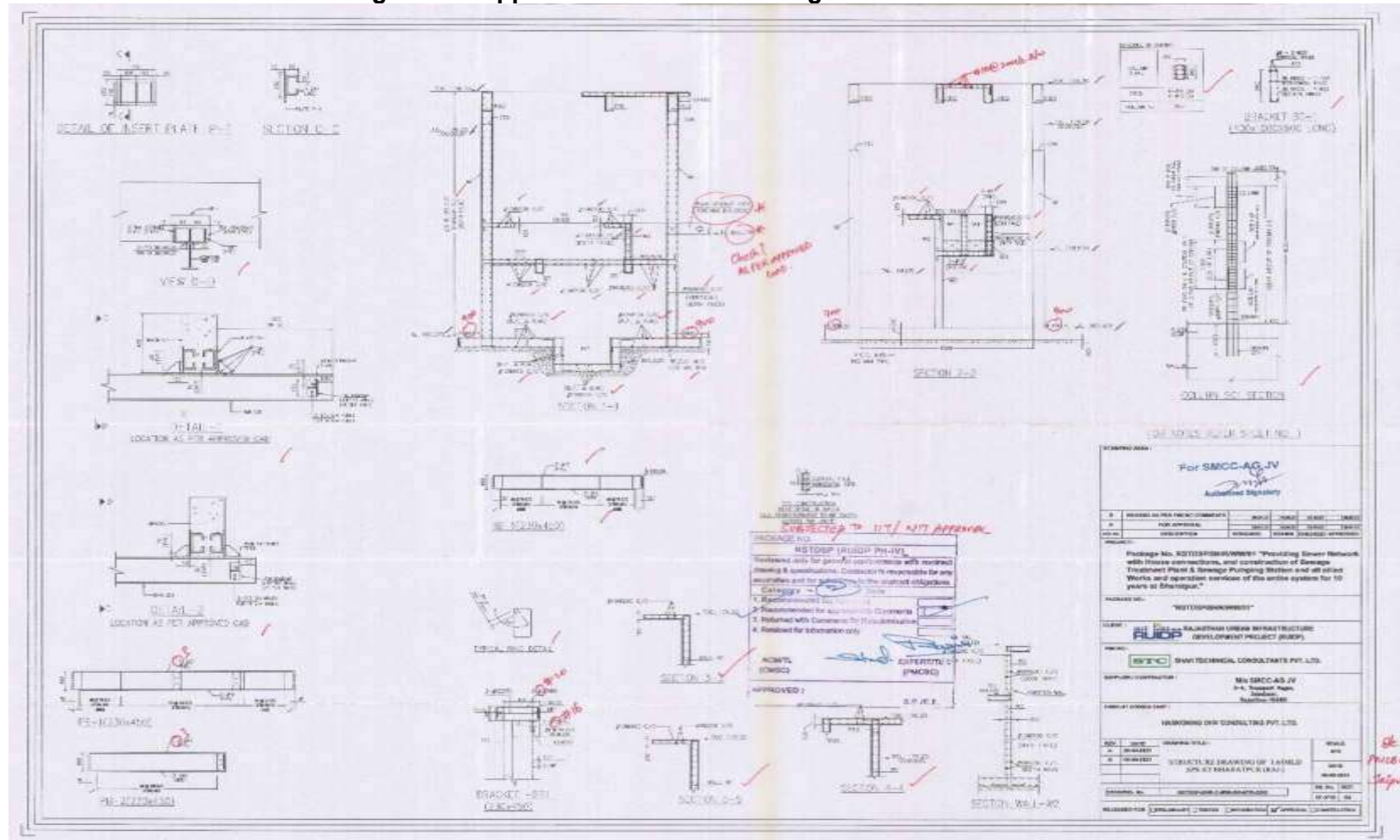


Figure 10A Approved Structural Drawings of SPS 4 2.23 MLD

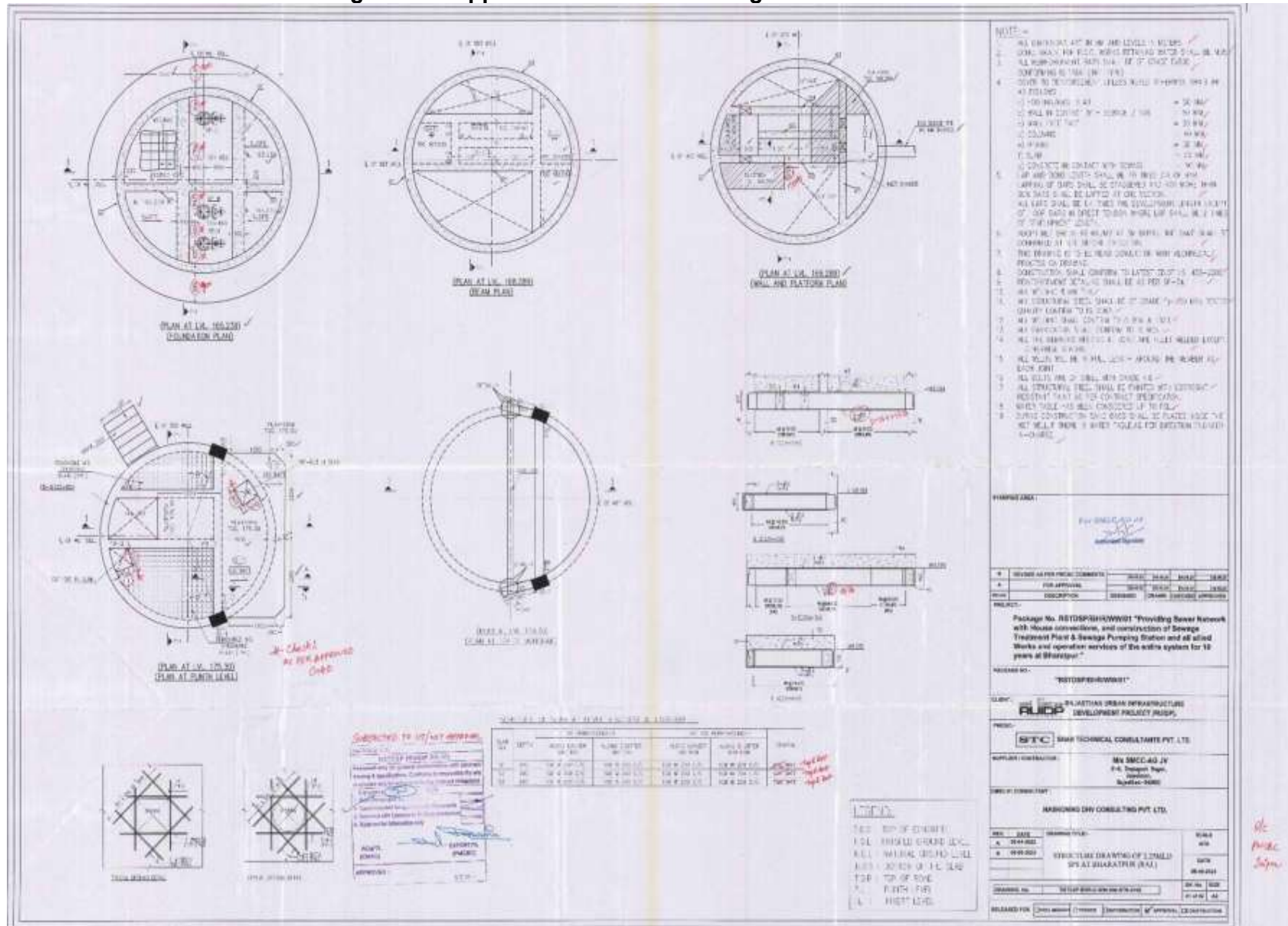


Figure 10B. Approved Structural Drawings of SPS 4 2.23 MLD

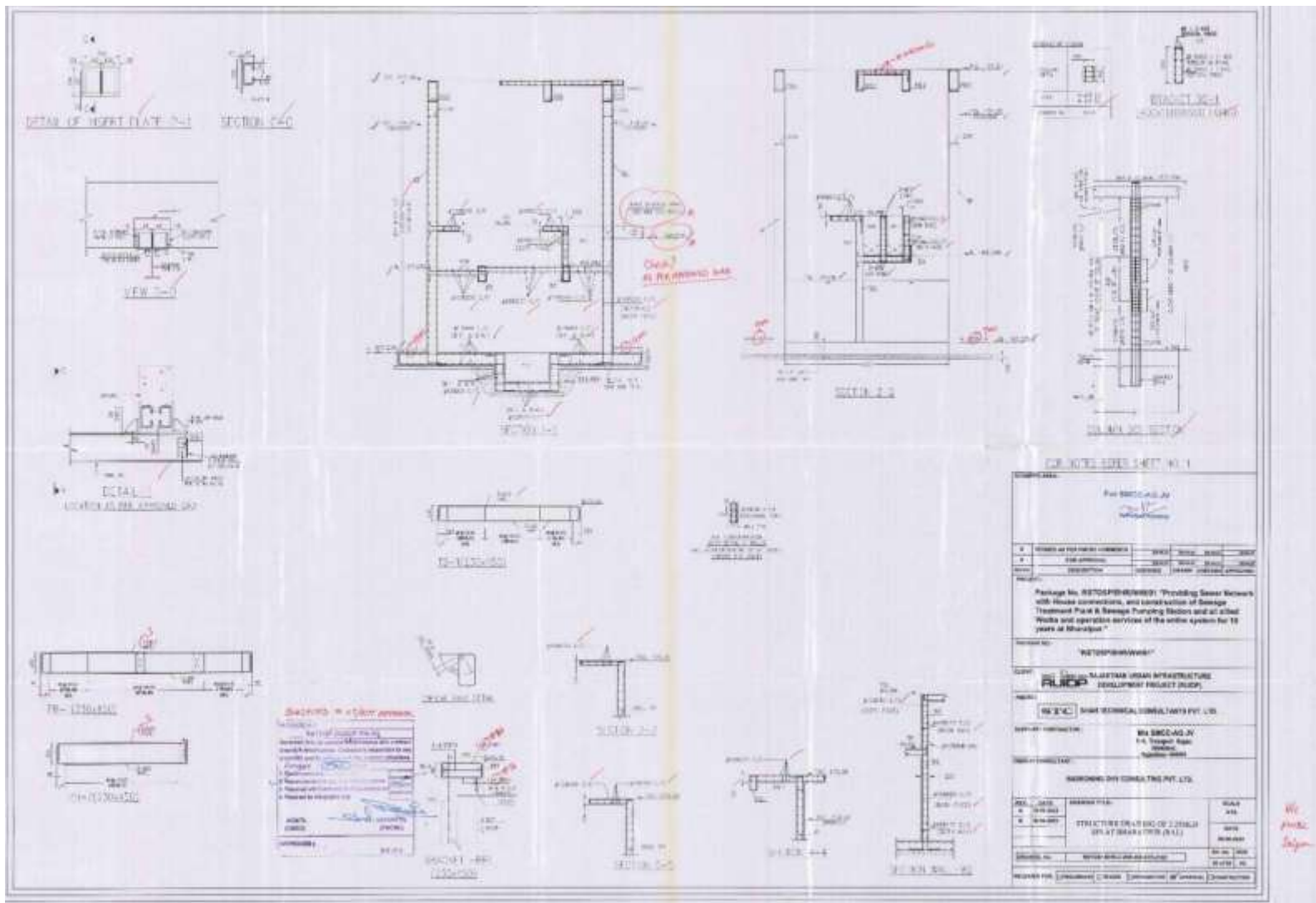


Figure 11: Approved network in sewerage zone –1 in Bharatpur

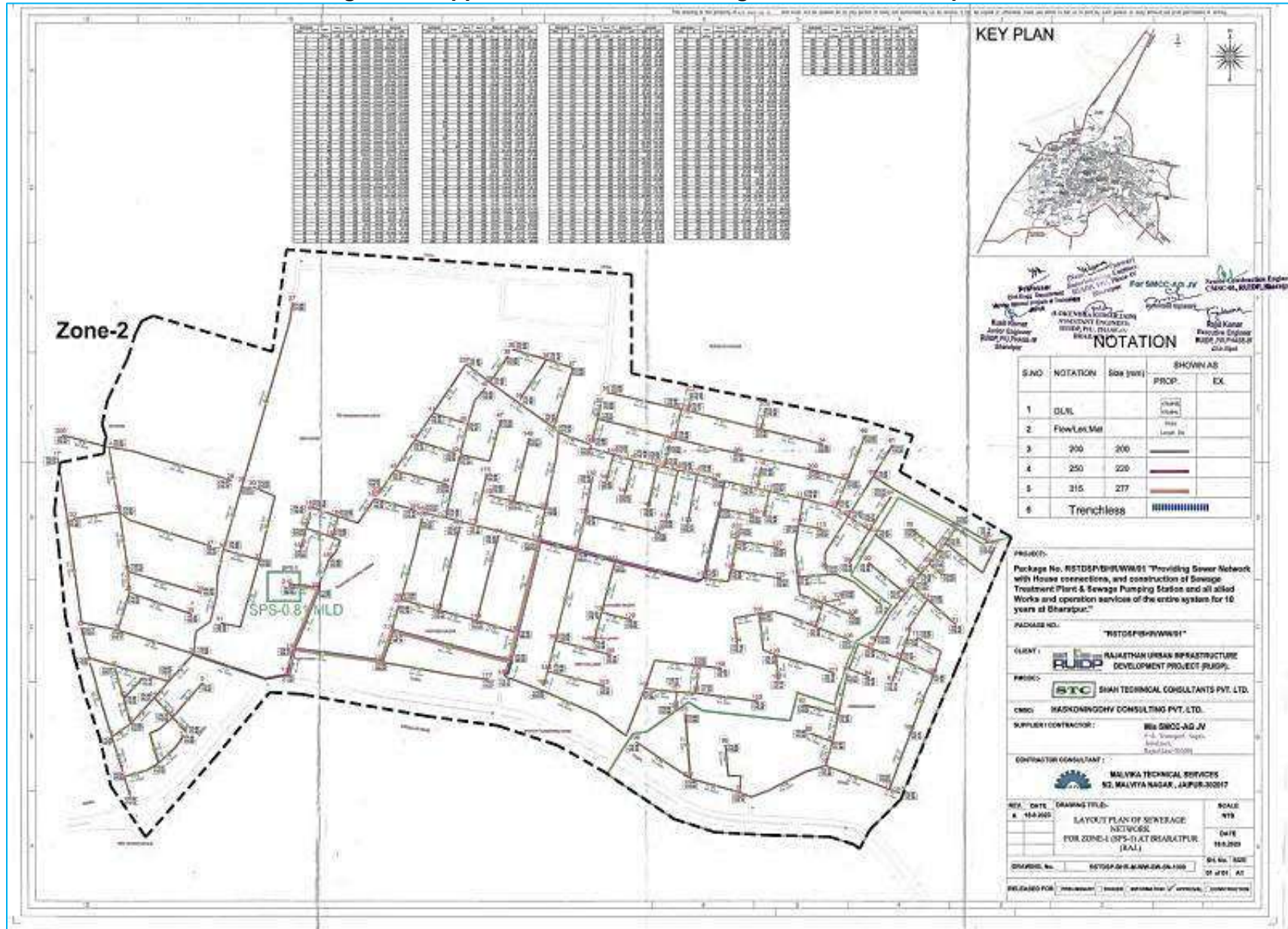


Figure 12 : Approved network in sewerage zone –3 in Bharatpur

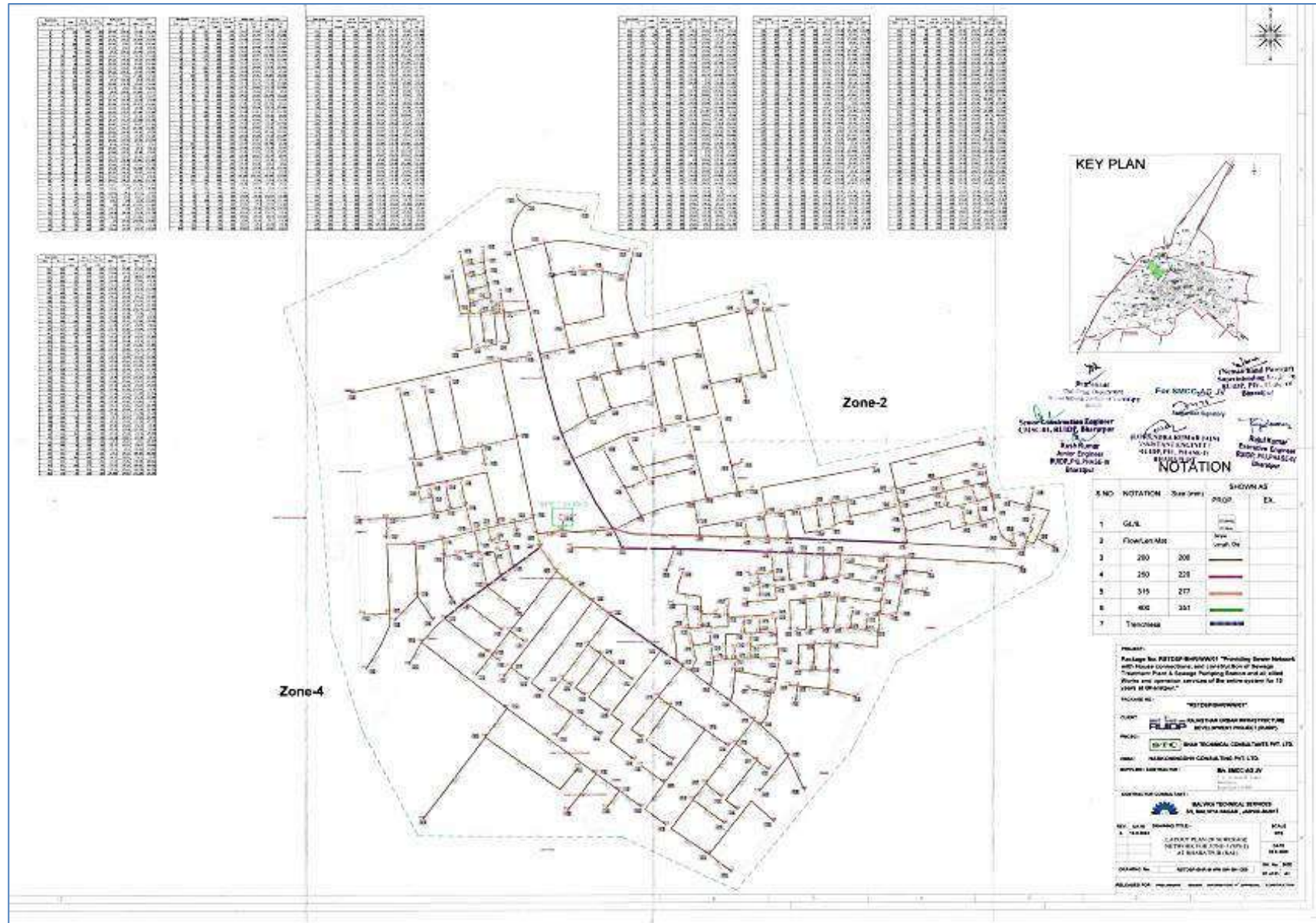
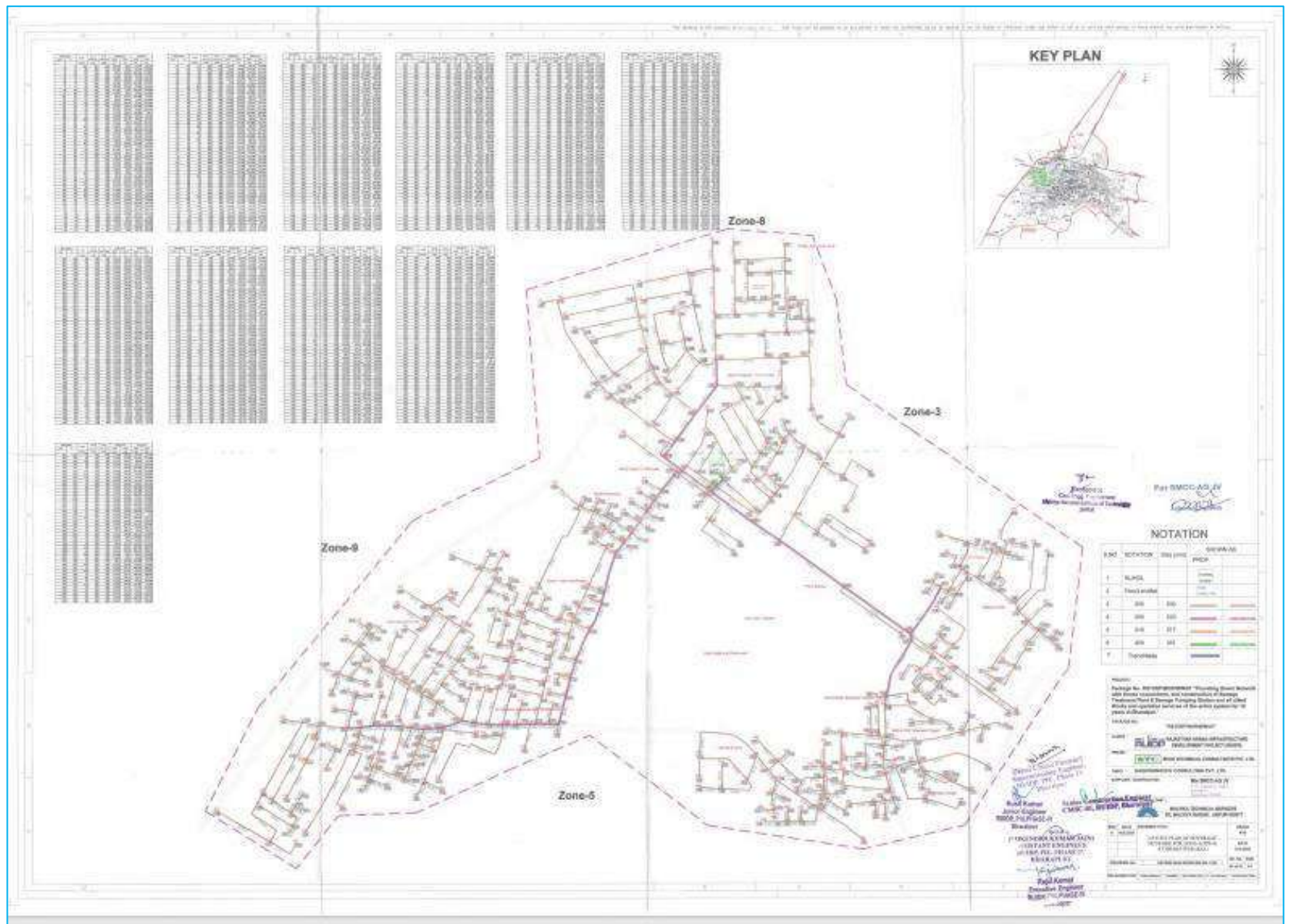


Figure 13: Approved network in sewerage zone –4 in Bharatpur town



D. Subproject Benefits

38. The subproject is primarily designed to improve environmental quality and living conditions of Bharatpur Town through provision of sewerage. The benefits arising from this subproject include: (i) better public health particularly reduction in waterborne and infectious diseases; (ii) reduced risk of groundwater contamination; (iii) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards.

39. The subproject will improve the efficiency of existing and new proposed sewer network, improve sanitary conditions within the city area, increase flow to avoid chocking of sewer line, reduce the water and air pollution near existing lake by trapping wastewater in the sewer than letting it flow open; improve water quality in existing lake as household sewer connections will collect sullage to sewer line.

E. Implementation Schedule

40. After the completion of preliminary designs, bids were and contract awarded to successful bidder in November 2022. Project duration of Design Build is 36 months. After completion of construction and commissioning, scheme will be operated by DBO contractor for 10 years, and after which the O&M will be carried out by ULB.

41. Subproject is being implemented under DBO modality, wherein which the successful bidder will design the sewerage systems and components (based on the feasibility/preliminary design/standards/guidelines provided in the bid document), construct, commission, and operate for 10 years, after which it will be transferred to Bharatpur Municipality. Therefore, at this stage, subproject is designed only in outline, and the details of components of the subproject provided in the **Table 7** are as finalized at this stage based on the preliminary designs and as included in the bid documents. This IEE is based on the subprojects and components detailed in the **Table 7**, and the IEE will be further updated during implementation in the event of any change in scope and location of project components.

III. ANALYSIS OF ALTERNATIVES

42. The ADB SPS, 2009 requires an analysis of project alternatives to determine the best method of achieving project objectives (which is safely collecting and disposing the human waste generated, in Bharatpur City, in this case) while minimizing environmental impacts. Alternative analysis provides opportunity to integrate environmental considerations into early stages of project (i.e., pre-feasibility or feasibility study), so that adverse environmental impacts can be avoided or minimized by various alternatives. It also provides opportunity to study various options vis a vis costs, provides a logical base, via transparent process, assist in decision making, gaining public support and ultimately in project approvals and timely implementation.

43. The proposed Sewerage subproject component in Bharatpur includes sewage collection network, transmission, treatment and treated wastewater reuse and disposal. Descriptions of various alternatives considered for critical components such as sewage treatment, treated wastewater disposal etc., are presented in the following **Table 9**.

Table 9: Analysis of Alternatives

1.	Project Need – No Project Alternative																																																
Type of alternative	'No project' alternative																																																
Description of alternatives	Bharatpur subproject is proposed to improve the service levels of basic infrastructure – sewerage. Bharatpur There are two existing STP of 8 & 5 MLD capacity based on SBR technology near Ikran village. Lack of efficient sewerage treatment and disposal system infrastructure in town is also causing environmental pollution, overall poor quality of life. Poor environmental quality affects the urban poor more. The project intends to provide following benefits to the town population, and the “no project” alternative will deprive people of these benefits: (i) better public health particularly reduction in waterborne and infectious diseases; (ii) reduced risk of groundwater contamination; (iii) improvement in quality of water bodies due to disposal of treated effluent meeting disposal standards																																																
Selected Alternative	Without subproject would yield the town to be continuously under-serviced that puts the health of the general public at an increasing risk and could potentially worsen the living environment. This ‘no project’ scenario would impede further social and economic development of the town and the defer commitments to improve the proportion of the population with sustainable access to clean water and basic sanitation. Given the large-scale benefits to the population and environment, ‘no project’ alternative is considered inappropriate.																																																
2	Sewage treatment process																																																
Type of alternative	Sewage treatment technology																																																
Description of alternatives	Various secondary treatment technologies have been considered in the sewage treatment process after the primary treatment consisting of screening and grit removal. Secondary treatment is the critical process that removes the organic putrescible organic matters and brings down the BOD of the effluent to meet the discharge standards. Following process technologies considered: Waste Stabilization Ponds; Aerated Lagoons; Up Flow Anaerobic Sludge Blanket (UASBR) + FAL; Conventional Activated Sludge Process; and Cyclic Activated Sludge Process/Sequential Batch Reactor (SBR) A comparison of various treatment technologies is presented below in terms of merits of the process over key parameters like quality characteristics and land requirement: <table border="1"> <thead> <tr> <th>Item</th><th>Conventional Activated Sludge</th><th>Extended Aeration</th><th>UASB followed by Facultative Aerobic Lagoon</th><th>Cyclic Activated Sludge Process / SBR</th></tr> </thead> <tbody> <tr> <td>Performance (Typical)</td><td>Mostly stable</td><td>Mostly stable</td><td>Varying with temperature variations</td><td>Complete Stable</td></tr> <tr> <td>BOD</td><td><30 ppm</td><td><30 ppm</td><td><30 ppm</td><td><10 ppm</td></tr> <tr> <td>COD</td><td><250 ppm</td><td><250 ppm</td><td><250 ppm</td><td><100 ppm</td></tr> <tr> <td>Suspended solids</td><td><50 ppm</td><td><50 ppm</td><td><100 ppm</td><td><10 ppm</td></tr> <tr> <td>Total Nitrogen</td><td>No Treatment</td><td>No Treatment</td><td>No Treatment</td><td><10 ppm</td></tr> <tr> <td>Total Phosphorous</td><td>No Treatment</td><td>No Treatment</td><td>No Treatment</td><td><2 ppm</td></tr> <tr> <td>Coliform removal, %</td><td>60-90</td><td>60-90</td><td>-</td><td>99.99%</td></tr> <tr> <td>Re-use Options</td><td>can only be used for low end</td><td>can only be used for low</td><td>can only be used for low</td><td>Can be used for low end</td></tr> </tbody> </table>				Item	Conventional Activated Sludge	Extended Aeration	UASB followed by Facultative Aerobic Lagoon	Cyclic Activated Sludge Process / SBR	Performance (Typical)	Mostly stable	Mostly stable	Varying with temperature variations	Complete Stable	BOD	<30 ppm	<30 ppm	<30 ppm	<10 ppm	COD	<250 ppm	<250 ppm	<250 ppm	<100 ppm	Suspended solids	<50 ppm	<50 ppm	<100 ppm	<10 ppm	Total Nitrogen	No Treatment	No Treatment	No Treatment	<10 ppm	Total Phosphorous	No Treatment	No Treatment	No Treatment	<2 ppm	Coliform removal, %	60-90	60-90	-	99.99%	Re-use Options	can only be used for low end	can only be used for low	can only be used for low	Can be used for low end
Item	Conventional Activated Sludge	Extended Aeration	UASB followed by Facultative Aerobic Lagoon	Cyclic Activated Sludge Process / SBR																																													
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Suspended solids	<50 ppm	<50 ppm	<100 ppm	<10 ppm																																													
Total Nitrogen	No Treatment	No Treatment	No Treatment	<10 ppm																																													
Total Phosphorous	No Treatment	No Treatment	No Treatment	<2 ppm																																													
Coliform removal, %	60-90	60-90	-	99.99%																																													
Re-use Options	can only be used for low end	can only be used for low	can only be used for low	Can be used for low end																																													

		usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial usages, cooling water etc.	end usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial usages, cooling water etc.	end usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial usages, cooling water etc.	usages as well as for high end usages without any tertiary treatment.
	Land requirement (m ² /person)	0.1-0.18	0.08-0.15	0.2-0.25	0.035-0.07
	Process Power requirement (kWh/person/year)	12-15	16-19	4-5	6-8
	Sludge handling	Sludge needs digestion prior to drying on beds or use mech. devices	Digested sludge, dry on beds or use mech. devices	Digested sludge, dry on beds or use mech. Devices	Digested sludge, dry on beds or use mech. devices
	Equipment requirement (excluding screening and grit removal)	Aerators, recycle pumps, scrapers, thickeners, digester, dryers, gas equipment	Aerators, recycle pumps, sludge scrapers, (for large settlers)	Nil (gas collection optional)	Diffuse aeration system, recycle sludge and waste sludge pumps, decanters
	Operational characteristics	Skilled Operation required	Simpler than activated sludge	Simpler than activated sludge	Complete automatic operation by computer and PLC. Negligible manpower Intervention required
	Special features	Considerable equipment and skilled operation required especially if gas collection and usage involved. Method considered mainly for large sized plants	BOD removal high, effluent nitrified relatively high power requirement, favoured for small and medium sized plants	Minimal to negligible power requirement of the system makes it an economical alternative if gas revenue is neglected land requirement is also relatively small but depends on type of past treatment adopted	Highest treatment efficiency with crystal quality power requirement is 50% of conventional technologies land requirement is less than 50% of conventional technologies
Selected Alternative	Selected processes: Sequential batch reactor (SBR)				

	The genesis of selecting a suitable treatment process is primarily correlated with degree of treatment aimed to be achieved. In India, the latest court Order of April 2019 (NGT Order dated 30 April 2019) mandates all the civic authorities to adopt the treated sewage characteristics applicable are as shown in table below: <table border="1"> <thead> <tr> <th>Parameter</th><th>Standards</th></tr> </thead> <tbody> <tr> <td>BOD, mg/l</td><td>10</td></tr> <tr> <td>TSS, mg/l</td><td>20</td></tr> <tr> <td>COD, mg/l</td><td>50</td></tr> <tr> <td>Nitrogen-Total, mg/l</td><td>10</td></tr> <tr> <td>Phosphorus- Total, mg/l</td><td>1</td></tr> <tr> <td>Fecal Coliform (MPN/ 100 ml)</td><td>100 (permissible 230)</td></tr> </tbody> </table> SBR provides highest treatment efficiency possible in a single step biological process. The system is operated in a batch reactor mode this eliminates all the inefficiencies of the continuous processes. A batch reactor is a perfect reactor, which ensures 100% treatment. Separate modules are provided to ensure continuous treatment. The complete process takes place in a single reactor, within which all biological treatment steps take place sequence. The complete biological operation is divided into cycles. Each cycle is of 3 – 5-hour duration, during which all treatment steps take place.	Parameter	Standards	BOD, mg/l	10	TSS, mg/l	20	COD, mg/l	50	Nitrogen-Total, mg/l	10	Phosphorus- Total, mg/l	1	Fecal Coliform (MPN/ 100 ml)	100 (permissible 230)
Parameter	Standards														
BOD, mg/l	10														
TSS, mg/l	20														
COD, mg/l	50														
Nitrogen-Total, mg/l	10														
Phosphorus- Total, mg/l	1														
Fecal Coliform (MPN/ 100 ml)	100 (permissible 230)														
4	Treated wastewater disposal														
Type of alternative	Treated wastewater disposal – reuse applications														
Description of alternatives	Discharge of treated wastewater into Water body (ii) Reuse the treated wastewater in non-potable uses Rajasthan is a water scarce region and receives low rainfall. Recognizing the importance of treated wastewater in reducing the demand on water, Sewerage and Wastewater Policy, 2016, of Rajasthan promotes the reuse of treated sewage for non-potable applications, and also to make sewerage projects environmentally sustainable. This policy prioritizes reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry and non-potable domestic reuse. Policy suggests construction of storage tanks to store treated wastewater to facilitate reuse. Policy prescribes that the detailed project report (DPR) should clearly define the best reuse option specific to the town and prepare a Reuse Action Plan part of the DPR following water quality norms and legal implications. Accordingly, it is proposed to utilize the treated wastewater for non-potable uses. There are vast agricultural practices near the STP sites, where there is scarcity of water for irrigation, due to which mostly rain fed agriculture is being practiced. A detailed Reuse Action Plan will be prepared during the detailed design phase, and, implemented. It is also proposed that the excess / surplus treated wastewater which is not being utilized in reuse will be discharge into natural drain located near STP, and necessary facilities – pipelines and pumping facilities, will be developed.														
Selected Alternative	Reuse in non-potable applications and discharge excess/surplus into natural stream located near STP site														
5	Project Locations														
Description of alternatives	STPs location. Based on the technical feasibility of gravity flow system, sewerage system in Bharatpur is designed and optimized with two sewage treatment plants (STPs). Site selection is guided by technical suitability, availability of government owned vacant land, adequate land parcel, site away from habitation, and where there is a channel to discharge the treated wastewater. The two selected sites are away from habitations and surrounded by agricultural lands (no habitations within 250 m from STP sites proposed at Nagla Gopala near Ikran village). As far as possible sufficient distance from proposed STPs from habitation is desirable, and also considering the selected														

	superior and compact sewage treatment technology (SBR), the two sites which are selected are suitable for the construction of STPs and therefore no site alternative is considered. Sewer lines. Sewer line is proposed along the roads/streets in the town within the road right-of-way (ROW). In wider roads water pipes will be laid in the road shoulder beside the tarmac, and in narrow roads, where there is no space, pipes will be laid in the road carriage way by break opening the tarmac. Sewers will be mostly laid in the center of the road, away from water pipes. There are existing asbestos cement pipes underground in the existing water supply networks, the alignment will be fine-tuned during the detailed design, to avoid existing AC pipe alignments as far as possible. SPS Locations. Sewage pumping station is proposed in vacant government land on the basis of drainage pattern of town, availability of government land with no any other use, adequate land parcel, site away from habitation etc. Nearest habitation is about 25 m away from site, therefore this site is suitable for construction of proposed SPS and no site alternative is considered. Disposal Point: After utilising the treated wastewater for non-potable uses, the excess water will be disposed at Bharatpur City Flood Control Drain for further use in agriculture by downstream users. The proposed land for disposal is govt. land. There is no habitation within 120 m radius.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

A. ADB Safeguard Policy (SPS 2009)

44. ADB SPS Requires that during the design, construction, and operation of the project necessary compliance to all applicable laws and international conventions / treaties along with pollution prevention and control technologies and practices consistent with international good practice, are ensured.

45. ADB uses a classification system to reflect the significance of a project's potential environmental impacts. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories:

- (i) Category A. A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An Environmental Impact Assessment (EIA) is required.
- (ii) Category B. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.
- (iii) Category C. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

- (iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a FI.

46. The environmental impacts of Bharatpur sewerage subproject have been identified and assessed as part of the planning and design process. An environmental assessment using ADB's REA checklist for sewerage treatment (see **Appendix 1**) was conducted, and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB SPS's requirements for environment category B projects.

47. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

48. **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. The Preliminary Environmental audit report of existing STP is given in **Appendix 5**.

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

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

50. **Consultation and Participation.** ADB SPS, 2009 require borrower to conduct meaningful consultation¹ with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

51. **Grievance Redress Mechanism.** ADB SPS, 2009 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 mechanism shall be scaled to the

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

risks and adverse impacts of the subproject.

52. 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 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.

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

54. Occupational Health and Safety. ADB SPS, 2009 requires the borrower² to ensure that workers³ 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.

55. Community Health and Safety. ADB SPS, 2009 requires the borrower to identify and assess risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and shall establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

56. Physical Cultural Resources. Borrower is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. ADB SPS, 2009 requires that such resources likely to be affected by the subproject are identified, and qualified and experienced 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 shall be included in the EMP.

57. ADB SPS International Best Practice Requirements. ADB SPS, 2009 requires that,

² 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.

³ 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.

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 Guidelines⁴ and Sector Specific [Water and Sanitation] Guidelines⁵). 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 Laws

58. The implementation of the subprojects will be governed by Government of India and State of Rajasthan and other applicable environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize or mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether applicable international, national, state or municipal or local. Key standards include those related to drinking water quality, air quality, effluent discharge, and protected areas. Compliance is required in all stages of the subprojects including design, construction, and operation and maintenance.

59. **Environmental assessment.** The Government of India's EIA Notification of 2006 and its amendments (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.

60. **Category A** projects require environmental clearance from the central Ministry of Environment, Forests and Climate Change (MOEFCC). The proponent is required to provide preliminary details of the project in the prescribed manner with all requisite details, after which an Expert Appraisal Committee (EAC) of the MOEFCC prepares comprehensive terms of reference (TOR) for the EIA study. On completion of the study and review of the report by the EAC, MOEFCC considers the recommendation of the EAC and provides the environmental clearance if appropriate.

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

⁴ <https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

⁵ <https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES>

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

63. **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 below**.

C. Environmental Regulatory Compliance

64. **Table 10** presents a summary of environmental regulations and mandatory requirements applicable to Bharatpur Town sewerage subproject.

Table 10: Applicable Environmental Regulations

Law	Description	Requirement	Relevance to Project Phase
National Environment Policy (NEP), 2006.	NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by Central, State and Local Government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management.	RSTDSP should adhere to NEP principle of “enhancing and conservation of environmental resources and abatement of pollution”.	All phases of project
Rajasthan State Environment Policy, 2010 And Rajasthan Environment Mission and Climate Change Agenda for Rajasthan (2010-14)	Follows the National Environment Policy, 2006 and core objectives and policies are: -Conserve and enhance environmental resources; assure environmental sustainability of key economic sectors; and, improve environmental governance and capacity building - it recommends specific strategies and actions to address the key environmental issues: water resources, desertification and land degradation, forest and biodiversity, air quality, climate change: adoption and mitigation, mining, industry,	Project implementation should adhere to the policy aims of: conservation and enhancement of environmental resources, integration of environmental concerns into projects/plans, and capacity building in environmental management. Under water sector, major concerns, as the policy notes, are huge water losses and wastage, declining water availability, pollution. Relevant recommendations for the project include control of losses, integrated water resources management,	All phases of project

Law	Description	Requirement	Relevance to Project Phase
	tourism, energy, urban development, etc. - Establishment of Environment Mission under the chairpersonship of the Chief Minister and a Steering Committee under the chairpersonship of Chief Secretary, Government of Rajasthan Tasks force set up for six key areas	control of raw water pollution¹⁸, reuse and recycling. Avoid/minimize use of forest lands. With reference to climate change adoption and mitigation following should be considered in the project: (i) diminishing flows in surface water bodies, and groundwater depletion, and revival traditional water bodies as water sources (lakes/tanks); (ii) equal stress on demand side management in water; and (iii) minimize energy use - design energy efficiency systems.	
EIA Notification, 2006 and amendments	Projects indicated in the schedule of this notification requires EIA study and environmental clearance.	None of the components of this subproject falls under the ambit of the notification; no EIA study or environmental clearance required	-
Central Ground Water Authority Public Notice 2/100	Public Notice specifies districts and areas where there are restrictions on the construction and installation of any new structure for extraction of groundwater resources without specific approval from the CGWA	Subprojects belonging to the Notified Areas in the Public Notice and will require new structures on extracting groundwater should seek the permission from the Central Groundwater Authority	Not applicable
Public Health Engineering Department Office Order P5 (1) PHE-2010 dated July 14 2020	PHED Office Order states that the State Government is instructed that permits for any new tube wells, bore wells or any structures extracting ground water shall be secured from the District Collector	Subprojects with components shall secure permits from the District Collector for components that include any new tube wells, bore wells or structures extracting groundwater	Not applicable
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. Control of water pollution is achieved through administering	Designed One STPs will require CTE (prior to start of construction works) and CTO (prior to start of operation) from Rajasthan State Pollution Control Board (RSPCB) All relevant forms, prescribed fees and procedures to obtain the CTE and CTO can be found in the RSPCB website. (http://environment.rajasthan.gov.in)	Construction and Operation

Law	Description	Requirement	Relevance to Project Phase
	conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act of 1974. These conditions regulate the quantity and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the subproject having the potential to generate sewage or trade effluent will come under its purview. Such projects have to obtain Consent to establish (CTE) under Section 25 of the Act from Rajasthan State Pollution Control Board (RSPCB) before starting implementation and Consent to Operate (CTO) before commissioning.		
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. The projects having potential to emit air pollutants into the atmosphere have to obtain CTE and CTO under Section 21 of the Act from RSPCB. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.	The following will require CTE and CTO from RSPCB: (i) Diesel generators (more than 15 KVA); (ii) Batching Plant hot mix plants; and (iii) stone crushers, if installed for construction. All relevant forms, prescribed fees and procedures to obtain the CTE and CTO can be found in the RSPCB website (http://environment.rajasthan.gov.in) If ready mix concrete and hot mix bitumen is procured from third party, contractor has to ensure that the plants, from where material is being purchased is having CTE/CTO and copy should be collected from third party and submitted in PIU	Construction and operation
Biodiversity Act of 2002	This Act 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	Not Applicable	-

Law	Description	Requirement	Relevance to Project Phase
	resources and knowledge to the country and the people.		
Wildlife Protection Act, 1972 and 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.	Not Applicable
Forest (Conservation) Act, 1980	The Forest (Conservation) Act prohibits the use of forest land for non-forest purposes without the approval of Ministry of Environment Forests & Climate Change (MoEFCC), Government of India	Not applicable; none of the components of the subproject are located in forest.	Not Applicable
Environmental (Protection) Act, 1986 amended in 1991 and the following rules/notifications:	This is an “umbrella” legislation that empowers the Central Government to take all necessary measures to protect and improve the quality of the environment and prevent, control and abate environmental pollution. Empowers central government to enact various rules to regulate environmental pollution, including standards for quality of air, water, noise, soil; discharge standards or allowable concentration limits for environmental pollutants, handling of hazardous substances, locating/prohibiting industries, etc.,	There are rules / notifications that have been brought out under this Act, which are relevant to RSTDSP, and are listed below	Construction and operation
Environmental Standards (ambient and discharge).	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards	Appendix C-2 provides ambient air quality standards, Appendix C-3 provides emission limits for vehicle exhaust and Appendix C-5 provides emission limits of DG sets and Appendix C-4 provided emission stack height requirements for diesel generators Appendix C-8 provides STP discharge standards	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Appendix C-7 provides applicable noise standards	Construction and operation
Indian Drinking Water Standards	Gives details of the permissible and desirable limits of various parameters in drinking water as per the Bureau of Indian Standards	Appendix C-1 provides drinking water standards	Construction and operation
Solid Waste Management Rules 2016	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; store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; (iii) No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.	Contractor to follow all the rules during construction works	Construction and operation
Construction and Demolition Waste Management Rules 2016	(i) Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities (ii) Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains (iii) Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before	Construction waste shall be collected at stockpile area for 8-10 days and will be sent to disposal site. Disposal site shall be identified and allotted by Municipal Council after mobilization of contractor (during SIP period) and can't be mentioned at this time. Contractor to follow all the rules during construction works.	Construction

Law	Description	Requirement	Relevance to Project Phase
	starting construction or demolition or remodelling work, (iv) Large generators shall have environment management plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal / reuse of C & D Waste. (v) Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar, (vi) Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;		
Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016,	Responsibilities of the occupier for management of hazardous and other wastes. - (1) For the management of hazardous and other wastes, an occupier shall follow the following steps, namely: - (a) prevention; (b) minimization; (c) reuse, (d) recycling; (e) recovery, utilization including co-processing; (f) safe disposal. (2) The occupier shall be responsible for safe and environmentally sound management of hazardous and other wastes. (3) The hazardous and other wastes generated in the establishment of an occupier shall be sent or sold to an authorized actual user or shall be disposed of in an authorized disposal facility. (4) The hazardous and other wastes shall be transported from an occupier's establishment to an authorized actual user or to an authorized disposal facility in accordance with the provisions of these rules. (5) The occupier who intends to get its hazardous and other wastes treated and	Contractor to comply all the requirements of this Act during construction works. STP Sludge or any material if classified as hazardous waste / material is to be handled and disposed according to this Rules	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
	disposed of by the operator of a treatment, storage and disposal facility shall give to the operator of that facility, such specific information as may be needed for safe storage and disposal. (6) The occupier shall take all the steps while managing hazardous and other wastes to- 6 (a) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and (b) provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.		
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 are not located in or near to designated wetland area.	Not applicable
Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010.	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 project. Lohargarh Fort is only ASI protected monument in the municipal limits of city. The nearest ASI monument is Moat wall surrounding the fort is about 450 m from proposed sewerage network in zone 1. None of the project components are coming under the prohibited or regulated areas of these monuments. Confirmatory survey is required to re assess the impact on cultural heritage sites."	Not applicable
The Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961; the	Any construction/excavation work in the 'protected area' (as declared by GoR under the Act) requires priori permission of Department of Archaeology & Museums	Not applicable - there are 11 state protected monuments in the town but are situated more than 200 m distance from the sewerage network.	Not applicable

Law	Description	Requirement	Relevance to Project Phase
Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007	-Application under the Rules shall be submitted to Director, State Archaeological Department, at least 3 months prior to the work. Department provides conditional permission, including time for completion, procedures to be followed during the work and for chance finds et-.	After confirmatory survey during pre-construction phase no proposed works identified within core area or regulated areas of these monuments, permission from State Archaeological Department will be required before start of construction works. In case of chance finds, the contractor/PIU will be required to follow chance finds protocol	
The Building and Other Construction Workers (BOCW) Act 1996 and Rajasthan Building and Construction Workers Rules 2009	Employer shall- • Provide and maintain, at suitable point, sufficient quantity of wholesome drinking water, such point shall be at least 6 meters away from any washing areas, urinals or toilets • Provide sufficient urinals and latrines at convenient place, easily accessible by workers • Provide free of charge, temporary living accommodations near to work sites with separate cooking place, bathing and lavatory facilities and restore the site as preconditions after completing the construction works • Provide crèche with proper accommodation, ventilation, lighting, cleanliness and sanitation if more than fifty female workers are engaged • Provide first aid facilities in all construction sites For safety of workers employer shall provide- • Safe access to site and workplace • Safety in demolition works • Safety in use of explosives • Safety in operation of transporting equipment and appoint competent person to	Contractors are required to follow all the provisions of BOCW Act and Rajasthan BOCW Rules. Salient features of Rajasthan BOCW Rules are- Chapter III, section 17- Registration of establishments Chapter VIII, section 61- Hours of works, intervals or rest and spread over, overtime Section 62- weekly rest Section 63- night shift Section 67- registers of workers Section 68- Muster roll, wages register Section 70- latrine and urinal facilities Chapter XI- Safety and Health Section 78- fire protection Section 79- emergency action plan Section 80- fencing of motors Section 81- lifting and carrying of weight Section 82- H&S policy Section 83- dangerous and harmful environment Section 84- Overhead protection Section 88- eye protection Section 89- PPEs Section 90- electrical hazards Section 97- use of safety helmets and shoes Chapter XIII-lifting appliances and gears Chapter XV- transport and earth moving equipment Chapter XVI- concrete works Chapter XVII- demolition works	Construction

Law	Description	Requirement	Relevance to Project Phase
	drive or operate such vehicles and equipment • Safety in lifting appliance, hoist and lifting gears • Adequate and suitable lighting to every workplace and approach • Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in workplace and confined space • Safety in material handling and stacking/unstacking • Safeguarding the machinery with fly-wheel of moving parts • Safe handling and use of plants operated by compressed air • Fire safety • Limit of weight to be lifted by workers individually • Safety in electric wires, apparatus, tools and equipment • Provide safety net, safety sheet, safety belts while working at height (more than 1.6 mtrs as per OSHA) • Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required • Safety in pile works, concrete works, hot asphalt, tar, insulation, demolition works, excavation, underground construction and handling materials • Provide and maintain medical facilities for workers • Any other matters for the safety and health of workers	Chapter XVIII-Excavation and tunnelling Chapter XX- ladders and step ladders Chapter XXII- structural frame and formworks Chapter XXIV- medical facilities and first aid box	
Contract Labor (Regulation and Abolition) Act, 1970;	Provides for welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the	• Applicable to all construction works in the project • Principle employer	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	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. 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.,	(RUDSICO-EAP) to obtain Certificate of Registration from Department of I, as principle employer - Contractor to obtain license from designated labor officer - Contractor shall register with Labor Department, if Inter-state migrant workmen are engaged - Adequate and appropriate amenities and facilities shall be provided to workers including housing, medical aid, traveling expenses from home and back, etc., Appendix C-12 provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.	
The Child Labour (Prohibition and Regulation) Act, 1986	Prohibits employment of children below 14 years of age in certain occupations and processes Employment of child labor is prohibited in building and construction Industry.	No child labour should be employed	Construction and operation
Minimum Wages Act, 1948	Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of buildings, roads and runways are scheduled employment.	Applicable to all construction works in the project All construction workers should be paid not less than the prescribed minimum wage	Construction and operation
Workmen Compensation Act, 1923	Provides for compensation in case of injury by accident arising out of and during the course of employment.	Compensation for workers in case of injury by accident	Construction and operation
Equal Remuneration Act, 1979	Provides for payment of equal wages for work of equal nature to male and female workers and not for making discrimination against female employees in the matters of transfers, training and promotions etc.	Equal wages for work of equal nature to male and female workers	Construction and operation
Rajasthan Forest Act, 1953 and	This Act makes the basis for declaration of Reserved	Not applicable; none of the components / pipeline	Construction

Law	Description	Requirement	Relevance to Project Phase
Rajasthan Forest Rules, 1962	Forests, constitution of village forest committees, management of reserved forests and penalties and procedures.	alignment are in reserved or community forest areas.	
International conventions and treaties			
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.	Keoladeo National Park in Bharatpur is one of the first recognized Ramsar Site in India. Recognised on October 01, 1981. No project component is proposed with or near Keoladeo National Park and its eco sensitive zone in Bharatpur.	Not applicable
Convention concerning the Protection of the World Cultural and Natural Heritage	Convention concerning the Protection of the World Cultural and Natural Heritage (5), it was adopted by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in 1972	Keoladeo National Park is one of the World Cultural and Natural Heritage recognized by UNESCO. No project component is proposed within or near Keoladeo National Park and its eco sensitive zone.	
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	India is a signatory of this convention which aims to control international commercial trade in endangered species	Not applicable in this project as no endangered species of wild fauna and flora is found in project town.	-
Montreal Protocol 1992	India is a signatory of this convention which aims to 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 Hydrochlorofluoro carbons (HCFCs)	Not applicable in this project as no ODS are involved in construction works	Not applicable
Basel Convention on Trans-boundary Movement of	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of	Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and	Not applicable

Law	Description	Requirement	Relevance to Project Phase
Hazardous Wastes, 1989	hazardous wastes	disposal of hazardous waste emerged during construction works Under this Convention, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste.	
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. Migratory species threatened with extinction are listed on Appendix I of the Convention. 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. Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II, and CMS encourages the Range States to conclude global or regional agreements.	Not applicable to this project as no migratory species of wild animals are reported in the project areas.	Not applicable

65. **Clearances / permissions to be obtained prior to start of construction.** Table 11 shows the list of clearances/permissions required for project construction. This list is indicative and the contractor should ascertain the requirements prior to start of the construction, and obtain all necessary clearances/permission prior to start of construction.

Table 11: Clearances and permissions required for Construction activities

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	Pipe laying works	Permission from Nagar Nigam and PWD (where applicable)	PIU
3	Establishment of construction camps	Allotment and approval for specific land use	Contractor

S. No	Construction Activity	Statute under which Clearance is Required	Implementation
4	Construction of new STP	Consent to establish under Water Act, 1974 from RSPCB	PIU & Contractor
5	Operation of new STP	Consent to operate under Water Act, 1974 from RSPCB	
6	Tree Cutting	State forest department/Revenue (Tehsildar)	PIU
7	Hot mix plants, Crushers, Batching plants and DG Set	Consent to establish and consent to operate under Air Act, 1981 from RSPCB	Contractor
8	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules, 2016 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from RSPCB	Contractor
9	Sand mining, quarries and borrow areas	Permission from District Collector/ State Department of Mines & Geology	Contractor
10	New quarries and borrow areas	Environmental clearance under EIA Notification 2006	Contractor
11	Use of vehicles and equipment	Pollution under control certificate (PUC) form RTO	Contractor
12	Temporary traffic diversion measures	Temporary traffic diversion measure including use of alternate road from District traffic police	Contractor
13	Use of Railways ROW for construction area/ crossing	Indian Railways	PIU
14	Use of highway ROW for construction area/ crossing	National Highway Authority of India	PIU

66. PMU will be overall responsible for supervision in getting all clearances and provide details to ADB through semi-annual report. PMU will ensure 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 ENVIRONMENT

A. Physical Environment

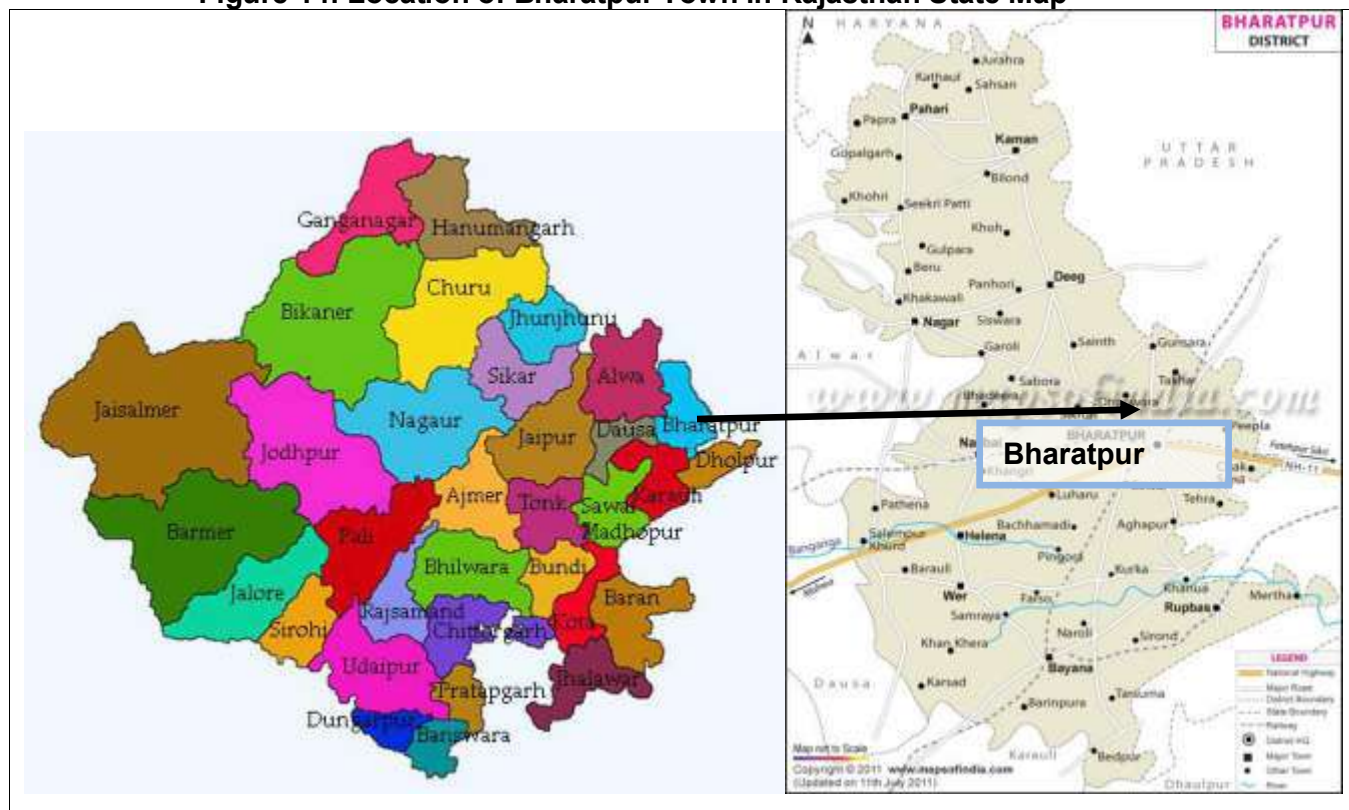
1. Location, Area & Connectivity

67. Bharatpur, also known as 'Eastern Gate of Rajasthan', is in the Braj region 180 km away from Delhi. Geographically, the district is situated between 26° 22' and 27° 83' N and 76° 53' and 78° 17' E and its average height above sea level is around 183 m. Bharatpur city is the district headquarters and is also known by the name of Lohagarh. It is situated very close to the main cities of Rajasthan and other states. Distance between Jaipur and Bharatpur is around 178 km whereas Agra lies at 55 km from the district. Mathura is located at 34 km. Bharatpur touches Gurgaon of Haryana in the north, Mathura in the east, Agra of Uttar Pradesh and Dholpur of Rajasthan in the south and Dausa and Alwar in the west.

68. Presently, Bharatpur is district headquarter and is also administrative head quarter

commissioner, covering other three district under it namely Dholpur, Karauli and Sawai Madhopur. Municipal Services in the existing areas of the city are managed by local self-government body “Bharatpur Nagar Parishad”. Development of upcoming areas of the city is looked after by UIT. Location of Bharatpur town in Rajasthan State map is shown in **Figure 14**.

Figure 14: Location of Bharatpur Town in Rajasthan State Map



69. The general physical character of district comprises of sand and rocky land in the major part. It is situated on an average altitude of 250 m above mean sea level.

2. Topography, Soils and Geology

70. **Topography:** the district is situated between $26^{\circ} 22'$ and $27^{\circ} 83'$ N and $76^{\circ} 53'$ and $78^{\circ} 17'$ E and its average height above sea level is around 183 m Topographically Bharatpur, is levelled and saucer in shape. The general topography of the city is low lying & marshy with black cotton soil. Looking at topography the town is like a saucer in shape, except inner mort portion, which have highest ground level from another site. Topography is marked by undulation without any regular slope pattern. There are several depressions scattered all over the city which get filled with Rainwater/ Wastewater. Two annular shape water bodies called inner mode (Sujan Ganga) and outer mode are interesting part of city's landscape. Besides inner mode and outer mode there are four other channels, namely CFCD, Giriraj Channel, Goverdhan Canal and RFCD which are draining the rainwater from the city. A canal starting from Ajan Bandh dam come up to Ranjit Nagar & Sujan Ganga.

71. **Soils.** The soil is generally alluvial, prone to water logging. The nature of recently alluvial calcareous has been observed. Nutrient level in the Bharatpur soil including area coverage of saline and sodic soil.

72. **Soil Quality:** The study of baseline soil quality has been conducted by the DBO contractor in May 2023. Four samples were collected from different sites which are STP site and SPS -1,2,& 3. The result of Soil sample are given below in Table. The PH range is from 7.50 to 7.84, in four samples Nitrogen from 428.74 to 628.74 mg/kg and Potassium from 128.94 to 202.96 mg/kg. Table 12

Table 12 : Test results of Soil Quality Monitoring

Sr.No	Parameters	Unit of Measurements	Results			
			Near New STP proposed site, At Nagar Nigam STP, Gopal Nagla Mod, Acchhnera Road, Bharatpur	At SPS – 1, proposed Site (0.81 MLD), Near Nayi Mandi Shamshan, Bharatpur	At SPS – 3, proposed Site (1.64 MLD), Near Mukharjee Nagar, R.N.F.C.D. Bridge, Bharatpur	At SPS – 4, proposed Site (2.23 MLD), Near Sulabh Complex UIT workshop Scheme, Deeg Road, Bharatpur
1	pH	-	7.62	7.55	7.84	7.60
2	Electrical Conductivity	µS/cm	487.85	512.84	564.20	411.76
3	Organic carbon	%	0.64	0.75	0.48	0.57
4	Organic matter	%	2.04	2.14	1.67	1.85
5	Total Nitrogen (as TKN)	mg/kg	628.74	497.85	428.74	482.63
6	Sodium (as Na)	mg/kg	165.30	112.63	128.94	133.70
7	Potassium (as K)	mg/kg	202.96	157.84	165.70	184.20
8	Iron (as Fe)	mg/kg	3.54	6.20	4.28	3.27
9	Copper (as Cu)	mg/kg	0.20	0.18	0.22	0.21
10	Zinc (as Zn)	mg/kg	0.90	0.65	0.70	0.97

Source:- Lab Test Report May-2003 by Nakshatra Enviro Services

73. **Drainage:** The peculiar topography of the town provides natural drainage pattern. The area has been divided into two river drainage basins, namely Barah river basin towards north and Banganga river basin towards south.

74. **Geology:** The rock types of districts exposed are grouped under Alwar and Ajabgarh Groups belonging to the Delhi super group (Lower to Middle Proterozoic). The rocks of Alwar group comprising quartzite, basic volcanic tuffaceous sandstone, shale etc. are well exposed in the south-western part of the district around Khankhera. The major parts of the district are occupied Quaternary alluvium and blown sand which conceal the hard rock geology. Hydrogeological domains of unconsolidated and consolidated rocks formation with varying ground water potential. Different formations belonging to Alwar super group, Delhi super group, Vindhyan group and Quaternary alluvium form the geological framework of the district. About 85% area of the district is occupied by alluvium and windblown sand.

75. **Geomorphology.** Geo-morphologically the district classified into seven geomorphic units namely hill and valley, younger flood plains, ravine, obstacle dunes and pediment / pediplain. On an average 90% of the district area covered with unconsolidated porous formations.

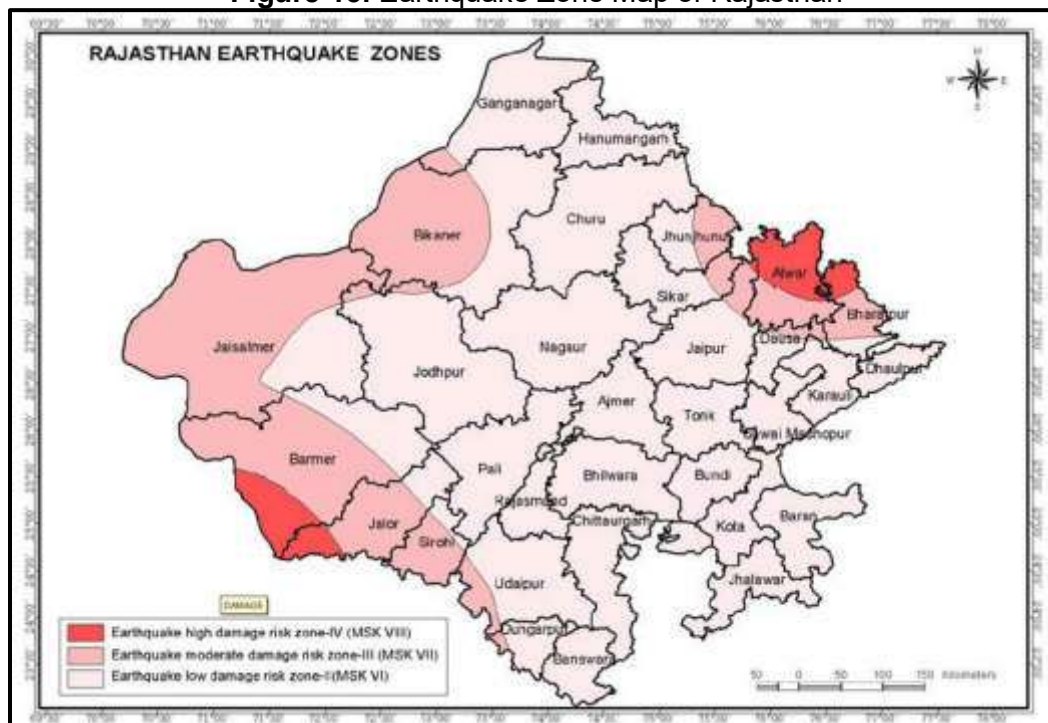
76. **Mineral Resources.** Barytes, buildings stones, and quartz are the important minerals of the district. The STP and SPS site has no mineral resources. Barytes closely associated with the

basic intrusive occurs in the rocks of the Delhi Super group. Barytes veins occur as fissure filling in quartzite. Occurrences are reported from Hatori (27°00' :77°06'), Karwar (27°00' :77°03') etc. Small deposit of copper with an indicated reserve of 1 million tone with 1% Cu is located near Khankhera (26°55' :77°08'). Minor occurrence of lead is reported from Jotri (27°35' :76°58'). Quartz is available at many places in the district. Quartzite and sandstone are quarried at Bansi Paharpur (26°56' :77°03'), Dig (27°27' :77°19') etc. White spotted, reddish sandstone of the Bhander Group is in great demand as building Stone.

3. Seismology

77. According to the Vulnerability Atlas of India, Bharatpur Town falls in “Earthquake Moderate damage risk zone-III so all structures will be constructed as per resistant of earthquake high damage risk zone-IV. Although Rajasthan has not experienced a major earthquake in the recent past, there have been 37 events with a magnitude of 5-7 since 1720, with the most recent occurring in 2001. This measured 6.9 on the Richter Scale, but because the epicentre was in neighbouring Gujarat, there was only limited damage in Bharatpur. Earthquake Zone Map of Rajasthan is shown in **Figure 15**.

Figure 15: Earthquake Zone Map of Rajasthan



4. Climatic Conditions

78. The climate of Bharatpur Town is quite dry. The summer season is hot, but milder than most of the other Rajasthan cities. The maximum temperature during summer months (April to June) goes above 49°C quite frequently and has reached up to 43°C during peak summer. The temperature during winter months (December to February) normally touches 25°C and the lowest minimum temperature recorded is 9°C.

79. Average annual rainfall of the district is 582.9mm. Major portion of rainfall is received in

the monsoon season. In the last year 2021 actual rainfall received is 596.3 mm while normal rainfall 545.2.

Table 13: Rainfall Statistics of Bharatpur District

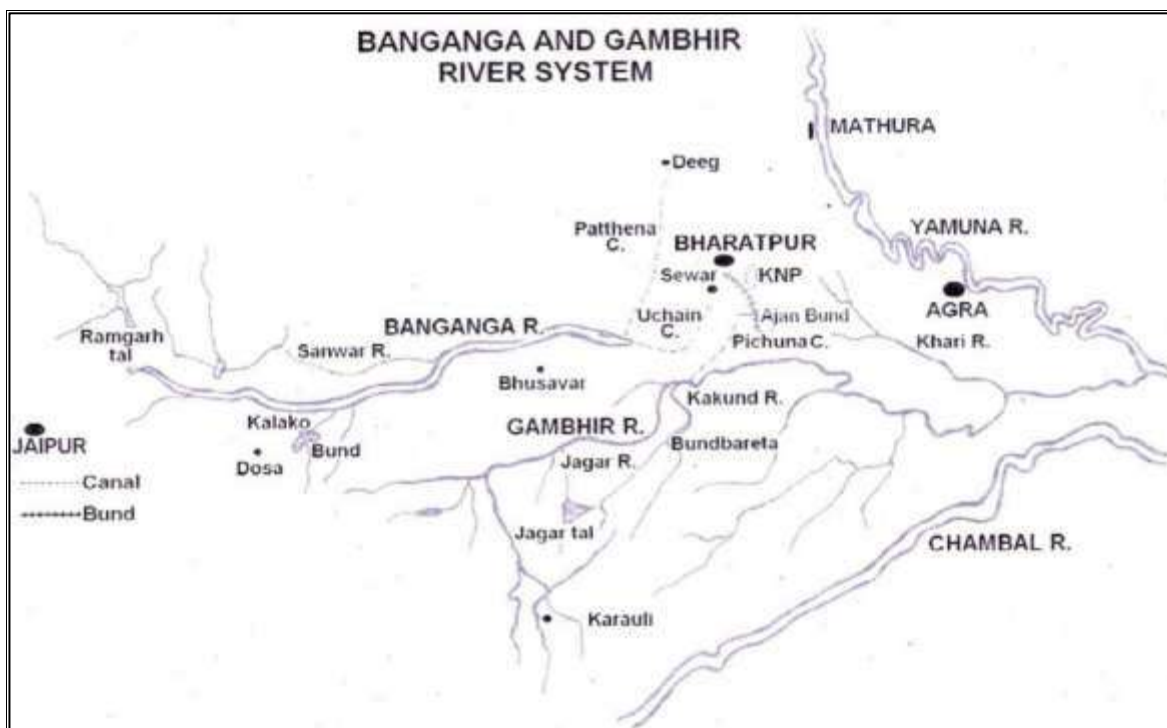
Duration	Cumulative Rainfall Statistics of Bharatpur District				
	SR NO.	Name of district	Actual rainfall (mm)	Normal rainfall (mm)	Departure from normal (%)
01/06/2021 to 30/09/2021	1	Bharatpur	596.3	545.2	9
01/06/2020 to 30/09/2020	2	Bharatpur	468.9	545.2	-14
01/06/2015 to 30/09/2015	3	Bharatpur	393.1	557.6	-30

Source: IMD Jaipur (End of season report 2021, 2019 and 2015)

5. Surface Water

80. There are only three main seasonal rivers in this District, namely Ban Ganga, Rooparel and Gambhir. Ban Ganga starts from Ramgarh Dam of Jaipur district, passes from Bharatpur and meets in river Gambhir near tehsil Bayana of District Bharatpur. Gambhir river starts from Panchna Dam of district Karauli and after passing from Bharatpur meets River Yamuna in Uttar Pradesh. Rooparel River starts from hills of district Alwar and enters into Bharatpur from tehsil Kaman. Instead of this, a Dam, namely, Bandh Baretha is situated near the village Baretha on river Kakund which starts from the hills of district Karauli. The water of this dam is used for drinking and irrigation purpose for this district. The capacity of this dam is 684.00 million cubic feet (29 Gaze feet). However, 9.4 MLD STP discharge is proposed on the Bharatpur flood control drain therefore some temporary slight changes may be taken in physicochemical properties of this drain water in the condition of untreated sewer discharge into drain.

81. **Bharatpur City flood Control Drain** is an earthen drain and is the main drainage line for Bharatpur town. Entire domestic wastewater not collected through Sewer lines and storm water runoff within the circular road and around Bharatpur town, discharged into this drain. It start from Kali Bagichi where storm water of south of Bharatpur. The alignment of this drain starts from Kali Bagichi and passes through Atal Bandh Gate, Neemda Gate, Anah Gate, Kumher Gate, Chandpole & upto Jaghina Gate. It consist of 25 nos. storm water inlets on left and 12 nos on right side.



6. Groundwater

82. For broadly grouping geological formations from ground water occurrence and movement considerations, the various lithological units have been classified into two groups on the basis of their degree of consolidation and related parameters. These are,

- (i) Unconsolidated porous, quaternary formation; and
- (ii) Fissured formations – consolidated sedimentary rocks.

83. On an average 90 % of the district area covered with unconsolidated porous formations. Ground water quality of Bharatpur is assessed by examine various physico-chemical parameters of open wells, bore wells and hand pumps. The results reveal that the water of most of the sampling area is hard and contaminated with higher concentration of total dissolved solids.

84. Because of the sandy soils and lack of rainfall, the water table is very deep around Bharatpur Town, ranging from 38-46 m below ground level. The main aquifer lies below this depth, comprising Lathi formations from the Lower Jurassic Age, composed of mainly sandstones and some lime stones in the upper levels. The aquifer is tapped by a number of wells, but the yield is reported to be low. Bharatpur Municipal Board (BMB) has developed a well field at Dabla Village 12.5 km from the town, where the aquifer is around 85 m below the surface. There are 12 tube wells of 200 m depth providing an average yield of 18,000 l/h, producing a total of around 3 million litres per day.

The chemical quality in the district is fresh to brackish; and quality of ground water varies from place to place. Most of the area shows higher values of fluoride and nitrate in the drinking water samples some other samples have higher values of TDS, Alkalinity, Hardness and chloride while remaining parameters are within the permissible limits.

85. Preconstruction phase groundwater quality of tube wells in Bharatpur City is presented in

the **Tables 14**, Four nos. ground water samples were collected on 09 and 10th May 2023 from four different locations. Test result are show that groundwater is alkaline in nature and most of the parameter are within acceptable limits for Indian and WHO's standards except for TDS, **Chloride and sulphate** in all location, **total hardness** at Gopal Nagla, near Naye mandi and near Mukharjee Nagar and **calcium** Near Naye Mandi are above desirable limit for Indian drinking water standards of IS10500 (2012) Laboratory test reports of groundwater quality are given in **Appendix 16**.

Table 14 : Test Results of Ground Water Monitoring

Test Laboratory			Nakshatra Environ Services, Jaipur				
Sample Collected By			NES Representative				
Date of Sample			09.05.2023 and 10.05.2023				
Source			Tube well (TW)				
Village/Town			Bharatpur				
National Standards for Drinking Water			WHO Guidelines for Drinking-Water Quality, 4 th Edition, 2011 ^b	Location of Source			
Parameter	Unit	Max. Concentration Limits		Near Proposed STP Site ,Gopal Nagla	SPS-1 (0.81MLD), Near Naye Mandi	SPS-3 (1.64 MLD), Near Mukharjee Nagar	SPS-4 (2.23 MLD),Near Sulabh Complex
Turbidity	NTU	1 (5)	-	< 01	<01	<01	<01
pH		6.5 – 8.5	none	7.26	7.28	7.45	7.65
Total Alkalinity				1085.25	778.12	308.00	632.88
Colour	Hazen units	5 (15)	none	---	---	-----	-----
Taste and Odor		Agreeable	-	---	---	-----	-----
TDS	mg/l	500 (2,000)	-	2853.50	2262.30	1942.00	1718.50
Iron	mg/l	0.3	-	0.20	0.26	0.18	0.15
Manganese	mg/l	0.1 (0.3)	-	BDL	BDL	BDL	BDL
Arsenic	mg/l	0.01 (0.05)	0.01	BDL	BDL	BDL	BDL
Cadmium	mg/l	0.003	0.003	BDL	BDL	BDL	BDL
Chromium	mg/l	0.05	0.05	---	---	---	---
Cyanide	mg/l	0.05	none	BDL	BDL	BDL	BDL
Fluoride	mg/l	1 (1.5)	1.5	0.28	0.08	0.28	0.28
Lead	mg/l	0.01	0.01	BDL	BDL	BDL	BDL
Ammonia	mg/l	0.5	none established	---	---	-----	-----
Chloride	mg/l	250 (1,000)	none established	561.10	823.86	999.20	508.44
Sulphate	mg/l	200 (400)	none	224.44	248.32	301.34	203.20
Nitrate	mg/l	45	50	97.67	41.02	28.45	64.15
Copper	mg/l	0.05 (1.5)	2	BDL	BDL	BDL	BDL
Total Hardness as (CaCo3)	mg/l	200 (600)	-	463.84	473.60	328.32	197.35
Calcium	mg/l	75 (200)	-	71.14	154.12	67.33	67.18
Zinc	mg/l	5 (15)	none established	0.07	0.04	0.02	0.02
Mercury	mg/l	0.001	0.006	BDL	BDL	BDL	BDL
Aluminium	mg/l	0.1 (0.3)	none established	BDL	BDL	BDL	BDL
Residual Chlorine	mg/l	0.2	5	BDL	BDL	BDL	BDL
E-coli	MPN/10	Must not be	Must not be	---	---	-----	-----

	0ml	detectable in any 100 ml sample	detectable in any 100 ml sample				

BDL:- Below Detection Level Sampling and testing done by : Nakshatra Enviro Services

Note-

^a Bureau of India Standard 10500: 2012.

^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.

7. Air Quality

86. Air quality parameters monitoring at Pre construction stage has been conducted on 09.05.2023 to 10.05. 2023. Except for carbon mono-oxide all parameters at all location were exceeding the WHO limits but well within the national limits prescribed by CPCB. Baseline data of Air Quality monitoring data are given in Table 15 and Appended in **Appendix:06**

Table 15: Ambient air quality of Bharatpur

Test Laboratory				Nakshatra Enviro Services, Jaipur			
Sample Collected By				NES representative			
Date of Sample				09.05.2023			
Village/Town				Bharatpur			
National Standards for Ambient Air quality (AAQ)				Location of Source			
Parameter	Unit	NAAQS	WHO Global Air Quality Standards -2021	Near Proposed STP Site ,Gopal Nagla	SPS-1 (0.81MLD), Near Naye Mandi	SPS-3 (1.64 MLD), Near Mukharjee Nagar	SPS-4 (2.23 MLD),Near Sulabh Complex
PM10	µg/m ³	100	45	72.36	84.20	78.65	81.74
PM2.5	µg/m ³	60	15	25.77	39.74	35.89	38.05
Sulfur Dioxide (SO ₂)	µg/m ³	80	40	8.02	9.15	8.87	8.29
Oxides of Nitrogen(NO _x)	µg/m ³	80	10	22.59	27.48	25.15	26.88
Carbon Monoxide(CO)	µg/m ³	2.00	4	0.60	0.69	0.64	0.67

Sampling & Testing done by Nakshatra Enviro Services, Jaipur

NO₂ = Nitrogen Dioxide

NAAQS = National ambient air quality standards

PM10 = Particulate Matter size less than 10µm or

SO₂ = Sulphur Dioxide

WHO = World Health Organization

Source: RSPCB

8. Noise Quality

87. Environmental parameters monitoring of Pre construction stage has been conducted on 24.05.2023 to 25.05.2023. Noise levels in sampling sites in Day as well as night times are well below the standards set for commercial area. Night time noise level when compared with WHO standards were below the prescribed limits in three sampling sites, while they were slightly higher at SPS-1 location for residential area. Baseline data of noise level monitoring are given in Table 16 and appended in IEE report in Appendix 6.

Table: 16. Test results of Noise Level Monitoring in Bharatpur

Test Laboratory		Nakshatra Enviro Services, Jaipur			
Date of Sample		09.05.2023			
Sample Collected by		NES representative			
Village/Town		Bharatpur			
Parameter	Unit	Near proposed STP site ,Gopal Nagla	SPS-1 (0.81MLD), Near naye mandi	SPS-3 (1.64 MLD), near Mukharjee nagar	SPS-4 (2.23 MLD),Near sulabh complex
Noise Level Day Time (6 am to 10 pm)	dB(A)	54.2	64.0	53.2	61.0
Noise Level Night Time (10 pm to 6 am)		42.0	47.2	41.8	43.5
Noise level standards					
Area code	Category of area/zone	Indian noise level standards (dBA) ^a		WHO guideline values for noise levels measured out of doors (one hour Lag in dBA)	
		Day time	Night time	07:00 - 22:00	22:00 -07:00
	Industrial area	75	70	70	70
	Commercial area	65	55	70	70
	Residential area	55	45	55	45
	Silence Zone	50	40	55	45

Sampling & Testing done by Nakshatra Enviro Services, Jaipur

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

^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.

B. Ecological Resources

1. Forest areas

88. The urban area in Bharatpur is surrounded by land converted for agricultural use. There is no natural habitat in the town, and the flora is limited to artificially planted trees and shrubs, whereas the fauna comprises of domesticated animals (cows, goats, pigs and chickens), plus other species able to live close to man (urban birds, rodents and some insects). There is no protected area nearby the subproject site.

89. Vegetation is sparse and comprises mostly of domesticated species, with limited fauna. There are fishes in most of the rivers and irrigation tanks outside the towns, but no aquatic areas is protected; Rohu (*Labeo rohita*) and Sanwal are the most common fish species.

90. As per the year 2021 assessment of the India State of Forest Report 2021 published by Ministry of Environment, Forests and Climate Change (MoEFCC), Bharatpur district has about 5066 sqkm area out of which 221.06 sqkm is total forest area, which is about 4.26 % of total Geographical area of district. Out of which, 26.33 sqkm area is covered with moderate dense forest and 194.73 sqkm is open forest. The forest area in district has been decreased by -9.21 % from 2019 assessment. About 77.15 sqkm area of Bharatpur covered with scrub forest.

91. Flora in Bharatpur consists of different vegetation types. The principal vegetation types are tropical dry deciduous forest dominated by *Acacia nilotica* intermixed with dry grassland. Besides the artificially managed marshes, much of the area is covered by medium-sized trees and shrubs. The common species grown near settlements are mostly edible or useful plants such as *Acacia chundra*, *Acacia nilotica*, *Aegle marmelos*, *Azadirachta indica*, *Bauhinia racemosa*, *Butea monosperma*, *Diospyros melanoxylon*, *Diospyros melanoxylon*, *Dichrostachys cinerea*, *Madhuca indica*, *Zizyphus nummularia*, *Mangifera indica*, *Emblica officinalis* and *Mitragyna sp.*

92. **Fauna:** The district is known for its duck shoots. Geese, ducks, teals, pintails, Siberian cranes during winter. Local birds are mainly egrets, painted storks, ibises, cormorants, saras cranes, spoonbills, and open-billed storks, darter, besides common parakeets, crows babblers, partridges and weaver bird.

2. Forest and Protected area in Bharatpur.

93. Bharatpur town is famous for **Keoladeo National Park** (KNP) formerly known as the Bharatpur Bird Sanctuary which was created 250 years ago. Situated at South of Bharatpur, Keoladeo is named after (Shiva) temple within its boundaries of National Park. Initially, it was a natural depression; and was flooded after the Ajan Bund was constructed by Maharaja Suraj Mal, the then ruler of the princely state of Bharatpur, between 1726 to 1763. The bund was created at the confluence of two rivers, the Gambhir and Banganga. Keoladeo was declared as a Ramsar site under the Convention on Wetlands of International Importance in year 1981. In 1985 The park was declared as World Heritage Site by UNESCO under the World Heritage Site Convention. The Subproject is proposed at northern side of Bharatpur town and the KNP is situated at Southern side of town. The nearest component to KNP is SPS1 proposed about 2736 m from outermost boundary of eco-sensitive zone and about 2200 m from national park's boundary.

94. National Park is a famous avifauna sanctuary of thousands of rare and highly endangered birds such as the Siberian Crane come here during the winter season. Over 230 species of birds are known to have made the National Park their home. It is also a major tourist centre with scores of ornithologists arriving here in the hibernal season. It was declared a protected sanctuary in 1971. The Keoladeo National Park is spread over 28.73 square kilometres recently eco-sensitive zone of sanctuary was defined by MoEFCC (261. S.O. 814(E) [21.02.2020]). The ESZ Zone for this national park will be 500 meters around the notified limit.

3. Flora

95. The KNP falls in the Punjab plains biotic province of semi-arid biogeographical zone, which is a flat dry area of the Indus-Yamuna watershed. The area also falls under Aravalli region. The Park's vegetation is a blend of xerophytes and semi-xerophytes consisting predominantly of *Acacia nilotica*, *Capparis decidua*, *C. sepiaria*, *Mitragyna parviflora*, *Prosopis cineraria*, *Salvadora oleoides*, *Syzygium cumini* and *Zizyphus* sp. The KNP has immense floral diversity from aquatic to terrestrial species in spite of its location in the sub-tropical region. The major trees found in the Park are *Acacia nilotica*, *Acacia leucophloea*, *Capparis* sp., *Mitragyna parviflora*, *Prosopis juliflora*, *Syzygium cumini*, *Salvadora* sp. and *Capparis* sp. show stunted growth depending much on the soil type in the park. Herbs constitute more than 55% of the floristic species. The most widespread grasses in the park are *Cyanodon dactylon*, *Desmostachya bipinnata* and *Vetiveria zizanioides* (khus grass).

96. As of now and also reported in the earlier studies the vegetation of the KNP wetland is largely dominated by emergent macrophytes, mainly *P. spinescens*, together with *P. distichum*, *P. punctatum*, *Limnophyton obtusifolium*, *C. alopecuroides*, *Panicum paludosum*, *Scirpus tuberosus*, *Scirpus littoralis* and *Echinochloa colonum*. Of 90 aquatic macrophytes (Prasad 1988), *Pseudoraphis spinescens* and *Paspalum distichum* predominate the wetland system. The weed species namely *Ipomoea aquatica* and *Eichhornia crassipes* (Water hyacinth) come up periodically and are removed manually on a regular basis with the help of local villagers as a part of KNP management plan. The edges of the wetland which remain inundated for almost 4-6 months remain covered by dense growth of sedge species such as *Scirpus tuberosus* and *Cyperus rotundus*. The tubers of these sedges and the rhizomes of water lilies (*Nymphaea* sp.) are the favourite food of the endangered species, the Siberian crane. Among the submerged plants, *Hydrilla verticillata*, *Najas minor*, *Vallisneria natans*, *Ceratophyllum* sp. and *Potamogeton* sp. are consumed by waterfowl.

4. Wetland Vegetation

97. The major plant species dominating the wetland vegetation are *Cyperus alopecuroides*, *Hydrilla verticillata*, *Ipomoea aquatica*, *Neptunia oleracea*, *Paspalidium punctatum*, *Paspalum distichum* and *Pseudoraphis spinescens*. Being mostly seasonal and dynamic the wetland system of the Keoladeo National Park supports six major / dominant types of vegetation communities, namely (i) free floating (*Spirodella polyrhiza*, *Lemna perpusilla*, *Eichornia crassipes*), (ii) rooted with floating leaves (*Nymphaea pubescens*, *N. nouchali*, *Nymphoides cristatum*), (iii) free submerged (*Ceratophyllum demersum*, *Utricularia aurea*, *U. stellaris*), (iv) rooted submerged (*Hydrilla verticillata*, *Najas minor*, *Potamogeton crispus*), (v) emergent, amphibious (*Eleocharis dulcis*, *Paspalum distichum*, *Cyperus alopecuroides*, *Scirpus littoralis*, *Ipomoea aquatica*) and, (vi) marshland plants (*Caesulia axillaris*, *Eclipta prostrata*, *Echinochloa colonum*)

5. Fauna

98. KNP is rich in faunal wealth. 375 species of birds, 34 species of mammals, 29 species of reptiles, 8 species of amphibians, 57 species of fishes and 71 species of butterflies, more than 16 species of dragonflies and more than 8 species of spiders inhabit the park.

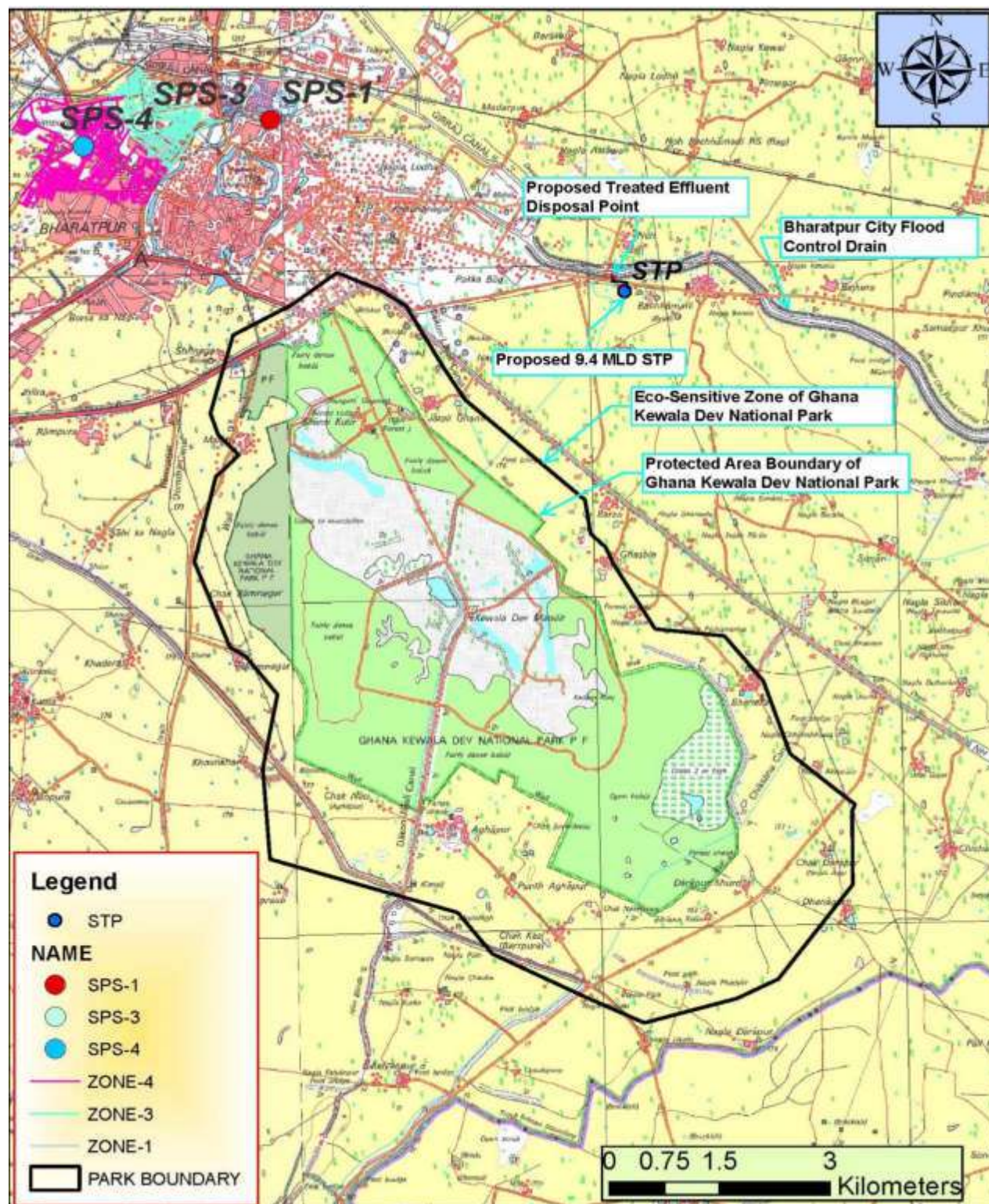
99. **Mammals:** Mammalian Fauna at Bharatpur comprises of 27 identified species including Indian porcupine, Sambar, Chital, Fishing Cat, Asian Palm Civet, Golden Jackals, Striped Hyenas and others.

100. **Birds-** More than 330 species of birds have already been identified. Local birds such as Painted Storks, Open Bill Storks, Spoonbills, Cormorants, Darters, Ibises, Moorhen, Pheasant - tailed Jacana, Purple Coot, White-breasted Waterhen, Paddy Bird, Night Heron, Comb Duck (Nukta) and Dabchick, begin nestling when the rains are about to start. Migratory birds start arriving in October which include a variety of Ducks, Geese, Raptors, Waders, Warblers and Cranes (including the Siberian Crane, of which there are about only 350 birds in the world and the Sanctuary is the wintering ground for about 52 such Cranes).

101. **Fishes** - The fish fauna of the park comprises 57 species, of which 37 enter the park along with the water from rivers, and six species are breeding residents. *Channa punctatus*, *Channa striatus*, *Channa marulius*, *Heteropneustes fossilis*, *Clarius batrachus* and *Colisa fasciata* breed inside the park.

102. **Amphibians and Reptiles** - Keoladeo National Park has seven species of turtles while the whole of Rajasthan state has only eleven species. Besides this, there are 5 species of lizards, 3 geckos, 14 snake species and 8 species of amphibians.

Figure 16: Proposed Component Locations on Topo Sheet, Showing Eco-sensitive Zone of Keoladev National Park



103. Biodiversity Assessment Report (IBAT Analysis) for Sewerage system of Bharatpur has been attached with this report as **Appendix 4**. The screening study for critical habitation indicates that within the area of analysis (AOA) there are no known species which would qualify the area as critical habitat under the set criteria (criterion 1–5, as presented in the report). There are 28 species of concern fauna listed as IUCN Red list, are 12 nos critical endangered and 16 endangered. Proposed activities are within the urban area of Bharatpur where there is no presence of such species. These mostly occur in the nearby protected areas

C. Economic Development

104. Economic base of a town reflects its prosperity. Bharatpur town, being the districts headquarter, has been functioning as administrative centre. Bharatpur is known not only for agriculture production but also for oil industries. It has also sustained growth in tertiary economic activities. The major economic activities are trade and commerce; thus it offers a number of wholesale and retail markets which act as a distribution centre for nearby towns and villages. Tourism income contributes very much towards economic generation of the town on the contrary household industries play a big role in providing employment and income generation.

1. Land use

105. The socio-cultural and economic factors have significantly influenced over land use both in rural and urban areas. Land forms, slope, soils and natural resources are some of the important which control the land use pattern of the town. Data are based on Bharatpur statistics outline, 2012-13. The land use pattern of district is presented in **Table 17** below-

Table 17: Existing Land Use of Bharatpur

S. No.	Land Use	year 2001 area(acre)	year 2001 Proposed area (%)	Proposed total area - 2023	Proposed total Developed area (%) - 2023	Proposed total urbanised area (%) - 2023
1	2	3	4	5	6	7
1	Residential	1864	48-77	5414	46-24	42-46
2	Commercial	206	5-40	618	5-28	4-84
3	Industrial	344	9-00	585	4-99	4-58
4	Government, Semi-Government	41	1-07	191	1-63	1-49
5	Public and Semi Public	576	15-07	1215	10-38	9-52
6	Recreation	166	4-34	1251	1251	1251
7	Circulation	625	16-35	2298	19-63	18-02
8	Special Planning area			136	1-16	1-06
	Total Developed area	3822	100-00			
	Total area for development			11708	100-00	91-78
9	Afforestation	802		435		3-42
10	Vacant land			195		1-54
11	Government reserved	215		215		1-69
12	Water bodies	254		198		1-57

S. No.	Land Use	year 2001 area(acre)	year 2001 Proposed area (%)	Proposed total area - 2023	Proposed total Developed area (%) - 2023	Proposed total urbanised area (%) - 2023
13	Urbanised Area	5093				

2. Commerce, Industry & Agriculture

106. **Trade and Commerce.** Bharatpur has been divided into six industrial areas: -

- (i) Old Industrial Area Bharatpur- A total 175.66 acre land has been allotted to this industrial area, out of which on 144.66 acre land 198 plots have been developed and 188 plots have been distributed to the entrepreneurs.
- (ii) The main retail and wholesale business activities of the town are carried out with the newly developed main market street where retail and transport-oriented businesses are located.
- (iii) Brij Industrial Area Bharatpur- A total 233.06 acre land has been allotted to this industrial area, out of which on 213.06 akad land 267 plots have been developed and 206 plots have been distributed to the entrepreneurs.
- (iv) Industrial Area Bayana- 53.22 acre land has been allotted to this industrial area, out of which on 52.20 acre land 127 plots have been developed and all plots have been distributed to the entrepreneurs.
- (v) Industrial Area Deeg- 39.08 acre land has been allotted to this industrial area, out of which on 30.85 acre land 92 plots have been developed and 91 plots have been distributed to the entrepreneurs.
- (vi) Industrial Area Jurhera- 40 acre land has been allotted to this industrial area, out of which on 40 acre land 64 plots have been developed and 58 plots have been distributed to the entrepreneurs.
- (vii) I.I.D. Center Bayana- 66.72 acre land has been allotted to this industrial area, out of which on 52.20 acre land 164 plots have been developed and all plots have been distributed to the entrepreneurs.

3. Industries

107. The industrial areas in Bharatpur town are Brij industrial area, Byana industrial area and Deeg industrial area.

108. Bharatpur town all the important infrastructures facilities for economic and industrial growth like water, power, transport, communication, industrial training, industrial estates, etc. One of the additional advantages is that Bharatpur is located at a very central place, linking it with important trade and industrial centers of the country. The impact of economic facilities has resulted in setting up of a number of large and medium scale industries and has contributed to the development of small-scale industries throughout the district. There are five large/medium scale industries in the district, viz., M/s. (CIMMCO) Central India machinery manufacturing Co. Ltd. Bharatpur, M/s (GEW) General engineering Works, Bharatpur, M/s Dalmia industries Ltd. Bharatpur, M/s Perfect sanitary pipe Manufacturing Co. Ltd. M/s Cattle feed plant Ltd. Nadbai, Bharatpur.

109. **Agriculture.** Bharatpur town is known not only for agriculture production but for oil

industries also mustard seeds and other agriculture products come to the market through mandies (wholesale market) established by Krishi Upaj Mandi Samiti (wholesale market committee) These Krishi Upaj Mandies are in Bharatpur, Nadbai, Weir, Deeg, Kaman, Bayana, Roopwas, and Bhusawar. About 70-80% of lands used for agricultural purpose.

110. Existing cottage and artisan units in the district are mainly based on handloom, forest, leather, and livestock, Industry. The development of cottage, village and artisan units is kept on important place in the development plans of the State. For the purpose easy loans on concessional Rate of Intt. by the financial instituted and the subsidies are also being provided for these units by state govt. Besides the above, the cottage/village/household and artisan units are also being facilitated by way of availability the loan facilities on liberal terms of various schemes of the NABARD and SIDBI through the channels of Regional Rural Banks, Commercial Banks, Co-operative Banks primary Land Development Banks etc.

111. Bharatpur is known not only for agriculture production but also known for oil industries. Mustard seeds and other agriculture products come to the market through mandies established by Krishi Upaj Mandi Samiti. These Krishi Upaj Mandies are in Bharatpur, Nadbai, Weir, Deeg, Kaman, Bayana, Roopwas and Bhusawar. There are total 554 oil mills registered in which 2317 persons are employed and Rs. 2690.84 lacs were invested. Out of these mills 78 are big units having AGMARK and rest are small oil expeller units.

4. Other Infrastructure

112. The total combined available water from the ground water and surface water is 24.03 MLD out of which 22.0 MLD is used for residential purpose and 2.03 MLD is used for other purposes. Current supply per capita is 60 liters per capita per day (lpcd) as against the standards of 135 LPCD. The existing water supply system comprises mainly of asbestos cement pipes.

113. **Sewerage and Sanitation.** At present, most of the Bharatpur town is covered with sewage networks and house service connections are being done for most of the house. Two projects has already been executed in town one under RUIDP, Phase-II (Funded by ADB) and other under AMRUT.

114. **Drainage.** Presently there exists a minimal network of storm water drains. These drains are also receiving the sludge and waste through domestic sewer. The existing drainage system is a piece-meal construction without proper designs of open nallahs (drains) that are irregular and insufficient. The wastewater along with sewage is discharged into the fields towards west of the town through open drains.

115. **Industrial Effluents.** Industries are outside the town area. The industries are required to treat their own effluents before disposal and are not allowed by the Bharatpur Nagar Parishad to connect to the local sewer network.

116. **Solid Waste.** The total waste generation in the town is about 116.74 MTD. the waste is collected door to door and processed in designated landfill and waste processing area of Bharatpur Nagar Nigam funded by ADB in RUIDP Phase - II. Biomedical wastes are collected and transported to Alwar for incineration.

117. **Storm Water Drainage:** Bharatpur town is facing severe drainage problem resulting water logging on roads and low lined areas during the rainy season, even though the rain is moderate.

The problem gets aggravated due to low water percolation as account of presence of higher percentage of silica clay formation in the sub soil which renders it less permeable and prone to moisture retention. The surface runoff from the town finally gets accumulated in every monsoon season in the outskirts of town in low lying areas.

5. Transport

118. Transport in the city is mainly by personal vehicles (motorcycles and bicycles) and auto- and private taxis. The Rajasthan State Road Transport Corporation (RSRTC) runs public buses to neighbouring villages and towns and to larger towns farther afield, such as Jaipur, Alwar, Dhaulpur, Dausa, with which there are good road connections. Bharatpur is also connected to Agra, Jaipur and Delhi by the national railway. National Highway no. 21 passes through the town to which State Highway no. 01,14,22,43,44,44A crosses in town. Roads are broad (about 60 feet) in city area which crosses at rectangle to each other. Broad gauge railway line and railway station exist in Bharatpur which connects Bharatpur with all the major districts of Rajasthan and other part of country.

D. Socio Cultural Resources

1. Demography

119. Bharatpur as of 2011 India census, had a population of 252342. The major languages spoken are Dehati and Hindi. The town has been growing steadily since 1951. The growth of the town has been phenomenal during 1961-71 when there was an influx of population of immigrants to this town. However, thereafter also the growth was not stable. The average decadal increase is 37.78%. However, the last decadal (2001-2011) growth is only 22.95%.

2. History, Culture and Tourism

120. Bharatpur the Eastern Gateway to Rajasthan was founded by Maharaja Suraj Mal. It was once an impregnable well-fortified city, carved out of the region formerly known as Mewat. The trio of Bharatpur, Deeg and Dholpur has played an important part in the history of Rajasthan.

121. The place was ruled by an tribal community of Sinsinwar clan, who came to India in 100 AD. Gohad city was built in 1505 AD and developed as a famous Jat state which was later ruled by the Marathas. In 1733 AD, Maharaja Suraj Mal built the city of Bharatpur. It is believed that it was a well-fortified city under his rule. Bharatpur was carved out from Mewat and got its name from Lord Bharat (Lord Rama's brother).

122. From the point of tourism, the Bharatpur town has a number of religious, historical and archaeological places of importance. These places mainly attract the tourists from within the country as well as abroad. The historical places include Lohagarh fort or the Iron Fort “and other places like Keoladeo National Park, Kamra Khas Palace, Deeg fort, and Purana Mahal which attracts domestic and foreign tourists. A famous breeding water bird sanctuary called 'Keoladeo Ghana bird sanctuary near Bharatpur.

123. **ASI Protected Monuments in Bharatpur** – Bharatpur town has 5 following ASI protected monuments.

- (i) Fateh Burj near Anah Gate;
- (ii) Moat surrounding the fort wall comprising part of Khasra No. 1881;

- (iii) Fort walls including Chowburja gate and approach bridges at the Chowburja and Ashtadhatu gates together with adjacent land comprised in part of survey plot No. 1881;
- (iv) Jawahar Burj and Ashtadhatu Gateway; and
- (v) Delhi Gate (Outside fort).

124. **Fateh burj**, built of earthwork is of strategic importance for the Jat rulers of Bharatpur due to location of the famous cannon over it, which perhaps played an important role in the victory of the rulers. The cannon is 6 m long with frontal diameter of 0.68 m. The perimeter on rear side is 2.67 m. The diameter of the slot is 16.5 cm. The cannon is placed over two stone shafts in east-north-east west-southwest alignment. The cannon bears engravings of rows of continuous arches, floral designs, a Swastik design and figure probably of a dog in dotted lines. The cannon is possibly made of wrought iron. The date is assignable to eighteenth century A.D.

125. **The fort wall** is massively built of stone rubbles in lime mortar with occasional use of *lakhauri* bricks at top and is surrounded all around by a deep and wide moat filled with water. The fort has only two gateways i.e. Chowburja Gate on the south flanked by round bastions on either side and Ashtadhatu Gate on the north. Both the gateways are approachable through long bridges. The bridge in front of Chowburja Gate is approximately 50 m long and 12 m wide. The other bridge is comparatively longer. It is datable to the eighteenth-century A.D.

126. **Moth Wall** - The city of Bharatpur and its fort are said to have been founded about 300 years ago by Rustam, a Jat of the Sogariya clan. Maharaja Surajmal took it from Khemkaran, the son of Rustam in A.D. 1733 and refurbished it by constructing a big fort and moat surrounding it. This historical fort, also known as Lohagarh, is rectangular in shape and has eight bastions with a high wall surrounded by a deep tapering moat (18.3 m wide). The outer wall got damaged at places but has now been repaired on the Gopalgarh side. Roads leading to the fort through its two gates i.e. Chawburja Gate and Ashtadhatu Gate, cross the moat by masonry bridges. The moat always remains filled with water

127. **Delhi Gate** - A small gateway in comparison to others facing north-northeast has an arched passage flanked by thick walls (1.5 m x 6 m) on either side. The gateway is built of stone rubble in lime mortar with lime plaster over it. The date is assignable to eighteenth century A.D.

128. The **Jawahar Burj** was constructed by Maharaja Suraj Mal (A.D. 1756-63) but the structures over it were raised by Maharaja Jawahar Singh (A.D. 1764-68) in commemoration of his victory of Delhi. Three mandapas were erected here, one painted with epic scenes. An inscribed Iron pillar bearing genealogy was recently erected here by the ex-ruler Maharaja Brijendra Singh. An Ashtadhatu Gate was brought from Delhi by Maharaja Jawahar Singh in A.D. 1765 as a trophy.

129. **Jawahar Burj** and stand erect within the glorious ramparts of the Lohagarh Fort. This site was considered as a coronation site for all the Jatrulers. This place is considered as victory towers and are decorated with deteriorating frescoes. It is different from the other forts in the state in that there is no flamboyance associated with the fort. However, it generates an aura of strength and magnificence.

130. No subproject components is places near ASI or state protected monuments. The nearest ASI monument is Mothwall surrounding the fort is about 450 m from proposed sewerage network in zone 1, rest all protected monument are situated between 500 to 5000 m distance from

proposed subproject components. Distance details are given in **Table 18** and map showing ASI and state protected monuments on Google earth in presented **Figure 17**.

Table 18: Distance of Proposed Subproject Components from ASI Monuments

Protected Monuments	Distance From Subproject Components (m)				
	SPS1	SPS3	SPS4	STP	Nearest Networks
Delhi gate (ASI Protected)	820	920	1790	5750	500
Fortwall (ASI Protected)	920	1020	1890	5850	540
Jawaharburj (ASI Protected)	690	1120	2000	5241	520
Moatwall (ASI Protected)	572	862	1612	4900	450
Fateh Burj (ASI Protected)	630	1954	2930	4750	520
Entire area of Kishori Mahal/Lohargarh Fort (State protected)	900	1230	2046	5500	930

131. Table 19: Distance of Proposed Subproject Components from State Protected monuments in Bharatpur

132.

Protected Monuments	Distance From Subproject Components (m)				
	SPS1	SPS3	SPS4	STP	Nearest Networks
Kishori mahal	820	920	1790	5750	500
Mathura gate	920	1020	1890	5850	540
B. Narain gate	690	1120	2000	5241	520
Atalbandh gate	572	862	1612	4900	450
Anah gate	630	1954	2930	4750	520
Kumher gate	900	1230	2046	5500	170
Neemda gate	2280	2000	2000	5500	1100
Chandpol gate	1310	680	1340	5700	200
Surajpol gate	370	1310	2850	5800	610
Kishori mahal's complete premises	900	1230	2046	5500	930
The mud bastion with canon and platform situated near Surajpol gate on North side of mud wall and the surrounding area of 100 Sq. feet of the plate form.	580	1270	2890	5500	520

(i)

- (ii) The mud bastion with canon and platform situated near Surajpol gate on North side of mud wall and the surrounding area of 100 Sq. feet of the plate form.

133. **Kishori Mahal** - This place is built by Maharaja Surajmal during the early half of 18th century A.D. for his family residence. Since Maharani Kishori, beloved wife of Maharaja Surajmal use to live in it. Hence his highness Sawai Brijendra singh named it as Kishori Mahal and it is known such till now. The palace carries the characteristics of mediaeval architecture. Cenotaph situated on the roof are an attraction of the palace. Creepers motif are inscribed on both entrance doors.

134. There are mainly two squares in the palace. The construction of the upper front part of this palace with the features of medieval architecture is incomplete. Chhatris are built on both sides above the east facing palace. There are several classrooms in the second square of the palace. This part of the palace is three storeyed. The palace has beautiful jaalis, windows with large rectangular design, etc. There are sights. There was a stable at the back of the palace. Belbute and lettering are engraved on both the four entrances of the palace.

135. The lattice structures built in the second square of the palace had fountains. Small doorways are built in the walls of the South Daul of the ground floor. In these lamps were kept and there was a provision of water flow from their upper part. A well was also built for water supply in the outer south-west part of the palace went.

136. Maharaja Surajmal Memorial and Panorama have been established here in 2008. The statue of Maharaja Surajmal and its local history have been carved on the stone in the east direction in front of the palace. Many galleries containing photographs, sculptures and manuscripts have been constructed inside the palace.

137. **Other Important monuments of Bharatpur.** The Lohagarh fort is the most distinguishable monument of Bharatpur district. It is also referred to as the iron fort and was founded and designed by Suraj Mai, the ruler of Bharatpur, in 18th century A.D. It took nearly twenty years for the fort to be completed. The name suggests the invincible nature of the fort. It stood firmly in face of repeated attacks by the British. More than splendour or lavishness, it is the air of magnificence and might that is associated with it. The Lohagarh fort of Bharatpur district is one of the best architectural monuments in Rajasthan. There are two gates in the fort, the one facing the north is called the Ashtdhaatu that is eight metal gate. It is decorated with paintings of elephants. The gate in the south is known as Chowburja or the four pillared gate. There are also some enthralling towers and monuments inside the Lohagarh fort. The tower Jawahar Burj was erected to celebrate the triumph of the Jats over the Mughals and the Fateh burj tower marked the defeat of the British army in the year 1803 A.D. The monuments like the Kishori Mahal, Mahal khas, Kothi khas and Moti Mahal inside the Lohagarh fort adds to its grandeur.

138. The Lohagarh fort in Bharatpur district at present has been transformed into an extensive museum. Articles like swords, daggers and guns and antiques like hunted tigers, bear kids, wood articles, vessels, jewellery boxes and ornaments have been put into display for tourists. There are also some inscriptions and historical pieces that are exhibited. The Lohagarh fort is breathing evidence to the gallantry and courage of the Jat rulers of Bharatpur

139. Another monument of Bharatpur is its palace. The Bharatpur Palace is next to Lohagarh fort in terms of magnificence and elegance. It is a medieval monument in the old city of Bharatpur in Rajasthan. It was built at different phases by different Jat maharajas of Bharatpur. The royal palace is a radiant combination of Rajput and Mughal architecture. The splendid apartments have beautiful carvings and are embedded with marvelously designed floor tiles. It gives us a vivid idea

of the royal lifestyle of the Jat rulers

140. Bharatpur palace houses a museum which has a collection of antique that dates back to 2nd century. These specimens provide important historical evidence of the ancient culture of the region. The palace is located near to the museum and is within easy reach of the tourists. The designer floor tiles and the stylish furnishings are all reflective of the grace and splendour of the majestic lifestyle of the Jats

141. **Shri Banke Bihari Temple** - Built during the Mughal rule in Bharatpur, the Bankey Bihari temple in Bharatpur is a delightful temple inside the Lohagarh Fort.

142. The peace and silence that hang around the temple, as well as the soothing gongs that reverberate the still air inside the temple, make for an auspicious and serene atmosphere. The temple is dedicated to Lord Krishna and houses several idols celebrating his power and virtue. This temple is one of the best places to visit in Bharatpur.

143. **Government museum**, Bharatpur was established on 11th November 1944. There is massive collection of antiquities of historic and artistic importance.

144. In archaeological section of museum there are several sculptures and artful slabs of stone related to Jainism, Shaivism, Vaishnavism, Shakrism and other sets. These sculptures show the religion development and sculpture art in this region.

145. On the upper storey of museum's gallery miniature paintings of various s locals and Mughal styles of Rajasthan are displayed. Manuscripts various types of artifacts of local handicrafts and stuffed animals wild animals also displayed. In arms section of the museum many kinds of arms and armory are displayed beautifully which were used by Jat warriors and some were acquired from Britishers. These arms shows the contemporary technique of war. Artistic work on the guns and swords is very attractive.

146. Besides the exhibited material in the galleries, the baradari of fifty six pillars on the roof and bath of Indo-Irani also known as "Persian Bath" of Mughal period (Hamam) are other main attractions of the museum.

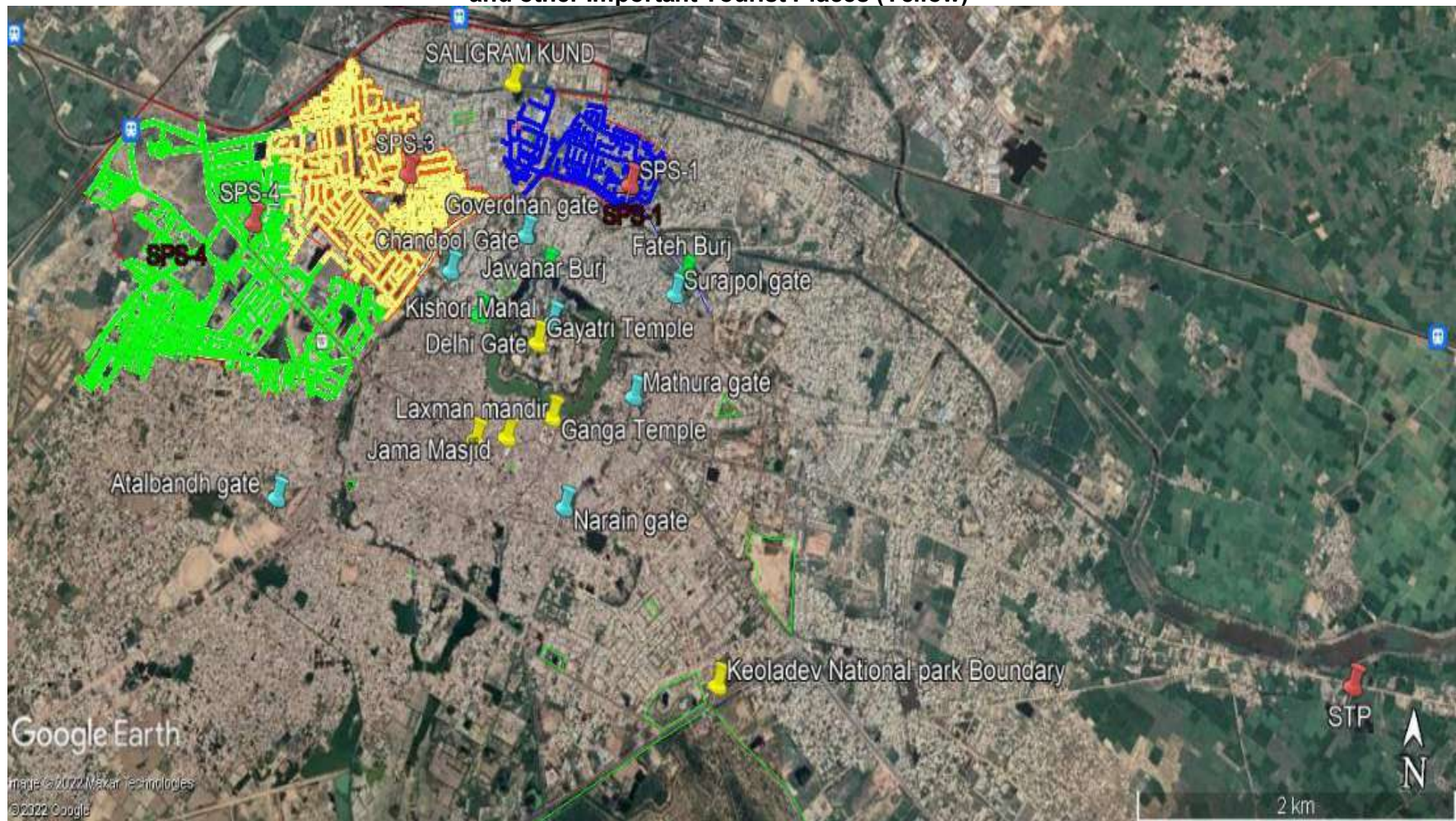
147. **Gayatri Temple** is located inside Lohagarh fort. This temple is built under the directions of Pandit Shri Ram Sharma Acarya Ji. Here Gayatri Pillar is also located. In this temple hand written 1.25 crores Gayatri books are present. This is the centre of "The GayatriParivar" on divisional level under which Dholpur, Karoli, Alwar and Bharatpur is included. The fire continuously burning from last 750 years is used to start daily "YAGYA" to start the Day.

148. **Brijendra Bihari temple** was founded in 1918 by Maharaja KishanJi to commemorate the birth of his son "Maharaj Brijendra Singh Ji." Maharaja Brijendra Singh Ji later donated this temple to Mahant Shri Vallabh Acharya Ji. Brijendra Bihari Kund was built in 1918 to meet the Temple's water needs, and it included 6 ghats and 1 well. Later, this Kund was used to provide drinking water for the elephants in the Seward fort.

149. **Saligram Temple** -. The Maharaj of Bharatpur built the temple 200-250 years ago to commemorate the birth of his son. Lord Hanuman Ji's idol can be found in the temple. This idol was discovered during excavation work for the Kund, making it more sacred and religious to the locals. The temple's first head priest was Mahant Shri Saligram Maharaj Ji, whose name the Kund and temple were named after.

150. There is an old saying about the place that when there was a lack of Ghee while making devotional offerings, the water of this Kund was used as Ghee in preparation of the same, making this Kund more of a place of belief.

Figure 17: Showing Project Components along with, ASI Protected Monument (green), State Protected Monuments (Blue) and other Important Tourist Places (Yellow)



E. Environmental Settings of Investment Program Component Sites

151. Sewers pipes will be laid along the roads/streets in the town within the road right of way (ROW). In wider roads pipes/sewers will be laid in the road shoulder beside the tarmac, and in narrow roads, where there is no space, sewers will be laid in the road carriage way by break opening the tarmac. Roads in some part of the town are narrow. Roads are lined both sides with open drains. In narrow roads sewers will be laid in the middle of the road, which may affect the traffic. Bigger diameter trunk sewers will be laid along the main roads, which are wide and have adequate space. No tree cutting is anticipated as there is adequate space to lay the water & sewer pipeline in those roads. There is sufficient space available for laying of Sewers pipes. These works will require advance permission from concerned authority for road cutting and traffic diversion etc. If any tree cutting will be required during execution mitigation measures shall be adopted.

152. STP (9.4 MLD) is proposed near Nagla Gopal, Near Ikran Village on vacant government land under Municipal Corporation. There are no trees present at site, which may be required to cut for construction of STP. There are only agricultural activities in the periphery of this site. There are no habitations within 250 m of the proposed site, however a cattle shed is observed at 75 m in north-east direction. No wildlife is reported in this area.

153. There are 3 nos. SPS are proposed at different location which are:- (i) SPS-01 (0.81 MLD) Near Nai Mandi Circular road Tiraha in Zone-01, (ii) SPS-03 (1.64 MLD) Near Mukherjee Nagar Pulia, PNT Quarters in Zone-3, and (ii) SPS-04 (2.23 MLD) Deeg Road, Workshop Yojna Infront of Vaishali agency in Zone-04. Most of the Land is low lying and accumulated area where wastewater from nearby areas is accumulated. No wildlife exists near the proposed sites. Some shrubs are present at nearby locations of proposed components, but they may be not impact and if they will be possibility of cutting of trees for construction works than prior permission from local administration for tree cutting will be required and compensatory plantation as per RUDSICO-EAP policy will also be required. All the precautions should be taken during construction and operation to minimize the impacts on nearby residents. Proposed SPS-1 location is existed on Mathura- Bharatpur Highway and there are some motor service station and shops are existed at 35 m distance in north-west side. The nearest habitant is observed at approx. 43 meter aerial distance in north side. As similar to SPS-1 site SPS-4 site is also existed in commercial area where are some motor service stations are existed at 40-meter distance. Both SPS site are propped on govt. land and located near the commercial areas. There are no residential property within 50 meter periphery. At above mentioned both SPS site, sewer will be collected by gravity and there are no suitable locations therefore these sites are selected whereas some commercial properties are existed in surrounding location at 25-50 m radius. Proposed SPS-3 site is located near Mukherjee Nagar Pulia where a small Sankat Mochan Hanuman Temple is situated at 50 meter distance in south-east direction. Although this temple is sensitive receptor but there are no resident inside the Temple. This SPS site is also, under Nagar Parishad Bharatpur ownership and sewer will be collected by gravity in this SPS.

154. Site environmental features of all subproject sites and photographs are presented in the following Table 19.

Table 19: Environmental Features of Project Sites

Table 10: Environmental Features of Project Sites							
S. No	Proposed Structure	Env. Sensitivity	Photo				
1.	STP (9.4 MLD)	- This Site is situated at campus of existing STP near village Ikran. 9.4 MLD STP is proposed on government land under ownership of Nagar Nigam. - The proposed site is connected with the Agra-Bharatpur state highway. - The nearest human habitation is at 250 m and a cattle shed at 75 m on northern side. - The site is surrounded by the agricultural fields. - The STP site is approximately 3.5 km away in the North from Keoladeo national park - The available and required government land at the location is 7300 m² and is 7000 m² respectively.	 Proposes site of STP near Ikran Village <table><tr><td>Lat.</td><td>27°12'18.7"N</td></tr><tr><td>Long</td><td>77°32'52.0"E</td></tr></table>	Lat.	27°12'18.7"N	Long	77°32'52.0"E
Lat.	27°12'18.7"N						
Long	77°32'52.0"E						
2.	SPS-1	- The proposed location SPS-1 (0.81 MLD) is at Zone-1 near Nai Mandi circular road Tiraha. - The proposed site area is under ownership of Urban Improvement Trust (UIT). - The SPS-1 Site is present north to Keoladeo national park at a distance of 2.7 km. - The nearby habitation to the SPS-1 is 35 meters. - The available and required government land at the location is 4700 m² and is 500 m² respectively. - Site is surrounded by Ranjeet Nagar Flood Canal followed by houses on north and Mathura- Bharatpur road on south	 Proposes site of SPS-1 (0.81 MLD) <table><tr><td>Lat</td><td>27°13'38.9"N</td></tr><tr><td>Long</td><td>77°29'60.0"E</td></tr></table>	Lat	27°13'38.9"N	Long	77°29'60.0"E
Lat	27°13'38.9"N						
Long	77°29'60.0"E						
3.	SPS-3	- This proposed site SPS-3 (1.64 MLD) is present at Zone 3, Near Mukherjee Nagar Pulia, abundant PNT Quarters, Bharatpur. - The proposed site area is under ownership of Urban Improvement Trust (UIT). - The Keoladeo National Park is present at 3.4 km away from the SPS- 3 Proposed location in the south direction. - The Proposed SPS-3 is 85 meters away from the Saint lukes international academy. - Sankat Mochan Hanuman temple is existed at 55 m distance in south-east direction. - The proposed SPS-3 is well connected with the city roads. - The nearby habitation to the SPS-3 is 65 meters away. - The available and required government land at the location is 6800 m² is 600 m² respectively - Site is surrounded by abundant government quarters, Ranjeet Nagar Flood canal and Colony roads	 Proposes site of SPS- (1.64 MLD) <table><tr><td>Lat</td><td>27°13'39.0"N</td></tr><tr><td>Long</td><td>77°29'04.6"E</td></tr></table>	Lat	27°13'39.0"N	Long	77°29'04.6"E
Lat	27°13'39.0"N						
Long	77°29'04.6"E						

S. No	Proposed Structure	Env. Sensitivity	Photo				
4.	SPS-4	- This proposed site SPS-4 (2.23 MLD) is present at Zone-4 Deeg road workshop yojna Infront of vaishali agency, Bharatpur. - The proposed site area is under ownership of Urban Improvement Trust (UIT). - There is no impacts on trees and wildlife. - The available and required government land at the location is 4900 m² is 650 m² respectively. - The nearby habitation from SPS-4 is at a distance of 25 meters. - The site is approachable using Bharatpur Marg and Mathura Bypass Road. - The SPS-4 site is situated north to the Keoladeo national park at an approximate distance of 4 km.	 Proposes site of SPS-4 (2.23 MLD) <table><tr><td>Lat</td><td>27°13'31.2"N</td></tr><tr><td>Long</td><td>77°28'28.6"E</td></tr></table>	Lat	27°13'31.2"N	Long	77°28'28.6"E
Lat	27°13'31.2"N						
Long	77°28'28.6"E						
5.	Proposed Disposal Point	- The Proposed site of the disposal is at Bharatpur flood control drain. This drain starts at Bharatpur and ends near mandolin (Uttar Pradesh). - Nearest habitation to the disposal point is 120 meters in north-west direction. - The disposal point is approximately 280 meters away from the STP Location. - The Site is approachable through Agra Bharatpur Road. - The Keoladeo National Park is at southern direction and present at a distance of 3.08 km from the Disposal Site.	<table><tr><td>Lat</td><td>27°12'25.0"N</td></tr><tr><td>Long</td><td>77°32'43.7"E</td></tr></table>	Lat	27°12'25.0"N	Long	77°32'43.7"E
Lat	27°12'25.0"N						
Long	77°32'43.7"E						

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

155. 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.

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

- (i) **Location impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site;
- (ii) **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services;
- (iii) **Pre-construction impacts** include impacts which are anticipated during

construction works but planning are 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 worker's 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; and
- (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.

157. 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).

158. 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 analyzed during pre-construction, construction, and operational stages in the context of the project's area of influence. The ADB Rapid Environmental Assessment Checklist has been used to screen the project for environmental impacts and to determine the scope of the IEE.

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

B. Pre-Construction Impacts– Design and Location

1. Location Impacts

160. **Location Impacts of Sewage Treatment Plants.** STP (9.4 MLD) is proposed on govt. land at adjoining of existing 5& 8 MLD STPs in Naglagopal, Ikran Village. This govt. land is under ownership Nagar Parishad Bharatpur. There are no tree cover in the proposed land. This land is open land. There are only agricultural activities in the periphery of this site. There is no habitation within 250 m of the proposed site, however a cattle shed is existed at 75 m meter distance in north-east direction. No wildlife and forest area are reported in the adjoining areas. There are some agricultural activities around this site and treated effluent and sludge from STP can be utilized in these agricultural practices. The treated effluent will be disposed in the Bharatpur fold control drain which is existed at 280 m aerial distance in north direction. There is no habitant in 120 m periphery.

161. **Odour Nuisance from STP.** As presented in the baseline profile, the proposed STP site is identified away from habitation, and sites are currently vacant, and do not have any notable sensitive environmental features. STP sites are located away from the habitation. The proposed treatment technology, SBR, being an aerobic process and conducted in a compacted and a

closed system with automated operation, odour nuisance will be very minimal. Limited bad odours may be generated from wet well, primary treatment units and sludge treatment. Also, to account for future development potential around the sites, and to enhance the environmental benefits following measures should be included in the STP site planning and design:

- (i) Provide a green buffer zone of 10-20 m wide all around the STP with trees in multi-rows. This will act as a barrier, visual screen around the facility and will improve the aesthetic appearance. Treated wastewater shall be used for plantation; and
- (ii) Develop layout plan of STP such that odour generating units (such as sludge/solids handling facilities) are located away from the surrounding area with future development potential.

162. **Reuse/discharge of treated effluent.** It is proposed reuse the treated effluent for use in agriculture, horticulture, development of urban forestry etc. and remaining treated effluent from STP is proposed to dispose by gravity in Bharatpur flood control drain by gravity. Although priority is given to reuse of treated wastewater for beneficial purposes following the Sewerage and Wastewater Policy of Government of Rajasthan, discharge point is necessary to provide for excess/surplus or when it is not reused

163. **Location Impacts of proposed SPS sites-** (i) SPS-01 (0.81 MLD) Near Nai Mandi Circular Road Tiraha in Zone-01, (ii) SPS-03 (1.64 MLD) Near Mukherjee Nagar Pulia, PNT Quarters in Zone-3, and (ii) SPS-04 (2.23 MLD) Deeg Road, Workshop Yojna Infront of Vaishali agency in Zone-04. Most of the Land is low lying and accumulated area where wastewater from nearby areas is accumulated. No wildlife exists near the proposed sites. Some shrubs are present at proposed site, few trees of kikkar and babool are present at site. If any tree cutting is required for construction works, prior permission from local administration for tree cutting will be required and compensatory plantation as per RUDSICO-EAP policy will also be required. All the precautions should be taken during construction and operation to minimize the impacts on nearby residents. Proposed SPS-1 location is existed on Mathura- Bharatpur Highway and there are some motor service station and shops are existed at 35 m distance in north-west side. As similar to SPS-3 site SPS-4 site is also existed in commercial area where are some motor service stations are existed at 35 meter distance from SPS 3 and nearest distance to SPS 4 is 25 m. Both SPS site are propped on govt. land and located near the commercial areas. At above mentioned both SPS site, sewer will be collected by gravity and there are no suitable locations therefore these sites are selected whereas some commercial properties are existed in surrounding location at 25-50 m radius. Proposed SPS-3 site is located near Mukherjee Nagar Pulia where a small Sankat Mochan Hanuman Temple is situated at 55 meter distance in south-east direction. Although this temple is sensitive receptor but there are no resident inside the Temple. This SPS site is also, under Nagar Parishad Bharatpur ownership and sewer will be collected by gravity in this SPS.

164. Except STP which is at south-east side, all Project components are proposed at northers side of Bharatpur town and the KNP is situated at Southern side of town. The nearest component to KNP is SPS1 proposed about 2736 m form outermost boundary of eco-sensitive zone and about 2200 m from national park's boundary

165. **Locations impacts of Sewerage Networks:** The sewerage collection networks will traverse through different city roads within ROW. There are no trees coming in the alignment of proposed pipeline works. Therefore, no significant impacts shall be envisaged regarding location; though some temporary disturbance are expected and mitigation measures will be required to minimize these impacts. This work will require advance permission from concerned authority for road cutting and traffic diversion etc. If any tree cutting will be required during execution of the work mitigation measures shall be adopted.

166. **Tree cutting at project sites.** There is no notable tree cover or vegetation in STP (9.4 MLD) site and SPS sites. Sewers will be laid along the road within road ROW. There are no notable trees in the alignment; thus, no tree cutting is envisaged. Following measures need to be implemented to minimize and/or compensate for the loss of tree cover.

- (i) Minimize removal of trees by adopting to site condition and with appropriate layout design of STP, SPS, any other site with trees;
- (ii) Obtain prior permission for tree cutting at any site that may require tree cutting finalized during detailed design; and
- (iii) Plant and maintain 3 trees for each tree that is removed.

167. During detail design DBO contractor confirm that no tree will be impacted for proposed project components including laying of sewage network and construction of STP & SPS. However, in case of change in alignment in future, tree cutting permission will be taken and compensatory plantation will be done. as per RUDSICO-EAP policy; compensatory plantation in the ratio of 1:3 is to be followed during construction works.

168. **Physical Cultural Resources.** There are notable and significant archaeological places, protected monuments and areas in Bharatpur town, but subproject components are located at sufficient distance from these protected monuments. Therefore, no impacts envisaged but risk of uncovering archaeological remains, given the long history of town, during the excavations cannot be ruled out completely. Construction contractors therefore should follow the below measures in conducting any excavation work:

- (i) develop a protocol in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.
- (ii) Conduct awareness training to contractor & supervision staff prior to start of excavation;
- (iii) Stop work immediately to allow further investigation if any finds are suspected;
- (iv) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol

2. Design Impacts

169. **Design of the Proposed Components.** The Central Public Health and Environmental Engineering Organization (CPHEEO) manual suggests a design period of 15/30 years⁶ in general while designing the systems for sewerage components. It is proposed to consider 2055 as the design year for all the components in order to maintain unanimity in the design period and design population. Accordingly, 2025 shall be the base year and 2040 the intermediate year to cross check the designs pertaining to intermediate demand. The rate of water supply has been taken as 135 lpcd for 100% population. Sewage generation is 85% of water supply (including 5% to account for infiltration).

170. **Design of Sewage Treatment Plant.** One STP of capacity 9.4 MLD and is proposed to be constructed at the identified sites to treat the sewage generated from Bharatpur Town. It is proposed to establish STP based on SBR (sequential batch reactor) process, followed by disinfection by chlorine. As the bid is DBO type, detailed design of the STP will be carried out by

⁶ As per CPHEEO, pumps, motors, STP, storage reservoirs are to be designed for a life of 15 years.

the contractor to the following specific discharge standards. Currently for STPs in India, the standards notified by Ministry of Environment, Forests and Climate Change (MOEFCC) in 2017 (see column 4 in table below) are applicable. However, under RSTDSP, PMU has decided to base the STP design on discharge standards for STPs suggested by CPCB in 2015, which are more stringent. The stringent standards also facilitate maximum utilization of treated wastewater for reuse in various purposes following the Sewerage and Wastewater Policy, 2016 of Rajasthan.⁷ It is also to be noted that in April 2019, the National Green Tribunal (NGT) in one of its orders directed MOEFCC to reconsider stringent standards for STPs.

Table 20: Proposed Raw and Treated Wastewater Characteristics for STP Design

S. No	Parameter	Proposed Discharge Standards for Bharatpur STPs	MOEFCC STP Discharge Standards, 2017	CPCB discharge standards, 2015	IFC Guideline value for sewage discharge	WHO Guideline Value for safe use in agriculture
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	pH	6.5 – 9.0	6 – 9	6.5-9.0	6 – 9	6 – 9
2	BOD ₅ , mg/l	≤10	<30	≤10	30	-
3	COD, mg/l	≤50		≤50	125	-
4	TSS, mg/l	≤20 (per STP)	<100	≤10	50	-
5	NH ₄ -N, mg/l	<5	-	≤5	-	
6	Total nitrogen, mg/l	<10	-	≤10	10	-
7	Oil & grease, mg/l	-	-	-	10	-
8	Total phosphorus, mg/l	-	-	-	2	-
9	Feecal Coliform,	<100	<1000	≤100	-	<1,000
10	Nematodes, number of eggs per litre	-	-	-	-	1

BOD = Biochemical Oxygen Demand; COD = Chemical Oxygen Demand; CPCB = Central Pollution Control Board; IFC = International Finance Corporation, the World Bank Group; TSS = Total Suspended Solids.

171. Treated wastewater Reuse/disposal. Rajasthan is a water scarce region and receives low rainfall. Recognizing the importance of treated wastewater in reducing the demand on water, Sewerage and Wastewater Policy, 2016, of Rajasthan promotes the reuse of treated sewage for non-potable applications, and also to make sewerage projects environmentally sustainable. Government of Rajasthan adopted this policy to ensure “improved health status of urban population, especially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment”. To further promote the reuse and provide guidance, Policy prioritized reuse in irrigation (agriculture, forestry, and landscaping), followed by fish farming, industry and non-potable domestic reuse. Policy requires monitoring of treated

⁷ “The use of treated wastewater in irrigation and industrial application shall be given the highest priority and shall be pursued with care. Effluent quality standards shall be defined based on the best attainable treatment technologies, and calibrated to support or improve ambient receiving conditions, and to meet public health standards for end users”.

wastewater quality, soil quality etc. Policy prohibits artificial recharge of aquifers using treated wastewater and promotes construction of storage tanks to store treated wastewater to facilitate reuse. Policy prescribes that the detailed project report (DPR) should clearly define the best reuse option specific to the town and prepare a Reuse Action Plan part of the DPR following water quality norms and legal implications. LSGD is currently in the process of publishing Guidelines for Reuse of Treated Wastewater in Rajasthan 2019 to promote the reuse and provide guidance to the stakeholders. Guidelines promotes the use the treated wastewater and envisages to maximize the collection and treatment of sewage generated and reuse of treated wastewater on a sustainable basis, thereby reducing dependency on freshwater resources.

172. Policy provided priority to reuse in agricultural for unrestricted irrigation. It suggests blending of treated wastewater with fresh water to improve quality where possible, and crops to be irrigated shall be selected to suit the irrigation water, soil type and chemistry. Policy requires monitoring of accumulation of heavy metals and salinity. It encourages farmers to use modern and efficient irrigation technologies, and to ensure protection of on-farm workers and crops. As a contingency measure, policy requires regular monitoring of treated water quality, and emergency alerts to users in any event of deterioration of quality. Policy prohibits use of treated wastewater for artificial recharge (excerpts from Policy on Reuse is provided in **Appendix C-10**).

173. **Reuse Options.** Following the Sewerage and Wastewater Policy, 2016, the draft Guidelines on Reuse provides the following reuse applications:

- (i) Agriculture, horticulture, irrigation;
- (ii) Gardening in park;
- (iii) Road washing and water sprinkling to reduce fugitive dust;
- (iv) Industries including mining;
- (v) Recreational ponds and lakes;
- (vi) Social forestry;
- (vii) Construction activities;
- (viii) Firefighting and other municipal uses;
- (ix) Railway;
- (x) Thermal power plants;
- (xi) Cantonments; and
- (xii) Individual users.

174. **Allocation of treated wastewater for reuse.** City Level Committee (CLC) headed by the district collector will allocate the water for most appropriate uses. According to the proposed procedure, agencies/individuals that require treated wastewater shall apply to the district collector. CLC will allocate water to users. In case of supply is more than the demand of the town, the treated wastewater can be allocated to users within 25 km of STP by the CLC. It may also be made mandatory to industries to use treated wastewater under certain conditions. Memorandum of understanding between ULB and the users of the treated water.

175. **Reuse Plan.** The State Policy requires the sewerage detailed project report provide reuse options and strategy to implement reuse, and detailed reuse action plan. As the Bharatpur subproject is proposed under DBO, the reuse plan will be prepared by the DBO contractor during the detailed design phase in consultation with the stakeholders in Bharatpur, and reuse modalities will be firmed up. Following needs to be considered in the preparation of reuse plan:

- (i) As part of the plan, identify potential reuse application in Bharatpur, and establish quality criteria for each of the use;
- (ii) For applications that use treated wastewater directly (e.g. agriculture), the quality

- required for such application in safe manner considering health, environment and crop yield concerns shall be ensured;
- (iii) Prepare a reuse plan for agriculture, if that is the priority use or one of the applications as per the CLC in Bharatpur, clearly indicating the limits (geographical/crops/type of application/type of soils etc.); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations;
- (iv) Plan should include awareness and training provisions and responsibilities; these can be conducted by concerned department (e.g., Agricultural Department, District Collectorate); and
- (v) Carryout regular/online monitoring of critical quality parameters of treated wastewater to ensure that they meet the present standards established for reuse

176. Use of treated wastewater for irrigation. Use of wastewater for irrigation is associated with some health risks – from germs in wastewater, which may contaminate food and spread disease, health risk to farm workers from worms (helminths) and nematodes and chemical risk is associated if industrial wastewater enter the sewers. If the wastewater with bacteriological contaminants are used for food crops like lettuce, tomato, which are eaten without peeling or cooking, it will present a greater health risk if precaution such as such washing with chlorinated water or storing for adequate time in normal temperature before use (at least 10 days). According to the WHO, effluent which is used to irrigate trees, industrial/commercial (not food, like cotton) and fodder crops, fruit trees, and pasture should have less than one viable nematode egg per litre. Effluent used for the irrigation of food crops, sports fields, public parks, should have and less than one viable nematode egg per litre and less than 1,000 faecal coliforms per 100 millilitres (ml). These shall be considered in the reuse plan that will be prepared during the detailed design and complied accordingly.

177. Disposal of treated wastewater. As the wastewater shall be treated to stringent disposal standards, no notable impacts envisaged. The disposal of treated wastewater meeting the set quality standards, in fact, will improve the quality of water by dilution. Proper systems should be put in place at the proposed STP to ensure that treated wastewater at all times meet the stipulated standards prior to its disposal into river. Baseline water quality monitoring of the discharge point should be conducted during the detailed design phase (monsoon flow). Any change/lowering of treatment efficiency during operation may lead to poor quality of wastewater and may further pollute the water body. It is therefore critical that STP treats the sewage as designed. O&M of STP and change in incoming sewage quality will have impact on the treatment efficiency. This therefore requires monitoring:

- (i) Obtain of consent of RSPCB for discharge of treated wastewater into water body;
- (ii) Conduct a baseline water quality assessment of receiving water body;
- (iii) Regularly monitor the treated wastewater quality at STP and ensure that it meets the discharge standards; and
- (iv) Monitor water quality periodically during operation phase as per the EMP.

178. Sludge treatment and disposal. Sewage sludge generally consists of organic matter, pathogens, metals and micro pollutants. The concentration of parameters such as metals can be influenced by input to the sewers system from industry. Since no industrial wastewater is allowed into sewers, it is unlikely that sludge contains heavy metals. Heavy metal concentration may not be ruled out completely as the chemicals used in treatment may potentially contain heavy metals, which will then leach into the sludge.

179. Subproject includes sludge management infrastructure in STP, including system for sludge collection, thickening, solar drying, and disposal at landfill/identified site. This includes a sludge sump to collect sludge from SBR basins; returning arrangement for supernatant from the sump to inlet/equalization tank for treatment; pumping sludge to sludge thickener and pumping thickened to mechanical sludge dewatering system (such as centrifuge). It also requires contractor to establish a shed where the dewatered sludge cake can be further air dried for 15 days. This is indicative sludge management system, and DBO contractor will design the system meeting these requirements. Bid indicates that “the sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner” and it requires DBO contractor “to conform to the regulations of public health and environment protection norms”. This follows the Sewerage and Wastewater Policy, 2016, which suggests “use of sludge produced from the treatment as fertilizer and soil conditioner after processing”. Other solid waste materials from sludge treatment should be covered by an environmentally compliant disposal management plan. Disposal to vacant lot (even if government land) should not be allowed.

180. The treatment and drying processes kill enteric bacteria and pathogens, and because of its high content of nitrates, phosphates and other plant nutrients the sludge is an excellent organic fertilizer for application to the land. Adequate drying is however necessary to ensure maximum kill of enteric bacteria. To achieve adequate drying minimum drying period (15 days) shall be ensured. The drying period, which will be varying depending on the season will be determined during operation and be followed. A sludge management plan will be developed by the DBO contractor during the detailed design phase. Proper sludge handling methods should be employed. Personal protection equipment should be provided to the workers.

181. Contractor will propose the sludge management plan with best methods for reuse of sludge as per guidelines of CPHEEO and best international practices in consultation with PMU and Municipal Council. Properly dried sludge can be used as soil conditioner. Periodic testing of dried sludge will be conducted to ensure that it does not contain heavy metals that make it unsuitable for food crops. Tests shall be conducted to confirm the concentrations below the following standards. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Solid Waste Management Rules, 2016 have been adopted here. Rules stipulate that “In order to ensure safe application of compost, the following specifications for compost quality shall be met”.

Table 21: Standards for Sludge Reuse as Manure

Standards for Composting. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Solid Waste Management Rules, 2016 (Schedule II A, Standards for Composting) have been adopted here. According to the standards “In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:			
Parameters	Units	Organic Compost (FCO 2009)	Phosphate Rich Organic Manure (FCO 2013)
Arsenic	mg/kg	10	10
Cadmium	mg/kg	5	5
Chromium	mg/kg	50	50
Copper	mg/kg	300	300
Lead	mg/kg	100	100
Mercury	mg/kg	0.15	0.15
Nickel	mg/kg	50	50
Zinc	mg/kg	1000	1000
C/N ratio	-	<20	<20:1

Standards for Composting. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Solid Waste Management Rules, 2016 (Schedule II A, Standards for Composting) have been adopted here. According to the standards “In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:			
Parameters	Units	Organic Compost (FCO 2009)	Phosphate Rich Organic Manure (FCO 2013)
pH	-	6.5 – 7.5	(1:5 solution) maximum 6.7
Moisture, percent by weight, maximum		15.0 – 25.0	25.0
Bulk density	g/cm ³	<1	Less than 1.6
Total Organic Carbon, per cent by weight, minimum	percent by weight	12	7.9
Total Nitrogen (as N), per cent by weight, minimum	percent by weight	0.8	0.4
Total Phosphate (as P ₂₀₅) percent by weight, minimum	percent by weight	0.4	10.4
Total Potassium (as K ₂₀), percent by weight, minimum	percent by weight	0.4	-
Colour			
Odour		Absence of foul Odour	
Particle size		minimum 90% material should pass through 4.0 mm is sieve	minimum 90% material should pass through 4.0 mm is sieve
Conductivity, not more than	dsm-1	4	8.2
* compost (final product) exceeding the above stated concentration limits shall not be used for food crops. however, it may be utilized for purposes other than growing food crops. FCO = Fertilizer Control Order, Department of Agriculture, Government of India			

182. In order to ensure the safe use of dried sludge, following should be followed:
- Prepare a dried Sludge utilization plan for Bharatpur within the help of Agriculture Department/CLC; plan should also include if any additional processing is required for sludge to use as soil conditioner;
 - Plan should clearly include various potential uses and demand in town and surroundings;
 - Establish usage limits, where required, (geographical/crops/type of application /type of soils etc.); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations;
 - Identify a landfill/suitable site for disposal of surplus dried sludge;
 - Monitor sludge quality during operation phase as per the EMP, ensure that it meets the quality parameters established by FCO; and
 - In case of sludge not meeting the quality parameters, it shall not be used as soil condition, and shall be disposed at appropriate disposal site (if it falls under hazardous category, it shall be disposed as per the Hazardous Waste Management Rules, 2016).
183. **Mixing of industrial effluent in wastewater.** One of the critical aspects in sewerage

system operation is, change in raw sewage characteristics at inlet of sewage treatment plant may affect the process and output quality. STPs are designed for municipal wastewater, which does not include industrial effluent. Characteristics of industrial effluent widely vary depending on the type of industry, and therefore disposal of effluent into sewers may greatly vary the inlet quality at STP and will upset process and affect the efficiency. While the project does not provide sewerage system in established industrial areas, there is a risk of industrial effluent joining municipal sewers from the small/household units established in town areas where sewers are being provided. Mixing of industrial effluent will severely deteriorate the quality of treated wastewater, and therefore the proposed reuse. Reuse of such water may have significant impact on public health, and on land and water. Following measures should be incorporated to safeguard the sewerage system and the intended reuse:

- (i) No industrial wastewater shall be allowed to dispose into municipal sewers;
- (ii) As there is a risk of potential mixing of industrial waste, no domestic wastewater from industrial units shall be allowed into municipal sewers;
- (iii) Ensure that there is no illegal discharge through manholes or inspection chambers;
- (iv) Conduct public awareness programs in coordination with RSPCB and CLC; and
- (v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated wastewater quality complies with the effluent standards.

184. **Design of Sewer system - collection & conveyance.** The sewerage system is designed as a separate system of sewage collection (i.e. caters only to domestic wastewater). There is considerable length of existing surface drains in the project area that can be used for disposal of storm runoff. The underground gravity sewers will carry sewage from households to trunk sewers and further to STP. To maximize the benefits as intended, Bharatpur Nagar Nigam should ensure that all existing septic tanks are phased out by bypassing the inlet and connecting the toilet discharge from each house directly to sewerage system.

185. Accumulation of silt in sewers in areas of low over time, overflows, blockages, power outages, harmful working conditions for the workers cleaning sewers etc. are some of the issues that needs to be critically looked into during the sewer system design. A properly designed system is a must for system sustainability.

186. Measures such as the following shall be included in sewer system design to ensure that the system provides the benefits as intended:

- (i) Limit the sewer depth where possible
- (ii) Sewers shall be laid away from water supply lines and drains (at least 1 m, wherever possible);
- (iii) In all cases, the sewer line should be laid deeper than the water pipeline (the difference between top of the sewer and bottom of water pipeline should be at least 300 mm)
- (iv) If unavoidable, where sewers are to be laid close to storm water drains, appropriate pipe material shall be selected (stoneware pipes shall be avoided)
- (v) For shallower sewers and especially in narrow roads, use small inspection chambers in lieu of manholes;
- (vi) Design manhole covers to withstand anticipated loads & ensure that the covers can be readily replace if broken to minimize silt/garbage entry
- (vii) Ensure sufficient hydraulic capacity to accommodate peak flows & adequate slope in gravity mains to prevent build-up of solids and hydrogen sulphide generation

- (viii) Take necessary precautionary measures to protect sewer network, and to avoid disposal of solid wastes, debris, wastewater into newly laid sewers from the time it is constructed to the start of operation phase.

3. Due diligence of associated/existing facilities

187. It is designed to utilize existing sewerage infrastructure like STP, Pumping mains 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 random 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. A more detailed environmental audit and risk assessment shall be carried out during detailed design stage and incorporated into the final IEE.

188. All the existing infrastructure facilities are located in urban areas within Bharatpur town. All these components are located away from state or centrally protected environmental or archeologically sensitive areas and monuments such as forests, wildlife sanctuaries or protected historical sites. Mitigation measures are designed to mitigate any negative impact of subproject around these areas. Required permission and clearances as discussed in above sections will be taken for proposed STP before start of construction in specific section. Besides, the generation and disposal of debris and discarded materials, and construction phase health and safety is being considered and being mitigated through implementation of EMP to comply with the SPS provisions.

189. At present there are two existing STPs in Bharatpur one 8 MLD constructed under RUIDP phase – 2, and one 5 MLD construction in AMRUT Project. The pumping mains from SPS-1, SPS-3 and SPS-4 will pump sewage through proposed mains and to existing main trunk line. Treatment of this sewage will be done in both the existing 8 MLD STP and proposed STP, hence the 8 MLD STP is associated with proposed subproject. 5 MLD STP constructed under AMRUT is separate from the proposed subproject components. Therefore, environmental audit of 8 MLD STP is conducted, and findings are summaries below. The detailed audit report is attached in Appendix 5.

- (i) As per government requirements, construction and operation of STPs requires, consent to establish (CTE) prior to start of construction, and consent to operate (CTO) prior to start of operation. At present, 8 MLD STP has valid CTO from RSPCB upto August 2024.
- (ii) 8 MLD STP design on SBR treatment process to meet latest norms for wastewater disposal into inland water bodies including, BOD < 10 mg/l, Total Suspended Solids < 20 mg/l, Fecal coliform < 100/100 ml. STP is treating effluent as per required standards. The lab results register for month of March – May 2022 confirms the STP is working on required efficiency and treating sewerage as per required parameters.
- (iii) STP has sludge management system components: Gravity thickeners for sludge from clarifiers, mechanical sludge dewatering system but No sludge drying bed were constructed for existing STP
- (iv) **Corrective action plan** – As per the findings of the audit conducted on the existing STP, there are no regulatory non-compliance issues identified within the

infrastructure of the 8 MLD existing STP Plant, where both the Consent to Establish (CTE) and Consent to Operate (CTO) have already been obtained. An online monitoring system, as recommended in the CTO, has been successfully installed at the STP. Furthermore, health and safety training for contractors' staff at the existing STP has been scheduled, and the monitoring of sludge quality has commenced as per the conditions of CTO. The proposed STP is designed to incorporate sludge drying beds for both new and existing STPs, with the layout of the STP depicting the proposed sludge drying bed provided in Appendix 5. It is imperative to ensure regular compliance measures are adhered to against the general and specific conditions stipulated in the CTO clearance of the STP.

- (v) As presented in the audit of the existing STP, there are no regulatory non-compliance issues in the existing infrastructure in 8 MLD existing STP Plant where CTE and CTO are already taken. Recommended measures that need to be conducted to ensure continued regulatory compliance are as follows. Health and safety training shall be conducted for contractors' staff in existing STP and sludge quality monitoring shall be done as per desired frequency. Online continuous effluent quality monitoring needs to be installed for the STP and DG set. Reuse plan for STP treated water shall be prepared for existing as well as proposed STP. Regular compliances should be taken against general and specific conditions given in CTO clearance of STP. Proposed STP is designed with sludge drying bed for both new and existing STPs (layout of STP showing proposed sludge drying bed is presented in Appendix 5)

C. Pre-construction Impacts

190. **Utilities.** Telephone lines, electric poles and wires, water lines within the proposed project locations may require to be shifted in few cases. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with ULB will

- (i) Identify the locations and contact operators of these utilities to prevent unnecessary disruption of services during construction phase; and
- (ii) Instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

191. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these near the project location. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered for setting up construction camps to protect the human environment (i.e., To curb accident risks, health risks due to air and water pollution and dust and noise and to prevent social conflicts, shortages of amenities and crime). Extreme care will be taken to avoid disposals near forest areas, water bodies, swamps or in areas which will inconvenience the community. Construction sites will be selected by DBO contractor in compliance with these conditions and the same will be reflected in Site Environmental Management Plan (SEMP) which is to be prepared by DBO contractor prior to start of construction and approved by PIU.

192. **Site selection of 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. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be assessed by PIU. Priority would be sites already permitted by Mines and Geology Department. If new sites are necessary, these would be located away from population centers, drinking water intakes and

streams, cultivable lands, and natural drainage systems; and in structurally stable areas. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Department of Mines & Geology and local revenue administration. If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PIU. DBO contractor will identify sources of water for construction purposes and obtain necessary permissions as required, and approval of PIU before the use. Details of material sources and water sources will be provided in SEMP.

193. **Debris disposal.** Prior to the commencement of works, contractor shall identify a debris disposal site in consultation with the PIU and Consultant. Contractor will prioritize, if available, the use of solid/construction waste disposal sites operated under the consent from RSPCB. Contractor will follow all the prescribed rules⁸ during construction and adhering to following criteria (including but not limited to)-

- (i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any activities;
- (ii) The local governing body and community shall be consulted while selecting the site;
- (iii) Contractor shall prepare a construction and demolition waste management plan in pre-construction phase for safe disposal of construction and demolition wastes as per applicable rules and submit to Municipality through PIU for approval;
- (iv) Debris disposal site shall be at least 200 m away from surface water bodies;⁹
- (v) No residential areas shall be located within 100 m downwind side of the site; and
- (i) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
- (ii) The contractor shall identify the disposal site confirming to the above criteria, obtain required permissions from local body, and submit for the approval of PIU; disposal sites shall be used only after approval of the PIU.

D. Construction Impacts

194. The civil works for the subproject include earth work excavation for sewer trenches, sewer laying, construction manholes, shifting of public utilities and providing house service connections. Earth work excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades at every 100 m., while sewer laying works will include laying sewer at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness.

195. **Laying Sewer Networks.** Subproject include linear works (sewage collection pipes). The maximum depth for sewers depends on the design, and in Bharatpur most of the sewers will be laid 1.2 m to 3.5 m below the ground, and some sewers will be laid deeper (>2 m) and maximum depth will be 6 m. As per the bid conditions, "The maximum depth of sewer is 3.5 m for open excavation; after 3.5 m sewer shall be laid by the trenchless method only. Trenchless method may also be used even where depth is less than 3.5 m for important roads in the city where traffic

⁸Construction and Demolition Waste Management Rules 2016

⁹ In the absence of site meeting the stipulated criteria, an alternate site can be selected specifying the reasons. In such a case, the construction camp management plan should incorporate additional measures specific to the site as suggested by the Construction Manager.

density is more, and in the streets where traffic diversion is not feasible etc. Sufficient care will be taken while laying so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. Trenches deeper than 1.5 m will be protected by shoring/bracings to avoid collapse of trenches, and also to avoid any risk to surrounding buildings. Once they are laid, pipes will be joined as per specification and then tested for any cracks or leakages. The minimum working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. Extraneous soil after backfilling of trenches shall be used for filling low lying area or stored/ dumped in approved debris disposal sites.

196. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project locations in the built-up areas of the town where there are a variety of human activities, will result in impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. The anticipated impacts are temporary and for short duration. A detail survey is needed after finalization of alignment to assess the feasibility of the alignment for need of any tree cutting, demolition of any structure, road and railway crossings, pipe laying in any private land, presence of any sensitive receptor along alignment, disturbance to public or business etc. Mitigation measures have been prepared for potential adverse impacts. Prior consent from land owners (if pipe laying is required in private land) and NOC from concerned departments (for pipe laying in roads, road/railway crossings etc) prior to start of construction works, is required

197. Physical impacts will be reduced by the method of working and scheduling of work, whereby the project components will be (i) constructed by small teams working at a time; (ii) any excavation done near sensitive area like school, religious places and house will be protected as per standard norms etc (iii) finish excavation, pipe laying and back filling of trench in the same day (iv) provide adequate barricades and road safety signage during pipe laying works in traffic areas (v) Further if night works are required (however unlikely, applicable only in extreme conditions) all the mitigation measures to reduce impacts of disturbance to minimum level to nearby habitants and road users should be ensured by contractor.

198. **Demolition works.** In the initial stage of project planning it is assessed that there is no requirement of demolition of structures. If any demolition works are required, proper work plan and Mitigation measures will be required for demolition works. Structures to be demolished should be wetted through water sprinkling to reduce dust emission. Appropriate site for storage and disposal of demolished materials should be selected prior to start of demolition activities with prior permission/approval of PIU/ULB. All the safety measures should be adopted during demolition activities.

199. **Storage and Disposal of excavated earth.** A large quantity of soil will be excavated for pipe laying, 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 land owner/concerned authority for storage and disposal of excess earth is required. Contractor will prioritize, if available, the use of solid/construction waste disposal sites operated under the consent from RSPCB. If not available, prior to the commencement of works, Contractor will follow all the prescribed rules¹⁰ and shall identify a debris disposal site in consultation with the PIU/ULB and adhering to following criteria:

¹⁰ 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, 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 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; and
- (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.

200. **Sources of Materials.** Significant amount of gravel, sand, coarse aggregate, and cement will be required for this project. The construction contractor will be required to:

- (i) Use material sources permitted by government;¹¹
- (ii) Verify suitability of all material sources and obtain approval of PIU;
- (iii) Ensure that the loading and unloading of the materials and the transportation of the materials from source to construction site does not cause impact on health and safety of the workers and the community; and
- (iv) Submit to PIU on a monthly basis documentation of sources of materials. If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will assure that all the parties/ suppliers are having CTE/CTO from RSPCB and will collect the copy of these certificates and submit to PIU/consultants

201. **Air Quality.** Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the construction sites. Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons. These however will be temporary limiting to construction activities only. To mitigate the impacts, construction contractors will be required to:

- (i) Consult with PIU on the designated areas for stockpiling of soils, gravel, and other construction materials;
- (ii) Damp down exposed soil and any stockpiled material on site by water sprinkling;
- (iii) Use tarpaulins to cover sand and other loose material when transported by trucks;
- (iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site;

¹¹CTE and CTO will be required for batching plant, hot mix plant, crushers etc. if specifically established for this project. If contractor is purchasing raw material or ready mix concrete, asphalt/macadam and aggregates from third party, he has to be assured that third party is having CTE/CTO from RSPCB and should collect the copy of these and submit to PIU/consultants. Quarry sites should also have the desired permissions.

- (v) Don't allow access in the work area except workers to limit soil disturbance and prevent access by barricading and security personnel;
- (vi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly, DGs should have proper stake height as per norms;
- (vii) Ensure all the equipment are having PUC certificates;
- (viii) Do regular water sprinkling in dusty areas to reduce dust emission during works;
- (ix) Damp down the structures before demolishing to reduce dust emission;
- (x) Damp down on regular basis all the access ways;
- (xi) Maintain all the equipment and vehicles to reduce emission of smoke and keep pollution under control and keep records of periodic maintenance; and
- (xii) Conduct ambient air quality monitoring periodically as per Environmental Management Plan EMP.

202. **Surface Water Quality.** There is no any surface water source near the proposed site, which can be polluted due to construction activities, however, run-off from stockpiled materials and chemical contamination from fuels and lubricants during construction works can contaminate the drainage system of town. These potential impacts are temporary and short-term duration only. However, to ensure that these are mitigated, construction contractor will be required to:

- (i) Prepare and implement a spoils management plan;
- (ii) Avoid to construct any construction camps and labour camps near to any water body and do not allow to dispose any waste or sullage in to any water body;
- (iii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (iv) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with PIU on designated disposal areas;
- (v) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (vi) Place storage areas for fuels and lubricants away from any drainage leading to water bodies and provide impermeable lining under the storage yard of fuels and lubricants;
- (vii) Dispose any wastes generated by construction activities in designated sites;
- (viii) Keep oil tray or pans under the DG set or during maintenance of mechanical equipment to avoid oil spillage resulting soil and water pollution; and
- (ix) Conduct surface water quality Monitoring according to the Environmental Management Plan (EMP).

203. **Noise and Vibration Levels.** Construction works will be conducted along the roads in Bharatpur urban area, where there are majorly houses, commercial activities, few religious places and small-scale businesses. The sensitive receptors are the schools, religious places, hospitals in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby buildings. This impact is negative but short-term, and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;

- (ii) Use road cutters instead of breaker/hammer for cutting the road before excavation for pipe laying on roads;
- (iii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- (iv) 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;
- (v) DGs being used at site should have sound reducing (acoustic) enclosures, preferably silent DGs should be used at site;
- (vi) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s and equipment;
- (vii) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
- (viii) Consult the custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals, exams of students etc.;
- (ix) Provide all workers appropriate PPEs like ear plug/muff, working in high noise conditions;
- (x) Keep all vehicles and equipment in good conditions to avoid excessive noise generation;
- (xi) Provide noise barriers near sensitive receptors like schools, hospitals, temples, courts etc and consult in advance with sensitive receptors about the working hours (specially schools, hospitals, offices, courts etc) and avoid noisy works in those hours;
- (xii) Avoid noisy works in nights in inhabited areas to avoid any disturbance to habitants;
- (xiii) Consult in advance with habitants and inform them about the nature and duration of works; and
- (xiv) Conduct noise monitoring according to the Environmental Management Plan (EMP).

204. 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) Contractor should plan for night works only after directions from PMU/PIU/CMSC;
- (iii) Contractor should submit plan for night works for approval from PIU;
- (iv) PIU should ensure that prior written information should be given to local authorities such as district administration, Police/traffic police, line agencies concerned, resident's welfare association/business association/vyapar of the affected areas and their consents/permissions should be taken prior to start of night works;
- (v) PIU/CMSC engineers should check and ensure that all the preparation as per management plan is done by contractor and contractor is having all the necessary equipment and materials for night works;
- (vi) Contractor is required to have following equipment/arrangements for night works;

- (vii) Contractors should have hand held noise level meter for measurement of noise during night hours;
- (viii) Contractors should have hand held lux meter for the measurement of illumination during night hours;
- (ix) Preferably electrical connections are available for running equipment otherwise sound proof/super silent Diesel Generator set should be available;
- (x) 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

- (xi) 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

- (xii) 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;
- (xiii) All the noise activity like hammering, cutting, crushing, running of heavy equipment should be done in day time and avoided in night time;
- (xiv) Workers engaged in night works should have adequate rest/sleep in day time before start of night works;
- (xv) 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;
- (xvi) 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;
- (xvii) 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;
- (xviii) Horns should not be permitted by equipment and vehicles;
- (xix) Workers should not shout and create noise;
- (xx) First aid and emergency vehicles should be available at site;
- (xxi) Emergency preparedness plan should be operative during night works;
- (xxii) Old persons and pregnant women and women having small kids should not work in night time;
- (xxiii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise;

- (xxiv) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works;
- (xxv) PIU/CMSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video graphic records as well as register the observations;
- (xxvi) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement;
- (xxvii) After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians;
- (xxviii) Drivers and workers should be alert and responsive during night works;
- (xxix) All the wages to workers working in night hours should be as per the applicable labour acts;
- (xxx) Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours; and
- (xxxi) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

205. **Soil Contamination, Landscape and Aesthetics.** The construction works may require cutting of trees and also will produce excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. Haphazard disposal of these will have negative impacts on Landscape and overall aesthetics. These impacts are negative but are of short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Store fuel, oils, lubricants etc on impervious and protected areas, ensure spill control kits, and proper containments bunds to ensure no spillage
- (ii) Prepare and implement spoils management plan;
- (iii) Avoid stockpiling of excess excavated soils;
- (iv) Coordinate with ULB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- (v) Recover used oil and lubricants and reuse or remove from the sites;
- (vi) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (vii) Minimize removal of vegetation and disallow cutting of trees;
- (viii) If tree-removal will be required, obtain tree-cutting permit from the Revenue Department; and
- (ix) Plant three native trees for every one that is removed.
- (x) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (xi) Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

206. **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. Although, groundwater is much deeper than the proposed trenching depth, and rains are scarce and limited to very short duration during monsoon, to ensure that water will not pond in pits and voids near project location, the construction contractor will be required to conduct excavation works in non-monsoon season to the maximum extent possible. These potential impacts are temporary and short-term duration only. However, to ensure that these are mitigated, construction contractor will be required to:

- (i) Prepare and implement a spoils management plan (**Appendix C-13**);
- (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, consult with PIU on designated disposal areas;
- (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) Dispose any wastes generated by construction activities in designated sites; and
- (vii) Conduct periodical ground water quality monitoring according to the Environmental Management Plan (EMP).

207. **Accessibility.** Excavation along the roads, hauling of construction materials and operation of equipment on-site can cause traffic problems. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Prepare and implement a Traffic Management Plan (**Appendix C-14**);
- (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- (iii) Schedule transport and hauling activities during non-peak hours;
- (iv) Locate entry and exit points in areas where there is low potential for traffic congestion;
- (v) Keep the site free from all unnecessary obstructions;
- (vi) Drive vehicles in a considerate manner;
- (vii) Coordinate with Traffic Police for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (viii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

208. Wherever road width is minimal, there will be temporary loss of access to restrains and vehicular traffic (including 2-wheelers) during the laying of pipes. Under those circumstances, contractor shall adopt following measures:

- (i) Inform the affected local population 1-week in advance about the work schedule;
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum; and
- (iii) Provide pedestrian access in all the locations until normalcy is restored. Provide wooden/metal planks over the open trenches at each house to maintain the access.

209. **Socio-Economic Income:** The project components will be located in government land and there is no requirement for land acquisition or any resettlement. Construction works will impede the access of residents to specific site in limited cases. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

- (i) Prepare and implement spoils management plan (**Appendix C-13**);
- (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; and
- (ix) Provide all mitigation measures as given in resettlement plan (RP) prepared for the project to mitigate impacts on vendors and shopkeepers.

210. **Socio-Economic Employment.** Manpower will be required during the 36-months construction stage. This can result in generation of temporary employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

- (i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
- (ii) Secure construction materials from local market.

211. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working on roads, in height and excavation (trenches and trenchless) works. Potential impacts are negative and long-term but reversible by mitigation measures. Construction contractor will depute experienced EHS personnel and will be required to:

- (i) Comply with all national, state and local labor laws (see **Appendix C-12**);
- (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OH&S Training¹² for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- (iii) Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- (iv) Provide medical insurance coverage for workers;
- (v) Secure all installations from unauthorized intrusion and accident risks;
- (vi) The project area experiences extreme temperature during summer months of April and May, which may affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following:
 - a. Work schedule should be adjusted to avoid peak temperature hours (12 -

¹² Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

- 3 PM);
- b. Provide appropriate shade near the work place; allow periodic resting and provide adequate water; and
- c. Provide necessary medicine and facilities to take care of dehydration related health issues;
- (vii) Provide supplies of potable drinking water;
- (viii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (ix) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
- (x) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
- (xi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xii) Ensure moving equipment is outfitted with audible back-up alarms;
- (xiii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- (xiv) 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.

212. **Health and safety risk during sewer works.** Subproject also includes adding missing links in the existing sewer system and may involve working on existing operational sewage lines. These works may present harmful working conditions due to accumulation of sewage, sludge and gases. Appropriate measures suggested including no manual working, supervisory control, safety equipment etc., These work sites may present hazardous or harmful working conditions due to accumulation of harmful gases such as hydrogen sulphide in the existing / old sewers, and lack of sufficient oxygen may endanger the lives of workers if care is not taken. Following measures shall be implemented:

- (i) Contractor and supervising staff should assess the conditions prior to start of work with necessary safety precautions; Gas detector shall be used to measure the level of harmful gases
- (ii) Works shall be conducted only under appropriate supervisory control
- (iii) Appropriate equipment shall be used, and manual working shall not be conducted, such as entry of workers into old sewers etc.,
- (iv) Adequate ventilation shall be maintained, workers on the site shall be provided with appropriate PPEs including oxygen masks and cylinders etc.,
- (v) Implement a site specific Health and Safety (H&S) Plan for sewer rehabilitation works

213. **Community Health and Safety.** Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Plan routes to avoid times of peak-pedestrian activities;

- (ii) Liaise with PIU in identifying risk areas on route cards/maps;
- (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure; and
- (iv) Provide road signs and flag persons to warn of on-going trenching activities.

214. Some part of the town is characterized by narrow roads. Particularly, the areas located in old town have very narrow roads with dense habitation and heavy traffic and are accessible only to pedestrians. Besides impeding the access, the trench excavation and pipe laying will pose safety risks to pedestrians, and the people living in these areas. Though the width (<500 mm) and depth (<750mm) of trench is minimal, it will pose safety risk, especially for children and elders. The construction contractor will be required to:

- (i) Trench excavation and pipeline works shall be conducted in a safe manner; if the allowing public movement along the work sites (pedestrians or vehicles as the case may be) is likely to cause safety risks, movement should be blocked temporarily and work shall be conducted; in such areas, conducting night work or working in small stretches to avoid blockage of traffic/movement no more than few hours in due consultation with the local community and ULB shall be planned;
- (ii) All trenches deeper than 1.5 m shall be provided with safety shoring/braces; and avoid open cutting method for trenches deeper than 3.5 m by adopting trenchless technology;
- (iii) Survey the surrounding vulnerable buildings for likely issues in structural stability/ differential settlement during the excavation works;
- (iv) Provide prior information to the local people about the nature and duration of work;
- (v) Conduct awareness program on safety during the construction work;
- (vi) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day; and
- (vii) Provide hard barricades and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches.

215. **Work Camps:** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Consult PIU before locating project offices, sheds, and construction plants;
- (ii) Minimize removal of vegetation and disallow cutting of trees;
- (iii) Provide drinking water, water for other uses, and sanitation facilities for employees;
- (iv) Provided temporary rest and eating area at all work sites;
- (v) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers; accommodation shall meet the IFC standards for

workers accommodation¹³ which include: provision of safe housing, availability of electricity, plumbing, water and sanitation, adequate fire protection and dormitory/room facilities; accommodation shall be in the range from 10 to 12.5 cubic meter (m³) (volume) or 4 to 5.5 square meters (m²) (surface) per worker, a minimum ceiling height of 2.10 m; a reasonable number of workers are allowed to share the same room—(standards range from 2 to 8 workers); workers with accompanying families shall be provided with a proper and safe accommodation (Suggested guidelines based on IFC benchmark standards for workers accommodation is provided in **Appendix C-21**;

- (vi) Prohibit employees from poaching wildlife and cutting of trees for firewood;
- (vii) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (viii) Recover used oil and lubricants and reuse or remove from the site;
- (ix) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (x) Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- (xi) Report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

216. **Social and Cultural Resources:** For this project, excavation will occur at locations not known to have archaeological values, so there is no risk of such impacts. Religious places such as temples are present nearby the proposed pipeline works and contractor will require to follow the mitigation measures as given below-

- (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/historic 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; and
- (iv) provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.

217. **Traffic diversion and/or road closure:** If traffic diversion and/or road closure is required for the proposed works, prior consent from traffic department will be required and prior information to affected areas and public should be disseminated through consultations by CAPPC. Proper road signage and traffic aids should be provided at site. Excavation along the roads, hauling of construction materials and operation of equipment on-site can cause traffic problems. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

- (i) Prepare and implement a Traffic Management Plan;
- (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;

¹³ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation

- (iii) Schedule transport and hauling activities during non-peak hours Locate entry and exit points in areas where there is low potential for traffic congestion;
- (iv) Keep the site free from all unnecessary obstructions;
- (v) Drive vehicles in a considerate manner;
- (vi) Coordinate with Traffic Police for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints;
- (viii) Maintain sufficient access to houses and shopkeepers (commercial establishments) during pipe laying work through metal sheets and temporary bridges; and
- (ix) Locate entry and exit points in areas where there is low potential for traffic congestion.

218. Wherever road width is minimal, there will be temporary loss of access to pedestrians and vehicular traffic including two wheelers during the laying of pipes. Under those circumstances, contractor shall adopt following measures:

- (i) Inform the affected local population 1-week in advance about the work schedule;
- (ii) Plan and execute the work in such a way that the period of disturbance/ loss of access are minimum;
- (iii) Provide pedestrian access in all the locations until normalcy is restored. Provide wooden/metal planks over the open trenches at each house to maintain the access; and
- (iv) Excavate only that stretch in a day that could be finished in the same day by laying of pipes and backfilling.

E. Operation and Maintenance Impacts

219. **Sewerage System:** O&M of the sewerage system will be carried out by DBO contractor for 10 years and then by Bharatpur Municipality directly or through an external operator. The sewerage system is intended to collect, convey, treat and dispose the sewage from the town areas safely. Operation will involve collection and conveyance of wastewater from houses to STP; treatment of sewage at STP to meet the disposal standards; and final disposal of treated wastewater, and treatment and disposal of sludge.

220. Treated wastewater is proposed to be utilized in reuse applications following the Sewerage and Wastewater Policy 2016 of Rajasthan, and accordingly reuse plan will be prepared by the DBO contractor during the detailed design phase. As stated previously, subproject will be implemented under DBO, and the successful bidder/DBO contractor will carry out detailed designs, therefore at present the subproject is designed in outline only. The treated wastewater if utilized for reuse purposes as per the reuse plan there will be no negative impacts, and in fact it will enhance environmental benefits in the form of water savings. Reuse plan for treated waste water is being prepared by DBO contractor in consultation with PIU and Local Body and the same will be updated in next version of IEE. Various measures to safeguard environment and health environment in utilizing the treated wastewater, including required quality for various process will be established in the reuse plan and will be implemented accordingly. All necessary safety, mitigation and monitoring measures as suggested in the reuse plan shall be implemented. Remaining treated effluent is proposed to be discharged into the open space available in campus during rainy season. Mixing of industrial effluents in sewers may affect the inlet quality of sewage. It is therefore critical that STP receives the sewage with intended quality and treats the same to

design discharge standards.

221. STP operational procedures will be firmed up during the detailed design phase, including the amount of automated or manual operation. It must be ensured that the facility is operated with standard operating procedures and only by trained staff. Ensuring uninterrupted power supply with back-up facility is a must. Standard operating procedures and operation manual will be prepared by the DBO contractor. Besides routine operation, this should cover all necessary items such as preventive maintenance, periodic maintenance and emergency maintenance, replacement of pumps, motors, and other electro-mechanical parts as per the design life to optimize energy use and system efficiency etc. Adequate resources – technical and financial, has been taken into consideration in the project design. Manual will also include safety awareness and mock drills for worker safety.

222. Subproject includes sludge management infrastructure in STP, including system for sludge collection, thickening, solar drying, and disposal at landfill/identified site. This includes a sludge sump to collect sludge from SBR basins; returning arrangement for supernatant from the sump to inlet/equalization tank for treatment; pumping sludge to sludge thickener and pumping thickened to mechanical sludge dewatering system (such as centrifuge). It also requires contractor to establish a shed where the dewatered sludge cake can be further air dried for 15 days. This is indicative sludge management system, and DBO contractor will design the system meeting these requirements and prepare sludge management plan. Bid indicates that “the sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner” and it requires DBO contractor “to conform to the regulations of public health and environment protection norms”. The norms for safe use of processed sludge as fertilizer and soil conditioner are discussed earlier in this IEE. This follows the Sewerage and Wastewater Policy, 2016, which suggests “use of sludge produced from the treatment as fertilizer and soil conditioner after processing”. A sludge disposal site will be identified during the detailed design phase to dispose unutilized dried sludge in reuse applications. The updated IEE will include the details of disposal site. If the sludge is managed accordingly, there will no impacts.

223. During the operation phase, it is necessary that the facility is operated by trained staff as per the standard operating procedures. Following measures are suggested for implementation/ compliance during the operation phase:

- (i) Ensure that treated wastewater meets the established discharge standards all times; conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated effluent quality complies with design standards;
- (ii) Ensure implementation of reuse plan, and ensure intended quality for each direct reuse;
- (iii) Assess composition and characteristics of sludge from the first batch operation at the initial phases, and confirm the handling, management and disposal/reuse actions suggested in the management plan;
- (iv) Conduct periodic testing of dried sludge/compost to check presence of heavy metals and confirming the concentrations to use as compost as specified in the Standards for Composting, Schedule II A, Solid Waste Management Rules, 2016, Fertilizer Control Order (FCO), 1985, amendments in 2009 and 2013. It shall not be used for food crops;
- (v) Ensure valid consent to operate (CTO) from RSPCB for operation of STP;
- (vi) Ensure that all conditions/standards prescribed by RSPCB are complied duly;

- (vii) Ensure that chlorinator facility is operated only by trained staff and as per the standard operating procedures; in case of any accident and/or maintenance activity, ensure that the staff follows documented procedures only;
- (viii) Implement emergency response system (ERS) for the chlorine leakage; Guidelines and Emergency plan for handling and storing chlorine is attached as **Appendix C-22**;
- (ix) Ensure proper knowledge transfer, hands-on training to municipal staff engaged in STP operation has been provided by contractor prior to handover of facility;
- (x) Operate and maintain the facility following standard operating procedures of operational manual;
- (xi) Undertake preventive and periodic maintenance activities as required;
- (xii) Conduct periodic training to workers; ensure that all safety apparatus at STP including personal protection equipment are in good condition all times; and are at easily accessible and identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations; and
- (xiii) No wastewater from industrial premises (including domestic wastewater) shall be allowed to dispose into municipal sewers; monitor regularly and ensure that there is no illegal discharge through manholes or inspection chambers; conduct public awareness programs; in coordination with RSPCB.

224. There are also certain environmental risks from the operation of the sewer system, most notably from leaking sewer pipes as untreated faecal material can damage human health and contaminate both soil and groundwater. It will be imperative therefore that the operating agency establishes a procedure to routinely check the operation and integrity of the sewers, and to implement rapid and effective repairs where necessary. There is an occupation health risk to workers engaged in sewer maintenance activities. Following measures should inter alia be followed:

- (i) Establish regular maintenance program, including:
 - a. Regular cleaning of grit chambers and sewer lines to remove grease, grit, and other debris that may lead to sewer backups. Cleaning should be conducted more frequently for problem areas;
 - b. Inspection of the condition of sanitary sewer structures and identifying areas that need repair or maintenance. Items to note may include cracked/deteriorating pipes; leaking joints or seals at manhole; frequent line blockages; lines that generally flow at or near capacity; and suspected infiltration or exfiltration;
 - c. Monitoring of sewer flow to identify potential inflows and outflows; and
 - d. Conduct repairs on priority based on the nature and severity of the problem;
 - e. Immediate clearing of blockage or repair is warranted where an overflow is currently occurring or for urgent problems that may cause an imminent overflow (e.g., pump station failures, sewer line ruptures, or sewer line blockages).
- (ii) Review previous sewer maintenance records to help identify “hot spots” or areas with frequent maintenance problems and locations of potential system failure, and conduct preventative maintenance, rehabilitation, or replacement of lines as needed;
- (iii) When a spill, leak, and/or overflow occurs, keep sewage from entering the storm drain system by covering or blocking storm drain inlets or by containing and diverting the sewage away from open channels and other storm drain facilities (using sandbags, inflatable dams, etc.). Remove the sewage using vacuum equipment or use other measures to divert it back to the sanitary sewer system;

- (iv) Prohibit/prevent disposal of wastewater/effluent from industrial units in the sewers; ensure regular checking to ensure no illegal entry of industrial wastewater into sewers;
- (v) Develop an ERS for the sewerage system leaks, burst and overflows, etc.;
- (vi) Provide necessary health & safety training to the staff;
- (vii) Provide all necessary personnel protection equipment;
- (viii) During cleaning/clearing of manholes and sewer lines great precautions should be taken for the safety of workers conducting such works:
 - a. As far as possible use remote/CCTV mechanism to identify/detect the problems in sewers and do not engage persons for this purpose;
 - b. As far as possible use mechanized cleaning of manholes and sewers by using modern techniques and machines and do not engage persons for this purpose;
 - c. Ensure that maintenance staff and supervisors understand the risks; provide proper instructions, training and supervision;
 - d. Use gas detector to detect any hazardous or inflammable gas in confined areas like sewers/manholes prior to maintenance process;
 - e. Provide suitable personal protective equipment that may include waterproof/abrasion-resistant gloves, footwear, eye and respiratory protection. Face visors are particularly effective against splashes. Equipment selection and a proper system for inspection and maintenance are important;
 - f. Provide adequate welfare facilities, including clean water, soap, nail brushes, disposable paper towels, and where heavy contamination is foreseeable, showers;
 - g. For remote locations portable welfare facilities should be provided;
 - h. Areas for storage of clean and contaminated equipment should be segregated and separate from eating facilities;
 - i. Provide adequate first-aid equipment, including clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings;
 - j. Make effective arrangements for monitoring the health of staff; and
 - k. Keep emergency preparedness plan ready before starting the work of sewage system cleaning.

225. Biological hazards are among the environmental risks that may adversely impact the health and wellness of the workers and the community. Breakouts of diseases such as diarrhoea, flu or pandemics such as the COVID19 shall be avoided. Designs and implementation of treatment systems shall ensure that disease-causing pathogens or viruses are disinfected and will not cause any health issues.

226. **Operation of FSSM.** Households of 65 Wards (refer Table 1) will be covered with FSSM system wherein which septage from individual septic tanks at houses will be collected via mobile/vehicle mount tankers with suction equipment, transport and discharged into STP for safe treatment and disposal. Although system will be completely mechanized, given the very harmful nature of septage, following precautionary measures shall be implemented:

- (i) Create awareness program on the FSSM in general public;
- (ii) Implement health and safety plan for FSSM;
- (iii) Provide proper training to the workers, and staff in safe handling of FSSM tasks, provide all necessary personal protection equipment and ensure their usage;

- (iv) Ensure that the system is operated completely mechanically, with least involvement of workers; there shall be no direct contact of septage to any worker or staff;
- (v) Ensure proper facilities for workers including showers, wash areas, toilets, drinking water, eating and resting places;
- (vi) Conduct regular health checks; and
- (vii) Ensure that tankers cleaning is done mechanically, and in the demarcate area at STP, and the wastewater generated in the process shall be discharged into STP.

F. Cumulative Impacts

227. Cumulative impacts are those that result from the successive, incremental, and/or combined effects of a project or activity when added to other existing, planned, and/or reasonably anticipated future ones. The subproject aims to improve and sewerage in Bharatpur Town, by rehabilitating, augmenting, and creating required new infrastructure.

228. Sewerage works is proposed to be taken up simultaneously in Bharatpur Town, which is a town congested with people, traffic, and activities. There are sensitive places like hospitals, schools, and religious places. Works will be spread over entire town, covering all the roads and streets. Although no other notable public works are anticipated during the project implementation on public roads, there will be usual construction activities, such as building construction, as Bharatpur is a developing town. Given dry and windy weather conditions, dust generation from cumulative construction activities may be significant, and this may increase the particulate matter concentration in ambient air. Dust control measures suggested in the EMP aim to minimize the dust generation from the subproject construction activities. Suggested trenchless method, by avoiding excavation, will also help in reducing the overall dust generation from the subproject activities. If there are any road improvement works proposed to be implemented in Bharatpur, scheduling of works needs to be coordinated with the respective road agency (ULB or Public Works Department [PWD]) so that improved roads are not subjected for excavation. There is also a need to streamline water and sewer line works to avoid repeated excavations in the same road/street. The increase in road traffic, disturbance to traffic, public safety and worker safety issues, damage to existing utilities, influx of outstation workers, etc., due to various simultaneous construction works will be notable. However, the measures suggested in the EMP will minimize these impacts greatly, and therefore effective implementation of EMP must be ensured. Thus, the net impacts are unlikely to be significant.

229. **Project Benefits.** The citizens of the Bharatpur will be the major beneficiaries of the sewerage systems, as (i) the human waste from the homes will be removed rapidly, which otherwise would flow in open drains. This should improve the environment, should deliver major improvements in individual and community health and well-being. The project will improve the over-all health condition of the town as water borne diseases will be reduced. Diseases of poor sanitation, such as diarrhoea 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

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

231. A three tier consultation process has been adopted for RSTDSP project: focus group discussions, primary household sample surveys and a town-level public consultation workshop. Most of the main stakeholders have already been identified and consulted during preparation of preliminary design and IEE, and any others that are identified during project implementation will be brought into the process in the future. Primary stakeholders of the subproject are: residents, shopkeepers and businesspeople who live and work alongside the roads in which network improvements will be provided, and government and utility agencies responsible for provision of services, Bharatpur Nagar Nigam Public Health Engineering Department, and Rajasthan Pollution Control Board. Secondary stakeholder is: NGOs and CBOs working in the area, community representatives, beneficiary community in general, government agencies, the executing and implementing agencies (LSGD and RUDSICO-EAP), Government of India and the ADB.

B. Public Consultation

232. The public consultation and disclosure program is a continuous process throughout the project implementation, including project planning, design and construction. Informal and formal consultations at different locations were also conducted during social and environmental impact assessment in Bharatpur in December 2021 and May 2022 (**Appendix 3**).

C. Consultation during Project Preparation

233. Institutional consultations were conducted with the Governmental Departments such as Local Self Government Department, Pollution Control Board, Public Health Engineering Department, Bharatpur Nagar Nigam etc. The project proposals are formulated in consultation with Bharatpur Nagar Nigam and the proposals have been finalized only after certification of Nagar Nigam that the proposals suit the requirements of the ULB.

234. Focus-group discussions with residents and other stakeholders were conducted to learn their views and concerns. A social and environmental impact assessment has been conducted in the town, covering sample households and nearby vendors to understand the basic characteristics of town, health status, and the infrastructure service levels, and also the demand for infrastructure services.

235. It was observed that people are willing to extend their cooperation as the proposed activities are supposed 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 the construction stage which can have impact on their day-to-day activities. Public demanded for advance notice before construction and proper warning signs along the construction area to avoid accidents and inconvenience. Public opined that an appropriate operation and maintenance system should be in place, especially for

sewerage system, for its best functioning and to have the maximum health and aesthetic benefits. Regarding sewerage works people were demanding sewage house connections in whole town because they are suffering a lot due to unsafe sewage disposal in drains. Project team responded to the issues on nuisance and disturbance and O&M issues raised during the consultation that measures have been incorporated in the EMP. Details of public consultations are given in **Appendix 3**.

236. A City Level Committee (CLC) in town has been formed in Bharatpur district by Government orders. City Level Committee meeting was organized during the detailed design stage to which representatives of primary and secondary stakeholders were invited. City Level Stakeholder committee meeting was organized for Bharatpur in District Head Quarter, Bharatpur on dtd. 27.07.2021 to discuss the matter of proposed Sewerage works in Bharatpur under the chairmanship of District Collector, Bharatpur, in presence of, DPR consultants, RUDSICO-EAP officials, PHED officials, Municipal Council officials, UIT officials, PWD and other invitee members. Proposed scope of works and technology was discussed in the meeting and it was decided that treated effluent shall be reused by Municipality in beneficial uses and for generation of revenue by ULB. Land availability for the proposed components was also confirmed by local authority. The feedback and concerns of the stakeholders were taken into consideration for finalization of design and scope of works. The project was agreed by the committee for further course of action by RUDSICO-EAP. Details of CLC meeting, minutes and photographs are attached in **Appendix 3**.

237. A town level consultation/workshop was organised in Meeting Hall of Municipal Corporation, Bharatpur on October 11, 2022. Meeting was attended by 45 stakeholders including public representatives, government departments and ADB consultants. Another Town level consultation was conducted in Bharatpur on January, 18, 2023 in the Meeting Hall. Elected counsellors, public representatives, news reporters, prominent persons and officers from RUIDP, Nagar Nigam, administration and PHED was invited for meeting. ADB team members and consultants also participated. Details of these meetings and photographs are attached in **Appendix 3**.

D. Consultation During Construction

238. Prior to start of construction, Bharatpur Nagar Nigam and PIU with the assistance of Consultants conducted information dissemination sessions at major intersections and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various social and environmental issues. At each ward/neighbourhood level, focus group meetings were conducted to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

239. A constant communication is being established with the affected communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. Nagar Nigam/PIU with the help of Community Awareness and Participation Consultant (CAPC) will organize public meetings and will appraise the communities about the progress on the implementation of EMP. Meeting will also be organized at the potential hotspots/sensitive locations before and during the construction.

E. Information Disclosure

240. Draft IEE has already been disclosed. Executive summary of the IEE will be translated in

the local language and made available at the offices of Nagar Nigam, RUDSICO-EAP- PMU and PIU. Copies of summary will be provided to participants of city level workshop to be organized in Bharatpur. Hard copies of the IEE will be accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE in English and Executive Summary in Hindi will be placed in the official website of the Nagar Nigam/RUDSICO-EAP after approval of the IEE by Government and ADB. Stakeholders were made aware of grievance register and redress mechanism.

241. Public information campaigns via newspaper/radio/TV, to explain the project details to a wider population were conducted, primarily by circulating pamphlets. Public disclosure meetings will be conducted at key project stages to inform the public about the progress and future plans. Prior to start of construction, the 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.

242. Local communities are 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. Before start of construction works, Social Outreach Team (SOT) of contractor and CAPP team are providing advance public notice/ public information by distributing pamphlets showing work details, toll free complaint registration number, also by individual consultation with each and every household and shop owner of the area/section.

243. Project related information shall be disclosed through public consultation and making relevant documents available in public locations. PMU and PIUs shall provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used. Before start of construction works, social outreach team (SOT) of contractor and CAPP team are providing advance public notice/ public information by distributing pamphlets showing works details, toll free complaint registration number, also by individual consultation with each and every household and shop owner of the area/section.

244. The following documents shall be made available at the offices of project agencies - PMU, PIU and Block level offices for public reference, and shall also be uploaded on respective websites.

- (i) Summary of project and draft IEE (in Hindi and English);
- (ii) Draft IEE Report (in English);
- (iii) Final IEE Report (in English);
- (iv) Updated/amended IEE (in English);
- (v) Corrective action plan prepared during project implementation (English); and
- (vi) Semi-annual Environmental Monitoring Reports (English).

245. A concise summary of project and draft IEE report (in Hindi), providing all necessary details of designs, implementation arrangements, subproject locations, likely issues and mitigation and monitoring measures and grievance redress mechanism, shall be made available to the stakeholders at consultation meetings. This should also provide contact information of project agency. This summary shall also be displayed at the notice boards of PMU, PIU and other public places. During project implementation, relevant information about any major changes to

project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders. Draft IEE has already been posted on ADB and RUDSICO website. Further, the following will be again posted on ADB website.. PMU will send written endorsement to ADB for disclosing these documents:

- (i) final IEE;
- (ii) a new or updated IEE and corrective action plan prepared during project implementation, if any; and
- (iii) environmental monitoring reports.

VIII. GRIEVANCE REDRESS MECHANISM

A. Project Specific Grievance Redress Mechanism

246. A project-specific, three-tier grievance redress mechanism (GRM) covers both environment and social issues. The GRM was established on 05.11.2023 to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at project level. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns related to the project. Assessment of the GRM designed and implemented for Rajasthan Urban Sector Development Program (RUSDP)¹⁴ the system was effective in timely resolution of grievances in a transparent manner.¹⁵ The multichannel, project-specific, three-tier GRM is functional at RUSDP, hence the design of GRM for RSTDSP takes into account the proposed institutional structure for RSTDSP and the positive features and learnings from the previous GRM.¹⁶

247. **Common Grievance Redress Mechanism.** A common GRM is in place for social, environmental, or any other grievances related to the project. Implementation of the resettlement plans/RIPPs/DDR/IEEs will follow the GRM described below. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project.

¹⁴ The procedures followed for grievance redress during implementation of RUSDP Phase III included the project GRM and the pilot GRM software application (smart check) in Pali, the Sampark portal of Government of Rajasthan, and the Chief Minister's helpline. Complaints received through various channels were mostly minor and pertained to damage to existing water supply pipelines and disruption of water supply during construction, delays in road restoration, and pending new connections. Complaints related to damage to private property (compound walls/steps, etc.) were less in number. The grievances were mostly possible to resolve in coordination with the contractors. Complaints received were immediately referred by the CAPC/PMDSC supervision staff to the PIU Nodal officer (safeguards) and concerned engineer at PIU, who advised them on further action. Follow up with the contractor on complaint resolution was undertaken by PIU Nodal officer CAPC and PMDSC and final feedback sought from complainant upon resolution. Complaints requiring inter-departmental coordination were referred to the PMU for resolution, and feedback provided to complainant. The PMU kept regular track of grievances through WhatsApp and email alerts, ensuring registration and follow-up until resolution.

¹⁵ Town-level grievance registration data indicates that a large number of grievances were registered, pointing to the effectiveness of the multi-channel GRM. No major grievance was received for RUSDP Phase III. The GRM helped smoothen the process of project implementation, hence the proposed architecture for the RSTDSP GRM remains similar, with some refinement, taking into account the changes in institutional setup proposed for project implementation.

¹⁶ Continued logistics support at field level will be key to successful management of grievance redress under RSTDSP. The target date for establishment of the first level (PIU level) and second level (Zonal level) of GRM is before loan negotiation.

248. Public awareness campaigns within entire ULB/Municipal area will ensure that awareness on grievance redress procedures is generated. The nodal officer- social/environment at field level through community awareness and public participation consultant (CAPPC) will conduct ULB/Municipal area-based awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements. Contractors will provide pamphlets to communities prior to start of works and billboards during construction. The pamphlets and billboards will include relevant environmental and social safeguards, GRM information, and contact details of key personnel from PIU and contractors.

B. Grievance Redress Process

249. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaint/suggestion boxes that will be installed by project PIUs or by e-mail, by post, or by writing in a complaints register in ULB offices/complaints register at contractor's work site¹⁷ or by sending a WhatsApp message to the PIU¹⁸ or by dialling the phone number of town level PIU/CAPPC or by dialling a toll-free number.¹⁹ Any aggrieved person can also avail the facilities of online grievance monitoring system 'Rajasthan Sampark' portal to register their grievances which is a parallel mechanism of grievance registration, in addition to the project GRM.²⁰ Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken and feedback provided to the complainant on action/decision taken. The Safeguard and safety officer of town/city level PIU will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, with the assistance of project consultants. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor, and officials of PIU with assistance from CMSC and CAPPC on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact numbers and names of the concerned PIU safeguard and safety officer, contractors, CAPPC and CMSC personnel will be posted at all construction sites at visible locations.

- (i) **1st level grievance.** The contractors, PIU executive engineer/assistant engineer designated as safeguard and safety officer (social and environment), CMSC (safeguard staff) and CAPPC can immediately resolve issues on-site, in consultation with each other and will be required to do so within 7 days of receipt of a complaint/grievance. If required, city level monitoring committee (CLMC)²¹ will be involved in resolution of grievances at the 1st level;
- (ii) **2nd level grievance.** All grievances that cannot be redressed within 7 days at field/PIU level will be brought to the notice of Zonal PIU headed by Additional Chief Engineer (ACE). The ACE at zonal PIU will resolve the grievance within 7 days of

¹⁷ RUSDP piloted an online application based live GRM counter for resolution of public grievances over and above the usual process of grievance registration and redressal. This app based GRM - "RUIDP Smart Check" is available at Google play store (free of cost) and is operational. The RUIDP Smart Check "app" was launched in Pali town in July 2017 and is proposed to be scaled up in RSTDSP project towns. For persons without access to the application, the traditional channels will continue to be available.

¹⁸ It is suggested for each PIU to have a dedicated WhatsApp group for registration of grievances and receipt of quick feedback, to be followed by more formal communication.

¹⁹ Project contractors in all project towns will have a toll-free number with specific working hours for registration of grievances related to RSTDSP.

²⁰ <http://www.sampark.rajasthan.gov.in/RajSamWelcome.aspx>

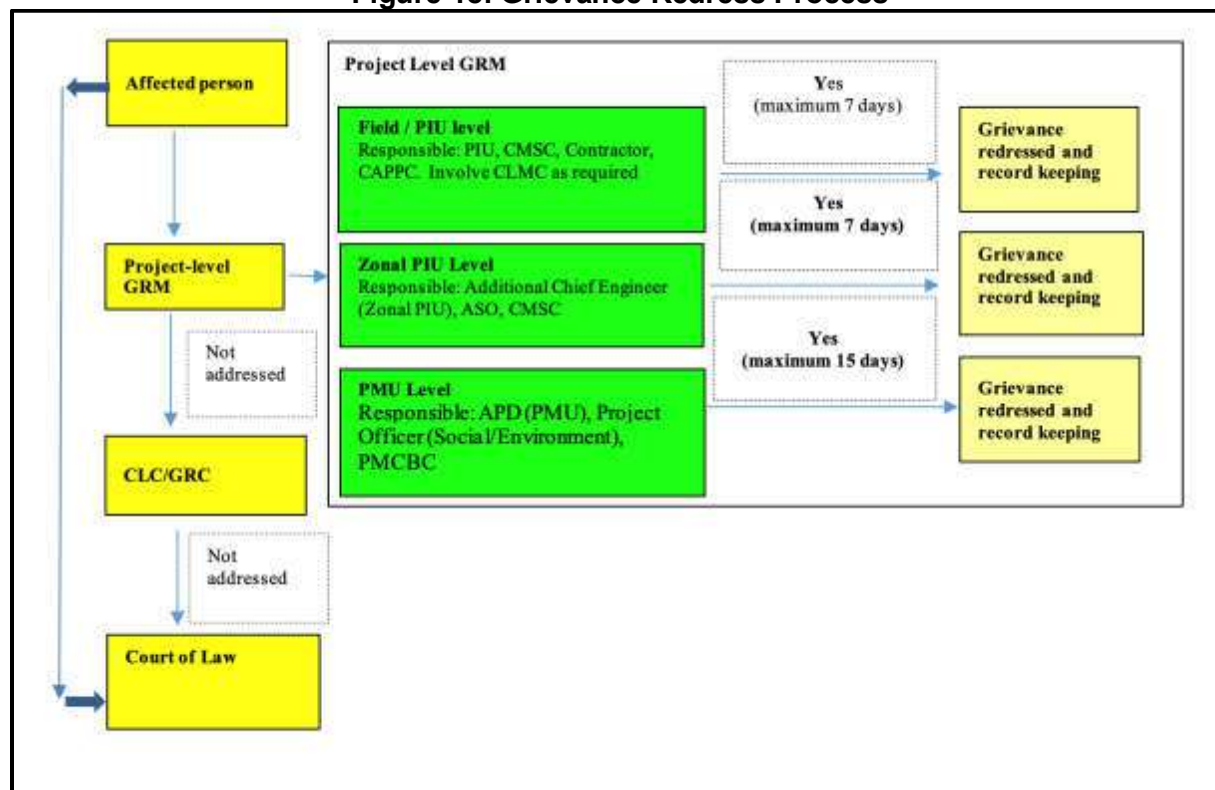
²¹ The CLMC has been formed at the town/city level for planning and monitoring of work, resolve issues related to departmental coordination etc. It is headed by Commissioner/Executive Officer ULB (Chairman) and city engineer of public health engineering department (PHED), public works department (PWD) and head of PIU acting as Member Secretary.

- receipt of compliant/grievance in discussion with the ASO, field level PIU, CMSC, CAPPCC and the contractor; and
- (iii) **3rd level grievance.** All the grievances that are not addressed by Zonal PIU within 7 days of receipt will be brought to the notice of the PMU. Depending on the nature of grievance, the project officer (social/environment) at PMU will resolve the grievance within 15 days of receipt of grievance with necessary coordination of Zonal PIU and CMSC and guidance/instruction of additional project director (APD-PMU).
 - (iv) Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the CLC/GRC, which has been set up.²² In its role as a GRC, the CLC will meet whenever there is an urgent, pending grievance. Other grievances can be discussed during its regular meetings. Zonal PIU will inform the CLC regarding any grievances required to be resolved urgently. The GRC will resolve the grievance within 15 days of receiving the complaint. In case of any indigenous peoples impacts in subprojects, the CLC/GRC must have representation of the affected indigenous people community, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and an NGO working with indigenous people groups.

250. The multi-tier GRM for the project is outlined below (**Figure 18**), each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required. The GRC will continue to function throughout the project duration.

²² City Level Committee (CLC)/grievance redress committees (GRCs) has been constituted for each town/city under the Chairmanship of District Collector to provide overall subproject guidance and "to sort out issues and remove hindrances, if any". CLC formed at city-level/district level with members composed of: District Collector as Chairperson and following as members: ULB Commissioner/Mayor/Chairman; Deputy Mayor/Vice Chairman ULB; Chairman/Secretary Urban Improvement Trust (UIT); Head of Zonal/field level PIU as Member Secretary; one representative each from relevant government departments as appropriate (PWD/PHED/Town Planning Department etc.). All CLCs in their role as GRCs will have at least one-woman member/chairperson. In addition, for project-related grievances, representatives of affected persons, community-based organizations (CBOs), and eminent citizens will be invited as observers in GRC meetings. The concerned Member of Parliament (MP) and Member of Legislative Assembly are also part of the CLC.

Figure 18: Grievance Redress Process



APD = Additional Project Director, ASO = Assistant Safeguards Officer, CAPPC = community awareness and public participation consultant, CMSC = construction management and supervision consultants, CLC = city level committee, CLMC = city level monitoring committee, GRC = grievance redress committee, PIU = project implementation unit, PMU = program management unit, PMCBC = project management and capacity building consultant.

251. The project GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In case of grievance related to land acquisition, resettlement and rehabilitation, the affected persons will have to approach a legal body/court specially proposed under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARRA), 2013.²³

252. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.²⁴

253. **Record-keeping.** The PIU of each town/city will keep records of grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and final outcome. The number of

²³The Authority admits grievance only with reference to the Land Acquisition and R&R issues under the RFCTLARRA, 2013.

²⁴ Accountability Mechanism. <http://www.adb.org/Accountability-Mechanism/default.asp>.

grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMU office, PIU offices, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis. The sample grievance registration format is attached as **Appendix C-17**.

254. **Periodic review and documentation of lessons learned.** The PMU Project Officers (Social and Environment) will periodically review the functioning of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

255. **Costs.** Contractors are required to allocated budget for pamphlets and billboards as part of the EMP. Costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the concerned PIU at town level while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates.

256. Presently GRC in 14 ongoing project towns are functional as per RSTDSP's Grievance Redress Mechanism (GRM). Therefore 2nd and 3rd level GRC are already functional at Zonal PIUs (at Jaipur and Jodhpur) and PMU levels. PIU and PIU level GRC is also formed in project town through an office order from PMU (Appendix 8).

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

257. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

258. A copy of the EMP must be kept at work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

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

Table 22: Design Stage Environmental Management Plan

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
Design of Sewage Treatment Plant	Treated effluent not meeting the disposal standards and associated impacts on receiving environment	STP design to meet latest norms for wastewater disposal into inland water bodies (ref Appendix C-8 for detailed parameters) including: BOD < 10 mg/l Total Suspended Solids < 20 mg/l Faecal coliform < 100/100 ml	RSPCB, Consent etc.,	Consultants / PMU	Project Costs
	Odour nuisance and aesthetics	(i) Provide a green buffer zone of 10-20 m wide all around the STP with trees in multi-rows. This will act as a visual screen around the facility and will improve the aesthetic appearance. Treated wastewater shall be used for plantation. (ii) Develop layout plan of STP such that odour generating units (such as sludge / solids handling facilities) are located away from the surrounding area with future development potential.	DBO Contractor / PIU	PMU	Project costs
	Impairment of STP treatment efficiency	Ensure continuous uninterrupted power supply (i) Provide back-up facility (such as generator) and make sure that adequate fuel supplies during operation for running of generator when required; (ii) Provide operating manual with all standard operating procedures (SOPs) for operation and maintenance of the facility; this should include guidance on the follow up actions in case of process disruptions, inferior quality of treated water; etc. Necessary training (hands-on and class room / exposure visits) shall be provided to the ULB staff dealing with STP.	RSPCB Consent etc.	Consultants / PMU	Project Costs

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		(iii) The scope of work of facility contractor should include extended operation period (at least five years) to ensure smooth operation, training to the ULB staff and transfer of facility to Bharatpur Nagar Nigam (iv) Design should include online monitoring for the minimum BOD, pH and Ammonia at the inlet and outlet of the plant			
	Mixing of industrial effluent with sewage	No industrial wastewater shall be allowed to dispose into municipal sewers No domestic wastewater from industrial units shall be allowed into municipal sewers (i) Ensure that there is no illegal discharge through manholes or inspection chambers (ii) Conduct public awareness programs; in coordination with RSPCB, issue notice to all industries for compliance (iii) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated effluent quality complies with the standards	ULB/PIU and RSPCB Consent etc.	PIU / ULB	Project Costs
Location impacts of proposed components	Nearby community may be affected due to increased pollution during construction and operation	(v) 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	List of pre-approved sites for -construction work camps, areas for stockpile, storage and disposal -Waste management plan	Consultants/PMU	No cost required
Seismic sensitivity	Damage to infrastructure and potential risks: project area in moderate	(i) Designs of project component structures shall comply with relevant codes of design such as Bureau of Indian Standard (BIS) specifications for earthquake resistant	Detail design considering risk of earthquake in town	DBO contractor/PIU	DBO contract or

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
	earthquake risk zone (Zone III)	design (IS: 1893: Criteria for earthquake resistant design of structures).			
Requirement of tree cutting	Tree cutting may result loss of aesthetics and increase in air pollution	(i) sites should be selected so that minimum tree cutting is required (ii) project documents should include the minimum tree cutting provisions (iii) Provision for Compensatory plantations should be included in contract documents	As per RUDSICO-EAP policy; Tree Cutting Approvals; Compensatory Afforestation Plan;	Consultants/PIU/PMU	No cost required
Energy Efficiency	Loss of natural resources	(vi) Use energy efficient electrical equipment (vii) Provision of use of energy efficient equipment in contract agreements and BOQ	As per BEE norms	Consultants/PMU	No cost required
Preparation of treated effluent reuse plan (During SIP)	Loss of natural resource of water, improvement of local income	Contractor to develop, design, implement and operate the treated effluent reuse plan in consultation with the ULB	Approved Plan included in the Contractor's Scope of Works	Contractor/PMU	Project Costs
Preparation of Sludge reuse plan (During SIP)	Loss of natural resource of water, improvement of local income	Contractor to develop, design, implement and operate the sludge reuse plan in consultation with the ULB	Approved Plan included in the Contractor's Scope of Works	Contractor/PMU	Project Costs
Incorporating EMP and Health and Safety requirements into Contractor Bid Document	Implementation of the EMP	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	EMP included in Bid Document	PMU	Project Costs
	Implementation of the Health and Safety measures by contractor	Health and safety requirements should be incorporated as part of the contract bid document so that the selected Contractor understands the issues and makes necessary plans to prepare and implement the health and safety requirements.	EMP included in Bid Document	PMU	Project Costs
STP	Use of treated wastewater for reuse applications	Develop wastewater reuse plan for Bharatpur town in consultation with CLC as per the Sewerage and Wastewater Policy,	DBO Contractor / PIU	PMU/ ULB	Project cost

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		2016. The Reuse Plan shall inter alia include the following: (i) Identify potential reuse application in Bundi, and establish quality criteria for each of the use (ii) For applications that use treated wastewater directly (e. g. , agriculture), the quality required for such application in safe manner considering health, environment and crop yield concerns shall be ensured; (iii) Prepare a reuse plan for agriculture, if that is the priority use or one of the applications as per the CLC in Bundi, clearly indicating the limits (geographical / crops / type of application / type of soils etc.); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations. (iv) Plan should include awareness and training provisions and responsibilities; these can be conducted by concerned department (e. g. , Agricultural Department, District Collectorate) (v) Carryout regular / online monitoring of critical quality parameters of treated wastewater to ensure that they meet the preset standards established for reuse			
STP	Treated effluent discharge into water channel/drains and associated impacts on river water and downstream users	(i) Obtain of consent of RSPCB for discharge of treated wastewater into drains (ii) Conduct a baseline water quality assessment of receiving water body (iii) Regularly monitor the treated wastewater quality at STP and ensure that it meets the discharge standards	DBO Contractor/PIU	PMU/ ULB	Project costs

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		(iv) Monitor water quality periodically during operation phase as per the Environmental Monitoring Plan			
STP	Sludge management and reuse	(i) Prepare a sludge management plan (ii) Prepare a dried Sludge utilization plan for Bundi within the help of Agriculture Department / CLC; plan should also include if any additional processing is required for sludge to use as soil conditioner (iii) Plan should clearly various potential uses and demand in Bundi and surroundings (iv) Establish usage limits, where required, (geographical / crops / type of application / type of soils etc.); adopt international good practice suggested by agencies like World Health Organization (WHO), Food and Agricultural Organization (FAO) of the United Nations. (v) Identify a landfill / suitable site for disposal of surplus dried sludge (vi) Monitor sludge quality during operation phase as per the Environmental Monitoring Plan, ensure that it meets the quality parameters established by FCO (vii) In case of sludge not meeting the quality parameters, it shall not be used as soil condition, and shall be disposed at appropriate disposal site (if it falls under hazardous category, it shall be disposed as per the Hazardous Waste Management Rules, 2016)	DBO Contractor/PIU	PMU/ ULB	Project costs
FSSM	Occupational health and safety issues, and impact on STP process	(i) Conduct detailed survey of the households to be covered with FSSM to design the system to suit the local conditions, such as type of septic tanks and their	DBO Contractor/PIU	PMU/ULB	Project costs

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		location in the houses (ii) Create awareness program on the FSSM from collection to treatment system that will be adopted (iii) Design the sewage treatment process duly considering mixing of septage (iv) Ensure that the FSSM system is completely mechanized no human touch, even accidentally, from collection at household to discharge into STP, and in periodic cleaning of tankers (v) Demarcate a proper area for cleaning of mobile tankers in STP premises, and ensure that the wastewater shall be discharged into STP (vi) Provide proper training to the workers, and staff in safe handling of FSSM tasks, provide all necessary personal protection equipment (vii) Ensure proper facilities for workers including showers, wash areas, toilets, drinking water, eating and resting places (viii) Conduct regular health checks (ix) Prepare Health and Safety Plan for FSSM			
Physical Cultural resource	Encroachment/ damage to protected monuments and chance finds	(i) develop a protocol in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved. (ii) Conduct awareness training to contractor & supervision staff prior to start of excavation; (iii) Stop work immediately to allow further investigation if any finds are	PIU	PMU	Project Cost

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		suspected; (iv) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol			

Table 23: Environmental Management Plan of Anticipated Impacts during Pre-Construction

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
Compliance with environmental subproject selection criteria	Environmental impacts due to subproject	Compliance with environmental subproject selection criteria A compliance checklist is appended to this report (Appendix 2)	Consents, permits, clearance, NOCs, etc. A compliance checklist is appended to this report (Appendix 2)	PIU and Bharatpur Nagar Nigam	PMU	No costs required
Legal compliance	Environmental legal noncompliance may attract legal actions Failure to obtain necessary consents, permits, NOCs etc. can result to design revisions and/or stoppage of works	(i) Obtain all consents, clearances (CTE/CTO from RSPCB), permits NOCs etc. before start of construction works Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction	Consents, permits, clearance, NOCs, etc.	PIU/Consultants in coordination of Nagar Nigam, Bharatpur	PMU	Cost of obtaining all consents, permits, clearance, NOCs etc. prior to start of civil works responsibility of PIU.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
		Refer tables in previous sections for consent requirements				
Environmental monitoring of baseline conditions of air, noise, water and soil	To establish base line environmental conditions	Environmental monitoring through NABL approved laboratory	Environmental Monitoring Report of Air, noise, soil and water quality	Construction contractor	Consultants/PIU	Contractor
Utilities	Telephone lines, electric poles and wires, and water lines within proposed project area	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) Require construction contractors to prepare a contingency plan to include actions to be taken in case of unintentional interruption of services. (iii) Require contractors to prepare spoils management plan (Appendix C-13) and traffic	-List and maps showing utilities to be shifted -Contingency plan for services disruption	Contractor in collaboration with PIU and with approval of PMU	CMSC/ PIU	No cost required. Mitigation measures are part of TOR of PMU, PIU and Consultants

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
		management plan (Appendix C-14)				
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Conflicts with local community; encroachment in sensitive areas; disruption to traffic flow and sensitive receptors	(i) Prioritize areas within or nearest possible vacant space in the project location; (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) Take extreme care in selecting sites to avoid direct disposal to water body which will inconvenience the community. (v) For excess spoil disposal, Contractor will prioritize the use of solid/construction waste disposal sites operated under the consent from RSPCB. If unavailable or not feasible, contractor	-List of pre-approved sites for construction work camps, areas for stockpile, storage and disposal -Waste management plan	Contractor to finalize locations in consultation and approval of PIU	CMSC/ PIU	No cost required. Mitigation measures are part of TOR of PIU and Consultants and also part of contractual terms

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
		contractor shall identify disposal site confirming to the following criteria, obtain required permissions from local body, and submit for the approval of PIU; disposal sites shall be used only after approval of the PIU: (a) site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, written consent from landowners (not lessees) will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies.				

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
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.	(i) Prioritize sites already permitted by the Department of Mines and Geology (ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of PMU and (iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PIU.	Permits issued to quarries/sources of materials	Contractor to prepare list of approved quarry sites and sources of materials with the approval of PIU	CMSC/ PIU	No cost required. Mitigation measures are part of TOR of PIU and Consultants and also part of contractual terms
Consents, permits, clearances, NOCs, etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or stoppage of works	(i) Obtain all necessary consents (including CTE for STP from RSPCB), permits, clearance, NOCs, etc. prior to award of civil works. (ii) Following consents are required- Tree cutting- local authority Storage, handling and transport of	Consents, permits, clearance, NOCs, etc.	PIU and Consultants	CMSC/ PIU	No cost required. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PIU. Mitigation measures are part of TOR of

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
		hazardous materials- RSPCB Sand mining, quarries, borrow areas- Department of mines and Geology Traffic diversion/road cutting- local authority, traffic police (ii) Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (iii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. (iv) Include in detailed design drawings and documents all conditions and provisions if necessary				PIU and Consultants

Table 24: Environmental Management Plan of Anticipated Impacts during Construction

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
EMP Implementation Training	Irreversible impact to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labor laws, applicable environmental laws, etc. (ii) Contractor has to depute a qualified EHS personnel in the start of the project to conduct training to all the personnel and effective monitoring of mitigation measures during construction	Training Plan and its implementation Achievement of the environmental performance targets by the Contractor;	Construction Contractor	CMSC/ PIU	Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU. Other costs responsibility of contractor.
Air Quality	Emissions from construction vehicles, equipment, and machinery used for installation of pipelines resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons.	(i) Consult with PIU on the designated areas for stockpiling of clay, soils, gravel, and other construction materials; (iii) Damp down exposed soil and any stockpiled material on site by water sprinkling necessary during dry weather; (iv) Use tarpaulins to cover sand and other loose material when transported by trucks; and (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly. (vi) Quarterly environmental monitoring for ambient air as per EMP	-Visual inspection -No complaints from sensitive receptors -Records -PUC certificates - CTE and CTO; -Periodic Air Quality Monitoring;	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality.	(i) Prepare and implement a spoils management plan (Appendix C-13) (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iii) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (iv) Dispose any wastes generated by work in designated sites; and (v) Conduct surface quality Monitoring according to the Environmental Management Plan (EMP).	-Periodic Water Quality Monitoring;	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with PIU/Consultants so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s. (v) Quarterly environmental monitoring for ambient noise as per EMP	-No complaints from sensitive receptors; - Periodic Noise level monitoring reports;	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Ground Water Quality	Contamination of ground water quality due to spillage of oil and lubricants	Prepare and implement a spills management plan; Provide impermeable liner on the ground and place layer of mortar or concrete over it in the oil and lubricants storage areas, provide spillage trap in oil and lubricant store, use dip tray and pump to pour oil from oil and lubricant drums; Dispose any oil contaminated wastes generated by construction activities in scientific manner; and Conduct ground water quality monitoring according to the EMP	-Complaints from sensitive receptors; -CTO and CTE compliance; -Periodic GW Quality Monitoring Reports;	Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Soil contamination, landscape and aesthetics	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items.	(i) Store fuel, oils, lubricants etc on impervious and protected areas, ensure spill control kits, and proper containments bunds to ensure no spillage (ii) Prepare and implement spoils management plan (Appendix C-13); (iii) Avoid stockpiling of excess excavated soils; (iv) Coordinate with ULB/PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; (v) Recover used oil and lubricants and reuse or remove from the sites; (vi) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vii) Remove all wreckage, rubbish, or temporary structures which are no longer required; and	As per Appendix C-13.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(viii) Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.				
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Obtain from PIU the list of affected utilities and operators if any; (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service (iii) inform nearby community in advance about the nature and timings of disturbance	As per contingency plan	Construction Contractor	CMSC/ 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 from the Revenue Department; and (iii) Plant three native trees for every one that is removed.	-Records -Plant native tree species as per RUDSICO-EAP Policy	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Land use	Environmental Issues due to land use change	The impact due to change in land use will be negligible due to this project.	-Latest land use records	Not applicable	PMU/ ULB	Not applicable
Accessibility	Traffic problems and conflicts near project locations and haul road	(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) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner;	As per Traffic Management Plan given in Appendix C-14.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(vi) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; (vii) Notify affected sensitive receptors 1-week in advance by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. (viii) Plan and execute the work in such a way that the period of disturbance/ loss of access are minimum. (ix) Provide pedestrian access in all the locations until normalcy is restored.				
Socio-Economic Income.	– Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan (Appendix C-13). Contractor to Implement RP and to follow mitigation measures prescribed such as- (ii) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required for people; (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	-Visible and understandable sign boards in construction zone; -Construction Implementation Schedule	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Socio-Economic - Employment	Generation of temporary employment and increase in local revenue	(i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; (ii) Secure construction materials from local market. (iii) Comply with labor laws	-Employment records	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Occupational Health and Safety	Occupational hazards which can arise during work	(A) Comply with all national, state and local core labor laws (see Appendix C-12 of this IEE) (B) Ensure that qualified EHS personnel is deputed to look the H&S matter (i) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion and accident risks; (v) The project area experiences extreme temperature during summer months of April and May, which may	-Visual inspection -Records -Work schedule -Noise level monitoring in work area -Visible first aid equipment and medical supplies -Condition in H&S plan -Area secured -Trenches barricaded -Supply of water -Providing clean drinking water in worker areas. -Visible and understandable sign boards in construction zone -H&S plan including appropriate	Construction Contractor		Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		affect the health of workers engaged in construction work. Contractor should take necessary measures during summers including the following: (a) work schedule should be adjusted to avoid peak temperature hours (12 – 3 PM); (b) provide appropriate shade near the work place; allow periodic resting and provide adequate water, and (c) provide necessary medicine and facilities to take care of dehydration related health issues (v) Provide supplies of potable drinking water; (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; (viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (x) Ensure moving equipment is outfitted with audible back-up alarms; (xi) Mark and provide sign boards for hazardous areas such as energized	signs for each hazard present -Construction vehicles condition in H&S plan.			

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. (xiii) Provide proper solid and liquid waste management program in workers' campsite, separate from spoils and debris disposal, as their presence can add to existing waste volume at the project sites.				
Occupational health and safety risks	Works on existing sewer lines to add missing links may pose harmful / hazardous conditions endangering workers life of workers	- Contractor and supervising staff should assess the conditions prior to start of work with necessary safety precautions; Gas detector shall be used to measures the level of harmful gases - Appropriate equipment shall be used, and manual working shall not be conducted, such as entry of workers into old/existing sewers etc., - Adequate ventilation shall be maintained, workers on the site shall be provided with appropriate PPEs including oxygen masks and cylinders etc., Implement a site specific Health and Safety (H&S) Plan for sewer rehabilitation works	Implementation of Health and safety plan for sewer rehabilitation works	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with PIU/ULB in identifying high-risk areas on route cards/maps. (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (iv) Provide road signs and flag persons to warn of on-going trenching activities.	As per Traffic Management Plan given in Appendix C-14 .	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Safety of sensitive groups (children, elders etc.) and others pedestrians in narrow streets	Trench excavation in narrow streets will pose high risk to children and elders in the locality	(i) Provide prior information to the local people about the nature and duration of work (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 also to prevent unnecessary entry and to avoid accidental fall into open trenches	-H&S plan including appropriate signs for each hazard present -Construction vehicles condition in H&S plan.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Work Camps and work sites	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants	(i) Consult with PIU before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times;	-Condition in list of preapproved sites for construction work camps, areas for stockpile, storage and disposal prepared by the Contractor.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
	Unsanitary and poor living conditions for workers	(v) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vi) Recover used oil and lubricants and reuse or remove from the site; (vii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (viii) Ensure unauthorized persons especially children are not allowed in any worksite at any given time.				
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 is 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 (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	As per Management Plan for night works (Appendix C-18).	Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		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 equipments 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 (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				

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		reduce noise (xviii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works				
Social and Cultural Resources	Risk of archaeological chance finds and damage/disturbance to resources	(i) develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. This should involve: (ii) Conduct awareness training to contractor & supervision staff prior to start of excavation; (iii) Stopping work immediately to allow further investigation if any finds are suspected; (iv) Calling in the ASI/state archaeological department if a find is suspected, and taking any action they require to ensure its removal or protection in situ (v) 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 (vi) Adjacent to religious/social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building.	Chance find protocol	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(vii) 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, (viii) provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.				
Monsoon preparedness	Disruption of utilities and water logging in trenches	(i) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it (ii) if open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (iii) Guidelines for safety during monsoon is attached as Appendix C-19	As per monsoon preparedness plan& as per Appendix C-19 "Guidelines for Safety during Monsoon/Heavy Rainfall"	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Submission of EMP implementation report	Unsatisfactory compliance to EMP	(i) Appointment of supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures	Availability and competency of appointed supervisor Monthly report	Construction contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
COVID-19 prevention and control during construction works	Health risk to workers due to COVID-19 virus	(i) provide face mask, hand gloves and sanitizers to workers during works (ii) Keep social distancing (iii) Educate workers about risks of COVID-19	Compliance of COVID-19 protocol and guidelines	Construction contractor	PIU/Consultants	Contractor

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(iv) Health check-up of workers suffering with symptoms of COVID-19 and test for same (v) isolation of workers suspected/suffering with COVID-19 and due medical care (vi) follow guidelines of WHO/Central/State/Local government and RUDSICO-EAP regarding COVID-19 (refer Appendix C-23 &24)				
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) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and re-grassed using the guidelines set out in the revegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (viii) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	PIU/Consultant report in writing that (i)worksite is restored to original conditions; (ii)camp has been vacated and restored to pre-project conditions; (iii)All construction related structures not relevant to O&M are removed; and (iv) worksite clean-up is satisfactory.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Table 25: Environmental Management Plan of Anticipated Impacts during Operation

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost Source and of Funds
Construction disturbances, nuisances, public & worker safety	All work sites	Implementation of dust control, noise control, traffic management, & safety measures. Site inspection checklist to review implementation is appended at Appendix C-16	All the dust control will be done by water sprinkling measures at site, noise will be kept well within prescribed limits of standards, Follow Traffic management Plan as given in Appendix C-14 and all the safety measures such as PPE's etc. Site inspection will be done as per checklist is given in Appendix C-16 .	Weekly during construction	Supervising staff and safeguards specialists	No costs required
Check the leakages blockages, overflow problem in sewers	It may affect the sewer system, contaminate land, water and create public health issues	Effective operation to avoid and/or immediate clearance of such leaks, blockages Implementation of regular O&M schedules	Follows regular O & M schedule	Bharatpur Nagar Nigam/O&M contractor	Bharatpur Nagar Nigam	DBO contractor cost O&M Cost
Check the leakages blockages, overflow problem in sewers	Occupational health & safety: for personnel cleaning underground sewers there is a risk due to oxygen deficiency and harmful gaseous emissions (hydrogen sulphide, carbon monoxide, methane, etc.);	(i) Provide necessary health & safety training to the staff engaged sewer cleaning & maintenance (ii) provide appropriate personal protection equipment (including oxygen masks)	-Training and Awareness campaign for Occupational, Health & Safety to ensure the use of PPE's.	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam	O&M Cost
Consent to Operate	Periodical renewal of consent to operate, if not done, may attract penal action from State Pollution Control Board	Renew the consent to operate (CTO) of STP before expiry date and follow all the conditions set forth in CTO	RSPCB	Bharatpur Nagar Nigam/PHED/ O&M Contractor	Bharatpur Nagar Nigam/PHED/ O&M Contractor	Bharatpur Nagar Nigam/PHED/ O&M Contractor

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost Source and of Funds
Treated effluent quality	Water pollution of the receiving body if treated effluent does not meet the standards set by CPCB/RSPCB	Regular monitoring (parameters tests) of treated effluent quality Follow all the parameters given in CTE/CTO	Test results records	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor
Reuse of Treated effluent/safe disposal	Adverse impact on water hydrology and crops	Prepare a plan of reuse of treated effluent in agriculture or other gainful purposes	Records on treated water reuse	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor
Achieving targeted sludge reuse	Violation of ULB commitment under the project. Moreover, a land has been identified for safe sludge disposal. Hence, it is imperative to achieve the targeted sludge reuse under the project.	Ensure that the targeted sludge reuse is achieved throughout the project period	Records	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor	Bharatpur Nagar Nigam/O&M Contractor
Safety precautions during sewage manhole cleaning	Health and safety risk to workers engaged in sewage manhole cleaning	Ensure all the safety equipment are available during manual cleaning As far as possible, use CCTV and mechanical cleaning (sewage jetting machine) for cleaning of manhole	-Training and Awareness campaign for Occupational, Health & Safety to ensure the use of PPE's.	O&M contractor for 10 years and then Nagar Nigam, Bharatpur	Nagar Nigam, Bharatpur	Nagar Nigam, Bharatpur

Table 26: Environmental Monitoring Plan of Ambient Air, Noise, Water and Soil Quality and other During Construction

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost Source & of Funds
Construction disturbances, nuisances, public & worker safety	All work sites	Implementation of dust control, noise control, traffic management, & safety measures. Site inspection checklist to review implementation is appended at Appendix C-16	Weekly during construction	Supervising staff, EHS officer and safeguards specialists	No costs required
Tree cutting	STP, SPS, Pipe laying, and CWR sites	Tree cutting permit taken, Tree cutting done	Continuous	Supervising staff, EHS officer and safeguards specialists	Contractor
Construction, Labour Camp, storage yard Management	Construction, Labour Camp, storage yard Management	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	contractor
Solid waste management	Construction, Labour Camp, storage yard Management	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	contractor
Construction and demolition waste management	All construction site	As per SEMP and applicable rules and regulations	Weekly	EHS officer, Environment Specialist of consultant	contractor
Consent to establish of STP, batching plants, crusher, hot mix plant. DG sets etc.	STP, batching plants, crusher, hot mix plants etc.	Copies of Consents	Periodically	EHS officer, Environment Specialist of consultant	No cost required for monitoring cost for obtaining CTE/CTO from PMU and for others from Contractor
Ambient air quality	5 locations (STP-1, SPS-3, Pipe laying-1) during construction)	PM ₁₀ , PM _{2.5} , NO ₂ , SO ₂ , CO	Quarterly except Monsoon period	Contractor	Contractor
Ambient noise	5 locations (STP-1, SPS-3, Pipe laying-1) during construction)	Day time and night time noise levels	Quarterly	Contractor	Contractor
Ground Water quality	4 locations (STP-1, SPS-3) during construction	pH, TDS, Total Hardness, Zn, Chloride, Iron, Copper, DO, Manganese,	Quarterly except Monsoon period	Contractor	Contractor

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost Source & of Funds
		Suplhate, Nitrate, Fluiride, Hg, Cadmium, Cr ⁺⁶ , Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound			
Soil quality	4 locations (STP-1, SPS-3,) during construction	pH, Elect. Conductivity (at 25°C), Moisture (at 105°C), Texture (silt, clay, sand), Calcium (as CaO), Magnesium (as Mg), Permeability, Nitrogen (as N), Sodium (as Na), Phosphate (as PO ₄), Potassium (as K), Organic Matter, oil and grease	Quarterly except Monsoon period	Contractor	Contractor

Table 27: Environmental Monitoring Plan of Anticipated Impacts During Operation

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Monitoring of raw sewage quality	Inlet of the STP	Suspended solids, pH, Temperature Oil and grease, Total residual chlorine, Ammonical nitrogen (as N), BOD, COD, Nitrate Nitrogen The values should be within the limit specified by CPCB to discharge into municipal sewers (see Appendix C-8)	As per O&M Plan	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam
Monitoring of treated effluent quality	Outlet of STP	pH, BOD, COD, TSS, NH ₄ -N, N-total, Fecal Coliform (as per Appendix C-8)	As per O&M Plan	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam
Monitoring of plantations	Plantations locations	Nos. of tree survived	monthly	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam
Sewer network to sustain operational efficiency and	Sewer network	to be included in the O&M plan prepared under the project	as per O&M plan	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
avoid clogging and early occurrence of leakages					
Consent to operate (CTO) from RSPCB	STPs	CTO should be renewed before expired	5 yearly	Bharatpur Nagar Nigam/PHED	Bharatpur Nagar Nigam, PHED
Reuse of treated effluent and safe disposal	STP outlet	Treated effluent is being used in agriculture or other gainful purposes	Continuously	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam
Sludge Reuse and safe disposal	Sludge Management	Sludge is being gainfully used	Continuously	O&M Contractor/Nagar Nigam	O&M Contractor/Nagar Nigam
Monitoring of quality of water supplied to consumers	Consumer end-random sampling in all zones	As per CPHEEO norms (refer Appendix C-1)	Daily	O&M Contractor	DBO contractor Cost
Pipeline network to sustain operational efficiency and avoid early occurrence of leakages	Pipeline network	to be included in O&M plan prepared under the project	Daily/when required	O&M Contractor	DBO contractor Cost
Reduction of NRW	Pipeline networks	As per RUDSICO-EAP norms	Daily/when required	O&M Contractor	DBO contractor Cost

B. Institutional Requirements

260. The Local Self Government Department (LGSD) is the executing agency which is responsible for the overall strategic guidance and ensure the compliance with ADB loan covenants. RUDSICO is the implementing agency responsible for the technical supervision and project implementation. The RUDSICO Board (under the chairmanship of the Honorable Minister), the LGSD and the City Level Monitoring Committees (CLMCs, under the chairmanship of their respective commissioner/executive officer) is proposed to monitor the project implementation. The PMU is already established at state-level (Jaipur) and headed by a dedicated Project Director. The PIUs have two zonal offices (1 in Jaipur and 1 in Jodhpur). Each zonal office is headed by an additional chief engineer. Urban Local Bodies (ULBs) will be the final custodian and user of the created infrastructure. As primary stakeholders, the ULBs will be involved and engaged in the day-to-day monitoring and implementation.

261. At the PMU level, the Project Director is being supported by Additional Project Director (Chief Engineer-level) and a Chief Engineer, who are being supported by Dy Project Directors (Technical and Administration) and a financial advisor. There is one project officer for Social and another project officer for Environmental aspects within PMU.

262. The PMU is being supported by the Project Management and Capacity Building Consultants (PMCBC). The PMCBC shall manage preparation/vetting design documents, tendering of contracts, implementation of resettlement, environmental management and gender action plans; setting and managing project performance monitoring systems, planning and managing implementation of training and capacity building as well as institutional strengthening activities besides preparing reports as per ADB requirements. PMCBC has engaged a social safeguard specialist and environmental safeguard specialist at the PMU level for managing all social and environmental safeguard related support services as envisaged in its scope of work. They will be assisted by concerned field level safeguard support staffs of CMSCs and PIU.

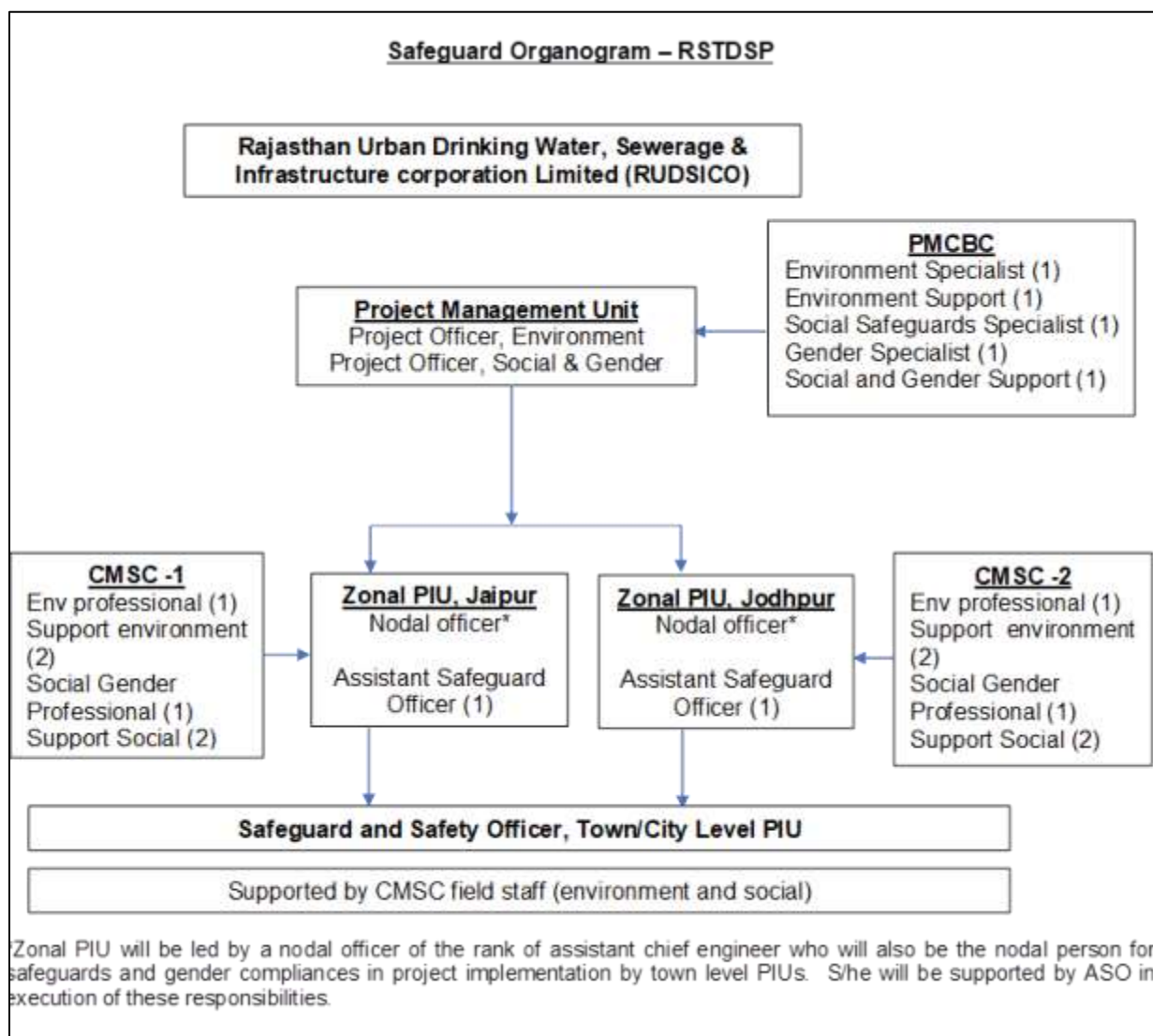
263. There are two zonal PIUs already established in Jaipur and Jodhpur. One PIU shall be established at every town before award of new projects. PIUs at the town-level shall be headed by a Superintending Engineer / Executive Engineer, who shall work as Project Manager and shall sign the contract documents, manage the contract and disburse payments as Drawing and Disbursing Officer.

264. **Construction management and supervision consultants (CMSCs)** - 2 nos. of CMSCs catering to Jaipur and Jodhpur units are already established. They shall directly support PIUs in day to day contract management, construction supervision including quality management of ongoing works etc. This shall include work measurement, quantities, verification of bills of contractors etc. In compliance with the EMP, the CMSC shall develop a strategy to overcome the difficulties of construction/traffic management in narrow streets and also prepare detailed plans for detour of traffic during excavation for pipe laying. The CMSCs will propose and implement mechanism for coordination among all stakeholders such as traffic police, roads department, user committees, etc., for smooth construction execution. Adequate measures shall be taken for working near physical cultural resources involving close coordination with the Department of Archaeology. The CMSC will lead design of surveys and investigations required for the protection of archaeological sites/heritage areas and prepare Archaeological Impact Assessments, or other agreed upon document to be approved by the Department of Archaeology for the archaeologically sensitive locations.

265. **Community awareness and public participation consultants (CAPPC)**- CAPPC core unit is already established at PMU, Jaipur and at fields in ongoing 14 project towns. CAPPC field team and PIU will be established in new towns. CAPPC will closely work in the field (with PIUs) to facilitate creation of project awareness and ensuring public participation for all project works at the community level. This shall mainly involve house connections for water supply, sewerage and metering. CAPPC shall also undertake various IEC activities to promote and pursue health and hygiene among the communities.

266. **Figure 19** shows Environmental Safeguards Implementation Arrangements within RUDSICO-EAP and **Table 28** summarize the institutional responsibility of environmental safeguards implementation at all stages of the project.

Figure 19: Environmental Safeguards Implementation Arrangement



267. **Project Management Unit.** RUDSICO will establish a state-level PMU, headed by dedicated project director, and housed in EAP division of RUDSICO. For the purpose of project implementation, 2 Zonal project implementation units (Zonal PIUs), at Jaipur and Jodhpur, headed by additional chief engineers (ACE) will be established. At PMU, there will be two dedicated project officers (i) project officer (Environment) and (ii) project officer (Social and Gender), who will be responsible for compliance with the environmental, social safeguards and gender in program implementation. Key responsibilities of the project officer (Environment) are enumerated in **Table 28**.

268. The PMU will be supported by 3 institutional consultants under the supervision and control of PD, PMU: (i) the project management and capacity building consultants (PMCBC) will support the PMU; (ii) 2 CMSC will support the 2 zonal PIUs and town-level PIUs; and (iii) CAPPC, will support the zonal PIUs and town-level PIUs.

269. **Zonal Project implementation units (Zonal PIUs).** There are 2 zonal level PIUs at Jaipur and Jodhpur. Under each zonal PIU, there will be city/town level PIUs, for ease of day-to-day monitoring and management at local level. The additional chief engineer at each Zonal PIU will serve as the Nodal Officer, Safeguards and Gender. Each Zonal PIU will be staffed with an assistant safeguards officer (ASO Environmental and Social Safeguards) who will assist PMU project officer (environment/social) in implementation of the environmental/social safeguards and GESI action plan in PIUs under its jurisdiction. Zonal PIUs will undertake internal monitoring and supervision and record observations throughout the project period to ensure that the safeguards and mitigation measures are provided as intended.

270. The zonal level ASO will oversee safeguards implementation by the city/town level PIUs, coordinate public consultations, information disclosure, regulatory clearances and approvals, implementation of resettlement plans, EMP implementation, and grievance redressal. Key safeguard tasks and responsibilities of the zonal PIU ASO (Environment) are enumerated in **Table 28**.

271. **Town/City Level Project Implementation Unit.** The town-level PIUs shall be responsible for the quality of works executed under the project and will be guided by the zonal PIUs. The city/town PIUs will be responsible for implementation of the IEE. The town-level PIUs will be headed by a project manager (executive engineer or assistant engineer) and supported by CMSC field staff. Environment Safeguard Professional of CMSCs will assist PIUs in implementation of environmental safeguard. At each PIU, the Assistant Project Manager will be given additional responsibilities of safeguard tasks and will be designated as safeguard and safety officer (SSO). The SSO will be assisted by the social and gender specialist and environment specialist of CMSC in reviewing updated/revised IEEs, etc. They will also be responsible for coordination of field level activities related to safeguards conducted by the DBO contractor and CMSC. Key responsibilities of the town-level environment specialist are enumerated in **Table 28**.

272. **Contractors.** The contractor will be required to update the IEE and will be responsible for providing final design (including pipe alignments) to the supervision consultant for finalization/updating of resettlement plan. The contractor shall appoint an environment, health and safety (EHS) engineer who will be responsible on a day-to-day basis for (i) ensuring implementation of EMP, (ii) coordinating with the town-level PIUs and environment specialists of project consultant teams; (iii) community liaison,²⁵ consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting.

273. The Contractor has required to submitted to RUDSICO-EAP, for review and approval, a SEMP including (i) proposed sites or 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 per SEMP; (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP.

274. A copy of the EMP or approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and the IEEs specify responsibilities in EMP implementation during design, construction and O&M phases.

²⁵ Reasonable size social outreach team (SOT) to be appointed by contractor to facilitate community liaison, consultations and R&R implementation (including resolution of grievances). Requirement of SOT will be included in bid document.

275. RUDSICO-EAP will ensure that bidding and contract documents include specific provision requiring Contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS, to employees and local communities surrounding the project sites.

Table 28: Institutional Roles and Responsibilities for Environmental Safeguards Implementation

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
PMU (Project Officer; Environment),	(i) Review REA checklists and assign categorization based on ADB SPS 2009 (ii) Review and approve EIA/IEE (iii) Submit EIA/IEE to ADB for approval and disclosure in ADB website (iv) Ensure approved IEEs are disclosed in RSTDSP/PMU websites and summary posted in public areas accessible and understandable by local people. (v) Ensure environmental management plans (EMPs) are included in the bid documents and contracts (vi) Organize an orientation workshop for PMU, PIU, ULB and all staff involved in the project implementation on (a) ADB SPS, (b) Government of India national, state, and local environmental laws and regulations, (c) core labor standards, (d) OH&S, (e) EMP implementation especially spoil management, working in congested areas, public relations and ongoing consultations, grievance redress, etc. (vii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs (viii) Organize an induction course for the training of	(i) Over-all environmental safeguards compliance of the project (ii) Monitor and ensure compliance of EMPs as well as any other environmental provisions and conditions. (iii) Review monthly monitoring report (iv) Prepare and submit to ADB semi-annual monitoring reports (v) If necessary, prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts; (vi) Review and submit Corrective Action Plans to ADB (vii) Organize capacity building programs on environmental safeguards (viii) Coordinate with national and state level government agencies (ix) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs (x) Coordinate PIUs, consultants and contractors on mitigation measures involving the community and affected persons and ensure that environmental concerns and suggestions are incorporated and implemented	Compliance monitoring to review the environmental performance of project component, if required and as specified in EMP

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
	contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation. (ix) Ensure compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements (x) Assist PMU, PIUs, and project NGOs to document and develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE. (xi) Assist in the review of the contractors' implementation plans to ensure compliance with the IEE.		
PIU, Safeguard and Safety Officer (SSO)	(i) Ensure IEE is included in bid documents and contract agreements. Ensure cost of EMP implementation is provided. (iv) Disclose of approved EIAs/IEEs. (v) Obtain all necessary clearances, permits, consents, NOCs, etc. Ensure compliance to the provisions and conditions. (vi) EMP implementation regarding sites for disposal of wastes, camps, storage areas, quarry sites, etc. (vii) Organize an induction course for the training of contractors, preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures, and on taking immediate action to remedy unexpected adverse impacts or ineffective	(i) oversee day-to-day implementation of EMPs by contractors, including compliance with all government rules and regulations. (ii) take necessary action for obtaining rights of way; (iii) oversee implementation of EMPs, including environmental monitoring by contractors; (iv) take corrective actions when necessary to ensure no environmental impacts; (v) submit monthly environmental monitoring reports to PMU, (vi) conduct continuous public consultation and awareness; (vii) address any grievances brought about through the grievance redress mechanism in a timely manner as per the IEEs; and	(i) Conducting environmental monitoring, as specified in the EMP. (ii) Issuance of clearance for contractor's post-construction activities as specified in the EMP.

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
	mitigation measures found during the course of implementation.		
Consultant – 1.PMCBC-Environmental Safeguard Specialist – 1 no. Asbestos Expert – 1no. Heritage Expert – 1no. Biodiversity Expert – 1no.	(i) Review IEE/EMP submitted by CMSC and revise report to submit to PMU (ii) Assist PMU and PIU in obtaining all necessary clearances, permits, consents, NOCs, etc. Ensure provisions and conditions are incorporated in the IEE and detailed design documents. (iii) Assist in ensuring IEE is included in bid documents and contract agreements. (iv) Assist in determining adequacy of cost for EMP implementation. (v) Assist in addressing any concern related to IEE and EMP. (vi). Conduct specific assessment requirements	(i) Monitor EMP implementation (ii) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.	
Consultant- 2. CMSC- 2 nos. Environmental safeguards professional	(i) Update initial environmental assessment for proposed project using REA checklists and submit to PIU/PMCBC (ii) Assist in summarizing IEE and translating to language understood by local people.	Monitoring of Implementation of EMP at site by contractor Recommend corrective action measures for non-compliance by contractors Assist in the review of monitoring reports submitted by contractors (iv) Assist in the preparation of monthly monitoring reports conduct continuous public consultation and awareness;	(i) Assist in the inspection and verification of contractor's post-construction activities.
Contractors (EHS Engineer)	(i) Review the IEE and provide information about changes needed as per revised design and scope of works to ESS of PMCBC for final revision of IEE (ii) Prepare EHS plan and take approval from CMSC/PIU and Ensure EMP implementation cost is included in the methodology. (iii) Undergo EMP implementation orientation by ESS of supervision consultant prior to start of works	(i) Implement EMP. (ii) Implement corrective actions if necessary. (iii) Prepare and submit monitoring reports including pictures to PIU (iv) Comply with all applicable legislation, is conversant with the requirements of the EMP; (v) Brief his staff, employees, and laborer about the requirements of the EMP and provide environmental awareness training to staff, employees, and laborers;	(i) Ensure EMP post-construction requirements are satisfactorily complied (ii) Request certification from PIU

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
	(iv) Provide EMP implementation orientation to all workers prior to deployment to worksites (v) Seek approval for camp sites and sources of materials. (vi) Ensure copy of IEE is available at worksites. Summary of IEE is translated to language understood by workers and posted at visible places at all times.	(vi) Ensure any sub-contractors/ suppliers who are utilized within the context of the contract comply with all requirements of the EMP. The Contractor will be held responsible for non-compliance on their behalf; (vii) Bear the costs of any damages/compensation resulting from non-adherence to the EMP or written site instructions; (viii) Ensure that PIU and ACM/SO are timely informed of any foreseeable activities related to EMP implementation.	

C. Capacity Building and Development

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

277. PMCBC's ESS shall assess the capabilities of the target participants, customize the training modules accordingly and provide the detailed cost.

278. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project, along with the frequency of sessions, is presented in **Table 29**.

Table 29: Capacity Building Program on EMP Implementation

Sl. No.	Description	Target Participants and Venue	Cost and Source of Funds
1	Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement -EARF of RSTDSP -Government of India and Rajasthan applicable safeguard laws, regulations and policies including but not limited to core labor standards, OH&S, etc. -Incorporation of EMP into the project design and contracts -Monitoring, reporting and corrective action planning	All staff, ULBs and consultants involved in the project At PMU, Jaipur	PMU cost
2	Treated Effluent Reuse Concepts, Design and Management	All staff at PMU and ULBs	PMU cost
3	Sludge Reuse Concept, Design and Management	All staff at PMU and ULBs	PMU cost
4	EMP implementation (2 days) -Roles and responsibilities -OH&S planning and implementation -Wastes management (water, hazardous, solid, excess construction materials, spoils, etc.) -Working in congested areas, - Public relations - Consultations - Grievance redress -Monitoring and corrective action planning -Reporting and disclosure -Post-construction planning	All staff and consultants involved in the subproject All contractors before start of construction works At PIU	PMU cost
5	Plans and Protocols (1 day) -Construction site standard operating procedures (SOP) - Asbestos Management Plan -Heritage Impact Assessment -Biodiversity and Critical Habitat Assessment - Site-specific EMP -Traffic management plan -Spoils management plan -Waste management plan - Chance find protocol - O&M plans - Post-construction plan	All staff and consultants involved in the project All contractors before start of construction works or during mobilization stage. At PIU	PMU cost Contractors cost as compliance to contract provisions on EMP implementation
6	Experiences and best practices sharing - Experiences on EMP implementation - Issues and challenges - Best practices followed	All staff and consultants involved in the project All contractors All NGOs At PMU Jaipur	PMU Cost
7	Contractors Orientation to Workers on EMP implementation (OH&S, core labor laws, spoils management, etc.)	All workers (including manual laborers) of the contractor prior to dispatch to worksite	Contractors cost as compliance to contract provisions on EMP implementation

D. Monitoring and Reporting

279. Prior to commencement of the work, the DBO contractor will submit a compliance report to PIU ensuring that all identified pre-construction environmental impact mitigation measures as detailed in the EMP will be undertaken. PIU with the assistance of the SO and ESS of PMCBC, consultant will review the report and thereafter PMU will allow commencement of works.

280. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports to the PIU and ACM, CMSC. Project officer (Environment) and ACM will review and advise contractors for corrective actions if necessary. Monthly report summarizing compliance and corrective measures taken will be prepared by safeguard officer with the assistance of ACM and submitted to PMU.

281. Quarterly report shall be prepared by CMSC and PIU and submitted to PMU for review and further actions.

282. Based on monthly and quarterly reports and measurements, PMCBC will draft semi-annual report and submit PMU for their review and further submission to ADB (**Appendix C-15**). Once concurrence from the ADB is received the report will be disclosed in the Project website.

283. The PMU will submit semi-annual environmental and social safeguards monitoring reports to ADB, which will be reviewed and disclosed on ADB's website. The monitoring reports will be prepared by PMU with assistance from the PMCBC based on inputs from the PIU's safeguard officers, CMSC, contractors and NGOs, where relevant. The status of safeguard implementation, issues, and corrective actions including associated cost and schedule are to be clearly reported to ADB. The status of safeguards implementation will also be discussed at each ADB review mission and with necessary issues and agreed actions recorded in Aide Memoires. ADB will also carry out annual environmental and/or social (including gender) reviews of the Project. The outline of the semi-annual environmental monitoring report is in **Appendix C-15**. ADB's monitoring and supervision activities are carried out on an ongoing basis until a project completion report (PCR) is issued. Thus, semi-annual report, which may cover O&M of completed packages, will be submitted to ADB until PCR is issued.

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

E. EMP Implementation Cost

Most of the mitigation measures require the contractors to adopt good site practice. DBO contractor being bound to adopt several mitigation measures through various legal obligations (e.g., BOCW Act, Labour acts etc.) such as use of PPEs, provide toilets and potable drinking water, labour camp management, safety at work sites, safety in equipment operations etc. which should be part of their normal procedures; are not included in EMP cost of this project. Mitigation that is the responsibility of PIU/ULB will be provided as part of their management of the project, so this also does not need to be duplicated here. Cost for the capacity building program is included as part of the project. Regardless of these, project specific costs of mitigation by the construction contractors are included in the EMP budget for the civil works are enumerated here (**Table 30**)

Table 30: Cost Estimates to Implement the EMP

	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
A.	Mitigation Measures						
1	Compensatory plantation measures*	Construction	per hectare	0.15	137200	20580	Civil works cost
	Subtotal (A)					20580	
B.	Monitoring Measures						
1	Air quality monitoring**	Pre-construction and Construction (quarterly)	per sample	45	4920	2,21,400	Civil works cost
2	Noise levels monitoring**	Pre-construction and Construction (quarterly)	Per sample	45	1980	89,100	Civil works cost
3	Groundwater quality**	Pre-construction and Construction (quarterly)	per sample	45 + 6=51	6720	3,42,720	Civil works cost
4.	Soil quality**	Pre-construction and Construction (quarterly)	per sample	45	5880	2,64,600	Civil works cost
	Subtotal (B)					09,17,820	
C.	Capacity Building						
1.	Introduction and sensitization to environment issues	Pre-construction	lump sum			100,000	PMU
2.	EMP implementation	Construction	lump sum			50,000	PMU
3.	Plans and Protocols	Construction	lump sum			25,000	PMU
			lump sum			25,000	Civil works cost
4.	Experiences and best practices sharing	Construction/Post-Construction	lump sum			100,000	PMU
5.	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	Lump sum			25,000	Civil works cost
	Subtotal (C)					325,000	
D	Civil Works						
1	Water Sprinkling for dust suppression	Construction	KL	5000	111	555,000	Civil works cost
2	Rainwater Harvesting for water conservation	Construction at proposed STP sites	Nos.	1	438819	438819	Civil works cost
3						9,93,819	
4	Barricading						
	Providing and fixing Barricading using 40 mm dia M.S. pipe vertical	Construction	m	162637	50	8131850	Civil works cost

	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
	and horizontal posts						
	Providing and fixing using 40 mm dia M.S. pipe ("B" class) as vertical post and PVC tape	Construction	m	159277	38.50	6132164	Civil works cost
	MS Pipe with nut and bolt and GI corrugated sheets	Construction	Sq.m.	775	101	78275	Civil works cost
	Sub Total (D)					1,43,42,289	
E	Grievance Redressal Mechanism				Lump sum	350,000	Civil works cost
	Sub Total (F)					350,000	
	Total (A+B+C+D+E+F)				INR	16949508	

After confirmatory survey, contractor confirm that no tree will be impacted for proposed project components including laying of sewage network and construction of STP & SPS. However in case of change in alignment in future, tree cutting permission will be taken and compensatory plantation will be done. As per RUDSICO-EAP policy; compensatory plantation in the ratio of 1:3 is to be followed during construction works.

Summary of EMP Cost incurred by Institution:

Contractor Cost - INR 169,49,508 /-

PMU Cost - INR 275,000/-

Total - INR 1, 72, 24,508/-

(In Words: Rupees One Crores seventy-two lacs twenty-four thousand and five hundreds eight only)

Table 31: Details of environment monitoring locations

Project components where environmental monitoring is required	Total numbers of environmental monitoring required in one quarter	Total numbers of environmental monitoring required in year (three quarters leaving quarter of monsoon)	Project duration	Total number of environmental monitoring required during project duration
STPs-1 SPS-3 Sewer networks 1 Total-5 Locations	Air- 5 Noise- 5 Ground Water- 5 Soil- 5	Air- 15 Noise- 15 Ground Water- 15 +2 Surface water in one year Soil- 15	3 years	Air- 45 Noise- 45 Ground Water- 45 + 6 (Surface Water) Soil- 45

X. CONCLUSION AND RECOMMENDATION

285. The process described in this document has assessed the environmental impacts of all elements of the Bharatpur sewerage subproject. All potential impacts were identified in relation to pre-construction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location were not significant. During the construction phase, impacts mainly arise from the construction dust and noise, the need to dispose of large quantities of waste soil and import a similar amount of sand to support the sewer in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. The social impacts (access disruptions) due to construction activities are unavoidable, as the residential and commercial establishments exist along the roads where sewers will be laid. A resettlement plan has been developed in accordance with ADB SPS 2009 and Government of India laws and regulations.

286. Most of the Bharatpur town is already covered by sewerage network. There is existing STP of 8.0 & 5.0 MLD capacity based on SBR technology at Bharatpur Town. Capacity of These STPs is not sufficient to meet the sewer load of town and therefore these STPs are overloaded and proper treatment of sewer is not being done. Sewerage received from various parts of town is disposed untreated in open lands and low lined areas at several places.

287. The subproject is formulated to address gaps in water and sewerage infrastructure in a holistic and integrated manner. The Project Components include improvements in sewerage infrastructure. Whole the sewage generated from municipal limits shall also be treated at STPs as per latest effluent norms.

288. Proposed sites of STPs are located away from habitation areas. However, there are only shrubs and 2-3 trees at these locations which may need to be cut during construction. Adequate compensatory afforestation measures are being proposed under the project to counter the tree-cutting activity. Also, It is proposed to reuse the treated effluent for use in agriculture, horticulture, development of urban forestry etc. and remaining treated effluent is proposed to be discharged in to a nearby drains or vacant govt. lands. In order to achieve recommended standards, it is proposed to achieve very low BOD (BOD 10) and suspended solids in the treated effluent from proposed STPs.

289. At the STP, sewage sludge will be removed continuously from reactors, and solidified using decanter, and stored in sludge drying beds for a period of 7-15 days. The treatment and drying processes kill enteric bacteria and pathogens. Because of its high content of nitrates, phosphates and other plant nutrients the sludge can be used as organic fertilizer.

290. Contractor will propose the plan with best methods for reuse of treated effluent and sludge as per guidelines of CPHEEO and best international practices in consultation with RUDSICO-EAP and Municipal Council and submit it in RUDSICO-EAP for approval. In order to aid preparation of a viable treated wastewater reuse and sludge reuse plan, an institutional and capacity building component shall be incorporated in the Project to enable the ULB staff to develop an understanding of the relevant issues.

291. Certain new initiatives have been taken in the project viz., promoting wastewater reuse, sludge reuse and contractor to work on private properties to provide sewerage connections. Hence, appropriate guidelines for these measures should be provided for these new initiatives. These could include viz., Guidelines for the ULBs for promoting wastewater reuse; Guidelines for

the ULBs for sludge reuse; and Guidelines for the Contractors to work within the private properties.

292. Anticipated impacts of sewerage system during operation and maintenance will be related to repair of blocks, overflows and leakages in sewers. Sewers are not 100% watertight and leaks can occur at joints. Faulty section will be exposed and repaired following the same basic procedure as when the sewer was built. Also, sewer pipes require regular maintenance as silt inevitably collects in areas of low flow over time. Necessary equipment for cleaning and removal of blockages in the sewers are included in the project.

293. 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 implementation. The project's grievance redress mechanism will provide the citizens with a platform for redressing grievances, and describes the channels, timeframe, and mechanisms for resolving complaints about environmental performance.

294. The Environmental Management Plan proposed in the project includes mitigation measures for identified impacts, training and capacity building activities, a monitoring plan to ensure that the environmental standards are maintained throughout the project construction period and a reporting plan to ensure that the project is implemented as per environmentally sound engineering and construction practices. The budgetary provision for mitigating the anticipated impacts by proposed subproject component is made in the project for effective implementation of the EMP Plan.

295. The EMP will assist the PMU, PIU, Consultants and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between PIU/ULB, PMU, consultants and contractor. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

296. The project will benefit the general public by contributing to the long-term improvement of water supply and sewerage system and community liveability in Bharatpur. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigation measures and environmentally sound engineering and construction practices.

297. Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment.

Recommendations.

251. The recommendations for the subproject based on the findings of the draft IEE, and updates on the status of compliance are as follows;

- (i) Include this IEE in bid and contract documents; Complied
- (ii) Ensure contractor appointed qualified environment, health and safety (EHS) officers prior to start of works; Complied
- (iii) Timely disclosure of information and establishment of GRM; Complied
- (iv) Involvement of contractors, including subcontractors, in first level GRM; Complied
- (v) Conduct safeguards induction to the contractor upon award of contract; Complied

219.

- (vi) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design; being complied
- (vii) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location; Being complied
- (viii) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation : Being complied
- (ix) Update and implement the asbestos management plan per site-specific conditions; Not applicable to this subproject
- (x)
- (xi) Ensure that sludge management protocols are compliant with environmental regulations (Solid Waste Management Rules 2016 and its amendments) and solid waste disposal should have a designated site (dumping on vacant lot is not allowed);Being complied
- (xii) Ensure the Construction and Demolish waste management -2016 protocols for disposal of construction waste: Being complied
- (xiii) Strictly supervise EMP implementation; Being complied
- (xiv) Continuous consultations with stakeholders; Being complied
- (xv) Documentation and reporting on a regular basis as indicated in the IEE: Being complied

APPENDIX 1: REA CHECKLIST

Instructions:

The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.

Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

Country/Project Title: India/Rajasthan Secondary Towns Development Investment Program (RSTDP)/Bharatpur Wastewater Sub Project, Distt. Bharatpur, Rajasthan

Sector Division: *Urban Development*

REA Checklist- Sewerage

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area...			
Densely populated?	√		Subproject activities are scattered to entire town including the densely populated areas.
Heavy with development activities?	√		Bharatpur is a developing town with continuous urban expansion, there are no major industries and mostly agriculture, business and service are the common occupations
Adjacent to or within any environmentally sensitive areas?	√		There is Keoladeo national park but project components are out of Eco-sensitive zone of national park.
Cultural heritage site	√		There are various cultural heritage site in Bharatpur but no one is falls under project construction area.
Protected Area	√		There is Keoladeo national park but project components are out of Eco-sensitive zone of national park.
Wetland	√		Keoladeo national park is Ramsar Wetland Site but none of the component are proposed near the Ramsar site.
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
Potential Environmental Impacts Will the Project cause...			
Impairment of historical/cultural monuments/areas and loss/damage to these sites?	√		There are various cultural heritage site in Bharatpur but no one is falls under project construction area.

SCREENING QUESTIONS	Yes	No	REMARKS
Interference with other utilities and blocking of access to buildings; nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc.?	√		Construction work may interfere with the water supply, power and communication lines. Access to houses and business may be affected during pipe laying works. Construction works may cause nuisance to public in form of traffic disturbance, utility disruption, increased noise and air pollution. Proposed STP sites are located away from inhabited areas. Adequate green buffer around the site will be provided to minimize the nuisance due to bad odour, if any.
dislocation or involuntary resettlement of people		√	Project does not involve land acquisition / involuntary resettlement /displacement. During the sewer construction, particularly in narrow streets there may be temporary disruption to household and there will also be temporary loss of livelihood to roadside vendors, the same is addressed in the Resettlement Plan.
disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		√	There is no any surface water source in Bharatpur. Nevertheless, there is proposal of reuse of treated effluent from STP and unused treated effluent shall be discharged in to nearby land or drains, therefore treated effluent needs to meet prescribed standards set by the Central Pollution Control Board (CPCB).
Overflows and flooding of neighbouring properties with raw sewage?		√	Raw sewage shall not cause any flooding and overflowing and will be ensured through regular operation and maintenance.
Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	√		Inadequate sludge disposal may cause environmental pollution (soil and Water) This sewerage system will cater only domestic wastewater, no industrial wastewater discharge is allowed into the sewerage system. As a precaution, ULB should take responsibilities that wastewater from industrial units should not be allowed into sewers.
Noise and vibration due to blasting and other civil works?		√	Blasting for underground works is prohibited in RUDSICO-EAP works
risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?	√		Occupational health and safety risks are negligible due to chemical and biological hazards during construction in sewerage works, physical hazards may arise due to safety risks during construction works. During operation of sewerage system physical and biological hazards may cause health and safety risks to workers for which mitigation measures will be required
Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		√	This sewerage system will cater only domestic wastewater, no industrial wastewater discharge is allowed into the sewerage system.

SCREENING QUESTIONS	Yes	No	REMARKS
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		√	STP is located in remote areas away from habitation. ULB will make provision of buffer zone of 250 m for both STPs (Existing and Proposed STP unit).
Road blocking and temporary flooding due to land excavation during the rainy season?	√		Road blocking/diversion will be done during pipe laying with prior permission from concerned authorities. Contractor has to prepare proper traffic management plan before excavation on roads. Underground construction works (sewer laying, foundations) will be carried out in non-monsoon period. No impacts envisaged
Noise and dust from construction activities?	√		Road cutting (cement and bituminous roads) for sewer laying works is likely to generate noise and dust. Scheduling of works appropriately and prior information to the affected people will minimize the impact. Dust generation will be controlled through water sprinkling, immediate transportation of excess soil, covered transport etc.
traffic disturbances due to construction material transport and wastes?	√		Linear activities like sewer laying along the roads is likely to disrupt traffic. Vehicle movement for construction purpose will increase the traffic. Identification of alternate routes, allowing limited - at least one-way traffic, prior information about the works and alternative arrangements, providing information/sign boards etc will reduce the impact.
temporary silt runoff due to construction?		√	The rainfall over Bharatpur is scanty and is concentrated over four month i.e. from June to September. The rains are erratic and so is the distribution of the rainfall.
hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	√		Sewerage system will be designed with applicable standards. Adequate trained staff and necessary equipment will be in place for regular operation and maintenance of the system. Proposed treatment system will be efficient and appropriate repair and maintenance procedure will be developed. Sufficient funds for operation will be ensured. Backup power supply system is part of project.
deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		√	There is no surface water body in Bharatpur, No untreated/partially treated sewage will be disposed. STP is designed to meet the peak demand. Regular monitoring of treated water will be conducted to check the treatment efficiency.
contamination of surface and ground waters due to sludge disposal on land?		√	Digested Sludge from reactors will be disinfected to be contamination free and will be collected, and stabilized / dried before disposal/reuse. This process will ensure the dried sludge is harmless.

SCREENING QUESTIONS	Yes	No	REMARKS
Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in sewage flow and exposure to pathogens in sewage and sludge?		✓	It is unlikely that sewage contain hazardous substances. Necessary apparatus and personal protection equipment will be provided. Staff will be trained in safe handling of sewage and sludge, and in cleaning of sewers.
large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		Ö	Most of the unskilled workers will be hired locally, some of skilled workers will be brought from outside but numbers will not so large to have impacts on social infrastructure and services.
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 necessary, labour camps and facilities will be provided appropriately. No conflicts envisaged
risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		Ö	No explosives shall be used in project. Fuel and other chemicals will be used in very less quantities which will not have significant impact on community health and safety. Safe handling of fuels and chemicals will be ensured by contractor.
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?	Ö		Community safety risk may be there during construction during excavation for pipe laying, equipment and vehicle operation, construction of STP etc. for which mitigation measures will be required by contractor

Checklist for Preliminary Climate Risk Screening

Country/Project Title: India/Rajasthan Secondary Towns Development Investment Program (RSTDP), Bharatpur sewerage Project, District Bharatpur, Rajasthan

Sector: Urban Development

Subsector: Sewerage

Division/Department: SARD/SAUW

Screening Questions		Score	Remarks ²⁶
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	No such issue may affect the project

²⁶ If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	No such issue may affect the project
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g., prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	No such issues may affect the project
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	No such issue may affect the project
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	No problem will envisaged in future which likely affect the performance of project output

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

Other Comments: The proposed subproject activity involves construction of one new STP and pump houses along with sewerage networks and the anticipated environmental impacts are very marginal and the construction activity does not impose any threat to the existing climatic conditions.

APPENDIX 2: COMPLIANCE WITH ENVIRONMENTAL CRITERIA FOR SUBPROJECT SELECTION

Components	Criteria	Compliance
All subprojects		
	Subproject will avoid potentially significant adverse impacts that are diverse, irreversible or unprecedented (ADB SPS Category A for environment).	Complied- Sub project is not having significant adverse impacts, anticipated impacts are temporary and reversible and can be mitigated through mitigation plans suggested in IEE
	Comply with all requirements of ADB SPS 2009 and follow procedures set in this EARF.	Complied- Sub project complies all the requirements of ADB SPS 2009
	Comply with relevant national, and local laws, rules and regulations regarding EIA, environmental protection, pollution prevention (water, air, noise, solid waste, etc.), wildlife protection, core labor standards, physical cultural resources, health and safety, and other laws in specific sectors as indicated below	Complied- Sub project complies all relevant national and local laws, rules and regulations applicable to this type of sub projects
	Reflect inputs from public consultations	Complied- Stakeholder's consultations are conducted in the project planning phase and suggestions are incorporated in project designs
Location	Avoid involuntary resettlement by prioritizing rehabilitation over new construction using vacant government land where possible, and taking all possible measures in design and selection of site or alignment to avoid resettlement impacts	Complied- All components of sub project are planned on government land only. No land acquisition is done to avoid any involuntary resettlement.
	Avoid or minimize the cutting of trees	Complied- Tree cutting is avoided as far as possible and if tree cutting is unavoidable, it has been minimized to lowest level and compensatory plantation measures are adopted for tree cutting
Biodiversity	Avoid locating subprojects in critical habitats, such as, but not limited to, wildlife/bird sanctuaries, national parks, tiger reserves, elephant reserves, conservation reserves or core zone of biosphere reserves. Appendix 1 provides preliminary analysis using the International Biodiversity Assessment Tool (IBAT) key biodiversity areas, protected areas, IUCN red list species and likelihood of critical habitats per town.	Complied- Keoladeo National Park Reserve is situated in Bharatpur at approx. 2.7 km aerial distance from the sites. None of the components of the subproject are located near or within any environmentally protected areas, core zones of biosphere reserves and highly valued habitat.

Components	Criteria	Compliance
	Should not directly affect environmentally protected areas, core zones of biosphere reserves and highly valued habitat	
	If work is proposed with the aim of improving the conservation or management of designated subproject sites (e.g. improved drainage), this must only be undertaken: (i) after a comprehensive study and development of management plans and criteria; and (ii) with the direct involvement and approval of national and local bodies responsible for the subproject site.	Not applicable to this sub project
Physical Cultural Resources	Should not result in the destruction/damage of or encroachment onto physical cultural resources (PCR) 27 such as archaeological monuments; heritage sites and movable or immovable objects, sites, structures, group of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance.	Complied- There are several State Protected Monuments in Bharatpur, most of them are outside of municipal boundary and only 1 are within municipal limits. Lohargarh Fort is only ASI protected monument in the municipal limits of city. None of the project components are coming under the prohibited or regulated areas of these monuments. Confirmatory survey is required to re assess the impact on cultural heritage sites
Existing Facilities to be rehabilitated or expanded	Conduct environmental audit of existing facilities ²⁸ per ADB SPS	Environmental audit for existing STP is done and included in IEE.
Associated Facilities ²⁹	Analyze environmental impacts and risks to be included in the IEE	Environmental impacts analysed for 8 MLD STP, which is an associated facility and included in IEE.
Asbestos-containing materials (ACM) including, but not limited to, pipes, roofing, ceilings, insulation materials, excess pipes stored in	Avoid handling or removing any ACM. Ensure asbestos concrete (AC) pipes facilities containing asbestos will not be disturbed and left in-situ. Appendix 4 (of EARF) provides asbestos management plan. RUDSICO shall include AMP in all contracts.	Not applicable to this sub project- only sewerage works are proposed under the sub project

²⁷ Physical cultural resources as defined as “movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level.”

²⁸ ADB SPS Appendix 4 para 12 on Existing Facilities

²⁹ ADB SPS Appendix 1 para 6 defines associated facilities as “not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project”

Components	Criteria	Compliance
PHED campuses, walls, etc.		
	When designing subproject infrastructure that involves excavation in urban areas the relevant authorities must be consulted to ascertain the location of any ACM prior to any subproject activity. Locations of new infrastructure must then be designed to avoid excavating or disturbing any ACM.	Not applicable to this sub project- only sewerage works are proposed under the sub project
Right-of-way	Locate water supply pipelines within the right of way (ROW) of other linear structures (roads, irrigation canals) as far as possible, to reduce new land acquisition.	Not applicable to this sub project- only sewerage works are proposed under the sub project
	Ensure that pipelines ROW do not require land acquisition from individual farmers that is a significant proportion of their total land holding (>10%).	Complied- no land acquisition is required for pipe laying works
Sewerage		
Location	Previous projects considered 500m as distance consideration from nearest habitation. This has been reduced to 100m considering facilities will be located in developed areas and technology to be used. RSTDSP considered using Sequencing Batch Reactor (SBR) technology in STPs, which is proven to cause minimal odor as compared to other treatment technologies such as Waste Stabilization Pond or Activated Sludge Process. As far as possible, new Sewage Treatment Plants (STP) should be preferably 100m away from any inhabited areas, in locations where no urban expansion is expected in the next 20 years, thus establishing a buffer to reduce effects of odor, visual appearance or other nuisance of the site (this may be reviewed depending on the technology adopted for the treatment of effluent).	Complied- No dense habitations are found within 100 mts from STP site. At 240 meters distance some scattered houses are present.
	As far as possible Sewage Pumping Stations (SPS) and wet wells should be located preferably 50m from any inhabited areas and from sites such as hospitals, schools, temples, etc. to minimize nuisance impacts from odor, rodents, etc.	Complied- No habitations are found within 50 mts from SPS site.
	Locate STP at sites where there is no risk of flooding or other hazards that might impair function of the STP or present a risk of damage to the STP or the surrounding area	Complied- STP (9.4 MLD) is proposed near Ikran village on government land near to existing STP under Municipal Council. There is no risk of flooding or other hazards that might impair function of the STP or present a risk

Components	Criteria	Compliance
		of damage to the STP or the surrounding area.
Quality	Ensure that sewage is treated at all times to national waste water discharge standards and confirm this by regular monitoring of effluent from the STP.	Will be complied- Regular monitoring of Treated waste water shall be done and after meeting all national waste water discharge standards, treated water shall be discharged in the nearest water body of the town.
Treated water	Ensure that no wastewater is discharged into a water course in which it could be a hazard to downstream users (e.g. a waterway that is used as a source of water for domestic or municipal supply)	Being complied- As far as possible reuse of treated effluent is proposed under the project. After ensuring that treated waste water meet all the national waste water discharge standards, it shall be discharged into Drainage which is located at about 250 meters distance from the proposed STP site.
Sludge	Include measures to ensure the safe disposal of sewage sludge and if possible, to promote its safe and beneficial use as an agricultural fertilizer	It is proposed that safe and beneficial use of sewage sludge as an agricultural manure shall be promoted
Right-of-way for sewer network	Locate sewage pipelines within the right of way (ROW) of other linear structures (e.g. roads) wherever feasible, to reduce new land acquisition.	Complied- Sewers pipes will be laid along the roads/streets in the City within the road right of way (ROW) therefore there is no need of land acquisition.
	Ensure that routes of sewage mains do not require land acquisition from individual farmers that is a significant proportion of their total land holding (10%)	

APPENDIX 3: PUBLIC CONSULTATION AND STAKEHOLDERS CONSULTATIONS CONDUCTED DURING PROJECT PREPARATION

A. Stakeholder consultation

- a. **City level Level Committee (CLC) Meeting (dated. 27.07.2021)**- City Level Committee meeting was organized for Bharatpur sewerage in District Head Quarter, Bharatpur on dated. 27.07.2021 to discuss the matter of proposed Sewerage works in Bharatpur under the chairmanship of District Collector, Bharatpur, in presence of, DPR consultants, RUDSICO-EAP officials, P0HED officials, Municipal Council officials, UIT officials, PWD and other invitee members. Proposed scope of works and technology was discussed in the meeting and it was decided that treated effluent shall be reused by Municipality in beneficial uses. Minutes of CLC meeting, attendance sheet and photographs are given below-

City Level Committee Minutes of Meeting held on 27.07.2021

कार्यालय अधिशाषी अभियन्ता आर.यू.आई.डी.पी. सवाई माधोपुर (राज0)

क्रमांक:- 594

दिनांक:- 27.07.2021

बैठक कार्यवाही विवरण

अधिशाषी अभियन्ता एवं सदस्य सचिव आर.यू.आई.डी.पी. सवाई माधोपुर के पत्रांक 541 दिनांक 19.07.2021 की अनुपालना में दिनांक 24.07.2021 समय दोपहर 12.00 बजे श्रीमान जिला कलक्टर महोदय की अध्यक्षता में भरतपुर शहर का सीवरेंज कार्य आर.यू.आई.डी.पी. की एशियन विकास बैंक की वित्त पोषित योजना धनुर्धर धरण के अन्तर्गत प्रस्तावित योजना की क्रियाविधि के सम्बन्ध में सिटी लेवल कमेटी की बैठक आयोजित की गई। जिसमें निम्नलिखित सदस्यों ने भाग लिया। सूची संलग्न है।

भरतपुर शहर के कुछ भाग में सीवरेंज नेटवर्क डालने का कार्य:- भरतपुर शहर के लिए एशियन विकास बैंक की वित्त पोषित योजना धनुर्धर धरण के अन्तर्गत प्रस्तावित योजना में सीवर लाईन डालने के लिये 125.02 करोड़ रुपये का प्रावधान रखा गया। जिसकी डी.पी.आर. बनाने के लिये नगर निगम भरतपुर द्वारा ग्रीन सिटी सर्वेयर, जयपुर को कार्य सौंपा गया। सलाहकार द्वारा भरतपुर शहर के निम्नलिखित कॉलोनियों में सीवर लाईन डालने के प्रस्ताव बनाये गये।

1. रणजीत नगर	2. मुखर्जी नगर
3. सीक्टर नं0 3	4. ट्रान्सपोर्ट नगर
5. अग्रसेन नगर	6. हरिजन कच्ची बस्ती
7. नई मण्डी	8. रेल्वे स्टेशन के सामने का क्षेत्र
9. प्रिंस नगर	10. बजरंग नगर
11. रेल्वे कॉलोनी	12. शिव नगर कॉलोनी फेज प्रथम
13. राम नगर (ईदगाह कॉलोनी)	14. गांधी नगर
15. बजरिया	16. रुधिया नगर
17. पीएनटी जवाहर	18. नई मण्डी
19. गोकुल नगर	
20. यूआईटी स्कीम	

आर.यू.आई.डी.पी. द्वारा पूर्व में कराये गये सीवर लाईन से वंचित निम्नलिखित कॉलोनियों के शेष भाग को भी इस कार्य में सम्मिलित किया गया है। जो निम्नानुसार है:-

1. बजरंग विहार कॉलोनी	2. नीम दरवाजा कॉलोनी
3. नदिया मीहल्ला	4. बासन गेट
5. सूरजपोल धीराह (नियर गुलाल कुण्ड)	6. नमक कटरा (नियर दाऊदयाल पार्श्व)
7. सहयोग नगर	8. नमक कटरा (मैन पोस्ट ऑफिस के पीछे)
9. नमक कटरा (नियर चोंदपोल गेट)	10. पटपरा मीहल्ला (कोली बस्ती)
11. पुराना डाक खाना (नियर कोतवाली)	12. गोपालगढ़ (हरी सिंह नेता के आगे)
13. लक्ष्मण मन्दिर (गुड की मंडी)	14. बडा मीहल्ला (मीसी किन्नर पार्श्व)
15. नमक कटरा (पार्श्व रैनू गौरावर)	16. मोरी चार बाग
17. बी-नारायण गेट के पास (कोली बस्ती)	18. अनाह गेट बजरिया (मंगी गली)
19. लवानिया मीहल्ला (नियर लक्ष्मण मन्दिर सर्किल)	

20. नवीन सिटी एवं उपरोक्त कॉलोनियों के आस-पास का क्षेत्र।

बैठक में माननीय मंत्री महोदय चिकित्सा एवं स्वास्थ्य, तकनीकी शिक्षा जो कि वर्तमान में भरतपुर शहर के विधायक हैं। उनके द्वारा इस सम्बन्ध में विस्तृत चर्चा की गई।

माननीय मंत्री महोदय द्वारा सर्वप्रथम भरतपुर शहर में आर.यू.आई.डी.पी. द्वारा डाले गये सीवर नेटवर्क की जानकारी ली गई। बैठक में उपस्थित अधिशाषी अभियन्ता आर.यू.आई.डी.पी. द्वारा बताया गया कि उपरोक्त कार्य आर.यू.आई.डी.पी. के द्वितीय चरण के अन्तर्गत वर्ष 2010 से 2019 के बीच में करवाया गया। जिसके तहत भरतपुर शहर की सरकूलर रोड़ के अन्दर की विभिन्न कॉलोनियों में लगभग 74 किलोमीटर सीवर लाईन डाली गई एवं सीवर लाईन को चालू करके नगर निगम भरतपुर को दिसम्बर 2019 में हस्तांतरित कर दिया गया। मंत्री महोदय द्वारा दिनांक 21.06.2021 को आयोजित की गई सिटी लेवल कमेटी की मीटिंग में जो कमियाँ बताई गई थी उनके निवारण के सम्बन्ध में जानकारी ली गई बैठक में उपस्थित अधिशाषी अभियन्ता आर.यू.आई.डी.पी. द्वारा बताया गया कि उन कमियों को देखते हुये डीपीआर में सुधार कर दिया गया है। जिसकी नगर निगम, भरतपुर के अधिकारियों द्वारा सहमति जताई गई। मंत्री महोदय द्वारा बैठक में निम्न निर्देश प्रदान किये गये।

1. मंत्री महोदय ने निर्देश दिये कि नया सीवर कार्य जिस एजेंसी को आवंटित किया जाये। उसके संवेदक से कार्य 18 महीने में पूरा कराया जावे एवं यदि संवेदक द्वारा कार्य में देरी होती है तो इसके लिये संवेदक को पैनल्टी लगायी जाये। तथा समयावधि में यदि संवेदक द्वारा कार्य पूर्ण किया जाता है तो यथाउचित प्रोत्साहन राशि दी जाये।
2. डीपीआर में सी.सी. 4 मीटर चौड़ाई तक एवं बीटी में 7 मीटर चौड़ाई तक सीवर लाईन डालने के पश्चात् पूरी चौड़ाई में रोड़ रेस्टोरेशन कार्य लिया गया है। उस पर सहमति बताई। अधिशाषी अभियन्ता, आर.यू.आई.डी.पी. द्वारा बताया गया कि 4 मीटर सी.सी. चौड़ाई से अधिक एवं 7 मीटर से अधिक चौड़ाई की बीटी में कार्य किया जाता है तो उसका रोड़ रेस्टोरेशन केवल ट्रेन्च में ही किया जायेगा। इस पर सिटी लेवल के चैयरमैन श्रीमान जिला कलक्टर महोदय, भरतपुर द्वारा निर्देश दिये गये कि उपरोक्त रोड़ रेस्टोरेशन पूरी चौड़ाई में किया जाये। जिसके लिये आवश्यक अतिरिक्त राशि का प्रावधान डीपीआर में रखा जावे।
3. डीपीआर में हाउस सीवर कनेक्शन कार्य के लिये प्रति कनेक्शन जो राशि डीपीआर में दर्शायी गई है जो अधिक प्रतीत होती है। उसका पनुः नये सिरे से आकलन किया जावे।
4. परियोजना के कार्य को निर्धारित समयावधि में पूर्ण करने के लिये उसके माइलस्टोन निर्धारित किये जाये एवं कार्य की गुणवत्ता को सुनिश्चित करने के लिये प्रभावी कदम उठये जाये।
5. बैठक में उपस्थित अधीक्षण अभियन्ता जन0 स्वा0 अभियांत्रिकी विभाग, वृत्त भरतपुर के द्वारा अवगत कराया गया कि सीवर लाईन डालने के समय उनके उपभोक्ताओं के नल कनेक्शन एवं विभागीय पाईप लाईन क्षतिग्रस्त हो जाती है। जिसके कारण उपभोक्ताओं को पेयजल समस्या का सामना करना पड़ता है। इसके निवारण के लिये मंत्री महोदय द्वारा आर.यू.आई.डी.पी. एवं नगर निगम के अधिकारियों को निर्देश प्रदान किये गये कि प्रस्तावित सीवर नेटवर्क की ड्राइंग जन0 स्वा0 अभियांत्रिकी विभाग को भी उपलब्ध करावे। एवं जन0 स्वा0 अभियांत्रिकी विभाग मौके पर निरीक्षण करके सीवर नेटवर्क कार्य के अन्तर्गत आने वाली पेयजल पाईप लाईनों की सर्वे करके उनको सीवर नेटवर्क अलाइनमेंट से हटाने के लिये तकमीना बनाकर कार्यकारी एजेंसी को कार्य प्रारम्भ से पूर्व उपलब्ध करावे। जिससे कि आवश्यक राशि जन0 स्वा0 अभियांत्रिकी विभाग में जमा करायी जाकर, कार्य पूर्ण कराया जा सके।

6. मंत्री महोदय द्वारा भरतपुर शहर में चल रहे हाउस सीवर कनेक्शन कार्य की समीक्षा की गई जिसमें नगर निगम के अधिकारियों द्वारा अवगत कराया गया कि आरयूआईडीपी नेटवर्क के 13742 हाउस सीवर कनेक्शन के लक्ष्य के विरुद्ध 5000 कनेक्शन एवं अमृत योजना के 16185 के विरुद्ध 1600 पूर्ण किये जा चुके हैं एवं शेष कार्य प्रगति पर है। इस पर मंत्री महोदय द्वारा नाराजगी व्यक्त की गई तथा हाउस सीवर कनेक्शन के लक्ष्य को तुरन्त प्रभाव से पूर्ण करने के निर्देश दिये गये।

अन्त में मंत्री महोदय द्वारा डीपीआर में उपरोक्त निर्देशों को सम्मिलित करने के निर्देश दिये गये तत्पश्चात् सीएलसी के सदस्यों द्वारा उसका सर्वसम्मति से अनुमोदन किया गया तथा आरयूआईडीपी को उपरोक्त कार्य की शीघ्र निविदा आमंत्रित करने के निर्देश दिये गये।

बैठक सचन्यवाद समाप्त हुई

संलग्न:-उपरोक्तानुसार

क्रमांक:- 595-610

प्रतिलिपि:-

1. निजी सहायक परियोजना निदेशक, आरयूआईडीपी, जयपुर।
2. निजी सहायक जिला कलेक्टर महोदय भरतपुर।
3. निजी सहायक सांसद महोदय लोकसभा क्षेत्र, भरतपुर।
4. निजी सहायक विधायक महोदय विधानसभा क्षेत्र, भरतपुर।
5. निजी सहायक महापौर महोदय नगर निगम, भरतपुर।
6. निजी सहायक उप महापौर महोदय नगर निगम, भरतपुर।
7. श्रीमान अध्यक्ष/सचिव नगर विकास न्यास, भरतपुर।
8. अति० मुख्य अभियन्ता पी.एच.ई.डी।
9. अति० मुख्य अभियन्ता पी.डब्ल्यू.डी।
10. अति० मुख्य अभियन्ता, आरयूआईडीपी जोन, जयपुर।
11. आयुक्त नगर निगम, भरतपुर।
12. अधिशाषी अभियन्ता, नगर निगम, भरतपुर।
13. अधिशाषी अभियन्ता, नगर विकास न्यास, भरतपुर।
14. उप नगर नियोजक भरतपुर।
15. मुख्य कार्यकारी अधिकारी ल्यूमिन भरतपुर।
16. मैसर्स ग्रीन सिटी सर्वेयर, जयपुर।

27/10/21

अधिशाषी अभियन्ता एवं
सदस्य सचिव

आर.यू.आई.डी.पी. सवाई माधोपुर

दिनांक:- 27.10.2021

27/10/21

अधिशाषी अभियन्ता एवं
सदस्य सचिव

आर.यू.आई.डी.पी. सवाई माधोपुर

b. Telephonic discussion with Wildlife and Forest Department on dated 17.10.2021 of Bharatpur

A Telephonic discussion was made with Deputy Conservator of Forest (Wildlife Division Bharapur Phone-05644-222777) and discussed about wildlife area, wildlife moment, migratory bird routes, timing of migratory bird and wildlife and avifauna movement near the proposed site of STP and SPSs.

Out Come of Consultation: - (i) Near the proposed site no wildlife moment has been observed, (ii) In the Bharatpur District Keoladeo National Park is existed and MoEFCC has declared Eco-Sensitive Boundary (iii) In this National Park majority of protected species are mainly birds.

c. Consultation with Officials of Nagar Nigam (Civil Department) Bharatpur

Concern Person: i). Mr. Radeshyam Gujar (JEN –Nagar Nigam Bharatpur)-9079773212

ii) Mrs. Seema Meena ((AEN –Nagar Nigam Bharatpur)-9716624825

Areas of Discussion: Proposed sewerage component in Bharatpur City, Location of Proposed Components and existing sewerage system including network, SPS & STPs.

Outcome of Consultation: i) There are 2 nos. STPs including one is operation and one is near the commission, ii) 2 nos new STPs one in RUIDP –IV and other in AMRUT–III are proposed and iii) Zone 1, 3 & 4 are taken under this RUIDP-IV project.

Public Consultation

Various consultations were done during environmental impact assessment of the project with residents of the town at various locations to understand their level of satisfaction about the present water supply and sewerage conditions in town and also to understand their awareness about the proposed works and their willingness/acceptance of the proposed works under RUSTDIP. Details of these consultations are given below-

Details of Public Consultation

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
07.12.2021, Near Indra Park, Bharatpur	12	12	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				Willingness of local public to pay for improved services.	requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
07.12.2021, Brajwasi Kund, Bharatpur	07	07	00	Project components under RSTDSP and the benefits to the Community. Present status and access of Water Supply and drinking water facilities in the town and other concerned issues and challenges. Process of logging grievance and its mechanism under the project. Willingness of local public to pay for improved services.	Pipeline laying work for water supply is proposed in the area and it was informed by nearby habitation that water facility is provided by concerned department but water supply is intermittent on alternate days along with quality of water is also not good. Process of grievance mechanism was also briefed with participants for lodging complaints. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
07.12.2021, Near Nehru Park, Bharatpur	10	05	05	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 
07.12.2021, Saligram Kund, Bharatpur	24	14	10	Project components under RSTDSP and the benefits to the Community. Present status and access of Water Supply and drinking	Pipeline laying work for water supply is proposed in the area and it was informed by nearby habitation that water facility is provided by concerned department but water supply is intermittent on alternate days along with quality of water is also not good. Process of grievance mechanism was also	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				water facilities in the town and other concerned issues and challenges . Process of logging grievance and its mechanism under the project. Willingness of local public to pay for improved services.	briefed with participants for lodging complaints. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
07.12.2021 Near STP worksite, Bharatpur	12	12	00	Project components under RSTDSP and the benefits to the Community. Present status and access of Water Supply and drinking water facilities in the town and other concerned issues and challenges . Process of logging grievance and its mechanism under the project.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households.	 

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				Willingness of local public to pay for improved services.	Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
07.12.2021 Nagar Parishad, Bharatpur	06	06	00	Proposed water supply works and availability of land, requirement of No objection certificate etc	Meeting with Nagar Parishad A.En, J.En, ward, councilors and officials and discussion were done about proposed project under phase-4. Nagar Parishad officers and officials assured of their full cooperation with RUIDP/RSTDSP during planning and implementation of the project	 
07.12.2021 Red Cross Circle, Bharatpur ; Indra Gandhi Park	15	15	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				m under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local public to pay for improved services.	outsskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
07.12.2021 Bharjwasi Khund; Bharatpur	10	06	04	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households.	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				public to pay for improved services.	Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
07.12.2021 Shani Dev Mandir; Hiradas; Bharatpur	05	05	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
07.12.2021 Nehru Park; Bharatpur	04	04	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
07.12.2021 Shaligram Khund; Bharatpur	16	10	06	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 
31.05.2022 Ganga Mandir; Bharatpur	12	12	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local public to pay for improved services.	prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
31.05.2021 City Gate; Bharatpur	05	05	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local public to	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households.	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				pay for improved services.	Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
31.05.2022 Khumhar Gate; Bharatpur	05	05	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
31.05.2022 Suraj Pole; Bharatpur	04	04	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
31.05.2022 Chand Pole; Bharatpur	03	02	01	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local public to pay for improved services.	prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
31.05.2022 Atal Gate and; Govardhan Gate; Bharatpur	05	05	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges . Willingness of local public to	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households.	

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
				pay for improved services.	Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	
31.05.2022 Anah Gate and; Neemda Gate; Bharatpur	06	06	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 

Date and Location	Participants			Topic Discussed	Outcome	Photographs
	Total	Male	Female			
31.05.2022 Brij Bihari Khund and; Town Hall; Bharatpur	09	09	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Present status and access of Waste Water facilities in the town and other concerned issues and challenges. Willingness of local public to pay for improved services.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are prone to practice open defecation. Process of grievance mechanism was also briefed with participants for lodging complaints. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. Participants are happy with proposed project and are willing to pay for improved sewerage services in the town.	 
31.05.2022 Jama Masjid; Bharatpur	07	07	00	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project.	Pipeline laying work for sewerage is proposed in the area and it was informed by nearby habitation that proper and structured sewerage facilities are not available in this part of the town and residents have their own septic tanks and soak pits. Some people living in outskirts area are	

Attendance sheet of Public consultation at Shaligram kund

Rajasthan Secondary Town Development Sector Project (RSTDSP-Ph-IV)

Consultations with Stakeholders

Project Town... Bhanotpur

Name of Project: Beautification City
Project
Work

Date: 07/12/2021

Place of Consultation Shaligram kund

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	Jiten Kumar	Resident	9983609671	
2	Umesh	Student	6367923645	
3	Kanha	Student	" "	
4	Nitin	Student	6376770285	
5	Mannu K	Local Resident	9119225273	
6	Lachhadevi	" "	9702304933 6376770282	
7	Sudhanshu devi	" "	6376770282	
8				
9	Kamini devi	Local Resident	6376770282	
10	Suman devi	" "	9119225273	
11				
12	Leela Vach	Local Resident	9119225273	
13	Abhishek tiwari	Local	9414025258	
14	Suresh	Self	6375918213	
15	Kashuram Singh	Resident	9460738374	
16	Kashuram devi		9705645625	
17	Urmil	Student	7877130577	
18	Chanchal	Shop Keeper	—	
19	Suman			
20	Dansi	Student	7877114436	

Anil Kumar (CMSCOI; Jaipur Zone)

Attendance sheet of Public consultation at Bharjwasi Khund

Consultation with Stakeholders (Panning/implementation Phase)

Project Town: Bharjwasi
 Date: 07/12/2021
 Name of the project: Beautification / City Development
 Place of consultation: Bharjwasi Khund

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
1	<u>Yousraj (992005583)</u>	<u>Local Resident</u>	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	<u>Local Resident was agreed with the Area Development</u>	<u>[Signature]</u>
2	<u>Krishna Sharma (635058314)</u>	<u>Local Resident</u>	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	<u>" "</u>	<u>[Signature]</u>
3	<u>Aarti Sharma (635058314)</u>	<u>Local Resident</u>	6. Whether project is beneficial for citizens and increase citizen's convenience	<u>" "</u>	<u>[Signature]</u>
4	<u>Boorvor Singh (992917137)</u>	<u>Ex-Army Person (Resident)</u>	7. Whether project is causing any livelihood impact to someone 8. Any historical or cultural monuments in town/near project sites	<u>" "</u>	<u>[Signature]</u>
5	<u>Man Singh (-)</u>	<u>Local Resident</u>	9. Any suggestion about the project 10. Any other relevant information found at site	<u>" "</u>	<u>[Signature]</u>

Hari Kumar Mani Boorvor (CHSCO I; Jaipur Zone)

Name and Signature of the person who done consultation:

Any special issue noted at site:

Consultation with Stakeholders (Panning/Implementation Phase)

Project Town: Bharatpur

Name of the project: Beautification/City Development

Date: 07/12/2021

Place of consultation: Bharigwasi Khurd

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
6	Phulwati	Local Resident	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Resident was agreed with the area development	
7	Shila	Local Resident	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	" "	
8	Rohini (97722666718)	Student	6. Whether project is beneficial for citizens and increase citizen's convenience	" "	
9	Lakshmi Chand	Local Resident	7. Whether project is causing any livelihood impact to someone 8. Any historical or cultural monuments in town/near project sites	" "	
10	Ravi (9982204553)	Student	9. Any suggestion about the project 10. Any other relevant information found at site	" "	

Mani Kumar

Name and Signature of the person who done consultation: Mani Kumar (CMSCOI; Jaipur Zone)

Any special issue noted at site:

Consultation with Stakeholders (Panning/implementation Phase)

Project Town: Red Cross Circle Bhanatpur

Name of the project: Beautification / City Development

Date: 07/07/2021

Place of consultation: Indira Gandhi Park.

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
1	Shri. K. K. Sharma 8240643514	Prachin Mahalla Bhanatpur	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Shopkeepers & Local Resident was agreed with Area development	[Signature]
2	Shri. K. K. Sharma 8240643514	Prachin Mahalla Bhanatpur	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	" "	[Signature]
3	Shri. K. K. Sharma 8240643514	Prachin Mahalla Bhanatpur	6. Whether project is beneficial for citizens and increase citizen's convenience	" "	[Signature]
4	Shri. K. K. Sharma 8240643514	Prachin Mahalla Bhanatpur	7. Whether project is causing any livelihood impact to someone 8. Any historical or cultural monuments in town/near project sites	" "	[Signature]
5	Shri. K. K. Sharma 8240643514	Prachin Mahalla Bhanatpur	9. Any suggestion about the project 10. Any other relevant information found at site	" "	[Signature]

Mani Kumar

Mani Kumar (CMSCOL; Jaipur Zone)

Name and Signature of the person who done consultation:

Any special issue noted at site:

Consultation with Stakeholders (Panning/Implementation Phase)

Project Town: Red cross circle - Bhacatpura

Name of the project: Beautification.

Date: 02/12/2021

Place of consultation: Tarika Gandhi Park.

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
8	Le Khana Jinni 9055304224	Vikash Nagar	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Shopkeepers & Local Resident was agreed with area develop	<i>[Signature]</i>
7	Ramesh Kumar 827903732	Red cross circle	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	" "	<i>[Signature]</i>
8	Hari Kishan	Red cross circle	6. Whether project is beneficial for citizens and increase citizen's convenience	" "	<i>[Signature]</i>
9	Amrit Singh 954060355	Sat Narayan Mandir	7. Whether project is causing any livelihood impact to someone	" "	<i>[Signature]</i>
10	Amrit Singh 954060355	Sat Narayan Mandir	8. Any historical or cultural monuments in town/near project sites 9. Any suggestion about the project 10. Any other relevant information found at site	" "	<i>[Signature]</i>

Muni Kumar

[Signature] Muni Kumar (CMSCOI, Jaipur Zone)

Name and Signature of the person who done consultation:

Any special issue noted at site:

Consultation with Stakeholders (Panning/implementation Phase)

Project Town: Red Cross Circle/ Bhanatpuri

Name of the project: Beautification/ City Development

Date: 02/12/2021

Place of consultation: Indira Gandhi Park

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
1.1	Mohan Singh 8502883749	Constable, Indira Gandhi Park	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Shopkeeper & Local Resident was agreed with consideration	<i>[Signature]</i>
1.2	Diljit Singh 8702883749	Constable, Indira Gandhi Park	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	" "	<i>[Signature]</i>
1.3	Shankar Singh 8785112450	Constable, Indira Gandhi Park	6. Whether project is beneficial for citizens and increase citizen's convenience 7. Whether project is causing any livelihood impact to someone	" "	<i>[Signature]</i>
1.4	Premchand Singh 8889687664320	Constable, Indira Gandhi Park	8. Any historical or cultural monuments in town/near project sites 9. Any suggestion about the project	" "	<i>[Signature]</i>
1.5	Yashvir Singh 8592096026	Constable, Indira Gandhi Park	10. Any other relevant information found at site	" "	<i>[Signature]</i>

Name and Signature of the person who done consultation: Mahi Kumar Mahi Kumar (CHSCOI; Jaipur Zone)

Any special issue noted at site:

Consultation with Stakeholders (Panning/Implementation Phase)

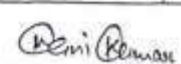
Project Town: Bharatpur

Name of the project: SPS-IV

Date: 07/12/2021

Place of consultation: Mukharji Nagar

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
1	Deepak 9636666638	Recycler	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Resident was agreed with the conce development	
2	Banvari Lal 7891968078	Transport Driver	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	" "	
3	Rahul 9782391415	Scrap shop	6. Whether project is beneficial for citizens and increase citizen's convenience	" "	
4	Panna Lal	shopkeeper	7. Whether project is causing any livelihood impact to someone 8. Any historical or cultural monuments in town/near project sites	" "	
5	—	—	9. Any suggestion about the project 10. Any other relevant information found at site	—	

Mani Kumar  (CMSCOZ, Jaipur Zone)

Name and Signature of the person who done consultation:

Any special issue noted at site:

Consultation with Stakeholders (Panning/implementation Phase)

Project Town: Bharatpur

Name of the project: GPS-V

Date: 02/12/2021

Place of consultation: Shubhash Nagar

S.No.	Name and mobile no.	Designation and/or Address	Topics Discussed	Outcome of the consultation	Signature
1	Muskanlal Sharma (889865846)	Colony Residential	1. Awareness about the project 2. Present status of site/project 3. Status of water supply/ Drainage/sewerage in town	Local Resident was agreed with the area development.	MS
2	Beena Sharma (9694330866)	Residential Personal	4. Requirement of any tree cutting due to project 5. Presence/movement of wild fauna at project town/project sites	u u	01/12/21
3	Naraindas Sharma (7891205524)	u u	6. Whether project is beneficial for citizens and increase citizen's convenience 7. Whether project is causing any livelihood impact to someone	u u	MS
4	Meena Sharma	u u	8. Any historical or cultural monuments in town/near project sites 9. Any suggestion about the project	u u	MS
5	Chandrar Shakti (9571750164)	u u	10. Any other relevant information found at site	u u	Chandrar Shakti

Mani Kumari (Mani Kumari (CMSCOZ, Jaipur Zone))

Name and Signature of the person who done consultation:

Any special issue noted at site:

Attendance Sheet – Jama Masjid

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV) Consultations with Stakeholders

Project Town.....जामा मस्जिद

Name Of Project: Sewerage

Date:.....21/05/22.....Place of Consultation:.....जामा मस्जिद.....

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	मनीष	डेली		मनीष
2	पवन	डेली	9764162509	पवन
3	रमेश चन्द	डेली		रमेश चन्द
4	सुरेश पात	डेली		सुरेश पात
5	अब्दुल हमीद			अब्दुल हमीद
6	मो. इयाजी	इमाम जामा मस्जिद	9955622030	मो. इयाजी
7	चाँड खान	मैनेजर जामा मस्जिद	9561032001	चाँड खान
8				

Attendance Sheet – Kumhar Gate

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV) Consultations with Stakeholders

Project Town.....Bharthar

Name Of Project: Sewerage Project

Date:.....21/04/22

Place of Consulta.....

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	शिव	जोनी		
2	हरन मेह		9677706095	
3	चरण		947158231	पद्मान
4	सुनील	ड्राइ	8098553742	सुनील
5	संजय	ड्राइ	8306671573	संजय
6				

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV) Consultations with Stakeholders

Project Town.....Bharthar

Name Of Project: Sewerage Project

Date:.....21/04/22Place of Consultation: BE NARAIN
Gate

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	Sony Sharma	shop	9079763727	शोनी
2	Diip	driver	8875775850	दिलीप
3	Syrach kumar	shop	9667242731	सुरेश
4	Laxman	Shop	9887557720	लखमन
5	Dhan Singh	shop	8696016506	धनसिंह
6				

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)
Consultations with Stakeholders

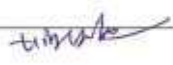
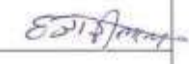
Project Town.....Rharthar

Name Of Project: Sewerage Project

Date:.....31/07/22

Place of Consultation:.....Mathura Gate

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	विजय रावेलाल	इ.डी.	9600223666	
2	मीनो	इ.डी.		
3	मनो	इ.डी.	9503672720	
4	कुलदीप डडल	New 1962	9902858087	
5	हमारी लाल	farmer	7237060502	
6				

Attendance Sheet – Mathura Gate

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)
Consultations with Stakeholders

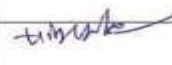
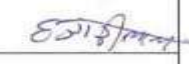
Project Town.....Rharthar

Name Of Project: Sewerage Project

Date:.....31/07/22

Place of Consultation:.....Mathura Gate

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	विजय रावेलाल	इ.डी.	9600223666	
2	मीनो	इ.डी.		
3	मनो	इ.डी.	9503672720	
4	कुलदीप डडल	New 1962	9902858087	
5	हमारी लाल	farmer	7237060502	
6				

Attendance Sheet – Chand Pole

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town: Bhartpur

Name Of Project: Sewerage project

Date: 21/07/22

Place of Consultation: ATAL BAND

GATE

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	<u>राजवीर</u>	<u>इंजी</u>	<u>98000 86541327</u>	<u>राजवीर</u>
2	<u>हजेरा</u>	<u>इंजी</u>	<u>6367315367</u>	<u>- हजेरा</u>
3				
4				

Attendance Sheet – Anah Gate

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town: Bhartpur

Name Of Project: Sewerage Project

Date: 21/07/22

Place of Consultation: Anah Gate

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	<u>विशाल</u>	<u>इंजी</u>	<u>8742078233</u>	<u>विशाल</u>
2	<u>देवीश</u>	<u>इंजी</u>	<u>9634116033</u>	<u>देवीश</u>
3	<u>दीपक</u>	<u>इंजी</u> <u>1204</u>	<u>9028777627</u>	<u>दीपक</u>
4				

Attendance Sheet – Govardhan Gate

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town: सरतपुर

Name Of Project:

Sewerage Project

Date: 31/03/22

Place of Consultation: जोबिपन गेट

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	शर्मा	इंजीनियर	858690051	शर्मा
2	प्रदीप कुमार	इंजीनियर	9414023286	Pradeep Kumar
3	न-गन पंडित	इंजीनियर	7537154643	Nannu
4				
5				

Attendance Sheet – Brij Bihari Kund

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town: भुजपुर

Name Of Project:

Sewerage

Date: 31/03/2022

Place of Consultation: ब्रज बिहारी कुंड

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	शर्मा	इंजीनियर	9799081487	Sharma
2	मिसे	इंजीनियर	7023615227	Mise
3	वीरु लाल गुप्ता	Service	7568797228	Veeru Lal Gupta
4	विशाल लाल	मैकेनिकल इंजीनियर		Vishal Lal
5	महेन कुंज		9783857047	Mahen Kunj
6				

Attendance Sheet – Neemda Gate

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town.....Pharabli

Name Of Project: Sewerage Project

Date:.....21/01/22

Place of Consultation:.....NEEMDA Gate

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	विमल मीर	इ-575	980747272	विमल मीर
2	बच्चू मीर	इ-575	9634975042	बच्चू मीर
3	दीपक		7850006188	दीपक
4				
5				

Attendance Sheet - Town Hall

Rajasthan Secondary Town Development Sector Project (RSTDSP- Ph-IV)

Consultations with Stakeholders

Project Town.....Pharabli

Name Of Project: Sewerage Project

Date:.....21/01/22

Place of Consultation:.....Town Hall

Attendance Sheet

S.N.	Name	Occupation	Mobile Number	Signature
1	राम कुमार		7740930571	राम कुमार
2	मनीष कुमार		9559555509	मनीष कुमार
3	बच्चू मीर		9807370271	बच्चू मीर
4	रोहित मीर		9772856113	रोहित मीर
5				

Photographs of Leaflet distribution

Town-level Stakeholders Consultation Meeting, dated 11.10.2022

An stakeholder consultation/workshop was organised in Meeting Hall of Municipal Corporation, Bharatpur on 11.10.2022 presided by the Minister for Technical Education and Ayurveda, Government of Rajasthan. Meeting was attended by stakeholders as well as public figures. District Collector, Bharatpur, Various Government Department representatives including PHED, Archaeological Survey of India (ASI), Department of Archaeology and Museum, GoR, PHED, PWD, UIT, Municipal Corporation Engineers, Town Planners, Representative engineer of Local self Government department of GoR. TA-Team of ADB with its members interacted on various aspects, sewerage and avenues of tourism development in Bharatpur, City beautification including conservation of its build and natural heritage was discussed in view of long term planning. The meeting got wide coverage in mainstream media and a paper cutting of the workshop is depicted below (Rajasthan Patrika, dated 12.10.2022)



Following participated in the Workshop and Consultation

S.No.	Name	Designation and Department
1.	Dr. Subhash Garg	Minister , Technical Education and Ayurveda, Government of Rajasthan
2.	Alok Ranjan	District Collector , Bharatpur District
3.	Abhijit Kumar	Mayor , Municipal Corporation , Bharatpur
4.	Nawon Kim	Team Leader , ADB
5.	Bhawesh Kumar	Sr. Project Officer , ADB
6.	Kapil Gupta	Superintending Engineer , RUIDP, Jaipur
7.	N.C. Panwar	Superintending Engineer , RUIDP, Jaipur
8.	Arvindo Vijay	Superintending Engineer , PHED, GoR.
9.	Vinod K Chauhan	Superintending Engineer , Municipal Corporation, Bharatpur
10.	Mudasar Ali	CA, Archeological Survey of India (ASI).
11.	Neraj Tripathi	Superintendent, Department of Archeology and Museum, GoR.
12.	Manoharlal Meena	DTP, Town Planning, GOR
13.	K.K. Khandelwal	Senior Town Planner, GoR.
14.	O.P. Kirab	Executive Engineer , PWD, GoR.
15.	D.P. Sharma	Executive Engineer , UIT
16.	Ashok Agarwal	Executive Engineer , PHED, GoR.

17.	Sanjay Kumar Singh	Executive Engineer , PHED, GoR.
18.	K.K. Khandalwal	AC , Devsthanam, GoR.
19.	Pradeep K. Jha	Team Leader , CMSC, RSTDSP, Jaipur
20.	Manas Sharma	Heritage Expert , PMCBC, RSTDSP, Jaipur
21.	Sanjay Grover	PPP Specialist , ADB
22.	Patrik R.	ADB
23.	Sanjay Saxena	Team Leader , TA Team
24.	Urvashi Srivastava	Heritage Expert , TSCPL
25.	Suresh Gupta	TA-Consultant , ADB, TA
26.	Nirdy mangal	TA-Consultant , ADB, TA
27.	Umar Khan	TA-Consultant , ADB, TA
28.	Stephen C.	TA-Consultant , ADB, TA
29.	Srilatha G.	TA-Consultant , ADB, TA
30.	Nomaen Akhtar	TA-Consultant , ADB, TA
31.	KOU SEAM MUM	TA-Consultant , ADB, TA
32.	HONG, NAHI	TA-Consultant , ADB, TA
33.	SEO HAN LIM	TA-Consultant , ADB, TA
34.	Deepa Kumari	Assistant Engineer , MCB
35.	Meena	Assistant Engineer , MCB
36.	Kodi Venkatesan	Chief Manager , BESL
37.	Aakash Saxena	COO , BESL
38.	Shatyabhanu	Director , Dhara Consultants
39.	Devendra Singh	Assistant Engineer , Water Resources Department, GoR.
40.	Radheshyam Gurjar	Assistant Engineer , Municipal Corporation, Bharatpur.
41.	Lokendra Jain	Assistant Engineer , Local Self Governance , GoR.
42.	Vicky Projapat	Project Manager , Green city Surveyors, Pvt. Ltd.

Attendance Sheet –Stakeholder consultation in, Bharatpur (11.10.2022)

S.No	Name	Designation	Department	E-mail	Mobile	Signature
1	Alex Ranjan	District Collector				
2	Dr. Subhash Chary	NIL-A				
3	Ranjit Kumar	Manager				
4						
5						
6						
7	Nawon Kim	Team leader	ADB	nawonkim@adb.org	+63999999/583	
8	Bhavesh Kumar	Sr. Project Officer (Urban)	ADB	bkumar@adb.org	+91 8800729004	
9	Sanjay Grover	Sr. PPP Specialist	ADB	sgrover@adb.org	+91 9999999999	
10	Rafid Rana	Director's Advisor	ADB	rana@adb.org	+91 9999999999	

S.No	Name	Designation	Department	E-mail	Mobile	Signature
11	SANJAY SAXENA	TEAM LEADER TA-TEAM	ADB TA	sanjay@tscpl.com	9811083474	
12	URVASHI SRIVASTAVA	HERITAGE EXPERT TSCPL	ADB TA	SREURVASHI@YAHOO.COM	9871973126	
13	Suresh Gupta	TA consultant	ADBTA		9419652063	
14	Omar Khan	TA - Infrastructure Consultant	ADBTA	umar-jk@yahoo.com	8527605222	
15	Stephen Cairns	TA consultant	FCL/ETHZ	cairns@arch.ethz.ch	96340467	
16	Srinidhi G	TA-consultant	FCL/ETHZ	srinidhi.gopalakrishnan@ethz.ch		
17	Niralya Mangal	TA-consultant	FCL/ETHZ	niralya.mangal@ethz.ch		
18	Nomaan Akhtar	TA-consultant	ADBTA	nomaan@tscpl.com	9125558087	
19	KOU, SEAN BVM	TA-Consultant	Non-A	zedikou@hott-a.com	+82107021148	
20	HONG, NA MI	TA-consultant	Non-A	synhng@hott-a.com	+82107021148	

S.No	Name	Designation	Department	E-mail	Mobile	Signature
31	KAPIL GUPTA	SE	RUIDP, Saurashtra	Kapil73gill@gmail.com	9414262943	
32	H. C. PANWAR	SE	RUIDP Punjab	h.c.panwar@gmail.com	9613613931	
33	Neeraj Tripathi	Superintendent, Bhopal Division	Archaeology Dept.	Supam.ghoshatp@gmail.com	9887722189	
34	Dr. ARVIND VIJAY	SE,	PHED	arvindvijay@gmail.com	9414924112	
35	Vinod Kr Chauhan	SE	MCB	Vinodchauhan75@gmail.com	9414307815	
36	O. P. KRAD	GF	PWT	OPKrad1571@gmail.com	9414014868	
37	Satyabhany Angirash	Director	Dhara Eng Consultants Pvt Ltd	dharaassociates@gmail.com	7727096633	
38	D. P. Sharma	EE	UT	vishwakarma@gmail.com	8209995497	
39	vicky propat	P.H	Lyrean City Surveys Pvt Ltd	greenconsultants.jodhpur@gmail.com	7742420043 9314165000	
40	Ashuk Agarwal	ESA TA+SE	PHED	ashukagrawal.003@gmail.com	5414930207	

S.No	Name	Designation	Department	E-mail	Mobile	Signature
21	SEC. HAN LIM	TA - consultant	HAN-A	hlimco@han-a.co.kr	982 10 0523 5548	
22	mohamed Lal meow	DT P	Team Planning		9160613641	
23	Ravi Raj Varma	STP (Project)	Team Planning	raji.raj@vsnl.com	8761718253	
24	K.K. Khosla	AC Beashten	Beashten		8094735980	
25	Deepa Kumari	SEN	Nagar Nigam		9737483717	
26	Meena Seema Ramhari	SEN	Nagar Nigam	meena.seema.v@gmail.com	9216624825	
27	VODI. VENKATESAN	Chief Manager	BESL	odi.venkatesan@vpg.in	9116107313	
28	AAKASH SAXENA	COO	BESL	akash.saxena@vpg.in	7412060128	
29	MANAS SHARMA	HERITAGE EXPERT	PHC BC (RUIDP)	manas.sharma09@gmail.com	9815354058	
30	PRADEEP KUMAR JHA	Team Leader CMSC-01, RUIDP	CMSC-01 RUIDP	pradeep.kumar.jha@vsnl.com	9910188505	

S.No	Name	Designation	Department	E-mail	Mobile	Signature
41.	Sanjay Kumar Singh	XFn (CMZ)	PHED Region Bharatpur		633523191	[Signature]
42.	Devendra Singh	A.En (M)	WFD Bharatpur		9887529215	[Signature]
43.	Kadheswari Gaur	A.En.	Nagar Nigam Bharatpur		9079773212	[Signature]
44.	Lokendra Jain	A.En.	DDR (LSC) B'PUR		941444535	[Signature]
45.	Mudassar Ali	CA, ASI,	ASI, Bharatpur	cad cabi.ali@gmail.com	9410830786	[Signature]

d. Town-level stakeholder consultation meeting dated 18 January, 2023

Stakeholder consultation was held on 18th January 2023 in the meeting hall of Nagar Nigam Bharatpur and proposed sewerage and beautification works were discussed in detail. Nigam parshad/ or ward councillors suggested that there are so many historical sites in Bharatpur and their renovation is also required. Mayor, Nagar Nigam informed that we will take up these issues with higher authorities and will request to consider under AMRUT scheme.





Stakeholder consultation-Nagar Nigam Conference hall-18.01.23

Rajasthan Secondary Towns Development Sector Project

Minutes of Stakeholder Consultation

Location: Meeting Hall, Nagar Nigam, Bharatpur

Date: 18.01.2023

Title: Stakeholder Consultation on Environment and Social Safeguard.

Location: Meeting hall, Nagar Nigam, Bharatpur

Date: January 18.01.2023

Objectives of Training Workshop:

The primary objective of this consultation was to enhance the knowledge on development induced social and environmental issues related to the implementation of the projects and to introduce the concept of social and environmental safeguards to address those social and environmental issues during the implementing of the projects. The training contains an awareness on social and environmental safeguard policies, best practices and operational guidelines globally practiced.

Participants:

As the module was setting the foundation to understand the concept of social and environmental safeguards, local government bodies (Nagar Nigam, UIT, Archeological Department) staff involved in implementation of the project would be preferred.

- ADB Expert
- Mayor, Deputy-Mayor and Councilors of Municipal council, Bharatpur
- Commissioner, Municipal council, Bharatpur
- Superintending and Executive Engineer of RUIDP
- Executive Engineer, Nagar Nigam, Bharatpur
- Revenue officer, Nagar Nigam, Bharatpur
- Assistant/Junior Engineers, UIT/Nagar Nigam, Bharatpur
- Representatives of PMCBC, Jaipur
- Representatives of CMSC-01, Jaipur
- Representatives of KIPL
- Representatives of CPPC

M. Hussain
Gender & Social
Safeguard
CMSC-01

Q. D. Jain
Env. Safeguards
CMSC-01

P. V. V.
TE-CMSC-01

U. J. J.
SE P. U. Bharatpur

Activity Schedule of Orientation/Training:

Orientation/ Safeguard Training program with officials of Municipal Council-Bharatpur, Project Implementation Unit (PIU), Project Contractor, was held on 18.01.2023 at Meeting hall, Municipal Council, Bharatpur. The objectives of this consultation was as follows.

- ✓ Familiarity with the requirement of social and environment international safeguards, policies and operational guidelines that is applicable for the Rajasthan Secondary Towns Development Sector Project
- ✓ Raising awareness on social and environment risks and implications of the subproject.
- ✓ Role of Contractor for ensure safeguard compliances during implementation of the subprojects.
- ✓ Role of local agencies for effective implementation of the subprojects and coordination with others departments for provide no-objection and others approval.
- ✓ Role of Safeguard Agency for ensure safeguard compliances and effective monitoring and reporting.

As part of the capacity building program of the Rajasthan Secondary Towns Development Sector Project, a one-day Training Workshop/ Consultation on Environmental and Social Safeguards of the Subproject at Bharatpur was conducted on 18.01.2023 at Meeting Hall, Nagar Nigam, Bharatpur



Mr. Vinod Chauhan, Executive Engineer, Nagar Nigam, Bharatpur, welcomed the distinguished guests and participants into the workshop. An agenda of workshop was briefed. He deliberated that the today training will be focused on environmental and social issues (E&S) related to ADB funded waste water and beautification project of Bharatpur Town. He explained the objectives of the workshop.

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Gender & Social
Safeguard
CMSC-01

Dr. J. M.
Env. Safeguard
CMSC-01

Dr. P. K.
TC-018-01

W. Chauhan

DPR Consultant briefed them about the proposed sewerage and beautification works of Bharatpur town. He explained that under the proposed beautification and waste water scheme of Bharatpur town, (i) conservation and redevelopment of town hall; and façade development in Government Special Primary Montessori school, adjacent building of town hall; (ii) Minor repair and façade lighting and illumination of 10 city gates (iii) façade lighting and illumination of Laxman Temple, Ganga Temple and Jama Mosque; (iv) conservation and redevelopment of Saligram Kund and campus; (v) conservation and redevelopment of Bijendra Bihari Kund and campus; and (vi) revitalization of Nehru park. The project is based on DBO contract and operation and maintenance of the project assets will also be under the jurisdiction of contractor for 10 years.

Councillors of Nagar Nigam suggested that contractor and project implementation unit need to touch with councillors of each wards, prior to commencement of works and suggestion of councillors need to be incorporated during implementation of the project.

Shri Abhijeet Kumar, Mayor of Nagar Nigam requested to SE, RUIDP, PIU, Bharatpur that coordination of each department will be required for effective implementation of the project. Shri. Girish Chaudhry, Dy. Mayor requested to all the councillors to provide support to RUIDP and Contractor, as they are engage to improve the waste water system in the town, which are ultimately benefitted to public.

ADB Expert informed that work should be carried out in such a way that no negative impact will be envisaged to anyone. If impact will be unavoidable then it need to be compensated. Grievances mechanism should be follow in the entire duration period of the project and grivances should be resolved in a timely manner.



ADB Expert informed them about the project activities and requirement of environmental monitoring periodically. He briefed about environmental laws and statutory clearances required for the project, environmental issues and mitigation measures, role and

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U. Kumar
SE PIU Bharatpur

responsibility contractor to ensure environmental compliances. He emphasized that It is the responsibility of contractor to ensure that hard barricading (for sewer line) with retro-reflective arrangements for all the open trenches with GI sheets should be provided so that no person or animal can enter/fall in trench. An information board should also be firmly fixed at every such locations giving information about the duration of closure of works and contractor contact details for grievance, if any.



CAPP consultant briefed that throughout project, public awareness activities will be carried out to develop the sense of ownership, so project can sustain for a long time.

The workshop was concluded with vote of thanks to all participants and distinguished guests by Shri Abhijeet Kumar, Mayor.

Attendance Sheet

S. No	Name of Participant	Designation
1	Sh. Abhijeet Kumar	Mayor Nagar Nigam Bharatpur
2	Sh. Girish Chaudhary	Dept. Mayor Nagar Nigam Bharatpur
3	Sh. Nemichand Panwar	SE, PIU, RUIDP, Bharatpur
4	Sh. Vinod Kumar Chauhan	Executive Engineer Nagar Nigam Bharatpur
5	Sh. Deepak Mudgal	Ward Councilor
6	Sh. Shailesh Parashar	Ward Councilor
7	Sh. Shyam Sundar Gaur	Ward Councilor
8	Sh. Bhaskar Sharma	Ward Councilor
9	Sh. Chatar Singh Saini	Ward Councilor
10	Sh. Ramesh Pathak	Ward Councilor
11	Sh. Narendra Kumar Jatav	Ward Councilor
12	Sh. Moti Singh	Ward Councilor
13	Sh. Daudayal Sharma	Ward Councilor

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Adnan
Env. Safeguards
cm 5c-01

Deepak
R-cmk-01

Urbana

14	Sh. Ramesh Dhawai	Ward Councilor
15	Sh. Narendra Chaudhary	Ward Councilor
16	Sh. Kapil Faujdar	Ward Councilor
17	Sh. Rakesh Pathaniya	Ward Councilor
18	Sh. Dinesh Prajapat	Nominated Councilor
19	Sh. Anoop	Nominated Councilor
20	Sh. Ayan Ali Khan	Nominated Councilor
21	Sh. Pankaj Goyal	Ward Councilor
22	Sh. Muddaisar Ali	ASI, Bharatpur Fort
23	Smt. Pushpa Gurjar	Bharatpur Fort Department
24	Smt. Anju Singh	ASI, Bharatpur, Museum
25	Sh. J.D. Singh	Social Expert, PMCBC, RUIDP, Jaipur
26	Sh. Manas Sharma	Heritage Expert, PMCBC, RUIDP, Jaipur
27	Sh. Surendra Singh	Safe Guard Specialist Environment PMCBC, RUIDP, Jaipur
28	Sh. KK Sharma	M&E, Expert, CAPP, RUIDP, Jaipur
29	Sh. Vardhan Singh Rathor	Environment Safe Guard Specialist, CMSC-01, RUIDP, Jaipur
30	Sh. Pradeep Jha	Team Leader, CMSC-01, RUIDP, Jaipur
31	Sh. Anil Vijaywargiya	PO Social, RUIDP, PMU, Jaipur
32	Sh. Govind Singh Rathor	Social Safeguard Consultant ADB
33	Smt. Saswati Deliyappa	Social Safeguard Consultant ADB
34	Sh. Rameshwar Saini	Ward Councilor
35	Sh. Narendra Singh	Ward Councilor
36	Sh. Bhupendra panda	Ward Councilor
37	Sh. Devendra Singh	Ward Councilor
38	Sh. Kishor Saini	Ward Councilor
39	Smt. Vimelesh	Ward Councilor
40	Sh. Mohan Singh	Manager, MTS, Jaipur
41	Sh. Sataybhanu Singh	Director, Dhara Engineer, Consultant
42	Sh. Ashish Kumar Maury	Junior Engineer, Nagar Nigam, Bharatpur

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Urban



Office of The Superintending Engineer,
External Aided project (RUIDP)
Rajasthan Urban Drinking Water Sewerage and
Infrastructure Corporation Ltd. P1U-Bharatpur

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Address: House No. 246 Ram Vatika Rajendra Nagar Bharatpur. (Rajasthan)

Tel: 0562-2622121/2622122

RUIDP/FMU/PL-IV/RHR/2022-23

Date:

Town Level Consultation Bharatpur City Beautification and also Bharatpur Sanitation components with officials of Asian Development Bank (ADB) and RUIDP, Jaipur a meeting is scheduled to be held on 18 January 2023 at 03:30 PM in Nagar Nigam Meeting hall, Bharatpur

Attendance Sheet

S.N	Name	Designation	Department	Mob. No	Signature
1	अभिनीता शर्मा मे 24				
2	विनीता शर्मा मे 34				
3	स. व. पं. शर्मा	SE RUIDP P1U Bharatpur	RUIDP	8619613736	
4	विनीता शर्मा	अ. व. पं. N	Nagar Nigam		
5	Deepak Kumar	Councillor	Nagar Nigam	9414234735	
6	Shailish Kumar	— IL	— IL	9414025830	
7	गोपाल शर्मा	Nagar Nigam Treasurer	Nagar Nigam	9414268421	
8	Blaskar Sharma	Councillor	Nagar Nigam	8335834735	
9	स. व. पं. शर्मा	पार्षद	नगर निगम	9001525736	
10	स. व. पं. शर्मा	पार्षद	नगर निगम	9414234735	
11	स. व. पं. शर्मा	पार्षद	नगर निगम	8375035861	
12	मीती सिंह	पार्षद	नगर निगम	9482743033	



Office of The Superintending Engineer,
External Aided project (RUIDP)
Rajasthan Urban Drinking Water Sewerage and
Infrastructure Corporation Ltd. PIU-Bharatpur

24/11/20

Address: House No. 246, Ram Vatika, Rajendra Nagar, Bharatpur (Rajasthan) Phone: 0562275214/215/216

S.N.	Name	Designation	Department	Mob. No.	Signature
13	हार्दिक कुमार	जार्ज-36	नगर निगम	9660600000	[Signature]
14	रमेश कुमार	जार्ज-36	नगर निगम	9464388	[Signature]
15	नरेश कुमार	जार्ज-36	नगर निगम	9660600000	[Signature]
16	कपिल कुमार	जार्ज-36	नगर निगम	9460740271	[Signature]
17	नरेश कुमार	जार्ज-36	नगर निगम	9461141781	[Signature]
18	विनोद कुमार	GIS Consultant		7792910291	[Signature]
19	अनुराग कुमार	GIS Consultant		773729805	[Signature]
20	Ayaz Ali Khan	GIS Consultant		873889626	[Signature]
21	पवन कुमार	जार्ज-36	नगर निगम	8875424242	[Signature]
22	Mudassar Ali	AST, Bharatpur	AST	940830706	[Signature]
23	पुष्पा कुमारी			753750776	[Signature]
24	Anurag Singh	GIS	Government	8300403233	[Signature]
25	P. D. Singh	Social Expert	PMCB/RUIDP	9602832937	[Signature]
26	MANAS SHARMA	HERITAGE EXPERT	PMCB/RUIDP	9828254008	[Signature]
27	Sankar Singh	Refugee	PMCB/RUIDP	7078358153	[Signature]



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Infrastructure Corporation Ltd. PIU-Bharatpur

भारत

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37	राजेश्वर शर्मा	PMU	PMU, PMU	9462056787	
38	राजेश्वर शर्मा	PMU	PMU, PMU	9413850032	
39	राजेश्वर शर्मा	PMU	PMU, PMU	9787660710	
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APPENDIX 4: INTEGRATED BIODIVERSITY ASSESSMENT TOOL REPORT FOR BHARATPUR SEWERAGE SUBPROJECT



Integrated Biodiversity Assessment Tool

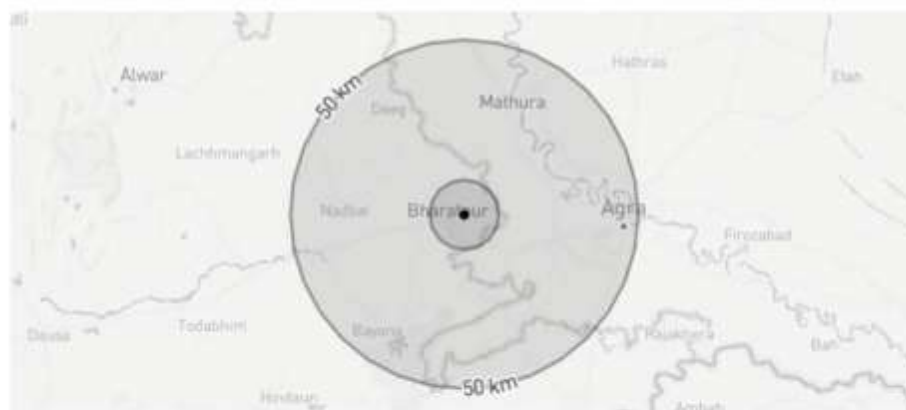
World Bank Group Biodiversity Risk Screen

BHARATPUR PROPOSED STP 14 MLD

- **Country:** India
- **Location:** [27.2, 77.5]
- **IUCN Red List Biomes:** Freshwater, Terrestrial
- **Created by:** Noime Walican

Overlaps with:

Protected Areas	1 km: 0	10 km: 2	50 km: 0	2
World Heritage (WH)	1 km: 0	10 km: 1	50 km: 0	1
Key Biodiversity Areas	1 km: 0	10 km: 1	50 km: 1	2
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0
IUCN Red List	26			
Critical Habitat	Likely			



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



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





About this report

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

Protected Areas:

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

Key Biodiversity Areas:

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

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

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

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

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

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



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Priority Species

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

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest.

For the full IUCN Red List please refer to the associated csv in the report folder.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Batagur kachuga	Red-crowned Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Batagur dhongoka	Three-striped Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Leucogeranus leucogeranus	Siberian Crane	AVES	CR	Decreasing	Terrestrial, Freshwater
Geoclemys hamiltonii	Spotted Pond Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Hardella thurjii	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia gangetica	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia hurum	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Amblyceps anunchalensis		ACTINOPTERYGII	EN	Unknown	Freshwater



Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Oxyura leucocephala</i>	White-headed Duck	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Rynchops albicollis</i>	Indian Skimmer	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Sterna acuticauda</i>	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Neophron percnopterus</i>	Egyptian Vulture	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Falco cherrug</i>	Saker Falcon	AVES	EN	Decreasing	Terrestrial, Marine, Freshwater
<i>Leptoptilos dubius</i>	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Ardeotis nigriceps</i>	Great Indian Bustard	AVES	CR	Decreasing	Terrestrial
<i>Sypheotides indicus</i>	Lesser Florican	AVES	CR	Decreasing	Terrestrial
<i>Vanellus gregarius</i>	Sociable Lapwing	AVES	CR	Decreasing	Terrestrial
<i>Gyps bengalensis</i>	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
<i>Sarcogyps calvus</i>	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
<i>Gyps tenuirostris</i>	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial



Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Gyps indicus	Indian Vulture	AVES	CR	Decreasing	Terrestrial
Manis crassicaudata	Indian Pangolin	MAMMALIA	EN	Decreasing	Terrestrial
Varanus flavescens	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Ploceus megarhynchus	Finn's Weaver	AVES	EN	Decreasing	Terrestrial

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Leucogeranus leucogeranus	Siberian Crane	AVES	CR	Decreasing	Terrestrial, Freshwater
Xenentodon cancila		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rosenbergii	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater



Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

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

Area name	Distance	IUCN Category	Status	Designation	Recommendation
Keoladeo National Park	10 km	Not Applicable	Inscribed	World Heritage Site (natural or mixed)	Highest risk. Seek expert help
Keoladeo National Park	10 km	Not Reported	Designated	Ramsar Site, Wetland of International Importance	Assess for biodiversity risk

Key Biodiversity Areas

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

Area name	Distance	IBA	AZE	Recommendation
Keoladeo National Park and Ajan Bande	10 km	Yes	No	Assess for critical habitat
Sur Sarovar Bird Sanctuary	50 km	Yes	No	Assess for critical habitat

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	53	11	2	5	4	3	38	1



Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
AVES	345	28	8	9	11	17	300	0
ACTINOPTERYGII	48	3	0	1	2	3	40	2
MAMMALIA	64	7	0	1	6	4	53	0
AMPHIBIA	10	0	0	0	0	0	10	0
INSECTA	66	0	0	0	0	0	63	3
MALACOSTRACA	11	0	0	0	0	0	10	1
GASTROPODA	33	0	0	0	0	0	31	2
POLYPODIOPSIDA	2	0	0	0	0	0	2	0
MAGNOLIOPSIDA	43	0	0	0	0	0	40	3
LILIOPSIDA	48	1	0	0	1	0	45	2
BIVALVIA	24	0	0	0	0	0	23	1
ARACHNIDA	1	0	0	0	0	0	1	0



Recommended citation

IBAT PS6 & ESS6 Report. Generated under licence 6274-30795 from the Integrated Biodiversity Assessment Tool on 20 May 2022 (GMT). www.ibat-alliance.org

Recommended Experts and Organizations

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

Birdlife Partners

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

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

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

APPENDIX 5: ENVIRONMENT AUDIT REPORT OF EXISTING COMPONENT

A. ENVIRONMENT AUDIT REPORT OF EXISTING 8 MLD STP (ADB funded)

Environmental Audit of Sewage Treatment Plant at Ikran Village Bharatpur of Nagar Nigam Bharatpur (NNB)

Introduction

Under the ADB funded Rajasthan Secondary Towns Development Sector Project (RSTDSP), it is proposed to develop sewer system (sewer collection and conveyance infrastructure) in different STP zone at Bharatpur town. Since adequate capacity treatment facility is already at Bharatpur STP zone, new STP of 8.0 MLD has been constructed near Nagla Gopal Ikran Village (Bharatpur) in RUIDP Phase-I and under operational stage. Sustainability of new sewer infrastructure and realisation of intended purpose (removing the human waste from those areas served by the network rapidly and treated to an acceptable standard) and benefits (Improved environmental conditions, public health etc.) would accrue only with a properly functioning treatment facility. No new trunk line is proposed under the present proposal as the sewage will be carried to STP through existing trunk line and the sewage will be treated in existing as well as proposed STP. Thus, the performance of existing STP is equally important hence the existing STP is an associated facility as per the ADB Safeguard Policy Statement 2009. Compliance with the environmental safeguards will ensure the subproject sustainability.

The objective of this study is to (i) assess the compliance of the existing sewage treatment plant (STP) with country's environmental regulatory framework; (ii) improve environmental performance, as required, through monitoring the effectiveness of the management system; and (iii) increase the RSTDSP's knowledge of its activities, thus increasing its ability to continually improve and minimize future potential liabilities.

Presently there are 8.0 MLD & 5.0 MLD capacities of STPs constructed under previous phases, located at Ikran village in Bharatpur town. 8 MLD STP was constructed under RUIDP, Phase-II have PTU unit of 24 MLD. Second STP of 5 MLD capacity was constructed under AMRUT 1.0

This STP is designed for treatment of 8.0MLD of domestic wastewater. This STP is based on physico-chemical treatment followed by activated sludge process of biological treatment and sludge digestion. It consists of different process units such as SBR Basins, Chlorination Room, Sludge sump, Dosing Tank, Sludge pump house, Centrifuge House etc. The sewage collected through city sewerage system comes to STP and is treated through different units of the system. The flow meter is installed at the inlet which was found working. The STP has a laboratory to analyse the quality of sewage water for necessary parameters.

There is one 180 KVA DG set installed near treatment plant for emergency power supply. The treated sewage is used for plantation and horticulture, excess treated effluent is discharged.

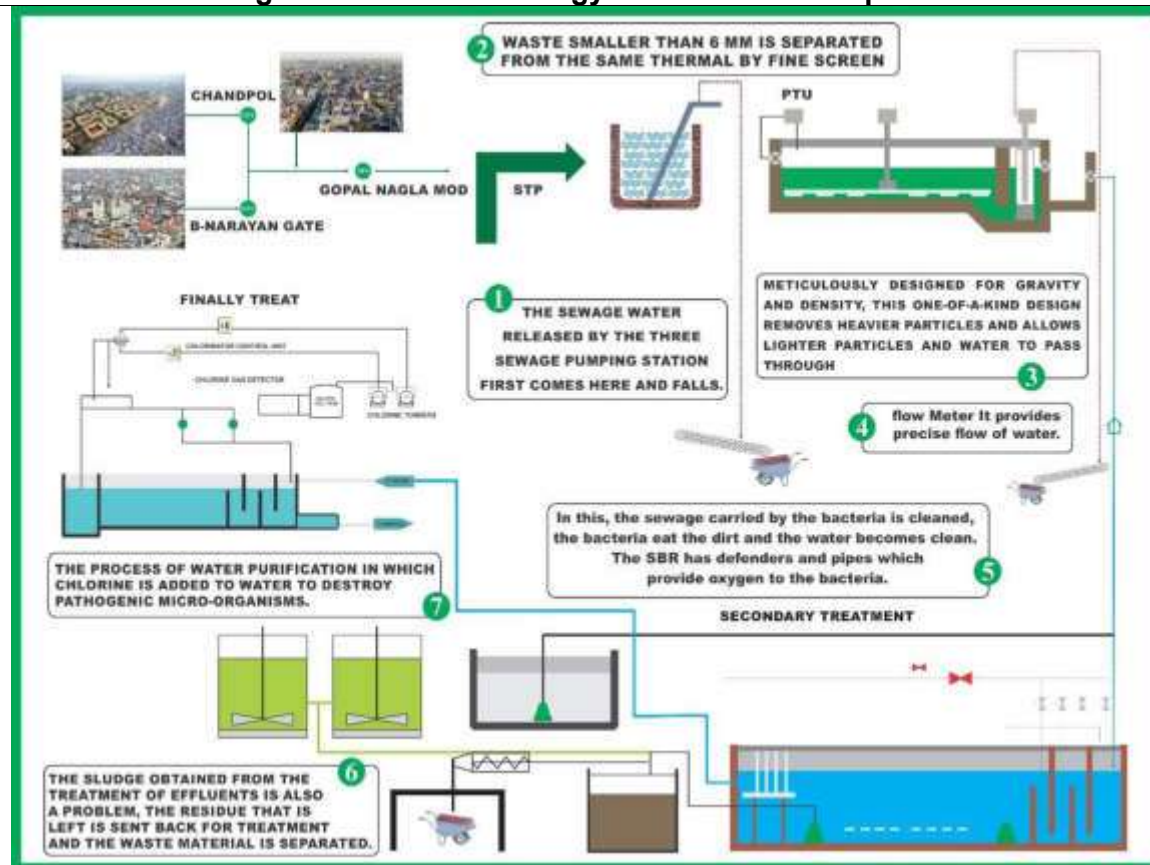
Description of the 8.0MLD STP:

Location	Near Nagla Gopal ,Near Ikran Village (Bharatpur) Latitude: 27°12'16.99"N Longitude: 77°32'49.37"E
Start of operation (year)	01 July 2019
Owned by	Nagar Nigan Bharatpur

Capacity	8.0 MLD														
Sewage treatment process	Sequencing Batch Reactor (SBR) sewage treatment plant. A Sequencing Batch Reactor (SBR) is a fill and draw activated treatment system. As such, SBR are capable of handling all waste waters commonly treated by conventional activated sludge plants. Municipal and industrial waste waters have both been successfully treated in SBR systems. The unit process involved in the SBR and conventional activated sludge systems are identical. Aeration and sedimentation/clarification are carried out in both systems. However, there is one important difference. In conventional plants, processes are carried out simultaneously in separate tanks, whereas in SBR the processes are carried out sequentially in the same tank. Component of 8.0MLD STP are as follows: <table border="1"> <thead> <tr> <th>Components</th><th>quantity</th></tr> </thead> <tbody> <tr> <td>SBR Basins</td><td>02</td></tr> <tr> <td>Chlorination Room</td><td>01</td></tr> <tr> <td>Sludge sump</td><td>01</td></tr> <tr> <td>Dosing Tank</td><td>02</td></tr> <tr> <td>Sludge Pump House</td><td>01</td></tr> <tr> <td>Centrifuge House</td><td>01</td></tr> </tbody> </table>	Components	quantity	SBR Basins	02	Chlorination Room	01	Sludge sump	01	Dosing Tank	02	Sludge Pump House	01	Centrifuge House	01
Components	quantity														
SBR Basins	02														
Chlorination Room	01														
Sludge sump	01														
Dosing Tank	02														
Sludge Pump House	01														
Centrifuge House	01														
	Treatment Process at STP: Process provides highest treatment efficiency possible in a single step biological process. The system is operated in a batch reactor mode this eliminates all the inefficiencies of the continuous processes, because filling in the basin do not allowed during aeration, settling and decanting, hence after treating one batch another batch will be take in basin. A batch reactor is a perfect reactor, which ensures 100% treatment. Four modules are provided to ensure continuous treatment. The complete process takes place in a single reactor, within which all biological treatment steps take place sequentially. No additional settling unit, secondary RUIDP - ADB DETAILED PROJECT REPORT FOR BHARATPUR TOWN WASTE WATER SYSTEM GREEN CITY SURVEYOR'S (P) LTD, Jaipur 81 VOLUME I- MAIN REPORT clarifier is required. The complete biological operation is divided into cycles. Each cycle is of 3 – 5 hrs duration, during which all treatment steps take place. Explanation of cyclic operation: A basic cycle comprises: (1) Fill-Aeration (F/A) + (2) Settlement (S) + (3) Decanting (D) These phases in a sequence constitute a cycle, which is then repeated. During the period of a cycle, the liquid is filled in the Basin up to a set operating water level. Aeration Blowers are started for aeration of the effluent. After the aeration cycle, the biomass settles, No extra settling unit is required after the aeration basin. The Cyclic Activated Sludge Process/SBR comprises the following features, 1. Biological Selector zone ENSURES NO FOAMING AND BULKING PROBLEMS 2. Oxygen Uptake rate control “OUR” ENSURES 40 - 50% POWER SAVINGS 3. Co Current Nitrification and De nitrification, Phosphorous removal this feature ENSURES more than														

80% nitrogen and Phosphorous removal within the same basin without need of any external units, mixers, and recycle pumps etc. 4. decanter assembly in stainless steel ENSURES no corrosion, long equipment life, no maintenance 5. Diffusers, Blowers and Aeration grid 6. Submersible pumps for return sludge (RAS) recycle and Surplus sludge (SAS) pumps for sludge wasting reduces space requirement. no secondary clarifier is used which drastically reduces civil cost. 7. PLC unit for complete automatic cycle control and operation reduces manpower cost complete operation can be hooked to central control desk.

Process Flow Diagram of SBR Technology based STP Bharatpur



Process Flow Diagram of Existing 8.0MLD STP

Treatment efficiency

Normally about 60-65% treatment efficiency (BOD removal) is expected in Activated Sludge process STPs.

The Expected raw sewage Characteristics Parameter are as follows

pH – 6.5-7.5

COD – 600 mg/l

BOD – 300 mg/l

TSS – 600 mg/l

TKN- 55 mg/L

TP- 6 mg/L

The treated effluent parameters are 18.05.2017

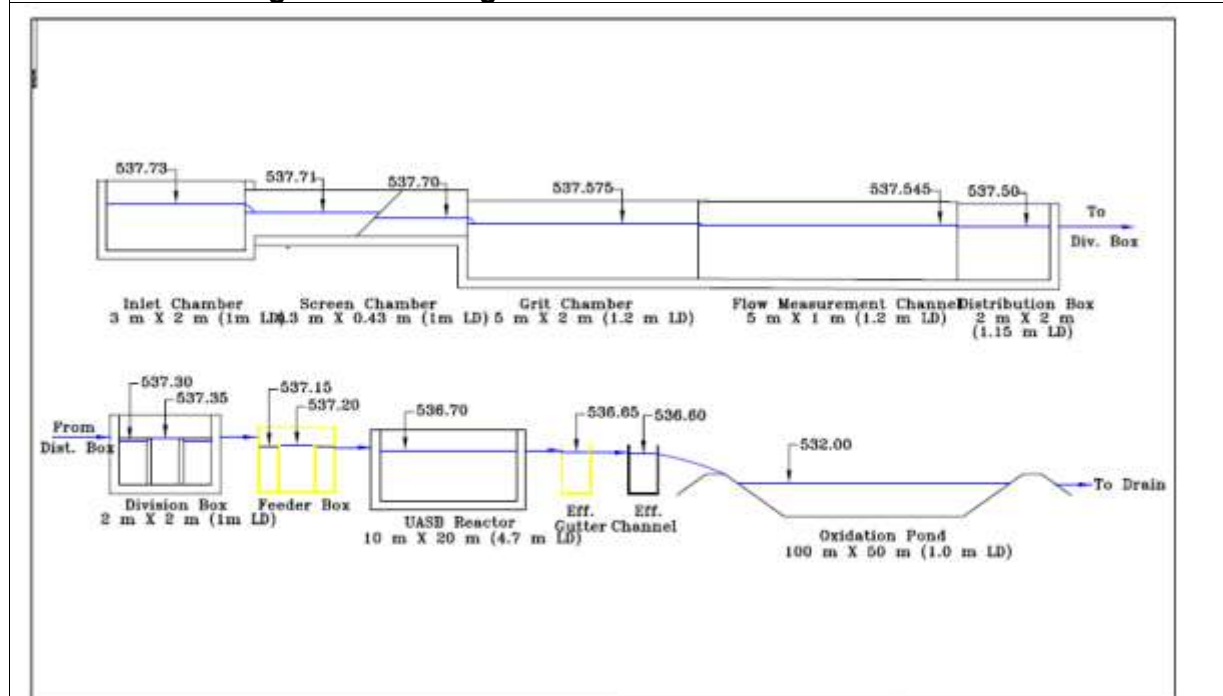
pH – 7.0-8.0

COD – 100 mg/l

BOD – <10 mg/l

	TSS – <10 mg/l TKN- <10 mg/L
Sludge management	Centrifugal process, average quantity 180-190
Treated wastewater (effluent disposal)	Disposal nearby flood Drain
Sludge disposal	Gravity thickeners for sludge from clarifiers, mechanical sludge dewatering system but No sludge drying bed were constructed for existing STP

Process Flow Diagram of Existing 8.0MLD STP



Compliance with Applicable National and State Laws, Rules, and Regulations

Law, Rules, and Regulations	Description and Requirement	STP at Nagla Gopal 8.0MLD
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ³⁰ 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

³⁰Compliant = 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.

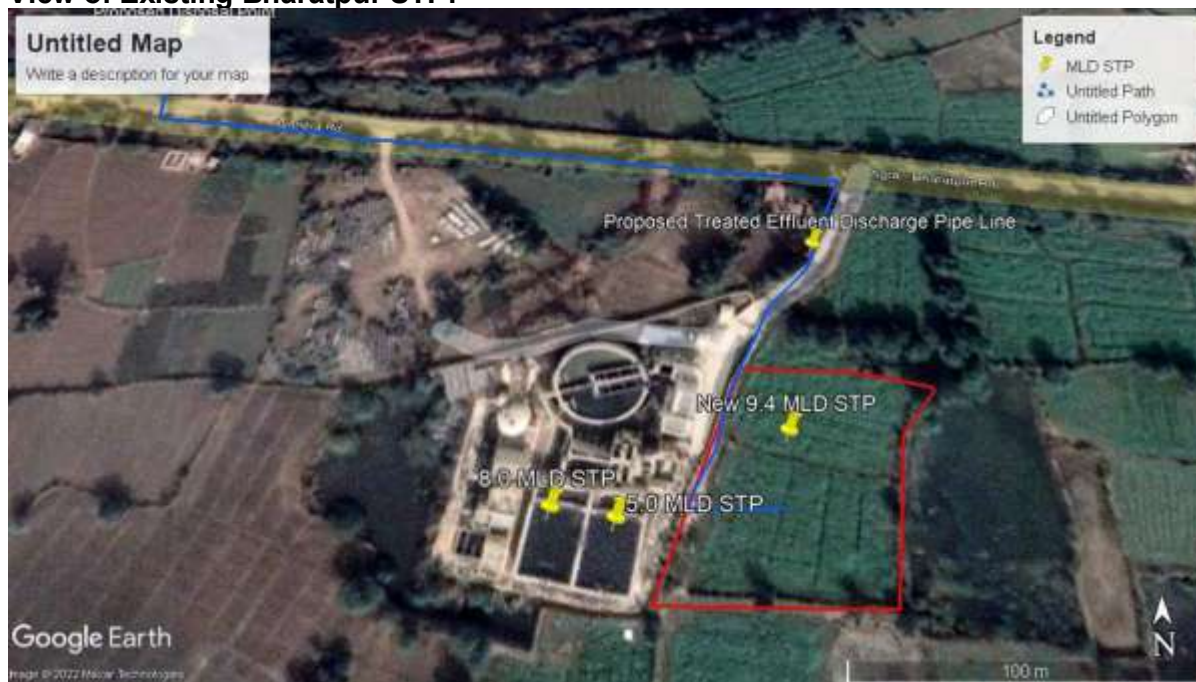
		Environmental clearance is not required as STPs are not listed in the EIA Notification's "Schedule of Projects Requiring Prior Environmental Clearance"
Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989	Storage of chlorine (threshold quantity greater than 10 tons but less than 25 tons) in WTPs will require clearance from PESO	N/A No chlorine used or stored in the STP.
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	Consent to operate from RSPCB	The 8.0MLD STP has valid CTO under water act from RSPCB – consent order no. 2020-2021/Liquid Waste/10 dated 15.01.2021 Valid from 15/09/2019 to 31/08/2024 For disposal of treated effluent On Land for Plantation/Horticulture after adequate treatment. (Annexure 2) Online Continuous Effluent Monitoring System is working now and the data is being maintained. (Copy of Online OCEMS photographs are attached in Appendix:10)
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	Consent to operate from RSPCB	The 8.0MLD STP has valid CTO under air act from RSPCB- CTO order no 2020-2021/Liquid Waste/10 dated 15.01.2021 Valid from 15/09/2019 to 31/08/2024 for 180 kVA DG Set valid for a period from 15/09/2019 to 31/08/2024 for 180 KVA DG set (Annexure -2)
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	Y As per the results depicted in test register of O&M contractor, the treated parameters are within the limits prescribed in CTO. As per the CTO issued by RSPCB, STP effluent shall meet the following disposal standards: TSS - Not to exceed 20 mg/l, pH - 5 to 9.0, BOD - (3 days at 27°C) Not to exceed 10 mg/l, Fecal Coliform not to exceed 230 MPN/100 ml.
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 Bio solids	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
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 Department of Archaeology.	N/A
The Child Labour (Prohibition and Regulation) Act, 1986	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 STP is operated by contract staff. No children are engaged.

Institutional Arrangement

Parameter	STP
Operations	Continuous operation; involves, mechanical and electrical operation;
Estimated number of technical employees on-site per shift	8.0MLD STP Plant Chemist -02 Senior Chemist-01 (Raju mahavir) Junior Chemist-01 (shubham) Electrician / Instrumental technician (ITI/ Diploma in electrical) -01 (vijendra gurjar) Mechanic-01 (Pappu Yadav)
Estimated number of laborers on-site per shift	
Estimated number of employees in charge of environmental management and monitoring	Two chemist and a junior chemist are responsible for environmental management and monitoring.
Frequency of waste water quality monitoring (raw)	Daily in in house laboratory
Frequency of wastewater quality monitoring (treated)	Daily in in house laboratory
Frequency of sludge quality monitoring	not conducted

Corrective Action Plan : As presented in the above table, there are no regulatory non-compliance issues in the existing infrastructure in 8 MLD existing STP Plant where CTE and CTO are already taken. An online monitoring system, as recommended in the CTO, has been successfully installed at the STP. Furthermore, health and safety training for contractors' staff at the existing STP has been scheduled, and the monitoring of sludge quality has commenced as per the conditions of CTO. The proposed STP is designed to incorporate sludge drying beds for both new and existing STPs, with the layout of the STP depicting the proposed sludge drying bed provided in Appendix 5. It is imperative to ensure regular compliance measures are adhered to against the general and specific conditions stipulated in the CTO clearance of the STP.

View of Existing Bharatpur STP:

STP Bharatpur. Google Earth image

Annexure -1 Lab testing report of STP effluent at outlet

*** B.M.P. STP (SBR PROCESS) NEAR GOPAL MADANA BHARATPUR (RAJ) ***										DAILY LAB ANALYSIS REPORT MONTH OF MARCH 2022 ***									
INLET CHARACTERISTICS										OUTLET CHARACTERISTICS									
DATE	FLOW	PH	TSS	COD	BOD	DO	TN	TP	Ph	TSS	COD	BOD	DO	TN	TP	ENTRANT	SIGN	REMARKS	
UNIT	m ³	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Flow	CHEMIST	CLIENT	
LIMIT	8000	7.5-8.5	650	650	300	-	-	-	-	610	650	10	-	<10	<1	m ³			
01-03-2022	5548	7.04	106	186	57	0.48	12.4	4	7.22	9	40	7	2.04	2.6	0.5	4923	2000		
02-03-2022	5267	7.17	114	184	60	0.41	10.4	3	7.20	8	36	8	2.02	2.4	0.4	5533	2000		
03-03-2022	5175	7.06	102	182	63	0.43	11.6	4	7.18	9	44	8	2.01	2.8	0.5	5199	2000		
04-03-2022	5132	8.98	108	200	60	0.32	10.4	3	7.12	9	40	7	2.12	2.4	0.3	5825	2000		
05-03-2022	5150	7.03	104	224	66	0.44	12.4	4	7.28	9	44	8	2.03	2.5	0.4	5159	2000		
06-03-2022	5104	7.24	119	216	70	0.33	10.4	3	7.34	8	32	6	2.22	2.2	0.3	5259	2000		
07-03-2022	5204	7.03	110	232	63	0.42	12.4	4	7.28	9	36	6	2.22	2.1	0.4	5680	2000		
08-03-2022	5242	7.12	116	208	63	0.36	9.6	3	7.36	8	40	6	2.10	2.6	0.3	5844	2000		
09-03-2022	5131	7.26	104	224	65	0.42	10.4	4	7.41	9	36	6	2.13	2.2	0.4	5231	2000		
10-03-2022	5143	7.36	102	116	70	0.32	11.4	5	7.24	8	44	7	2.24	2.4	0.5	4961	2000		
11-03-2022	5278	7.03	124	220	55	0.40	10.4	4	7.28	7	48	10	2.40	3.0	0.8	6115	2000		
12-03-2022	5148	7.12	104	932	60	0.46	10.4	4	7.28	9	40	8	2.32	2.6	0.4	5154	2000		
13-03-2022	5191	6.96	104	884	60	0.42	11.4	3	7.26	8	36	6	2.32	2.4	0.5	5551	2000		
14-03-2022	5143	6.33	110	184	57	1.06	10.4	3.5	7.30	10	48	6	2.05	1.5	0.6	5146	2000		
15-03-2022	5104	6.33	116	208	66	0.80	11.2	4.5	7.1	7	48	7	2.03	1.0	0.7	5430	2000		
16-03-2022	5210	6.38	102	200	63	2.30	3.8	5.0	7.03	9	61	2	2.5	2.0	0.5	3135	2000		
17-03-2022	5131	7.06	120	204	66	1.45	10.4	4.5	7.20	8	40	7	2.05	1.5	0.6	6135	2000		
18-03-2022	5131	6.33	114	192	55	1.46	7.2	4.0	7.21	9	44	9	2.12	2.2	0.5	6110	2000		
19-03-2022	5123	7.12	106	210	60	1.40	12.4	5.0	7.25	8	36	7	2.14	2.2	0.7	6131	2000		
20-03-2022	6132	6.37	110	220	63	0.42	10.4	4.5	7.18	8	40	8	2.32	3.1	0.6	4666	2000		
21-03-2022	4080	6.33	112	800	60	1.36	12.4	5.0	7.20	7	48	7	2.35	2.0	0.4	2633	2000		
22-03-2022	5110	7.01	120	136	70	0.50	11.4	4.0	7.08	10	44	7	2.30	2.5	0.7	3264	2000		
23-03-2022	5119	7.11	106	136	66	0.45	11.4	4.5	7.25	10	34	8	2.25	1.5	0.5	1454	2000		
24-03-2022	5002	7.01	128	220	71	0.55	11.4	5.0	7.21	9	48	8	2.12	2.0	0.8	4422	2000		
25-03-2022	5001	7.02	108	210	65	0.48	12.4	5.0	7.10	10	60	8	2.52	1.5	0.5	5429	2000		
26-03-2022	4713	6.33	120	136	65	0.30	11.4	5.0	7.10	9	44	7	2.00	2.5	0.5	3071	2000		
27-03-2022	5128	7.12	114	228	70	0.46	12.6	4.9	7.28	8	40	2	2.54	2.6	0.7	5129	2000		
28-03-2022	5000	7.10	110	200	66	0.54	3.8	4.5	7.20	7	48	7	0.55	0.9	0.8	5118	2000		
29-03-2022	5001	6.33	122	136	55	0.40	12.6	3.5	7.12	10	44	7	0.45	0.4	0.5	3361	2000		
30-03-2022	5146	7.04	110	210	60	0.36	10.4	4.0	7.28	10	36	7	0.05	0.5	0.7	2565	2000		
31-03-2022	5140	6.33	124	200	70	0.48	12.4	4.5	7.12	7	70	6	0.5	1.0	0.5	5121	2000		

PAGE NO.
(DATE)

PAGE NO.
(DATE)

*** 11/12/2022 (SAR) (SAR

*** BOLD STP (SBR PROCESS) NEAR GOPAL NAGALA BHARATPUR (Raj.) DAILY LAB ANALYSIS REPORT MONTH OF MAY 2022 ***																	
INLET PARAMETER									OUTLET PARAMETER								
DATE	TIME	PH	TSS	CO2	BOD	AMMONIA	TN	TP	DO	Flow	PH	TSS	CO2	BOD	AMMONIA	TN	TP
UNIT	m3	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	m3	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SIGNATURE	LAB	CLERK															
05/05/22	0800	6.55	116	208	70.0	4.1	15.4	5.0	0.26	1134	7.23	3.0	48	9.03	2.6	1.5	0.5
05/05/22	0800	6.07	100	220	65.0	4.3	13.2	5.0	0.30	1130	7.28	8.0	30	10.00	1.0	1.6	0.6
05/05/22	0800	7.03	118	202	60.0	4.0	14.0	5.0	0.35	1130	7.14	3.0	42	7.24	1.5	0.5	0.3
05/05/22	0800	6.50	102	204	75.0	4.0	13.2	5.0	0.26	1130	7.20	9.0	44	6.60	1.6	0.8	0.5
05/05/22	0800	6.33	118	208	70.0	4.0	14.0	5.0	0.40	1130	7.14	8.0	40	7.14	1.3	0.5	0.1
05/05/22	0800	6.05	104	210	65.0	4.1	7.8	5.0	0.45	1134	7.03	7.0	48	8.20	1.1	0.6	0.5
05/05/22	0800	6.35	117	224	65.0	4.0	12.6	5.0	0.42	1130	7.16	8.0	32	7.13	1.4	1.0	0.3
05/05/22	0800	6.33	110	240	80.0	4.0	8.4	5.0	0.25	1130	7.24	7.0	44	6.67	1.6	1.5	0.5
05/05/22	0800	6.00	128	248	85.0	4.0	11.6	5.0	0.32	1134	7.08	8.0	40	7.14	1.5	0.5	0.7
05/05/22	0800	6.34	120	208	65.0	4.0	14.0	4.5	0.35	1132	7.18	3.0	36	8.03	1.0	0.3	0.8
05/05/22	0800	6.33	114	114	70.0	4.1	7.0	5.0	0.45	1132	7.21	7.0	32	6.67	1.1	0.5	0.6
05/05/22	0800	7.02	110	120	70.0	4.0	10.2	4.0	0.40	1130	7.11	8.0	48	7.14	1.0	0.8	0.5
05/05/22	0800	6.36	102	232	85.0	4.0	11.3	5.0	0.31	1130	7.10	10.0	44	8.63	0.3	1.0	0.5
05/05/22	0800	6.35	120	250	80.0	3.0	16.4	3.5	0.40	1130	7.10	9.0	40	7.14	1.1	1.2	0.6
05/05/22	0800	7.02	118	112	30.0	5.0	14.0	4.0	0.35	1130	7.18	7.0	36	8.35	1.0	0.8	0.8
05/05/22	0800	6.50	120	200	85.0	5.0	8.0	5.0	0.34	1131	7.20	8.0	48	7.33	0.8	1.0	0.7
05/05/22	0800	6.43	114	272	80.0	4.1	11.2	5.0	0.24	1132	7.10	9.0	28	5.0	0.3	1.5	0.5
05/05/22	0800	6.42	96	340	75.0	3.4	11.2	4.0	0.38	1130	6.84	9.0	36	6.66	0.8	1.2	0.8
05/05/22	0800	6.64	112	288	70.0	3.1	14.0	4.0	0.34	1130	6.94	8.0	40	8.00	0.3	1.0	0.6
05/05/22	0800	6.72	88	264	65.0	3.5	11.2	5.0	0.42	1134	7.14	7.0	40	7.5	1.1	1.5	0.5
05/05/22	0800	7.02	88	272	60.0	3.4	14.0	4.0	0.42	1130	7.21	3.0	36	6.66	1.2	1.2	0.4
05/05/22	0800	6.75	92	356	65.0	3.2	9.8	4.0	0.53	1130	7.02	8.0	40	8.0	1.0	0.0	0.5
05/05/22	0800	6.27	106	340	60.0	3.1	8.4	3.0	0.41	1130	6.42	7.0	36	7.5	1.1	1.1	0.6
05/05/22	0800	6.34	114	240	70.0	3.4	3.8	3.0	0.44	1131	6.52	9.0	44	8.0	1.0	1.2	0.7
05/05/22	0800	6.30	122	264	75.0	4.4	12.6	4.0	0.33	1130	6.49	8.0	36	6.66	1.3	1.3	0.5
05/05/22	0800	6.32	128	272	80.0	3.2	11.2	4.0	0.44	1131	6.51	7.0	40	8.0	1.2	1.1	0.7
05/05/22	0800	6.26	108	264	75.0	3.6	12.6	3.0	0.40	1130	6.96	8.0	40	7.3	1.1	1.3	0.6
05/05/22	0800	6.33	110	280	80.0	3.3	9.8	5.0	0.34	1130	6.54	9.0	36	6.66	1.2	1.2	0.5
05/05/22	0800	6.42	120	272	75.0	3.4	11.2	5.0	0.38	1130	6.54	7.0	40	8.0	1.1	1.4	0.7
05/05/22	0800	6.34	116	264	70.0	3.2	12.6	4.0	0.42	1130	6.45	8.0	44	8.0	1.3	1.3	0.4
05/05/22	0800	6.20	122	280	70.0	3.0	11.2	5.0	0.35	1130	6.41	8.0	40	7.5	1.6	1.4	0.6

Annexure 2 Copy of Consent to Establish



Head Office (PLG)
Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302
004
Phone: 0141-5159600, 5159695 Fax: 0141-5159697



Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/3626-3628

Order No : 2020-2021/PLG/1175

Dispatch Date : 23/11/2020

Unit Id : 97040

M/s Sewage Treatment Plant

Office of Municipal Corporation, Mathura Gate,
Bharatpur

Sub: Consent to Establish under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1986.

Ref: Your application(s) for Consent to Establish dated 14/07/2020 and subsequent correspondence.

Sir,

Consent to Establish under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1986, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder is hereby granted for your Sewage Treatment plant plant situated / proposed at Sewage Treatment Plant, Village Gopal Nagla, Acharya Road, Bharatpur Tehsil, Bharatpur District, Bharatpur, Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

1. That this Consent to Establish is valid for a period from 24/07/2020 to 30/06/2025 or date of Commencement of production / commissioning of the project or activities whichever is earlier.
2. That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/precesses or providing following services with capacities given below:

Particular	Type	Quantity / Capacity
Sewage Treatment Plant	Service	0.03 MLD

3. That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel the project proponent is required to obtain fresh consent to establish.
4. That the control equipment as proposed by the applicant shall be installed before trial operation is started for which prior consent to operate under the provision of the Water Act and Air Act shall be obtained. This consent to establish shall not be treated as consent to operate.

Page 1 of 5

Signature Not Verified
Digitally signed by Anuj Mathur
Date: 2020.11.23 11:35:58 IST
Reason: Self-issued
Location:





Head Office (PLG)
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302
 Phone: 0141-5159600, 5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/3626-3628

Order No : 2020-2021/PLG/1175

Dispatch Date: 23/11/2020

Unit Id : 97840

- 5 That the quantity of effluent generation and disposal along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Quantity of effluent to be recycled (KLD)	Quantity of treated effluent to be disposed (KLD) and mode of disposal
Domestic Sewage	8000.000	NIL	8,000,000 On Land For Plantation/Horticulture after adequate treatment

- 6 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
D.G. Set(180KVA)	ACOUSTIC ENCLOSURE, WITH ADEQUATE STACK HEIGHT	..	..

- 7 That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed by the Board as notified under the Environment (Protection) Act-1986 for disposal into Inland Surface Water. The main parameters for regular monitoring shall be as under:

Signature Not Verified

Digitally signed by Niraj Mathur
 Date: 2020.11.27 11:35:58 IST
 Reason: SelfAttested
 Location:





Head Office (PLG)
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302
 Phone: 0141-5159600, 5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/3626-3628

Order No : 2020-2021/PLG/1175

Dispatch Date: 23/11/2020

Unit Id : 97840

Parameters	Standards
pH Value	Between 5.5 to 9.0
Phosphate as P	Not to exceed 1.0 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 10 mg/l
Chemical Oxygen Demand	Not to exceed 50 mg/l
Fecal Coliform	not to exceed 230 MPN/100 ml
N total	10 mg/l

- 8 In addition to above total suspended solids in the treated effluent before disposal shall not exceed 20 mg/L.
- 9 That fee for this consent to establish has been deposited on the basis of estimated project cost of Rs. 723 lacs and in case of any increase in the project cost, the project proponent shall be liable to deposit balance amount.
- 10 That no treated/untreated effluent shall be discharged into any water body and entire treated sewage shall be utilized in plantation/horticulture/ other gainful purposes.
- 11 That the sludge will be properly digested, de-watered and used as manure or disposed in a scientific manner.
- 12 That the unit shall undertake spray of insecticides from time to time to control fly/mosquito growth in the area.
- 13 That the unit shall undertake plantation in two rows of suitable species all along the periphery of the site of the STP to control foul smell.
- 14 That above stated effluent standards are subject to the Hon'ble NGT order dated 30/4/2019 in matter of O.A. no. 1069/2018 Nitin Shankar Deshpande Vs Union of India and Ors.
- 15 That efforts should be made to reuse the treated sewage to the maximum possible extent and minimize its discharge. A network of pipelines should be laid from the treated sewage collection tank to fields for utilisation.
- 16 That adequate measures shall be taken to avoid foul odour during treatment and disposal of sewage and sludge.
- 17 That the unit shall maintain adequate height of stack along with acoustic enclosures on one D.G.Set of 180 KVA.

Page 3 of 5

Signature Not Verified

Digitally signed by Niraj Mathur
 Date: 2020.11.23 11:35:58 IST
 Reason: SelfAttested
 Location;





Head Office (PLG)
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302
 Phone: 0141-5159600, 5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/3626-3628

Order No : 2020-2021/PLG/1175

Dispatch Date: 23/11/2020

Unit Id : 97840

- 18 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of compliance of the **Water Act and Air Act**.
- 19 That the grant of this **Consent to Establish** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.
- 20 That the grant of this **Consent to Establish** shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.
- This **Consent to Establish** shall also be subject, beside the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time, be specified by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Establish** and project proponent / occupier shall be liable for legal action under the the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[PLG]

(A) **Copy To:-**

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Bharatpur to ensure compliance of conditions of CTE.
- 2 Master File.

Page 4 of 5

Signature Not Verified
 Digitally signed by Niraj Mathur
 Date: 2020.11.27 11:39:58 IST
 Reason: SelfAttested
 Location:



Copy of CTO



Head Office Liquid Waste
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302 004
 Phone: 0141-2716852 Fax: 0141-276852



Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/4578-4580
 Order No : 2020-2021/Liquid Waste/10
 Unit Id : 97840
 Date: 15/01/2021

M/s Sewage Treatment Plant
Office of Municipal Corporation, Mathura Gate, Bharatpur

Sub: Consent to Operate under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.
Ref: Your application for Consent to Operate dated 15/05/2019 and subsequent correspondence.

Sir,

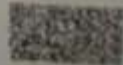
Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder is hereby granted for your Sewage Treatment plant plant situated at Sewage Treatment Plant, Village Gopal Nagla Achnera Road Bharatpur Tehsil:Bharatpur District:Bharatpur, Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from 15/09/2019 to 31/08/2024.
- 2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
Sewage Treatment Plant	Service	8.00 MLD

- 3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.
- 4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Signature Not Verified
 Digitally signed by Niraj Mathur
 Date: 2021.01.16 16:40:58 IST
 Reason: SelfAttested
 Location:



Page 1 of 4

Head Office Liquid Waste
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302 004
 Phone: 0141-2716852 Fax: 0141-276852

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/4578-4580

Order No : 2020-2021/Liquid Waste/19

Date: 15/01/2021

Unit Id : 97840

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD) and mode of disposal
Domestic Sewage	8005.000	NIL	8,005.000 On Land For Plantation/Horticulture after adequate treatment

5. That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
DC set(110KVA)	ACOUSTIC ENCLOSURE ADEQUATE STACK HEIGHT	-	-

6. That the domestic sewage shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal into Inland Surface Water. The main parameters for regular monitoring shall be as under:

Parameters	Standards
pH Value	Between 5.5 to 9.0
Phosphate as P	Not to exceed 1.0 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 10 mg/l
Chemical Oxygen Demand	Not to exceed 50 mg/l
Fecal Coliform	Not to exceed 1000 MPN/100 ml
N total	Not to exceed 1.0 mg/l

Signature Not Verified

Digitally signed by _____

Date: 2020.01.15 16:40:58 IST

Reason: Signed

Location: _____


Head Office Liquid Waste
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302 004
 Phone: 0141-2716852 Fax: 0141-276852

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/4570-4580
 Order No: 2020-2021/Liquid Waste/10
 Date: 15/01/2021
 Unit Id : 97840

- 7 In addition to above total suspended solids in the treated effluent before disposal shall not exceed 20 mg/l.
- 8 That no treated/untreated effluent shall be discharged into any water body and entire treated sewage shall be utilized in plantation/horticulture/ other gainful purposes.
- 9 That the sludge will be properly digested, de-watered and used as manure or disposed in a scientific manner.
- 10 That the unit shall undertake spray of insecticides from time to time to control fly/mosquito growth in the area.
- 11 That the unit shall undertake plantation in two rows of suitable species all along the periphery of the site of the STP to control foul smell.
- 12 That above stated effluent standards are subject to the Hon'ble NGT order dated 30/4/2019 in matter of O.A. no 1069/2018 Nitin Shankar Deshpande Vs Union of India and Ors.
- 13 That efforts should be made to reuse the treated sewage to the maximum possible extent and minimize its discharge. A network of pipelines should be laid from the treated sewage collection tank to fields for utilisation.
- 14 That adequate measures shall be taken to avoid foul odour during treatment and disposal of sewage and sludge.
- 15 That sample of treated sewage shall be collected/analysed within 30 days and report of analysis shall be submitted to the Board within 15 days thereafter.
- 16 That Online Continuous Effluent Monitoring System(OCEMS) for parameters namely pH, TSS,COD,BOD and flow meter shall be installed and monitoring data shall be connected with the servers of State Board and Central Pollution Control Board before 31.07.2020.
- 17 That regular maintenance and operation of the OCEMS with temper proof mechanism with facilities for calibration shall be ensured.
- 18 That guidelines prescribed by CPCB for OCEMS for effluents and Standard Operating Procedure(SOP) for Verification of Installation and Calibration of UV-Vis Dual Beam Scanning & Multipoint calibration mechanism technology based OCEMS (Effluent) used in STPs shall be followed.
- 19 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained under section 22(2) of the Water Act and under section 21(6) of the Air Act to review conditions imposed here in above and to make such variation as it deems fit.

Digitally signed by _____
 Date: 2024.01.15 10:45:56 IST
 Reason: Self Attested
 Location: _____

Page 3 of 4

Head Office Liquid Waste
Rajasthan State Pollution Control Board
 4, Institutional Area, Jhalana Doongari, Jaipur-302 004
 Phone: 0141-2716852 Fax: 0141-276852

Registered

No. : F(Tech)/Bharatpur(Bharatpur)/2694(1)/2020-2021/4578-4580

Order No: 2020-2021/Liquid Waste/10

Date: 15/01/2021

Slut Id : 97040

20. That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time being in force, rests with the industry/ unit/ project proponent.

21. That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time, be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge Liquid Waste

(A) Copy To:-

1. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Bharatpur to carry out inspection and sampling of the STP.
2. Master File.

Signature Not Verified

Digitally signed by Niraj Mathur
 Date: 2021.01.15 16:40:58 IST
 Reason: Self Attested
 Location:

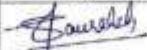
Group Incharge Liquid Waste



APPENDIX 6: -PRE-CONSTRUCTION ENVIRONMENTAL PARAMETERS MONITORING REPORTS.

Pre-construction environmental monitoring has been conducted by contractor at different working site locations and submitted their environmental monitoring report on dated 18.05.2023. All environmental monitoring parameters meet out CPCB guideline and come under environmental standard permissible limit. Following are the environmental monitoring reports:

Ambient Air Quality (AAQ) Sample: 1 (Proposed STP)

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Recognized by Ministry of Environment, Forest and Climate Change, Government of India					
ISO 9001 : 2015, ISO 14001 : 2015 & ISO 45001 : 2018 Certified Laboratory					
ULR No.: TC733423000000595F		Date: 13/05/2023			
Sample ID: NES230510001					
TEST CERTIFICATE					
AMBIENT AIR QUALITY MONITORING					
Issued to	Client	Superintending Engineer – PTU, RUIDP Phase IV, Bharatpur, Rajasthan			
	EPC Contractor	M/s. SMCC – AG (Joint Venture)			
Name of Project	Providing Sewer Network with Hoist Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)				
Address	Bharatpur, Rajasthan – IN				
Industrial Activity	Construction of STP, SPS & Sewer Network				
SAMPLE IDENTIFICATION DETAILS					
Sampling Location	Near New STP Proposed Site, At Nagar Nigam STP, Gopal Nagla Mod, Aachhara Road, Bharatpur				
GPS Coordinates	27°12'19.9"N 77°32'51.8"E				
Date of Sampling	09/05/2023				
Ambient Temperature	Max. 37°C & Min. 21°C				
Relative Humidity	37%				
Weather Conditions	Clear Sky				
Period of Testing	10/05/2023 to 13/05/2023				
TEST RESULTS					
S. N.	Parameters	Values Found	NAAQS	Unit	Protocol
1.	PM ₁₀	72.36	100	µg/m ³	IS 5182 (P-23):2006 (RA 2017)
2.	PM _{2.5}	25.77	60	µg/m ³	IS 5182 (P-24):2019
3.	Sulphur dioxide (SO ₂)	8.02	80	µg/m ³	IS 5182 (P-02):2001 (RA 2017)
4.	Oxides of Nitrogen (NO _x)	22.59	80	µg/m ³	IS 5182 (P-06):2006 (RA 2017)
5.	Carbon Monoxide (CO)	0.60	2.00	mg/m ³	IS 5182 (P-10):1999 (RA 2019)
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 (Saurabh Sharma) Review By		 (Jag Mohan Sharma) Authorized Signatory			
*** END OF REPORT ***					



Ambient Air Quality (AAQ) Sample: 2 (SPS-1,0.81 MLD)

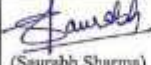
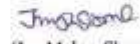


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E-mail : neslab2004@gmail.com, nakshatraenviro@gmail.com

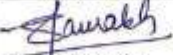
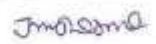


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ULR No.: TC73342300000596F		Date: 13/05/2023			
Sample ID: NES230510002					
TEST CERTIFICATE					
AMBIENT AIR QUALITY MONITORING					
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan			
	EPC Contractor	M/s. SMCC – AG (Joint Venture)			
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)			
Address		Bharatpur, Rajasthan – IN			
Industrial Activity		Construction of STP, SPS & Sewer Network			
SAMPLE IDENTIFICATION DETAILS					
Sampling Location		At SPS – I Proposed Site (0.81 MLD), Near Naye Mandi Shamshan, Bharatpur			
GPS Coordinates		27°13'44.5"N 77°29'40.4"E			
Date of Sampling		09/05/2023			
Ambient Temperature		Max. 37°C & Min. 21°C			
Relative Humidity		37%			
Weather Conditions		Clear Sky			
Period of Testing		10/05/2023 to 13/05/2023			
TEST RESULTS					
S. N.	Parameters	Values Found	NAAQS	Unit	Protocol
1.	PM ₁₀	84.20	100	µg/m ³	IS 5182 (P-23):2006 (RA 2017)
2.	PM _{2.5}	39.74	60	µg/m ³	IS 5182 (P-24):2019
3.	Sulphur dioxide (SO ₂)	9.15	80	µg/m ³	IS 5182 (P-02):2001 (RA 2017)
4.	Oxides of Nitrogen (NO _x)	27.48	80	µg/m ³	IS 5182 (P-06):2006 (RA 2017)
5.	Carbon Monoxide (CO)	0.69	2.00	mg/m ³	IS 5182 (P-10):1999 (RA 2019)
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 (Saurabh Sharma) Review By		 (Jag Mohan Sharma) Authorized Signatory			
		 Seal *** END OF REPORT ***			



Ambient Air Quality (AAQ) Sample: 3 (SPS- ,1.64 MLD)

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Recognized by Ministry of Environment, Forest and Climate Change, Government of India ISO 9001 : 2015, ISO 14001 : 2015 & ISO 45001 : 2018 Certified Laboratory					
ULR No.: TC733423000000597F		Date: 13/05/2023			
Sample ID: NES230510003					
TEST CERTIFICATE					
AMBIENT AIR QUALITY MONITORING					
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan			
	EPC Contractor	M/s. SMCC – AG (Joint Venture)			
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)			
Address		Bharatpur, Rajasthan – IN			
Industrial Activity		Construction of STP, SPS & Sewer Network			
SAMPLE IDENTIFICATION DETAILS					
Sampling Location		At SPS – 3 Proposed Site (1.65 MLD), Near Mukharjee Nagar, R.N.F.C.D.Bridge, Bharatpur			
GPS Coordinates		27°13'41.8"N 77°28'51.9"E			
Date of Sampling		09/05/2023			
Ambient Temperature		Max. 37°C & Min. 21°C			
Relative Humidity		37%			
Weather Conditions		Clear Sky			
Period of Testing		10/05/2023 to 13/05/2023			
TEST RESULTS					
S. N.	Parameters	Values Found	NAAQS	Unit	Protocol
1.	PM ₁₀	78.65	100	µg/m ³	IS 5182 (P-23):2006 (RA 2017)
2.	PM _{2.5}	35.89	60	µg/m ³	IS 5182 (P-24):2019
3.	Sulphur dioxide (SO ₂)	8.87	80	µg/m ³	IS 5182 (P-02):2001 (RA 2017)
4.	Oxides of Nitrogen (NO _x)	25.15	80	µg/m ³	IS 5182 (P-06):2006 (RA 2017)
5.	Carbon Monoxide (CO)	0.64	2.00	mg/m ³	IS 5182 (P-10):1999 (RA 2019)
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 (Saurabh Sharma) Review By					
		 (Jag Mohan Sharma) Authorized Signatory			
*** END OF REPORT ***					
					

Ambient Air Quality (AAQ) Sample: 4 (SPS-4,2.23 MLD)

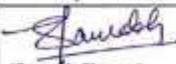
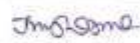


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ULR No.: TC733423000000598F		Date: 13/05/2023			
Sample ID: NES230510004					
TEST CERTIFICATE AMBIENT AIR QUALITY MONITORING					
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan			
	EPC Contractor	M/s. SMCC – AG (Joint Venture)			
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)			
Address		Bharatpur, Rajasthan – IN			
Industrial Activity		Construction of STP, SPS & Sewer Network			
SAMPLE IDENTIFICATION DETAILS					
Sampling Location		At SPS – 4 Proposed Site (2.25 MLD), Near Sulabh Complex – UIT Workshop Scheme, Deeg Road, Bharatpur			
GPS Coordinates		27°13'28.1"N 77°28'31.2"E			
Date of Sampling		09/05/2023			
Ambient Temperature		Max. 37°C & Min. 21°C			
Relative Humidity		37%			
Weather Conditions		Clear Sky			
Period of Testing		10/05/2023 to 13/05/2023			
TEST RESULTS					
S. N.	Parameters	Values Found	NAAQS	Unit	Protocol
1.	PM ₁₀	81.74	100	µg/m ³	IS 5182 (P-23):2006 (RA 2017)
2.	PM _{2.5}	38.05	60	µg/m ³	IS 5182 (P-24):2019
3.	Sulphur dioxide (SO ₂)	8.29	80	µg/m ³	IS 5182 (P-02):2001 (RA 2017)
4.	Oxides of Nitrogen (NO _x)	26.88	80	µg/m ³	IS 5182 (P-06):2006 (RA 2017)
5.	Carbon Monoxide (CO)	0.67	2.00	mg/m ³	IS 5182 (P-10):1999 (RA 2019)
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 (Saurabh Sharma) Review By		  (Jag Mohan Sharma) Authorized Signatory			
*** END OF REPORT ***					



Noise Level Sample: 1 (Proposed STP)

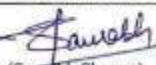
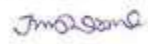


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ULR No.: TC73342300000599F		Date: 13/05/2023		
Sample ID: NES230510005				
TEST CERTIFICATE				
NOISE LEVEL MONITORING DATA				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
MONITORING DETAILS				
Sampling Location		Near New STP Proposed Site, At Nagar Nigam STP, Gopal Nagla Mod, Acchhnera Road, Bharatpur		
GPS Coordinates		27°12'19.9"N 77°32'51.8"E		
Date of Sampling		09/05/2023		
Ambient Temperature		Max. 37°C & Min. 21°C		
Relative Humidity		37%		
Weather Conditions		Clear Sky		
Control Measures, if any		Nil		
Protocol		IS 9989 : 1981 (Reaffirmed Year 2014)		
RESULTS				
Sl. No.	Parameter	Unit	Noise Level Measured	Limits
1.	Noise Level Day Time: L_{Day}	dB (A)	54.2	75.0
2.	Noise Level Night Time: L_{Night}	dB (A)	42.0	70.0
Note: • This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without special permission in writing. • Total liability of this laboratory is limited to the invoice amount. • The results enlisted refer only to the above sample and applicable parameters endorsement of products is neither inferred nor implied.				
 (Saurabh Sharma) Review By		 *** END OF REPORT ***		
		 (Jag Mohan Sharma) Authorized Signatory		



Noise Level Sample: 2 (Proposed SPS:1,0.81 MLD)

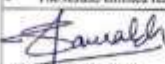
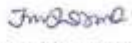


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ULR No.: TC73342300000600F		Date: 13/05/2023		
Sample ID: NES230510006				
TEST CERTIFICATE NOISE LEVEL MONITORING DATA				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
MONITORING DETAILS				
Sampling Location		At SPS – 1 Proposed Site (0.81 MLD), Near Naya Mandi Shamshan, Bharatpur		
GPS Coordinates		27°13'44.5"N 77°29'40.4"E		
Date of Sampling		09/05/2023		
Ambient Temperature		Max. 37°C & Min. 21°C		
Relative Humidity		37%		
Weather Conditions		Clear Sky		
Control Measures, if any		Nil		
Protocol		IS 9989 : 1981 (Reaffirmed Year 2014)		
RESULTS				
Sl. No.	Parameter	Unit	Noise Level Measured	Limits
1.	Noise Level Day Time: L_{day}	dB (A)	64.0	65.0
2.	Noise Level Night Time: L_{night}	dB (A)	47.2	55.0
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 (Saurabh Sharma) Review By		 *** END OF REPORT ***		
		 (Jag Mohan Sharma) Authorized Signatory		



Noise Level Sample: 3 (Proposed SPS:2,1.65 MLD)

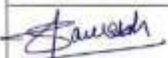


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 ISO 9001 : 2015, ISO 14001 : 2015 & ISO 45001 : 2018 Certified Laboratory

ULR No.: TC73342300000601F		Date: 13/05/2023		
Sample ID: NES230510007				
TEST CERTIFICATE NOISE LEVEL MONITORING DATA				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
MONITORING DETAILS				
Sampling Location		At SPS – 3 Proposed Site (1.65 MLD), Near Mukharjee Nagar, R.N.F.C.D.Bridge, Bharatpur		
GPS Coordinates		27°13'41.8"N 77°28'51.9"E		
Date of Sampling		09/05/2023		
Ambient Temperature		Max. 37°C & Min. 21°C		
Relative Humidity		37%		
Weather Conditions		Clear Sky		
Control Measures, if any		Nil		
Protocol		IS 9989 : 1981 (Reaffirmed Year 2014)		
RESULTS				
Sl. No.	Parameter	Unit	Noise Level Measured	Limits
1.	Noise Level Day Time: L_{day}	dB (A)	53.2	65.0
2.	Noise Level Night Time: L_{night}	dB (A)	41.8	55.0
Note: • This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without special permission in writing. • Total liability of this laboratory is limited to the invoice amount. • The results enlisted refer only to the above sample and applicable parameters endorsement of products is neither inferred nor implied.				
 (Saurabh Sharma) Review By		 ***END OF REPORT***		
		 (Jag Mohan Sharma) Authorized Signatory		



Noise Level Sample: 4 (Proposed SPS:4,2.23 MLD)

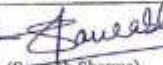
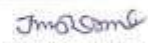


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 E-mail : neslab2004@gmail.com, nakshatraenviro@gmail.com



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ULR No.: TC733423000000602F		Date: 13/05/2023		
Sample ID: NES230510008				
TEST CERTIFICATE				
NOISE LEVEL MONITORING DATA				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
MONITORING DETAILS				
Sampling Location		At SPS – 4 Proposed Site (2.25 MLD), Near Sulabh Complex – UIT Workshop Scheme, Deeg Road, Bharatpur		
GPS Coordinates		27°13'28.1"N 77°28'31.2"E		
Date of Sampling		09/05/2023		
Ambient Temperature		Max. 37°C & Min. 21°C		
Relative Humidity		37%		
Weather Conditions		Clear Sky		
Control Measures, if any		Nil		
Protocol		IS 9989 : 1981 (Reaffirmed Year 2014)		
RESULTS				
Sl. No.	Parameter	Unit	Noise Level Measured	Limits
1.	Noise Level Day Time: L_{Day}	dB (A)	61.0	65.0
2.	Noise Level Night Time: L_{Night}	dB (A)	43.5	55.0
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Ground water Sample :1 Proposed STP



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ULR No.: TC73342300000607F				Date: 13/05/2023		
Sample ID: NES230510013						
TEST CERTIFICATE WATER QUALITY ANALYSIS						
Issued to	Client	Superintending Engineer - PIU, RUIDP Phase IV, Bharatpur, Rajasthan				
	Authority Engineer	M/s. SMCC - AG (Joint Venture)				
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)				
Address		Bharatpur, Rajasthan - IN				
Industrial Activity		Construction of STP, SPS & Sewer Network				
SAMPLE DETAILS						
Sampling Location		Near New STP Proposed Site, At Nagar Nigam STP, Gopal Nagla Mod, Achhnera Road, Bharatpur				
GPS Coordinates		27°12'19.9"N 77°32'51.8"E				
Sampling Source		Borewell Water				
Sample Description		Clear & Colorless Liquid				
Sample Quantity		1.0 Litres				
Sample Condition		Sealed & Refrigerated				
Date of Sample Collection		09/05/2023				
Period of Testing		10/05/2023 to 13/05/2023				
TEST RESULTS						
Sl. No.	Parameters	Unit	Values Found	Standards as per IS 10500 : 2012		
				Desirable Limits	Permissible Limits	Test Method
A. Physical Parameters						
1.	pH	-	7.26	6.5 to 8.5	N.R.	IS 3025 (P-11):1983, RA 2017
2.	Odour	-	Agreeable	Agreeable	Agreeable	IS 3025 (P-05):2018
3.	Turbidity (NTU)	NTU	< 1	01	05	IS 3025 (P-10):1984, RA 2017
4.	Total Solids	-	2879.50	--	--	IS 3025 (P-15):1984, RA 2019
5.	Total Dissolved Solids	mg/l	2853.50	500	2000	IS 3025 (P-16):1984, RA 2017
6.	Total Suspended Solids	mg/l	26.00	--	--	IS 3025 (P-17): 1984, RA 2017
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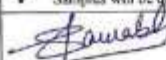


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B.	General Parameters					
7.	Total Hardness	mg/l	463.84	200	600	IS 3025 (P-21):2009, RA 2019
8.	Total Alkalinity	mg/l	1085.25	200	600	IS 3025 (P-23):1986, RA 2019
9.	Calcium (as Ca)	mg/l	71.14	75	200	IS 3025 (P-40):1991, RA 2019
10.	Magnesium (as Mg)	mg/l	70.62	30	100	IS 3025 (P-46):1994, RA 2019
11.	Chloride (as Cl)	mg/l	561.10	250	1000	IS 3025 (P-32):1988, RA 2019
12.	Fluoride (as F)	mg/l	0.28	1.0	1.5	IS 3025 (P-60):2008, RA 2019
13.	Sulphate (as SO ₄)	mg/l	224.44	200	400	IS 3025 (P-24):1986, RA 2019
14.	Nitrate (as NO ₃)	mg/l	97.67	45	N.R.	IS 3025 (P-34):1988, RA 2019
15.	Sodium (as Na)	mg/l	325.58	--	--	IS 3025 (P-45):1993, RA 2019
16.	Potassium (as K)	mg/l	146.51	--	--	IS 3025 (P-45):1993, RA 2019
17.	Iron (as Fe)	mg/l	0.20	0.3	N.R.	IS 3025 (P-53):2003, RA 2019
18.	Silver (as Ag)	mg/l	B.D.L.	0.1	N.R.	IS 13428 : 2005, RA 2018
19.	Copper (as Cu)	mg/l	B.D.L.	0.05	1.5	IS 3025 (P-42):1992, RA 2019
20.	Zinc (as Zn)	mg/l	0.07	05	15	IS 3025 (P-49):1994, RA 2019

Note: N.R. -- No Relaxation; B.D.L. -- Below Detection Limit

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 (Saurabh Sharma)
 Review By




 (Jag Mohan Sharma)
 Authorized Signatory

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Ground Water Sample: 2 (Proposed SPS:1,0.81 MLD)



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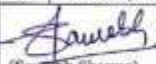
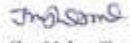
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ULR No.: TC733423000000608F				Date: 13/05/2023		
Sample ID: NES230510014						
TEST CERTIFICATE						
WATER QUALITY ANALYSIS						
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan				
	Authority Engineer	M/s. SMCC – AG (Joint Venture)				
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)				
Address		Bharatpur, Rajasthan – IN				
Industrial Activity		Construction of STP, SPS & Sewer Network				
SAMPLE DETAILS						
Sampling Location		At SPS – I Proposed Site (0.81 MLD), Near Naye Mandi Shamshan, Bharatpur				
GPS Coordinates		27°13'44.5"N 77°29'40.4"E				
Sampling Source		Borewell Water				
Sample Description		Clear & Colorless Liquid				
Sample Quantity		1.0 Litres				
Sample Condition		Sealed & Refrigerated				
Date of Sample Collection		09/05/2023				
Period of Testing		10/05/2023 to 13/05/2023				
TEST RESULTS						
Sl. No.	Parameters	Unit	Values Found	Standards as per IS 10500 : 2012		
				Desirable Limits	Permissible Limits	Test Method
A. Physical Parameters						
1.	pH	-	7.28	6.5 to 8.5	N.R.	IS 3025 (P-11):1983, RA 2017
2.	Odour	-	Agreeable	Agreeable	Agreeable	IS 3025 (P-05):2018
3.	Turbidity (NTU)	NTU	< 1	01	05	IS 3025 (P-10):1984, RA 2017
4.	Total Solids	-	2283.75	--	--	IS 3025 (P-15):1984, RA 2019
5.	Total Dissolved Solids	mg/l	2262.30	500	2000	IS 3025 (P-16):1984, RA 2017
6.	Total Suspended Solids	mg/l	21.45	--	--	IS 3025 (P-17): 1984, RA 2017
 (Saurabh Sharma) Review By		  (Jag Mohan Sharma) Authorized Signatory				
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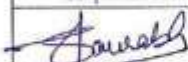
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B.	General Parameters					
7.	Total Hardness	mg/l	473.6	200	600	IS 3025 (P-21):2009, RA 2019
8.	Total Alkalinity	mg/l	778.12	200	600	IS 3025 (P-23):1986, RA 2019
9.	Calcium (as Ca)	mg/l	154.12	75	200	IS 3025 (P-40):1991, RA 2019
10.	Magnesium (as Mg)	mg/l	21.92	30	100	IS 3025 (P-46):1994, RA 2019
11.	Chloride (as Cl)	mg/l	823.86	250	1000	IS 3025 (P-32):1988, RA 2019
12.	Fluoride (as F)	mg/l	0.26	1.0	1.5	IS 3025 (P-60):2008, RA 2019
13.	Sulphate (as SO ₄)	mg/l	248.32	200	400	IS 3025 (P-24):1986, RA 2019
14.	Nitrate (as NO ₃)	mg/l	41.02	45	N.R.	IS 3025 (P-34):1988, RA 2019
15.	Sodium (as Na)	mg/l	106.11	--	--	IS 3025 (P-45):1993, RA 2019
16.	Potassium (as K)	mg/l	48.15	--	--	IS 3025 (P-45):1993, RA 2019
17.	Iron (as Fe)	mg/l	0.18	0.3	N.R.	IS 3025 (P-53):2003, RA 2019
18.	Silver (as Ag)	mg/l	B.D.L.	0.1	N.R.	IS 13428 : 2005, RA 2018
19.	Copper (as Cu)	mg/l	B.D.L.	0.05	1.5	IS 3025 (P-42):1992, RA 2019
20.	Zinc (as Zn)	mg/l	0.04	05	15	IS 3025 (P-49):1994, RA 2019

Note: N.R. - No Relaxation; B.D.L. - Below Detection Limit

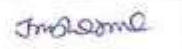
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(Saumish Sharma)

Review By



END OF REPORT


(Jag Mohan Sharma)
Authorized Signatory

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Ground Water Sample: 3 (Proposed SPS:2,1.65 MLD)



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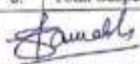
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ULR No.: TC73342300000609F				Date: 13/05/2023		
Sample ID: NES230510015						
TEST CERTIFICATE WATER QUALITY ANALYSIS						
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan				
	Authority Engineer	M/s. SMCC – AG (Joint Venture)				
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)				
Address		Bharatpur, Rajasthan – IN				
Industrial Activity		Construction of STP, SPS & Sewer Network				
SAMPLE DETAILS						
Sampling Location		At SPS – 3 Proposed Site (1.65 MLD), Near Mukharjee Nagar, R.N.F.C.D Bridge, Bharatpur				
GPS Coordinates		27°13'41.8"N 77°28'51.9"E				
Sampling Source		Borewell Water				
Sample Description		Clear & Colorless Liquid				
Sample Quantity		1.0 Litres				
Sample Condition		Sealed & Refrigerated				
Date of Sample Collection		09/05/2023				
Period of Testing		10/05/2023 to 13/05/2023				
TEST RESULTS						
Sl. No.	Parameters	Unit	Values Found	Standards as per IS 10500 : 2012		
				Desirable Limits	Permissible Limits	Test Method
A.	Physical Parameters					
1.	pH	-	7.45	6.5 to 8.5	N.R.	IS 3025 (P-11):1983, RA 2017
2.	Odour	-	Agreeable	Agreeable	Agreeable	IS 3025 (P-05):2018
3.	Turbidity (NTU)	NTU	< 1	01	05	IS 3025 (P-10):1984, RA 2017
4.	Total Solids	-	1958.00	--	--	IS 3025 (P-15):1984, RA 2019
5.	Total Dissolved Solids	mg/l	1942.00	500	2000	IS 3025 (P-16):1984, RA 2017
6.	Total Suspended Solids	mg/l	16.00	--	--	IS 3025 (P-17): 1984, RA 2017
 (Saurabh Sharma) Review By				 (Jag Mohan Sharma) Authorized Signatory		
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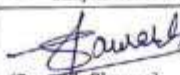
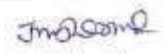


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B.	General Parameters					
7.	Total Hardness	mg/l	328.32	200	600	IS 3025 (P-21):2009, RA 2019
8.	Total Alkalinity	mg/l	308.00	200	600	IS 3025 (P-23):1986, RA 2019
9.	Calcium (as Ca)	mg/l	67.33	75	200	IS 3025 (P-40):1991, RA 2019
10.	Magnesium (as Mg)	mg/l	38.88	30	100	IS 3025 (P-46):1994, RA 2019
11.	Chloride (as Cl)	mg/l	999.20	250	1000	IS 3025 (P-32):1988, RA 2019
12.	Fluoride (as F)	mg/l	0.28	1.0	1.5	IS 3025 (P-60):2008, RA 2019
13.	Sulphate (as SO ₄)	mg/l	301.34	200	400	IS 3025 (P-24):1986, RA 2019
14.	Nitrate (as NO ₃)	mg/l	28.45	45	N.R.	IS 3025 (P-34):1988, RA 2019
15.	Sodium (as Na)	mg/l	102.18	--	--	IS 3025 (P-45):1993, RA 2019
16.	Potassium (as K)	mg/l	41.38	--	--	IS 3025 (P-45):1993, RA 2019
17.	Iron (as Fe)	mg/l	0.18	0.3	N.R.	IS 3025 (P-53):2003, RA 2019
18.	Silver (as Ag)	mg/l	B.D.L.	0.1	N.R.	IS 13428 : 2005, RA 2018
19.	Copper (as Cu)	mg/l	B.D.L.	0.05	1.5	IS 3025 (P-42):1992, RA 2019
20.	Zinc (as Zn)	mg/l	0.02	05	15	IS 3025 (P-49):1994, RA 2019
Note: N.R. – No Relaxation; B.D.L. – Below Detection Limit						
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Ground Water Sample: 4 (Proposed SPS:4,2.23 MLD)



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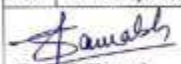
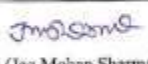
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ULR No.: TC73342300000610F				Date: 13/05/2023		
Sample ID: NES230510016						
TEST CERTIFICATE WATER QUALITY ANALYSIS						
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan				
	Authority Engineer	M/s. SMCC – AG (Joint Venture)				
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)				
Address		Bharatpur, Rajasthan – IN				
Industrial Activity		Construction of STP, SPS & Sewer Network				
SAMPLE DETAILS						
Sampling Location		At SPS – 4 Proposed Site (2.25 MLD), Near Sulabh Complex – UIT Workshop Scheme, Deeg Road, Bharatpur				
GPS Coordinates		27°13'28.1"N 77°28'31.2"E				
Sampling Source		Borewell Water				
Sample Description		Clear & Colorless Liquid				
Sample Quantity		1.0 Litres				
Sample Condition		Sealed & Refrigerated				
Date of Sample Collection		09/05/2023				
Period of Testing		10/05/2023 to 13/05/2023				
TEST RESULTS						
Sl. No.	Parameters	Unit	Values Found	Standards as per IS 10500 : 2012		
				Desirable Limits	Permissible Limits	Test Method
A. Physical Parameters						
1.	pH	-	7.65	6.5 to 8.5	N.R.	IS 3025 (P-11):1983, RA 2017
2.	Odour	-	Agreeable	Agreeable	Agreeable	IS 3025 (P-05):2018
3.	Turbidity (NTU)	NTU	<1	01	05	IS 3025 (P-10):1984, RA 2017
4.	Total Solids	-	1731.70	--	--	IS 3025 (P-15):1984, RA 2019
5.	Total Dissolved Solids	mg/l	1718.50	500	2000	IS 3025 (P-16):1984, RA 2017
6.	Total Suspended Solids	mg/l	13.20	--	--	IS 3025 (P-17): 1984, RA 2017
 (Saurabh Sharma) Review By		  (Jag Mohan Sharma) Authorized Signatory				
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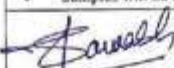


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B.	General Parameters					
7.	Total Hardness	mg/l	197.35	200	600	IS 3025 (P-21):2009, RA 2019
8.	Total Alkalinity	mg/l	632.88	200	600	IS 3025 (P-23):1986, RA 2019
9.	Calcium (as Ca)	mg/l	67.18	75	200	IS 3025 (P-40):1991, RA 2019
10.	Magnesium (as Mg)	mg/l	7.30	30	100	IS 3025 (P-46):1994, RA 2019
11.	Chloride (as Cl)	mg/l	508.44	250	1000	IS 3025 (P-32):1988, RA 2019
12.	Fluoride (as F)	mg/l	0.25	1.0	1.5	IS 3025 (P-60):2008, RA 2019
13.	Sulphate (as SO ₄)	mg/l	203.20	200	400	IS 3025 (P-24):1986, RA 2019
14.	Nitrate (as NO ₃)	mg/l	64.15	45	N.R.	IS 3025 (P-34):1988, RA 2019
15.	Sodium (as Na)	mg/l	182.13	--	--	IS 3025 (P-45):1993, RA 2019
16.	Potassium (as K)	mg/l	77.32	--	--	IS 3025 (P-45):1993, RA 2019
17.	Iron (as Fe)	mg/l	0.15	0.3	N.R.	IS 3025 (P-53):2003, RA 2019
18.	Silver (as Ag)	mg/l	B.D.L.	0.1	N.R.	IS 13428 : 2005, RA 2018
19.	Copper (as Cu)	mg/l	B.D.L.	0.05	1.5	IS 3025 (P-42):1992, RA 2019
20.	Zinc (as Zn)	mg/l	0.02	05	15	IS 3025 (P-49):1994, RA 2019
Note: N.R. – No Relaxation; B.D.L. – Below Detection Limit						
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 (Seemabhi Sharma) Review By					 (Jag Mohan Sharma) Authorized Signatory	
*** END OF REPORT ***						
SMCC / Bharatpur / May 23 / BW / SPS-4 / Page 2 of 2						



Soil Sample: 1 (Proposed STP)



NAKSHATRA ENVIRO SERVICES

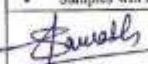
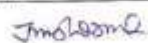
Plot No. 46, Solitaire Industrial Park, Phase I, Dahmi Kalan, Bagru (Ext.), Jaipur - 303007

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E-mail : neslab2004@gmail.com, nakshatraenviro@gmail.com



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ULR No.: TC733423000000603F		Date: 13/05/2023		
Sample ID: NES230510009				
TEST CERTIFICATE SOIL ANALYSIS REPORT				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
SAMPLE IDENTIFICATION DETAILS				
Sampling Location		Near New STP Proposed Site, At Nagar Nigam STP, Gopal Nagla Mod, Acchhnera Road, Bharatpur		
GPS Coordinates		27°12'19.9"N 77°32'51.8"E		
Sample Quantity		1 Kilogram (1 Kg)		
Sample Condition		Sealed		
Date of Sample Collection		09/05/2023		
Period of Testing		10/05/2023 to 13/05/2023		
TEST RESULTS				
Sl. No.	Parameters	Values Found	Unit	Test Protocol
1.	pH	7.62	--	IS 2720 (P-26):1987 (RA 2016)
2.	Electrical Conductivity	487.85	µS/cm	IS 14767:2000 (RA 2016)
3.	Organic Carbon	0.64	%	IS 2720 (P-22):1972 (RA 2015)
4.	Organic Matter	2.04	%	IS 2720 (P-22):1972 (RA 2015)
5.	Total Nitrogen (as TKN)	628.74	mg/kg	IS 14684:1999 (RA 2014)
6.	Sodium (as Na)	165.30	mg/kg	IS 9497:1980 (RA 2020)
7.	Potassium (as K)	202.96	mg/kg	IS 9497:1980 (RA 2020)
8.	Iron (as Fe)	3.54	mg/kg	As per USEPA Guidelines
9.	Copper (as Cu)	0.20	mg/kg	As per USEPA Guidelines
10.	Zinc (as Zn)	0.90	mg/kg	As per USEPA Guidelines
Note: N.R. – No Relaxation; B.D.L. – Below Detection Limit - This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without special permission in writing. - Total liability of this laboratory is limited to the invoice amount. - The results enlisted refer only to the above sample and applicable parameters; endorsement of products is neither inferred nor implied. - Samples will be destroyed after 15 days from the date of issuance of analysis of report unless otherwise specified.				
 (Sadrabh Sharma) Review By		 Seal *** END OF REPORT ***		
		 (Jag Mohan Sharma) Authorized Signatory		



Soil Sample: 2 (Proposed SPS:1,0.81 MLD)



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ULR No.: TC73342300000604F		Date: 13/05/2023		
Sample ID: NES230510010				
TEST CERTIFICATE SOIL ANALYSIS REPORT				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
SAMPLE IDENTIFICATION DETAILS				
Sampling Location		At SPS – I Proposed Site (0.81 MLD), Near Naye Mandi Shamshan, Bharatpur		
GPS Coordinates		27°13'44.5"N 77°29'40.4"E		
Sample Quantity		1 Kilogram (1 Kg)		
Sample Condition		Sealed		
Date of Sample Collection		09/05/2023		
Period of Testing		10/05/2023 to 13/05/2023		
TEST RESULTS				
Sl. No.	Parameters	Values Found	Unit	Test Protocol
1.	pH	7.55	--	IS 2720 (P-26):1987 (RA 2016)
2.	Electrical Conductivity	512.84	µS/cm	IS 14767:2000 (RA 2016)
3.	Organic Carbon	0.75	%	IS 2720 (P-22):1972 (RA 2015)
4.	Organic Matter	2.14	%	IS 2720 (P-22):1972 (RA 2015)
5.	Total Nitrogen (as TKN)	497.85	mg/kg	IS 14684:1999 (RA 2014)
6.	Sodium (as Na)	112.63	mg/kg	IS 9497:1980 (RA 2020)
7.	Potassium (as K)	157.84	mg/kg	IS 9497:1980 (RA 2020)
8.	Iron (as Fe)	6.20	mg/kg	As per USEPA Guidelines
9.	Copper (as Cu)	0.18	mg/kg	As per USEPA Guidelines
10.	Zinc (as Zn)	0.65	mg/kg	As per USEPA Guidelines
Note: N.R. – No Relaxation; B.D.L. – Below Detection Limit - This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without special permission in writing. - Total liability of this laboratory is limited to the invoice amount. - The results enlisted refer only to the above sample and applicable parameters endorsement of products is neither inferred nor implied. - Samples will be destroyed after 15 days from the date of issuing of analysis of report unless otherwise specified.				
 (Saurabh Sharma) Review By		 (Jag Mohan Sharma) Authorized Signatory		
*** END OF REPORT ***				



Soil Sample: 3 (Proposed SPS:2,1.64 MLD)



NAKSHATRA ENVIRO SERVICES

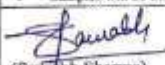
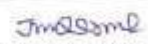
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E-mail : neslab2004@gmail.com, nakshatraenviro@gmail.com



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ULR No.: TC73342300000605F		Date: 13/05/2023		
Sample ID: NES230510011				
TEST CERTIFICATE SOIL ANALYSIS REPORT				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project	Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)			
Address	Bharatpur, Rajasthan – IN			
Industrial Activity	Construction of STP, SPS & Sewer Network			
SAMPLE IDENTIFICATION DETAILS				
Sampling Location	At SPS – 3 Proposed Site (1.65 MLD), Near Mukharjee Nagar, R.N.F.C.D.Bridge, Bharatpur			
GPS Coordinates	27°13'41.8"N 77°28'51.9"E			
Sample Quantity	1 Kilogram (1 Kg)			
Sample Condition	Sealed			
Date of Sample Collection	09/05/2023			
Period of Testing	10/05/2023 to 13/05/2023			
TEST RESULTS				
SL No.	Parameters	Values Found	Unit	Test Protocol
1.	pH	7.84	--	IS 2720 (P-26):1987 (RA 2016)
2.	Electrical Conductivity	564.20	µS/cm	IS 14767:2000 (RA 2016)
3.	Organic Carbon	0.48	%	IS 2720 (P-22):1972 (RA 2015)
4.	Organic Matter	1.67	%	IS 2720 (P-22):1972 (RA 2015)
5.	Total Nitrogen (as TKN)	428.74	mg/kg	IS 14684:1999 (RA 2014)
6.	Sodium (as Na)	128.94	mg/kg	IS 9497:1980 (RA 2020)
7.	Potassium (as K)	165.70	mg/kg	IS 9497:1980 (RA 2020)
8.	Iron (as Fe)	4.28	mg/kg	As per USEPA Guidelines
9.	Copper (as Cu)	0.22	mg/kg	As per USEPA Guidelines
10.	Zinc (as Zn)	0.70	mg/kg	As per USEPA Guidelines
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 (Jag Mohan Sharma) Review By		  (Jag Mohan Sharma) Authorized Signatory		
*** END OF REPORT ***				



Soil Sample: 4 (Proposed SPS:4,2.2 MLD)



NAKSHATRA ENVIRO SERVICES

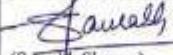
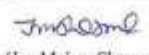
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ULR No.: TC73342300000606F		Date: 13/05/2023		
Sample ID: NES230510012				
TEST CERTIFICATE SOIL ANALYSIS REPORT				
Issued to	Client	Superintending Engineer – PIU, RUIDP Phase IV, Bharatpur, Rajasthan		
	Authority Engineer	M/s. SMCC – AG (Joint Venture)		
Name of Project		Providing Sewer Network with House Connections & Construction of Sewage Treatment Plant & Sewer Pumping Station & all allied works & operation services of the entire system for 10 Years Bharatpur, (Package No. RSTDSP/BHR/WW/01)		
Address		Bharatpur, Rajasthan – IN		
Industrial Activity		Construction of STP, SPS & Sewer Network		
SAMPLE IDENTIFICATION DETAILS				
Sampling Location		At SPS – 4 Proposed Site (2.25 MLD), Near Sulabh Complex – UIT Workshop Scheme, Deeg Road, Bharatpur		
GPS Coordinates		27°13'28.1"N 77°28'31.2"E		
Sample Quantity		1 Kilogram (1 Kg)		
Sample Condition		Sealed		
Date of Sample Collection		09/05/2023		
Period of Testing		10/05/2023 to 13/05/2023		
TEST RESULTS				
Sl. No.	Parameters	Values Found	Unit	Test Protocol
1.	pH	7.60	–	IS 2720 (P-26):1987 (RA 2016)
2.	Electrical Conductivity	411.76	µS/cm	IS 14767:2000 (RA 2016)
3.	Organic Carbon	0.57	%	IS 2720 (P-22):1972 (RA 2015)
4.	Organic Matter	1.85	%	IS 2720 (P-22):1972 (RA 2015)
5.	Total Nitrogen (as TKN)	482.63	mg/kg	IS 14684:1999 (RA 2014)
6.	Sodium (as Na)	133.70	mg/kg	IS 9497:1980 (RA 2020)
7.	Potassium (as K)	184.20	mg/kg	IS 9497:1980 (RA 2020)
8.	Iron (as Fe)	3.27	mg/kg	As per USEPA Guidelines
9.	Copper (as Cu)	0.21	mg/kg	As per USEPA Guidelines
10.	Zinc (as Zn)	0.97	mg/kg	As per USEPA Guidelines
Note: N.R. – No Relaxation; B.D.L. – Below Detection Limit - This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law and should not be used in any advertising media without special permission in writing. - Total liability of this laboratory is limited to the invoice amount. - The results enlisted refer only to the above sample and applicable parameters endorsement of products is neither inferred nor implied. - Samples will be destroyed after 15 days from the date of issuing of analysis of report unless otherwise specified.				
 (Satish Sharma) Review By		 (Jag Mohan Sharma) Authorized Signatory		
		 *** QOPBREPORT ***		



APPENDIX 7: INDUCTION CUM ORIENTATION SAFETY TRAINING PROGRAMME FOR CONTACTORS & TECHNICAL PERSONALS OF PIU/CMSC.

Induction cum Orientation Safety Training Programme for Contactors & Technical personals was organised on 01.06.2023 for various EMP provision, employment, Health and Safety standards and compliances. Training was imparted by Environmental Safeguards Personnel of CMSC-01, Jaipur and was attended by contractor's employees as well as technical staff of PIU. Various provision, requirements and compliances regarding Environment Health and Safety were discussed in detail. Photographs and attendance of training are attached below:



Environment Safeguard Training at PIU-Bharatpur Office with CMSC-01 Site Staff, CAPP & Contractor Teams

APPENDIX 8 : OFFICE ORDER FOR GRM

Rajasthan Urban Drinking Water, Sewerage and Infrastructure Corporation Limited
 (External Aided Project)
 AVS Building, Jawahar Circle, JLN Marg, Jaipur - 302017
 Tel No.: 141 2721966, Fax No.: 141 2721919,
 email : mailruidp@gmail.com, mail.ruidp@rajasthan.gov.in

No. F3 (301) (60)/RUIDP/PMU/PH-IV/ADB S. Safeguard /2023/

Date:-

Suprintending Engineer/Executive Engineer

PIU-Jodhpur, Ratangarh, Dungarpur,
 Nokha, Nathdwara, Ajmer, Bharatpur,
 Bundi, Abu Road, Barmer.

Subject:- Nomination of Safeguard and Safety Officer (SSO) of each PIUs for proper monitoring of Environmental and Resettlement issues and addressing of safeguard related Grievances through Grievance Redress Mechanism.

Reference: - Agreed Environmental Resettlement framework and EARF of RSTDSP-AF.

All PIUs are directed to issue an office order to nominate one engineer from PIU to works as Safeguard and Safety Officer (SSO). It will be additional responsibility of Safeguard and Safety Officer (SSO), PIU to ensure day to day monitoring of implementation of Environmental Management and Monitoring Plan (EMMP) provisions, Implementation & Monitoring Resettlement Plan (RP) and ADB Safeguard Policy& Safety compliance in concern town.

Further it is directed that all the PIU should maintain proper separate records of safeguard related Grievances received in their town and ensure that the safeguard related Grievances received are resolved as per Grievance Redress Mechanism (GRM) prescribed in EARF/RF which is summarized as under (for ready reference)

Methodology of multi-tier GRM	Responsibility/ Action to be taken	Time Frame	Record Keeping
1st level: Grievances that are immediate and urgent in the perception of the complainant, the contractor, and supervision personnel from PIU and CMSC on-site will provide	EE PIU will resolve issues in consultation with supervision personnel (ACM), Safeguard and Safety Officer (SSO) PIU, Contractor, and Safeguard staff CMSC and CAPPC.	PIU will resolve issues within 7 days of receipt of a complaint/ grievance.	Safeguard Support of CMSC will oversee the matters and prioritize / follow up the issues with PIU/Contractor. Safeguard and Safety Officer will support of PIUs, CMSC and CAPPC.

Digitally signed by Arun Vyas
 Designation : Project Director
 Date: 2023.10.20 10:20:58 IST
 Reason: Approved

Methodology of multi-tier GRM	Responsibility/ Action to be taken	Time Frame	Record Keeping
the most easily accessible or first level of contact for quick resolution of grievances	required, city level monitoring committee (CLMC) will be involved in resolution of grievances at the 1st level;		Grievances timely in the format enclosed as Annexure 1. Contractor/ Safeguard Support of CMSC will enter the general Grievance received (in a summarized manner) in Grievance Register (format enclosed as Annexure 2) on receipt form public forwarded to head of PIU or Safeguard and Safety Officer (SSO) for resolve in time and provide summarized information as and when required. The grievance register will be endorsed by all field agencies involved in implementation of EMP and RP.
2nd level: All grievances that cannot be redressed within 7 days at field/PIU level will be brought to the notice of Zonal PIU headed by Additional Chief Engineer (ACE).	The ACE at zonal PIU will resolve issues in consultation with SE/EE PIU, assistant safeguard officer (ASO), field level PIU, CMSC, CAPPC and contractor.	The ACE at zonal PIU will resolve the grievance within 7 days of receipt of compliant/grievance.	Environmental and Social Safeguards Personal of CMSC will keep all the records referred to zonal PIU and after compilation, all the details will be submitted to PMU.
3rd level: All the grievances that are not addressed by Zonal PIU within 7 days of receipt will be	Project Officer (Social/Environment) at PMU will resolve the grievance with necessary coordination of Zonal PIU and CMSC and	PMU will resolve the grievance within 15 days of receipt of grievance. Digitally signed by Arun Vyas Designation : Project Director Date: 2023.10.18 00:20:58 IST Reason: Approved	Safeguard Support of PMCBC will keep all the records referred to PMU.

Methodology of multi-tier GRM	Responsibility/ Action to be taken	Time Frame	Record Keeping
brought to the notice of the PMU.	guidance/instruction of additional project director (APD-PMU);		
4th level: Grievances not redressed through this process within/at the project level within stipulated time period will be referred to the CLC/grievance redress committee (GRC).	Zonal PIU will inform the CLC regarding any grievances required to be resolved urgently.	The GRC will resolve the grievance within 15 days of receiving the complaint.	Environmental and Social Safeguards Personal of CMSC will keep all the records.

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

PIU Safeguard and Safety Officer (SSO) will monitor the entire process and all decisions taken by the PIU, zonal officers, PMU and GRC and will be communicated to the APs by Safeguard Support of CMSC.

It is also directed that names and contact number of the concerned Safeguard and Safety Officer (SSO) of PIU, contractors, safeguard support staff of CMSC will be posted at all construction sites at visible locations.

All PIUs will ensure timely issuance of order with a copy to Project Officer (Social & Environment), PMU. Further PIUs will be responsible to ensure redressal of grievances as per GRM procedures summarized above.

(Arun Vyas)

Chief Engineer, RUIDP

No. F3 (301) (60)/RUIDP/PMU/PH-IV/ADB S. Safeguard /2023/

Date:

Copy to the following for information and necessary action please:-

1. ACE-I & II Phase-IV, RUIDP zone Jaipur & Jodhpur
2. TL, PMCBC, Phase-IV, RUIDP
3. TL, CAPPC, Phase-IV, RUIDP
4. TL CMSC-01/02 Phase-IV, RUIDP zone Jaipur & Jodhpur

RajKaj Ref
4919835

Digitally signed by Arun Vyas
Designation: Project Director
Date: 2023.10.18 00:20:58 IST
Reason: Approved

Appendix :09 – Copy of Consent to Establish (CTE) for proposed STP (9.4 MLD).



Regional Office Bharatpur Rajasthan State Pollution Control Board



Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

M/s Sewage Treatment Plant

Office of The Municipal Commissioner, Near Mathura
gate, Bharatpur

Sub: Consent to Establish under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under Section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application(s) for Consent to Establish dated 21/09/2023 and subsequent correspondence.

Sir,

Consent to Establish under the provisions of Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Sewage Treatment Plant plant** situated / proposed at **Khasra No 44,45,46,47,48,62,63,64,65,66,67,73,74,75 Gopal Nagala Tehsil:Bharatpur District:Bharatpur**, Rajasthan under the provisions of the said Act(s). This consent is granted on the basis of examination of the information furnished by you in consent application(s) and the documents submitted therewith, subject to the following conditions:-

- 1 That this Consent to Establish is valid for a period from **21/09/2023** to **31/08/2028** or **date of commencement of production / commissioning of the project or activities whichever is earlier**.
- 2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below:

Particular	Type	Quantity / Capacity
Sewage Treatment Plant (STP)	Operation	9.40 MLD

- 3 That in case of any increase in capacity or addition / modification / alteration or change in product mix or process or raw material or fuel, the project proponent is required to obtain fresh consent to establish.
- 4 That the control equipment as proposed by the applicant shall be installed before trial operation is started for which prior consent to operate under the provision of the **Water Act and Air Act** shall be obtained. This consent to establish shall not be treated as consent to operate.

Page 1 of 6

Signature Not Verified

Digitally signed by Umesh Kumar
Date: 2023.12.07 17:48:14 IST
Reason: Self Attested
Location:





Regional Office Bharatpur
Rajasthan State Pollution Control Board

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

- 5 That the quantity of effluent generation and disposal along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Quantity of effluent to be recycled (KLD)	Quantity of treated effluent to be disposed (KLD) and mode of disposal
Domestic Sewage	9.400	NIL	NIL Gardening/Plantation/F lushing and Firefighting

- 6 That the sources of air emissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
D.G SET(150KVA)	ACOUSTIC ENCLOSURE, ADEQUATE AIR POLLUTION CONTROL MEASURES, ADEQUATE STACK HEIGHT		

- 7 That the Domestic Sewage shall be treated before disposal so as to conform to the standards prescribed by the Board as notified under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water**. The main parameters for regular monitoring shall be as under:

Page 2 of 6

Signature Not Verified

Digitally signed by Umesh Kumar
Date: 2023.12.07 17:48:14 IST
Reason: Self Attested
Location:



II.



Regional Office Bharatpur
Rajasthan State Pollution Control Board

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

Parameters	Standards
pH Value	Between 5.5 to 9.0
Phosphate as P	Not to exceed 1.0 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 10 mg/l
Chemical Oxygen Demand	Not to exceed 50 mg/l
Fecal Coliform (MPN per 100 ml)	less than 230
Total Suspended Solids	Not to exceed 20 mg/l

- 8 In addition to aforementioned parameters for regular monitoring, the total suspended solids (TSS) in the treated effluent before disposal shall not exceed 20 mg/l.
- 9 That above stated effluent standards are subject to the Hon'ble NGT order dated 30/4/2019 in matter of O.A. no 1069/2018 Nitin Shankar Deshpande Vs Union of India and Ors.
- 10 That the unit is proposed to be established in Taj Trapezium Zone Area, thus unit has to strictly comply with the directions given time to time by the Hon'ble court/ TTZ Authority /CAQM/ State Pollution Control Board and in case of any non-compliance this consent shall be deemed as revoked.
- 11 That the treatment plant shall only be established within the land with detail as, Khasra no:44,45,46,47,48,62,63,64,65,66,67,73,74,75 Village: Gopal Nagla, Tehsil and District: Bharatpur.
- 12 The total project cost without depreciation shall not exceed 2600 lacs which includes the cost of Land, Building, Misc. Fixed Assets Plant & Machinery and in case of any increase in the project cost, the project proponent shall be liable to deposit balance amount.
- 13 This consent is not evidence for ascertaining entitlement of land and its use.
- 14 That no ground water shall be abstracted without prior permission from CGWA.
- 15 That a sign Board showing the name, address, capacity of the STP and validity of the consent shall be provided and maintained at the entrance of the site.
- 16 That the water flow meters shall be provided at all suitable points to measure quantity of daily waste water received, and waste water treated. Daily record of the same shall be maintained and to be submitted to the Board.

Page 3 of 6

Signature Not Verified

Digitally signed by Umesh Kumar
Date: 2023.12.07 17:48:14 IST
Reason: Self Attested
Location:



III.



Regional Office Bharatpur
Rajasthan State Pollution Control Board

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

- 17 That Online Continuous Effluent Monitoring System (OCEMS) for parameters namely pH, TSS, COD, BOD and flow meter shall be installed and monitoring data shall be connected with the servers of State Board and Central Pollution Control Board within 03 months without fail.
- 18 That regular maintenance and operation of the OCEMS with temper proof mechanism with facilities for calibration shall be ensured.
- 19 That guidelines prescribed by CPCB for OCEMS for effluents and Standard Operating Procedure (SOP) for Verification of Installation and Calibration of UV-Vis Dual Beam Scanning & Multipoint calibration mechanism technology based OCEMS (Effluent) used in STPs shall be followed.
- 20 That no treated/partially treated untreated effluent shall be discharged into any water body and entire treated sewage shall be utilized in plantation/horticulture/ other gainful purposes.
- 21 That the sludge generated shall be properly digested, de-watered and used as manure or disposed in a scientific manner.
- 22 That the unit shall undertake spray of insecticides from time to time to control fly/mosquito growth in the area.
- 23 That minimum 33% area of the total area of treatment plant premises shall be covered by tree plantation.
- 24 That the unit shall obtain Environmental Clearance from competent authority under EIA Notification dated 14.09.2006 for any such activity which attracts Environmental clearance under EIA Notification dated 14.09.2006.
- 25 That the grant of this consent is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.
- 26 That the unit shall comply with the standard as prescribe by MOEF Notification No. GSR/826(E) Dated 16.11.2009 with respect to National Ambient Air Quality Standards.
- 27 That unit shall establish D.G.Set of rating 150 KVA only after ensuring compliance of the CAQM direction No.76 dt. 29.09.2023.
- 28 That the unit shall strictly comply with the direction no. 75 and 77 issued from Commission for Air Quality Management (CAQM) in NCR and adjoining areas with respect to Graded Response Action Plan (GRAP), and in case of any non-compliance this consent shall be deemed as revoked.

Page 4 of 8

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Location:



IV.



Regional Office Bharatpur
Rajasthan State Pollution Control Board

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

- 29 That you shall ensure that D.G.Set is equipped with adequate acoustic enclosure and the noise level meets the prescribed noise standards laid under Noise Pollution(Regulation and Control (Amendment) Rules, 2002 and subsequent amendments.
- 30 That you shall ensure that D.G.Set is equipped with adequate stack height and the exhaust emission meets the prescribed emission limits laid under the Environment (Protection) Amendment Rules, 2022 and subsequent amendments.
- 31 That submission of any incorrect or partial information/false documents or concealment or misrepresentation of material facts shall make the applicant/industry/ process/ project liable for legal action, jointly as well as severally, under the provisions of the Indian Penal Code,1860, Information Technology Act,2000, Water (Prevention & Control of Pollution) Act,1974 & Air (Prevention & Control of Pollution) Act,1981, which may include imprisonment and/or penalty as per the provisions of the statutes.
- 32 In case, it is found during post inspection, the industry has flouted conditions of consent or inadequate pollution control measures, the consent will be revoked and further action may be taken under Environmental (Protection) Act, 1986, Air Act, 1981 and Water Act, 1974.
- 33 This consent shall be subjected to compliance of any direction or order passed by court of law in matter.
- 34 The unit shall comply with the provisions of Hazardous Waste (Management and Trans-boundary Movement) Rules 2016 and any further amendments.
- 35 That no Single use Plastic (SUP) item, which is banned vide MoEF&CC, Govt of India notification dated 12/08/2021 shall be used in the unit premises.
- 36 That, notwithstanding anything provided hereinabove, the State Board shall have the power and reserves its right, as contained under Section 27(2) of the Water Act and under Section 21(6) of the Air Act to review anytime or all of the conditions imposed here in above and to make such variation as it deems fit for the purpose of compliance of the Water Act and Air Act.
- 37 That the grant of this Consent to Establish is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility, to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

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Location:



V.



Regional Office Bharatpur
Rajasthan State Pollution Control Board

Registered

File No : F(Tech)/Bharatpur(Bharatpur)/7226(1)/2023-2024/1083-1084

Order No : 2023-2024/Bharatpur/9055

Dispatch Date: Dec 7 2023 5:48PM

Unit Id : 129479

10 That the grant of this **Consent to Establish** shall not, in any way, adversely affect or jeopardize the legal proceedings, if any, instituted in the past or that could be instituted against you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Establish** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time, be specified by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Establish** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Yours sincerely,

Regional Officer[Bharatpur]

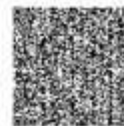
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Regional Officer[Bharatpur]

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VI.

Appendix:10- OCEMS monitoring photographs at STP site.



Date	Influent Sewage Quality								Effluent Sewage Quality									
	PH	TSS	COD	BOD	Alkalinity	TP	TN	DO	PH	TSS	COD	BOD	Alkalinity	TP	TN	DO	Residual Chlorine	TOTAL SOLIDS (mg/L)
1-Jan-14																		
2-Jan-14	7.50	88.0	333.0	80.0	3.0	8.0	11.0	0.88	7.91	7.0	40.0	0.5	1.1	0.88	3.0	1.10	0.5	18.0
3-Jan-14	7.10	96.0	376.0	86.0	3.0	5.0	10.0	0.90	7.63	8.0	44.0	7.0	1.2	0.70	3.3	1.10	0.4	83.0
4-Jan-14	7.00	80.0	316.0	70.0	4.0	3.0	11.0	0.73	7.90	6.0	36.0	1.0	1.0	0.40	2.7	2.90	0.2	67.0
5-Jan-14	7.11	101.0	264.0	83.0	4.0	3.0	10.0	0.50	7.90	7.0	51.0	0.0	1.2	0.70	1.8	1.40	0.4	70.0
6-Jan-14	7.00	70.0	324.0	68.0	3.0	3.0	9.0	0.10	7.61	9.0	44.0	0.0	1.0	0.20	3.8	1.10	0.5	78.0
7-Jan-14	7.10	96.0	370.0	80.0	3.0	3.0	8.0	0.20	7.55	8.0	40.0	7.0	1.0	0.40	3.3	1.20	0.0	83.0
8-Jan-14	7.00	68.0	324.0	66.0	3.0	3.0	10.0	0.80	7.60	7.0	30.0	5.0	1.0	0.80	3.8	1.00	0.2	80.0
9-Jan-14	6.90	87.0	370.0	80.0	4.0	1.0	11.0	0.38	7.82	8.0	40.0	7.0	1.0	0.80	3.0	1.80	0.4	86.0
10-Jan-14	6.90	87.0	370.0	80.0	4.0	1.0	11.0	0.30	7.60	8.0	30.0	5.0	1.0	0.40	3.4	1.40	0.1	71.0
11-Jan-14	7.10	76.0	330.0	63.0	4.0	2.0	10.0	0.80	7.68	9.0	44.0	0.0	1.2	0.80	1.0	1.10	0.0	77.0
12-Jan-14	6.80	74.0	324.0	60.0	3.0	3.0	10.0	0.10	7.20	7.0	40.0	6.0	1.1	0.40	3.7	1.00	0.2	84.0
13-Jan-14	7.10	80.0	370.0	85.0	4.0	3.0	9.0	0.40	7.58	8.0	40.0	7.0	1.0	0.80	2.0	1.30	0.3	80.0
14-Jan-14	7.00	82.0	324.0	80.0	4.0	3.0	9.0	0.15	7.40	9.0	44.0	8.0	1.0	0.80	3.0	1.60	0.4	70.0
15-Jan-14	7.11	88.0	376.0	71.0	4.0	3.0	10.0	0.40	7.20	8.0	51.0	5.0	1.2	0.60	3.7	1.30	0.5	78.0
16-Jan-14																		
17-Jan-14																		
18-Jan-14																		
19-Jan-14																		
20-Jan-14	7.10	96.0	333.0	70.0	4.0	3.0	11.0	0.10	7.60	9.0	44.0	0.0	1.0	0.9	3.0	1.40	0.2	70.0
21-Jan-14	7.21	70.0	324.0	53.0	4.0	3.0	10.0	0.40	7.40	9.0	44.0	7.0	1.0	0.8	3.0	1.60	0.5	86.0
22-Jan-14	7.00	80.0	300.0	80.0	4.0	3.0	11.0	0.30	7.60	7.0	40.0	0.0	1.1	0.4	2.0	1.40	0.4	80.0
23-Jan-14	7.01	40.0	340.0	51.0	3.0	3.0	8.0	0.18	7.20	6.0	36.0	3.0	1.1	0.3	3.3	1.10	0.0	80.0
24-Jan-14	7.06	70.0	224.0	64.0	2.0	7.0	10.0	0.15	7.34	8.0	44.0	7.0	0.9	0.2	1.9	1.00	0.3	77.0
25-Jan-14	6.14	67.0	316.0	30.0	7.0	3.0	8.0	0.20	7.21	7.0	40.0	0.0	1.1	0.4	2.4	1.00	0.4	72.0
26-Jan-14	6.80	88.0	232.0	53.0	3.0	3.0	9.0	0.12	7.10	8.0	30.0	0.0	1.0	0.7	1.9	1.00	0.0	74.0
27-Jan-14	7.00	71.0	220.0	60.0	4.0	7.0	11.0	0.38	7.19	8.0	44.0	7.0	1.0	0.4	3.0	1.04	0.0	76.0
28-Jan-14	7.04	68.0	324.0	60.0	3.0	3.0	10.0	0.20	7.19	8.0	31.0	7.0	1.0	0.8	2.0	1.10	0.2	76.0
29-Jan-14	6.98	72.0	316.0	61.0	3.0	7.0	8.0	0.15	7.22	8.0	44.0	7.0	1.2	0.4	3.3	1.00	0.3	73.0
30-Jan-14	6.91	52.0	376.0	70.0	3.0	3.0	10.0	0.41	7.40	9.0	44.0	8.0	1.0	0.4	3.0	1.41	0.4	70.0
31-Jan-14	7.10	78.0	276.0	70.0	3.0	3.0	12.0	0.30	7.28	7.0	40.0	6.0	1.0	0.6	2.6	1.30	0.0	76.0

Common Appendices C1 – C24 attached separately

Appendix C-1: Drinking Water Standards

Appendix C-2: Ambient Air Quality Standards

Appendix C - 3: Emission limits for New DG sets up to 800 KW

Appendix C- 4: Stack Height Requirement of DG set

Appendix C-5: Vehicle Exhaust Emission Norms

Appendix C-6: Ambient Noise Quality Standards

Appendix C-7: Noise Limits for DG Set

Appendix C-8: Effluent Discharge Standards for Sewage Treatment Plant

Appendix C-9: Pages from Rajasthan State Sewerage and Waste Water Policy for reuse of treated effluent and sludge

Appendix C-10: Guidelines for Reuse of Treated Effluent and Sludge from STP for Beneficial Purposes

Appendix C-11: Guidelines for compensatory tree plantation in RUIDP works

Appendix C-12: Salient Features of Laws applicable to Construction Works including Labor Laws

Appendix C-13: Sample Outline Spoil Management Plan

Appendix C-14: Sample Outline Traffic Management Plan

Appendix C- 15: Sample Six Monthly Reporting Format

Appendix C-16: Sample Environmental Site Inspection Report

Appendix C-17: Sample Grievance Registration Form

Appendix C-18: Management Plan for Night works at Project Sites

Appendix C-19: Guidelines for Safety during Monsoon/Heavy rainfall

Appendix C-20: Sample ACM Management Plan

Appendix C-21: Guidelines for Workers Camps

Appendix C-22: Guidelines for Safety in Chlorine Usage

Appendix C-23: Guidelines for Prevention and Control of COVID-19

Appendix C-24: RUDSICO-EAP Guidelines for implementation of Prevention and Control Measures for COVID-19

Initial Environmental Examination

PUBLIC

Document Stage: Updated Draft
Project Number: 42267-034
February 2024

India: Rajasthan Secondary Towns Development Sector Project – Additional Financing (PART B)

Bharatpur Wastewater Works

Common Appendices

Prepared by Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Limited-
External Aided Project (RUDSICO-EAP) for the Asian Development Bank (ADB). This is an
updated version of the draft originally posted in February 2023 available on
<https://www.adb.org/projects/documents/ind-42267-034-iee-5>

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Appendix C-1: 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	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.

^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 C-2: Ambient Air Quality Standards

Parameter	Location ^a	India Ambient Air Quality Standard ^b (µg/m ³)	WHO global air quality guidelines 2021 (µg/m ³)	Applicable Per ADB SPS ^e (µg/m ³)
PM ₁₀	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	15 (Annual) 45 (24-hr)	15 (Annual) 45 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	15 (Annual) 45 (24-hr)	15 (Annual) 45 (24-hr)
PM ₂₅	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	5 (Annual) 15 (24-hr)	5 (Annual) 15 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	5 (Annual) 15 (24-hr)	5 (Annual) 15 (24-hr)
SO ₂	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	40 (24-hr) 500 (10-min)	40 (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)	10 (Annual) 200 (1-hr)	10 (Annual) 80 (24-hr) 200 (1-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	10 (Annual) 200 (1-hr)	10 (Annual) 80 (24-hr) 200 (1-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	4000 (24 hour)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)		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)	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) 1.0 (24-hr)
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual) 1.0 (24-hr)
Ammonia (NH ₃)	Industrial Residential,	100 (Annual) 400 (24-hr)		100 (Annual) 400 (24-hr)

Parameter	Location ^a	India Ambient Air Quality Standard ^b (µg/m ³)	WHO global air quality guidelines 2021 (µg/m ³)	Applicable Per ADB SPS ^e (µg/m ³)
	Rural and 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)pyrene (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)

Note-

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

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

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

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

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

**Appendix C-3: Emission limits for New DG sets up to 800 KW
(As per Environment (Protection) (Third Amendment) Rules, 2013)**

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

Note:

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

Appendix C-4: Stack Height Requirement of DG set

DIESEL GENERATOR SETS : STACK HEIGHT

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

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

H = Total height of stack in metre

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

KVA = Total generator capacity of the set in KVA

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

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

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

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

Appendix C-5: Vehicle Exhaust Emission Norms

1. Passenger Cars

Norms	CO(g/km)	HC+ NOx(g/km)
1991Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998Norms	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)
1991Norms	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 C-6: Ambient Noise Quality Standards

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

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 C-7: Noise Limits for DG Set

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

Noise Limit for Generator Sets run with Diesel

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

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

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

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

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

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

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

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

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

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

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

3.1 Applicability

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

3.2 Requirement of Certification

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

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

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

Appendix C-8: Effluent Discharge Standards for Sewage Treatment Plant

Discharge Standards to be achieved as per NGT order dtd. 30.04.2019

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

Note: These parameters are being followed under RSTDSP works

Appendix C-9: Pages from Rajasthan State Sewerage and Waste Water Policy for reuse of treated effluent and sludge

STATE SEWERAGE AND WASTE WATER POLICY- 2016

- viii. Design and performance specifications of wastewater treatment plants shall be as per guidelines given in the manual on sewerage treatment systems published by CPHEEO. Sufficient room in tendering for the construction of new plants shall be provided for competition to take place in both technologies and costs.

5.4. On Reuse of Treated Effluent and Sludge

1. Treated wastewater effluent is considered a water resource and is added to the water stock for reuse.
2. Priority shall be given to agricultural reuse of treated effluent for unrestricted irrigation. Blending of treated wastewater with fresh water shall be made to improve quality where possible. Crops to be irrigated by the treated effluent or blend thereof with freshwater resources shall be selected to suit the irrigation water, soil type and chemistry, and the economics of the reuse operations.
3. Crop nutrient requirements shall be determined taking into consideration the prevailing effluent quality. Overuse of nutrients shall be avoided.
4. Accumulation of heavy metals and salinity shall be monitored, managed and mitigated. Leaching of soils shall be advocated by the irrigation authorities.
5. Farmers shall be encouraged to determine the rate of water application needed for different crops, taking into consideration the value of nutrients in the treated water and other parameters.
6. Farmers shall be encouraged to use modern and efficient irrigation technologies. Protection of on-farm workers and of crops against pollution with wastewater shall be ensured.
7. Treated effluent quality should be monitored and users alerted to any emergency causing deterioration of the quality so that they will not use such water unless corrective measures are taken.
8. Studies should be conducted and projects designed and implemented to store the excess treated wastewater in surface reservoirs but artificial recharge is not permitted. Due attention shall be given to the quality of treated and groundwater and the characteristics of the strata.
9. Plans and studies for power generation from sludge, if proven technically, economically and financially feasible, shall be made with due attention to environment impacts.
10. Sludge produced from the treatment process would be processed so it may be used as fertilizer and soil conditioner. Care shall be taken to conform to the regulations of public health and environment protection norms.

11. **Industry:** Industrial reuse of reclaimed wastewater represents major reuse next only to irrigation in both developed and developing countries. Reclaimed wastewater is ideal for many industrial purposes. Where effluent is to be used in the industrial processes, it should be the responsibility of the industry to treat it to the quality standards required. Pilot scale feasibility studies carried out in Australia have concluded that it is possible to economically treat the domestic wastewater to achieve adequate quality for reuse as cooling water. Based on the conclusions of the feasibility study, a full-scale treatment plant employing cross-flow membrane microfiltration system may be installed. The membrane filtration system can remove all suspended solids, fecal coliforms, and giardia cysts. It could also significantly reduce human enteric viruses such as *reovirus* and *enterovirus*. The water reclamation plant at Eraring Power Station demonstrates the potential for reuse of wastewater in power generation and other industrial manufacturing facilities.

Industrial uses for reclaimed water include:

- (i) Evaporative cooling water:-
 - (a) Once-through cooling system.
 - (b) Re-circulating cooling system.
 - (c) Cooling water quality requirements.
 - (ii) Boiler –Feed water- The use of reclaimed water differs little from use of conventional public supplies for boiler-feed water, as both require extensive additional treatment. Quality requirements for boiler feed make up water are dependent upon pressure at which boiler is operated.
 - (iii) Industrial process water-
Suitability of reclaimed water for use in industrial process depends upon particular use like-
 - (a) Pulp and paper.
 - (b) Chemical industry.
 - (c) Textile industry.
 - (d) Petroleum and coal.
12. Whenever possible, other end uses of treated effluents; such as recycling, cooling, power generation, etc. shall be considered.
13. **Re-use Options:** The following options for re-use of effluent have been identified: In general, public health concern is the major issue in any type of reuse of wastewater, be it for irrigation or non-irrigation utilization, especially long term impact of reuse practices. It is difficult to delineate acceptable health risks and is a matter that is still hotly debated. Potential reuse of wastewater depends on the hydraulic and biochemical characteristics of wastewater, which determine the methods and degree of treatment required. While agricultural irrigation reuses, in general, require lower quality levels of treatment, domestic reuse options (direct or indirect potable and non-potable) reuses need the highest treatment level. Level of treatment for other

reuse options lie between these two extremes. The reuse options may be (artificial recharge of aquifers is not permitted):

- i. Irrigation
 - (a) Agriculture and forestry
 - (b) Landscaping
- ii. Fish – farming
- iii. Industry
- iv. Non-potable Domestic Reuse.

The detailed project report should clearly define the best reuse option particular to town and strategy to obtain it. Action plan with clarity should be the part of Detailed Project Report (DPR), while preparing sewerage projects. Before deciding the reuse of treated waste water, authorities must full fill the water quality norms and its legal implications.

14. Governing local body can sell the treated waste water and digested sludge to generate the revenue.

5.5. On Pricing, Financing and Investment

1. In view of increasing marginal cost of wastewater collection and treatment, wastewater charges, connection fees, sewerage taxes and treatment fees shall be set to cover at least the operation and maintenance costs. It is also highly desirable that part of the capital cost of the services shall be recovered. The ultimate aim is for a full cost recovery.
2. Appropriate criteria in order to apply the "polluter pays" principle shall be established.
3. Different charges for different areas may be applied. This shall be assessed for each geographical area as a function of end users and effluent quality and will be subject to economic and social considerations.
4. Because of the limited financial resources available to Government of Rajasthan, setting investment priorities in wastewater will be compatible with government investment plans.
5. Criteria for prioritizing investments in the wastewater sector shall take into account the current and future needs of the state, needs to expand wastewater systems in urban areas and to provide wastewater systems to smaller towns and villages.
6. Priorities of wastewater projects shall not be disconnected from water supply projects and urbanization in general. Decisions will be made concerning them to attain optimum solutions to the need for services, availability of finance and availability of trained manpower.

7. Treated effluent shall be priced and sold to end users at a price covering at least the operation and maintenance costs of delivery.
8. It is the intention of the Government, through private sector participation, to transfer management of infrastructure and services from the public to the private sector, in order to improve performance and upgrade the level of service.
9. The role of the private sector will expand with management contracts, concessions and other forms of private sector participation in wastewater management.
10. The concepts of BOO/BOT shall be entertained, and the impact of such concepts on the consumers shall be continually addressed and negative impacts mitigated.
11. The private sector role in reuse of treated effluent shall be encouraged and expanded.
12. As per urban reforms (under various schemes by MOUD) 100% cost of O&M of sewerage system shall be recovered from consumer. The costs will depend on the system/technology adopted for collection of sewerage and treatment and the administration costs. It is important that the full cost of the service is assessed for each urban area instead of adopting a typical cost assessment. The full cost shall cover the following:
 - (i) Institutional aspect of the sanitation service e.g. the management information systems, accountancy and finance management, billing and collection, customer services, etc. and oversight activities.
 - (ii) Operating, maintaining (on a planned maintenance basis), repairing replacing and extending sanitation service physical infrastructure.
 - (iii) Keeping updated infrastructure and customer data on a GIS base.
 - (iv) Managers, staff, vehicles, equipment and consumables associated with the above.
 - (v) Consumable like chemicals etc.
 - (vi) Power charges.
 - (vii) Spare Parts.
 - (viii) Any other O&M contract amount

5.6. Source of Funds for Sewerage Project

- (A) In general, implementation of reuse facility requires substantial capital expenses. In addition to capital cost associated with reclaimed water facility, there are also additional operation, maintenance, and replacement and administrative costs. Hence responsible agencies may consider following sources of 'Funds for Construction of Sewerage Project':

Appendix C-10: Guidelines for Reuse of Treated Effluent and Sludge from STP for Beneficial Purposes

(Source: Manual on Sewerage and Sewage Treatment Systems, CPHEEO, Ministry of Urban Development, Govt. of India)

Health Hazards during Sewage Operations

Labourers working on the sewage treatment and operations may suffer from a number of ailments directly attributed to handling of sewage. In view of this it is desirable to disinfect sewage and where feasible mechanize sewage operations.

The staff of sewage operations must be well educated in the sanitary rules on the utilization of sewage for irrigation as well as with personal hygiene. All persons working in sewage farms must undergo preventive vaccination against enteric infections and annual medical examination for helminthiasis and be provided treatment if necessary.

Sewage treatment plants should be provided with adequate space for canteens with proper sanitation, wash-stands and lockers for irrigation implements and protective clothing. Safe drinking water must be provided for the workers and for population residing within the effective range of the sewage treatment plants.

All workers should be provided with gum boots and rubber gloves, which must compulsorily be worn while at work. They should be forced to observe personal hygiene such as washing after work as well as washing before taking food. The use of antiseptics in the water used for washing should be emphasized. The farm worker should be examined medically at regular intervals and necessary curative measures enforced.

Mitigation measures to avoid Health Hazards

Personal Hygiene against Pathogen

The worker should take precautions because a large number of coliform groups, various kinds of micro-organisms, and egg parasites exist in sewage. The workers should strive to maintain good health by taking care of the following points:

- Wear clean uniform, work boots, etc.
- After work and before having a meal, always wash hands and disinfect them.
- After work, take a shower if possible.
- Do not enter the offices and lounges wearing dirty clothes.
- If necessary, take vaccinations against tetanus, leptospirosis fever and so on

Maintaining Cleanliness The worker should maintain each facility in a clean and neat condition.

- The floors of workrooms, stairs and corridors should be cleaned at the appropriate frequency to maintain them in a clean condition
- Disinfection of relevant locations is to be carried out periodically.

Health Check Workers should receive health check once a year to maintain their health, and prevent illnesses or detect them at an early stage. The results of the health check should be maintained as records. Recommended items to be inspected during the health check are as given below.

- Examine medical history.
- Examine subjective symptoms and other objective symptoms.
- Check height, weight, vision and hearing ability.
- Chest X-ray examination.
- Blood pressure measurement.
- Check for anaemia.
- Check for liver functions.
- Check for lipids in blood.
- Check blood sugar level
- Urine analysis.
- Electrocardiogram analysis

Welfare Measures The Sanitation Workers (Regulation of Employment and Conditions of Service) Act 2012 proposes constitution of a Sanitation Workers State Welfare Board to exercise powers conferred on it and to perform welfare functions such as the following for sanitation workers:

- Provide immediate assistance to a beneficiary in case of an accident
- Sanction of loan and advances
- Medical expenses for treatment of major ailments
- Financial assistance for education of children
- Payment of maternity benefits
- Make provision and improvement of welfare measures and facilities as may be prescribed

Corrective Measures When a worker has symptoms of an illness listed above, the plant engineer should ensure that the worker is checked-up by a specialist doctor and receives proper treatment and care and should take the following actions considering the content of work done by the worker:

- Change the workplace if necessary
- Change the content of the work
- Shorten the working hours
- Perform relevant measurements of the working environment
- Maintain the facility or equipment

Risks in use of treated effluent and sludge in agriculture practices

Cultivation of crops that are eaten raw should be banned. Cultivation of paddy in bunded fields is likely to give rise to sanitation problems and hence is undesirable. Growing of non-edible commercial crops like cotton, jute, fodder, milling varieties of sugarcane and tobacco would be suitable. Cultivation of grasses and fodder legumes, medicinal and essential oil yielding plants like menthol and citronella may be allowed. Cultivation of cereals, pulses, potatoes and other crops that are cooked before consumption may be permitted, if sewage is treated and care is taken in handling the harvests to ensure that they are not contaminated. Cultivation of crop exclusively under seed multiplication programmes would be advantageous as these are not consumed. As an additional safeguard, sewage irrigation should be discontinued at least two months in advance of harvesting of fruits and berries, one month for all kinds of vegetables and a fortnight for all other crops. Direct grazing on sewage irrigated farms should be prohibited.

Risks of Nutrient Loading in Agriculture

Crops receiving excessive dosage of nitrogen show superfluous vegetative growth and decrease in grain or fruit yield. The phosphate deficit of sewage, therefore, should be made good by supplementing with phosphate fertilizers, the extent of phosphate fortification depending upon the nature of crop and its phosphate requirements. As the availability of phosphate is low in the irrigation water it would be desirable to apply the required quantity of phosphatic fertilizer at the time or even (about a fortnight) before the sowing or planting of the crop. Even when sewage nutrients are balanced by fortification, irrigation with such sewage may supply excessive amount of nutrients resulting in waste or unbalanced growth of plants with adverse effects on yields. It may therefore be necessary to dilute the sewage. Dilution also helps in reducing the concentration of dissolved salts and decomposable organic matter in the sewage thus, decreasing hazards to the fertility of the soil. It is desirable to limit the BOD and total suspended solids of sewage to be disposed on land for irrigation, as per relevant standards. There is a need to take caution on describing nutrient supply capacity of sewage particularly in the case of availability of phosphorus because there is a possible conversion of available phosphorus in unavailable mode in the presence of heavy metals present in the sewerage. This happens commonly in high as well as low pH soils.

Alternative Arrangement during Non-irrigating Periods

During rainy and non-irrigating seasons, agricultural practices may not need any water for irrigation. Even during irrigating season, the water requirement fluctuates significantly. Hence,

satisfactory alternative arrangements have to be made for the disposal of sewage on such occasions either by storing the excess sewage or discharging it elsewhere without creating environmental hazards. The following alternatives are generally considered: a) Provision of holding lagoons for off-season storage. They enable irrigation of a fixed area of land to varying rates of crop demand. They may also serve as treatment units such as aerated or stabilization lagoons, provided the minimum volume required for treatment is provided beyond the flow-balancing requirement. b) Provision of additional land where treated sewage is not required on the main plot of land c) Discharge of surplus treated sewage to river or into sea with or without additional treatment. Combining surface discharge facilities with irrigation system is quite common and often quite compatible. d) Resorting to artificial recharge in combination with an irrigation system where feasible.

Treated Sewage into Perennial Rivers

When sewage is treated and discharged into perennial flowing rivers and the blended river water is drawn downstream of the point of such blending as raw water for treatment in public water supply schemes. This is indirect potable use after blending. This is historical and ongoing all around. However, of late, the organic load due to the discharged treated, partially treated and non-point sewage becomes in excess of the self-purifying capacity of the river. Thus, the river water is not actually fresh water. The water quality of Yamuna river for Agra water supply scheme requires to be first treated in MBBR to purify the river water to a level as raw water for the downstream WTP. When it passes through flowing surface water it has the potential disadvantages of contamination by human and animal activities adding organic matter and waterborne pathogens unless the river stretch is protected from such activities. The guiding principle in such cases for the ULBs will be to at least intercept the sewage outfalls and provide adequate STPs and follow the recommended quality criteria for the treated sewage.

Treated Sewage into Non-Perennial / Dry River Courses

There are locations where the rivers are not perennial or almost dry throughout the year except some monsoon runoff. In this case the discharged treated sewage sinks into the aquifer zone and is extracted by infiltration wells or galleries. The advantage of direct dilution from surface water is lost, but the additional purification in the soil and dilution from the aquifer water are happening. An example is the case of the Palar river course in Tamilnadu. The surface water flow in this occurs only for about a week if the monsoon is normal and if the water spills beyond the upstream impoundments. The aquifer however supports the public water supply of over 30 habitations along its dry tract of nearly 80 km before the sea. The partly treated sewage of the en-route habitations does reach this river course as intervals. So far, no epidemics have been met with. This may be due to the above said additional purification in the soil and dilution by aquifer water. However, if these are exceeded by the contamination load, there can be immediate health problems. The guiding principle in such cases for the ULBs will be (a) to keep a check on the raw water quality from the infiltration wells to detect sudden increase in contaminants and (b) at least intercept the sewage outfalls and provide adequate STPs.

Appendix C-11: Guidelines for compensatory tree plantation in RUIDP works

RUIDP Office of RUDSICO, External Aided Project (RUIDP)
 Rajasthan Urban Drinking Water Sewerage and Infrastructure Corporation Ltd (RUDSICO)
 {Erstwhile Rajasthan Urban Infrastructure Finance and Development Corporation Ltd}
 Head Quarter Address:- Old Working Women Hostel, Behind Nehru Palace, Tonk Road Jaipur
 Branch Address:- AVS Building, Jawahar Circle, JLN Marg, Jaipur - 302017
 Ph. - 141 2721966 Fax No. 141 2721919,
 E-mail:- mailruidp@gmail.com, mail.ruidp@rajasthan.gov.in Website:- www.ruidp.rajasthan.gov.in

No. F3 (201)(57)/RUIDP/PMU/Ph-III/CMS/ 556 Date: 13.04.2018

Sub: Construction Management System: Circular - 10
Ref: Guidelines for Compensatory Tree Plantation in RUIDP works.

RUIDP being a responsible organization in the sector of Urban Infrastructure understands the need & responsibility towards protection and conservation of Environment. It is mandatory in all RUIDP projects to avoid tree cutting during construction activities, however, in some unavoidable cases tree cutting may be allowed subjected to following conditions :-

1. Submission of detailed proposal by contractor indicating number of trees required to be cut with justification and details of efforts made to avoid/minimize tree cutting.
2. Tree cutting should be allowed by PIU/Employer Representative only after permission from concerned authorities (Administration/ Tahsildar/ Forest Department as the case may be).
3. Compensatory plantations should be ensured/ done by contractor in sufficient number of trees so that final survived trees should meet criteria of 1:3 (three trees should be planted for every one tree cut). This ratio is a minimum requirement; additional plantation by contractor should be encouraged. The ratio shall also be got approved by concerned permitting authority.
4. Compensatory plantations can be done in any of project sites (if space available) or any other place in the town after due permission from land owner/concerned department and PIU.
5. Tree species selected for compensatory plantations should be native (local) species and list of such species should be obtained/ verified from Forest Department of concerned town prior to submission of proposal for tree cutting.
6. Trees proposed to be planted should be at least of 3 mtrs height and in healthy condition.
7. It shall be responsibility of contractor to ensure the survival of planted trees upto 5/10 years i.e. for entire O&M period.
8. After completion of Contract period and before handing over project for O&M, all the trees should be counted by PIU through consultants and handed over to Municipality/asset owner/concerned department through PIU.

Circular 10



9. Compensatory plantation is an additional obligation (deemed to be accepted by all parties) and should not be considered as replacement/substitution of any pre-existing contractual obligation/conditions. Compensatory plantation obligations will be additional to Pre defended mandatory plantations for sites in contract.
10. Payments for this Compensatory plantation shall be done from provisional sum of contract and rates shall be taken from RUIDP SOR for the available items and market rate analysis for other items.

This circular shall be strictly abided by all the members of PIU, PMDSC, PSC & Contractor.

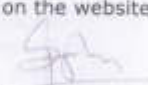

(Dr. Preetam B Yashvant)
Project Director

No. F3 (201)(57)/RUIDP/PMU/Ph-III/CMS/ 57-91

Date: 13.04.2018

Copy to following for information and necessary action:

1. PA to PD/Addl. PD/ FA/ CE/ ACE/SE-I/SE-II/SE-III/ POs/APOs, PMU, RUIDP, Jaipur
2. SE, PIU, Pall/Tonk/Srganaganagar/Jhunjhunu/Bhilwara/Hanumangarh/Kota
3. EE, PIU, Sawal Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
4. Team Leader/ Project Coordinator/CM/ Dy. CM/ACM, PMDSC/ PSC, Jaipur, Pall/ Tonk/ Srganaganagar/ Jhunjhunu/ Bhilwara/ Hanumangarh/ Kota/ Sawal Madhopur/ Bikaner/ Udaipur/ Jhalawar/ Mt. Abu/Banswara
5. ACP, RUIDP, Jaipur to send by e-mail and put up the Guidelines on the website.


Addl. Chief Engineer

Appendix C-12: Salient Features of Laws applicable to Construction Works including Labor Laws

- (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) **Construction and Demolition Waste Management Rules 2016**- This Rule stipulate that-

- Every waste generator shall segregate construction and demolition waste and deposit at collection centre or handover it to the authorized processing facilities
- Shall ensure that there is no littering or deposition so as to prevent obstruction to the traffic or the public or drains.
- Large generators (who generate more than 20 tons or more in one day or 300 tons per project in a month) shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodelling work,
- Large generators shall have environment management plan to address the likely environmental issues from construction, demolition, storage, transportation process and disposal / reuse of C & D Waste.
- Large generators shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar,
- Large generators shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities;

(xvi) **Solid Waste Management Rules 2016**- As per this Rule, responsibility of Solid Waste Generator is as below-

- 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;
- store separately construction and demolition waste, as and when generated, in his own premises and shall dispose off as per the Construction and Demolition Waste Management Rules, 2016; and
- No waste generator shall throw, burn or bury the solid waste generated by him, on streets, open public spaces outside his premises or in the drain or water bodies.

(xvii) **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. Following are the major requirements under this Act, applicable to this project-

Employer shall-

- Provide and maintain, at suitable point, sufficient quantity of wholesome drinking water, such point shall be at least 6 meters away from any washing areas, urinals or toilets
- Provide sufficient urinals and latrines at convenient place, easily accessible by workers
- Provide free of charge, temporary living accommodations near to work sites with separate cooking place, bathing and lavatory facilities and restore the site as pre conditions after completing the construction works
- Provide crèche with proper accommodation, ventilation, lighting, cleanliness and sanitation if more than fifty female workers are engaged
- Provide first aid facilities in all construction sites

For safety of workers employer shall provide-

- Safe access to site and work place
- Safety in demolition works
- Safety in use of explosives
- Safety in operation of transporting equipments and appoint competent person to drive or operate such vehicles and equipments
- Safety in lifting appliance, hoist and lifting gears
- Adequate and suitable lighting to every work place and approach
- Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in work place and confined space
- Safety in material handling and stacking/un stacking
- Safeguarding the machinery with fly-wheel of moving parts
- Safe handling and use of plants operated by compressed air
- Fire safety
- Limit of weight to be lifted by workers individually
- Safety in electric wires, apparatus, tools and equipments
- Provide safety net, safety sheet, safety belts while working at height (more than 1.6 mtrs as per OSHA)
- Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required
- Safety in pile works, concrete works, hot asphalt, tar, insulation, demolition works, excavation, underground construction and handling materials
- Provide and maintain medical facilities for workers
- Any other matters for the safety and health of workers

(xviii) **The Occupational Safety, Health and Working Conditions Code, 2020:** The Occupational Safety, Health And Working Conditions Code, 2020 is a code to consolidate and amend the laws regulating the Occupational safety and health and working conditions of the persons employed in an establishment and for matters connected therewith or incidental thereto. This Code simplifies, amalgamates and rationalises the provisions of the different enactments with certain important changes which, inter alia, are as under:—

- To impart flexibility in adapting technological changes and dynamic factors, in the matters relating to health, safety, welfare and working conditions of workers;
- To apply the provisions of the proposed Code for all establishments having ten or more workers, other than the establishments relating to mines and docks;
- To provide the concept of “one registration” for all establishments having ten or more employees. However, for the applicability of all other provisions of the Code in respect of factories, except registration, the threshold has been fixed twenty workers in a factory (with power) and forty workers (without power);

- To include the journalist working in electronic media such as in e-paper establishment or in radio or in other media in the definition of “working journalists”;
- To provide for issuing of appointment letter mandatorily by the employer of an establishment to promote formalisation in employment;
- To provide free of cost annual health check-ups for employees above the specified age in all or certain class of establishments by which it would be possible to detect diseases at an early stage for effective and proper treatment of the employees;
- To make the provisions relating to Inter-State Migrant Workers applicable on the establishment in which ten or more migrant workers are employed or were employed on any day of the preceding twelve months and also provide that a Inter-State Migrant may register himself as an Inter-State Migrant Worker on the portal on the basis of self-declaration and Aadhaar;
- An Inter-State Migrant Worker has been provided with the portability to avail benefits in the destination State in respect of ration and availing benefits of building and other construction worker cess;
- To constitute the National Occupational Safety and Health Advisory Board to give recommendations to the Central Government on policy matters, relating to occupational safety, health and working conditions of workers;
- To constitute the State Occupational Safety and Health Advisory Board at the State level to advice the State Government on such matters arising out of the administration of the proposed Code;
- To make a provision for the constitution of Safety Committee by the appropriate Government in any establishment or class of establishments;
- To employ women in all establishments for all types of work. They can also work at night, that is, beyond 7 PM and before 6 AM subject to the conditions relating to safety, holiday, working hours and their consent;
- To make provision of “common license” for factory, contract labour and beedi and cigar establishments and to introduce the concept of a single all India license for a period of five years to engage the contract labour;
- To enable the courts to give a portion of monetary penalties up to fifty per cent. to the worker who is a victim of accident or to the legal heirs of such victim in the case of his death;
- To provide overriding powers to the Central Government to regulate general safety and health of persons residing in whole or part of India in the event of declaration of epidemic or pandemic or disaster;
- To make provision for Social Security Fund for the welfare of unorganised workers; and
- To make provision for adjudging the penalties imposed under the Code.

Appendix C-13: Sample Outline Spoil Management Plan

- The Spoil Management Plan should be site specific and be part of the monthly Construction Management Plan.
- The contractor, in consultation with the ULB, has to find out appropriate location/s for the disposal of the excess soil generated. The spoils should be deposited only at these sites.
- Further precautions need to be taken in case of the contaminated spoils.
- The vehicle carrying the spoil should be covered properly.
- The spoils generating from each site should be removed on the same day or immediately after the work is complete. The site / road should be restored to the original condition.

I. Spoils information

The spoil information contains the details like a) The type / material, b) Potential contamination by that type, c) Expected volume (site / component specific), d) Spoil Classification etc.

II. Spoils management

The Spoil Management section gives the details of a) Transportation of spoil b) disposal site details c) Precautions taken d) Volume of contaminated spoil, if present, d) Suggested reuse of disposal of the spoil

III. Documentation

The volume of spoil generated (site specific, date wise), site disposed, reuse / disposal details should be documented properly.

Appendix C-14: Sample Outline Traffic Management Plan

A. Principles for TMP around the Water Pipes/Sewer Construction Sites

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties; and
- addressing issues that may delay the project.

B. Operating Policies for TMP

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

- Make traffic safety and temporary traffic control an integral and high-priority element of project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- Train all persons that select, place, and maintain temporary traffic control devices.
- Keep the public well informed.
- Make appropriate accommodation for property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

3. **Figure A2 to Figure A12** illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the impact due to street closure

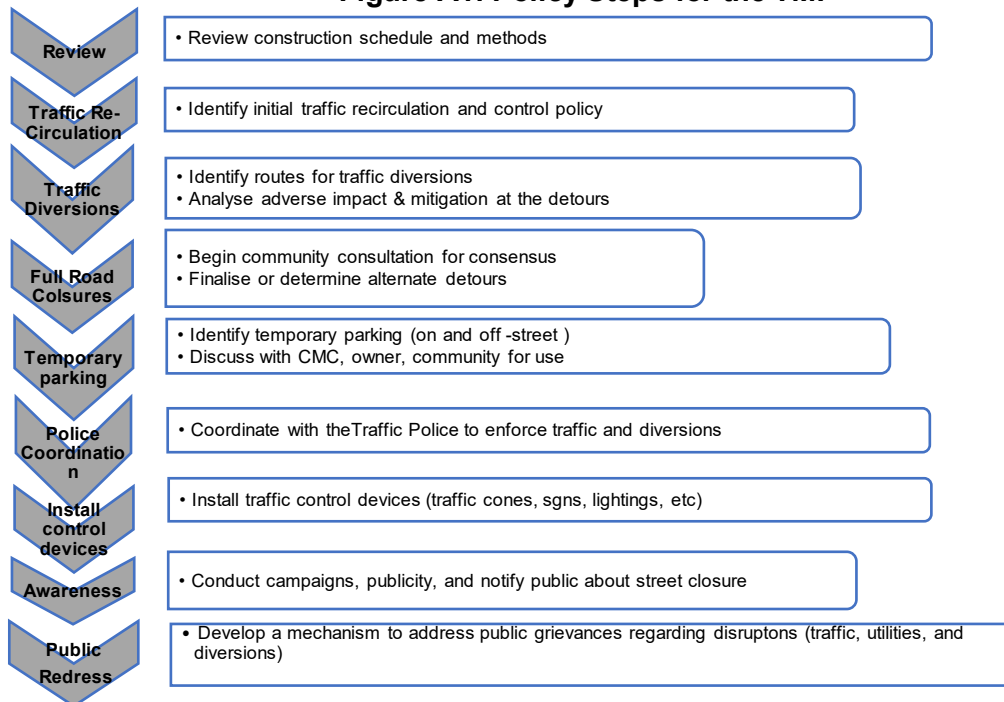
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- approval from the ULB/Public Works Department (PWD) to use the local streets as detours;
- consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- determining if additional traffic control or temporary improvements are needed along the detour route;
- considering how access will be provided to the worksite;
- contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

5. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends

with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

6. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

7. The PIU will also conduct an awareness campaign to educate the public about the following issues:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behaviour along the work zones; and
- reduced speeds enforced at the work zones and traffic diversions.

8. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

9. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centres. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- explain why the brochure was prepared, along with a brief description of the project;
- advise the public to expect the unexpected;
- educate the public about the various traffic control devices and safety measures adopted at the work zones;
- educate the public about the safe road user behaviour to emulate at the work zones;
- tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- indicate the office hours of relevant offices.

E. Install traffic control devices at the work zones and traffic diversion routes

10. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

11. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

12. **Figure A2 to Figure A12** illustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel lane
- Lane closure on road with low volume
- Lane closure on a two-line road with low volume (with yield sign)
- Lane closure on a two-line road with low volume (one flagger operation)
- Lane closure on a two lane road (two flagger operation)
- Lane closure on a four lane undivided Road
- Lane closure on divided roadway
- Half road closure on multi-lane roadway
- Street closure with detour

13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

16. In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

Figure A2 & A3: Work on shoulder or parking lane & Shoulder or parking lane closed on divided road

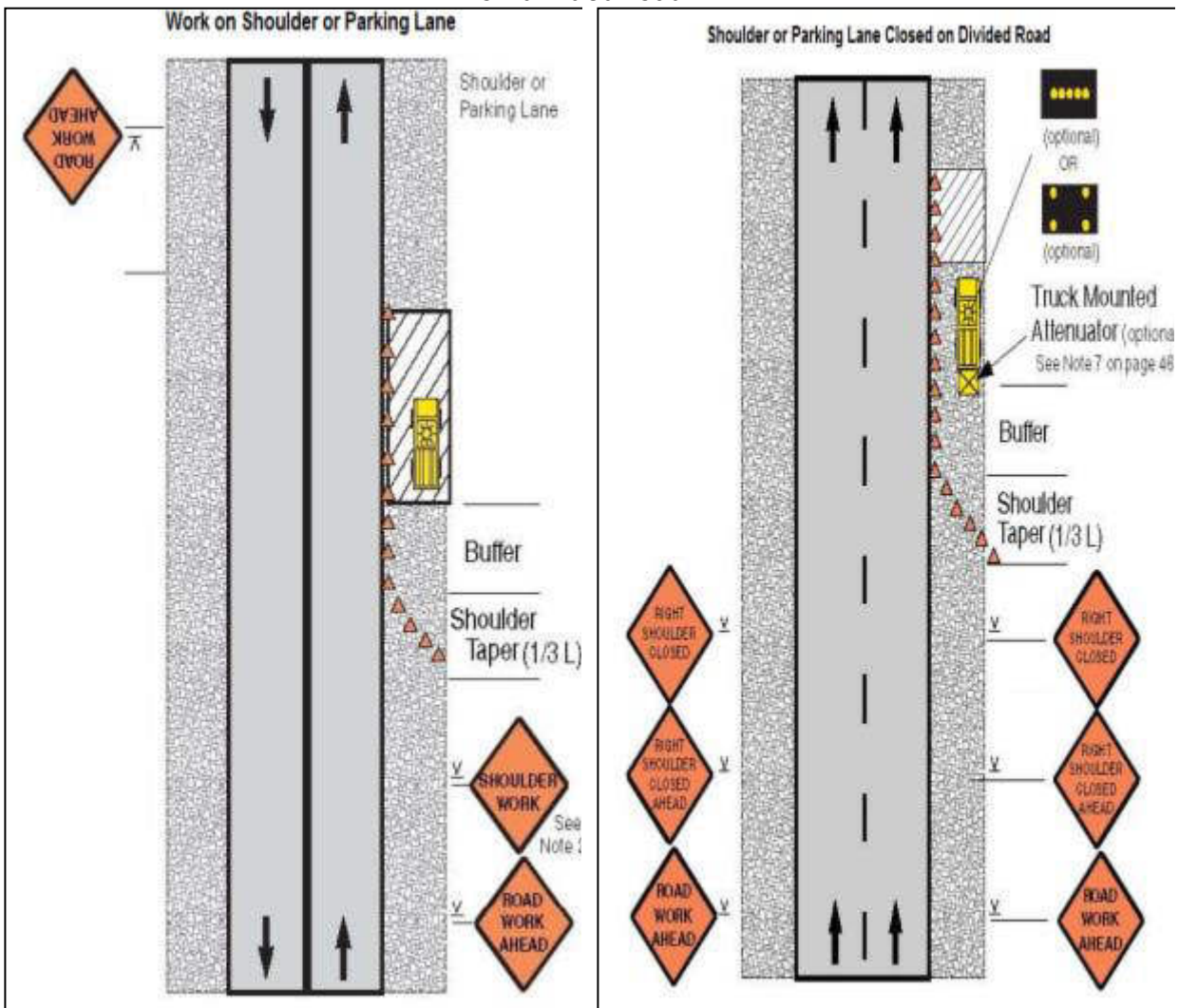


Figure A4 & A5: Work in Travel Lane & Lane closure on road with low volume

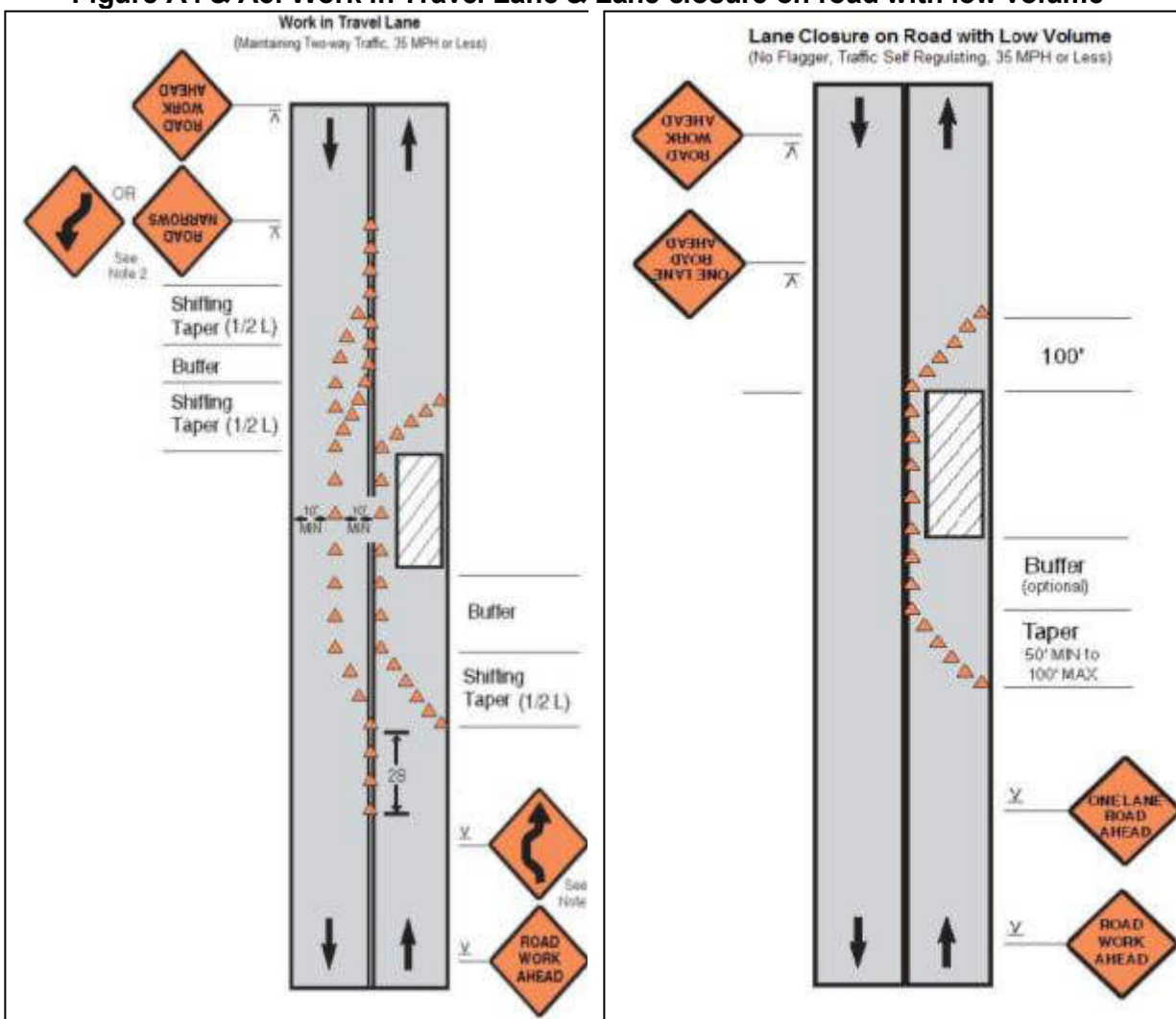


Figure A6 & A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)

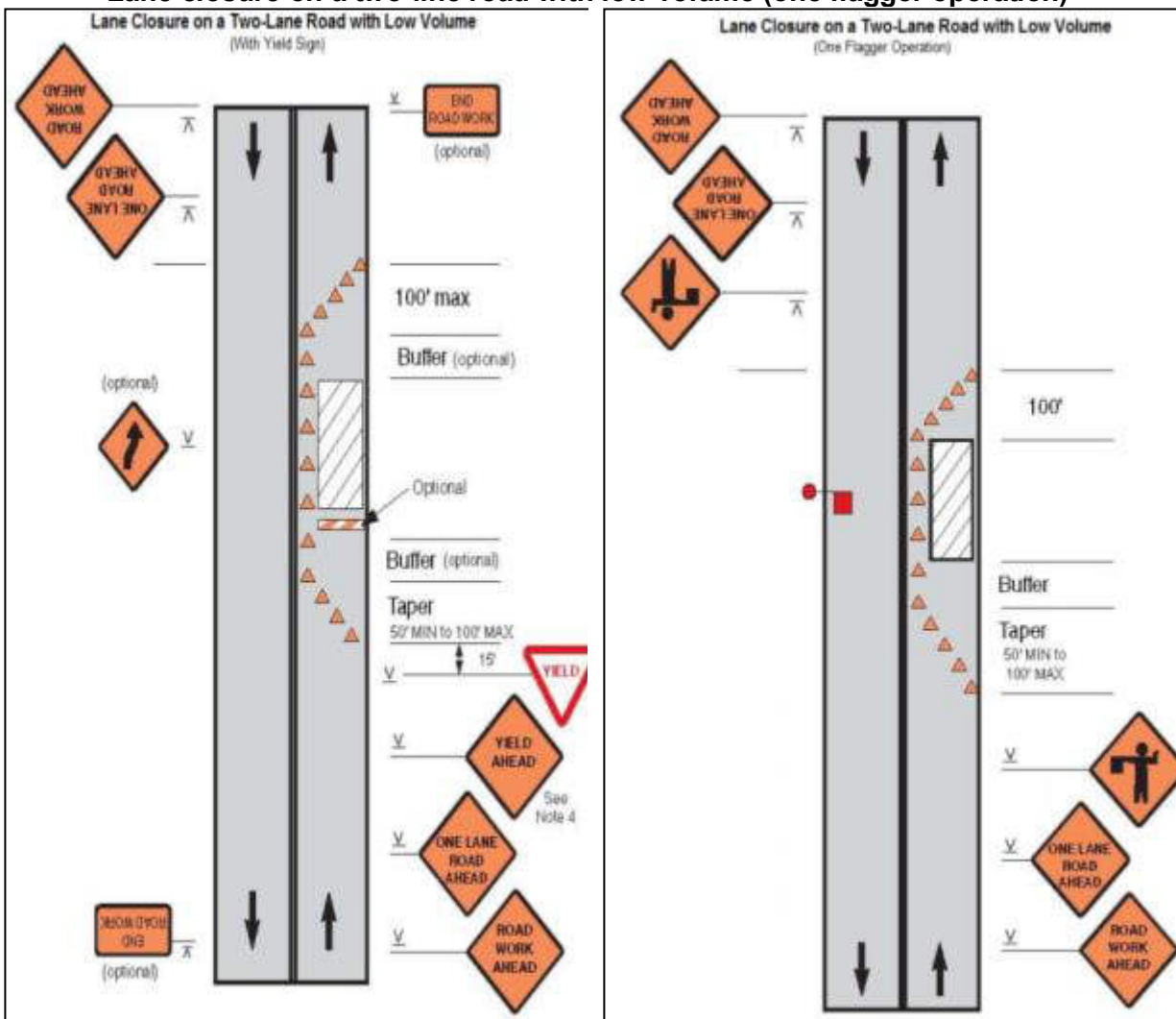


Figure A8 & A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

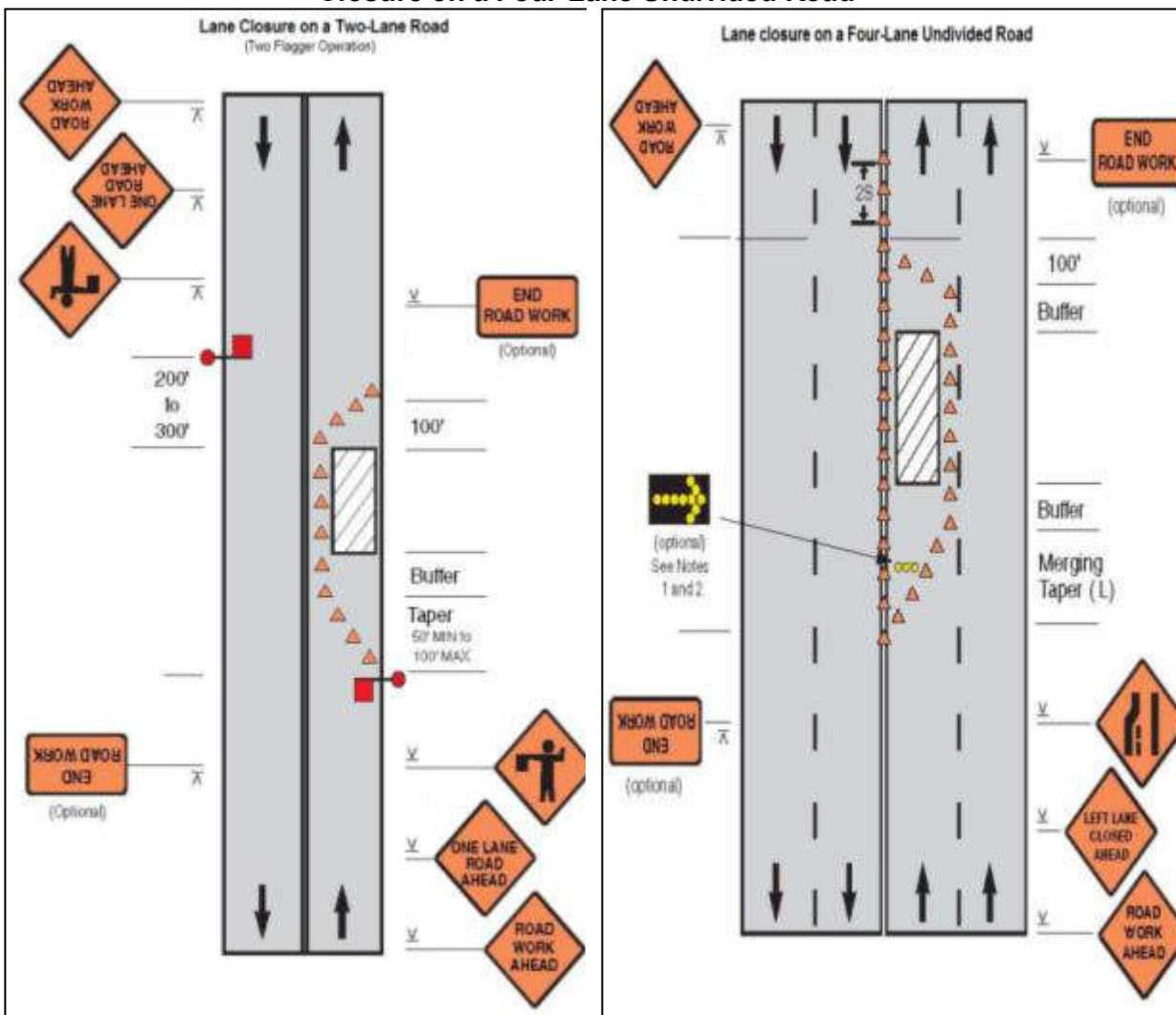


Figure A10 & A11: Lane Closure On Divided Roadway & Half Road Closure On Multi-Lane Roadway

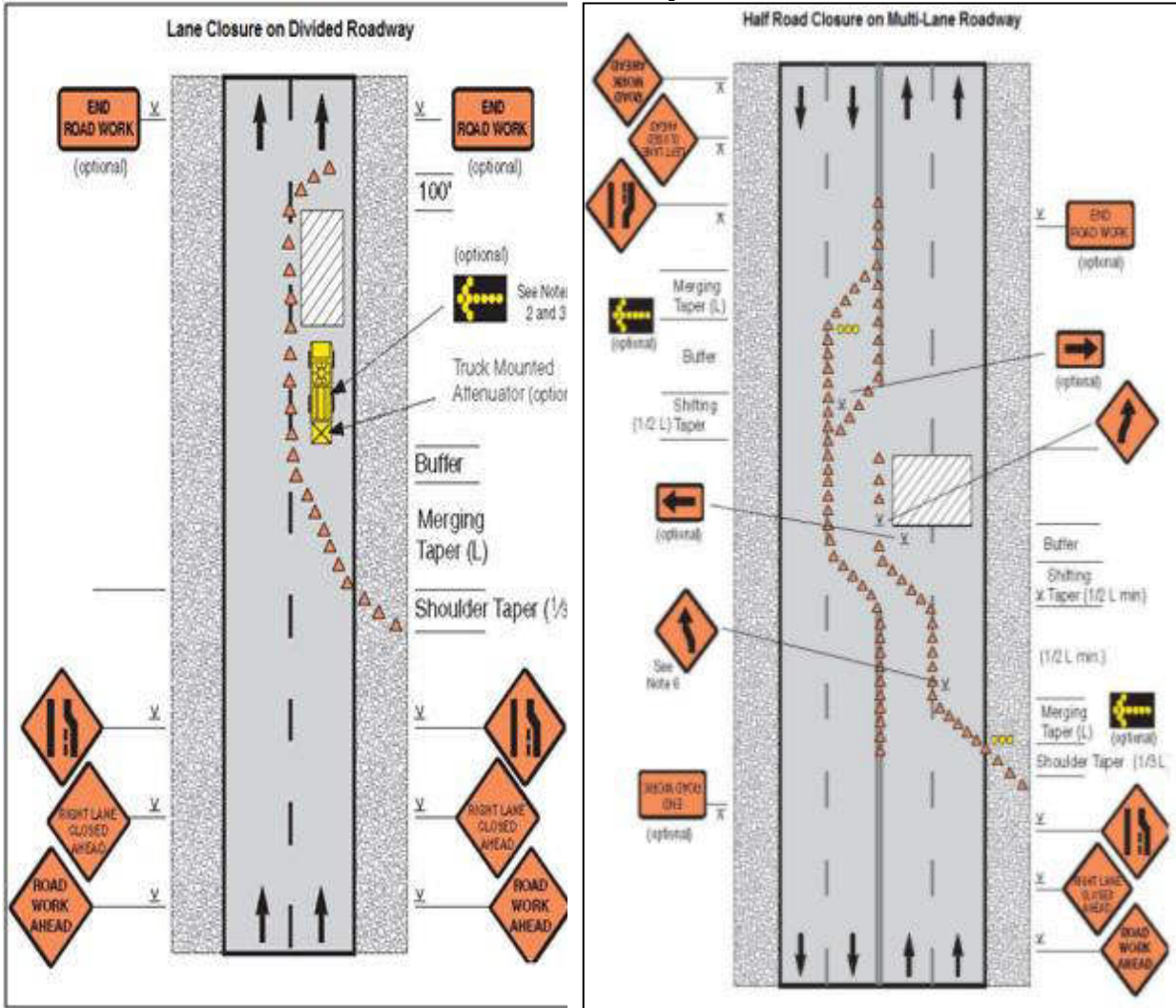
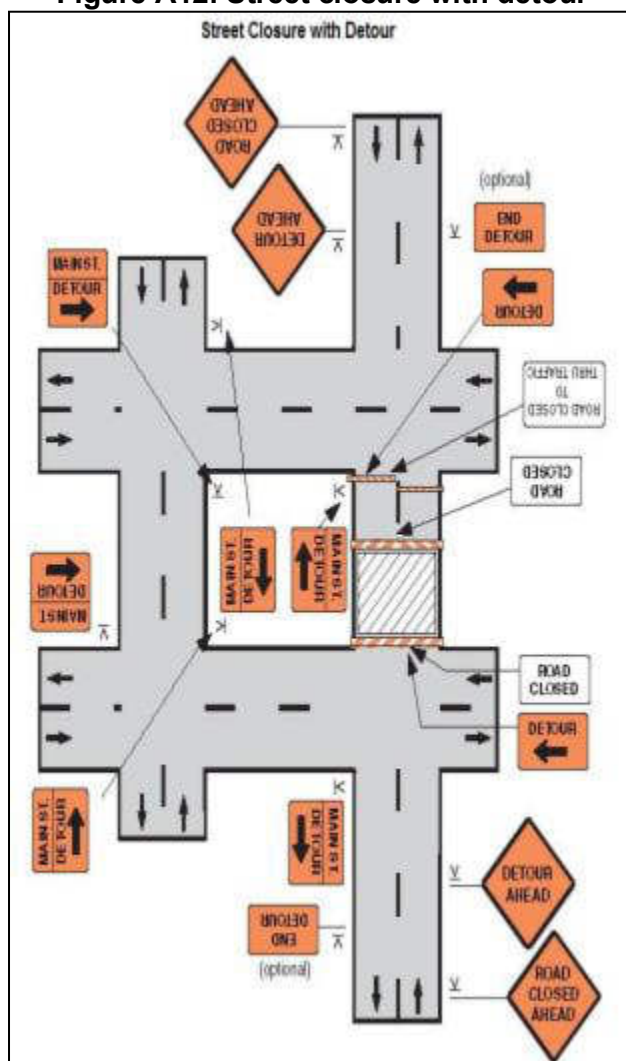


Figure A12: Street closure with detour



Appendix C-15: Sample Six Monthly Reporting Format

1. Introduction

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		

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

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

3. Compliance status with environmental loan covenants

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

4. Compliance status with the environmental management and monitoring plan

5. Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
6. There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
 - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
 - If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
 - adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
 - Are their designated areas for concrete works, and refuelling;
 - Are their spill kits on site and if there are site procedure for handling emergencies;
 - Is there any chemical stored on site and what is the storage condition?
 - Is there any dewatering activities if yes, where is the water being discharged;
 - How are the stockpiles being managed;
 - How is solid and liquid waste being handled on site;
 - Review of the complaint management system;
 - Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Status Compliance	of	Responsibility of mitigation	Responsibility of monitoring	Cost and Source of Funds	Remarks
Design Phase							
Pre-Construction Phase							
Construction Phase							
Operational Phase							

Overall Compliance with CEMP/ EMP

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

5. Approach and methodology for environmental monitoring of the project

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

6. Monitoring of environmental impacts on project surroundings (ambient air, water quality and noise levels)

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

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

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)			
			PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters(Government Standards)					
			pH	Conductivity μS/cm	BODm g/L	TSSmg /L	TNmg/ L	TPmg/ L

Noise Quality Results

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			DayTime	NightTime

7. Summary of key issues and remedial actions

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

8. Appendixes

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

Appendix C-16: 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	
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

Appendix C-17: Sample Grievance Registration Form

(To be available in Hindi 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:	

Appendix C-18: Management Plan for Night works at Project Sites

Following requirements should be fulfilled for construction works at night hours-

1. 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.
2. Contractor should plan for night works only after directions from PMU/PIU/CMSC
3. Contractor should submit plan for night works for approval from PIU.
4. PIU should ensure that prior written information should be given to local authorities such as district administration, Police/traffic police, line agencies concerned, residents welfare association/business association/vyapar of the affected areas and their consents/permissions should be taken prior to start of night works.
5. PIU/CMSC engineers should check and ensure that all the preparation as per management plan is done by contractor and contractor is having all the necessary equipments and materials for night works.
6. Contractor is required to have following equipments/arrangements for night works-
 - Contractors should have hand held noise level meter for measurement of noise during night hours
 - Contractors should have hand held lux meter for the measurement of illumination during night hours
 - Preferably electrical connections is available for running equipments otherwise sound proof/super silent Diesel Generator set should be available
 - 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

- 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

- 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
- All the noise activity like hammering, cutting, crushing, running of heavy equipments should be done in day time and avoided in night time

- Workers engaged in night works should have adequate rest/sleep in day time before start of night works
 - 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
 - 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
 - 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
 - Horns should not be permitted by equipment's and vehicles
 - Workers should not shout and create noise
 - First aid and emergency vehicles should be available at site
 - Emergency preparedness plan should be operative during night works
 - Old persons and pregnant women and women having small kids should not work in night time
 - All the vehicles and equipment's being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise
 - All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works
7. PIU/CMSC site engineers and contractor's safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and videographic records as well as register the observations
 8. Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement
 9. After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians
 10. Drivers and workers should be alert and responsive during night works
 11. All the wages to workers working in night hours should be as per the applicable labour acts
 12. Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours
 13. Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

Appendix C-19: Guidelines for Safety during Monsoon/Heavy rainfall

Excavation and refilling of earth are common activities, which, if not carefully executed may pose problems to the safety of works as well as passers-by and road users during the impending Monsoon.

Normal and heavy rainfall event affect our ongoing works, It should be our conscientious effort to ensure that such events do not prove to be problematic to people and structures in town. During monsoon PIU/PMCBC should ensure that any further excavation work is taken up only after ensuring that the earlier work is in safe stage. It is desired that DCM/ACM & Ex En PIU should inspect all sites during rains and take proactive actions.

Some of the precautions and mitigation measures to be taken are discussed below-

1. The execution of works having deep excavation in smaller lanes and congested areas should be completed well before monsoon. The works of deep excavation during monsoon should not be preferably taken up or extensive care should be taken for execution of such works.
2. The settlement in refilled trenches of sewerage and water supply lines may occur during monsoon. PMCBC and PIU team should inspect all sites after a storm to identify such reaches and take immediate corrective action by proper refilling and compacting. It is responsibility of all engineers to look after this activity during monsoon and ensure corrective actions from Contractor's side.
3. The contractor's crew should be equipped with vehicle, gum boots, raincoats, torch etc. to tackle such situation during and after rains. Adequate quantities of earth, debris and gravel should be stacked at strategic places so that no time is lost in procuring such material.
4. In trenches where pipe laying has been done and duly tested and approved, refilling should be done and all surplus material relocated to safe disposal sites such that it does not obstruct traffic or waterways.
5. All open ends of WS and WW pipelines should be firmly plugged to prevent debris from entering the pipeline. Manhole covers of sewer lines should be fixed in place to avoid any harm to road users.
6. Drains are primary or secondary carriers of storm water. Any unutilized construction material should be relocated to allow free passage of storm water. Surplus earth should be suitably and immediately be relocated to avoid earth from falling into the drain so that choking does not occur.
7. Overhead works should not be carried on in-weather conditions that threaten the safety of workers. More frequent checks on scaffold and bracings should be done during monsoon season.
8. Additional precautions should be taken of the power lines, ignorance and carelessness can cause major accidents and casualty.
9. Take preventive measures for water logging in working areas by providing dewatering pumps. Place bright and reflective warning signs.
10. Inspection should also be carried out before resumption of work after a shower/rain.
11. Storage of Construction Material: Steel & Cement are vital ingredients for quality construction work but in absence of proper storage, especially during monsoon, cement and steel may rapidly decline in quality and strength. Care should be taken to protect these materials and use of any exposed material should be allowed only after conducting fresh tests. Improper storage of such material should be reported to SE PIU/ACM PMCBC and use of any apparently affected material should be done after permission of SE PIU/DCM/ACM.

Additional Precautions

1. Adequate set up and resources such as dewatering pumps, electrical routings etc should be planned ahead. Water logging on main roads to be avoided, where construction works are going on.
2. Ensuring the monsoon specific PPE's issued in adequate and are used during monsoon.
3. Use of electric extension box should be avoided; extension cables (if used) should not be wet and damaged. Cables connections should be only weatherproof/waterproof. Electrical and HSE personnel of contractor should visit permanent and running sites regularly. Transparent protective sheets/rain sheds should be placed for the power distribution boards.
4. Welding machines, bar cutting machines etc. should be kept in dry conditions; should not stand in water logged area. Brakers and Drill machines should not be used when raining; dirt/mud should be scrubbed with cloth.
5. Special Trainings to all drivers and operators on safe practices and all vehicles/ equipment's maintenance checks to be more frequent.
6. High boom equipment to be stopped during blowing of high speed wind and rain storm. Arresting of parked vehicles, equipment during monsoon should be done.
7. All chemicals should be stored as per MSDS, chemicals to be protected from water ingress. Chemical waste should be disposed for preventing overflow of chemicals.
8. At labor camps following precautions should be taken:-
 - Maintaining hygiene & proper housekeeping.
 - Additional health checkup camp to identify seasonal diseases
 - Preventive measures on mosquito/parasite breeding mainly in work locations and camps
 - Frequent cleaning of toilets
 - To avoid water borne diseases, high level of cleanliness to be maintained, drinking water containers need to be cleaned and kept covered. Walk areas and pathways to be covered with Murom and soft rock particles (to avoid soft soil conditions).
 - Obstacle free approach to rest sheds, camp and toilets.
 - Proper illumination, provision of battery operated emergency lights
 - No bonfires inside resting sheds. No use of wood.

Note-

SE-PIU and ACM-PMCBC should oversee the arrangements to effectively deal with the eventuality.

EHS officer of contractor should visit each site and camps more frequently. Contractor/EHS officer will also impart training on safe working methods during Monsoon and will keep a daily watch on weather conditions to share with site team to act accordingly.

Contractor should organize Monsoon Health Camps and Monitor Workmen Habitat and Hygiene.

Appendix C-20: Sample ACM Management Plan

BACKGROUND OF ASBESTOS

1. The purpose of this Asbestos Management Plan (AMP) is to identify, use appropriate methodology and scientifically handling /disposal of the Asbestos Containing Materials (ACM) in order to comply with the applicable National legislation and International standards in sync with norms of ADB's SPS 2009. ADB has mandated as per Appendix 5 - prohibit the investment activities list - production of, trade in, or use of un-bonded asbestos fibers is deliberated. As per SPS 2009 Safeguard Requirement 1, it is emphasized "that the borrower/client will provide workers with a safe and healthy working environment" in the work areas with accounted risks inherent to the work zone and defined safety instructions and standard operating procedures identifying roles and responsibilities.
2. Asbestos is a collective name given to a group of minerals that occur naturally as fiber bundles and possess high tensile strength, flexibility, heat resistance, non-biodegradability with chemical and physical durability. Asbestos is hydrated silicates with complex crystal structures. It is found in two configurations: chrysotile (derived from serpentine minerals) and amphibole is a naturally occurring mineral with long thin fibers. The most abundant asbestos used in the world is chrysotile. The use of ACM propagated due to its economic viability.
3. The purpose of this AMP is to identify, use appropriate methodology and scientifically handling /disposal of the Asbestos Containing Materials (ACM) in order to comply with the applicable National legislation and International standards in sync with norms of ADB's SPS 2009.. As per SPS 2009 Safeguard Requirement 1, it is emphasized "that the borrower/client will provide workers with a safe and healthy working environment" in the work areas with accounted risks inherent to the sector and defined safety instructions and standard operating procedures identifying roles and responsibilities.

Table 1: REGULATORY FRAMEWORK, STANDARDS AND PROTOCOL

Government of India Laws, Regulations and standards on Asbestos Applicable to the projects	Requirements for the project
IS 11768: 1986/2005: Recommendations for disposal of asbestos waste material	The standard emphasis that every employer who undertakes work which is liable to generates asbestos containing waste, shall undertake adequate steps to prevent and /or reduce the generation of airborne dust during handling, storing, transportation and final disposal of final disposal of asbestos and asbestos containing products. • The crux is waste avoidance: the practice inculcated should focus the on minimal waste generation. • Waste Collection: In the project circumstance, the waste is referred to the damaged powered asbestos which will be collected in the Permissible plastic bags to be disposed off to the nearest TSDF facilities.
IS 12081: Pictorial Warning to be implemented on equipment containing Asbestos Contaminated Products.	The objective of the caution is to make the person handling to take all pre-cautionary measures and make them aware of all the possible risk.

	
IS 11451: Safety and Health Requirements related to Occupational Exposure to Asbestos contaminated Products.	In the project the norms pertaining to limiting number of hours working with ACM will be 8.0 hrs/48 hrs a week and the medical examination has to be periodic, the environmental monitoring has to be done as per the protocol. The safety at work place shall be enforced.
IS 11768: Waste Disposal Procedure for Asbestos Containing Products.	The protocol pertaining to disposal of the waste is emphasized, the collection of ACM powered will be in permissible plastic bags, which will be twisted tight at the neck so that the wear and tear due to abrasion will be minimum and the transportation of the asbestos waste has to be done by the authorized vendor to the approved landfill site that in the project case id TSDF.
Sampling of asbestos fiber (as per BIS-11450) has to be done regularly using personal sampler and determined using phase contrast microscope.	The Sampling and analysis protocol is emphasized. Details are given as above.

4. Further, there are several legislations that regulate the use and handling of asbestos as applicable, namely:

- a. The Supreme Court of India – Banned ACM use in January 21 2011.
- b. National Green Tribunal - In pursuant to the above order, in 2015, NGT issued an order- “that there is no asbestos mining presently operational anywhere in the country and the operations of the mines of associated minerals with asbestos has also been halted.”
- c. Environmental (Protection) Act (1986)-Environmental monitoring.

RISK ASSESMENT:

5. The process of evaluation of risk at all the working sites was evaluated with the

inventorization of the unscientific storage pipes-in case of worst scenario. The site identified and evaluated was Sardarshar. Site visit was conducted to evaluate the risk associated with the ACM handling and re- handling. Working with or handling AC pipes in manner that produces dust, fibers, air borne particles etc., is very harmful and hazardous to the workers and general public in and around the work sites. The condition of existing underground AC pipes are not known, however, as these are old certain pipes will be in deteriorated conditions. So the Conditions were presumed if it is in friable form or in a condition in which it can release fibers before it is subjected any disturbance or removal, all safeguard measures needs to be adopted. There were certain areas where the AC pipes were subjected to shear and are powered, and AC Pipe ends were damaged these were the high risk zones in the campus. The probability of the air borne asbestos fibers in the areas cannot be over ruled.

6. Thus it is necessitated to draft standard operating procedure for disposal of ACM. The purpose of this standard operating procedure (SOP) is to ensure the safe handling of AMC including protection from hazards associated with uncontrolled distribution, encounter and removal of Asbestos Cement (AC) Pipes and pipe fittings. The scope of this SOP encompasses all aspects of safe AC pipe handling including identification of site, re-handling and encountering of ACM, site selection and proper identification for storage, inventorization, monitoring, final disposal, training and maintenance of records.

7. The fatal health hazard with inhalation of air borne asbestos fibers and its adverse health impact are known and needs a proper attention and planning with defined roles and responsibilities to ensure the work zone is at minimal risk and safe for the workers. It is also necessary to mandate the standard operating procedures with implementation of all requisite safety gears.

8. The assessment of the ACM disposal will be vested with the DBO Operator. The undamaged pipe-where the pipe ends are intact that there is no damaged on the entire length of pipe-to be stored in isolated storage with secured pipe ends either by wrapping the ends with permissible plastic bags. The damaged/broken pipes/powered pipes will be disposed off, by bagging the same in permissible plastic bags. All the records pertaining to the inventorization has to be kept by the DBO Contractor. The same shall be cross verified by RUIDP.

EMERGENCY RESPONSE PLAN & CHANCE FIND PROTOCOL

9. The emergency procedures should include managing an uncontrolled release of asbestos materials into the workplace. The onus of the same shall be ensured with immediate action of the field staff-DBO Operator/ HSE Staff. Steps should be taken to:

- Warn anybody who may be affected.
- Exclude from the area anyone not needed to deal with the release.
- Identify the cause of the uncontrolled release.
- Regain adequate control as soon as possible.
- Make sure anyone in the work area affected, who is not wearing personal protective equipments (PPEs), including respiratory protective equipment (RPE), leaves the affected area immediately.
- Minimize the spread of asbestos by ensuring they are suitably decontaminated.
- Clean up dust and debris.
- Decontaminate anyone who is contaminated with dust and debris.
- Ensure rags, clothing or PPE is decontaminated or disposed of as contaminated

- waste.
- Consider alone and/or remote workers to ensure they can alert someone if necessary.

Check what you're working on before you start:

- Avoid using a sweeping brush as this can spread asbestos.
- Make sure no unauthorised personnel enter the area.
- The clean-up of any accidental release of higher risk materials, eg asbestos cuttings, powered asbestos that may release the asbestos fibers, to be done by authorized person

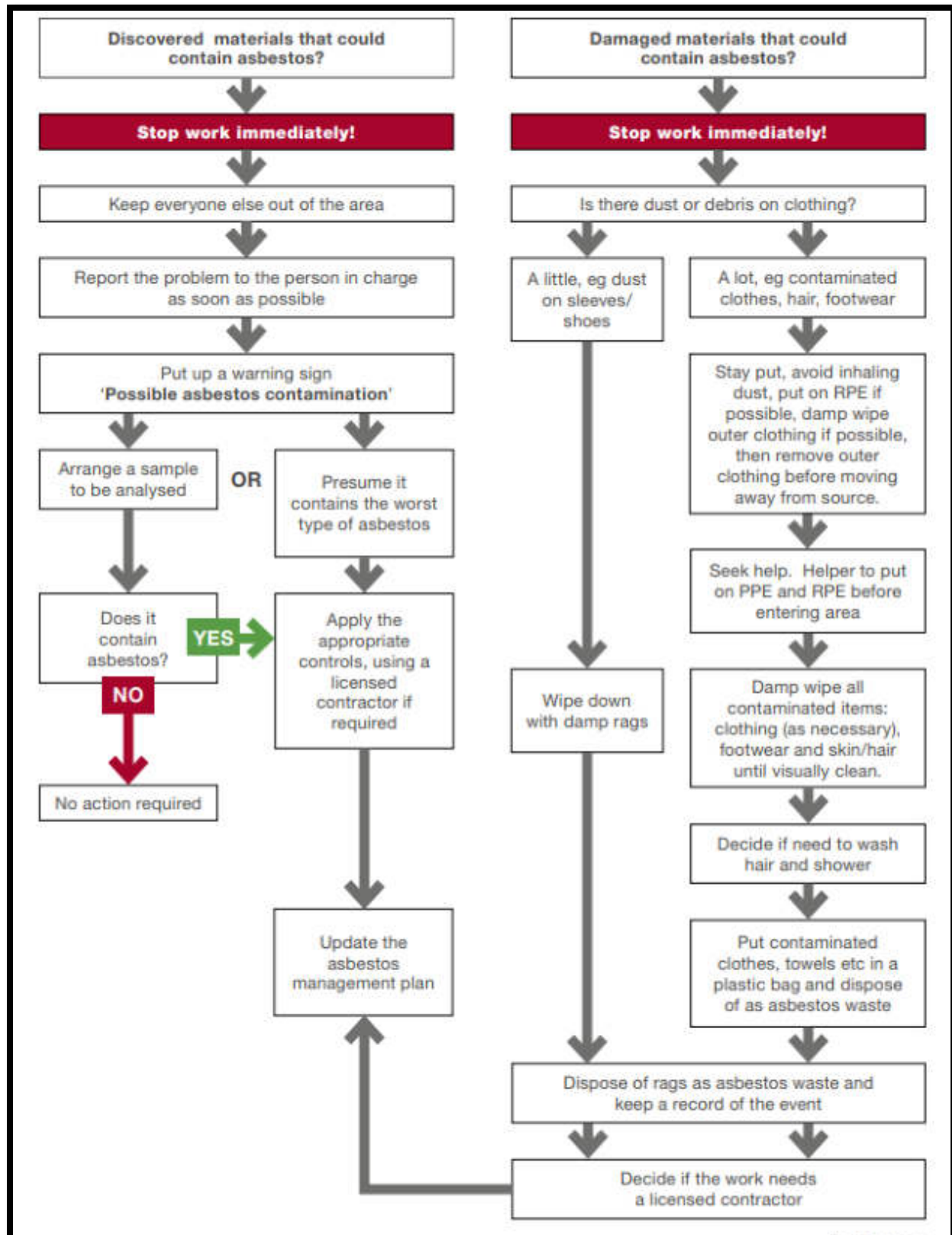


Fig.No.1-Showing Flow chart of ERP

Table 2-Roles and Responsibilities

PRE-CONSTRUCTION				
Activities	Responsibilities	Associated Documents	Estimated Cost	Remark
Design to encounter minimal ACM, and then Identification & Inventorization ACM - AC pipes & fittings	RUIDP & DBO CONTRACTOR	Form-I	Rs.100/km	The onus of the minimal encounter of ACM is vested upon the RUIDP and inventory will be with the DBO Operator and has to be annually verified by RUIDP.
Define & confine ACM storage area-in-situ			Rs.65/Sq.m	The storage area made available will be confined and fenced.
Warning signage near the ACM work site, storage and on AC pipes in local language**			Rs.500/label	The signage labels can be printed, sticker pamphlets or painted.
Training of personals handling the AC pipes and fittings	DBO CONTRACTOR	Form-II	Rs.1000/Person	All requisite safety gears should be made available at all sites.
Use of safety Gears			Rs.6000/Person	All the safety gears should be silicon based and suitable for Asbestos protection.
Briefing of Emergency Response Plan			Rs.500/Person	All the risk zones with respect to white card has to be briefed.
Confined storage with access control plan			Rs.5000/site	Inward and outward movement of authorized person must be allowed and has to be guarded or should be under key control.
Pre-history medical records of the ACM handling team			Rs.3000/Person	All requisite medical test, Respiratory test, lungs /Chest X-ray/CT Scan, Blood Test, Lower Abdomen examination etc
CONSTRUCTION PHASE				
Monthly Inspection & Annual Environmental Monitoring.	DBO CONTRACTOR	Form-III	Rs.40,000/sample	The sampling zone should be 500 m from the storage site and personal sampling has to be as per SOP-2
Reporting in SEMR	RUIDP/ DBO CONTRACTOR	None	Nil	As per ADB Format
Collection of Health records in compliance to the local laws	DBO CONTRACTOR/RUIDP/PHED/LSG	Form-IV	Nil	For regular evaluation & identification of any aboronmality.

Ensure adoption of all standard operating procedure		SOP-1&2	Nil	As revision desired on basis of Site specific information may be upgraded in the SOP 1&2 if required
Collection, Segregation, Reception and Disposal as per National norms of ACM		Form-V	Nil	Standard Regulatory format has to be filled and disposed off within 90 days.
Use of safety gears prior to handling of ACM based on White Card.		White Card-Page-11	Nil	Periodic training can be site specific
Disposal of ACM to the identified TSDF Facility to be done as per procedure within or prior to 90 days		SOP-2	1500/ton of waste plus freight as per actual.	Within 90 days from the generation of waste, in case of existing waste it has to be disposed off within 90 days from the Project Start.
To inform and fill the returns in the prescribed manifest as per HWMR.		Form-V(Form-10 of the Rule HWMR	Nil	90 days from the start of work
To facilitated a restricted confined storage space with access control with proper inventorization.		Form-II	Nil	Site Specific
In-situ storage of ACM.	DBO CONTRACTOR	Form-VI		The storage of existing and encountered ACM pipes (more than 4.0 ft) will be stacked end to end at 90 deg. With vertical stacks, 8 inches above the ground, covered with permissible plastic sheet. The campus custodian-viz PHED etc should also be informed about the In-situ storage of ACM and its impact.
ACM removal	DBO CONTRACTOR	--	--	Follow ACM Removal
Record maintenance of ACM in-situ and disposed off to TSDF	DBO CONTRACTOR	Form-I & Form-IV	Nil	The copies of inventory generated and collected will have to be shared with Land Custodian (LC), RUIDP and DBO Operator. To distinguish the forms they can be

				numbered. FORM-I(LC),Form-IV(LC)
Transits ACM storage of waste to be disposed off to TSDF	DBO Contractor	Form-IV	50,000/room	An isolated storage room should be constructed with 10x10 with height of 3.5 ft roofed properly for transit disposal of ACM to TSDF. DISPOSABLE ASBESTOS WASTE STORAGE ROOM HAZARDOUS WASTE CATEGORY-15.2 (as per Hazardous waste management & Handling Rules 2015).
POST CONSTRUCTION PHASE				
Compliance of AAQM, Asbestos Fiber monitoring and Soil Quality monitoring and Periodic Work zone monitoring(Asbestos fiber count) records to be maintained	DBO Contractor	SOP-2	Rs.40,000/sample	The Asbestos Fiber count monitoring has to be conducted prior to ACM handling operation and after ACM Handling operation by an Accredited Laboratory. List of accredited laboratory will be available at Rajasthan State Pollution Control Board website- rspcb.nic.in
Health records &Periodic Medical Checkup of the personals handling ACM to be maintained.	PHED/LSG/DBO CONTRACTOR	Form-II	Rs.3000/Person	All the concerned employees deputed to handle or deal with ACM has to have Pre medical history and periodic medical examination done

Permissible Levels

10. Permissible Exposure Limit (PEL) for asbestos is 0.1 fibers per cubic centimeter of air as an eight hour time weighted average (TWA), with an excursion limit (EL) of 1.0 asbestos fiber per cubic centimeter over a 30 minutes period.

ACM REMOVAL

11. ACM Removal has to be checked in sync with the design and emphasis has to be laid to avoid the removal of ACM, in case it is unavoidable, then all the requisite safety gears are to be adopted:

- Inform the Asbestos Expert/HSE Expert prior to removal.

- Isolate the area with access to only trained staff/employees under supervision of Asbestos /HSE Expert.
- Exhibit all warnings

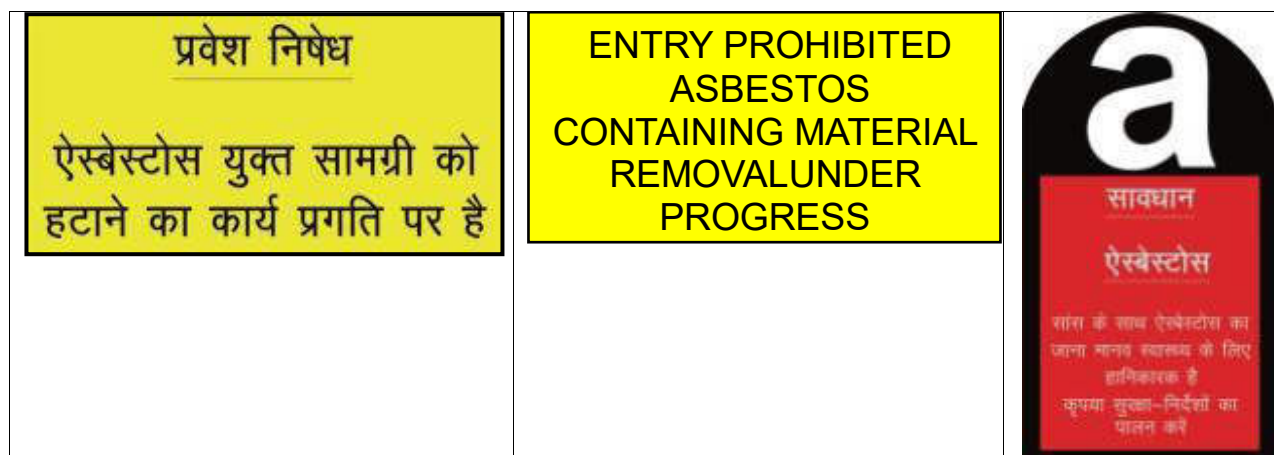


Fig. 2 Asbestos warning signage

- Undertaken Asbestos fibre Monitoring
- The trained Employees have to be deputed for removal of ACM.
- The removal ACM material has to be check with the status and extent of damage.
- Efforts should be made to remove the ACM as minimal as possible.
- The ACM removal has to be manual; it should neither be cut nor drilled.
- All removal operation should be undertaken with ACM in wet condition.
- The removed ACM will then be labeled and placed on permissible plastic sheet. It should not be put on ground directly.
- The dimension of plastic sheet should be larger than the ACM placed.
- If the ACM pipe is not damaged as about 4.0 ft and above, the ACM will be subjected for in-situ disposal.
- If the ACM is damaged and broken then it has to be packed in permissible plastic bags and disposed off to TSDF.
- Prior to disposal it can be stored in isolated room-showing board of –Hazardous waste storage room.
- The hazardous waste to be disposed off to TSDF should not be stored over 90 days after the removal date of ACM at site.
- All the safety procedures and safety gears should be worn by all the employees engaged in the ACM Removal operation.
- The Asbestos fiber monitoring, soil monitoring has to be undertaken during the operation as well.
- The process of removal of ACM will be completed after the removed ACM and its suitably disposed off either in -situ or to the isolated room prior to disposal at TSDF.
- Post ACM Removal asbestos fiber monitoring has to be undertaken to ensure the work zone is safe to resume further operations.

Safe Practices in Handling ACM

12. Proper handling and PPE:

- a. Cover up and wear PPE (Personal Protection Equipment). including respirator or

dust mask

- b. Make sure the mask has two straps to hold it firmly in place. Don't use masks that only have one
 - c. Also wear a Hard hat, gloves, disposable coveralls with a hood, and safety glasses or goggles to protect eyes
 - d. Do not eat, drink or smoke in the work area as you may inhale or eat dust. Wash your hands and face with soap and water before meal breaks and when finished work for the day.
 - e. Do not use power tools Asbestos fibers can be released if power tools are used for anything other than the removal of screws.
 - f. Do not water blast or scrub with a stiff broom or brush. It is illegal to water blast asbestos cement sheets. If the material has been accidentally water blasted or has suddenly deteriorated in some way, you should call a licensed asbestos removal DBO Operator
 - g. Wet gently with water when removing asbestos cement pipes, use a pump spray to lightly dampen the pipes and keep the dust down. Remember: Not to waterblast asbestos cement materials.
 - h. Avoid drilling and cutting into asbestos products.
 - i. Do not drill holes through and never cut Instead remove the entire product and replace it with a non-asbestos product
 - j. Don't drop fiber pipes remove them carefully, Lower them to the ground, don't drop them, to minimize breakage.
 - k. Lay plastic sheeting under the work area to prevent any dust contaminating the ground. Use 200 micron thick plastic sheeting or bags or as permissible these must not be made from recycled materials or re-used for any other purpose.
 - l. The work area has to be barricaded and there should be no un-authorized person allowed. Only Trained ACM expert should be allowed to handle the ACM along with EHS Expert.
 - m. Close windows and doors and seal vents to stop dust getting into the house; ask neighbors' to do the same.
 - n. Seal off other places where dust can get in.
 - o. Remove soft furnishings like rugs, clothes, jute bags from the work area, and seal anything with plastics if it cannot be moved.
 - p. All the AC broken pipes have to collected and stacked properly with 200micron plastic wrapping with winning signage.
 - q. Do not leave plastic sheet lying about where they may be further broken or crushed by people or traffic.
 - r. Remove all ACM by the trained handler.
 - s. Since we are amidst of dry climatic conditions due care must be taken to see that no waste broken pipes or fittings are left loose and outside the confined area and may be dampened as required.
 - t. Mark and add signage.
13. Due care has to be taken to collect the dampened waste in a permissible standard bags with proper warning signage's.
14. The wastages packed have to be disposed off to Treatment, Storage or Disposal Facility

(TSDF). The plastic bags must have legible note:

- d. Waste Type:
- e. Date of packing:
- f. Qty/Numbers:
- g. Packed by:
- h. Warning Signage:
- i. Disposal



Fig. 3- ACM: In-situ storage warning

15. The AMP procedures-**Standard Operating Procedure-01-** are as follows and are summarized as above

- j. Objectives – to keep the work zone safe and secured.
- k. Requirements – identify all the requirements needed for handling AC in the specific site and project
- l. Conduct and ensure awareness and vocational training to ACM handlers
- m. Conduct a comprehensive identification and risk assessment of ACMs
- n. Apply restriction / re-handling of ACM on ground-use of PPE. Ensure that workers handling ACM have the right PPEs as follows:
 - i. Hard helmet
 - ii. Overall suit
 - iii. Gloves
 - iv. Mask to be strapped tight
 - v. Safety goggles
 - vi. Safety shoes
 - vii. Ear plugs
- o. Avoid underground encountering of ACM
 - i. Ensure that an authorized person (HSE) are supervising the work
 - ii. Barricade the area with signage
 - iii. Damp ACM
 - iv. Use safety gears
 - v. Dismantle ACM to be labeled, kept on plastic grounding and packed in permissible bags
 - vi. Label the bags properly
 - vii. Ensure shipping to proper disposal sites
- p. Site selection – the disposal site should be ready to handle ACM and protect the nearby people as well The site selection criteria are as follows:
 - i. Away from habitation
 - ii. Avoid low lying areas
 - iii. Away from water storage
 - iv. To be enveloped with minimum of 8-feet height enclosure
 - v. Avoid high vertical stacks
 - vi. Access controlled
 - vii. Proper signage enclosure
- q. Proper re-handling of AMC, labeling and packing

- r. Control access and ensure proper monitoring of records, specifically:
- i.Environment
 - ii.Health
 - iii.Reporting to regulators
- s. Dispose the ACM through qualified DBO Operators up to the Total Sanitary Disposal Facility (TSDf)

Table 3: LIST OF APPROVED TSDf OPERATORS IN RAJASTHAN

S.No	Operator	Address	Remark
1.	Rajasthan Waste Management Project (M/s Ramky Enviro Engineers Ltd)	Survey 1018/13, Vill-Gudli, Tehsil-Mavli, Zinc Choraha to Debari Railway Station Road, Dist Udaipur (Rajasthan).	This TSDf is for all kind of hazardous waste as listed in the hazardous waste (Management & Handling) Rules.
2.	Ramky Enviro Engineers Ltd, Balotra	Ramky BWMP Rd, Rajasthan 344032.	This TSDf is for all kind of hazardous waste as listed in the hazardous waste (Management & Handling) Rules
3.	Continental Petroleum Ltd	Bheror, Distt- Alwar	Only for Incineration

16. Label/display for TSDf disposal bags has to have clear display of the content in both English and local language as displayed under:

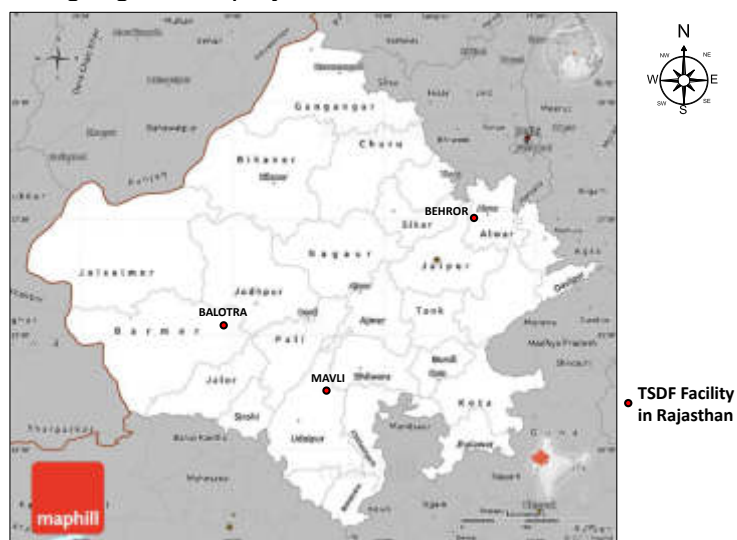


Fig 4: Map of the locations of approved TSDf in Rajasthan.

IN-SITU STORAGE ACM PIPES AREA

17. The removed undamaged ACM pipes have to be stacked properly as shown below to avoid any rolling of the pipes and eventual damage. The existing ACM Pipe stacking has to be

re-handled to stack the ACM pipes properly. If the removed ACM Pipes is less than the full length of the ACM pipes, then separate stack of the same should be done with proper pre-caution and safety measures and gears.

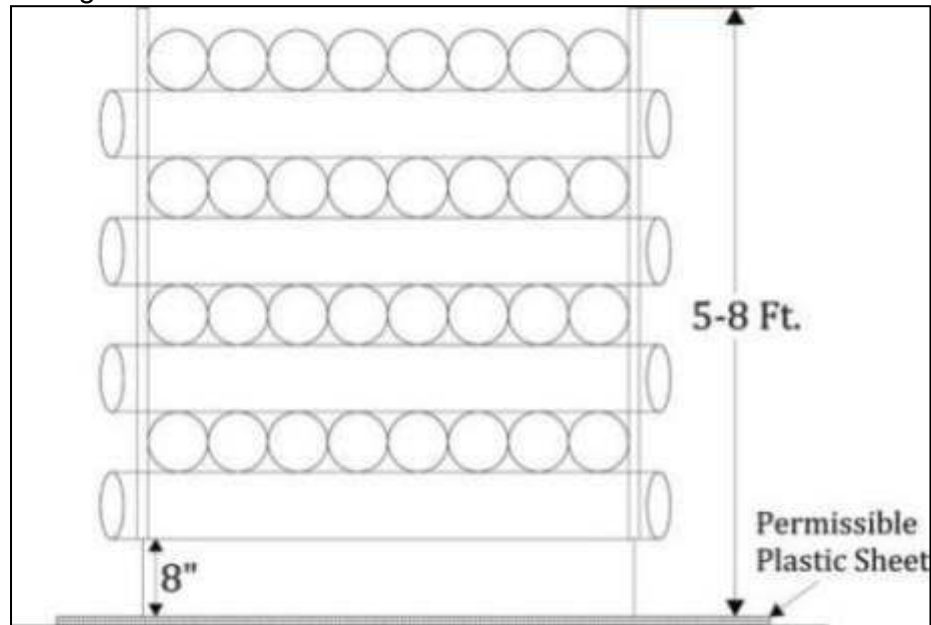


Fig. 5: Schematic diagram showing ACM Pipes stacking

18. The ACM stack has to be enveloped with proper fencing showing internal movement of person with 4.0ft corridor all around the stack. The Storage area will have display of all requisite warning and access control of the authorized person's entry and exit.

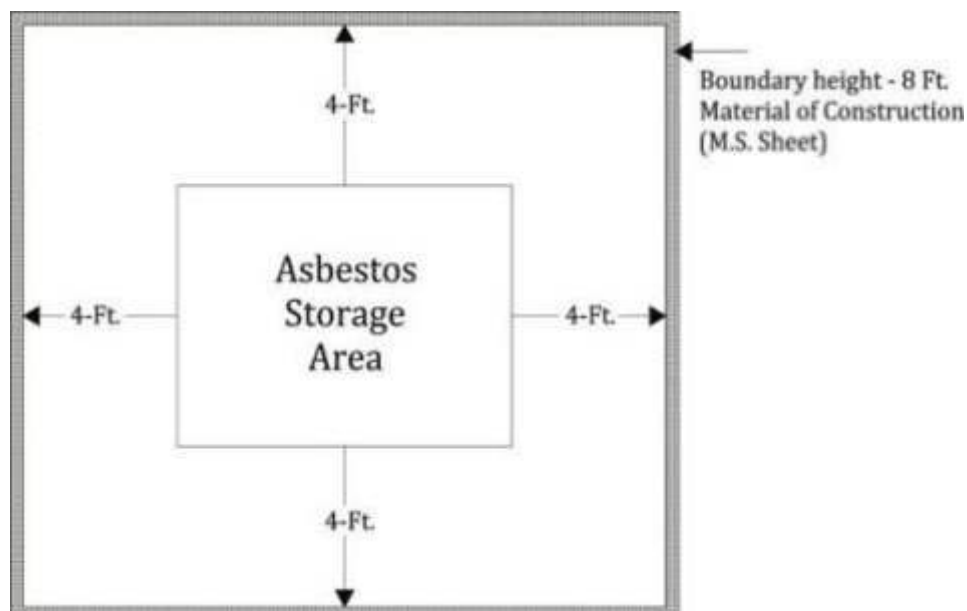


Fig. 6: Schematic diagram showing ACM Pipes storage area

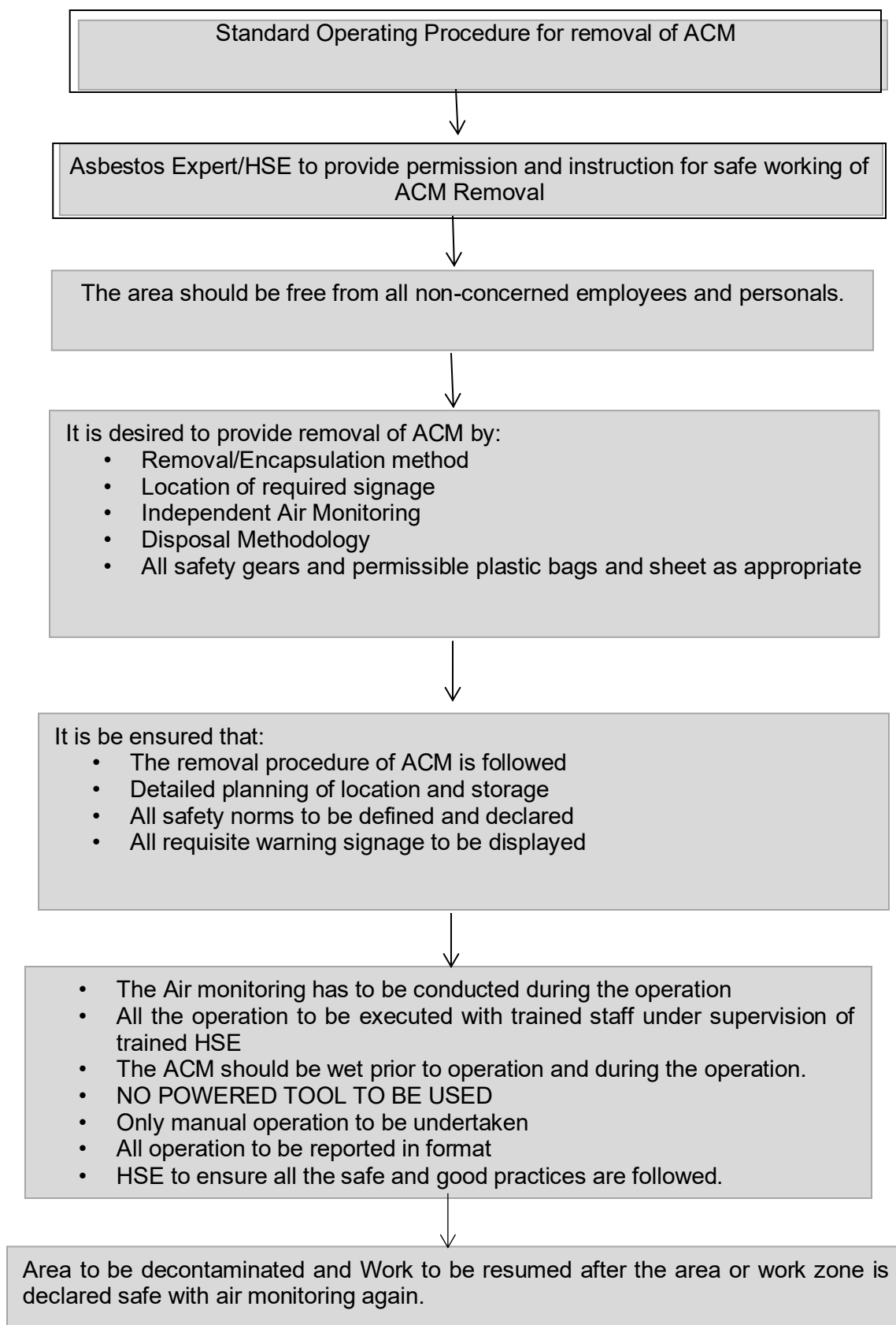


Fig. 6 -Standard Operating Procedure Flow Sheet

19. All the records in the pre-determined format are to be maintained and the disposal as stated in the applicable National legislation is to be followed. Any innovative use of the discarded ACM with the permissible law frame must be approved by respective Regulators prior to practice.

20. The format of Inventorization & records at all locations must be maintained irrespective of generation of ACM waste. The format of documentation must be uniform in order to track and trace the details as desired.

21. Based on the outcome of the workshop it was essential to enumerate the standard operating procedure & define the roles and responsibilities (already discussed as above) and the re-handling cost of the ACM as stated below:

Table 4- Suggestive Protective measures & Estimation of the cost of Re-Handling of ACM

1	Re-Handling			
	Re-handling of AC Pipes scattered/used in the premises.	- Re-Handling of the old AC Pipes in the premises needs to be quantified and a proper inventorization has to be prepared. - The isolated enveloped storage sites should be away from the habitation, the pipes used for fencing, tree guard needs to be re-handled & stored in the nearest isolated storage site and the damaged pipes/broken pipes have to be disposed off to the TSDF with all pre-cautionary measures. NOTE: Only powered/grounded ACM will have to be disposed off to TSDF.	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	The re-handling cost will be part of the laying program. The disposal cost is Rs.1500/MT plus freight as per actual
	Removal of encountered AC Pipes	The damaged / broken AC Pipes have to be cautiously handled with prior moistening and packed in plastic bags (permissible plastic bags) and sent for re-use in road making or to TSDF with all signage and precautionary measures as suggested above.	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	As stated above
	Storage	The existing storage stacks have to be shielded with 8.0 ft height and above ground (min1.0 ft) The Pipes shall be stored in stacks with stoppers provided at the bottom layer to keep the pipe stack stable. The stack, particularly of smaller diameter pipes, shall be in pyramid shape. Pipes shall not be stacked more than 1.5 m high. Each stack shall have pipes of the same type and size only. Removal of pipes shall start from the top layer and by pulling from one end, if required, with all safety precautions. A pipe shall not be stored inside another pipe. The pipes	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert	As on daily wages

		may also be placed alternately length and crosswise. They shall be stored on horizontal racks supported throughout their lengths on a reasonably flat surface free from stones and sharp projections. They should not be stacked in large piles, especially under warm conditions. Open ends of pipes to be sealed with permissible polythene.		
	Transportation	• Full length pipes • Damaged/Broken Pipes	Authorised agency	As per actual.
Disposal				
	Isolated storage	The storage area should be twice the area required for storage of ACM	Manpower engaged: Trained labor, Supervisor, HSE Experts/Asbestos Expert. Authorised vendor. Boundary, signage, safety aspects etc	As stated in Table 1.1.
	Sent to TSDF	The damaged/broken pipes will be packed in permissible Poly bags and has to be stored in defined location within the isolated storage. The records pertaining to the disposal (within 90 days of generation) have to be made systematic. Possibilities of using the broken pipes in wet conditions in road making in order to bind the asbestos fibers can be explored.	Authorised agency	Freight as per actual.
Estimation of suggestive protective and preventive measures				
	Air Quality sampling & Analysis- Asbestos fiber count	Personal sampler, phase contrast microscope, In case of asbestos dust, the same shall not exceed 2 mg/Nm ³ . Per the OSHA standards for asbestos, exposure monitoring and medical surveillance of workers is required when the Workers are or will be exposed to airborne concentrations of fibers of asbestos at or above OSHA's exposure limits for a combined total of 30 or more days per year; Workers perform work that disturbs asbestos-containing material (ACM) or presumed asbestos-containing material (PACM) for a combined total of 30 or more days per year. Minimum 3 locations (@120deg from each location) at min 500 m from the isolated storage of ACM and one sampling near the encountered site. The frequency of monitoring should be bi-annually.	Approved/accredited laboratory	As stated above.

	PPE's	Hard helmet, double strapped mask, safety tapes, boots(non laced), gloves, safety suits, goggles, ear plugs,	Standard make, minimum-4 sets at each site	As stated Above
	Education & Training	Awareness, New induction training and inspections	Asbestos expert/HSE Experts	As stated Above
	Medical Check up	As per norms or in consultation with Medical Practitioner.	Medical Doctor	As stated Above

Note:

Efforts should be made to minimize the existing AC water pipes. In areas where ACM are stored, it is required to have induction training of AMP, complete the formats and maintain the records.

Removals of used AC Pipes for fencing, boundary wall etc have to be carefully removed from use and stored in isolated storage.

At certain locations, it was observed that the discarded pipes was used as tree guard, when the sapling was planted as on date the tree is fully grown, in that case the removal of ACM has to be done with all precautions and use of total safety gears. Hand tools or slow-running tools producing coarse dust or chips should be used where practicable rather than high-speed machines or those which cut by abrading the material after wetting. Alternatively, the same can also be bounded properly by bitumen paint.

The coarse dust and pieces in wet conditions will have to be collected in permissible plastic bags with use of all safety gears.

The collected wastes are to be labeled as stated above and disposed off to TSDF. The records of the same will have to be kept on daily basis and summarized to monthly basis.

FORM I – ASBESTOS INVENTORY, INSPECTION AND ACTION FORM

Format: RUIDP/IIA/ LOCATION/NAME OF DBO CONTRACTOR/HSE 002/YEAR		
Location:		
Site co-ordinates:		
Elevation:	Team:	
Date of visit	Sign:	
Present Status		Indicate if installed, operational, in storage, etc.
Original age		Months or years since installation
Diameter		mm or inches
Length		meters
Volume		
Total packet		
Packing date		
Disposal date		
Existing Site (Photo or illustrations):		
Illustration/ Design of Activities On-site with respect to existing asbestos (include details such as size of new pipes, distance from existing AC pipes, other notable observations)		
DBO Contractor Handling Asbestos:		
Number of persons handling waste		
Medical Records		

Safety Gears	
Vocational Training Last Conducted:	
Number of attendees:	
Conducted by Schedule:	
Required Actions:	
Remarks	
Conclusion/Remark	
HSE Signatory	

FORM-II – MATRIX FOR TRAINING & RECORDS

Format: RUIDP/INSP.MATRIX/LOCATION/NAME OF DBO CONTRACTOR/HSE 001/YEAR			
S. No.	Aspects of ACM	Check points	Remarks
Training Schedule:			
Trainer Details:			
Date/Location of Training:			
Number of attendees:			
Training Schedule, Training Materials & Attendance Sheet, Feedback of Trainees.			
Understanding of:			
A. DOCUMENTS AND RECORDS			
1.	Site Inventory		
2.	List of ACM storage and installation points		
3.	Structure of ACM management committee		
B. INVENTORY			
1.	Inventorization of ACM		
	Number of ACM/ pipes		
	Dimensions of ACM/ pipes		
	Total volume of ACM/ pipes		
2.	Storage facility/ installation location:		
A.	In-use	Location	
		Condition	Intact/ damaged
		Purpose	
		Accessibility by the workers	
		Evidence of physical damage and approximate size (length, width, volume) without coming into contact with The damaged ACM	
		Impacts on the environment (Based on Asbestos fiber Monitoring)	
3.	LABELING AND SIGNAGE		
	Notification to workplace safety and health		
	Working instruction		
	The risks associated with exposure to asbestos fibers		
	Cautionary statement to not disturb materials containing asbestos		
4.	PERSONAL PROTECTIVE EQUIPMENT (PEP)		
	Record of pep		
	Mask		

	Eye glasses	
	Gloves	
	Ear muffs	
	Others	
	Training	
	On occupational risks of asbestos to the workers	Date: Time: In-house/ external: Faculty: No of workers attended:
	Training for maintenance, repair and renovation	Date: Time: In-house/ external: Faculty: No of workers attended:
	Training for workers working with asbestos	Date: Time: In-house/ external: Faculty: No of workers attended:
	Periodic air quality monitoring records	• Within the permissible limits • Not within the permissible limits (specify the reason)
	Workers medical check-up records	Date: In-house/ external: Performed by: Remarks: No of workers attended:
Conclusion/Remark HSE Signatory		

The all the data required in Form-II will be filled by the DBO Operator (HSE-Officer), the records of this document has to be maintained for a pre-decided life. Details of training imparted have to be file with appropriate evidence like photographs, feedback form, videos etc. There has to be a proper documentation of the records kept with highest level of transparencies to retrieve, trace and track the records as necessary. The records maintained by the DBO Operator, has to be audited regularly by the ACM-Expert.

Form-I has to be accompanied with Form-II. Defined period of Air Quality monitoring and health will have to be minimum twice a year. Where ever the fiber counts are found/ recorded beyond the permissible norms, corrective action, like:

- Cordon off the area of ACM
- HSE team with trained experts to be deputed for the task
- Moisten the ACM prior to handling
- Storage area of the ACM stacks to be covered
- The damaged/deteriorated ACM to be re-handled in presence of Asbestos Expert/ HSE (Trained) with all defined norms and safety gears.
- Disposal of damaged/deteriorated ACM to be done as per the Norms.
- Records of disposal to be maintained.
- Keep all requisite evidence in form of documentation, geo-tagged photographs etc
- Frequency of health monitoring at such locations to be increased.

Form-III-AIR QUALITY MONITORING AND RESULTS

Format: RUIDP/AQMR/ LOCATION/NAME OF DBO CONTRACTOR/HSE 003/YEAR				
Vendor details				
Approvals				
S.No	Location	Agency	Results& Norms	Permissible
Conclusion/Remark				
HSE Signatory				

FORM-IV-MEDICAL HISTORY

Format: RUIDP/MH/ LOCATION/NAME OF DBO CONTRACTOR/HSE 004/YEAR							
Employee code:							
Employer Details:							
PPE Used:							
Insurance/ESI							
S. No	Name	Age/Sex/D BO	Address/ Contact details:	Period of Employment/ Job Title	Pre-History	Doctor's comments	HSE Remarks
					Height		
					Weight/B MI		
					Blood group		
					X-Ray		
					CT Scan		
					others		
					Smoker: Tobacco: Alcohol Consumption: Family History: Medication if any: Eye sight: Hearing: Others:		

FORM -V

[FORM-10- as per rule 19 (1) of Hazardous waste Handling & Management Rules-2016]
MANIFEST FOR HAZARDOUS AND OTHER WASTE

1.	Sender's name and mailing address (including Phone No. and e-mail)					
2.	Sender's authorisation No.		•			
3.	Manifest Document No.		•			
4.	Transporter's name and address: (including Phone No. and e-mail)					
5.	Type of vehicle		•			(Truck/Tanker/Special Vehicle)
6.	Transporter's registration No.		•			
7.	Vehicle registration No.		•			
8.	Receiver's name and mailing address (including Phone No. and e-mail)					
9.	Receiver's	Authorisation No.				
10.	Waste description		•			
11.	Total quantity No. of Containers		•			m ³ or MT Nos.
12.	Physical form				(Solid/Semi-Solid/Sludge/Oily/Tarry/Slurry/Liquid)	
13.	Special handling instructions and additional information					
14.	Sender's Certificate				I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and are in all respects in proper conditions for transport by road according to applicable National Government regulations.	
	Name and stamp:	Signature:		Month	Day	Year
15.	Transporter acknowledgement of receipt of Wastes					
	Name and	Signature:		Mont	Day	Year

	stamp:			h											
1			Receiver's certification for receipt of hazardous and other waste												
6.	Name stamp:	and Signature:		Mont h	Day			Year							

FORM –VI: IN-SITU STORAGE OF ACM

S. No	Activity	Number of Stacks	Area occupied	Details of ACM Pipes		Day/month/year Of storage
Site History						
For existing Stacks, details of re-handling of pipes in number or volume to be mentioned under supervision of Authorized Experts.						
Details of Location of re-handled ACM storage, new area should be • Minimum 10-15 ft away from campus habitation. • 250m away from the water sources • 500-800m away from Children play area • The area should be isolated and covered from all the sides with restricted Access for Authorised Experts Only. • Register to be maintained for Entry& Exit of personals. • Register to be maintained for Entry & Exit of ACM • Labels to be displayed in legible format • Specific training of ACM to be inducted in the ACM storage area for residing population in the campus.						
Details of transit storage of ACM to be maintained as per norms in an isolated storage room full covered						

Standard Operating Procedure-02

Asbestos Fiber Monitoring, Analysis and Identification

Principle

1. The collection of environmental samples including air must follow an appropriate sampling procedure. A review of method for sampling of asbestos fibers has been published (IPCS, 1986). The most commonly used analytical method involves phase contrast optical microscopy (PCOM) in the work place and transmission electron microscopy (TEM) in the general environment. The phase contrast optical microscopy (POCM) is universally recommended for asbestos analysis (Eache and Groff, 1997; Dion and Perrault, 1994) including Bureau of Indian Standard. POCM coupled with polarized light is largely used for asbestos analysis in solid samples (USEPA, 1993). The fiber monitoring has to be done by any NABL/MOEF&CC accredited laboratory either in-house or by third party.

Monitoring of Asbestos Fiber in Air

2. A general survey of inside and outside the storage sites of the work zone has to be conducted to choose the sampling sites. Sampling is to be carried out at visually selected locations appeared more prone to emission or possibility of release of asbestos fiber. The sample

collected by drawing a measured quantity of air through cellulose ester a membrane filter by a battery operated sampling pump that was fully charged to operate continuously over the chosen sampling time. The exposed filters will then be placed into plastic petri dishes and transferred carefully to the laboratory.

3. Two types of samples are to be taken, one within the workers breathing zone that is 300 mm radius extending in front of the face, and measured from the midpoint of a line bisecting the ears called personal samples. The samples taken at a fixed location mostly near to the source point called area or static samples. Personal sampler model "XX 5700000" and low volume vacuum/pressure pump model "XX5622050" attached with monitor or cowl model "MAWP025AC" of Millipore Corporation, USA are to be used for the collection of personal and area samples, respectively. The flow rate of pump is to be adjusted to 1litre per minute. The flow rate checked before and after in each monitoring, those samples showing the difference by >10 percent from the initial flow rate are to be rejected. In both the samples filter holder (Cowl) always pointed downward position to avoid the deposition of heavy particles. An ester cellulose membrane filters "AAWP02500" having 0.8 µm-1.2 µm pore size diameter are to be used throughout the sampling for asbestos counts at work environment.

Mounting Procedure

4. Complete filter is to be placed on clean microscopic slide, dust side up at room temperature. Electrostatic force keeps the filter usually on the slide. Filters are to be exposed to acetone fumes and triacetin (Glycerol triacetate, Sigma). In this procedure a small quantity of acetone in round bottom flask (500-1000ml) heated at the boiling point underwater bath, the vapors condensed in a simple condensing column. When the sufficient fumes of acetone become ready then pass it throughout on the filter for 3-5 seconds at a distance of 15-25 mm. put the 1-3 drops of Glycerol Triacetate (Triacetin) on the acetone-cleared filter. Place a cover slip on cleared filter by avoiding the air bubbles. Heat the cleared filter at 50°C for 15 minutes and leave it at room temperature for 24 hours under the action of triacetin to clear entire filter. Alternatively, membrane filter can also be made transparent with immersion oil (Leica Microsystems Wetzlar GmbH, Wetzlar). Using a phase contrast microscope with polarized light, Laborlux S (of M/s Leica, Germany) and then counting has to be done at magnification 400X-500x

$$C = A/a \times N/n \times 1/r \times 1/t$$

Where:

C= concentration in fibers per cubic centimeter rounded to first place of decimal,

N = total no. of fiber counted,

n = number of graticule areas observed,

A= effective filter area in mm²

a= graticule counting area in mm²,

r= flow rate of air through filter in cm³/min., and

t= single sample duration in minutes

5. To rule out the probability of the air borne asbestos in the existing scenario at the said site as well as other similar sites at the different work zones, it is necessary to have the asbestos fiber monitoring and sampling counts to be recorded at regular intervals. The environmental air sampling stations will have to be minimum three at 120 degree angle, within 1000-500 m from the ACM. The sampling frequency has to be in all three stages-Pre-Construction, Construction and Post Construction, while the personal sampling has to be done as stated above.

6. Bureau of Indian Standards (BIS) Guidelines for Safe Use of Products containing Asbestos states that "Asbestos cement products (such as AC pipes) generally contain about 10-

15% asbestos fibers in a cement matrix that comprises the rest of the materials and are termed as locked in asbestos products as these products have the asbestos fibers bound in cement. The possibilities of air borne asbestos fiber will be in case of mishandling of encountered pipes with unsafe practice. During storing and installation; recommended work practices shall be followed to avoid harmful exposure". According to Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016, any waste with asbestos concentration limit of 10,000 mg/kg (i.e. 1%), however this will apply only if the asbestos containing substances are in a friable, powdered or finely divided state. Under the Basel Convention¹, asbestos or asbestos waste in the form of dust and fibers is classified as hazardous waste. The applicable legislation under the present scenario are:

¹ Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal, adopted in 1989

Summary of Asbestos Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Remark
Clearing, transfer and disposal of ACM pipes	Possibilities of air borne asbestos if handled unsafely, cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma ☐ Peritoneal mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma ☐ Second hand-exposure	Implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods.	DBO Contractor /RUIDP	There has to be a suitable call to be taken for in-situ disposal if the removed ACM pipes are not damaged, full length or 4.0 ft length not damaged.
Work in narrow streets	Possibilities of air borne asbestos if handled unsafely cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma ☐ Peritoneal mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma Second hand-exposure	Conduct awareness program on safety during the construction work Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day Provide barricades, and deploy security personnel to ensure safe movement of people and also to prevent unnecessary entry and to avoid accidental fall into open trenches Identify risk of intervention with existing AC pipes. If there is significant risk, implement the AMP strictly that includes identification of hazards, the use of proper safety gear and disposal methods.	DBO Contractor/RUIDP	All provision of safe working with proper signage has to be undertaken prior to work initiation, during the work and after the work.
Interventions in existing AC pipelines	Possibilities of air borne asbestos if handled unsafely cut, drilled or broken into pieces that may cause: ☐ Inflammation of the lungs ☐ Mesothelioma	Appropriate actions as defined in the Asbestos Management Plan will have to be adhered to	DBO Contractor/RUIDP	Measure to avoid the encounter & removal has to be prioritized and if the same is not avoided then the

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation/ Monitoring	Remark
	☐ Peritoneial mesothelioma ☐ Pleural plaques ☐ Asbestosis ☐ Bronchogenic Carcinoma Second hand-exposure			measures stated have to be strictly followed.
Documentation /record	Unmonitored ACM might be handled incorrectly and can cause release of airborne asbestos	To be formatted and kept as mentioned in the Asbestos Management Plan	DBO Contractor/RUIDP	To be kept intact for easy tracking and reference in legible format. The same can be kept in soft format as well.

Appendix C-21: 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 mosquitoes 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. In particular, 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 equipments.
29. 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 C-22: Guidelines for Safety in Chlorine Usage

Instructions for Storage and Handling of Chlorine Cylinders

(Based on the 'Manual on Operation and Maintenance of Water Supply Systems' published by the Central Public Health and Environmental Engineering Organization (CPHEEO) in 2005)

1.1 Storage Area

- Obtain storage license from controller of explosives under Gas Cylinder Rules 2004 if the quantity of Cl₂ containers to be stored is more than 5 Nos.
- Storage area should be cool, dry, well ventilated, and clean of trash and protected from external heat sources. Please refer to Manual on "Water Supply and Treatment", (1999 Edition), for further details.
- Ventilation must be sufficient to prevent accumulation of vapour pockets. The exhaust should be located either near the floor or duct be provided extending to the floor. All fan switches should be outside the storage area.
- Do not store container directly under the sun.
- Weather cock should be installed near the storage to determine wind direction.
- The storage building should be of non-combustible construction with at least two exits opening outside.
- Neutralization system should be provided.
- Continuous monitoring of chlorine leak detection equipment with alarm should be installed in the storage area.
- The area should be free and remote from elevators, gangways or ventilating system to avoid dangerous concentration of Chlorine during leak.
- Two portable foam type fire extinguishers should be provided in the premises.
- Corrosive substances shall not be stored nearby which react violently with each other.
- Unauthorized person should not be allowed to enter into the storage area.
- The floor level of storage shed should be preferably 30 cms (at least one foot) higher from the ground level to avoid water logging.
- Ensure that all containers are properly fitted with safety caps or hooks.

1.2. Cylinder & Drum Containers

- Store chlorine cylinders upright and secure them so that they do not fall.
- Drum containers should be stored on their sides on rails, a few inches above the floor. They should not be stacked one upon the other. They should be stored such that the valves are in vertical plane.
- Keep enough space between containers so as to have accessibility in case of emergency.
- Store the containers in a covered shed only. Keep them away from any source of heat as excessive heat may increase the pressure in container which will result into burst.
- Do not store explosives, acids, turpentine, ether, anhydrous ammonia, finely divided metals or other flammable material in the vicinity of Chlorine.
- Do not store containers in wet and muddy areas.
- Store filled and empty containers separately.
- Protective covers for valves are secured even when the containers are empty, except during use in the system.
- Never use containers as a roller to move other equipment.
- Never tamper with fusible plugs of tonners.
- Check leakages every day by means of ammonia torch. However, it should not be touched to brass components like valves of container for safety.
- Never carry out any welding work on the chlorine system as combustion of steel takes place at 2510C in presence of chlorine.

- The boxes containing emergency kit, safety applications and self contained breathing apparatus should be kept in working order in an easily approachable area.

1.3. Use of Cylinders & Drum Containers in Process System

- Use containers in the order of their receipt, as valve packing can get hardened during prolonged storage and cause gas leaks.
- Do not use oil or lubricant on any valve of the containers.
- Badly fitting connections should not be forced and correct tool should always be used for opening and closing valves. They should never be hammered.
- The area should be well ventilated with frequent air changes.
- Transport the cylinders to the process area by using crane, hoist or railings etc.
- The drum containers should be kept in a horizontal position in such a way that the valves are in a vertical plane. The upper valve gives out gas and the lower one gives out liquid chlorine.
- The cylinder should be kept in upright position in order to release gas from the valve. For liquid chlorine withdrawal, it should be inverted with the help of an inverted rack.
- Connect the containers to the system by using approved accessories.
- Use copper flexible tube, with lead washer containing 2 to 4% antimony or bonded asbestos or teflon washer. Use yoke clamp for connecting chlorine container.
- Never use rubber tubes, PVC tubes etc. for making connections.
- Use the right spanner for operating the valve. Always keep the spanner on the valve spindle. Never use ill fitting spanner.
- After making the flexible connection, check for the leakage by means of ammonia torch but it should not come in contact with a valve.
- Keep minimum distance between the container valve and header valve so that during change-over of the container, minimum amount of gas leaks.
- The material of construction of the adapter should be same as that of valve outlet threads. o. The valve should not be used as a regulator for controlling the chlorine. During regulation due to high velocity of Chlorine, the valve gets damaged which in turn can cause difficulty in closing.
- The tools and other equipment used for operating the container should be clean and free of grease, dust or grit.
- Wear breathing apparatus while making the change-over of the container from the process header.
- Do not heat the container to withdraw more gas at faster rate.
- Use pressure gauge and flow measuring device to control the flow and to know the quantity of gas left in the container.
- Use an inverted U type barometric leg or vacuum breaking arrangement for connecting the container to the process piping.
- Withdrawal of the gas should be stopped when the gas pressure inside the container is between 0.1 to 0.5 kg/cm² approximately.
- If withdrawal of the gas from the container connected to the process system has to be suspended for long intervals, it should be disconnected from the system, and the valve cap and hood replaced.
- Gas containers should be handled by trained persons only.

1.4. Disconnecting Containers from Process System

- Use breathing apparatus before disconnecting the container.
- First close the container valve fully. After removal of chlorine the process valve should be closed.
- Remove the flexible connection, plug the flexible connection in order to avoid entry of humid air. Replace the valve cap or hood on the container.

- Put the tag on the empty container & bring it to storage area marked for empties. e. Check for the leakage.

1.5. Loading and Unloading of Containers

- The handling of containers should be done under the supervision of trained and competent person.
- It should be done carefully with a crane, hoist or slanted ramp. Do not use magnet or sharp object for lifting the containers.
- Small cylinders should not be lifted by means of valve caps as these are not designed to carry the weight.
- The containers should not be allowed to strike against each other or against any hard object.
- Vehicles should be braked and isolated against any movement.
- After loading, the containers should be secured properly with the help of wooden wedges, rope or sling wire so that they do not roll away.
- The containers should never be dropped directly to the ground or on the tyre from the vehicle.
- There should be no sharp projection in the vehicle.
- Containers must have valve caps and plugs fitted properly.
- Check containers for leakage before loading/unloading.

1.6. Transportation of Container

- The name of the chemical along with diamond pictorial sign denoting the dangerous goods should be marked on the vehicle.
- The name of the transporter, his address and telephone number should be clearly written on the vehicle.
- The vehicle should not be used to transport any material other than what is written on it. d. Only trained drivers and cleaners should transport hazardous chemical
- The driver should not transport any leaking cylinder.
- The cylinder should not project outside the vehicle.
- The transporter must ensure that every vehicle driver must carry "Trem Card" (Transport Emergency Card) and 'Instructions in writing booklet' and follow them.
- Every driver must carry safety appliances with him, viz; Emergency kit, breathing apparatus etc.
- The vehicles must be driven carefully, especially in crowded localities and on bumpy roads. Do not apply sudden brakes.
- Check for the leakage from time to time.
- In the case of uncontrollable leakage, the vehicle should be taken to an open area where there is less population.

1.7. Emergency Kit: It consists of various tools and appliances like gaskets, yokes, studs, tie rods hoods, clamps, spanners, mild steel channels, screws, pins, wooden pegs etc. of standard sizes. Separate kits are used for cylinders and tonners. All the gadgets are designed for using in controlling or stopping the leakages from valves, fusible plug and side walls of cylinders and containers used for handling chlorine.

- Leakage may occur through the valve. There are basically four types of valve leaks.
 - Valve packing
 - Valve seat
 - Defective inlet thread
 - Broken valve thread

- Leakage may occur through container wall. For controlling such leakages, clamps are used for cylinders and chain and yoke arrangement is used for tonner. Sometimes wooden peg is used by driving into the leaking hole as a temporary arrangement.
- Leakage may occur through fusible plug.
 - If the leakage is through the threads of fusible plug, yoke, hood and cap nut arrangement is used to control the leak.
 - If fusible metal itself in the plug is leaking, yoke and stud arrangement is used to control the leak.

2. First Aid to be Provided for a Person Affected by Chlorine

a. General Remove the affected person immediately to an uncontaminated area. Remove contaminated clothing and wash contaminated parts of the body with soap and plenty of water. Lay down the affected person in cardiac position and keep him warm. Call a physician for medical assistance at the earliest. Caution: Never attempt to neutralize chlorine with other chemicals.

b. Skin Contact Remove the contaminated clothes, wash the affected skin with large quantity of water. Caution: No ointment should be applied unless prescribed by the physician.

c. Eye Contact If eyes get affected with liquid chlorine or high concentration of chlorine gas, they must be flushed immediately with running water for atleast 15 minutes keeping the eyelids open by hand. Caution: No ointment should be used unless prescribed by an eye specialist.

d. Inhalation If the victim is conscious, take him to a quiet place and lay him down on his back, with head and back elevated (cardiac position). Loosen his clothes and keep him warm using blankets. Give him tea, coffee, milk, peppermint etc. for making good effect on breathing system. If the victim is unconscious, but breathing, lay him down in the position mentioned above and give oxygen at low pressure until the arrival of doctor. If breathing has stopped, quickly stretch him out on the ground or a blanket if available, loosen his collar and belt and start artificial respiration without delay. Neilson arm lift back pressure method is useful. Automatic artificial respiration is preferable if available. Continue the respiration until the arrival of the doctor. Amboo bag can also be used for this purpose.

3. On-Site Emergency Plan to Cover the Leakage of Chlorine

3.1. Introduction As chlorine is a hazardous chemical, handling and storage of it demand adequate precautions to avoid possible hazards. Leakage of chlorine may develop into a major emergency. Therefore, the emergency procedure to cover this eventuality is essential. It is drawn in the form of on-site emergency plan. The elements of onsite emergency plan are as follows:

3.2. Identification of Hazard Chart

In this case the site risk is evaluated by the expert and the extent of the probable damage is calculated on the basis of stored chlorine quantity, nearby population, wind direction, type of equipment failure etc. For this purpose, hazard analysis is conducted in which case all the hazardous properties of chlorine are considered. If evacuation is required, the range of it is calculated.

3.3. Appointing Key Persons In order to control the incident like chlorine leakage, it is essential to appoint various persons with their well-defined responsibilities. Taking into account the various activities likely to be involved, the following key persons are

appointed (i) Site Controller, (ii) Incident controller, (iii) Shift Executive In charge, (iv) Communication Officer, (v) Safety Officer, (vi) Fire and Security Officer, (vii) Utilities and Services In charge, (viii) Traffic Controller, (ix) First Aider

3.4. Assembly Points These points are set up where persons from the plant would assemble in case of chlorine leakage. At these points the in-charge for counting the heads will be available.

3.5. Emergency Control Centre

The control centre is the focal point in case of an emergency from where the operations to handle the emergency from are directed and coordinated. It contains site plan, telephone lines, public address system, safety equipment, first aid boxes, loud speaker, torches, list of essential telephone numbers, viz. fire brigade, police, hospital, civil defence, collector, factory inspector, organizational authorities, chlorine suppliers, mutual aid group, social workers, list of key persons and their addresses, copy of chemical fact sheet, location plan of fire hydrant, details of dispersion model of chlorine gas, population distribution pattern, location of alarm system.

3.6. Procedure to Meet Emergency

The actions to be taken by the staff and authority are given below; Emergency Alarm: An audible emergency alarm system is installed throughout the plant. On hearing the alarm the incident controller will activate the public address system to communicate with the staff about the emergency and give specific instructions for evacuations etc. anyone can report the occurrence of chlorine leakage to section in-charge or incident controller through telephone or intercom or in person.

3.7. Communication

Communication officer shall establish the communication suitable to that incident.

3.8. Services

For quickness and efficient operation of emergency plan the plant is divided into convenient number of zones and clearly marked on the plan. These are emergency services viz. firefighting, first aid, rescue, alternative source of power supply, communication with local bodies etc. The incident controller will hand over the charge to the site controller of all these coordinating activities, when the site controller appears on the site. The site controller will coordinate all the activities of the key persons. On hearing the emergency alarm system all the key persons will take their charge. In case of their absence other alternatives are nominated. The person nominated for personnel and administration purposes will be responsible for informing all statutory authorities, keeping account of all persons in the plant including contract labour, casual workers and visitors. He will be responsible for giving information to press or any outside agencies. He is also responsible for organizing canteen facilities and keeping informed the families of affected persons. The person nominated as security officer should guide police, fire fighting and control the vehicle entries. The site controller or any other nominated person will announce resumption of normalcy after everything is brought under control. The onsite emergency plan needs to be evaluated by mock drill. Any weaknesses noticed during such drills should be noted and the plan is modified to eliminate the weaknesses.

3.9. Emergency

Measures In case of leakage or spillage of Chlorine, the following emergency measures should be taken:

- Take a shallow breath and keep eyes opened to a minimum.
- Evacuate the area.

- Investigate the leak with proper gas mask and other appropriate Personal protection.
- The investigator must be watched by a rescuer to rescue him in emergency.
- If liquid leak occurs, turn the containers so as to leak only gas.
- In case of major leakage, all persons including neighbours should be warned.
- As the escaping gas is carried in the direction of the wind all persons should be moved in a direction opposite to that of the wind. Nose should be covered with wet handkerchief.
- Under no circumstances should water or other liquid be directed towards leaking containers, because water makes the leak worse due to corrosive effect.
- The spillage should be controlled for evaporation by spraying chilled water having temperature below 9.4oC. With this water crystalline hydrates are formed which will temporarily avoid evaporation. Then try to neutralize the spillage by caustic soda or soda ash or hydrated lime solution carefully. If fluoroprotein foam is available, use for preventing the evaporation of liquid chlorine.
- Use emergency kit for controlling the leak.
- On controlling the leakage, use the container in the system or neutralize the contents in alkali solution such as caustic soda, soda ash or hydrated lime. Caution: Keep the supply of caustic soda or soda ash or hydrated lime available. Do not push the leaking container in the alkali tank. Connect the container to the tank by barometric leg.
- If container commences leak during transport, it should be carried on to its destination or manufacturer or to remote place where it will be less harmful. Keeping the vehicle moving will prevent accumulation of high concentrations.
- Only specially trained and equipped workers should deal with emergency arising due to major leakage.
- If major leak takes place, alert the public nearby by sounding the siren.
- Any minor leakage must be attended immediately or it will become worse.
- If the leakage is in the process system, stop the valve on the container at once.

3.10. Safety Systems Required at Chlorination Plant

The following safety systems should be kept ready at the chlorination plant:

- Breathing apparatus.
- Emergency kit.
- Leak detectors.
- Neutralisation tank.
- Siren system.
- Display of boards in local language for public cautioning, first aid and list of different authorities with phone numbers.
- Communication system.
- Tagging system for equipment's.
- First aid including tablets and cough mixtures.
- Exhaust fans.
- Testing of pressure vessels, chlorine lines etc. every year as per factory act.
- Training & mock drill.
- Safety showers.
- Eye fountain.

- Personal protective equipment.
- Protecting hoods for ton-containers.
- Fire extinguishers.
- Wind cock.

Appendix C-23: Guidelines for Prevention and Control of COVID-19 WHO Interim Guidance on Water, Sanitation, Hygiene and Waste Management for the COVID19 virus



Water, sanitation, hygiene, and waste management for the COVID-19 virus

Interim guidance
19 March 2020

Background

This interim guidance supplements the infection prevention and control (IPC) documents by summarizing WHO guidance on water, sanitation and health care waste relevant to viruses, including coronaviruses. It is intended for water and sanitation practitioners and providers and health care providers who want to know more about water, sanitation and hygiene (WASH) risks and practices.

The provision of safe water, sanitation, and hygienic conditions is essential to protecting human health during all infectious disease outbreaks, including the COVID-19 outbreak. Ensuring good and consistently applied WASH and waste management practices in communities, homes, schools, marketplaces, and health care facilities will help prevent human-to-human transmission of the COVID-19 virus.

The most important information concerning WASH and the COVID-19 virus is summarized here:

- Frequent and proper hand hygiene is one of the most important measures that can be used to prevent infection with the COVID-19 virus. WASH practitioners should work to enable more frequent and regular hand hygiene by improving facilities and using proven behavior-change techniques.
- WHO guidance on the safe management of drinking-water and sanitation services applies to the COVID-19 outbreak. Extra measures are not needed. Disinfection will facilitate more rapid die-off of the COVID-19 virus.
- Many co-benefits will be realized by safely managing water and sanitation services and applying good hygiene practices.

Currently, there is no evidence about the survival of the COVID-19 virus in drinking-water or sewage. The morphology and chemical structure of the COVID-19 virus are similar to those of other human coronaviruses for which there are data about both survival in the environment and effective inactivation measures. This document draws upon the evidence base and WHO guidance on how to protect against viruses in sewage and drinking-water. This document will be updated as new information becomes available.

1. COVID-19 transmission

There are two main routes of transmission of the COVID-19 virus: respiratory and contact. Respiratory droplets are generated when an infected person coughs or sneezes. Any person who is in close contact with someone who has respiratory symptoms (sneezing, coughing) is at risk of being exposed to potentially infective respiratory droplets.¹ Droplets may also land on surfaces where the virus could remain viable; thus, the immediate environment of an infected individual can serve as a source of transmission (contact transmission).

Approximately 2–10% of cases of confirmed COVID-19 disease present with diarrhoea,^{2,4} and two studies detected COVID-19 viral RNA fragments in the faecal matter of COVID-19 patients.^{5,6} However, only one study has cultured the COVID-19 virus from a single stool specimen.⁷ There have been no reports of faecal-oral transmission of the COVID-19 virus.

2. Persistence of the COVID-19 virus in drinking-water, faeces and sewage and on surfaces

Although persistence in drinking-water is possible, there is no evidence from surrogate human coronaviruses that they are present in surface or groundwater sources or transmitted through contaminated drinking water. The COVID-19 virus is an enveloped virus, with a fragile outer membrane. Generally, enveloped viruses are less stable in the environment and are more susceptible to oxidants, such as chlorine. While there is no evidence to date about survival of the COVID-19 virus in water or sewage, the virus is likely to become inactivated significantly faster than non-enveloped human enteric viruses with known waterborne transmission (such as adenoviruses, norovirus, rotavirus and hepatitis A). For example, one study found that a surrogate human coronavirus survived only 2 days in dechlorinated tap water and in hospital wastewater at 20°C.⁸ Other studies concur, noting that the human coronaviruses transmissible gastroenteritis coronavirus and mouse hepatitis virus demonstrated a 99.9% die-off in from 2 days⁹ at 23°C to 2 weeks¹⁰ at 25°C. Heat, high or low pH, sunlight, and common disinfectants (such as chlorine) all facilitate die-off.

It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems likely to behave like other coronaviruses. A recent review of the survival of human

coronaviruses on surfaces found large variability, ranging from 2 hours to 9 days.¹¹ The survival time depends on a number of factors, including the type of surface, temperature, relative humidity, and specific strain of the virus. The same review also found that effective inactivation could be achieved within 1 minute using common disinfectants, such as 70% ethanol or sodium hypochlorite (for details, see Cleaning practices).

3. Keeping water supplies safe

The COVID-19 virus has not been detected in drinking-water supplies, and based on current evidence, the risk to water supplies is low.¹² Laboratory studies of surrogate coronaviruses that took place in well-controlled environments indicated that the virus could remain infectious in water contaminated with faeces for days to weeks.¹⁰ A number of measures can be taken to improve water safety, starting with protecting the source water; treating water at the point of distribution, collection, or consumption; and ensuring that treated water is safely stored at home in regularly cleaned and covered containers.

Conventional, centralized water treatment methods that use filtration and disinfection should inactivate the COVID-19 virus. Other human coronaviruses have been shown to be sensitive to chlorination and disinfection with ultraviolet (UV) light.¹³ As enveloped viruses are surrounded by a lipid host cell membrane, which is not robust, the COVID-19 virus is likely to be more sensitive to chlorine and other oxidant disinfection processes than many other viruses, such as coxsackieviruses, which have a protein coat. For effective centralized disinfection, there should be a residual concentration of free chlorine of ≥ 0.5 mg/L after at least 30 minutes of contact time at pH < 8.0 .¹² A chlorine residual should be maintained throughout the distribution system.

In places where centralized water treatment and safe piped water supplies are not available, a number of household water treatment technologies are effective in removing or destroying viruses, including boiling or using high-performing ultrafiltration or nanomembrane filters, solar irradiation and, in non-turbid waters, UV irradiation and appropriately dosed free chlorine.

4. Safely managing wastewater and faecal waste

There is no evidence that the COVID-19 virus has been transmitted via sewerage systems with or without wastewater treatment. Further, there is no evidence that sewage or wastewater treatment workers contracted the severe acute respiratory syndrome (SARS), which is caused by another type of coronavirus that caused a large outbreak of acute respiratory illness in 2003. As part of an integrated public health policy, wastewater carried in sewerage systems should be treated in well-designed and well-managed centralized wastewater treatment works. Each stage of treatment (as well as retention time and dilution) results in a further reduction of the potential risk. A waste stabilization pond (an oxidation pond or lagoon) is generally considered a practical and simple wastewater treatment technology particularly well suited to destroying pathogens, as relatively long retention times (20 days or longer) combined with sunlight, elevated pH levels, biological activity, and other factors serve to accelerate pathogen destruction. A final disinfection step may be considered if existing wastewater treatment plants are not optimized to remove viruses. Best practices for protecting the health of workers at sanitation treatment facilities should

be followed. Workers should wear appropriate personal protective equipment (PPE), which includes protective outerwear, gloves, boots, goggles or a face shield, and a mask; they should perform hand hygiene frequently; and they should avoid touching eyes, nose, and mouth with unwashed hands.

WASH in health care settings

Existing recommendations for water, sanitation and hygiene measures in health care settings are important for providing adequate care for patients and protecting patients, staff, and caregivers from infection risks.¹⁴ The following actions are particularly important: (i) managing excreta (faeces and urine) safely, including ensuring that no one comes into contact with it and that it is treated and disposed of correctly; (ii) engaging in frequent hand hygiene using appropriate techniques; (iii) implementing regular cleaning and disinfection practices; and (iv) safely managing health care waste. Other important measures include providing sufficient safe drinking-water to staff, caregivers, and patients; ensuring that personal hygiene can be maintained, including hand hygiene, for patients, staff and caregivers; regularly laundering bedsheets and patients' clothing; providing adequate and accessible toilets (including separate facilities for confirmed and suspected cases of COVID-19 infection); and segregating and safely disposing of health care waste. For details on these recommendations, please refer to Essential environmental health standards in health care.¹⁴

1. Hand hygiene practices

Hand hygiene is extremely important. Cleaning hands with soap and water or an alcohol-based hand rub should be performed according to the instructions known as "My 5 moments for hand hygiene".¹⁵ If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20–30 seconds using the appropriate technique.¹⁶ When hands are visibly dirty, they should be washed with soap and water for 40–60 seconds using the appropriate technique.¹⁷ Hand hygiene should be performed at all five moments, including before putting on PPE and after removing it, when changing gloves, after any contact with a patient with suspected or confirmed COVID-19 infection or their waste, after contact with any respiratory secretions, before eating, and after using the toilet.¹⁸ If an alcohol-based hand rub and soap are not available, then using chlorinated water (0.05%) for handwashing is an option, but it is not ideal because frequent use may lead to dermatitis, which could increase the risk of infection and asthma and because prepared dilutions might be inaccurate.¹⁹ However, if other options are not available or feasible, using chlorinated water for handwashing is an option.

Functional hand hygiene facilities should be present for all health care workers at all points of care and in areas where PPE is put on or taken off. In addition, functional hand hygiene facilities should be available for all patients, family members, and visitors, and should be available within 5 m of toilets, as well as in waiting and dining rooms and other public areas.

2. Sanitation and plumbing

People with suspected or confirmed COVID-19 disease should be provided with their own flush toilet or latrine that has a door that closes to separate it from the patient's room. Flush toilets should operate properly and have functioning drain traps. When possible, the toilet should be flushed with the lid down to prevent droplet splatter and aerosol clouds. If it is not possible to provide separate toilets, the toilet should be cleaned and disinfected at least twice daily by a trained cleaner wearing PPE (gown, gloves, boots, mask, and a face shield or goggles). Further, and consistent with existing guidance, staff and health care workers should have toilet facilities that are separate from those used by all patients.

WHO recommends the use of standard, well-maintained plumbing, such as sealed bathroom drains, and backflow valves on sprayers and faucets to prevent aerosolized faecal matter from entering the plumbing or ventilation system,²⁰ together with standard wastewater treatment.²¹ Faulty plumbing and a poorly designed air ventilation system were implicated as contributing factors to the spread of the aerosolized SARS coronavirus in a high-rise apartment building in Hong Kong in 2003.²² Similar concerns have been raised about the spread of the COVID-19 virus from faulty toilets in high-rise apartment buildings.²³ If health care facilities are connected to sewers, a risk assessment should be conducted to confirm that wastewater is contained within the system (that is, the system does not leak) before its arrival at a functioning treatment or disposal site, or both. Risks pertaining to the adequacy of the collection system or to treatment and disposal methods should be assessed following a safety planning approach,²⁴ with critical control points prioritized for mitigation.

For smaller health care facilities in low-resource settings, if space and local conditions allow, pit latrines may be the preferred option. Standard precautions should be taken to prevent contamination of the environment by excreta. These precautions include ensuring that at least 1.5 m exists between the bottom of the pit and the groundwater table (more space should be allowed in coarse sands, gravels, and fissured formations) and that the latrines are located at least 30 m horizontally from any groundwater source (including both shallow wells and boreholes).²⁵ If there is a high groundwater table or a lack of space to dig pits, excreta should be retained in impermeable storage containers and left for as long as feasible to allow for a reduction in virus levels before moving it off-site for additional treatment or safe disposal, or both. A two-tank system with parallel tanks would help facilitate inactivation by maximizing retention times, as one tank could be used until full, then allowed to sit while the next tank is being filled. Particular care should be taken to avoid splashing and the release of droplets while cleaning or emptying tanks.

3. Toilets and the handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (if hands are dirty, then soap and water are preferred to the use of an alcohol-based hand rub). If the patient is unable to use a latrine, excreta should be collected in either a diaper or a clean bedpan and immediately and carefully disposed of into a separate toilet or latrine used only by suspected or confirmed cases of COVID-19. In all health care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling

faeces should follow WHO contact and droplet precautions¹⁸ and use PPE to prevent exposure, including long-sleeved gowns, gloves, boots, masks, and goggles or a face shield. If diapers are used, they should be disposed of as infectious waste as they would be in all situations. Workers should be properly trained in how to put on, use, and remove PPE so that these protective barriers are not breached.²⁷ If PPE is not available or the supply is limited, hand hygiene should be regularly practiced, and workers should keep at least 1 m distance from any suspected or confirmed cases.

If a bedpan is used, after disposing of excreta from it, the bedpan should be cleaned with a neutral detergent and water, disinfected with a 0.5% chlorine solution, and then rinsed with clean water; the rinse water should be disposed of in a drain or a toilet or latrine. Other effective disinfectants include commercially available quaternary ammonium compounds, such as cetylpyridinium chloride, used according to manufacturer's instructions, and peracetic or peroxyacetic acid at concentrations of 500–2000 mg/L.²⁶

Chlorine is ineffective for disinfecting media containing large amounts of solid and dissolved organic matter. Therefore, there is limited benefit to adding chlorine solution to fresh excreta and it is possible that this may introduce risks associated with splashing.

4. Emptying latrines and holding tanks, and transporting excreta off-site

There is no reason to empty latrines and holding tanks of excreta from suspected or confirmed COVID-19 cases unless they are at capacity. In general, the best practices for safely managing excreta should be followed. Latrines or holding tanks should be designed to meet patient demand, considering potential sudden increases in cases, and there should be a regular schedule for emptying them based on the wastewater volumes generated. PPE (long-sleeved gown, gloves, boots, masks, and goggles or a face shield) should be worn at all times when handling or transporting excreta off-site, and great care should be taken to avoid splashing. For crews, this includes pumping out tanks or unloading pumper trucks. After handling the waste and once there is no risk of further exposure, individuals should safely remove their PPE and perform hand hygiene before entering the transport vehicle. Soiled PPE should be put in a sealed bag for later safe laundering (see Cleaning practices). Where there is no off-site treatment, in-situ treatment can be done using lime. Such treatment involves using a 10% lime slurry added at 1-part lime slurry per 10 parts of waste.

5. Cleaning practices

Recommended cleaning and disinfection procedures for health care facilities should be followed consistently and correctly.¹⁹ Laundry should be done and surfaces in all environments in which COVID-19 patients receive care (treatment units, community care centres) should be cleaned at least once a day and when a patient is discharged.²⁷ Many disinfectants are active against enveloped viruses, such as the COVID-19 virus, including commonly used hospital disinfectants. Currently, WHO recommends using:

- 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers);
- sodium hypochlorite at 0.5% (equivalent to 5000 ppm) for disinfecting surfaces.

All individuals dealing with soiled bedding, towels, and clothes from patients with COVID-19 infection should wear appropriate PPE before touching soiled items, including heavy duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, an apron if the gown is not fluid resistant, and boots or closed shoes. They should perform hand hygiene after exposure to blood or body fluids and after removing PPE. Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine. Machine washing with warm water at 60–90°C (140–194°F) with laundry detergent is recommended. The laundry can then be dried according to routine procedures. If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

If excreta are on surfaces (such as linens or the floor), the excreta should be carefully removed with towels and immediately safely disposed of in a toilet or latrine. If the towels are single use, they should be treated as infectious waste; if they are reusable, they should be treated as soiled linens. The area should then be cleaned and disinfected (with, for example, 0.5% free chlorine solution), following published guidance on cleaning and disinfection procedures for spilled body fluids.²⁷

6. Safely disposing of greywater or water from washing PPE, surfaces and floors.

Current WHO recommendations are to clean utility gloves or heavy duty, reusable plastic aprons with soap and water and then decontaminate them with 0.5% sodium hypochlorite solution after each use. Single-use gloves (nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed. If greywater includes disinfectant used in prior cleaning, it does not need to be chlorinated or treated again. However, it is important that such water is disposed of in drains connected to a septic system or sewer or in a soakaway pit. If greywater is disposed of in a soakaway pit, the pit should be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow.

7. Safe management of health care waste

Best practices for safely managing health care waste should be followed, including assigning responsibility and sufficient human and material resources to dispose of such waste safely. There is no evidence that direct, unprotected human contact during the handling of health care waste has resulted in the transmission of the COVID-19 virus. All health care waste produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated, and then safely disposed of or treated, or both, preferably on-site. If waste is moved off-site, it is critical to understand where and how it will be treated and destroyed. All who handle health care waste should wear appropriate PPE (boots, apron, long-sleeved gown, thick gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. For more information refer to the WHO guidance, 'Safe management of wastes from health-care activities'.²⁸

Considerations for WASH practices in homes and communities.

Upholding best WASH practices in the home and community is also important for preventing the spread of COVID-19 and when caring for patients at home. Regular and correct hand hygiene is of particular importance.

1. Hand hygiene

Hand hygiene in non-health care settings is one of the most important measures that can prevent COVID-19 infection. In homes, schools and crowded public spaces – such as markets, places of worship, and train or bus stations – regular handwashing should occur before preparing food, before and after eating, after using the toilet or changing a child's diaper, and after touching animals. Functioning handwashing facilities with water and soap should be available within 5 m of toilets.

2. Treatment and handling requirements for excreta.

Best WASH practices, particularly handwashing with soap and clean water, should be strictly applied and maintained because these provide an important additional barrier to COVID-19 transmission and to the transmission of infectious diseases in general.¹⁷ Consideration should be given to safely managing human excreta throughout the entire sanitation chain, starting with ensuring access to regularly cleaned, accessible, and functioning toilets or latrines and to the safe containment, conveyance, treatment, and eventual disposal of sewage.

When there are suspected or confirmed cases of COVID-19 in the home setting, immediate action must be taken to protect caregivers and other family members from the risk of contact with respiratory secretions and excreta that may contain the COVID-19 virus. Frequently touched surfaces throughout the patient's care area should be cleaned regularly, such as bedside tables, bed frames and other bedroom furniture. Bathrooms should be cleaned and disinfected at least once a day. Regular household soap or detergent should be used for cleaning first and then, after rinsing, regular household disinfectant containing 0.5% sodium hypochlorite (that is, equivalent to 5000 ppm or 1-part household bleach with 5% sodium hypochlorite to 9 parts water) should be applied. PPE should be worn while cleaning, including mask, goggles, a fluid-resistant apron, and gloves,²⁹ and hand hygiene with an alcohol-based hand rub or soap and water should be performed after removing PPE.

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US Centers for Disease Control and Prevention, United States of America; David Berendes, US Centers for Disease Control and Prevention, United States of America; Lisa Casanova, Georgia State University, United States of America; David Cunliffe, SA Health, Australia; Rick Gelting, US Centers for Disease Control and Prevention, United States of America; Dr Thomas Handzel, US Centers for Disease Control and Prevention, United States of America; Paul Hunter, University of East Anglia, United Kingdom; Ana Maria de Roda Husman, National Institute for Public Health and the Environment, the Netherlands; Peter Maes, Médecins Sans Frontières, Belgium; Molly Patrick, US Centers for Disease Control and Prevention, United States of America; Mark Sobsey, University of North Carolina-Chapel Hill, United States of America.

WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

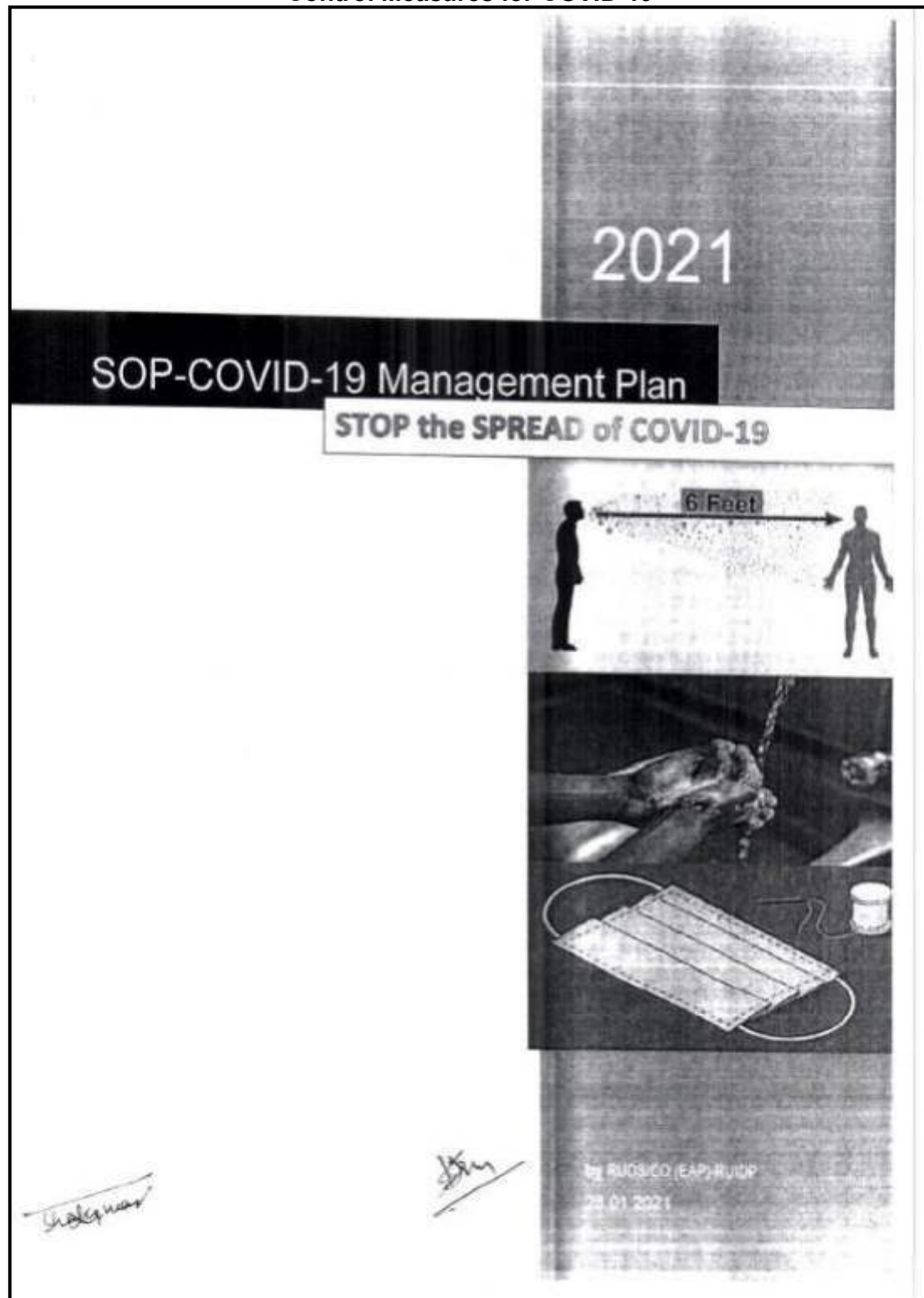
Contributors

This interim guidance was written by staff from WHO and UNICEF. In addition, a number of experts and WASH practitioners contributed. They include Matt Ardiano,

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Appendix C-24: RUDSICO-EAP Guidelines for implementation of Prevention and Control Measures for COVID-19



Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

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Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

Safe Operating Procedure (SOP) and COVID-19 Management Plan for Construction Works during COVID-19 Situation

I. INTRODUCTION

- Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.
- Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.
- The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow) and maintain social distancing
- At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments

II. PURPOSE

- This document¹ is intended to supplement formal EH&S policies, procedures and plans that the contractor has in place for its employees and staff working in RSTDSP projects. Hence, this document is not intended to replace any formalized procedures currently in place for the Contractor. Where this guideline does not meet or exceed the standards put forth by the Contractor, the Contractor shall abide by the most stringent procedure available.
- In addition to prevailing EH&S Plan in all projects, Safe Operating Procedures specific to COVID-19 are prepared by working contractors and being followed in all work sites.
- Existing EH&S Officer of contractor to be given additional responsibility of COVID-19 Officer² to implement and monitor the COVID-19 SOPs. The EH&S officer cum COVID-19 Officer² at the Contractor's worksite (appointed by Contractor and agreed by PIU) will submit a written weekly report to the Client's Representative (PIU Head). The EH&S Officer cum COVID-19 Officer shall certify that the Contractor and all subcontractors are in full compliance with these guidelines.
- The EH&S Officer cum COVID-19 officer should monitor all sites on daily basis.
- Any issue of non-compliance with these guidelines shall be a basis for the suspension of work. The Contractor will be required to submit a corrective action plan (on the next day or immediately as per the nature of issue) detailing each issue of non-conformance and a plan to rectify the issue(s). The Contractor will not be allowed to resume work until the plan is approved by the Client (PIU). Any additional issues of non-conformance may be subject to action against the Contractor's as health & safety/safeguard clauses of the contract.
- Construction sites operating during the Covid-19 pandemic need to ensure they are

¹ This document may be made available in the local language, and the salient features would be displayed through signages at the appropriate locations throughout work sites and stretches by the Contractor for wider dissemination and awareness

² The existing safeguards officer OR health & safety officer OR supervisor of the contractor can be designated as COVID-19 officer by undergoing the training available at

(a) <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/training/online-training>
 (b) <https://openwho.org/courses/eprotect-acute-respiratory-infections>
 (c) <https://openwho.org/courses/COVID-19-IPC-EN>

Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

protecting their workforce and minimizing the risk of spread of infection.

- This guidance is intended to introduce consistent measures on sites of all sizes in line with the Government's recommendations on social distancing.
- These are exceptional circumstances and the contractor and PIU must remain abreast of and comply with the latest Government advice on COVID-19 at all times.
- The health and safety requirements of any construction activity must also not be compromised at this time. If an activity cannot be undertaken safely due to a lack of suitably qualified personnel being available or social distancing being implemented, it should not take place.
- It is to be noted that emergency services/medical services are also under great pressure and may not be in a position to respond as quickly as usual.
- Sites should remind the workforce at every opportunity of the Worksite Procedures which are aimed at protecting them, their colleagues, their families and the nearby population.

If a worksite is not consistently implementing the measures in this document, it may be required to shut down.

III. COVID-19 TYPICAL SYMPTOMS

- Fever
- Cough
- Shortness of Breath
- Sore Throat

IV. PRINCIPLES OF WORKER PROTECTION

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

V. MAXIMUM PRECAUTION FOR PERSONS/LABOURERS REPORTING TO WORK

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

VI. PPEs AND SANITIZATION ARRANGEMENTS

Contractor to provide face masks (of the type approved by Government for use to protect persons from COVID-19) to all persons working in or visiting the worksite. At each worksite hand sanitizers/soap shall be kept and workers will be required to regularly sanitize/wash hands with soap. If any object is to be used by several workers, all workers shall be provided hand gloves. Full sanitization of worksite and work objects shall be done every day before start of works. This along with procedures set out in this document is for maximum precaution to protect all persons/labourers at all times.

VII. HEALTH CHECK UP AND THERMAL SCANNING

All persons at the worksite should have their temperature screened by COVID-19 officer with Infrared Thermometer (handheld non-contact).

Health checkup of all workers and staff shall be done by a medical practitioner on weekly basis. If any suspected COVID-19 infected person is found, he shall immediately reported to local authority/govt. recognized COVID-19 hospital. Thermal scanning shall be done of each worker and staff before entering to site and office and if any person has more than normal

Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

temperature, he shall not be allowed to enter site/office. Such person shall be sent back to home/work camp and regular daily monitoring of his temperature shall be done and if temperature remains high he shall be reported to local authority/govt. recognized COVID-19 hospital for further treatment/quarantine.

VIII. SELF ATTESTATION BY PERSONS/LABOUR PRIOR TO WORK

Prior to starting a work (on daily basis), each labour /worker will self-attest to the supervisor:

- 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)

The engagement of workers falling in the high-risk category such as workers over the age of 55 years, with underlying medical conditions or health issues, etc. should be done only after obtaining the requisite clearance from trained and registered medical practitioners.

The self-attestation would be verified in collaboration with trained and registered medical practitioners deployed at site through discussions with laborers /workers and/or preliminary checks such as temperature checks, etc. prior to their engagement at site.

In addition, the Contractor shall mandatorily follow all medical test requirements for the workers prior to their engagement and/or mobilization at site as per the guidelines issued by the Central and State government agencies and WHO from time to time.

Persons/Labourers showing COVID-19 symptoms or not providing self-attestation shall be directed to leave the work site and report to the Govt. recognized hospital/quarantine centre immediately. Labour not to return to the work site until cleared by Govt. recognized hospital /quarantine centre.

IX. GENERAL PRECAUTIONS TO BE FOLLOWED AT PERMANENT SITES/OFFICES

- No handshake, Only Namaste
- Non-essential physical work that requires close contact between workers should not be carried out
- Work requiring physical contact should not be carried out
- Plan all other work to minimise contact between workers
- Wash hands often (every 1-2 hrs or frequently as possible) with soap for at least 20 seconds
- Use hand sanitizer
- No person should enter the work site other than the authorized persons mentioned by supervisor during start of work
- All must implement social distancing³ by maintaining a minimum distance of 6-feet from others³ at all times to eliminate the potential of cross contamination.
- Avoid face to face meetings – critical situations requiring in-person discussion must follow social distance i.e., 6 ft from others.
- Conduct all meetings via conference calls, if possible. Do not convene meetings of

³ Social distancing may not be practical for undertaking certain specific activities within the workplace. It is therefore important to review the work method statements for these types of activities to assess impact and how to find safe ways of doing in line with best available guidance

Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

more than 10 people. Recommend use of cell phones, texting, web meeting sites and conference calls for project discussion

- All individual work group meetings/ talks should follow social distancing
- At each job briefing /toolbox talk, employees are asked if they are experiencing any symptoms, and are sent home if they are
- Each worksite should have displayed laminated COVID-19 safety guidelines and handwashing instructions (seen Annexure for display pictographs)
- All restroom /toilet facilities should be cleaned (min twice a day), and handwashing facility must be provided with soap, hand sanitizer and paper towels
- All surfaces should be regularly cleaned, including mobiles, tabletops /surfaces, door handles, laptops, records, etc.
- All common areas and meeting areas are to be regularly cleaned (min twice a day) and disinfected at least twice a day
- All persons to maintain their own water bottle, and should not be shared.
- To avoid external contamination, it is recommended everyone bring food from home
- Maintain Social Distancing separation during breaks and lunch.
- Cover coughing or sneezing with a tissue, then throw the tissue in the trash and wash hands, if no tissue is available then cough /sneeze into your upper sleeves or elbow. Do not cough or sneeze into your hands.
- Clean your hands after coughing or sneezing thoroughly by using soap and water (minimum for 20 seconds). If soap and water are not available, please use a hand sanitizer. The Contractor shall ensure adequate quantities of sanitizer and soap are made available at all locations including site offices, meeting rooms, corridors, washrooms /toilets, etc. as appropriate.
- Avoid touching eyes, nose, and mouth with your hands
- To avoid sharing germs, please clean up after Yourself. DO NOT make others responsible for moving, unpacking and packing up your personal belongings
- If you or a family member is feeling ill, stay home!⁴
- Work schedules are adjusted to provide time for proper cleaning and disinfecting as required.

X. TEMPORARY WORK-SITE (PIPE LAYING SITES) PREVENTION PRACTICES

- At the start of each shift, confirm with all employees that they are healthy and inform all workers of reusable and disposable PPE.
- Outside person(s) should be strictly prohibited at worksite
- All construction workers will be required to wear cut-resistant gloves or the equivalent.
- Use of eye protection (reusable safety goggles/face shields) is recommended. The supply of eye protection equipment to the workers is considered as a standard part of PPE during construction works.
- In work conditions where required social distancing is impracticable to achieve, such employees shall be supplied with standard face mask, gloves, and eye protection.
- All employees shall drive to work site in a single occupant vehicle. Staff shall not ride together in the same vehicle
- When entering a machine or vehicle which you are not sure you were the last person to enter, make sure that you wipe down the interior and door handles with disinfectant (with 1% sodium hypochlorite solution) prior to entry. Adequate quantity of the disinfectant shall be provided by the Contractor at all such site-specific locations.
- Workers should maintain separation of 6 feet from each other.
- Multi person activities will be limited where feasible (two persons lifting activities)
- Gathering places on the site such as sheds and/or break areas will be eliminated, and

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- instead small break areas will be used with seating limited to ensure social distancing.
- Contact the cleaning person of the worksite and ensure proper COVID-19 sanitation processes. Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with gloves, gown and face mask for each cycle of cleaning. The Contractor shall make available adequate supply of PPE and chemicals while the threat of COVID-19 continues.
- Clean all high contact surfaces a minimum of twice a day in order to minimize the spread of germs in areas that people touch frequently. This includes but is not limited to desks, laptops and vehicles
- All employees to maintaining good health by getting adequate sleep; eating a balanced, healthy diet, avoid alcohol; and consume plenty of fluids.
- Continuation of works in construction project with workers available on site and no workers to be brought in from outside
- The site offices shall have adequate ventilation. The air conditioning or ventilation systems installed at the site offices would have high-efficiency air filters to reduce the risk of infection. The frequency of air changes may be increased for areas where close personal proximity cannot be fully prevented such as control rooms, elevators, waiting rooms, etc.
- The Contractor shall carry out contactless temperature checks for the workers prior to site entrance, during working hours and after site works to identify persons showing signs of being unwell with the COVID-19 symptoms

XI. WASHING FACILITY

- All worksites should have access to toilet and hand washing facility.
- Providing hand cleaning facilities at entrances and exits. This should be soap and water wherever possible or hand sanitizer if water is not available
- Washing facility with hot water, and soap at fire hydrants or other water sources to be used for frequent handwashing for all onsite employees
- All onsite workers must help to maintain and keep stations clean
- If a worker notices soap or towels are running low or out, immediately notify supervisors. Proactively supervisor should make sure shortage situation never occurs.
- Garbage bins will be placed next to the hand wash facility for discarding of used tissues/towels with regular removal and disposal facility (end of each day)

XII. CLEANING PROCEDURES

Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with gloves, gown and face mask for each cycle of cleaning.

Each worksite should have enhanced cleaning and disinfection procedures that are posted and shared including sheds, gates, equipment, vehicles, etc. and shall be posted at all entry points to the sites, and throughout the project site. These include common areas and high touch points like

- Taps and washing facilities
- Toilet flush and seats
- Door handles and push plates
- Handrails on staircases and corridors
- Lift and hoist controls
- Machinery and equipment controls
- Food preparation and eating surfaces
- Telephone equipment / mobiles
- Keyboards, photocopiers and other office equipment



Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

Re-usable PPEs⁴ should be thoroughly cleaned after use and not shared between workers

XIII. LABOUR CAMP

Contractor shall follow a zero-tolerance policy on wearing of masks.

Masks (homemade can be thought of) to be provided to all the persons/labourers for use at the camp site as well as at the worksite. Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with disposable gloves, gown and face mask for each cycle of cleaning.

Toilet Facility

- Restrict the number of people using toilet facility at any one time e.g. appoint one welfare attendant among the labours.
- Wash hands before and after using the facilities
- Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush
- Portable toilets should be avoided wherever possible, but where in use these should be cleaned and emptied more frequently
- Provide suitable and sufficient rubbish bins for hand towels with regular removal and disposal.

Eating/snacks Arrangements

- Provide permanent (till society is safe from COVID-19) on-camp/off-camp cook/helpers can be implemented. Make sure that the "Guidelines for food handling, preparation and distribution during COVID-19" and its regular updates are being followed.
- Whilst there is a requirement for construction camps to provide a means of heating food and making hot water, these are exceptional circumstances and where it is not possible to introduce a means of keeping equipment clean between use, etc. must be removed from use.
- Contractor to arrange all daily need items and grocery at site itself and no worker is allowed to go to shops for daily need items.
- Dedicated eating areas should be identified on camp to reduce food waste and contamination
- Break times should be staggered to reduce congestion and contact at all times
- Hand cleaning facilities or hand sanitizer should be available at the entrance of any room where people eat and should be used by workers when entering and leaving the area
- Workers should sit 2 metres apart from each other whilst eating and avoid all contact
- Where catering is provided on camp, it should provide pre-prepared and wrapped food only
 - Payments should be taken by contactless options wherever possible
 - Crockery, eating utensils, cups etc. should be avoided wherever possible
- Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced
- Tables should be cleaned between each use
- All rubbish should be put straight in the bin and not left for someone else to clear up; only covered pedal operated bins should be used and the bins should be cleared and cleaned regularly, with strict adherence to safety protocols for disposal and hygiene maintenance (including proper PPE's such as gloves, mask and apron worn by the

⁴ Advisory on use of Homemade Protective Cover for Face & Mouth by GOI

Safe Operating Procedures (SOP) and COVID-19 Management Plan for Construction works

- waste handler/cleaner and disposal at a designated place);
- All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs, door handles, etc.

Changing Facilities, Bathrooms, Showers and Drying Areas

- Introduce staggered start and finish times to reduce congestion and contact at all times
- Introduce enhanced cleaning of all facilities throughout the day and at the end of each day
- Consider increasing the number or size of facilities available on camp if possible
- Based on the size of each facility, determine how many people can use it at any one time to maintain a distance of two metres
- Provide suitable and sufficient garbage bins in these areas with regular removal and disposal.
- Visitor log should be strictly maintained that the labour camp.

COVID-19 officer will ensure compliance with prevention issues at the labour camp(s).

XIV. UPDATES ON COVID-19

The Contractor shall be in touch with the Department of Health & Family Welfare and Labour Department to identify any potential worksite exposures relating to COVID-19, including:

- Strictly follow the guidelines issued by Ministry of Health and Family Welfare
- Other workers, vendors, inspectors, or visitors to the worksite with close contact to the individual
- Labour Camps / Work areas such as designated workstations or rooms /sheds
- Work tools and equipment
- Common areas such as break rooms, tables and sanitary facilities

Also refer the following websites from time to time for regular updates.

<https://www.mohfw.gov.in/>

This document can be updated from time to time based on the advisories or directions of the Govt.

XV. TRAINING

- PIU to ensure all workers get training on above requirements before start of any construction activity
- During construction period frequent visual and verbal reminders to workers can improve compliance with hand hygiene practices and thus reduce rates of infection. Handwashing posters should also be displayed at work site and labour camps

XVI. EMERGENCY CONTACT

- Provide emergency contact number(s) at work site and labour camp for reporting COVID-19 symptoms

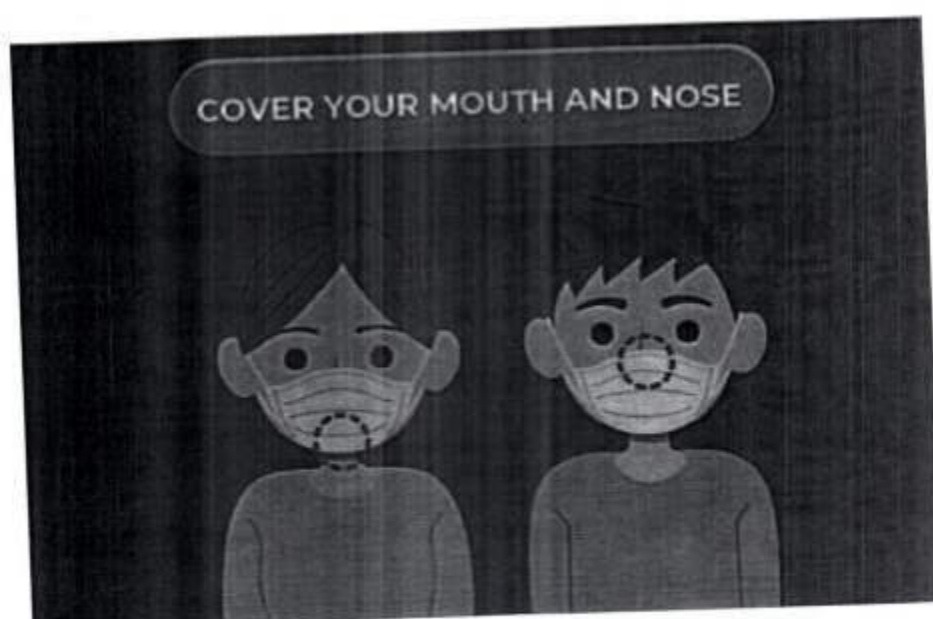
Ensure all staff and personal use the Aarogya Setu app, recommended by GOI for tracking COVID-19 patients.

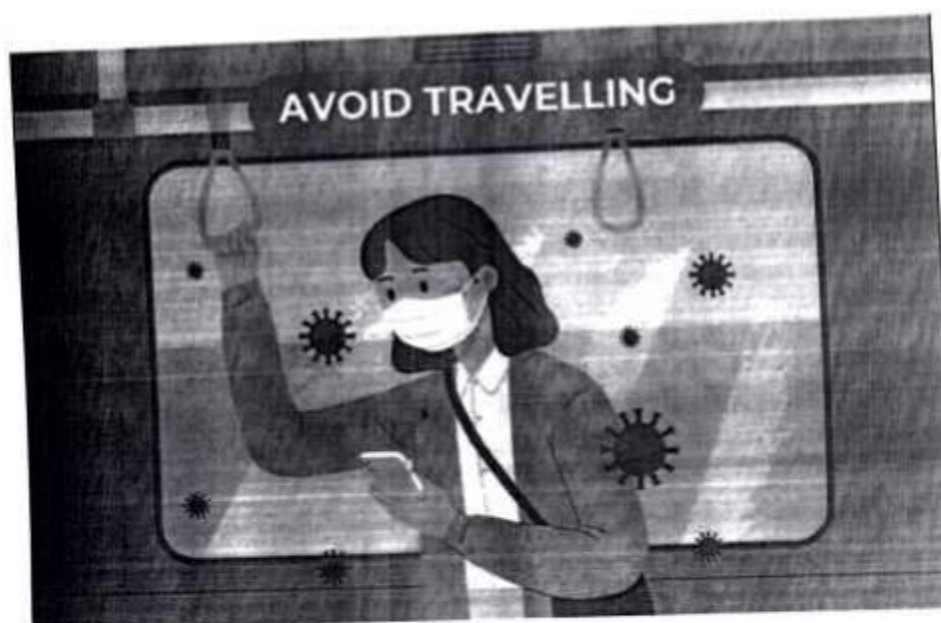
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COVID-19 PRECAUTIONS

(To be displayed at sites)









Appendix C-25: Management of Work Plan during Festivals and Melas

1.	Planning Of Fair and Festival	• The date and time should be fixed well in advance so that all requisite preparations can be made. It should be announced at least 60 days in advance. • Information shall be shared with local health authorities'/ health officers of all localities in which fair/festival is being organized. • Health officer shall inform higher officials concerned with the fair/festival
2.	Notification of fairs and festivals	• Notification (by govt. order or otherwise) should specify ➤ The area and duration of the fairs/ festivals ➤ The limits of the area where fairs/ festivals are to be organized should be well defined • Also, festival tax if any being levied by the govt. on vehicles, travellers, etc should be notified. The Govt. should also notify how much tax will be levied
3.	EHS Arrangements	• The site should be demarcated and preparation of the site be done. • Site should be cleaned and drained properly • Roads should be aligned properly • Water sprinkling should be done periodically to avoid dust nuisance. • Sufficient numbers of dustbin container should be placed (Wet & Dry) • Water sufficient in quality and quantity fit for drinking and cooking should be arranged. Also facilities for safe storage of water can be made. • To practically possible extent, accommodation to the pilgrims and visitors be made. • Adequate lighting arrangements be made. • Wholesome food should be made available at reasonable price and yet of necessary quantities. Foods prepared/ offered/ stored has to be properly supervised. • All the food preparation should be hygienic. • Refuse, rubbish, sewage should be collected, removed and disposed off safely. • Suitable latrines should be arranged and maintained • Infectious cases if any should be detected early and segregated. Preventive measures should be started. • Adequate medical staff, medical relief, hospital accommodation be provided. • Any other service deemed necessary can be arranged for. • Health officer be given adequate powers to seize private buildings, private water supply like wells, etc. Same should be informed to public to prevent protest. • There should be good approach to the road. • Sweepers in ratio of 1 per 1000 pilgrims be appointed. • Temporary hospital be set up for management of any infections. District health officer should stay at the site of fair and festival.
4.	Promoting COVID appropriate Behaviour.	• Avoiding physical contact is a responsible behaviour as it prevents the spread of COVID-19 disease and other viruses. • Physical distance Should be maintained minimum 6 feet • Avoid Touching Eyes, Nose and Mouth / Maintain respiratory hygiene / Wash hands frequently and thoroughly