

Initial Environmental Examination

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

Jodhpur Wastewater Works

CURRENCY EQUIVALENTS

(as of 16 February 2023)

Currency unit	–	Indian rupee (₹)
₹1.00	=	\$ 0.01
\$1.00	=	₹ 82.76

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
CTO	–	Consent To Operate
DBO	–	Design-Build-Operate
DPR	–	Detailed Project Report
EHS	–	Environmental Health and Safety
EIA	–	Environmental Impact Assessment
FCO	–	Fertilizer Control Ordinance
FSSM	–	Faecal Sludge and Septage Management
IEE	–	Initial Environmental Examination
IFC	–	International Finance Corporation
JoDA	–	Jodhpur Development Authority
LSGD	–	Local Self Government Department
MOEFCC	–	Ministry of Environment, Forest and Climate Change
NNJ	–	Nagar Nigam Jodhpur (Municipal Corporation Jodhpur)
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
SEIAA	–	State Environmental Impact Assessment Authority
SPS	–	Safeguard Policy Statement, 2009
STP	–	Sewage Treatment Plant
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	–	kilolitre
km	–	kilometre
kmph	–	kilometre per hour
KLD	–	kilolitres per day
ha	–	hectare
HP	–	horsepower
LPCD	–	liters per capita per day
lps	–	liters per second
m	–	meter
mg	–	milligram
mm	–	millimetre
MCM	–	million cubic meter
MLD	–	million litres per day
km ²	–	square kilometre

NOTE

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

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Appendix C1 – C25 – 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 livability 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, livability 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.

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

- **Sewerage.** New sewage treatment plant (STP) 5 MLD; Treated Effluent Elevated Reservoir (TEER), Treated Effluent Storage Reservoir (TESR); lines for disposal of treated effluents 850 m up to Jojri river; New Sewerage Pumping Station (SPS) 6.5 MLD; Total Sewer Network Length- 255.89 km; including both new 113.4 km and replacement 142.53 km sewer networks; 3296 manholes and 19375 house sewer connections.

Screening and Categorization. assessment of potential impacts. Jodhpur 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 Jodhpur 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. Jodhpur is the second largest city of Rajasthan. It is located in the lower middle of the Thar Desert in western Rajasthan. Jodhpur is an historic city, most notable attractions are Mehrangarh Fort which overlooks the city, Umaid Bhawan Palace, Jaswant Thada, and the Ghanta Ghar, or Clock Tower. There are several other places of interest in and around the town. The subproject sites are located in existing road right of way (RoW) and government-owned lands. Proposed SPS and STP will be constructed on vacant government lands. There are no trees on the site and is surrounded mostly by agricultural areas. On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are 5 houses and commercial building. The STP will be located at the farthest possible point from the habitation, required land for STP is only 4500 sq. m against available land of 32400 sq m, therefore adequate buffer can be maintained The site is surrounded by railway line at one side and Highway on other side. Nearest wildlife protected area is Gudha Vishnoiyan Conservation Reserve, which is about 10-12 km in southeast of the City.

No interference with forest resources, as STP will be built within the proposed STP site. Some networks are proposed near protected monuments and nearest proposed network is 100 m from Mehrangarh fort, a state protected monument and 781 m from ASI protected Mandore Fort. There are also some old/heritage buildings in old town area of Jodhpur, which are not notified or protected, but are part of local heritage. No works are located within these, sewerage networks are proposed along the roads along which some of these buildings are located.

Potential Environmental Impacts and Mitigation measures. In this draft 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 5 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. Various measures suggested including site sensitive design, provision of green buffer within the STP site, etc.

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. Sewer rehabilitation / replacement works may present harmful working conditions. 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. There are some gaps

in regulatory compliance at existing STP identified in the environmental audit. Consent to operate (CTO) from Rajasthan Pollution Control Board (RPCB) needs to be obtained.

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 11 places along with proposed alignment with about 117 persons (91 male and 26 females) from December 2021 to February 2022 and meetings was conducted with local councillors and habitant of STP nearby area, in month of January and February 2023 with about 39 persons. A City Level Committee (CLC) was held and CLC has appreciated and approved the subproject. The IEE will be made available at public locations; this draft IEE will be disclosed to a wider audience via the ADB and RUDSICO websites. Consultation process will continue during project implementation. A grievance redress mechanism (GRM) will be 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 Jodhpur will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of Jodhpur 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 fresh water 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. This IEE needs to be updated during the detailed design,

reviewed and approved by ADB, and disclosed prior to start of construction. PMU needs to ensure that CTO is obtained for existing STP.

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 livability 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, livability 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. **Jodhpur 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.

C. Scope of IEE

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

D. Report Structure

7. 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

8. Jodhpur is the second largest city of Rajasthan. It is located in the lower middle of the Thar Desert of Western Rajasthan and is about 280 Km from Indo-Pak border and is situated at

26°18'North latitude and 73°01'East longitude. It has an altitude of 242 meters above mean sea level (amsl) at Railway Station, with Fort being much higher at about 367.83 meters amsl and the old city between 245 to 325 meters amsl. The outer city area lies at about 210-255 meters amsl.

9. The city of Jodhpur was founded in 1456 A.D. by Rao Jodha. Jodhpur, the past capital of Rathore clan of Rajput's, is an oasis in the desert. The city itself is in complete contrast to the surrounding country both in sudden appearance of hills and ridges and the presence of a large number of water bodies.

10. The city which originally had about 5.0 sq. km area within the city wall, covered more than 50 sq. km in 1972 and presently expanded to some 281 sq. km with a potential to grow in about 321 sq. km by the year 2023. Expansion of city towards the north and west is restricted because of hill ranges and in south-east due to defence establishments.

B. Existing Conditions of the Town

1. Water Supply

11. The major source of drinking water for Jodhpur is the water supply system being operated by Public Health Engineering Department (PHED), which is connected from Kayalana Lake. The PHED takes care of the water supply in the town. The present water supply capacity in the town is 110-120 litres per capita per day. The quality of the water supply at Jodhpur has been tested periodically and the recent test results show that it is of acceptable quality as per national drinking water quality standards, IS 10500 (2012).

2. Drainage System

12. The existing storm water drainage system in Jodhpur comprises of about 13 major drains with Jojari River as the ultimate catchment. The city has a natural system of surface drainage, comprising primary drains (natural channels), secondary drains (mostly artificial drains) and tertiary drains (mostly roadside drains). The entire city drains towards Jojari River which is a non-perennial river and flows from north-east to south-west of the city. For the purpose of storm water drainage system and depending upon the natural surface topography, Jodhpur City is divided into four master drainage districts; namely: Pal, Punjala, Jhalamand and Industrial Zone.

3. Sewerage System

13. Jodhpur city has an existing sewerage, but it does not cover the entire city and adjoining newly developed areas. Currently, there is approx. 1,780 km aggregate length of sewer networks that exist in Jodhpur city. The sewerage network of the walled city is more than 30 years old. Some of the sewer lines are as old as 75 years. Most of the area have a minimum sewer pipe size of 150 mm diameter, while some areas have sewer pipe size of 100 mm diameter which is difficult to maintain. Nagar Nigam Jodhpur is facing daily chocking and overflowing of sewage from manholes in Jhalamand, Pal and Punjala areas of Jodhpur city.

14. At present, there are two STPs of 50 MLD capacity each (total 100 MLD) that are located in Salawas area, and one STP (WSP Technology) of 20 MLD capacity that is located in Nandri. Considering the big area of city, some of the areas are still not covered under sewerage system. Therefore, untreated wastewater and septic tank effluent from uncovered areas are discharged into open drains and accumulated in the low-lying areas in the outskirts of the town. The STP (20

MLD) in Nandri is planned for upgrading to meet the latest effluent standards. In the absence of a safe collection and disposal system for sewage, the people of these areas of Jodhpur city are facing unhealthy and unhygienic environmental conditions therefore public representatives are also demanding improvements in sewerage system of uncovered areas on priority basis.

15. Currently, other STPs are under construction in Jodhpur town, with funding from Nagar Nigam Jodhpur and Jodhpur Development Authority. These are the STP Vivek Vihar (15 MLD), STP Basni Benda (40 MLD), and STP Uchiyada (10 MLD).

Figure 1: Existing Sewerage System of Jodhpur Town

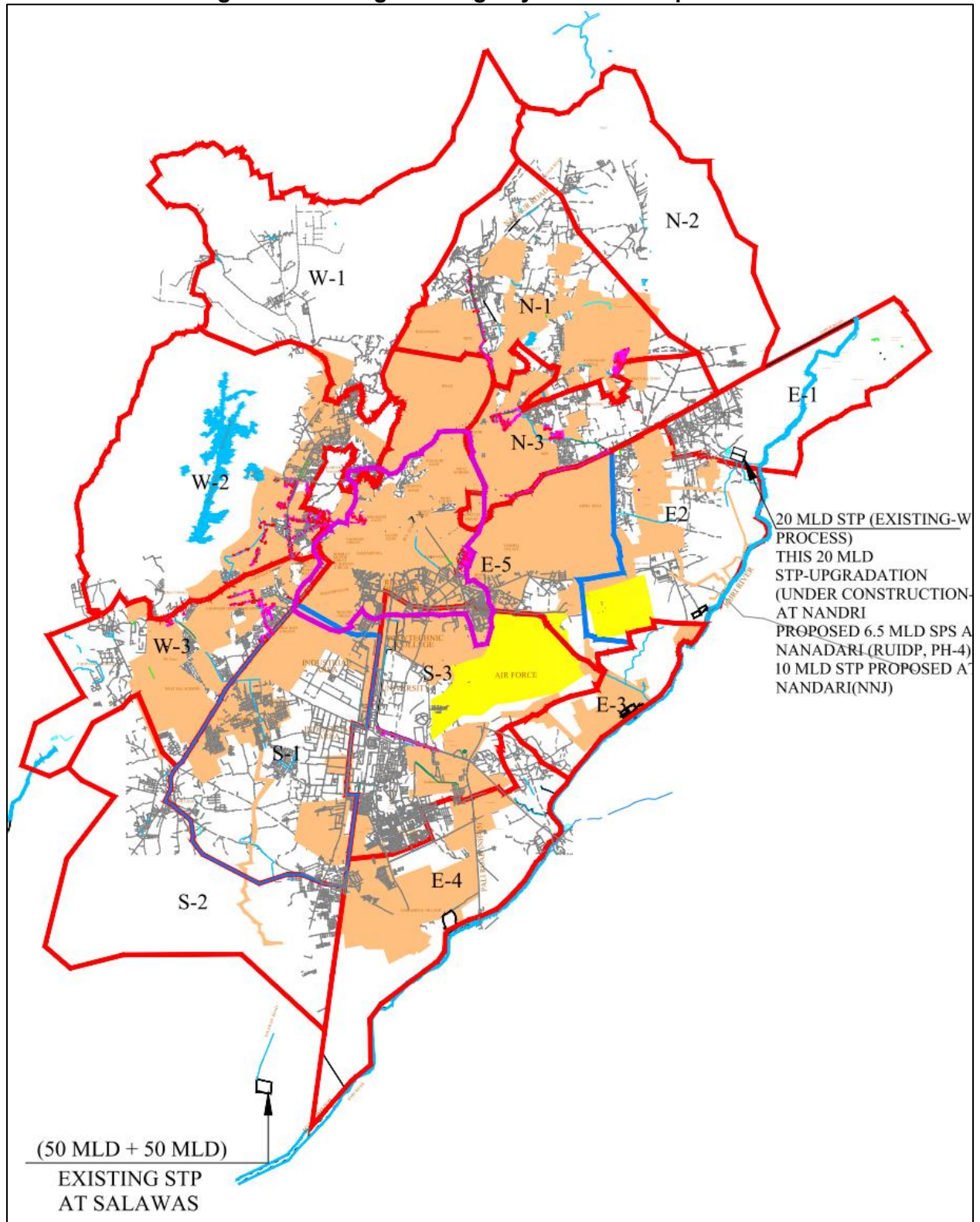


Table 1: Zone wise Current and Planned STPs

	Design capacity	Current sewerage volume (MLD)	Coverage of Sub Zone
Existing STPs Zones in Jodhpur			
Salawas STP	100 MLD	60 MLD	W-2, W-3, S-1, S-2 & S-3
Nandri STP	20 MLD	20 MLD	E-1, N-1 & N-3
Under construction			
Basni Benda STP (under construction using state fund)	40 MLD		E-3 & E-5
2 nd Phase of Nandri STP (under construction using state fund)	20MLD		E-1, N-1 & N-3
Vivek Vihar STP (under construction using state fund)	15 MLD		E-4
Proposed or planned			
Khokhariya STP (proposed under this subproject - RSTDSP-AF)	5 MLD		N-2
Uchiyada STP (proposed using state fund)	10 MLD		E-2
Goylo Ki Dhani STP (proposed using state fund)	2 MLD		W-1

(Source: detailed project report 2022)

C. Proposed Sewerage Infrastructure in Jodhpur under RSTDSP-AF

16. For the subproject, a sewerage system is proposed covering different areas of Jodhpur city to collect, treat, and dispose/reuse the domestic wastewater safely. The objectives of the proposed sewerage system are:

- (i) To strengthen the sewerage network through replacement of old/problematic sewer line, laying new sewers, construction of manholes and collection of wastewaters from point of generation;
- (ii) To construct energy efficient and mechanized STP and SPS;
- (iii) To provide for reuse of treated effluent, etc.; and
- (iv) To ensure sustainability of the subproject by implementing a comprehensive asset management plan focusing on an integrated approach to O&M to minimize lifecycle costs.

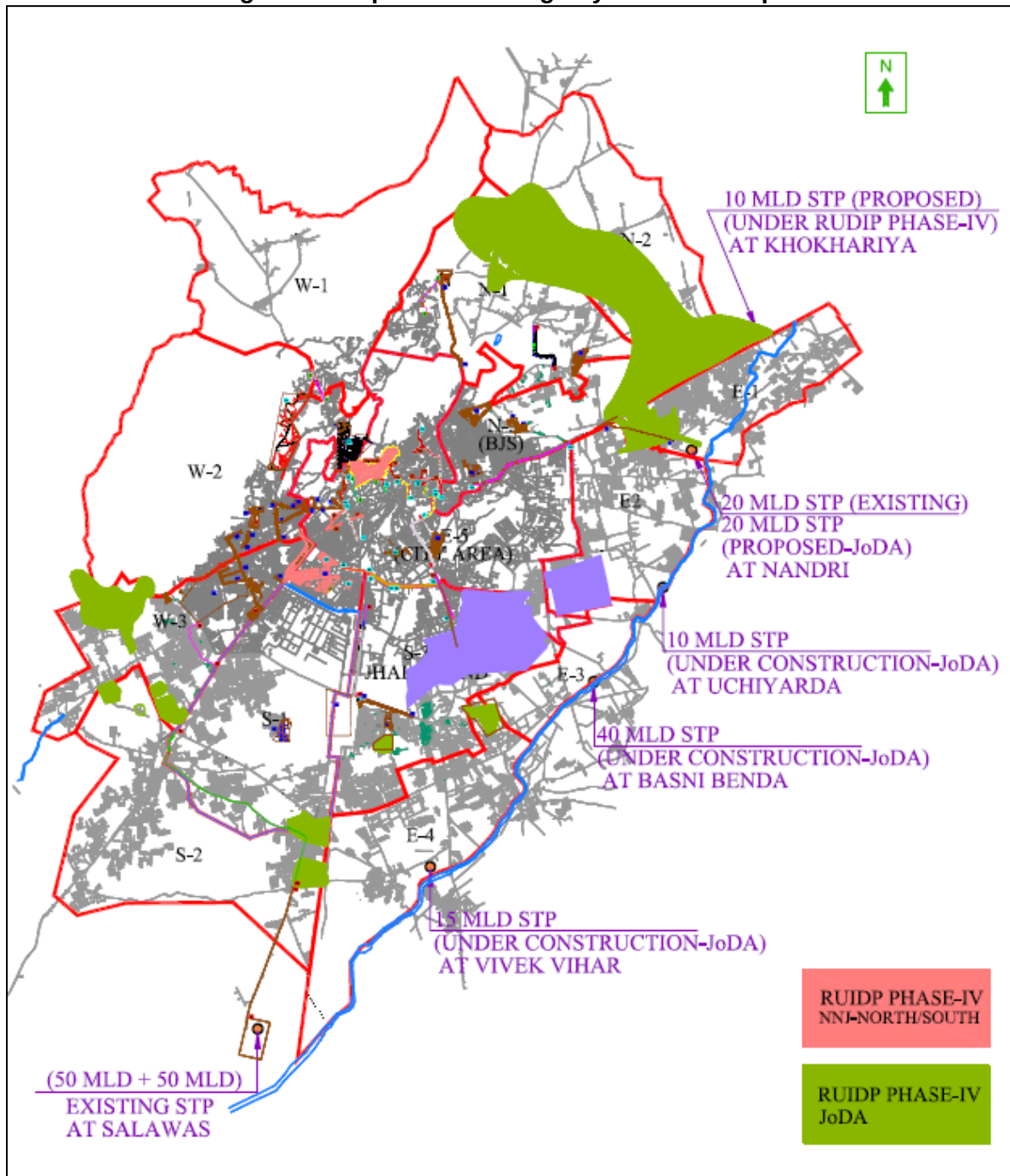
17. Sewer network includes rehabilitation works in currently covered areas and new network in uncovered areas. Project will rehabilitate 113 km of existing sewers and provide 155 km of new sewers in currently uncovered areas. Table 2 and Table 3 present the nature and size of the various civil works components of this sewerage subproject in Jodhpur.

Table 2: Proposed Scope of Work in Jodhpur Town

Component	Function	Description	Location & Ownership
House Sewer Connections	They connect the house to sewers in the road.	Total 19,375 nos. of house sewer connections are proposed to be done	Location: Entire City Ownership: Jodhpur Nagar Nigam
Manholes	Used as an access point for an underground public utility, allowing inspection, maintenance, and system upgrades	Total 3,296 nos. of various types of manholes proposed in the sewer network.	Location: Entire city area Ownership: Jodhpur Nagar Nigam
Sewer Collection networks	Collect wastewater from houses and convey by a combination of gravity and pressure pumping to pumping station and ultimately to the STP	Total Sewer Network Length- 255.89 Km A. Under Nagar Nigam Jodhpur (NNJ) areas- Total sewer network- 123.99 km 1. Replacement including augmentation of sewer- 98.9 km 2. Pipe bursting- 3.21 km 3. Cured in Place Pipe (CIPP)- 10.41 km (out of which 1.80 km in trenchless) 4. New sewer- 11.47 km B. Under Jodhpur Development Authority (JoDA) areas- (new sewers) -109.90 HDPE PE-100 PN-6 (laying with Trenchless Method)-5.44 km	Location: within existing ROW of different city roads Ownership: NNJ/JoDA
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 1 nos. of SPS (6.5 MLD) is proposed	Location: E-1 Zone, Nandri, existing STP (20 MLD) campus Ownership: NNJ- location is confirmed
Sewage Treatment plants (1 no)	Treatment of collected wastewater to meet stipulated discharge standards	Construction of 1 no. of STP (5 MLD)	Location: Khokhariya Ownership: JoDA

18. The coverage of the proposals includes interventions in municipal areas managed by NNJ as well as outskirts being managed by Jodhpur Development Authority. These are names as Nagar Nigam- North, Nagar Nigam-South and JoDA. JoDA proposals are further termed as N-1, N-2, E-1, E-4, S-1, SE, W-3 and West and shown in Figure 2.

Figure 2: Proposed Sewerage System of Jodhpur town



D. Proposal for zones under Nagar Nigam

19. The project is designed for rehabilitation and augmentation of old/damaged existing sewerage system, replacement of undersized pipes and missing links, and construction of new sewerage system in other developed colonies in Jodhpur city. The sewerage network design is proposed for design lifetime of 30 years period or up to 2055.

20. Table 4 shows the proposed rehabilitation/ augmentation (112.53 km) of existing sewers and Table 5 shows new networks proposed under the jurisdiction of Jodhpur Nagar Nigam.

Table 4: Proposed Rehabilitation/ Augmentation of Existing Sewers under Nagar Nigam Jodhpur

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
1	Education Office to Ratanada Circle	Cured-in-place pile (CIPP) by Trenchless	900	1.80	North	E-5 (City)	Basni Benda
2	Magra	CIPP	600	1.79	North	N1	Nandari
3	Fatehpole to Jalori gate	Pipe Bursting	300, 350	0.50	North	E-5 (City)	Basni Benda
4	Kandoi Bazar City Police Main Line	Pipe Bursting	300	0.33	North	E-5 (City)	Basni Benda
5	Balasamad	Pipe Bursting	250, 300	1.45	North	N1	Nandari
6	Soorsagar	Pipe Bursting	300 to 400	0.93	North	W2	Salawas
7	Saran Nagar ROB to Nandari	Replacement	1600	2.13	North	E1	Nandari
8	Chandani Chowk Line	Replacement	200	1.35	North	W2	Salawas
9	Dabbo Basti Road	Replacement by Trenchless	200	0.91	North	W2	Salawas
10	Dabhu Colony	Replacement	200	0.39	North	W2	Salawas
11	Gadhi Ashram Road	Replacement	200	0.57	North	E-5 (City)	Basni Benda
12	Internal Pratap Nagar	Replacement by Trenchless	200	1.10	North	W2	Salawas
13	Kaylana Road	Replacement by Trenchless	200, 250	1.02	North	W2	Salawas
14	Ram Dev Nagar (Basni Tamboliya)	Replacement by Trenchless	200 to 315	4.28	North	N1	Nandari
15	Shivanchi Gate to Pratap Nagar Main Road	Replacement by Trenchless	200, 315	1.10	North	E-5 (City)	Basni Benda
16	Tilak Nagar	Replacement by Trenchless	200	3.61	North	N1	Nandari

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
17	Bhandriyon Ki Pole	Augmentation & Rehabilitation by replacement	200	0.42	North	E-5 (City)	Basni Benda
18	Adjoining Area Fatehpole	Augmentation & Rehabilitation by replacement	200	1.43	North	E-5 (City)	Basni Benda
19	Adjoining Area J.N.Vyas Park Road	Augmentation & Rehabilitation by replacement	200	0.74	North	E-5 (City)	Basni Benda
20	Adjoining Area Kayaston Ki Ghati	Augmentation & Rehabilitation by replacement	200	0.25	North	E-5 (City)	Basni Benda
21	Amar Chowk Area	Augmentation & Rehabilitation by replacement	200	0.20	North	E-5 (City)	Basni Benda
22	Area Adjoining Lakhara Bazar	Augmentation & Rehabilitation by replacement	200	0.36	North	E-5 (City)	Basni Benda
23	Area Adjoining Chudi Bazar	Augmentation & Rehabilitation by replacement	200	0.18	North	E-5 (City)	Basni Benda
24	Area Adjoining Hada Bazar	Augmentation & Rehabilitation by replacement	200	0.55	North	E-5 (City)	Basni Benda
25	Area Adjoining Kandoi Bazar	Augmentation & Rehabilitation by replacement	200	0.25	North	E-5 (City)	Basni Benda
26	Area Adjoining Nath Ji Ka Marg	Augmentation & Rehabilitation by replacement	200	0.58	North	E-5 (City)	Basni Benda
27	Area Tripoliya Bazar	Augmentation & Rehabilitation by replacement	200	0.22	North	E-5 (City)	Basni Benda
28	Brahmpuri	Augmentation & Rehabilitation by replacement	200	1.49	North	E-5 (City)	Basni Benda
29	Bundo Ka Mohalla	Augmentation & Rehabilitation by replacement	200	0.73	North	E-5 (City)	Basni Benda
30	Chand Bari	Augmentation & Rehabilitation by replacement	200	1.01	North	E-5 (City)	Basni Benda
31	Chandpole Area	Augmentation & Rehabilitation by replacement	200	0.46	North	E-5 (City)	Basni Benda
32	Chune ki Chowki Brahmpuri	Augmentation & Rehabilitation by replacement	200	0.47	North	E-5 (City)	Basni Benda
33	Dargah sayyad Asgar Ali	Augmentation & Rehabilitation by replacement	200	0.02	North	E-5 (City)	Basni Benda

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
34	Dodidaron Ka Mohalla	Augmentation & Rehabilitation by replacement	200	0.60	North	E-5 (City)	Basni Benda
35	Gol Mehro Ka Bas	Augmentation & Rehabilitation by replacement	200, 250	2.41	North	E-5 (City)	Basni Benda
36	Gol Nadi Purvion ka Bas& Krishna Chowk Area	Augmentation & Rehabilitation by replacement	200, 250	1.60	North	E-5 (City)	Basni Benda
37	Harijan Basti & Gol Mehro Ka Chowk	Augmentation & Rehabilitation by replacement	200	1.49	North	E-5 (City)	Basni Benda
38	J.N.Vyas Park Road	Augmentation & Rehabilitation by replacement	200	0.13	North	E-5 (City)	Basni Benda
39	Lakhara Bazar	Augmentation & Rehabilitation by replacement	200	0.12	North	E-5 (City)	Basni Benda
40	Lakharon Ki Harijan Basti	Augmentation & Rehabilitation by replacement	200	1.01	North	E-5 (City)	Basni Benda
41	Laykan Mohalla	Augmentation & Rehabilitation by replacement	200	1.93	North	E-5 (City)	Basni Benda
42	Makrana Mohalla	Augmentation & Rehabilitation by replacement	200	0.06	North	E-5 (City)	Basni Benda
43	Mehron Ka Chowk	Augmentation & Rehabilitation by replacement	200	0.18	North	E-5 (City)	Basni Benda
44	Mehta Market Area	Augmentation & Rehabilitation by replacement	200	0.22	North	E-5 (City)	Basni Benda
45	Naiyon Ka Mohalla	Augmentation & Rehabilitation by replacement	200	1.27	North	E-5 (City)	Basni Benda
46	Naya Bas	Augmentation & Rehabilitation by replacement	200	0.49	North	E-5 (City)	Basni Benda
47	Saraffa Bazar	Augmentation & Rehabilitation by replacement	200, 250	0.15	North	E-5 (City)	Basni Benda
48	Sewagon Ka Mohalla	Augmentation & Rehabilitation by replacement	200	1.25	North	E-5 (City)	Basni Benda
49	Singhaviyon Ka Mohalla	Augmentation & Rehabilitation by replacement	200	0.52	North	E-5 (City)	Basni Benda
50	Surya Colony	Augmentation & Rehabilitation by replacement	200	0.71	North	E-5 (City)	Basni Benda

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
51	Sutarkhana Mohalla	Augmentation & Rehabilitation by replacement	200	1.30	North	E-5 (City)	Basni Benda
52	Sangariya to Salawas	CIPP	1600	1.00	South	S2	Salawas
53	Pal To Sangariya	CIPP	900	1.00	South	S1	Salawas
54	Peepali Choraha	CIPP	600	1.82	South	W3	Salawas
55	Bhagat ki khoti	CIPP	500 & 600	3.00	South	S-3 (Jhalamand)	Salawas
56	Sindhi Muslim Basti (Pal Road)	Replacement	200	0.52	South	W3	Salawas
57	Shiv Basti	Replacement by Trenchless	200	0.16	South	W3	Salawas
58	Rajeev Gandhi Colony	Replacement	200 to 315	2.94	South	W3	Salawas
59	Jyoti Nagar	Replacement by Trenchless	200	0.42	South	W3	Salawas
60	Kamla Nehru Nagar	Replacement	200	0.73	South	W2	Salawas
61	Ganeshpura & Patel Nagar	Replacement	200 to 300	4.35	North	E-5 (City)	Basni Benda
62	Gayatri Nagar (W-10)	Replacement	200	0.25	South	W2	Salawas
63	Central Academy School	Replacement by Trenchless	200 to 315	4.43	South	W2	Salawas
64	Shastri Nagar Area	Replacement by Trenchless	200 to 400	20.93	South	S-3 (Jhalamand)	Basni Benda
65	Vidhya Nagar (W-78)	Replacement by Trenchless	200	0.62	South	N-3 (BJS)	Nandari
66	Vishnu Nagar (W-78)	Replacement by Trenchless	200, 300	1.62	South	N-3 (BJS)	Nandari
67	Vishnu Colony (W-10)	Replacement by Trenchless	200	0.62	South	W2	Salawas
68	Barlo ka Chowk to Umed Chowk to Cycle Market	Upgradation by replacement existing damaged sewer lines	200 to 300	0.64	North	E-5 (City)	Basni Benda
69	Gaglov Talab Main Road to Swanchi Gate to Sanichar Ji ka Than to Sardarpura to Targhar	Upgradation by replacement existing damaged sewer lines	200, 300, 315, 400, 500	2.33	North	E-5 (City)	Basni Benda

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
70	Cycle Market to Hathi Ram Ka Odha to Bamba to Stadium	Upgradation by replacement existing damaged sewer lines	200, 500, 600, 630	0.88	North	E-5 (City)	Basni Benda
71	Kaga to Nagori Gate to Khat Singh Ji ka Bangla to Raika Bagh	Upgradation by replacement existing damaged sewer lines	200 to 630	2.45	North	E-5 (City)	Basni Benda
72	Rai ka Bagh Railway Track to Education Office	Upgradation by replacement existing damaged sewer lines	630 to 800	0.88	North	E-5 (City)	Basni Benda
73	Suchana Kendra to Rai ka Bagh Foot Bridge to Ummed Club Circle	Upgradation by replacement existing damaged sewer lines	200, 500	0.88	North	E-5 (City)	Basni Benda
74	Manak Chowk to Sojti Gate	Upgradation by replacement existing damaged sewer lines	250, 315	0.22	North	E-5 (City)	Basni Benda
75	Manihar Girl Se. Sec. School Road (Geeta Bhawan Road)	Upgradation by replacement existing damaged sewer lines	200, 250	0.84	North	E-5 (City)	Basni Benda
76	Medti Gate to Udai Mandir to Paota Circle	Upgradation by replacement existing damaged sewer lines	200 to 350	0.61	North	E-5 (City)	Basni Benda
77	Internal Line of Udai mandir to Paota	Upgradation by replacement existing damaged sewer lines	200	0.27	North	E-5 (City)	Basni Benda
78	Samvit Circle to Air Force Circle	Upgradation by replacement existing damaged sewer lines	450, 600	0.65	South	S-3 (Jhalamand)	Salawas
79	Riktiya Bhairu to Sanvit Circle	Upgradation by replacement existing & damaged line	450, 500	1.94	South	S-3 (Jhalamand)	Salawas
80	Medical Collage to Riktiya Bheru ji	Upgradation by replacement existing damaged sewer lines	630	0.87	South	S-3 (Jhalamand)	Salawas
81	New Airport Road Area	Upgradation by replacement	600	0.39	South	S-3 (Jhalamand)	Salawas

S. No.	Proposed Line	Nature of Work	Sewer Dia (mm)	Sewer Length (Km)	MCJ Area	Sub Zone	STP Zone
		existing damaged sewer lines					
82	Shani Bhagavan Mandir to Jalori Gate	Upgradation by replacement existing damaged sewer lines	200, 250	0.41	North	E-5 (City)	Basni Benda
83	Sindhi Colony	Upgradation by replacement existing damaged sewer lines	200, 250	5.36	South	S-3 (Jhalamand)	Salawas
84	Sardarpura 5th Road	Upgradation by replacement existing damaged sewer lines	200	0.44	North	E-5 (City)	Basni Benda
		Total length of Sewer line		112.53			

Table 5: Proposed New Sewer Lines under Nagar Nigam Jodhpur

S. No.	Proposed Line	Sewer Dia (mm)	Sewer Length (Km)	NNJ Area	Sub Zone	STP Zone
84A	Raj Clinic to Nagori Gate	300	0.33	North	E-5 (City)	Basni Benda
85	Railway Hospital	200	2.04	South	E-5 (City)	Basni Benda
86	Military Hospital Tiraha	200, 450, 500	3.19	South	N-3 (BJS)	Nandri
87	Rawat Ram Nagar	200	0.63	South	W3	Salawas
88	Kamla Nehru Colony (Shastri Nagar)	200	1.10	South	W2	Salawas
89	RPTC to Mandore Police Chowky	400	2.67	North	N1	Nandri
90	Basni PHED Office to AFRI office	600	1.51	South	S-3 (Jhalamand)	Salawas
	Total		11.47			

E. Proposal for zones under Jodhpur Development Authority (JoDA)

21. The project area under JoDA was divided into 4 zones, namely East zone, West zone, South zone and North zone. The East zone lies between Jaipur Road and Pali road. The general slope of the area in East zone has a slope ratio of 1 in 200. The area is draining from Northwest to Southeast direction towards Jojari river. South zone lies between Pali Road and Pal road. The general slope of the area in South zone has a slope ratio of 1 in 350. The area is draining from Northeast to Southwest direction. North zone lies between Nagore road and Jaipur Road. The general slope of the area is 1 in 200. The area is draining from North direction to East direction. West zone lies between Nagore road and Pal Road. The general slope of area has a slope ratio

of 1 in 150. The area is draining from Northeast to Southwest direction. All four zones have further been divided into sub-zones as E-1, E-2, E-3, E-4; W-1, W-2, W-3; N-1, N-2 and S-1, S-2.

Table 7: Details of zone wise STP and sewer generation

Table 1: Details of Zone Wise STP and Sewer generation									
STP Location	Existing	STP Capacity (MLD)				Sewage Generation (MLD)			Covera ge of Sub Zone
		Under Constructi on (JoDA)	Propos ed (plannin g stage)	Propose d under this project	Tot al	Curre nt	Addition al through this project	Total upon completi on	
STP zones linked with proposed subproject									
Salawas	100				100	60	1.77	61.77	W-2, W-3, S-1, S-2 & S-3
Nandri	20 (+20 current upgradin g)		20 (see note 1)		40	20	2.52	22.52	E-1, N-1 & N-3
Basni Benda		40			40		1.0	1.0	E-3 & E-5
Vivek Vihar		15			15		1.07	1.07	E-4
Khokhari ya				5 (see note 2)	5		0.97	0.97	N-2
Note 1. JODA/ Nagar Nigam Jodhpur is planning to propose new STPs at Nandri to treat additional quantity of sewer generated in this Zone under other Government scheme									
Note 2. The STP at Khokariya is proposed based on proposed catchment area under Jodhpur development area.									

22. Considering the execution ease, availability of funds and priority the sewer network has been grouped and proposed into 8 subzones (E-1,E-4; West,W-3; N-1,N-2 and S-1 and S-E)

23. Details of subzones and the proposed sewer lines under JODA area have been presented in Table 8.

Table 8: Details of Subzones and Proposed Sewer under JODA

S. No.	Proposed Sewer Lines	Sewer Dia (mm)	Sewer Length (km)	Sub Zone	STP Zone
1	Nandri Area, Ramjan ji ka hatha, Dhapi Marbale and near about area Etc.	200, 250, 300, 350, 450 & 500	32.7	E-1	Nandri

S. No.	Proposed Sewer Lines	Sewer Dia (mm)	Sewer Length (km)	Sub Zone	STP Zone
2	Adarsh Nagar, Vayu vihar, Partap naira ,Keshav nagar, Majisa mandir, Lal nagar,Babu nagar, Hajari nagar,Hanuman nagar, Ketha nagar, Adarsh nagar-II, Jhalamnd area Etc.	200, 250 & 300	10.18	E-4	Vivek Vihar
3	Laying of main trunk line, Transport Nagar, Anganwa village, Barli Mandawata Etc.	200, 250, 300, 350, 450, 500, 600, 700 & 800	31.3	N-2	Khokhariya
4	Sangariya area, Bhomiji Nagar, New ganesh nagar, Mahaveer Nagar, Soho ki dhani Etc.	200 & 250	10.43	S-1	Salawas
5	Rajiv Nagar, Shiv Nagar, Khetaswar Nagar Etc.	200 & 250	7.04	S-E	Vivek Vihar
6	Prabhu parshwanth nagar, Aushi Nagar, Jai Nagar & Ashapurna Nagar	200 & 250	10.28	WEST	Salawas
	Total Sewer Length (Km)		101.9		

24. The sewer system will be designed as a separate sewer system that carries only the domestic wastewater. The open drain system that exists in the town will cater to storm runoff. No industrial wastewater will be allowed into the sewers.

25. Sewage Treatment Plant (STP). It is proposed that one 5 MLD STP based on sequential batch reactor (SBR) technology be constructed to treat the incoming sewage to stringent discharge standards specified in this IEE and included in the bid documents. SBR is a cyclic activated sludge treatment process and provides highest treatment efficiency possible in a single step biological process. This new STP will be constructed in Khokhariya.

26. Sewage Pumping Station (SPS). In addition, a 6.5 MLD SPS will be constructed in E-1 Zone, Nandri as integral part of the system. The collected house sewage in sewerage network will flow to three existing STPs in two locations (Salawas and Nandri) and to the proposed new STPs.

27. Disposal of Treated Wastewater: After treatment of wastewater at proposed STP located near Khokhariya village, regular monitoring of treated effluent shall be done. After meeting all national wastewater discharge standards, treated effluent shall be discharged into Jojari river which is located at about 850 meters distance from the proposed STP site. Location of STP and discharge point is shown in Figure-3.

28. Google Coordinates of proposed work sites are given in Table 9. Locations of project sites in google map, conceptual layout plans and alignments are shown in Figures 3 to 7.

Table 9: Coordinates of Subproject Locations

COMPONENTS	Latitude	Longitude
Proposed STP 5 MLD site	26°20'3.99"N	73° 8'2.52"E
Proposed SPS site 6.5 MLD	26°18'8.46"N	73° 6'51.54"E
Discharge Point of Treated Wastewater at Jojari River	26°20'15.61"N	73° 8'31.83"E

29. 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 Jodhpur; and
- (vii) Maintaining environmental norms at entire system components.

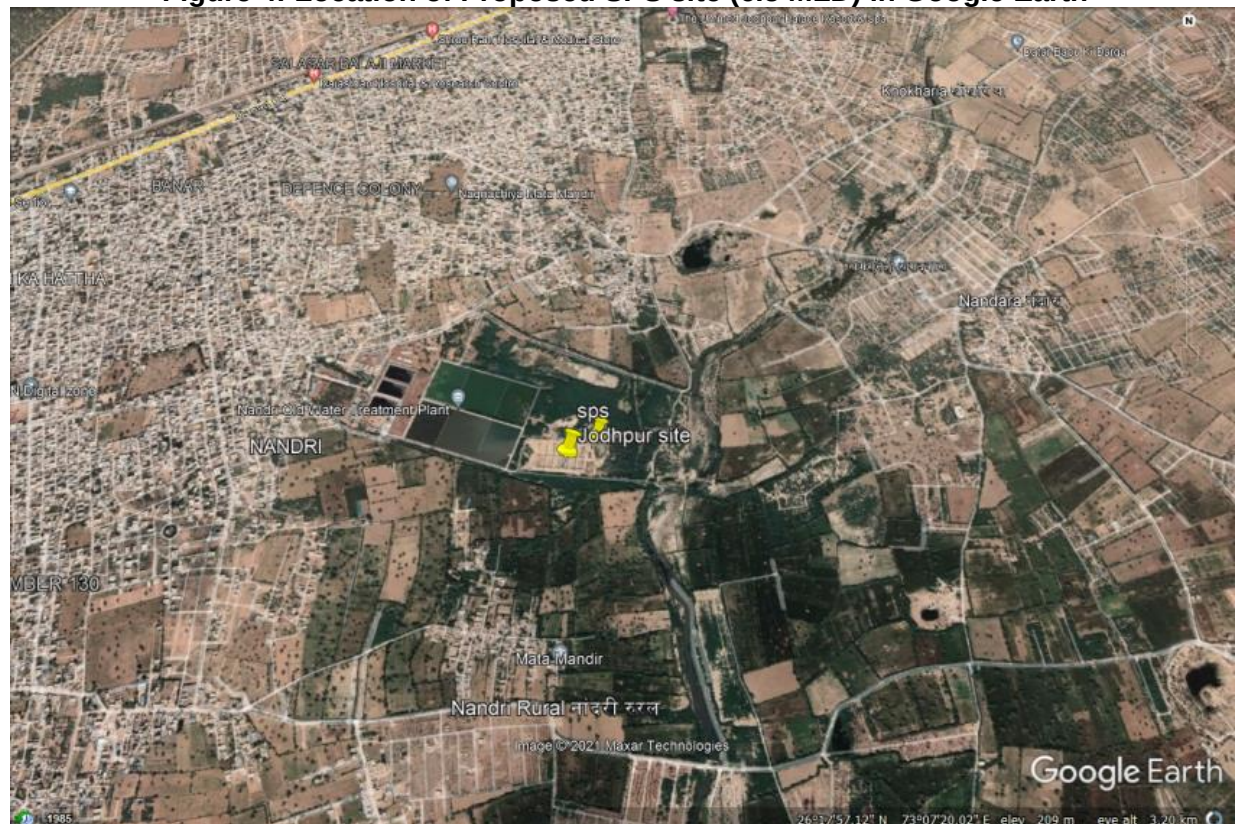


Figure 5: Layout of Proposed Sewerage Networks in Jodhpur Town

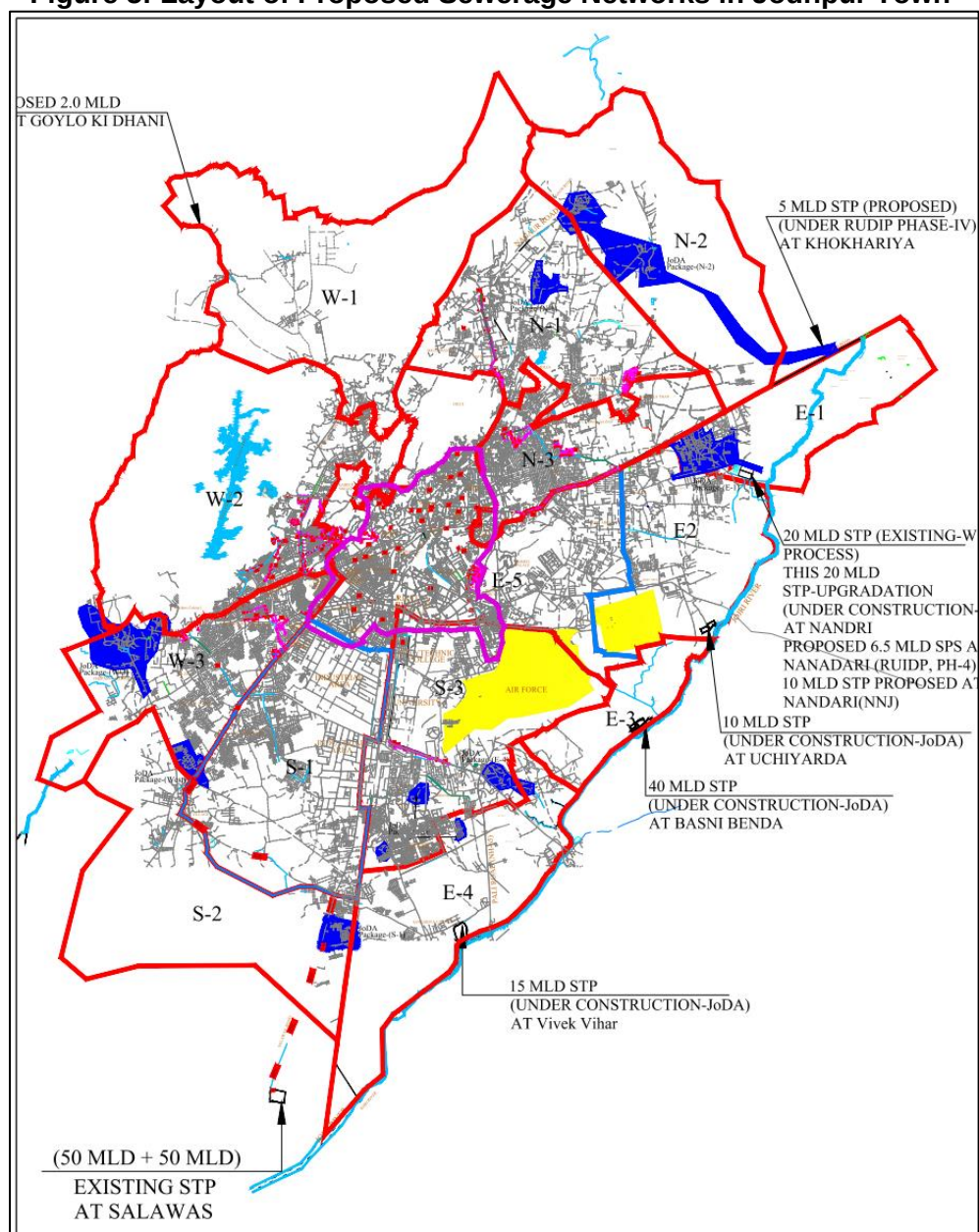
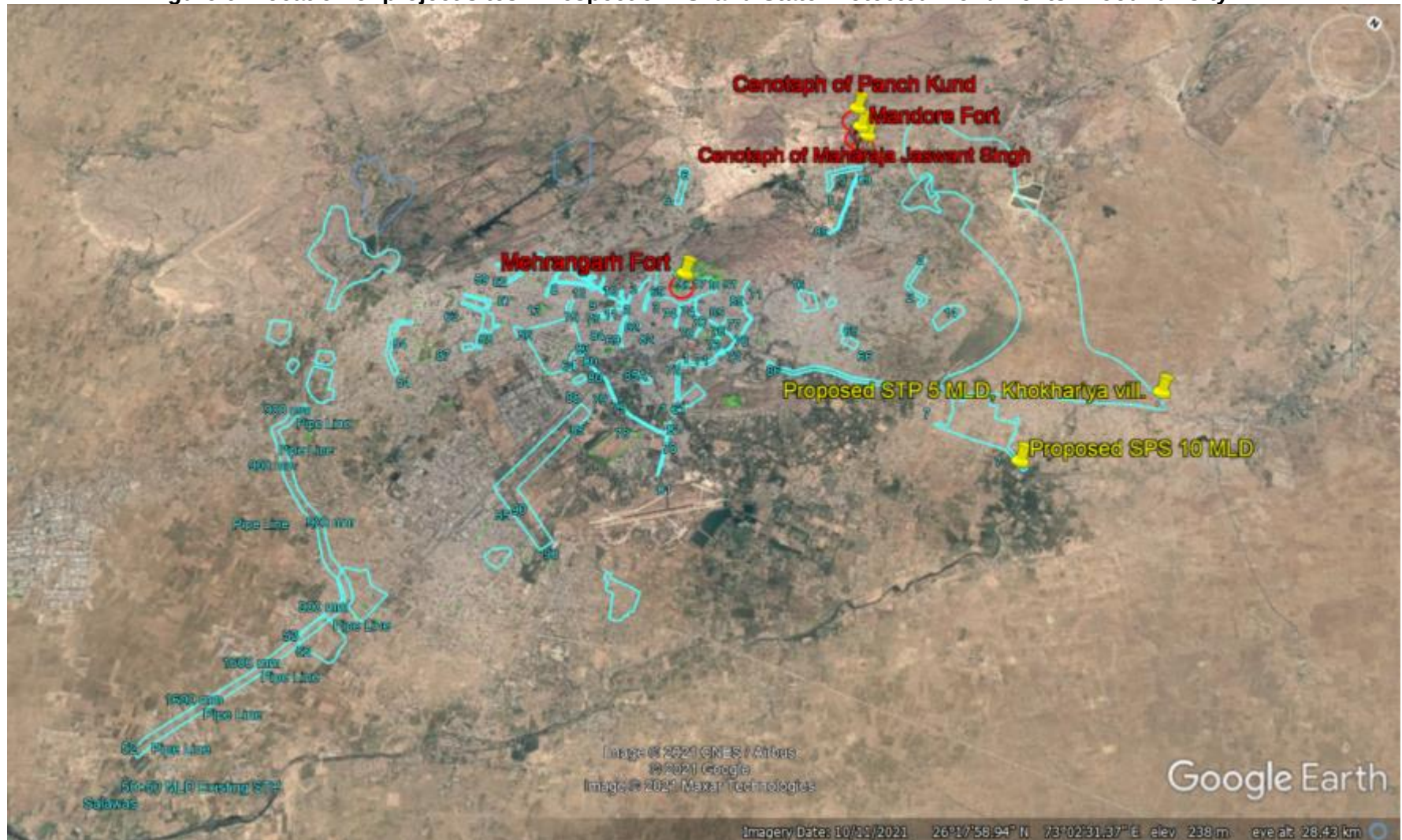
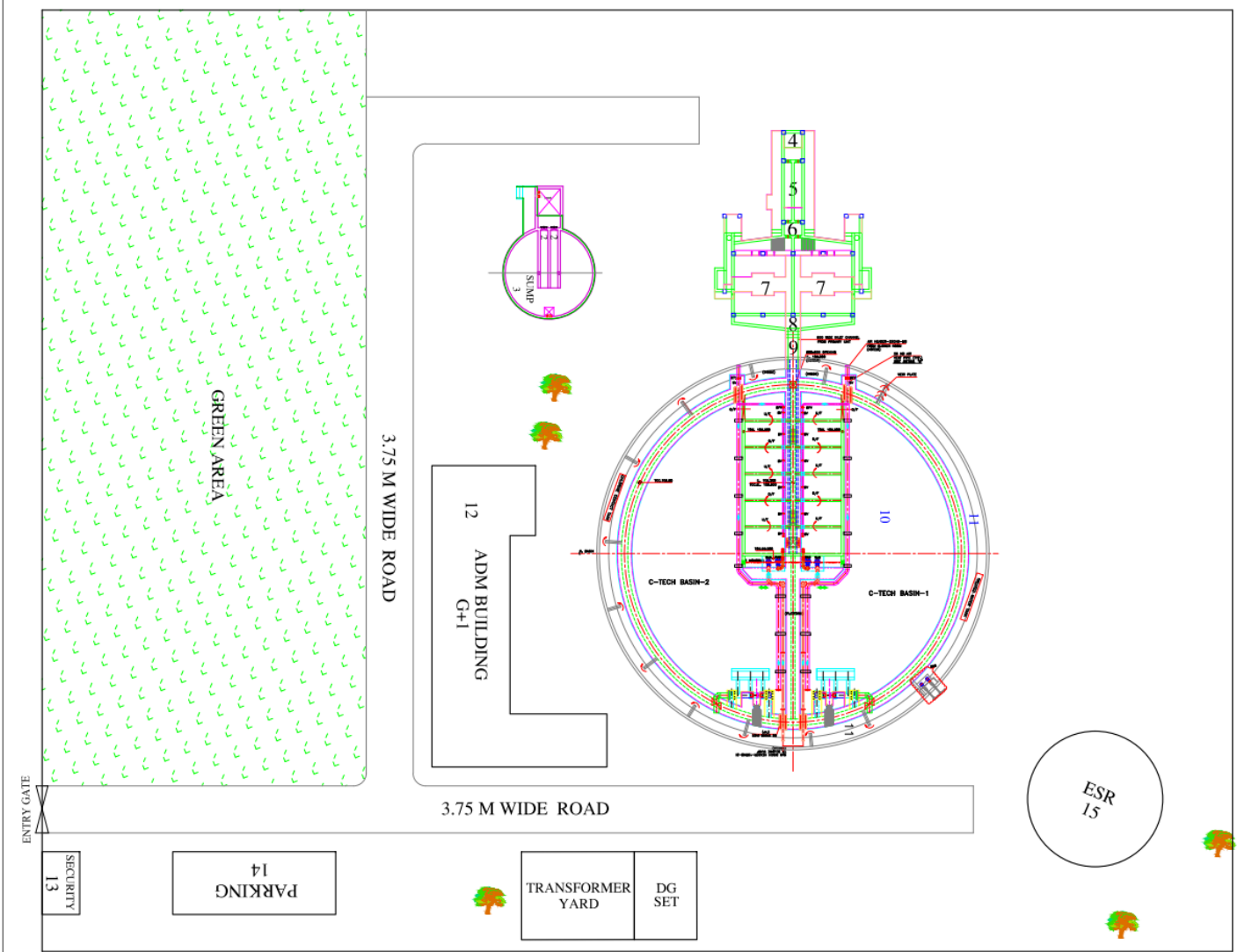


Figure 6: Location of project sites in respect of ASI and State Protected Monuments in Jodhur City



Note: Protected monuments are mentioned in yellow points and red circles are 300 m areas from protected monuments, sky blue areas are proposed for sewerage works (for details refer Appendix 5)

Figure 7: Layout of Proposed STP



F. Subproject Benefits

30. The subproject is primarily designed to improve environmental quality and living conditions of Jodhpur 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. .

31. The project will improve the efficiency of existing & new proposed sewer network, improve sanitary conditions within the city area, increase flow to avoid choking 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.

G. Implementation Schedule

32. Subproject is proposed for implementation 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 Jodhpur Municipal Corporation (Nagar Nigam Jodhpur-NNJ) and Jodhpur Development Authority (JoDA). Therefore, at this stage, subproject is designed only in outline, and the details of components of the subproject provided in the previous sections 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 2, and the IEE will be further updated during the detailed design phase.

33. After the completion of preliminary designs, bids were invited and contract awarded to successful bidder in the Month of July/August 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 NNJ/JoDA. DBO contractor is still carrying out detailed designs.

III. ANALYSIS OF ALTERNATIVES

34. 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 Jodhpur 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.

35. The proposed Sewerage subproject component in Jodhpur 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 10.

Table 10: Analysis of Alternatives

Type of alternative	'No project' alternative																																											
Description of alternatives	Jodhpur Sewerage subproject is proposed to improve the service levels of basic infrastructure. 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.																																											
	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> </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%
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 usages like flushing and gardening tertiary treatment required for high and usages like construction water, industrial usages, cooling water etc.	can only 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.	can only 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.	Can be used for low end 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	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	Highest treatment efficiency with crystal quality power requirement is 50% of conventional technologies land requirement

		mainly for large sized plants		requirement is also relatively small but depends on type of past treatment adopted	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><tr><td>Parameter</td><td>Standards</td></tr><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>Faecal Coliform (MPN/ 100 ml)</td><td>100 (permissible 230)</td></tr></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	Faecal Coliform (MPN/ 100 ml)	100 (permissible 230)
Parameter	Standards																		
BOD, mg/l	10																		
TSS, mg/l	20																		
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Faecal Coliform (MPN/ 100 ml)	100 (permissible 230)																		
2	Treated wastewater disposal																		
Type of alternative	Treated wastewater disposal – reuse applications																		
Description of alternatives	(i) 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 is proposed
3	Project Locations
Description of alternatives	Location of and Sewage Pumping Stations (SPS) and Sewage Treatment Plants (STPs): The site selection for these facilities mainly guided by technical feasibility, availability of suitable and adequate lands. 1. STPs location. Based on the technical feasibility of gravity flow system, sewerage system in Jodhpur is designed and optimized with one 5 MLD sewage treatment plant (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 selected site is away from dense habitations and surrounded by agricultural lands (no dense habitations within 500 m from STP site proposed at Khokhariya village). On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are residences (5 double-story buildings) and a business complex with 9 shops. The STP will be located at the farthest possible point from the habitation, required Land for STP is only 4500 sqm against available land of 32400 sqm, which is about 13 % of total available land. The site is surrounded by railway line at one side and Highway on other side .. As far as possible a 500 m distance from proposed STP from habitation is desirable, and also considering the selected superior and compact sewage treatment technology (SBR), the site which is selected, is suitable for the construction of STP and therefore no site alternative is considered. Sewer lines. Sewer pipes are proposed along the roads/streets in the city within the road right-of-way (ROW). Sewers will be mostly laid in the centre of the road, away from water pipes. SPS Location. Sewage pumping station of 6.5 MLD is proposed in vacant government land on the basis of drainage pattern of City, availability of government land with no other use, adequate land parcel, site away from habitation etc. There are no any dense habitations within 500 m. radius of proposed site, nearest habitation is about 400 m away from site, therefore this site is suitable for construction of proposed SPS and no site alternative is considered.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

A. ADB Safeguard Policy

36. 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.

37. 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.

38. The environmental impacts of Jodhpur 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 (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.

39. **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.

40. **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.

41. **Public Disclosure.** The IEE will be put in an accessible place (e.g., local government offices, libraries, community centres, 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.

42. **Consultation and Participation.** ADB SPS, 2009 requires borrower to conduct meaningful consultation¹ with affected people and other concerned stakeholders, including civil

¹ Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage

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

43. **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 risks and adverse impacts of the subproject.

44. **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.

45. **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.

46. **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.

47. **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.

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.

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.

48. **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.

49. **ADB SPS International Best Practice Requirements.** ADB SPS, 2009 requires that, during the design, construction, and operation of the project, the executing agency shall apply pollution prevention and control technologies and practices that are consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety (EHS) Guidelines. (IFC's General EHS 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

50. 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.

51. **Environmental assessment.** The Government of India EIA Notification of 2006 (replacing the EIA Notification of 1994) sets out the requirement for environmental assessment in India. This states that environmental clearance is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

52. **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

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>

if appropriate.

53. **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.

54. 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.

C. Environmental Regulatory Compliance

55. 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 11.

Table 11: 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	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	All phases of project

Law	Description	Requirement	Relevance to Project Phase
	resources, desertification and land degradation, forest and biodiversity, air quality, climate change: adoption and mitigation, mining, industry, 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	wastage, declining water availability, pollution. Relevant recommendations for the project include control of losses, integrated water resources management, 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	Projects indicated in the schedule of this notification require 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	Not applicable
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
Guidelines for compensatory tree plantation in RUIDP works – Circular 10 dated 13.04.2018	Official Guidelines for Compensatory tree plantation in RUIDP work	Subprojects involving tree cutting to follow guidelines setup in RUIDP's Circular – 10, for compensatory plantation, trees specification, post plantation care etc.	Construction and Operation

Law	Description	Requirement	Relevance to Project Phase
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 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.	Construction of one STP (5 MLD at Khokhariya) will require CTE (prior to start of construction works) and CTO (prior to start of operation) from Rajasthan State Pollution Control Board (RSPCB) under RSTDSP works. Rehabilitation works of STP (20 MLD at Nandri) will also be required to be obtained by Nagar Nigam Jodhpur 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
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	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
		from third party and submitted in PIU	
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 resources and knowledge to the country and the people.	Not Applicable	Not applicable
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.	Gudha Vishnoia Conservation Reserve is situated in Jodhpur at approx. 10 Km aerial distance from municipal boundary of Jodhpur. None of the components of the subproject are located near or 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-5 provides emission limits for vehicle exhaust and Appendix C-3 provides emission limits of DG sets and Appendix C-4 provided emission stack height	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
		requirements for diesel generators Appendix C-8 provides STP discharge standards	
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-6 provides applicable noise 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 starting construction or demolition or remodelling work, IV Large generators shall have environment management plan to	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. Sludge or any material if classified as hazardous waste / material is to be handled and disposed according to this Rules	Construction

Law	Description	Requirement	Relevance to Project Phase
	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 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	Contractor to comply all the requirements of this Act during construction works.	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
	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).	Mandore Fort is listed as ASI Protected Monument in Jodhpur City. No physical work is proposed near this site; Proposed SPS and STP sites are located at a distance of approx. 10 kms from Mandore fort therefore there will be no impact on the ASI protected monuments. The construction and maintenance of works meant for providing supply of water for public or the construction or provision for similar facilities for public are exempted from definition of construction in this act. List of ASI protected monuments in Jodhpur is given in Appendix 5 . Re-assessment will be required after confirmatory survey during pre-construction phase and if any proposed work is identified within core area or regulated areas of these monuments, permission from ASI will be required before start of construction works.	Construction
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	4 State protected monuments are listed in Jodhpur city (Appendix 5). Except some sewer networks (actual distance of network from protected monument will be	Construction

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-.	available only after final design), no other project components falls under core and regulated area of the protected monuments. Re-assessment will be required after confirmatory survey during pre-construction phase and for the 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 find.	
The Building and Other Construction Workers (BOCW) Act 1996 and Rajasthan Building and Construction Workers Rules 2009	Employer shall- 1. 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 2. Provide sufficient urinals and latrines at convenient place, easily accessible by workers 3. 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 4. Provide crèche with proper accommodation, ventilation, lighting, cleanliness and sanitation if more than fifty female workers are engaged 5. Provide first aid facilities in all construction sites For safety of workers employer shall provide- 6. Safe access to site and workplace 7. Safety in demolition works 8. Safety in use of explosives 9. 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	Construction

Law	Description	Requirement	Relevance to Project Phase
	drive or operate such vehicles and equipment 10. Safety in lifting appliance, hoist and lifting gears 11. Adequate and suitable lighting to every workplace and approach 12. Prevention of inhalation of dust, smoke, fumes, gases during construction works and provide adequate ventilation in workplace and confined space 13. Safety in material handling and stacking/unstacking 14. Safeguarding the machinery with fly-wheel of moving parts 15. Safe handling and use of plants operated by compressed air 16. Fire safety 17. Limit of weight to be lifted by workers individually 18. Safety in electric wires, apparatus, tools and equipment 19. Provide safety net, safety sheet, safety belts while working at height (more than 1.6 m as per OSHA) 20. Providing scaffolding, ladders and stairs, lifting appliances, chains and accessories where required 21. Safety in pile works, concrete works, hot asphalt, tar, insulation, demolition works, excavation, underground construction and handling materials 22. Provide and maintain medical facilities for workers 23. Any other matters for the safety and health of workers	Chapter XV- transport and earth moving equipments Chapter XVI- concrete works Chapter XVII- demolition works Chapter XVIII-Excavation and 38 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; The Inter-State Migrant Workmen (Regulation of Employment and	Provides for welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to	• Applicable to all construction works in the project • Principle employer (RUDSICO-EAP) to obtain Certificate of Registration from Department of I, as principle employer • Contractor to obtain	Construction and operation

Law	Description	Requirement	Relevance to Project Phase
Conditions of Service) Act, 1979	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.,	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 Rajasthan Forest Rules, 1962	This Act makes the basis for declaration of Reserved Forests, constitution of village forest committees, management of reserved forests and penalties and procedures.	Not applicable; none of the components / pipeline alignment are in reserved or community forest areas.	Construction

Law	Description	Requirement	Relevance to Project Phase
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.	There are no Ramsar sites in or near Jodhpur. Not applicable to Jodhpur sewerage subproject.	Not applicable
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 City.	-
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 Hydrochlorofluorocarbons (HCFCs)	Not applicable in this project as no ODS are involved in construction works	Not applicable
Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes	Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of hazardous waste emerged during construction works Under this Convention, asbestos or asbestos waste in the form of dust and fibres is classified as hazardous waste.	Not applicable
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	Not applicable to this project as no migratory species of wild animals are reported in the project areas.	Not applicable

Law	Description	Requirement	Relevance to Project Phase
	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.		

56. **Clearances / permissions to be obtained prior to start of construction.** Table 12 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 12: 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	JoDA/NNJ
2	Pipe laying works	Permission from NNJ/JoDA and PWD (where applicable)	PIU
3	Establishment of construction camps	Allotment and approval for specific land use	Contractor
4	Construction of new STP	Consent to establish and consent to operate under Water Act, 1974 from RSPCB	PIU & Contractor
5	Tree Cutting	State forest department/Revenue (Tehsildar)	PIU
6	Hot mix plants, Crushers, Batching plants and DG Set	Consent to establish and consent to operate under Air Act, 1981 from RSPCB	Contractor
7	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules, 2016 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from RSPCB	Contractor
8	Sand mining, quarries and borrow areas	Permission from District Collector/ State Department of Mines & Geology	Contractor
9	New quarries and borrow areas	Environmental clearance under EIA Notification 2006	Contractor
10	Use of vehicles and equipment	Pollution under control certificate (PUC) form RTO	Contractor
11	Temporary traffic diversion measures	Temporary traffic diversion measure including use of alternate road from District traffic police	Contractor

S. No	Construction Activity	Statute under which Clearance is Required	Implementation
12	Use of Railways ROW for construction area/crossing	Indian Railways	PIU
13	Use of highway ROW for construction area/crossing	National Highway Authority of India	PIU
14	Laying of sewers near State Protected Monuments (if Applicable)	The Rajasthan Monuments, Archaeological Sites and Antiquities Act, 1961; the Rajasthan Monuments, Archaeological Sites and Antiquities (amendment) Act 2007- NOC from State department of Archaeology and Museums	PIU/JoDA/NNJ

57. 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 Resources

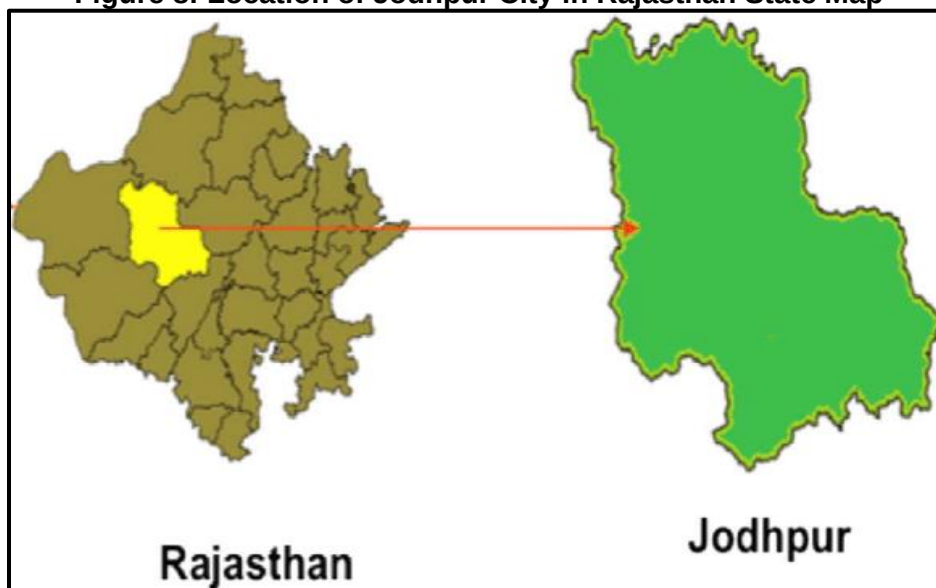
1. Location, Area & Connectivity

58. The city of Jodhpur was founded in 1456 A.D. by Rao Jodha. Jodhpur, the past capital of Rathore clan of Rajputs is an oasis in the desert. The city itself is in complete contrast to the surrounding country both in sudden appearance of hills and ridges and the presence of a large number of water bodies.

59. Jodhpur is the second largest city of Rajasthan. It is located in the lower middle of the Thar Desert of Western Rajasthan and is about 280 Km from Indo-Pak border and is situated at 26°18'North latitude and 73°01'East longitude. It has an altitude of 242 meters above MSL at Railway Station with Fort and old city being much higher i.e. 367.83 meters and between 245 to 325 meters. The outer city area lies between to 210-255 meters above MSL.

60. The city which originally had about 5.0 Sq. Km area within the city wall, covered more than 50 Sq. Km in 1972 and presently expanded to some 281 Sq. Km with a potential to grow in about 321 Sq. Km by the year 2023. Expansion of city towards the north and west is restricted because of hill ranges and in south-east due to defence establishments. Location of Jodhpur town in Rajasthan State map is shown in **Figure 8**.

Figure 8: Location of Jodhpur City in Rajasthan State Map



2. Topography, Soils and Geology

61. **Topography:** The topography of Jodhpur city is greatly influenced by the underlying geological formations that consist of several flat-topped sandstone and Rhyolite hills that run in north-east to south-west direction. A continuous high ridge of Rhyolite separates the Kailana and Takhat Sagar lakes from the rest of the area. At places, the Rhyolite hills are capped by a few meters thick sandstone.

62. The mean sea level at Railway station is 242 msl while the fort and walled city is much higher, lies between 245 to 310 MSL. The outer city lies between 210 to 250 MSL contours. The hills with naturally developed drainage system ultimately drain into Jojari River which flows from north-east to south-west of the city. It is a non-perennial river. There are extensive stone quarries to the northwest of city. Land to the north-east and south-west mostly consists of plain terrain.

63. **Soils:** The geologists classify the soil of Jodhpur mainly as sandy and loamy. Bajra (Pearl millet) is the major crop in Jodhpur, especially in Kharif season. As Jodhpur is blessed with excellent groundwater in many areas, Rabi, pulses, wheat and various spices like dhanian, jeera and red chilly are grown here. Red chilli, onion and garlic are the main crops here. Guar is also widely cultivated in Jodhpur. Sandstone and limestone are the important minerals of Jodhpur district. Fawn and red coloured sandstone are found in abundance in the district. Building stones, stone slabs and flagstones are also mined in the district on a regular basis. The other minerals available here include quartz, clays of various colours and dolomite.

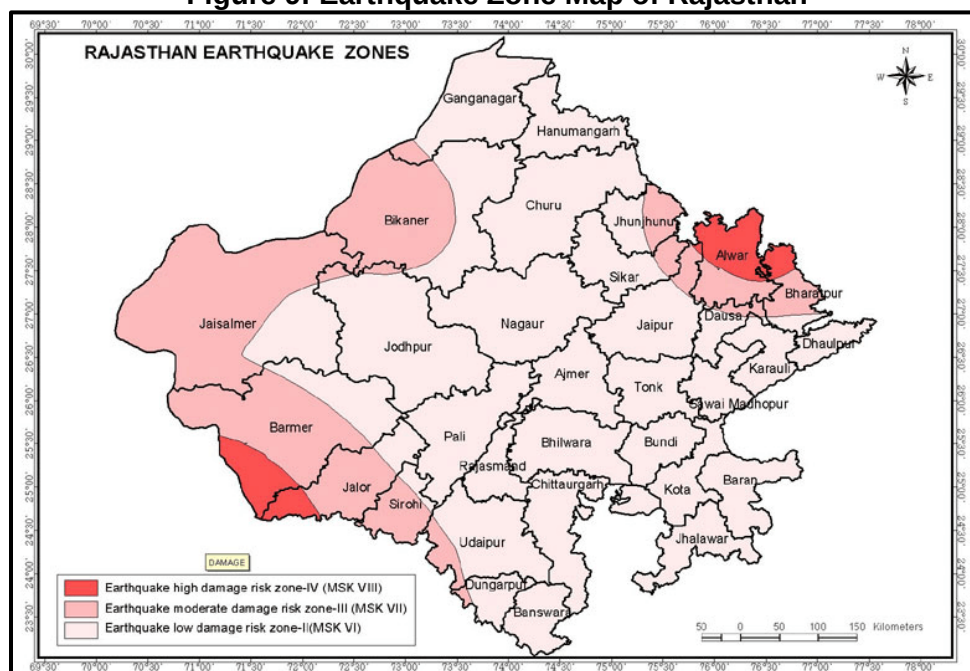
64. **Geology:** The area in and around Jodhpur comprises of variety of rock types ranging from Proterozoic bedrock to recent alluvium and desert sand. Pale Proterozoic deformed meta sediments of Aravalli super group form the basement. This unit is followed by 745 million year old intrusive and extrusive rocks of Malani igneous suite, overlain in turn by rocks of the Maiwar Super group, its lower part comprising of the Sonia shale formation and Girbhakar sand stone formation of the Jodhpur group.

65. The surrounding flat terrain is occupied recent alluvium and desert sands of the Thar. Most of the city and surrounding area show outcrops of Malani Volcanic i.e. Rhyolite flows, Byroclain welded tuffs, Volcanic breccias and Pyroclastic. However, Mehran Garh Fort and the Umed Palace have their foundation on sand stone of Jodhpur group.

3. Seismology

66. Many parts of the Indian subcontinent have historically high seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. Approx. 59 % of the land area of India is liable to seismic hazard damage. In India, seismic zones are divided into four zones i.e. V, IV, III and II. As per the seismic zoning map of India, Jodhpur City falls under the Zone II, which is the lowest earthquake risk zone in India. This zone is termed as “low damage risk zone”. Hence the risk of earthquake at the proposed sites is minimal and so the site is safe. Earthquake Zone Map of Rajasthan is shown in **Figure 9**.

Figure 9: Earthquake Zone Map of Rajasthan



4. Climatic Conditions

67. The climate of Jodhpur city is characterized by extreme dryness, wide range and extremes of temperature and fitful and uncertain rainfall. The winter season is from November to March and is followed by summer from April to June. The period from July to mid-September forms the South-West monsoon season and mid-September to October is the post-monsoon season. Temperature rises rapidly after March & June is the hottest month with mean daily maximum at 41.6°C. The summer months are intensely hot with scorching winds. The maximum temperature occasionally exceeds 47°C. Peak maximum temperature recorded during summer is 48.9°C. After mid-July temperature drops appreciably. The secondary maximum in day temperature is attained in October after withdrawal of the south-west monsoon. January is the coldest month, when mean daily minimum temperature recorded is 2.2°C. The mean monthly temperature varies from 26°C to 41°C in summer and 9°C to 31°C in winter the maximum & minimum temperatures ever

recorded is Jodhpur in 48.9°C in the summer and 2.2°C in the Winter. The annual evaporation is very high, of the order 3048 mm, which is about 8.7 times the average annual rainfall. Evaporation at Kailana Lake, Jodhpur was measured during 1932-37 by Mr F.F. Fergusson the then Executive Engineer, Public Works Department Jodhpur state and was estimated as 2540 mm (100") per year. The relative humidity varies from 45% to 82% in the mornings and 15% to 50% in the evening. Prevailing wind directions are from the South-West to North-West during the summer months and from north – east to south-west in the winter. The mean monthly wind speed varies from 7-17 Km/hour.

68. **Rainfall:** The climate of Jodhpur is generally hot and arid but with a rainy season from late June to September. Although the average rainfall is around 360 millimetres (14 inch), it is extraordinarily variable. The temperature varies from 49 degrees in summer to 1 degree in winter. The Sandstorm (andhi) is a spectacle for people from other regions of India. The rainy days are limited to a maximum of 15 in a year. Temperatures are extreme throughout the period from March to October, except when monsoonal rain produces thick clouds to lower it slightly. During these periods of heavy rain, however, the generally low humidity rises and this adds to the normal discomfort from the heat.

5. Surface Water

69. Jodhpur City is situated partly along the foot of hills and partly in the plains formed by weathering of rhyolites and sandstone. Major part of the old city lies on the piedmont zone. City is bounded by the hills in the north and west directions. The hills of rhyolites rising to an elevation of 395 m above mean sea level mark the prominent elevated landmark feature in the western part of the area. Topographic lowering of the plain area to the extent of 180 m above **msl** occurs in the south-eastern part of the area. The area is devoid of perennial drainage. Jojari river is an ephemeral stream in the area which flow in response to monsoon rainfall. The city sewerage is directed to Jojari through various drains. Balsamand, Kaylana, Takhatsagar, Ummedsagar, Ranisar, Padamsar, Lalsagar, Gulab Sagar and Fatehsagar are notable water reservoirs in and around the city.

70. **'Jojari River'** originates from the southern part of Nagaur near village Pudlu in Rajasthan. Flowing from Jodhpur, this river enters Barmer in the south-west and then joins the Luni River near Siwana. The length of this river is 150 km. It is the longest river among the tributaries of Luni. The Jojari River running west of the Luni River is a stream of the ancient Saraswathi River, which joins the Luni River near Siwana. Luni River meet. The Jojari is the only tributary that merges to the right-bank of the river while other 10 tributaries reach its left bank. All the tributaries of Luni except Jojari originates from the Aravalli hill. The Luni River finally dissipates into the wastes of the north-eastern part the Rann of Kachchh (Kutch) in Gujarat.

6. Groundwater

71. There is a large variation in chemical quality of ground water in the district depending on the characteristics of water bearing formation, movement of ground water, depth to water levels etc. It is seen that in shallow ground water zone, the electrical conductance varies generally from 570 ms/cm at 250C at Balarwa to 10210 ms/cm at 250C at Raron ki dhani. Highly mineralized ground water occurs in Rann area. The ground water in southern, south-eastern, and southwestern parts of the district is saline. In Bap block, northern and western parts have brackish ground water. The electrical conductance is less than 3000ms/cm at 250 C in major part of the district. In the central part of the district where sandstone forms the aquifer, electrical conductance generally varied from less than 1000 to 2000 ms/cm at 250 C.

7. Air Quality

72. Jodhpur being located in dry arid zone coupled with dust storms, especially during summer months, the particulate matter in ambient air is high. Traffic on the roads and winds are the main source of dust generation. Ambient air quality in Rajasthan is monitored by Rajasthan State Pollution Control Board (RSPCB). As presented in the following table, annual average concentration of gases like NO₂ and SO₂ are within both national standards and WHO guideline values, while particulate matter concentration (PM₁₀) is high.

73. The contractor is required to conduct ambient air quality of Jodhpur in the pre-construction phase to establish the baseline at project sites and will continue periodic monitoring as per the environmental management plan.

Table 12A: Ambient air quality of Jodhpur (annual average)

Yes	PM ₁₀ (µg/m ³)	NO ₂ (µg/m ³)	SO ₂ (µg/m ³)
2022	139	29.04	6.16
2021	149	16.25	3.24
2020	135	24.43	5.02
2019	188	23.76	6.65
2018	252	25	6.88
2017	203	22.96	6.3
2016	154	23.46	5.55
2015	133	23.93	5.96
Standards			
NAAQS (annual)	60	40	50
WHO guidelines (annual)	20	40	20

Monitoring location: DIC office, Jodhpur

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

74. Noise level quality of Jodhpur is not available and DBO contractor is required to conduct noise level monitoring of Jodhpur; at prominent project sites, in the pre-construction phase and will update in IEE report.

B. Ecological Resources

75. **Forest, flora and fauna:** Jodhpur District has rich flora and fauna. The forests include mainly teak. The wildlife includes a large variety of wild animals like leopard, chinkara, etc. Common birds in the region are fowl, partridge, black drongo, grey shrike, green bee-eater, bulbul, parrot etc. Even though Jodhpur has an arid climate, we can see forests in a rather negligible percentage of the total land of the district. But the sandy soil allows only scrub and thorny bushes of vegetation to grow in these forests. Kumat, Kair, Khejri, Jal Khara, Bir and Pilu etc are the main species of trees in these forests. The fruit bearing trees like pomegranates and guavas are also grown here. Animals from the wild cat and jackal specimens are commonly found in the area. You can also find the birds like Baya, parrot, koyal, Jungle crow, bulbul, house sparrow, sand grouse, kite, grey partridge, little egret and common quail in Jodhpur. The recorded forest area of the district is 98 sq.km which is 0.43% of the district's geographical area.

76. **Gudha Vishnoia Conservation Reserve.** This is small area of 2.32 sq. km. notified by Govt. Of Rajasthan on dated. 15.12.2011 as Gudha Vishnoia conservation reserve. This conservation reserve is at approximately 10 km aerial distance from the municipal boundary of Jodhpur. Chinkara, Black Buck, Wild boar, blue bulls, desert Fox, Indian Jackal, Migratory Birds, local bird species are the major animal species found in this reserve No any project activity or site will have impact on this conservation reserve.

77. Biodiversity Assessment Report (IBAT Analysis) for Sewerage system of Jodhpur has been attached with this report as **Appendix 7**. The screening study for critical habitat indicates that within the area of analysis (AOA) of 50km radius of the STP and SPS, there are 15 species included in the IUCN Red. However, field investigations and interviews confirmed that these species are not encountered in urban areas of Jodhpur. Proposed activities will not have impact on these species.

C. Economic Development

1. Land use

78. Jodhpur Master Plan provides land use details of Jodhpur City. Out of total 16326 acre area, 60.73 % is developed urban area. Rest of the land is under reserved area, open land, forest land, hilly area and water body. Details of the land use is provided in **Table 13** below-

Table 13: Existing Land Use of Jodhpur

S. No.	Land Use	Area (in Acres)	Percentage of Developed area (%)	Percentage of Urban area (%)
1	Residential	8325	50.99	30.97
2	Business	442	2.71	1.64
3	Industrial	1968	12.06	7.32
4	Govt. / Semi Govt.	348	2.13	1.29
5	Recreation	1133	6.94	4.22
6	Public and Semi Public	2018	12.36	7.51
7	Transport, roads and Recirculation	2092	12.81	7.78

S. No.	Land Use	Area (in Acres)	Percentage of Developed area (%)	Percentage of Urban area (%)
	Developed Area	16326	100.00	60.73
8	Reserved area	4040		15.03
9	Open land	4120		15.33
10	Forest area	405		1.51
11	Hilly Area	1870		6.96
12	Water body	119		0.44
	Total Urban area	26880	-	100.00

*Source: Master Plan Jodhpur 2011-2031

2. Commerce, Industry & Agriculture

79. The industrial development in Jodhpur has led to the economic growth of the city. Jodhpur is the third largest industrialized district of the Rajasthan state. The Handicraft industry has been the largest industry in the city. Many workers are in manufacturing of motor parts, textiles, metal utensils, bicycles and ink, handloom and sport goods. Lot of cottage industries are involved in manufacturing of glass bangles, cutlery, carpet, marble products and traditional items of tourist interests such as Tie and Die textile products. There were 6806 industrial units in 2000, which are increased to 6983 in the year 2001. Total area under industrial use in 2001 was 1968 acres which is 12.62% of the developed area. RIICO have developed different industrial areas in Jodhpur like Basani, Boronada, Mandore, Bhagat ki Kothi and Pal.

D. Socio Cultural Resources

1. Demography

80. As per Census of India, Jodhpur had a population of 1,033,918 in 2011, consisting of approximately 52.62 males and approximately 47.38 percent females. The average literacy rate is 80.56 percent, approximately 88.42 percent for males and 73.93 percent for females. Approximately 12.24 percent of the population is under six years of age. Jodhpur city is governed by a Municipal Corporation which comes under Jodhpur Urban Agglomeration.

81. The Jodhpur Urban/Metropolitan area includes Jodhpur, Kuri Bhagtasani, Mandore Industrial Area, Nandri, Pal Village and Sangariya. Its urban/metropolitan population is 1,137,815 of which 599,332 are males and 538,483 are females. With the inclusion of 395 villages in Jodhpur city in the month of February 2021 by JoDA, the new population count for the city is 2,330,000 and is expected to grow by 33.04% over the next decade. In the year 2031 population of Jodhpur city is expected to be more than 3.1 million. The population of Jodhpur city after expansion of city borders is 2,330,000.

2. History, Culture and Tourism

82. The Jodhpur city was founded in 1459 by Rao Jodha, a Rajput chief of the Rathore clan. Jodha succeeded in conquering the surrounding territory and thus founded a kingdom which came to be known as Marwar. As Jodha hailed from the nearby town of Mandore, that City initially served as the capital of this state; however, Jodhpur soon took over that role, even during the

lifetime of Jodha. The city was located on the strategic road linking Delhi to Gujarat. This enabled it to profit from a flourishing trade in opium, copper, silk, sandalwood, dates, and other tradeable goods. Mandore Fort is located in the city of Jodhpur, which is an ASI protected monument. There are several state protected monuments in Jodhpur. List of protected monuments in the city and their aerial distance from major components proposed under the sub-project is attached in **Appendix 5**.

Table 14: Distance of Protected Monuments (within Municipal Limit of Jodhpur)] from proposed major components in Jodhpur

S. No.	Name of protected monument	Approx. Aerial Distance of STP from Protected monuments	Approx. Aerial Distance of SPS from Protected monuments	Approx. Aerial Distance of nearest sewer networks from Protected monuments
1	Mandore Fort (ASI Protected)	10.374 km	9.92 km	781 m.
2	Cenotaph of Maharaja Jaswant Singh (State protected)	10.08 km	9.65 km	517 m.
3	Cenotaphes at Panch Kunda (State protected)	10.8 km	10.5 km	1.35 km
4	Mehrangarh Fort (State Protected)	12.3 km	9.6 km	100 m.

83. Jodhpur has culturally been known by the name of Jodhana by the locals. The city is famous for its food and its popularity can be judged by the fact that one can find sweet shops named "Jodhpur Sweets" in many cities throughout India. Being at the onshore of Thar Desert, life has been influenced by ways of select nomadic tribes (so-called "gypsy" groups – Banjare in Hindi – have settled in some parts of the city). Jodhpur has distinct cultural identity through its food and is famous for its Mirchi Bada and Mawa Kachori.

84. Jodhpur's most notable attractions are Mehrangarh Fort which overlooks upon the city, the blue bylanes of the old city are also an attraction, Umaid Bhawan Palace, Jaswant Thada, and the Ghanta Ghar, or Clock Tower. Tourists are also within proximity to Mandore Garden, Kaylana Lake and Garden, Balsamand Lake, Machia Biological Park, Rao Jodha Desert Rock Park, Ratanada Ganesh Temple, Toorji Ka Jhalra, Sardarsamand Lake and Palace, Masooria Hills, Veer Durgadas Smarak (monument, park, and museum) and Bhim Bhadak Cave. Other attractions of people are at markets of food, antique items, traditional clothes and traditional shoes (also called Jodhpuri Mojari) held in Jodhpur.

E. Environmental Settings of Investment Program Component Sites

85. Sewers pipes will be laid along the roads/streets in the City 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 project area 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 sewer pipeline in those roads. 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.

86. Mandore Fort is listed as ASI Protected Monument in Jodhpur City. There are several State Protected Monuments in the City, most of them are not in the municipal limits of Jodhpur, where proposed works will be undertaken. Except some sewer networks; no other physical work is proposed near any protected monument site; Proposed SPS and STP sites are located at a distance of approx. 10 kms from Mandore fort therefore there will be no impact on the ASI protected monuments due to proposed activities and this act is not applicable for this project. List of ASI and State protected monuments in Jodhpur. Jodhpur city being cultural and historical city, there may be possibilities of any chance finds encountered during excavation for pipe laying.

87. Re-assessment will be required after confirmatory survey during pre-construction phase and if any proposed work is identified within core area or regulated areas of these monuments, permission from ASI will be required before start of construction works.

88. STP (5 MLD) is proposed on khasra no. 119 of Khokhariya village near Jojari river on vacant government land. Total area required for construction of STP is 3.24 hectare. Permission for construction of the proposed STP on this land has been given to RUIDP by JoDA. There are no trees present at site, which may be required to cut for construction of STP.

89. On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are residences (5 double-story buildings) and a business complex with 9 shops.

90. The STP will be located at the farthest possible point from the habitation, required Land for STP is only 4500 sqm against available land of 32400 sqm, which is about 13 % of total available land. The site is surrounded by railway line at one side and Highway on other side

91. No dense habitations are found within 500 m from STP site. No wildlife is reported in this area.

92. A SPS (6.5 MLD) is proposed in E-1 Zone at Nandri. This proposed SPS will be constructed on the land of Existing STP (20 MLD) located at Nandri village. This land comes under Nagar Nigam Possession and NOC for the construction of SPS on this land is under progress. No wildlife exists near the proposed site of SPS. There are no trees 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. There are no trees present at site. However, all precautions should be taken during construction and operation to minimize the impacts on nearby residents.

93. Site environmental features of all subproject sites and photographs are presented in the following Table 15. Site Photographs are presented in Appendix 4.

Table 15: Environmental Features of Project sites

S. No	Subproject component	Environmental Features of the Site	Photographs
1	Sewage Treatment plant (5 MLD) at village Khokhariya	STP (5 MLD) is proposed near Khokhariya village on vacant government land under Municipal Council. There are no trees present at site.. 2. There is railway line at one end and highway at another end of proposed STP land. Power transmission line are passing through this site, which may require shifting before construction. On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are residences (5 double-story buildings) and a business complex with 9 shops. The STP will be located at the farthest possible point from the habitation, required Land for STP is only 4500 sqm against available land of 32400 sqm, which is about 13 % of total available land. The site is surrounded by railway line at one side and Highway on other side , . No wildlife is reported in this area. 4 State Protected Monuments and Mandore Fort is listed as ASI Protected Monument in Jodhpur City. Proposed STP site is located at a distance of approx. 10 kms from Mandore fort.	 
2	Sewage Pumping Station (6.5MLD) in E-1 Zone	A SPS (6.5 MLD) is proposed in E-1 Zone at Nandri. No wildlife exists near or on the proposed site of SPS. There are no trees present at site, Jojari river is passing nearby allotted land. Site is connected with BT road, away from habitation. The proposed site is adjacent to existing Nandri STP	
3	Sewer networks	Sewer network pipes will be laid in different city roads and streets of Jodhpur city. Sewer pipes will not be laid in the area where existing sewer networks are functioning satisfactory. There are different residential and commercial activities along the proposed roads, where sewer networks are proposed. There are several common property resources such as community-owned facilities, hospitals,	 Existing Roads at Ratananda

S. No	Subproject component	Environmental Features of the Site	Photographs
		schools, religious places, public utilities, in the proposed areas. There are no environmentally, archeologically sensitive or protected areas in the proposed zone. There are no trees cutting involved for selected alignment, however, 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. Some of sewer networks; may be aligned near ASI protected and state protected monuments. The exact impact can be assessed only after final design of alignment, and it will be reflected in final IEE.	 City road at Education department

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

94. 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.

95. 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 workers camps, deployment of safety officer, arrangement of required barricades and caution boards etc.
- (iv) **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust,

noise, traffic congestion and waste production.

- (v) **O&M impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

96. 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).

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

98. 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. Design and Location Impacts

1. Location Impacts

99. **Location Impacts of Sewage Treatment Plant.** STP (5 MLD) is proposed on Khadra no. 119 of Khokhariya village near Jojari river on vacant government land. Total area required for construction of STP is 3.24 hectare. Permission for construction of the proposed STP on this land has been given to RUIDP by JoDA. 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. On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are residences (5 double-story buildings) and a business complex with 9 shops.

100. The STP will be located at the farthest possible point from the habitation, required Land for STP is only 4500 sqm against available land of 32400 sqm, which is about 13 % of total available land. The site is surrounded by railway line at one side and Highway on other side.

101. . No dense habitations are found within 500 m from STP site. No wildlife is reported in this area. There are agricultural activities around this site and treated effluent and sludge from STP can be utilized in these agricultural practices. 23 State Protected Monuments and a Mandore Fort is listed as ASI Protected Monument in Jodhpur City. Proposed STP site is located at a distance of approx. 10 kms from Mandore fort. There are no any environmental sensitive features at this site.

102. **Odor Nuisance from STPs.** As presented in the baseline profile, the proposed STP site

is identified away from habitation, and site is currently vacant, and do not have any notable sensitive environmental features. 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.
- (ii) Develop layout plan of STP such that door generating units (such as sludge/ solids handling facilities) are located away from the surrounding area with future development potential.

103. 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 River Jojari located near STP site. 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. Jojari River is mostly dry, and carries untreated wastewater from the City, except during the rains.

104. Location Impacts of proposed SPS - A SPS (6.5 MLD) is proposed in E-1 Zone at Nandri location. This proposed SPS will be constructed on the land of Existing STP (20 MLD) located at Nandri village. This land comes under Nagar Nigam Possession and NOC for the construction of SPS on this land is under progress. No wildlife exists near the proposed site of SPS. There are no trees 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. However, all precautions should be taken during construction and operation to minimize the impacts on nearby residents. Additionally, public consultations should be held near the SPS location to provide project information, type of anticipated disturbances and gain the consent of the nearby residents for the construction of the proposed SPS.

105. Locations impacts of Sewerage Networks: Proposed sewerage collection networks (augmentation of existing sewer lines and new sewer lines) will traverse through different city roads within ROW. There are no trees coming in the alignment of proposed pipe line 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. 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.

106. Tree cutting at project sites. There are no notable tree cover or vegetation at STP (5 MLD) site and SPS site (6.5 MLD). Sewer pipeline will be laid along the road within road ROW. There are no notable trees in the alignment; therefore 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 or 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.

107. During detail design DBO contractor will be required to confirm that there will be any tree will be impacted or not. Tree cutting requirement for pipe line works can be decided only after confirmatory survey of full length of alignment by contractor. As per RUDSICO-EAP policy; compensatory plantation in the ratio of 1:3 is to be followed during construction works (Appendix C-11).

108. **Physical Cultural Resources.** There are notable and significant archaeological places, protected monuments and areas in Jodhpur 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; Inform local Archaeological Department / Museum office 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

109. **Health and safety risk during sewer replacement/rehabilitation works.** These work sites may present hazardous or harmful working conditions due accumulation of harmful gases such as hydrogen sulphide in the existing / old sewers, and lack of sufficient oxygen may engager the lives of workers if care is not taken. Following measures shall be implemented:

- 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
- Works shall be conducted only under appropriate supervisory control
- Appropriate equipment shall be used, and manual working shall not be conducted, such as entry of workers into 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

2. Design Impacts

110. **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

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

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).

111. 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. Although legally the disposal of effluent meeting certain standards is allowed into municipal sewers (refer Appendix C-8), the monitoring of the same is not-practical.

112. To prohibit the industrial discharge into municipal sewers following measures should be considered:

- (i) No industrial wastewater shall be allowed to dispose into municipal sewers'
- (ii) 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, issue notice to all industries for compliance; and
- (v) Conduct regular wastewater quality monitoring (at inlet and at outlet of STP) to ensure that the treated wastewater quality complies with the national effluent standards.

113. **Design of Sewage Treatment Plant.** In terms of treatment capacity adequacy, based on the technical review of capacity of existing STPs, combined with the under construction STPs and proposed STPs by Nagar Nigam Jodhpur and Jodhpur Development Authority for Jodhpur town, a gap of 5 MLD in treatment capacity is assessed. Therefore, a 5 MLD STP based on sequential batch reactor (SBR) process, which will meet the stipulated discharge standards is proposed under this subproject. This new STP will be constructed at Khokhariya to meet the demand of Kokhariya zone from both existing and proposed sewer network. At present, there are 3 STPs of total capacity 120 MLD (which are proposed for improvement), 3 are under construction (total capacity 65 MLD), and an additional STP of 20 MLD capacity is planned by Nagar Nigam Jodhpur at Nandri. Together with proposed plant of 5 MLD under the ADB project, the total treatment capacity will be 205 MLD once all the works are completed. To achieve this it is critical that all the proposed planned and under construction STPs are completed as planned and put into operation prior to completion of civil works under this subproject.

114. One STP of 5 MLD capacity is proposed to be constructed at the identified site to treat the sewage generated from some areas of Jodhpur City. 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 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 strident 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 Jodhpur 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	6.0-9.0	6 – 9	6 – 9
2	BOD5, mg/l	≤10	<30	≤10	30	-
3	COD, mg/l	≤50		≤50	125	-
4	TSS, mg/l	≤20	<100	≤10	50	-
5	NH4-N, mg/l	<25	-	≤5	-	
6	Total nitrogen, mg/l	<10	-	≤10	10	-
7	Oil & grease, mg/l	-	-	-	10	-
8	Total phosphorus, mg/l	-	-	-	2	-
9	Faecal Coliform,	<1000	<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.

115. 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, specially 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 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 prepares 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

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”.

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.

116. 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-9).

117. 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.

118. 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 City, 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.

119. 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 Jodhpur 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 Jodhpur, 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 Jodhpur 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 Jodhpur, 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

- (iv) Agricultural Organization (FAO) of the United Nations; 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

120. **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 later 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.

121. **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.

122. **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.

123. 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.

124. 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.

125. Contractor will propose the sludge management plan with best methods for reuse of sludge as per guidelines of CPHEEO (guidelines are attached as Appendix C-10) 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 17: 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
pH	-	6.5 – 7.5	(1:5 solution) maximum 6.7
Moisture, percent by weight, maximum		15.0 – 25.0	25.0

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)
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 ₂ O ₅) percent by weight, minimum	percent by weight	0.4	10.4
Total Potassium (as K ₂ O), 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			

126. In order to ensure the safe use of dried sludge, following should be followed:

- (i) Prepare a dried Sludge utilization plan for Jodhpur within the help of Agriculture Department/CLC; plan should also include if any additional processing is required for sludge to use as soil conditioner;
- (ii) Plan should clearly include various potential uses and demand in City and surroundings;
- (iii) 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;
- (iv) Identify a landfill/suitable site for disposal of surplus dried sludge;
- (v) Monitor sludge quality during operation phase as per the EMP, ensure that it meets the quality parameters established by FCO; and
- (vi) 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).

127. **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 City 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.

128. **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, NNJ/JoDA 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.

129. 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.

130. 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; and

- (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

131. As stated earlier, the proposed subproject, which will improve and expand the existing sewerage system in Jodhpur, will utilize the existing facilities and proposed STPs funded under various financing apart from ADB. The sustainability of new sewer infrastructure and realization 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 proper functioning STPs. To achieve this, it is critical that (i), all the proposed planned and under construction STPs as detailed are completed and put into operation prior to completion of civil works under this subproject, (ii) all STPs are in compliance with government rules and regulations, and (iii) all STPs meet stipulated treated effluent discharge standards.

132. At present following STPs are under construction: Vivek Vihar (15 MLD), STP Basni Benda (40 MLD), and STP Uchiyada (10 MLD). All these new plants are based on SBR process, and the works are scheduled to be completed by March 2023. The construction of this subproject is likely to start in May/ June 2022 and completed by May/ June 2026. The 20 MLD STP proposed at Nandri, is in initial stages of planning, and needs to be constructed and put into operation prior to start of operation of network under this ADB project.

133. All the 3 STPs under construction are based on SBR technology, and designed to meet the treated effluent parameters of Government of India (ref Table 6). The three existing STPs based on WSP (waste stabilization process) and ASP (activated sludge process) are not meeting the treated effluent discharge standards. Accordingly, improvements to treatment system are already planned. Existing STP Nandri 20 MLD (WSP) is currently under upgradation to meet applicable treated effluent discharge standards, Similarly, the existing 2 STPs (50 MLD each) at Salawas are ASP based, Since the treatment process is not able to meet the applicable standards, NNJ proposed upgradation. Accordingly, NNJ invited tenders to provide consultancy services for review of existing process and suggest improvements, after which upgradation will be taken up. Copy of work orders are attached as Appendix 2 and details of these STP are given in table 18 below. It is critical that these upgradations works are completed and put into operation prior to start of operation of network under this ADB project.

134. 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, Nandri STP has no valid CTP, has RSPCB rejected the renewals as the STP is not meeting the discharge standards. Upgrading STP is under progress, and CTO will be obtained once the upgradation work is completed. Both the STPs at Salawas has valid CTOs up to Aug 2022, however, the treated water quality is not meeting the discharge standards stipulated in CTO. It is anticipated that the proposed upgrade of treatment process will enhance treatment efficiency, and will meet the standards, and accordingly CTO will be renewed.

135. As per requirement of SPS 2009 environmental compliance assessment of these existing networks and STPs was conducted and details are attached in Appendix 6 as environment Audit of existing facilities.

Table 18: Status of associated STPs to the subproject

S. No.	STP Location	Technology of STP	Final treated water Parameters	Time of completion of construction	Status of consent from RSPCB	Corrective action
Proposed STPs						
1	STP Vivek Vihar (15 MLD)	SBR Process (Sequential Batch Reactor)	- BOD @20°C : ≤ 10 mg/l - COD : ≤ 50 mg/l - TSS: ≤ 10 mg/l - NH₃-N (as N): ≤ 2 mg/l - TN (as N): ≤ 10 mg/l - TP (as PO₄): ≤ 2 mg/l	29.03.2023	Applied for CTE, waiting from RSPCB	
2	STP Basni Benda (40 MLD)	SBR Process (Sequential Batch Reactor)	- BOD @20°C : ≤ 10 mg/l - COD : ≤ 50 mg/l - TSS: ≤ 10 mg/l - pH: 6.0- 9.0	March 2023	CTE issued by RSPCB	
3	STP Uchiyada * (10 MLD)	SBR Process (Sequential Batch Reactor)	- BOD @20°C : ≤ 10 mg/l - COD : ≤ 50 mg/l - TSS: ≤ 10 mg/l - NH₃-N (as N) : ≤ 2 mg/l - TN (as N): ≤ 10 mg/l - TP (as PO₄) : ≤ 2 mg/l	March 2023	CTE issued by RSPCB	
Existing STPs						
4	STP Salawas (Phase -1) (50 MLD)	Activated Sludge Process (ASP)	Parameter tested on March 2022 - BOD @20°C : ≤ 20 mg/l - COD : ≤ 200 mg/l - SS: ≤ 30 mg/l - pH : 6-9	2011	CTE and CTO under Water & Air act issued from RSPCB	Bids are already invited for providing consultancy services to upgrade Phase -1 and Phase 2 STPs, to treat effluent up to latest required parameters
5	STP Salawas (Phase -2) (50 MLD)	Activated Sludge Process (ASP)	Parameter tested on March 2022 - BOD @20°C : ≤ 20 mg/l - COD : ≤ 200 mg/l - SS: ≤ 30 mg/l - pH : 6-9	2018	CTE and CTP under Water & Air act issued from RSPCB	
6	STP Nandri (20 MLD)	Waste Stabilization Pond (WSP)	Parameter tested on March 2022 BOD @20°C : ≤ 30 mg/l	2005	Already Applied to get CTO under Water Act from RSPCB after first Refusal	Upgradation of existing 20 MLD STP with Horizontal Subsurface Wetland units

136. **Corrective Measures.** Corrective actions to address gap in treatment capacity, improve treatment efficiency to treat the sewage to stipulated standards are already undertaken by Jodhpur Development Authority and Nagar Nigam Jodhpur to improve overall sewerage system in Jodhpur. No additional corrective actions are needed; however, it is critical that these actions are completed on time. Following table 19 shows the actions, and timelines and responsible agency.

Table 19: Action Plan to Monitor Corrective Actions

S. No.	Item	Action required	Timeline	Responsible agency
1	Treatment inadequacy	Ensuring timely completion (March 2023) of construction of 3 STPs and start of operation	All preparatory, construction, and compliance requirements are to be met and STPs start operation prior to completion of civil works under this subproject. Effluent standards to be met throughout the operation phase	PMU, RUIDP
2		Ensuring timely completion (Dec 2022) of upgrading works at existing Nandri 20 MLD STP		PMU, RUIDP
3		Ensuring timely finalization of improvements needed at Salawas STPs, and initiation and completion of construction works and start of operation of upgraded STP.		PMU, RUIDP
4	CTE and CTO	Ensure CTE obtained prior to start of construction of: - Any new/upgrades STP - Upgraded Nandri STP		PMU, RUIDP
5		Ensure CTO obtained prior to start of operation of: - Upgraded Nandri STP - Upgraded Salawas STPs 3 new STPs - Any new/upgraded STP		PMU, RUIDP
6	Treated effluent standards	Ensure that all STPs treat sewage to effluent standards established by RSPCB in CTE/CTO		PMU, RUIDP

C. Pre-construction Impacts

137. **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 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.

138. **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 prevent disposals near forest areas, water bodies, swamps or in areas which will inconvenience the community. Construction sites, including disposal 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.

139. 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 centres, 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.

140. 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 rules during construction and adhering to following criteria (including but not limited to)

- (i) 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 PIU for approval
- (ii) Dispose the construction waste and debris in construction and demolition waste management facility approved by RSPCB; if such facility is not available near the project town, the contractor shall identify disposal site confirming to the criteria, obtain permissions from local body and government agencies as required, and submit for the approval of PIU; disposal sites shall be used only after approval of the PIU
- (iii) Sites shall not be located in forest areas, water bodies or drainage lines, swamps or in areas which will inconvenience the community
- (iv) The site shall be selected preferably from barren, infertile lands.
- (v) The local governing body and community shall be consulted while selecting the site.
- (vi) Debris disposal site shall be at least 200 m away from surface water bodies.
- (vii) No residential areas shall be located within 100 m downwind side of the site.
- (viii) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.

D. Construction Impacts

141. 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.

142. **Laying of Sewer Networks.** Subproject includes strengthening of existing sewage networks including augmentation of existing damaged/problematic sewers, and laying of new sewer pipes. This covers almost entire project area of Jodhpur City. Small sewers of dia 200-400 mm (tertiary sewers) will be laid/augmented in many streets and roads, the larger sewers mains of dia 400-800 mm will be laid mostly on wider main roads. Pipes/sewers will be laid by open cut method. The maximum depth for sewers depends on the design, and in Jodhpur 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 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.

143. 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 City 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 access 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

144. 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.

145. **Demolition works/Old sewer pipe removal.** In the initial stage of project planning it is

accessed 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. All the safety measures should be adopted during demolition activities. There is requirement of replacement/augmentation of about 98.9 km of existing sewer pipes of different dia and material. Replaced pipes shall also need to be disposed. Appropriate site for storage and disposal of demolished materials/old replaced pipes should be selected prior to start of demolition activities/replacement of sewer pipes with prior permission/approval of PIU/ULB.

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

- (i) 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 PIU for approval
- (ii) Dispose the construction waste and debris in construction and demolition waste management facility approved by RSPCB; if such facility is not available near the project town, the contractor shall identify disposal site confirming to the criteria, obtain permissions from local body and government agencies as required, and submit for the approval of PIU; disposal sites shall be used only after approval of the PIU
- (iii) Sites shall not be located in forest areas, water bodies or drainage lines, swamps or in areas which will inconvenience the community
- (iv) The site shall be selected preferably from barren, infertile lands.
- (v) The local governing body and community shall be consulted while selecting the site.
- (vi) Debris disposal site shall be at least 200 m away from surface water bodies.
- (vii) No residential areas shall be located within 100 m downwind side of the site.
- (viii) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.
- (ix) Soil storage site should be properly demarcated by fencing and information board should be placed at entrance;
- (x) At soil storage site soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission; and
- (xi) 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.

147. 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;⁸

⁸CTE and CTO will be required for batching plant, hot mix plant, crushers etc. if specifically established for this project.

- (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.

148. **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;
- (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.

149. **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 City. 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 construction waste / spoils management plan;
- (ii) Avoid constructing 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;

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.

- (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).

150. Noise and Vibration Levels. Construction works will be conducted along the roads in Jodhpur 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).

151. **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 construction waste / 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).

152. **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, old replaced sewer pipes 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) Prepare and implement construction waste / spoils management plan;
- (ii) Avoid stockpiling of excess excavated soils;
- (iii) Coordinate with ULB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- (iv) Recover used oil and lubricants and reuse or remove from the sites;
- (v) Store fuel, oils, lubricants etc on impervious and protected areas, ensure spill control kits, and proper containments bunds to ensure no spillage
- (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;
- (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.

153. **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.

154. 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.
- (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.

155. **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 construction waste / 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.

156. **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.

157. **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 labour 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 Training⁹ 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) Sewer rehabilitation / replacement works - 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
- (v) Appropriate equipment shall be used, and manual working shall not be conducted, such as entry of workers into sewers etc.,
- (vi) Works shall be conducted only under appropriate supervisory control
- (vii) Adequate ventilation shall be maintained, workers on the site shall be provided with appropriate PPEs including oxygen masks and cylinders etc.,
- (viii) Implement a site specific Health and Safety (H&S) Plan for sewer rehabilitation works
- (ix) Provide medical insurance coverage for workers;

⁹ 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.

- (x) Secure all installations from unauthorized intrusion and accident risks;
- (xi) 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 - 3 PM)
 - b. Provide appropriate shade near the work place; allow periodic resting and provide adequate water
 - c. Provide necessary medicine and facilities to take care of dehydration related health issues
- (xii) Provide supplies of potable drinking water;
- (xiii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- (xiv) 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;
- (xv) 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;
- (xvi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- (xvii) Ensure moving equipment is outfitted with audible back-up alarms;
- (xviii) 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;
- (xix) 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; and
- (xx) Follow all the protocols and guidelines (WHO interim guidelines and RSTDSP-EAP SOP and COVID-19 Management Plan) as given in Appendix C-23 & C-24.

158. **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.

159. Some part of the City is characterized by narrow roads. Particularly, the areas located in old City 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.

160. 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, residents 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-
 - a. Contractors should have handheld noise level meter for measurement of noise during night hours; and
 - b. Contractors should have handheld lux meter for the measurement of illumination during night hours;
- (vii) Preferably electrical connections is available for running equipment otherwise sound proof/super silent Diesel Generator set should be available;
- (viii) 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

(ix) 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

- (x) 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;
- (xi) All the noise activity like hammering, cutting, crushing, running of heavy equipment should be done in day time and avoided in night time;
- (xii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works;
- (xiii) 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;
- (xiv) 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;
- (xv) 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;
- (xvi) Horns should not be permitted by equipment and vehicles;
- (xvii) Workers should not shout and create noise;
- (xviii) First aid and emergency vehicles should be available at site;
- (xix) Emergency preparedness plan should be operative during night works;
- (xx) Old persons and pregnant women and women having small kids should not work in night time;
- (xxi) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise;
- (xxii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works;
- (xxiii) PIU/CMSC site engineers and contractors safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and maintain photographic and video graphic records as well as register the observations;
- (xxiv) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement;
- (xxv) After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians;
- (xxvi) Drivers and workers should be alert and responsive during night works;

- (xxvii) All the wages to workers working in night hours should be as per the applicable labour acts;
- (xxviii) Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours; and
- (xxix) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

161. **Worker 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 accommodation¹⁰ 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.

162. **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. There is Mandore Fort in Jodhpur city area which is an ASI site. No works are planned near the ASI monument, nearest work (sewer line) is about 750 m from the monument boundary. There are several State protected monuments in the Jodhpur. During initial survey except some sewer networks; no other project

¹⁰ https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation

sites are located near any protected monuments. Nearest works to state protected monument (Mehrangarh Fort) is 100 m. Religious places such as temples are present nearby the proposed pipe line works and contractor will require to follow the mitigation measures as given below-

- (i) Conduct of any works within 300 m from the boundary of ASI monument requires prior permission from National Monument Authority;
- (ii) PIU to consult Archaeological Department with exact distance and depth of sewer works close to Mehrangarh fort, and ensure that any feedback or measures suggested is incorporated into design/construction;
- (iii) 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;
- (iv) Adjacent to religious/social/historical buildings, undertake excavation and construction work in such a way that no structural damage is caused to the religious building;
- (v) Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrances/obstacles during such time to the religious places; and
- (vi) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.

163. Physical Cultural Resources. There are notable archaeological places and protected monuments in project area. Therefore, 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) Conduct of any works within 300 m from the boundary of ASI monument requires prior permission from National Monument Authority;
- (ii) PIU to consult Archaeological Department with exact distance and depth of sewer works close to Mehrangarh fort and ensure that any feedback or measures suggested is incorporated into design/construction;
- (iii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (iv) Stop work immediately to allow further investigation if any finds are suspected;
- (v) Inform local Archaeological Department / Museum office if a find is suspected and take any action, they require to ensure its removal or protection in situ; and
- (vi) Prepare a chance find protocol

164. 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 CAPC. 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;

- (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;
- (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.

165. 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

166. **Sewerage System.** O&M of the sewerage system will be carried out by DBO contractor for 10 years and then by Nagar Nigam Jodhpur/JoDA directly or through an external operator. The sewerage system is intended to collect, convey, treat and dispose the sewage from the City 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.

167. 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. 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 in to 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.

168. 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.

169. 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.

170. 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.

171. 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.

172. 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.

173. **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 urban sewerage in Jodhpur City, by rehabilitating, augmenting, and creating required new infrastructure.

174. Sewerage works is proposed to be taken up in Jodhpur City, which is an old city congested with people, traffic and activities. There are sensitive places like hospitals, schools, and religious places. Works will be spread over entire City, covering many 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. 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 Jodhpur, 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 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.

175. **Project Benefits.** The citizens of the Jodhpur will be the major beneficiaries of the improved sewerage systems, as there will be reduction in waterborne and infectious diseases; less risk of groundwater contamination, 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

176. 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.

177. A three tier consultation process has been adopted for RSTDSP project: focus group discussions, primary household sample surveys and a City-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, Jodhpur Municipal Corporation, Jodhpur Development Authority, Public Health Engineering Department, and Rajasthan Pollution Control Board. Secondary stakeholder are: 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

178. 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 Jodhpur in December 2021 - February 2022 and meetings was also conducted with local councillors and habitant of nearby project area, including residence near proposed STP site. In month of January and February 2023 with about 39 persons.

C. Consultation during Project Preparation

179. Institutional consultations were conducted with the Governmental Departments such as Local Self Government Department, Pollution Control Board, Public Health Engineering Department, Jodhpur Municipality (NNJ), JoDA etc. The project proposals are formulated in consultation with NNJ and JoDA and the proposals have been finalized only after certification of both; that the proposals suit the requirements of the ULB.

180. 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 City, covering sample households and nearby vendors to understand the basic characteristics of City, health status, and the infrastructure service levels, and also the demand for infrastructure services.

181. Informal and formal consultation are conducted with local population of the area, about at 11 places along with proposed alignment with about 117 persons (91 male and 26 females) from December 2021 to February 2022 (Appendix 3). A consultation meeting with elected ward councillors of Jodhpur Nagar Nigam, representatives of NGOs, etc., conducted on 25 January 2023. PIU staff and consultants participated in the meeting and held detailed discussions. Consultations were also conducted with people living near the project sites (STP and SPS). Discussions were held about proposed project components, EMP measures, grievance redressal, ownership of land, tree cutting, wastewater and logging problems and general people perception for proposed project. It was noted 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 and drainage system, for its best functioning and to have the maximum health and aesthetic benefits. 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.

182. A City-level City Level Committee (CLC) has been formed in Jodhpur district by Government orders. City Level Committee meeting was organized during the preliminary design stage to which representatives of primary and secondary stakeholders were invited. City Level Stakeholder committee meeting was organized for finalization of works of sewerage and drainage in Jodhpur city in District Head Quarter, Jodhpur on dated. 24.11.2021 under the chairmanship of District Collector, Jodhpur, in presence of Chief Minister and Member of Legislative Assembly, 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. 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.

D. Consultation During Construction

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

184. A constant communication will be established with the affected communities to redress the environmental issues likely to surface during construction and operational phases and also regarding the grievance redress mechanism. NNJ, JoDA and 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

185. Executive summary of the IEE will be translated in the local language and made available at the offices of NNJ, JoDA and RUDSICO-EAP- PMU and PIU. Copies of summary will be provided to participants of city level workshop to be organized in Jodhpur. 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 NNJ, JoDA and /RUDSICO-EAP after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

186. Public information campaigns via newspaper/radio/TV, to explain the project details to a wider population will be conducted. 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.

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

188. 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.

189. 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).

190. 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

191. A project-specific, three-tier grievance redress mechanism (GRM) covers both environment and social issues. The GRM will be established 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)¹¹ the system was effective in timely resolution of grievances in a transparent manner.¹² The multichannel, project-specific, three-tier GRM is functional at

¹¹ 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.

¹² 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

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.¹³

192. Common Grievance Redress Mechanism. A common GRM will be in place for social, environmental, or any other grievances related to the project. Implementation of the resettlement plans/RIPPs/DDRs/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.

193. 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

194. 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 site¹⁴ or by sending a WhatsApp message to the PIU¹⁵ or by dialling the phone number of town level PIU/CAPPC or by dialling a toll-free number.¹⁶ 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.¹⁷ 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

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.

¹³ 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.

¹⁴ 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.

¹⁵ 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.

¹⁶ Project contractors in all project towns will have a toll-free number with specific working hours for registration of grievances related to RSTDSP.

¹⁷ <http://www.sampark.rajasthan.gov.in/RajSamWelcome.aspx>

personal 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 CAPPCC 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)¹⁸ 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 receipt of complaint/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.¹⁹ 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.

195. The multi-tier GRM for the project is outlined below (Figure 10), 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.

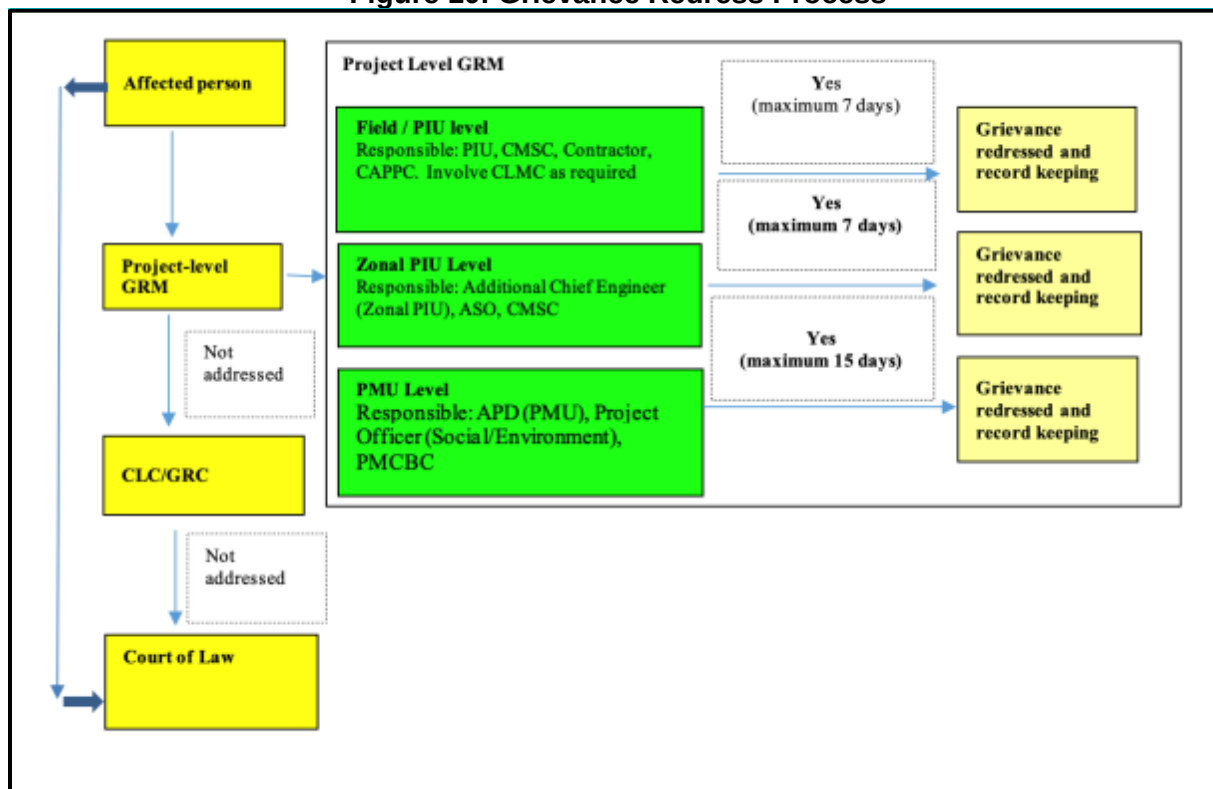
196. The project GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In case of grievance related

¹⁸ 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.

¹⁹ 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.

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), 2013.²⁰

Figure 10: 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.

197. 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.²¹

198. **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 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.

²⁰The Authority admits grievance only with reference to the Land Acquisition and R&R issues under the RFCTLARRA, 2013.

²¹ Accountability Mechanism. <http://www.adb.org/Accountability-Mechanism/default.asp>.

199. **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.

200. **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.

201. 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 level GRC shall be formed in upcoming project towns after PIUs in new towns are established through office order from PMU for the same

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

202. 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.

203. 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.

204. 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. Tables for Environment Management Plan during Design, Pre-construction, Construction and Operation phases are given below

205. 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.

206. The contractor has to submitted to PIU, for review and approval, a site environmental plan (SEP) including (i) designed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works can commence prior to approval of SEP.

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

Table 20: 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.	RSPCB, Consent etc.,	Consultants / 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 NNJ/JoDA (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	(i) No industrial wastewater shall be allowed to dispose into municipal sewers (ii) 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
Seismic sensitivity	Damage to infrastructure and potential risks: project area in low earthquake risk zone (Zone II)	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
		design (IS: 1893: Criteria for earthquake resistant design of structures).			
Location impacts of proposed components	Nearby community may be affected due to increased pollution during construction and operation	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
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	Use energy efficient electrical equipment 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	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

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
into Contractor Bid Document	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	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 (iv) Monitor water quality periodically during operation phase as per the Environmental Monitoring Plan	DBO Contractor/PIU	PMU/ ULB	Project costs
STP	Sludge management and reuse	(i) Prepare a sludge management plan (ii) Prepare a dried Sludge utilization plan for Jodhpur 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 Jodhpur 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	DBO Contractor/PIU	PMU/ ULB	Project costs

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation/ Monitoring	Cost and Source of Funds
		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)			

Table 21: Environmental Management Plan of Anticipated Impacts during Pre-Construction

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
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 requirements	Consents, permits, clearance, NOCs, etc.	PIU/Consultants in coordination of NNJ/JoDA	PMU	Cost of obtaining all consents, permits, clearance, NOCs etc. prior to start of civil works responsibility of PIU.
Environmental monitoring of baseline	To establish base line	Environmental monitoring through NABL approved laboratory	Environmental Monitoring Report of Air, noise, soil and water quality	Construction contractor	CMSC/ PIU	Contractor

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
conditions of air, noise, water and soil	environmental conditions					
Utilities	Telephone lines, electric poles and wires, water lines and gas pipe 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 construction waste / spoils management plan (Appendix C-13) and traffic management plan (Appendix C-14)	-Contingency plan for services disruption (i) List of affected utilities and operators; (ii) Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (Appendix C-13), and traffic management plan (Appendix C-14)	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
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 prevent direct disposal to water body which will inconvenience the community.	-PIU approval of 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
		(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 shall identify disposal site confirming to the following criteria, obtain permissions from local body and other government agencies as required, and submit for the approval of PIU; disposal sites shall be used only after approval of the PIU: (a) sites shall not be located in forest areas, water bodies or drainage lines, swamps or in areas which will inconvenience the community (b) site shall be selected preferably from barren, infertile lands. (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 hospitals, religious places, ponds/lakes or other water bodies				
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated	(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	Permits issued to quarries/sources of materials - List of approved quarry sites and sources of materials;	Contractor to prepare list of approved quarry sites and sources of materials with	CMSC/ PIU	No cost required. Mitigation measures are part of TOR of PIU and

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
	erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	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.	- Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	the approval of PIU		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 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	Consents, permits, clearance, NOCs, etc.	PIU and Consultants	PMU	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 PIU and Consultants

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost Source and of Funds
Social and Cultural Resources	Risk of archaeological chance finds	• Conduct of any works within 300 m from the boundary of ASI monument requires prior permission from National Monument Authority. • PIU to consult Archaeological Department with exact distance and depth of sewer works close to Mehrangarh fort, and ensure that any feedback or measures suggested is incorporated into design/construction. • 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 • Plan construction adjacent to religious/social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building. Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and plan construction activities not to make any disturbance/hindrances/obstacles during such time to the religious places,	Consultation records with ASI.	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Implementation	Monitoring of Mitigation	Cost and Source of Funds
Occupational health and safety risks	Sewer rehabilitation/ replacement work sites may have harmful / hazardous conditions endangering workers life	- 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 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.

Table 22: 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	a) 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 labour laws, applicable environmental laws, etc.	Training Plan and its implementation Achievement of the environmental performance targets by the Contractor; (i) Certificate of Completion (Safeguards	Construction Contractor	CMSC/ PIU	Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU. Other costs responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		b) 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	Compliance Orientation) (ii) Posting of Certification of Completion at worksites (iii) Posting of EMP at worksites			
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 -Location of stockpiles. - Complaints from sensitive receptors. -Heavy equipment and machinery with air pollution control devices. -Certification that vehicles are compliant with Air Act -Quarterly environmental monitoring report for ambient air, noise, water and soil	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
Water quality	Mobilization of settled silt materials, and	(i) Prepare and implement a construction waste / spoils management plan (Appendix C-13)	(i) Areas for stockpiles, storage of	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
	chemical contamination from fuels and lubricants during installation of pipelines can contaminate nearby surface water quality.	(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).	fuels and lubricants and waste materials; (ii) Number of silt traps installed along trenches leading to water bodies; (iii) Records of surface water quality Monitoring; (iv) Effectiveness of water management measures; (v) No visible degradation to nearby drainages, nallahs or waterbodies due to civil works			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.	(i) Complaints from sensitive receptors; (ii) Use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and night time noise levels (see Appendix C-7 of this IEE)	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
		(v) Quarterly environmental monitoring for ambient noise as per EMP				
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; - Areas for storage of fuels and lubricants and waste materials; - Number of oil traps installed in oil and lubricant storage areas; -Records of ground water quality monitoring;	Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
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) Prepare and implement construction waste /spoils management plan (Appendix C-13); (ii) Avoid stockpiling of excess excavated soils; (iii) Coordinate with ULB/PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and	(i) Complaints from sensitive receptors; (ii) Worksite clear of hazardous wastes such as oil/fuel (iv) Worksite clear of any excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers	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) 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	Existing Utilities 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	ULB/ PIU	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;	(i) Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite (Appendix C-14); (ii) Complaints from sensitive receptors; (iii) Number of signages placed at project location.	Construction Contractor	CMSC/ PIU / traffic police	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 construction waste /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	-Visible and understandable sign boards in construction zone; -Construction Implementation Schedule Complaints from sensitive receptors; Spoils / construction waste management plan Number of walkways, signages, and metal sheets placed at project location.	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
		(v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.				
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 labour laws	(i) Employment records; (ii) Records of sources of materials (iii) Compliance to labour laws (see Appendix C-12 of this IEE)	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 labour 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	(i) Site-specific OH&S Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of H&S orientation trainings (viii) personal protective equipment;	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
		first-aid stations shall be easily accessible throughout the site; (iii) • Sewer rehabilitation works. 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 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 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 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	(ix) % of moving equipment outfitted with audible back-up alarms; (xi) permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. (xii) Compliance to core labour laws (see Appendix C-12 of this IEE)			

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

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		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.				
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.	(i) Traffic Management Plan;	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	-H&S plan including appropriate signs for each hazard present -Construction vehicles condition in H&S plan Complaints from neighbourhood and monitoring of accidents.	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
		(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				
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 Unsanitary and poor living conditions for workers	(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 liability at work camps are maintained at the highest standards possible at all times; (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.	(i) Complaints from sensitive receptors; (ii) Drinking water and sanitation facilities for employees	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures responsibility of contractor.
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	a) Contractors should have hand held noise level meter for measurement of noise during night hours b) Contractors should have hand held lux meter for the measurement of illumination during night hours	Management Plan for night works (As per 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
	unavoidable cases	c) Preferably electrical connections is available for running equipment's otherwise sound proof/super silent Diesel Generator set should be available d) Sound level should not increase as per EMP e) Illumination should be adequate as required according to nature of works f) 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 g) All the noise activity like hammering, cutting, crushing, running of heavy equipment's should be done in day time and avoided in night time h) Workers engaged in night works should have adequate rest/sleep in day time before start of night works i) 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 j) 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 k) Workers should be trained				

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		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 l) Horns should not be permitted by equipment's and vehicles m) Workers should not shout and create noise n) First aid and emergency vehicles should be available at site o) Emergency preparedness plan should be operative during night works p) Old persons and pregnant women and women having small kids should not work in night time q) All the vehicles and equipment's being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise r) 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	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: Conduct awareness training to contractor & supervision staff prior to start of excavation;	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
		Stopping work immediately to allow further investigation if any finds are suspected; 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 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 Adjacent to religious/social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building. Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrane/obstacles during such time to the religious places, 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	As per monsoon preparedness plan& as per Appendix C-19 "Guidelines for Safety during	Construction Contractor	CMSC/ PIU	Cost for implementation of mitigation measures

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(ii) if open trenches are not avoidable during monsoon, keep ready all the mitigations measures 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	Monsoon/Heavy Rainfall"			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 (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 (Appendix C-13& C-14)	Compliance of COVID-19 protocol and guidelines (Appendix C-23& C-24)	Construction contractor	PIU/ CMSC	Contractor's cost
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and	PIU/Consultants report in writing that (i) worksite is restored to original conditions; (ii) camp	Construction Contractor	CMSC/PIU	Cost for implementation of mitigation measures

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost and Source of Funds
		(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 regressed 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.	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.			responsibility of contractor.

Table 23: Action Plan to Monitor Corrective Actions

S. No.	Item	Action required	Timeline	Responsible agency
1	Treatment inadequacy	Ensuring timely completion (March 2023) of construction of 3 STPs and start of operation	All preparatory, construction, and compliance requirements are to be met and STPs start operation prior to completion of civil works under this subproject.	PMU, RUIDP
2		Ensuring timely completion (Dec 2022) of upgrading works at existing Nandri 20 MLD STP		PMU, RUIDP

3		Ensuring timely finalization of improvements needed at Salawas STPs, and initiation and completion of construction works and start of operation of upgraded STP.	Effluent standards to be met throughout the operation phase	PMU, RUIDP
4	CTE and CTO	Ensure CTE obtained prior to start of construction of: Any new/upgrades STP Upgraded Nandri STP		PMU, RUIDP
5		Ensure CTO obtained prior to start of operation of: - Upgraded Nandri STP - Upgraded Salawas STPs 3 new STPs - Any new/upgraded STP		PMU, RUIDP
6	Treated effluent standards	Ensure that all STPs treat sewage to effluent standards established by RSPCB in CTE/CTO		PMU, RUIDP

Table 24: 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

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost Source and of Funds
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	NNJ/JoDA/O&M contractor	Jodhpur NNJ/JoDA	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.	NNJ/JoDA /O&M Contractor	NNJ/JoDA	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	NNJ/JoDA /O&M Contractor	NNJ/JoDA /O&M Contractor	NNJ/JoDA /O&M Contractor
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	NNJ/JoDA /O&M Contractor	NNJ/JoDA /O&M Contractor	NNJ/JoDA/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	NNJ/JoDA/O&M Contractor	NNJ/JoDA/O&M Contractor	NNJ/JoDA/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	NNJ/JoDA/O&M Contractor	NNJ/JoDA/O&M Contractor	NNJ/JoDA/O&M Contractor

Field	Anticipated Impact	Mitigation Measures	Indicator of Compliance	Responsible for Mitigation	Monitoring of Mitigation	Cost Source and of Funds
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 for 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 NNJ/JoDA	NNJ/JoDA	NNJ/JoDA

Table 25: 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 and Pipe laying	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	3 locations (STP-1, SPS-1, Pipe laying-1) during construction)	PM ₁₀ , PM _{2.5} , NO ₂ , SO ₂ , CO	Quarterly except Monsoon period	Contractor	Contractor
Ambient noise	3 locations (STP-1, SPS-1, Pipe laying-1) during construction)	Day time and night time noise levels	Quarterly	Contractor	Contractor
Ground Water quality	2 locations (STP-1, SPS-1) 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
		Sulphate, Nitrate, Fluoride, Hg, Cadmium, Cr ⁺⁶ , Arsenic, Lead, Total Alkalinity, Phosphate, Phenolic compound			
Soil quality	2 locations (STP-1, SPS-1) 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 26: 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, Ammoniacal 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/NNJ/JoDa	O&M Contractor/N NJ/ JoDa
Monitoring of treated effluent quality	Outlet of STP	pH, BOD, COD, TSS, NH ₄ -N, N-total, Faecal Coliform (as per Appendix C-8)	As per O&M Plan	O&M Contractor/NNJ/JoDA	O&M Contractor/N NJ/ JoDa
Monitoring of plantations	Plantation's locations	Nos. of tree survived	monthly	O&M Contractor/NNJ/JoDA	O&M Contractor/N NJ/ JoDa
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/NNJ/JoDA	O&M Contractor/N NJ/ JoDa

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	STP	CTO should be renewed before expired	5 yearly	NNJ/JoDA/PHED	Jodhpur Nagar Palika, 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/NNJ/JoDA	O&M Contractor/NNJ/JoDA
Sludge Reuse and safe disposal	Sludge Management	Sludge is being gainfully used	Continuously	O&M Contractor/NNJ/JoDA	O&M Contractor/NNJ/JoDA
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 r Cost

B. Institutional Arrangements

208. 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 Honourable 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.

209. 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.

210. 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.

211. 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.

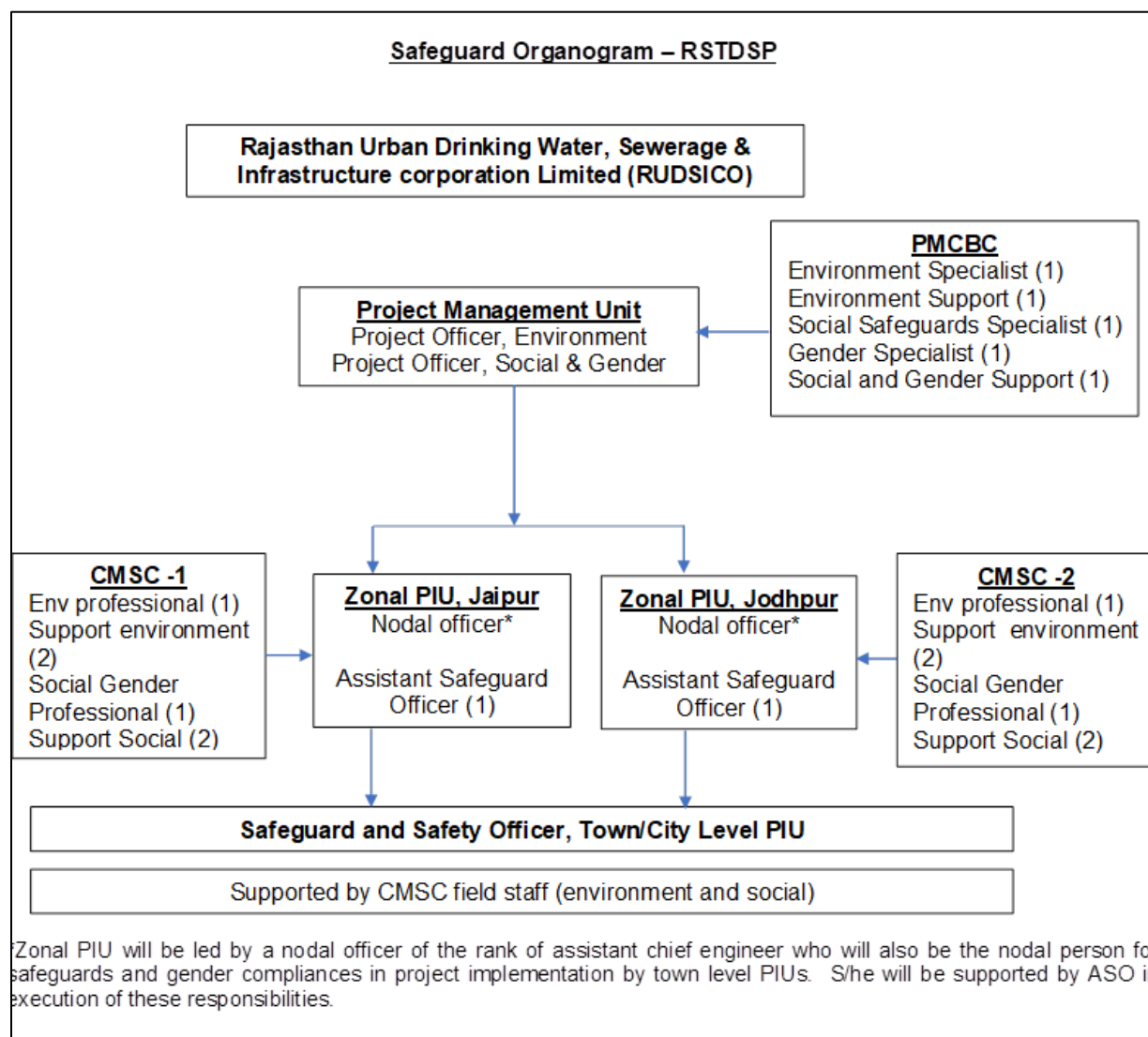
212. **Construction management and supervision consultants (CMSCs)** - 2 nos. of CMSCs catering to Jaipur and Jodhpur units are already established. They shall directly support PIUs in day to day contract management, construction supervision including quality management of ongoing works etc. This shall 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.

213. Community awareness and public participation consultants (CAPPC)- CAPC core unit is already established at PMU, Jaipur and at fields in ongoing 14 project towns. CAPC field team will be established in upcoming project towns after PIUs are formed in new towns. CAPC 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.

214. Figure 11 shows Environmental Safeguards Implementation Arrangements within RUDSICO-EAP and Table 27 and 28 summarize the institutional responsibility of environmental safeguards implementation at all stages of the project.

215. 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.

Figure 11: Environmental Safeguards Implementation Arrangement



216. 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.

217. **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.

218. 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.

219. 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.

220. **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,²² consultations with interested/affected people, (iv) field-level grievance redress; and (iv) reporting.

221. 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.

222. 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.

223. RUDSICO-EAP will ensure that bidding and contract documents include specific provision requiring Contractors to comply with: (i) all applicable labour laws and core labour standards on (a) prohibition of child labour 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 labour; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS, to employees and local communities surrounding the project sites.

²² 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.

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 labour 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 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.	(i) Over-all environmental safeguards compliance of the project (iii) Monitor and ensure compliance of EMPs as well as any other environmental provisions and conditions. (i) Review monthly monitoring report (ii) Prepare and submit to ADB semi-annual monitoring reports (iv) If necessary, prepare Corrective Action Plan and ensure implementation of corrective actions to ensure no environmental impacts; (iii) Review and submit Corrective Action Plans to ADB (iv) Organize capacity building programs on environmental safeguards (iv) Coordinate with national and state level government agencies (vi) Assist in addressing any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs (ix) 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
	(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 mitigation measures found during the course of implementation.	(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.
Consultant – 1.PMCBC-Environmental Safeguard Specialist – 1 no. Asbestos 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	(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.	

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
Heritage Expert – 1no. Biodiversity Expert – 1no.	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		
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 (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	(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 labourer about the requirements of the EMP and provide environmental awareness training to staff, employees, and laborers; (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-	(i) Ensure EMP post-construction requirements are satisfactorily complied (ii) Request certification from PIU

Responsible Agency	Responsibility		
	Pre-Construction Stage	Construction Stage	Post-Construction
	workers and posted at visible places at all times.	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.	

A. Capacity Building and Development

224. 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.

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

226. 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 labour 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

Sl. No.	Description	Target Participants and Venue	Cost and Source of Funds
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 labour 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

B. Monitoring and Reporting

227. 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.

228. 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.

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

230. 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.

231. 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.

232. 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.

C. EMP Implementation Cost

233. 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

S. N.	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
A.	Mitigation Measures						
1	Plantation at STP and SPS sites*	Construction	per tree	50	4050	202,500	Civil works cost
	Subtotal (A)					202,500	
B.	Monitoring Measures						
1	Air quality monitoring**	Pre-construction and Construction (quarterly)	per sample	27	4920	132,840	Civil works cost

S. N.	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
2	Noise levels monitoring**	Pre-construction and Construction (quarterly)	Per sample	27	1980	53,460	Civil works cost
3	Groundwater quality**	Pre-construction and Construction (quarterly)	per sample	18	6720	120,960	Civil works cost
4.	Soil quality**	Pre-construction and Construction (quarterly)	per sample	18	5880	105,840	Civil works cost
	Subtotal (B)					413,100	
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 site	Nos.	1	438819	438819	Civil works cost
3	Barricading						
	Providing and fixing Barricading using 40 mm dia M.S. pipe vertical and horizontal posts	Construction	m	136187.04	50	6809352	Civil works cost
	Providing and fixing using 40 mm dia M.S.	Construction	m	255138.59	38.50	9822836	Civil works cost

S. N.	Particulars	Stages	Unit	Total Number	Rate (INR)	Cost (INR)	Costs Covered By
	pipe ("B" class) as vertical post and PVC tape						
	MS Pipe with nut and bolt and GI corrugated sheets	Construction	Sq.m.	168396.05	101	17008001	Civil works cost
	Sub Total (D)					34,634,008	
E	Grievance Redressal Mechanism				Lump sum	350,000	Civil works cost
	Sub Total (F)					350,000	
	Total (A+B+C+D+E+F)				INR	35,924,608	

*At STP site, total 30 plants and at SPS site, total 20 plants shall be planted to reduce the impact of foul smell generated by SPS and STP to nearby residents.

** As per table 31

Summary of EMP Cost incurred by Institution:

Contractor Cost - INR 356,49,608 /-

PMU Cost - INR 2,75,000/-

Total - INR 35,924,608/-

(In Words: Rupees Three Crores Fifty-nine lacs Twenty four Thousands and six hundreds and 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
STP-1 SPS-1 WW networks-1 Total-3 Locations	Air- 3 Noise- 3 Ground Water- 2 Soil- 2	Air- 9 Noise- 9 Ground Water- 6 Soil- 6	3 years	Air- 27 Noise- 27 Ground Water-18 Soil- 18

X. CONCLUSION AND RECOMMENDATION

234. The process described in this document has assessed the environmental impacts of all elements of the Jodhpur 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. . Sewer rehabilitation / replacement works may present harmful working conditions. Appropriate measures suggested including no manual working, supervisory control, safety equipment etc.,

235. Whole the Jodhpur City is already covered by sewerage network. Total 1780 kms of sewer networks are already laid in the city, out of which many old pipe lines are not functioning properly and need augmentation/replacement. There is existing STPs of 50 MLD (2 nos.) at Salawas and 20 MLD at Nandri Village. Capacity of these STPs are not sufficient to meet the sewer load of city and therefore this STP is over loaded and proper treatment of sewer is not being done. Sewerage received from various parts of City is disposed untreated in open lands and low lined areas at several places.

236. The subproject is formulated to address gaps in sewerage infrastructure in a holistic and integrated manner. The Project Components include improvements in sewerage infrastructure. Whole sewage generated from uncovered areas within municipal limits shall also be treated at proposed STP (5MLD) as per latest effluent norms. In terms of treatment capacity adequacy, a gap of 5 MLD is assessed by duly considering the capacity of existing STPs, combined with the under construction STPs and proposed STPs by Nagar Nigam Jodhpur and Jodhpur Development Authority for Jodhpur town. Therefore, a 5MLD STP based on sequential batch reactor (SBR) process, which will meet the stipulated discharge standards is proposed under this project. It is however critical that the planned/ongoing upgrading and new STP works to be completed on time to ensure these STPs are up and operational prior to completion of sewer works proposed under this project. PMU will ensure that these works are completed timely, and consent of state pollution control board is obtained prior to start of operation, and that treated effluent meets the discharge standards

237. A SPS (6.5 MLD) is proposed in E-1 Zone at Nandri. No wildlife exists near the proposed site of SPS. There are no trees 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. However, all precautions should be taken during construction and operation to minimize the impacts on nearby residents.

238. A STP (5 MLD) is proposed near Khokhariya village on vacant government land under Municipal Council. 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. On STP site there is a temporary labour camp for ongoing nearby railways construction works. Across the road of STP site there are residences (5 double-story buildings) and a business complex with 9 shops.

239. The STP will be located at the farthest possible point from the habitation, required Land for STP is only 4500 sqm against available land of 32400 sqm. The site is surrounded by railway line at one side and Highway on other side.

240. . No wildlife is reported in this area. There are agricultural activities around this site and treated effluent and sludge from STP can be utilized in these agricultural practices and remaining treated effluent is proposed to be discharged into nearby river/drain. 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.

241. 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.

242. 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.

243. 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.

244. 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.

245. 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.

246. 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.

247. The ESS 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.

248. The project will benefit the general public by contributing to the long-term improvement of sewerage system and community liveability in Jodhpur. 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.

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

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

- (i) PMU to ensure adequate treatment capacity and treatment efficiency of all STPs meeting discharge standards in compliance with government regulations;
- (ii) PMU to ensure that STPs under construction in Jodhpur are completed on time, and are in operation prior to completion of civil works under this subproject;
- (iii) PMU to ensure that ongoing/planned upgrading works at existing STPs are completed on time and in operation prior to completion of civil works under this subproject;
- (iv) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design;
- (v) PIU to consult Archaeological Department with exact distance and depth of sewer works close to Mehrangarh fort, and ensure that any feedback or measures suggested is incorporated into design/construction;
- (vi) Include this IEE in bid and contract documents;
- (vii) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation;
- (viii) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location;
- (ix) Update and implement the asbestos management plan per site-specific conditions;
- (x) Conduct safeguards induction to the contractor upon award of contract;
- (xi) Ensure that sludge management protocols are compliant with environmental regulations (Solid Waste Management Rules 2000 and its amendments) and solid waste disposal should have a designated site (dumping on vacant lot is not allowed);
- (xii) Ensure contractor appointed qualified environment, health and safety (EHS) officers prior to start of works;
- (xiii) Timely disclosure of information and establishment of GRM;
- (xiv) Involvement of contractors, including subcontractors, in first level GRM;
- (xv) Strictly supervise EMP implementation;
- (xvi) Continuous consultations with stakeholders; and
- (xvii) Documentation and reporting on a regular basis as indicated in the IEE.

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)/Jodhpur Sewerage Subproject, Distt. Jodhpur, 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?	√		Jodhpur 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?	√		Gudha Vishnoi Conservation reserve is situated in Jodhpur at approx. 10 km aerial distance from municipal boundary of Jodhpur
Cultural heritage site		√	There are several State Protected Monuments in Jodhpur and Mandore Fort is ASI protected monument in the city. Except some sewer networks; no other project components are coming under the prohibited or regulated areas of these monuments. Confirmatory survey is required to re access the impact on cultural heritage sites
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	

SCREENING QUESTIONS	Yes	No	REMARKS
Special area for protecting biodiversity	√		Gudha Vishnoia Conservation Reserve is situated in Jodhpur at approx. 10 Km aerial distance from municipal boundary of Jodhpur. None of the components of the subproject are located near or within the protected Area. Therefore, this act is not applicable
Bay		√	
Potential Environmental Impacts Will the Project cause...			
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	In Jodhpur, 23 State Protected Monuments are present at different locations. Most of them are not within municipal boundary of Jodhpur City. Mandore Fort is listed as ASI Protected Monument in Jodhpur city. Proposed STP site is located at a distance of approx. 10 kms from Mandore fort. Except small patches of sewerage networks, no other project components fall under core and regulated area of the protected monuments. Therefore there will be no impact on the ASI and State protected monuments due to proposed Project activities.
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?		√	

SCREENING QUESTIONS	Yes	No	REMARKS
Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		√	There is no any surface water source in Jodhpur. 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.
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 200 m for STPs.

SCREENING QUESTIONS	Yes	No	REMARKS
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. In Jodhpur, rainfall is scanty and confined only to a limited 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?		√	Jodhpur is predominantly dry and rainfall is very limited
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.

SCREENING QUESTIONS	Yes	No	REMARKS
deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		√	There is no surface water body in Jodhpur, 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.
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 to workers. 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)?		√	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?		√	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?	√		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), Jodhpur Sewerage subproject, District - Jodhpur , Rajasthan

Sector : Urban Development
Subsector: Sewerage
Division/Department: SARD/SAUW

Screening Questions		Score	Remarks ²³
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
	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 one SPS 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.

²³ 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.

Appendix 2: Work order for upgradation of existing STPs

ORDER FOR COMPLETION OF GOING CONSTRUCTION WORKS AT NANDRI 20 MLD STP



कार्यालय नगर निगम जोधपुर (उत्तर)
नगर निगम भवन, पोलिटिकल कॉलेज परिसर, रेजिडेंसी रोड, जोधपुर- 342004
फोन नं. :- 0291-2651464, ईमेल :- nnjjodhpur@gmail.com

नांदड़ी सीवरेज ट्रीटमेंट प्लांट जोधपुर का उन्नयन कार्य के सम्बंध में रिपोर्ट

अवृत्त योजना के पैकेज सं. अमृत/RJ/ SEW-06 के अन्तर्गत नांदड़ी ट्रीटमेंट प्लांट जोधपुर का उन्नयन कार्य किया जाना प्रस्तावित है। उक्त कार्य की कुल राशि रु. 1208.11 लाख स्वीकृत है तथा कार्यदेश संख्या 4649 दिनांक 01/06/2018 है, कार्यदेश अनुसार कार्य शुरू करने की तिथि 08/06/2018 व कार्य पूर्ण करने के दिनांक 07/06/2020 है। एक वर्ष की Defect Liability Period के परभाव 10 वर्ष तक रखरखाव एवं संचालन भी फर्म द्वारा ही किया जाएगा। कार्य की निर्माण राशि का 864.44 लाख तथा रखरखाव एवं संचालन की राशि रु. 343.67 लाख है।

पूर्व में निर्मित STP प्लांट WSP (Waste Stabilization process) तकनीक पर आधारित है। इसमें निर्मित प्लांट में प्राइमरी ट्रीटमेंट कोर्स स्क्रीन, फाइन स्क्रीन व ग्रिट चेम्बर से तथा सेकण्डरी ट्रीटमेंट एनएसेबिक पोन्डस व फेकल्टेटिव पोन्डस द्वारा किया जाता है तथा इस प्लांट से उपचारित सीवरेज पानी की गुणवत्ता लेवल बढ़ाने के लिये उपरोक्त अपग्रेडेशन का कार्य किया जाना प्रस्तावित है।

STP प्लांट के अपग्रेडेशन का कार्य फाइटोराइट तकनीक पर आधारित है। जिसके अन्तर्गत सेकण्डरी ट्रीटमेंट Horizontal Sub Surface Wetlands Units (फाइटोराइट बेड), एयरेशन टैंक व क्लोरिनेशन Unit इत्यादि द्वारा किया जाना है। इसके अतिरिक्त उक्त कार्य के अन्तर्गत एडमीन बिल्डिंग, सिविलिटी रूम व टॉइलेट व DG शेड, वर्कशॉप व स्टोर रूम, ऑवरहेड ट्रीटेड वाटर टैंक, चार दिवारी इत्यादि कार्य प्रस्तावित है। फाइटोराइट तकनीक से उपचारित सीवरेज के पैरामीटर पॉल्यूशन कंट्रोल बोर्ड के नए पैरामीटर (BoD<10 PPM, COD<50 PPM etc.) प्राप्त किए जा सकेंगे।

वर्तमान में मौके पर फाइटोराइट बेड की दिवारों की नींव की PCC का कार्य, CCT Unit की RAFT का कार्य, व चार दिवारी का कार्य 30 प्रतिशत किया जा चुका है व वर्तमान में मौके पर कार्य बंद है तथा संवेदक को शीघ्र कार्य शुरू करने व पूर्ण करने के निर्देश दिये गये हैं।

Tender Notice for consultancy services for Upgradation of Salawas STPs

DLB-142550 B30164



कार्यालय नगर निगम जोधपुर दक्षिण
[नगर निगम मकान] पोलिटैक्निक कॉलेज के अंदर, रेजिडेंसी रोड, जोधपुर 342004
फोन नं. :- 0291-2651464 फेक्स 0291- 2651464 ईमेल :- ceo_nnja@rediffmail.com

Date:- 16/3/22

No:- 22597

ON LINE NOTICE INVITING TENDER

UBN NO- DLB2122550B30164

Online Tender is hereby invited by Municipal Corporation Jodhpur South for the following work from eligible/experienced contractors as per bid conditions. Tender to be submitted duly digitally signed in electronic format only on website <http://eproc.rajasthan.gov.in> and www.sppp.rajasthan.gov.in. The tender document shall be available for downloading from above mentioned website from Date:- 16-03-2022

S. No.	Name of Work	Estimated Project (Rs.)	Earnest Money (Rs.) 2% of estimated project cost	Cost of Tender form (Rs.)	Processing Fee (Rs.)	Duration of Contract
01	Providing Consultancy Service for Up gradation of existing Sewage treatment plant phase I, Phase II each of capacity 50 MLD based on ASP Technology at Salawas Jodhpur	10 Lacs.	20,000/- or as per latest govt. Rules	1,000/-	500/-	15 Days

1. Important Dates

S. No.	Events	Date and Time
A.	Availability of tender document	16-03-2022 6:00 PM
B.	Last date and time of online submission of tender	30-03-2022 up to 3:00 PM
C.	Submission of tender fee, RISL Charges and EMD in physical form through DD/ BC only	31-03-2022 up to 3:00 PM
D.	Date and timing of Opening of online Bid.	31-03-2022 at 4:00 PM

Terms and conditions

1. Bidders who wish to participate in online bidding will have to procure digital certificate as per IT Act 2000 to sign their electronic bids. Offers which are not digitally signed will not be accepted.
2. The cost of tender document and EMD as mentioned against NIT is to be paid in the form of DD/BC in the name of "Commissioner, Municipal Corporation, Jodhpur South" payable at Jodhpur Separately in the manner prescribed in the tender document and processing fee as mentioned against NIT is to be paid in DD in the name of "Managing Director, RISL" payable at Jaipur.
3. Eligibility Criteria: As per tender conditions.
4. Tender fee and process is not refundable.
5. The bid validity period is up to 120 days from the date of opening of tender.
6. Tender will not be opened without following documents.
(A) Processing fee, tender fee & EMD fee
(B) Self attested Certificate regarding no black listing/debarment form any govt./Semi. Govt. deptt./ULB
7. Self attested Certificate regarding no blood relation Certificate.

Other details can be obtained from website <http://eproc.rajasthan.gov.in>, www.jodhpurmc.org & www.sppp.rajasthan.gov.in


Commissioner

Municipal Corporation Jodhpur South

No:-

Date:- 16/3/22

Copy to:-

1. PA to Mayor, Municipal Corporation, Jodhpur South
2. Add. Chief Engineer, Municipal Corporation, Jodhpur South
3. Superintending Engineer, Municipal Corporation, Jodhpur.
4. Chief Account Officer, Municipal Corporation, Jodhpur South
5. Executive Engineer, Municipal Corporation, Jodhpur South
6. Astt. Engineer, Municipal Corporation, Jodhpur South
7. Gaurd file


Commissioner

Municipal Corporation Jodhpur South

Appendix 3: Stakeholders Consultations Conducted During Project Preparation

1. Consultations during Social and Environmental Impact Assessment

Various consultations were done during social and environmental impact assessment of the project with residents of the town at various locations to understand their level of satisfaction about the present 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-

Public Consultation

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
1	20.12.2021 Aanganwa Village	Kanwara Ram, Gidhari Ram Raju ram Kheta ram Nema ram Bhanwar Ram Shaarda Dhanni Oma ram Oma shayam Hukma ram Gumaan Singh Narsingh Yashoda Manish Rahul Jaisal singh Manish Male: 15 Female: 4	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. Participants are happy with proposed project	
2	21.12.2021 Layeko ki Mohalla	Ashok Kumar Ramesh Bhinwari Bai Santosh Aanad bai Dev Banda Radha Shobha Manorbai Laxmi Bai Geeta devi Mamta Shila bai Daud Ranabai Dileep Ramji Naveen	Project components under RSTDSP and the benefits to the Community. Probable disturbances and pollution during construction works Presence of any environmental sensitive area nearby the project, Present status and access of Waste Water facilities in	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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. Drinking water is providing by PHED, but the supply is intermittent on alternate days which	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
		Nitesh Arjun Ritesh Bai Babulal Male: 15 Female: 7	the town and other concerned issues and challenges.	is less than requirement of households. There are no any environmental sensitive features near to proposed work sites and pipe line work areas People are having understanding that during construction works they may have some disturbance such as traffic, air and noise pollution and they were satisfied with proposed mitigation measures Participants are happy with proposed project	
3	21.12.2021 Makrana Road	Daulat bibi Lalita Nikita Sehnaaz Afzal Razia Sardar Khan Imran shekh Male:4 Female: 4	Project components under RSTDSP and the benefits to the Community. Probable disturbances and pollution during construction works Present Status of Sewerage, problems which may arise during pipe laying works 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. During pipe laying works on roads, they suggested providing proper safety arrangements and access for pedestrians and vehicles during pipe laying works. People are having understanding that during construction works they may have some disturbance such as traffic, air and noise pollution and they were satisfied with proposed mitigation measures	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
				Participants are happy with proposed project	
4	21.12.2021 Amar Chowk	Abdul Munwar Ali Mohammad Sikandar Rahmohammad Kamal Mohammad Mohsin Mohammad akram Male: 7 Female: 0		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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. Participants are happy with proposed project	
5	22.12.2021 Near Hospital, Shastri Nagar, Jodhpur	Manoj Reena Rajmani Sukhram Vishnu Bhanwarlal Kishan Singh Male: 5 Female: 2	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works Status of Sewerage availability of labours for project, anticipated problems during construction works, 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. There is no adequate sewerage treatment system in the town. People are supportive of the project. Labours are available in nearby villages of town. No wild fauna is found in the outer areas of town.	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
				Participants are happy with proposed project	
6	22.12.2021 Near Railway Hospital, Jodhpur	Anda Ram Raju Kumar Rahul Prajapat Prakash Nand Lal Deepak Kumar Ravi Kumar Ravindra Singh Mishri Lal Jyoti Sarla Prabhu Nath Kushal Singh Anju Kumari Male: 11 Female: 3	Present Status of Work Proposed by RUDSICO-EAP, Present Status of Sewerage	People are supportive of the project and indicated their willingness to participate in the project to make it successful. People understand direct benefits along with latent benefits of the project, present water sewerage system in town is not adequate and proper treatment of sewage is not done and untreated sewage is accumulated in vacant lands and create nuisance	
7	22.12.2021 Near Medical college, Jodhpur	Dhan Raj Virendra Kumar Ramesh Rekha Ravindra Kumar Satyam Puran Singh Mamta Sarita Mohan Singh Rajesh Kumar Rukmani Male: 08 Female: 4	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works presence of any wild flora and fauna in nearby areas, 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. No wild fauna is found in the nearby areas of town	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
				Participants are happy with proposed project	
8	23.12.2021 Gita Bhawan and Panchvi Road Jodhpur	Bhawani Hemkumar Thaakli Kamlesh Ashok Om Prakash Ram Kumar Male: 7 Female: 0	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. Participants are happy with proposed project	
9	24.12.2021 Shastri Nagar Jodhpur	Rajaram Lalit Shyam Lalchand Dashrath Ashok Bunti Male: 7 Female: 0	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works Present status and access of Waste Water facilities in the town and other	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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
			concerned issues and challenges.	bear these impacts within acceptable limits. Participants are happy with proposed project	
10	25.12.2021 Near Ummid Hospital Jodhpur	Suneel Kapil Malaram Sanjay Chaand Afzal Nandu Male: 6 Female: 1	Project components under RSTDSP and the benefits to the Community. Probable disturbances and pollution during construction works 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. Participants are happy with proposed project	
11	25.12.2021 Truck Line Road Jodhpur	Vikram Veena Ramchandra Noratmal Bhaagirath Rakesh Bharat Male: 6 Female: 1	Project components under RSTDSP and the benefits to the Community. Process of logging grievance and its mechanism under the project. Probable disturbances and pollution during construction works Present status and access of Wastewater facilities in the town and other	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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
			concerned issues and challenges.	bear these impacts within acceptable limits. Participants are happy with proposed project	

Attendance Sheets of Consultations

1. Attendance sheet of Public consultation at Aanganwa Village

स्थान: आंगनवा गाँव बड़वल्ल

दिनांक 20/12/2021

क्र.सं. - नाम -	व्यवसाय -	मोबा नं. -	हस्ताक्षर
1. केवरा राम	मजदुरी	9928118298	केवरा राम
2. गिरधारी राम	मजदुरी	8696961308	गिरधारी राम
3. राजुराम	मजदुरी	9460796984	राजुराम
4. अंतराम	मजदुरी	7137708460	अंतराम
5. नेमाराम	मजदुरी	7568099342	नेमाराम
6. भवेंद्रलाल	मजदुरी	7568097899	भवेंद्रलाल
7. शारदा	छात्रा	-	शारदा
8. चूनी	छात्रा	-	चूनी
9. सोमराम	मजदुरी	6350512258	सोमराम
10. सोमराम	मजदुरी	-	सोमराम
11. दुक्काम	मजदुरी	6350512258	दुक्काम
12. सोमराम	मजदुरी	999952157	सोमराम
13. नरसिंह	दुपान	9461029091	नरसिंह
14. सोमराम	मजदुरी	9928589491	सोमराम
15. सोमराम	मजदुरी	-	सोमराम
16. सोमराम	मजदुरी	-	सोमराम
17. सोमराम	मजदुरी	-	सोमराम
18. सोमराम	मजदुरी	-	सोमराम

2. Attendance sheet of Public consultation at Layeko ki Mohalla

21/10/2021 लायको की मोहल्ला में			
क्र.सं.	नाम	पता	मोबा.
1	श्रीमती कुमारी	रुखान	982106634
2	श्रीमती	रुखान	805822344
3	श्रीमती	रुखान	2191
4	श्रीमती	रुखान	963657834
5	श्रीमती	रुखान	आनन्द
6	श्रीमती	रुखान	देवना
7	श्रीमती	रुखान	राधा
8	श्रीमती	रुखान	श्रीमती
9	श्रीमती	रुखान	श्रीमती
10	श्रीमती	रुखान	श्रीमती
11	श्रीमती	रुखान	श्रीमती
12	श्रीमती	रुखान	श्रीमती
13	श्रीमती	रुखान	श्रीमती
14	श्रीमती	रुखान	श्रीमती
15	श्रीमती	रुखान	श्रीमती
16	श्रीमती	रुखान	श्रीमती
17	श्रीमती	रुखान	श्रीमती
18	श्रीमती	रुखान	श्रीमती
19	श्रीमती	रुखान	श्रीमती
20	श्रीमती	रुखान	श्रीमती
21	श्रीमती	रुखान	श्रीमती
22	श्रीमती	रुखान	श्रीमती

3. Attendance sheet of Public consultation at Makrana Road

दिनांक	स्थान	नाम	मोबाइल नंबर	सह-संकेत
24/12/2021	मकराना रोड	मोहम्मद	9587223778	देवनागरी
1	देवनागरी	मोहम्मद		लीलना
2	लीलना	मोहम्मद		मोहम्मद
3	मोहम्मद	मोहम्मद		मोहम्मद
4	मोहम्मद	मोहम्मद	8561928816	मोहम्मद
5	मोहम्मद	मोहम्मद	895520950	Razia
6	मोहम्मद	मोहम्मद	8094524530	सिद्ध
7	मोहम्मद	मोहम्मद		

4. Attendance sheet of Public consultation at Amar Chowk

दिनांक	स्थान	नाम	मोबाइल नंबर	सह-संकेत
24/12/2021	अमर चौक	मोहम्मद	8890897151	
1	मोहम्मद	मोहम्मद		
2	मोहम्मद	मोहम्मद	9950453036	मोहम्मद
3	मोहम्मद	मोहम्मद	9602218880	मोहम्मद
4	मोहम्मद	मोहम्मद	982935028	मोहम्मद
5	मोहम्मद	मोहम्मद	8005835091	मोहम्मद
6	मोहम्मद	मोहम्मद	8560009786	मोहम्मद
7	मोहम्मद	मोहम्मद	9014247704	Ramul
8	मोहम्मद	मोहम्मद		मोहम्मद
9	मोहम्मद	मोहम्मद	1014322399	मोहम्मद

5. Attendance sheet of Public consultation at Near Hospital, Shastri Nagar, Jodhpur

1	शारदा-नाथ हॉस्पिटल के पास	मनोज	बंके बिहारी	श्याम	शेला
2	"	रिना	मनोज कुमार	श्याम	शेला
3	"	रमेश मठा	अमरलाल	श्याम	केबिन
4	"	सुखराम	लक्ष्मण	सरस डेरी	केबिन
5	"	विष्णु	सुखराम	चाय	शेला
6	"	अमरलाल	सुरजाराध	चाय	शेला
7	"	किशन सिंह	लक्ष्मण सिंह	नास्ता	शेला

6. Attendance sheet of Public consultation at Near Railway Hospital, Jodhpur

Rajasthan Secondary Towns Development Sector Project (RSTDSP)
RUIDP Phase-IV

Consultation Sheet

Place: Near Railway Hospital Town: Jodhpur Date: _____

Topic Discussed During Consultation:

1. जोड़पुर थला में जल संचयन एवं जल संचयन योजना

2. जल संचयन योजना

S. No.	Name	Gender		Address	Contact No.	Signature
		Male	Female			
1	अनवराम	✓		होस्पिटल के पास	अनवराम	
2	राजू कुमार	✓		— " —	राजू	
3	राहुल कुमार	✓		— " —	राहुल कुमार	
4	हरिहर सिंह	✓		— " —	प्रदीप सिंह	
5	नरेश कुमार	✓		— " —	मेधा सिंह	
6	दीपक कुमार	✓		— " —	दीपक	
7	रवि कुमार	✓		होस्पिटल के पास	रवि	
8	रवींद्र सिंह	✓		— " —	रवींद्र	
9	मिर्छावाल	✓		— " —	मिर्छावाल	
10	जयसिंह		✓	— " —	जयसिंह	
11	सरिता		✓	— " —	सरिता	
12	सुनील	✓		— " —	सुनील	
13	सुधीर सिंह	✓		— " —	अनवराम	
14	अनुराध		✓	— " —	अनुराध	

7. Attendance sheet of Public Consultation Near Medical college, Jodhpur

Rajasthan Secondary Towns Development Sector Project (RSTDSP)
RUIDP Phase-IVConsultation SheetPlace: Medical College Town: Jodhpur Date:

Topic Discussed During Consultation:

1. ગોદાવરી નદી પર પાણીની સુવિધા અને સેવા
 2. સેવા સુવિધા સુધારવાની

S. No.	Name	Gender		Address	Contact No.	Signature
		Male	Female			
1	અમલો	✓		મોડેલ ગામ		અમલો
2	વિદ્યુત્તુમલ	✓		— " —		વિદ્યુત્તુમલ
3	અમલ	✓		— " —		અમલ
4	સેવા		✓	— " —		સેવા
8	વિદ્યુત્તુમલ	✓		— " —		વિદ્યુત્તુમલ
6	અમલ	✓		— " —		અમલ
7	પૂનર્વસ	✓		મોડેલ ગામ		પૂનર્વસ
8	અમલ		✓	— " —		અમલ
9	અમલ		✓	— " —		અમલ
10	મોડેલ ગામ	✓		— " —		મોડેલ
11	સેવા સુવિધા	✓		— " —		સેવા
12	અમલ		✓	— " —		અમલ

8. Attendance sheet of Public consultation at Gita Bhawan and Panchvi Road Jodhpur

क्र	हरेराम	नाम	पिता का नाम	व्यवसाय	Signature
1	गिता भवन	भवानी	मेताकसिंह	उध डेरी	फोटोपाथ
2	गिता भवन	हैमकुमार	भवैरलाल	नास्ता	थेला
3	पांचवी रोड	थाकली	मुकार अली	अवजी	थेला
4	पांचवी रोड	कमलेश	सुरेश जी	सवजी	थेला
5	पांचवी रोड	अशोक	राम जी	सवजी	थेला
6	पांचवी रोड	ओमप्रकाश	राम जी	फ्रूट	थेला
7	पांचवी रोड	राम जी	नानक	हेल्मेट	थेला

9. Attendance sheet of Public consultation at Shastri Nagar Jodhpur

क्र	शास्त्री नगर	नाम	पिता का नाम	व्यवसाय	Signature
1	शास्त्री नगर	राजराज	रघुनाथ	पात्र	थेला
2	"	अलीत	गोकलराम	जमुत	थेला
3	"	इमाम	देवीकिशन	पात्र	थेला
4	"	लालचन्द	नाशमठावाल	ककुली	थेला
5	"	दशरथ	भेडाराम	नास्ता	थेला
6	"	अशोक	बालकिशन	कॉमेसीक	थेला
7	"	बन्सी	बालकिशन	पात्र	थेला

1. Attendance sheet of Public consultation at Near Ummed Hospital Jodhpur

(40)					
①	उम्मेद हॉस्पिटल	सुनिल	मनवरलाल	नास्ता	थैला
②	उम्मेद हॉस्पिटल	फपिल	मनवरलाल	नास्ता	थैला
③	उम्मेद हॉस्पिटल	भालाराम	शंईराम	नास्ता	थैला
④	उम्मेद हॉस्पिटल	सजेंय	भैराम	नास्ता	थैला
⑤	उम्मेद हॉस्पिटल	चाद	जबाउली	फैन्सी	थैला
⑥	उम्मेद हॉस्पिटल	अफजल	जलाल खों	फुट	थैला
⑦	उम्मेद हॉस्पिटल	जन्कु	रामता	चना-मुंगफली	थैला

2. Attendance sheet of public consultation at Truck Line Road Jodhpur

(53)					
क्र.सं.	रास्ता	नाम	पिता का नाम	व्यवसाय	संकेत
①	ट्रक लाईन रोड	विक्रम	भागवन्त	गारत	थैला
②	"	वीणा	जेमीनन्द	रिचका	फुटपाथ
③	"	राम-चन्द्र	दीपाराम	रिचका	फुटपाथ
④	"	नोरतमल	जगद्वारा	जन्कु	थैला
⑤	"	भागीरथ	बाबुलाल	ककुली	थैला
⑥	"	राकेश	राजकुली	जमकीन-पीप	केबिन
⑦	"	भरत	जोनईश्वर	फुट	थैला

3. Stakeholders Consultations in CLC:

City level Stakeholder Committee (CLC) Meeting (dtd. 24.11.2021)- City stakeholder committee meeting was organized for Jodhpur in District Head Quarter, Jodhpur on dtd. 24.11.2021 to discuss the matter of proposed Sewerage and Drainage works in Jodhpur under the chairmanship of District Collector, Jodhpur, in presence of MLA, Jodhpur, 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. Minutes of CLC meeting, attendance sheet and photographs are given below-



Minutes of CLC meeting with Outcomes

Office of District Collector, Jodhpur

No. RUIDP/Phase IV/Jodhpur/2021/567

Date: 24.11.2021

Minutes of City Level Committee Meeting- Jodhpur

A City Level Committee meeting held on 24.11.2021 under the chairmanship of District Collector, Jodhpur for finalization of works of Sewerage and Drainage in Jodhpur city under RUIDP Phase-IV (Tranche-II). List of Public Representative, Officials, & other stake holders attended the meeting, is enclosed at Annexure 'A'.

It was initially briefed that RUIDP will take up sewerage and drainage works in Jodhpur city under Phase-IV, Tranche-II with ADB funding.

Proposed scope of works and other provisions considered in sewerage & Drainage works in Jodhpur City were appraised to the committee members and other stakeholders through Power Point Presentation with tentative cost of project. Salient features of proposed work in Jodhpur city are as under:-

1. Sewerage Works

In the proposed sewerage works, the provisions considered for the rehabilitation of old and damaged sewerline by CIPP technology, increasing the capacity of old laid sewerline by pipe bursting technology, CC/ BT road restoration (full width road restoration in CC roads - upto 4m & in BT road upto 7m) depending upon the site conditions. House sewer connections, sewer laying through trenchless technology to avoid inconvenience to public (where the depth of sewer is greater than 3.5 m), Installation of sensors in sewer manholes at strategic locations for real time information of overflow / chocking at control room are also proposed.

Brief description of proposed works are as under:-

- Total sewerline proposed in Jodhpur City is approx. 478.30 Kms. The area wise detail is as below:-
- Jodhpur Nagar Nigam (North) - 150.10 Kms
- Jodhpur Nagar Nigam (South) - 171.60 Kms
- Jodhpur Development Authority - 156.60 Kms
- Out of 478.30 Kms, 156.30 Kms are for Augmentation, rehabilitation and Up-gradation of existing sewerage lines works and 322 Kms is proposed as new sewerline works.
- Construction of new 10 MLD Sewage Treatment Plant at Khokhariya on SBR technology.
- Provisions of approx. 51,630 house sewer connections.
- Estimated total cost of proposed works under sewerage is 452.21 Cr.

2. Drainage Works

Two major drains of Jodhpur town viz. Bhairav Nallah and Mata Ka than Nallah is proposed to extend up to Joghari River to sort out the problem of storm water accumulation within the city.

Brief description of proposed works are as under:-

- a. Extension of storm water drainage system of Bhairav Nallah (from Sobhawaton ki Dhani to Joghari River):-

27

- i. It is proposed to construct the drainage system by covering the area starting from Shobhawato ki dhani to Pal Village, Tanawara, and Ghinnado ki Dhani & Salawas road till Johari River.
 - ii. Length of proposed drain is 13.10 kms. out of which drainage cover will be provided on around 7.50 kms while the remaining length will be covered as the open drainage works.
 - iii. Estimated cost of this work is Rs. 141.00 Cr.
- b. Extension of storm water drainage from Mata ka Than to Johari River:-**
- i. It is proposed to construct the drainage system by covering the area starting from extension of Mata Ka Than upto Saran Nagar Flyover, Extension of existing Krishi Mandi nallah upto Saran Nagar Flyover and extension of RTO Nallah from Saran Nagar Flyover to Johari River.
 - ii. Length of proposed drains under this work is 8.0 kms.
 - iii. Estimated cost of this works is Rs. 66.16 Cr.

3. Rising ground water problem in jodhpur city- finding sustainable solution

To find out the sustainable solution of the rising ground water table problem, following proposal has been considered:

- i. Provision for developing pattern to use Surface and Ground Water sources as one integrated resource including IEC activities etc.
- ii. Provision for Water Balance Study
 - a) For PHED to meet ancillary requirements e.g. additional flow meters etc. against work already planned/sanctioned for monitoring at Kaylana and Takhsatagar impounding reservoirs.
 - b) For accounting roll of rainfall by calculations of recharge/draft of ground water: Flow measurement in seven major drains of the city at minimum 14 spots in rainy season months.
- iii. Provision for
 - a) Increasing Ground Water Abstraction (adding 35 new sources in affected area.
 - b) Providing new 65 piezo-meters with SCADA compatibility etc.
- iv. Provision for mapping/ satellite imaginary work etc to be conducted by RRSC/ISRO, Jodhpur
- v. Provision for capacity building of GWD in regard Installation and operation of Telemetric Digital water level recorder (TDWLR), preparation of supporting digital maps etc.
- vi. Provision for "Ground water Contouring and Aquifer Modeling" alongwith exploring the possibility of Tracer Study/ Isotope Study and Curtain Grouting including its execution requirement complete including drilling of required bore holes.

Tentative cost for this proposal is 27.30 Crs.

District Collector, Jodhpur focussed on maintaining the quality standards and timely completion of works, going to be executed under RUIDP.

District Collector, Jodhpur raised the concern for the quality parameter of the

treated sewage from existing STP's to be maintained as per latest NGT/CPCB and suggested to take up the work of up-gradation of existing STPs in coming phases, especially Nandari STP.

Looking to the requirement of digitization of existing and GIS mapping of proposed sewerage network and other assets, it was directed to include the same in the project.

Suggestions and directions of the City level committee will be incorporated in the detailed project report. The City Level Committee decided to approve the Detailed Project Reports of Sewerage and Drainage works for which the brief is mentioned as above.

Meeting ended with vote of thanks to the chair.

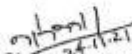

(Inderjeet Singh)
District Collector and Chairman CLC,
Jodhpur

No. RUIDP/Phase-IV/Jodhpur/2021/ 568-593

Date: 24.11.2021

Copy to the following for information and necessary action please:

1. PA to Hon'ble Chief Minister & Member of Legislative Assembly - Sardarpura (Jodhpur)
2. PA to Hon'ble Member of Parliament -Jodhpur
3. PA to Hon'ble Member of Legislative Assembly - Soorsagar (Jodhpur)
4. PA to Hon'ble Member of Legislative Assembly -Jodhpur
5. PA to Hon'ble Member of Legislative Assembly - Luni (Jodhpur)
6. PA to District Collector and Chairman CLC, Jodhpur.
7. PA to Mayor, Nagar Nigam, Jodhpur-South
8. PA to Mayor, Nagar Nigam, Jodhpur-North
9. Chairman, Jodhpur Development Authority
10. Commissioner, Municipal Corporation, Jodhpur (North/South).
11. Commissioner, Jodhpur Development Authority, Jodhpur
12. PA to Project Director, RUIDP, Jaipur.
13. PA to Dy. Mayor, Nagar Nigam, Jodhpur-South
14. PA to Dy. Mayor, Nagar Nigam, Jodhpur-North
15. Chief Engineer, Nagar Nigam Jodhpur
16. Addl. Project Director, RUIDP, Jaipur.
17. Addl. Chief Engineer, RUIDP, Jaipur.
18. Director Engineering, Jodhpur Development Authority, Jodhpur
19. Addl. Chief Engineer, PHED, Jodhpur
20. Addl. Chief Engineer, PWD, Jodhpur
21. Addl. Chief Engineer, JDVVNL, Jodhpur
22. Addl. Chief Engineer, WRD, Jodhpur
23. Senior Town Planner, Jodhpur.
24. M/s Exceltech Consultant, Jaipur.
25. M/s Mars Planning Engineering, Ranchi.
26. M/s Advance Engineering Consultant, Gandhinagar (Gujarat).


Addl. Chief Engineer
RUIDP, Phase-IV, Zone- Jodhpur

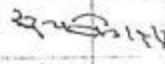
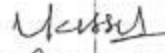
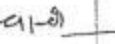
Attendance Sheet of CLC Meeting

ATTENDANCE SHEET of City Level Committee (CLC) meeting, Jodhpur

Purpose: - Discussion of broad scope of DPR and identification & finalization of Drainage & sewerage works to be taken up in Jodhpur under RUIDP Phase IV.

Date of Meeting : 24th November, 2021 at 3:00 PM

Venue : Meeting Hall, Collectorate, Jodhpur

S.No.	Name	Designation and Organization	Signature
1.	Sh. Ashok Gehlot	Hon'ble Chief Minister & Member of Legislative Assembly - Sardarpura (Jodhpur)	
2.	Sh. Gajendra Singh Shekhawat	Hon'ble Union Cabinet Minister, Ministry of Jal- Shakti & Member of Parliament-Jodhpur	
3.	Smt. Manisha Panwar	Hon'ble Member of Legislative Assembly -Jodhpur City	
4.	Smt. Suryakanta Vyas	Hon'ble Member of Legislative Assembly -Soorsagar (Jodhpur)	
5.	Sh. Mahendra Bishnoi	Hon'ble Member of Legislative Assembly -Luni (Jodhpur)	
6.	Sh. Indrajeet Singh	District Collector and Chairman CLC-Jodhpur	
7.	Smt. Kunti Deora Parihar	Mayor, Nagar Nigam, Jodhpur-North	
8.	Ms. Vanita Seth	Mayor, Nagar Nigam, Jodhpur-South	
9.	Sh. Abdul Karim	Dy. Mayor, Nagar Nigam, Jodhpur-North	
10.	Sh. Kishan Laddha	Dy. Mayor, Nagar Nigam, Jodhpur-South	
11.	Sh. Qummer Choudhary	Commissioner, Jodhpur Development Authority, Jodhpur	
12.	Sh. Rajendra Singh Kaviya	Commissioner, Municipal Corporation, Jodhpur-North	
13.	Sh. Arun Purohit	Commissioner, Municipal Corporation, Jodhpur-South	

14.	Sh. D. K. Meena	Chief Engineer, Nagar Nigam, Jodhpur	<i>Me</i>
15.	Sh. Arun Vyas	Chief Engineer, RUIDP, Jalpur	<i>Ar</i>
16.	Sh. L.R. Vishnoi	Director Engineering, Jodhpur Development Authority	<i>LV</i>
17.		Addl. Chief Engineer, PWD, Jodhpur	
18.	M. S. Charan	Addl. Chief Engineer, JDVNL, Jodhpur	<i>MS</i>
19.	Narayan Lal Kumbhar	Addl. Chief Engineer, WRD, Jodhpur <i>SE WRD Jodhpur</i>	<i>NL</i>
20.	VINOD BHARTI	Addl. Chief Engineer, PHED, Jodhpur	<i>V</i>
21.	Vibendra Ajmera	Addl. Chief Engineer, RUIDP, Zone-Jodhpur	<i>VA</i>
22.	Yogesh K.	(DTP) Senior Town Planner, Jodhpur	<i>YK</i>
23.	Sampat Meghwal	ACE PMTS	<i>SM</i>
24.	Sh. P. S. Tamwar	SE, Nagar Nigam, Jodhpur	<i>PS</i>
25.	Mookesh Bhati	ACE, PWD, Jodhpur	<i>MB</i>
26.	Yogesh Kr.		
27.	Rakha Chaudhary	TH to XEN, WR Div. Jodhpur	<i>RC</i>
28.	RAGHUVENDRA SHARMA	DPR CONSULTANT (SEWER) EXECUTECH CONSULTANCY	<i>RS</i>
29.	Satish Chitla	DPR Consultant for Jodhpur	<i>SC</i>
30.	Shubham Shah	MARS Ranchi	<i>SS</i>
31.	Ravi Suthar	SDS, PMCB, RUIDP PN-9	<i>RS</i>
32.			

Stakeholder Consultation Meeting on 6 February 2023



Government of Rajasthan
Office of Superintending Engineer
Rajasthan Urban Infrastructure Development Project
Phase-IV, Tranche –II (RSTDSP), PIU-Jodhpur
(Email:- ju.ruidp@rajasthan.gov.in)

(40)RUIDP/Ph-IV/GEN/ 994

Date: 6/2/2023

Minutes of Stakeholder Meeting

A city level Stakeholder Meeting and Public Consultation was held on 25.01.2023 at CSI Nagar Nigam Office, Jodhpur under the Chairmanship of Executive Engineer, PIU, Jodhpur, for awareness and disclosure of information about Jodhpur Sewerage and Drainage subprojects, including project benefits, details of Environmental Management Plan, Environmental and Social Safeguarded, provision of Health and Safety, etc. Proposed scope of works and other provisions in the wastewater and drainage projects in Jodhpur city were appraised to the stakeholders through PowerPoint presentation with salient features of the proposed works. Details of area covered under the wastewater and drainage project and other components of the projects was also appraised to stakeholders along with the provisions for environmental and social safeguard and Grievance redressal mechanism. Meeting was attended by several ward councillors of Jodhpur Nagar Nigam, representatives of NGOs, PIU, Jodhpur, Environmental and Social and Safeguard Professionals of CMSC-2 and CAPP personals. A few members suggested if the additional areas would have covered in the project, it would have been good for the inhabitants of those areas.

Counsellors and other representatives exhibited their contentment for the selection and implementation of Jodhpur WW and Drainage project. The attendance sheet of participants of stakeholder meeting is attached at separate sheet.

Meeting was ended with a note of thanks to chair

(Nemichand Gehlot)
Executive Engineer
RUIDP, PIU-Jodhpur

A. Photos of Stakeholder Consultation





B. Attendance Sheet of Stakeholder Consultation

RUIDP Rajasthan Urban Infrastructure Development Project
(RUIDP Ph-IV)
Community Awareness and Public Participation (CAPP) Consultant

**जोधपुर सीवरेज परियोजना में हित धारकों के साथ
परिचर्चा कार्यक्रम**

दिनांक 25.01.2023, स्थान—CSI कार्यालय प्रतापनगर, नगर निगम उत्तर, जोधपुर

क्र.सं.	नाम	पद	मोबाईलनम्बर	हस्ताक्षर
1	लीलाधर	पाषंड	94141 25768	
2	अमृ कंवर	पाषंड	722997667	
3	विशाल खरेबन्दा	पाषंड वार्ड-3	9929412 767	
4	जालिंद चौहान	पाषंड वार्ड-17	820922 1010	
5	मेहराज खंसारी	पाषंड वार्ड-15	7014439 269	
6	SANDEEP KUMAR	वार्ड-15 Schiff	9897343575	
7	Dhishunder Vaishna	वार्ड-15	94147 2199	
8	सीमा खेतान	पाषंड वार्ड 07 उत्तर	9269209232	



Rajasthan Urban Infrastructure Development Project (RUIDP Ph-IV)

Community Awareness and Public Participation (CAPP) Consultant

9	उत्तमेश्वर	पार्षद प्रतिनिधि वार्ड नं० ७ अर	9782288787	उत्तमेश्वर
10	अजय जोशी	पार्षद वार्ड - 11 अर	9314711418	Ajay Joshi
11	प्रदीप मंगर	पार्षद वार्ड - 10 (उत्तर)	9203479535	Pradeep Mangar
12	मेमोचन्द गहलोत	अध्यक्ष आर्यो आर्यो आर्यो जोधपुर	9413145233	Memochand Gahlot
13	मनोज कुमार	CME I CAPP	8094002757	Manoj Kumar
14	Gowind Singh Rathore	Consultant ADB	9560967524	Gowind Singh Rathore
15	एएसएन भाई	पार्षद प्रतिनिधि	7727863780	ASAN Bhai
16	Dinesh Parmar	Support Engineer	8005592288	Dinesh Parmar
17	Saurabh Pandey	CME - II	98263 99058	Saurabh Pandey
18	RAJEEV SHARMA	Gandab Soud Sahgwan expert CMSC-II	93101 03101	Rajeev Sharma

Public Consultation Conducted near the STP and SPS Locations

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
1	27.01.2023 STP Location in Khokariya, jodhpur	Ghisa Ram Gujjar, Ghan Singh Shekhawat, Mathuri Bai, Atul Achariya, Vikash Giri Male: 5 Female: 01 Attendance Sheet is given below: Attachment-1	Proposed 5 MLD STP, STP components and Proposed SBR Treatment Technology Location of Proposed STP and in Khokariya village on govt. land. Treated effluent of STP, Design Standards of Treated effluent and its reuses. Minimum distance of STP from nearest habitants. Present status and access of Waste Water facilities in the town and other concerned issues and challenges.	Local residents told about the there is no sewer line and sewage treatment facilities in the residential colonies located on Jodhpur- Jaipur NH near the Military area and Ram Ji Ka Hatha, Jodhpur. Majority of houses in nearby location of proposed STP are constructed in recent one or years. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. Participants are happy with proposed project and facilities in their area.	 
2	27.01.2023 STP Location in Khokariya, jodhpur	Mahipal Singh, Sher Khan, Mahesh, Ramesh Charan, Raju Ram, Babula Male: 6 Female: Attendance Sheet is given below: Attachment-1	Proposed 5 MLD STP, STP components and Proposed SBR Treatment Technology Location of Proposed STP and in Khokariya village on govt. land. Treated effluent of STP, Design Standards of Treated effluent and its reuses. Minimum distance of STP from nearest habitants. Present status and access of Waste Water facilities in the town and other concerned issues and challenges.	Local residents told about the there is no sewer line and sewage treatment facilities in the residential colonies located on Jodhpur- Jaipur NH near the Military area and Ram Ji Ka Hatha, Jodhpur. Majority of houses in nearby location of proposed STP are constructed in recent one or years. People understand that during construction works there may be some disturbance and air and noise pollution and they are ready to bear these impacts within acceptable limits. Participants are happy with proposed project and facilities in their area.	

S. No	Date and Location	participants	Topic Discussed	Outcome	Photographs of Public Consultation
3	27.01.2023 SPS Location in Nandri, Jodhpur	Rameshwar, Ashoke Jod, Vinod Mahoroliya, Dharmaram, Gopal, Kalu Ram, Balkishan and Ramesh Male: 08 Female: 00 Attendance Sheet is given in Attachment-2.	Proposed Location of SPS in Nandri, and route of main trunk line near the Proposed SPS location. Project components under RSTDSP and the benefits to the Community. Probable disturbances and pollution during construction works Presence of any environmental sensitive area nearby 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 the town and city people have their own septic tanks and soak pits and out skirts people are practicing open defecation. Drinking water is providing by PHED, but the supply is intermittent on alternate days which is less than requirement of households. There are no any environmental sensitive features near to proposed work sites and pipe line work areas People are having understanding that during construction works they may have some disturbance such as traffic, air and noise pollution and they were satisfied with proposed mitigation measures Participants are happy with proposed project	

Attachment: 1: Attendance Sheet of Public consultation near the Proposed STP Location

Subproject Waste Water town Jodhpur, RUIDP (Phase-IV) Public Consultation Sheet				
Town: Jodhpur		Name of the person conducted public consultation: Kamlesh (SSS) & Sandeep (ESS) Mobile: 9799352233, 9897343579 Designation: SSS, ESS		
Site / Zone: STP Khokhariya				Date: 27.01.23
Area: Gram Khokhariya				
Sr. No.	Name	M/F	Contact No.	Signature
1.	महिला सिंठ	M		
2.	श्रीर रवा	M	9887355730	
3.	महेश	M	9119359454	
4.	रमेश चारण	M		
5.	राजु राम	M	9680465453	21/1/21/1
6.	बाबु लाल जी	M	9314299314	
7.				

Subproject Waste Water town Jodhpur, RUIDP (Phase-IV)				
Public Consultation Sheet				
Town: Jodhpur		Name of the person conducted public consultation: Kamlesh & Sandeep Mobile: 9799352233, 9897343579 Designation: SSS, ESS		
Site / Zone: STP Khokhariya				Date: 27.01.23
Area: Gram Khokhariya				
Sr. No.	Name	M/F	Contact No.	Signature
1.	दीप्ता राम गुजर	M	9602686687	दीप्ता
2.	ज्ञान सिंह ब्रह्मवत	M	6350297031	
3.	मुथरी वार्ड	F		मुथरी वार्ड
4.	अतुल आचार्य	M	9799629125	अतुल
5.	विकास मिर	M	8769563384	विकास मिर

Attachment-2: Attendance Sheet of Public Consultation Near the SPS Location

Subproject Waste Water town Jodhpur, RUIDP (Phase-IV) Public Consultation Sheet				
Town: Jodhpur		Name of the person conducted public consultation: Sandeep & Kamlesh Mobile: Designation: E.S.S.S.S		
Site / Zone: SPS Nandari				Date: 27.01.23
Area: Gho shela Nandari				
Sr. No.	Name	M/F	Contact No.	Signature
1.	Rameshwar	m	7665597073	Rf.
2	Ashok Jod	m	9928221415	AS
3.	Vinod Muroliya	m	8094487577	Vinod
4.	Dhasma Ramji	m	9352097505	धर्म राम
5	Gopal ji	m	978 2501757	Gopal
6	Kalu Ramji	m	9950970012	काल राम
7.	Balkishan	m	9001518710	बी/म/किशन
8.	Ramesh	m	8890116000	Ramesh

Appendix 4: Photographs of Proposed Component Locations and Existing components
Photos of STP and SPS sites

	
Approach road to proposed SPS site	Proposed SPS Land within the existing land of under constructed STP at Nandri Village
	
STP upgradation work under progress in Nandri Village	
	
	
Approach road to STP site and Proposed STP Site	

Photos of roads where sewer networks are proposed

	
Existing Roads at Ratananda	Near Education department
	
Railway hospital to JDA circle	Medical Circle
	
Riktiya Bhairoji Road	Sambit Circle
	
Airforce Road	Airforce Circle

	
Military hospital area	
	
Transport Nagar Road	Aagnawa Road
	
Saran Nagar Bridge	Nandari Village

Appendix 5: List of ASI and State Protected Monuments in Jodhpur district

1. List of ASI Protected Monuments in Jodhpur

S.N. in ASI List	Monument's name	Location	Town
89.	Fort	Mandore	Jodhpur

2. List of State Protected Monuments in Jodhpur

District-Jodhpur		
S. No	Name of Monument	Location
1.	Jodhpur Fort	Jodhpur
2.	Hari-Har Temple-1	Osian
3.	Hari-Har Temple-2	Osian
4.	Hari-Har Temple-3	Osian
5.	Hari-Har Temple-4	Osian
6.	Hari-Har Temple-5	Osian
7.	Sun Temple	Osian
8.	Shiv Temple	Osian
9.	Piplad Mata Temple	Osian
10.	Vishnu Temple	Osian
11.	Jain Temple	Osian
12.	Sachiya Mata Temple	Osian
13.	Baori (Jalara or Jhalara)	Osian
14.	Heroes Hall (Veeron ki Dalan)	Mandore
15.	Cenotaph of Rao Mal Deva	Mandore
16.	Cenotaph of Motaraja Udai Singh	Mandore
17.	Cenotaph of Sawai Raja Sur Singh	Mandore
18.	Cenotaph of Raja Gaj Singh	Mandore
19.	Cenotaph of Maharaj Jaswant Singh-I	Mandore
20.	Cenotaph of Maharaj Ajeet Singh	Mandore
21.	Cenotaphes at Panch Kunda	Mandore
22.	Kakku Deval and Kirti Stambha	Ghatiyala
23.	Sculpture of Tokeshwara Maharaj	Mandore
24.	Ravana ki Chanwari	Mandore
25.	City wall Jodhpur	Jodhpur
26.	Shiv Mandir, Lamba (Khasra No. 1529)	Bilara
27.	Vishnu & Shiv Mandir, Buchakala	Bilara
28.	Prachin, Mandir, Gangana (Khasra No. 123)	Jodhpur
29.	Prachin Mahal, Sursagar	Jodhpur
30.	Durg Phalodi	Phalodi
31.	Zanana Mahal	Mandore
32.	Harsh ka Deval (Shiv Temple)	Varna (Bilara)
33.	Prachin Shiv Temple Baori, Bhopalgarh	Bhopalgarh

34.	Prachin Shivalay, Bhundana	Bhopalgarh
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Appendix 6: Environmental audit of existing sewage treatment plants

ENVIRONMENTAL AUDIT OF EXISTING SEWAGE TREATMENT PLANT AT SALAWAS, JODHPUR OF JODHPUR NAGAR NIGAM (NNJ)

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 Jodhpur town. Since adequate capacity treatment facility is already Salawas STP zone, no new STPs is proposed for this STP zone. 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. Therefore 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 objectives 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.

Salawas STP is designed for treatment of 100 (50X2) MLD 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 screens and grit removal chamber, primary clarifier, Aeration tank, Secondary clarifier, Primary and secondary thickeners, digesters, centrifuges 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 analyze the quality of sewage water for necessary parameters.

There is one 450 KVA DG set installed for emergency power supply. The treated sewage is used for plantation and horticulture, excess treated effluent is discharged into River Jojari.

Description of the Salawas STP):

Location	Salawas STP Latitude: 26° 8'56.77"N Longitude: 72°59'11.96"E
Start of operation (year)	Phase – 1 - 50 MLD – 2011 Phase -2 – 50 MLD - 2018
Owned by	Municipal Corporation, Jodhpur
Capacity	100 (50 X2) Million liters per day (MLD)
Sewage treatment process	Activated Sludge Process (ASP) sewage treatment plant. Facility has the following components: Sewage collected through city drains comes to STP & after ASP based treatment like i.e. grit removal chamber, primary clarifier, aeration process,

secondary clarifier and sludge thickener process got discharged to final drain. The treated sewer partly used in agriculture and horticultural activities in plant premises.

Salawas STP

Component of both STP are same and each 50 MLD plant having following components

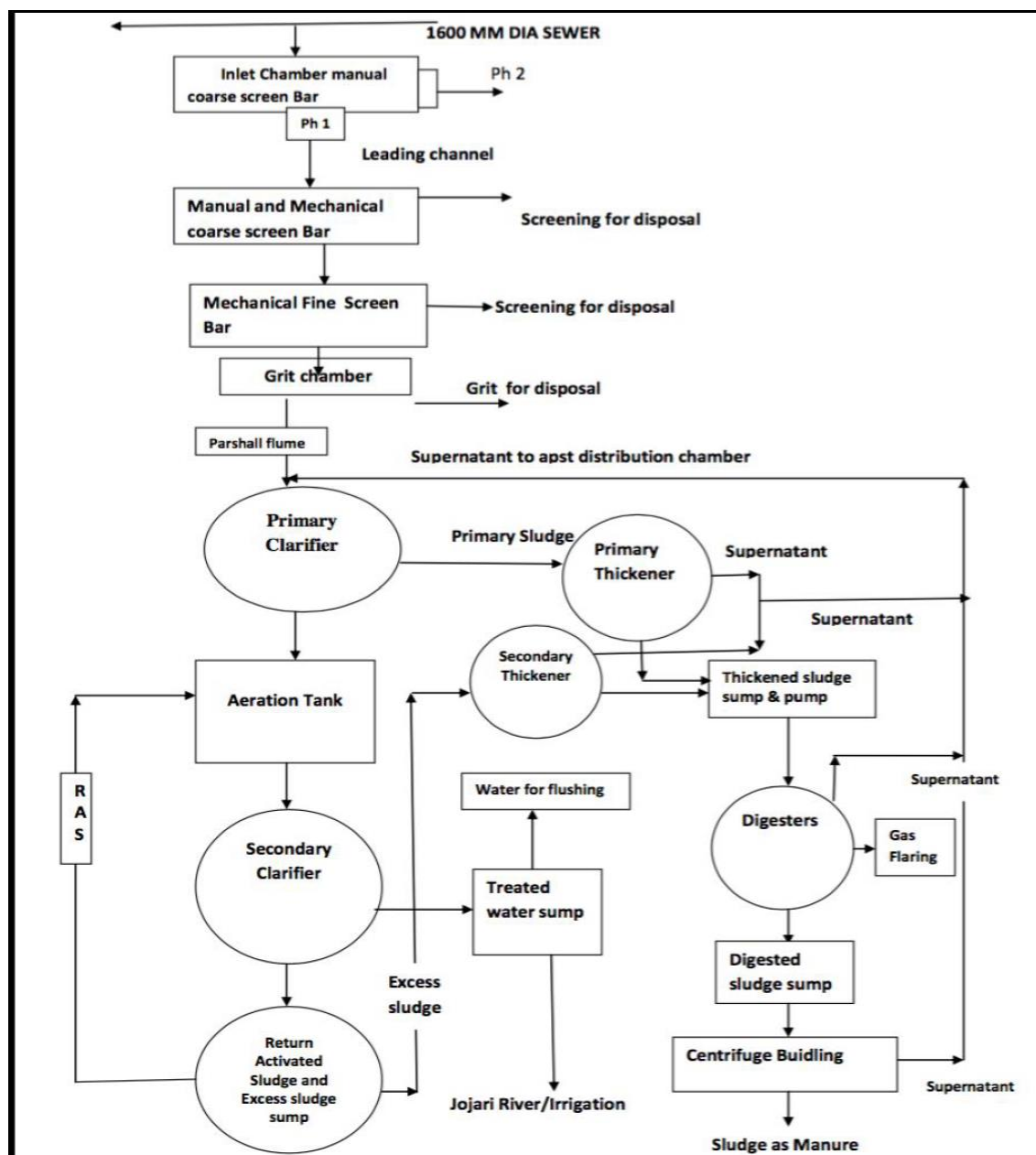
Components	quantity
Inlet chamber	01
By pass channel from inlet chamber	01
Coarse screen (Mechanical)	01
Coarse screen (Manual)	01
Fine bar screen (Mechanical)	02
Grit Chamber	04
Flow measurement – Parshall Flume	01
Dist. Chamber of Primary Clarifier	01
Primary Sludge Pump	01
Dist Chamber of Aeration tank	01
Aeration tank	02
Return Activated sludge pumphouse	01
Blower Room	01
Dist Chamber of Secondary Clarifier	01
Secondary clarifier	02
Primary Sludge thickner	01
Thickened Sludge Sump	
Wet well	01
Dry well	01
Anaerobic sludge digester	02
Sludge collection tank	01
Centrifugal building	01
Intermittent Effluent Chamber	01
Filtrate Sump	01
Office building	01
Workshop and Storage room	01
Laboratory	01
Control room	01
Rest room Security cabin	01

Treatment Process at STP:

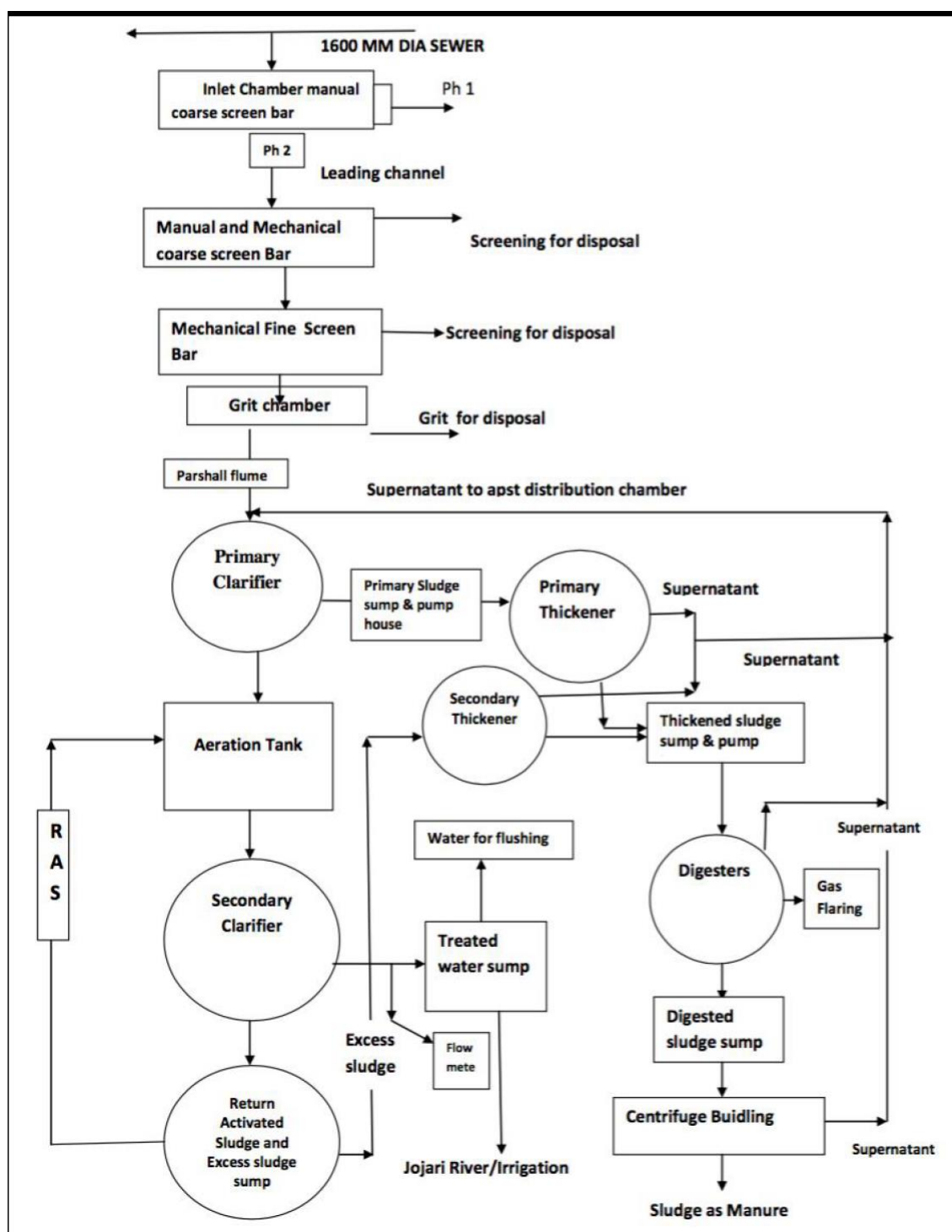
The activated sludge process uses microorganisms to feed on organic contaminants in wastewater, producing a high-quality effluent. The basic principle behind all activated sludge processes is that as microorganisms grow, they form particles that clump together. These particles (floc) are allowed to settle to the bottom of the tank, leaving a relatively clear liquid free of organic material and suspended solids. Described simply, screened wastewater is mixed with varying amounts of recycled liquid containing a high proportion of organisms taken from a secondary clarifying tank, and it becomes a product called mixed liquor. This mixture is stirred and injected with large quantities of air, to provide oxygen and keep solids in suspension. After a period of time, mixed liquor flows to a clarifier where it is allowed to settle. A portion of the bacteria is removed as it settles, and the partially

cleaned water flows on for further treatment. The resulting settled solids, the activated sludge, are returned to the first tank to begin the process again.

Process Flow Diagram of Existing 50.0 MLD STP (Phase I) Salawas



Process Flow Diagram of Existing 50.0 MLD STP (Phase II) Salawas



Treatment efficiency

Normally about 90% to 95% treatment efficiency (BOD removal) is expected in Activated Sludge process STPs.
The Raw sewerage Parameter are as tested at inhouse laboratory on 28.03.2022

	pH – 7.7 COD – 560 BOD – 185 mg/l TSS - 364mg/l The treated effluent parameters are pH – 7.4 COD – 112 BOD – 19 mg/l TSS – 29 mg/l The treated effluent are not meeting the required parameter of CPCB.
Sludge management	The Raw Sludge from the sewage is collected at the underflow of Primary clarifier and pumped to sludge thickener for increasing the sludge concentration. After the sludge thickening, the thickened sludge is fed into sludge digester for Anaerobic bacterial process. The digested sludge is then sent to mechanical centrifuge for sludge dewatering, the digested sludge is dewatered in centrifuge by adding polyelectrolyte. The dried sludge with moisture is then collected and used as landfills inside the STP premises. No testing for sludge at present, the sludge distributed to farmers.
Treated wastewater (effluent disposal)	The Salawas treated effluent from the STP is used for plantation and horticulture, excess treated effluent is discharged into River Jojari.

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

Law, Rules, and Regulations	Description and Requirement	STP at Salawas
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant²⁴ N/A = not applicable (state justification)
EIA Notification	The EIA Notification of 2006 states that environmental clearance is required for certain defined activities/projects.	N/A Environmental clearance is not required as STPs are not listed in the EIA Notification's "Schedule of Projects Requiring Prior Environmental Clearance"
Manufacture, Storage, and Import	Storage of chlorine (threshold quantity greater than 10 tons but	N/A No chlorine used or stored in the STP.

²⁴Compliant = There is sufficient and appropriate evidence to demonstrate that the particular regulatory requirement has been complied with; non-compliant = clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

Law, Rules, and Regulations	Description and Requirement	STP at Salawas
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ²⁴ N/A = not applicable (state justification)
of Hazardous Chemical Rules, 1989	less than 25 tons) in WTPs will require clearance from PESO	
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	Consent to operate from RSPCB	The 50 MLD STP has valid CTO under water act from RSPCB – consent order no.2019-2020/PLG/1076 dated 10.04.2019 Valid from 10/10/2017 to 30/09/2022 For disposal of treated effluent On Land for Plantation/Horticulture after adequate treatment. (Annexure 2)
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	Consent to operate from RSPCB	The 50 MLD STP has valid CTO under air act from RSPCB- CTO order no 2021-2022/Liquid Waste/1266 dated 29/10/2021 for 400 kVA DG Set valid for a period from 21/02/2019 to 31/01/2024 for 400.00 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	N As per the CTO issued by RSPCB, STP effluent shall meet the following disposal standards: TSS - Not to exceed 100 mg/l, pH - 6.5 to 9.0, BOD - (3 days at 27C) Not to exceed 10 mg/l, Fecal Coliform not to exceed 230 MPN/100 ml. but current treatment process is not meeting the required standards.
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010	Applicable ambient noise standards with respect to noise for different areas/zones	Y No source of noise
National Institute of Occupational Safety and Health (NIOSH) Publication No. 2002-149	Compliance with NIOSH Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids	N Training and proper PPEs are required

Law, Rules, and Regulations	Description and Requirement	STP at Salawas
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ²⁴ N/A = not applicable (state justification)
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 Labor (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	50 MLD Plant (phase -1) Plant Engineer (Diploma) -01 Lab Chemist-(BSc.) -01 Lab assistance (12th Science)-02 Electrician / Instrumental technician (ITI/ Diploma in electrical) -01 Fitter (ITI fitter) -02 Plant operator -05 Helper (8-10 passed) 7 Gardner / Sweeper -02
Estimated number of laborers on-site per shift	

Parameter	STP
	Watchman -03 50 MLD Plant (phase -2) Plant Manager -01 Mechanical Engineer Lab Chemist - 01 Electrician/Instrumental technician - 01 Plant operator -04 Helper - 4 Gardner / Sweeper -01 Watchman -02
Estimated number of employees in charge of environmental management and monitoring	Nil
Frequency of waste water quality monitoring (raw)	Daily in inhouse laboratory
Frequency of wastewater quality monitoring (treated)	Daily in inhouse laboratory
Frequency of sludge quality monitoring	not conducted
In-house laboratory for water quality analyses (Yes/None). If none, provide name of third-party laboratory.	In-house laboratory is available at the STP; apparatus to conduct pH, BOD, COD and TSS available Laboratories of RSPCB are available in Jodhpur

Corrective Action Plan

Corrective actions to address gap in treatment capacity, improve treatment efficiency to treat the sewage to stipulated standards are already undertaken by Nagar Nigam Jodhpur to improve overall treatment capacity of STP.

NNJ has already invited RFP on 16.03.2022 for the consultancy work of preparation of Detailed project report for upgradation of both STPs (50 X2 MLD) on latest treated effluent norms of NGT. Upon completion of consultancy work, the projects will be taken up in a phased manner. No additional corrective actions are needed; however it is critical that these actions are completed on time.

View of Existing Salawas STP:



STP Salawas. Google Earth image dated - 10.11 2021

Annexure -1 Lab testing report of STP effluent at outlet

FORM - X
RAJASTHAN STATE POLLUTION CONTROL BOARD
REPORT OF THE STATE BOARD ANALYST
 (See Rule - 24)
Final Report

Report No. : 2085

Report On : 19/07/2021

I hereby certify that I V S Parihar, State Board Analyst duly appointed under sub Section(3) of Section 53 of the Water (Prevention & Control of Pollution) Act, 1974 received on the 07/06/2021 from Industrially Itself a sample of Waste Water of M/S Sewage Treatment Plant (Phase 2) , Plant - , , City- Salawas Tehsil- Luni , District- Jodhpur Collected from Treated Sewage from 50 MLD STP Phase-2 Collected on 07/06/2021. The Sample was in a condition fit for analysis as reported below :-

I further certify that I have analyzed the aforementioned sample on 19/07/2021 and declare the result of the analysis to be as below :-

S. No.	Parameters	Result
1	pH	7.3
2	Total Suspended Solids mg/l	22
3	Bio-Chemical Oxygen Demand (BOD) (3days at 27° C) mg/l	19

The condition of the seals, fastening and container on receipt was as follows : **Intact**
 Signed This On 19/07/2021

BOARD ANALYST

Rajasthan State Pollution Control Board
 Regional Office Jodhpur
 SPL-I, Phase-I, Basni Ind. Area, Jodhpur
 Phone: 0291-2723225

FORM - X
RAJASTHAN STATE POLLUTION CONTROL BOARD
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BOARD ANALYST

Rajasthan State Pollution Control Board
 Regional Office Jodhpur
 SPL-I, Phase-I, Basni Ind. Area, Jodhpur
 Phone: 0291-2723225

Annexure 2 Copy of Consent to operate



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(Plan)/Jodhpur(Jodhpur)/1(1)/2018-2019/138-140

Order No : 2019-2020/PLG/1076

Date: 10/04/2019

Unit Id : 40041

M/s Sewage Treatment Plant

Chief Executive Officer, Municipal Corporation, ,

District:Jodhpur

Sub: Consent to Operate under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 10/10/2017 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) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **50 MLD Sewage Treatment plant** situated at **village Salawas on Salawas Road Tehsil:Jodhpur District:Jodhpur**, Rajasthan, subject to the following conditions:-

- 1 That this Consent to Operate is valid for a period from **10/10/2017** to **30/09/2022** .
- 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	50,000.00 KLD

- 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:



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

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File No : F(Plan)/Jodhpur(Jodhpur)/1(1)/2018-2019/138-140

Order No : 2019-2020/PLG/1076

Date: 10/04/2019

Unit Id : 40041

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Domestic Sewage	50000.000	50,000.000	NIL On Land For Plantation/Horticulture after adequate treatment

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

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 6.5 to 9.0
Biochemical Oxygen Demand (3 days at 27C)	Not to exceed 10 mg/l
Fecal Coliform	not to exceed 230 MPN/100 ml

- 6 That no treated/untreated effluent shall be discharged into any other water body and entire treated sewage shall be utilized in plantation and horticulture and other gainful purposes.
- 7 That sewage network alongwith house connections will be completed simultaneously with the commissioning of the STP.
- 8 That the sludge will be properly digested, de-watered and the treated sludge will be used as manure or will be disposed in a scientific manner.
- 9 That the unit shall undertake spray of insecticides from time to time to control fly/mosquito growth in the area.
- 10 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.
- 11 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** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act**.



Head Office (PLG)
Rajasthan State Pollution Control Board
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File No : F(Plan)/Jodhpur(Jodhpur)/1(1)/2018-2019/138-140

Order No : 2019-2020/PLG/1076

Date: 10/04/2019

Unit Id : 40041

12 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.

13 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 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[PLG]

Copy To:-

- 1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Jodhpur. With directions to ensure compliance of consent conditions.
- 2 Master File.

Group Incharge[PLG]

ENVIRONMENTAL AUDIT OF EXISTING SEWAGE TREATMENT PLANT AT NANDRI OF JODHPUR OF JODHPUR NAGAR NIGAM (NNJ)

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 Jodhpur town. Since adequate capacity treatment facility is already Nandri STP zone, no new STPs is proposed for this STP zone. 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. Therefore 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 objectives 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.

Nandri sewage treatment plant is located just upstream of Jojari river in Nandari village, Jodhpur, which is based on Waste Stabilization Ponds (WSP) treatment technology to treat the sewage of upstream of Jodhpur. The entire sewage of Punjala zone is collected through 900 mm diameter sewer line to bring it into this STP. This STP was constructed in 2005 by RUIDP. Presently it is operated and maintained by Municipal Corporation of Jodhpur. This plant is designed for treatment of 20 MLD of domestic wastewater.

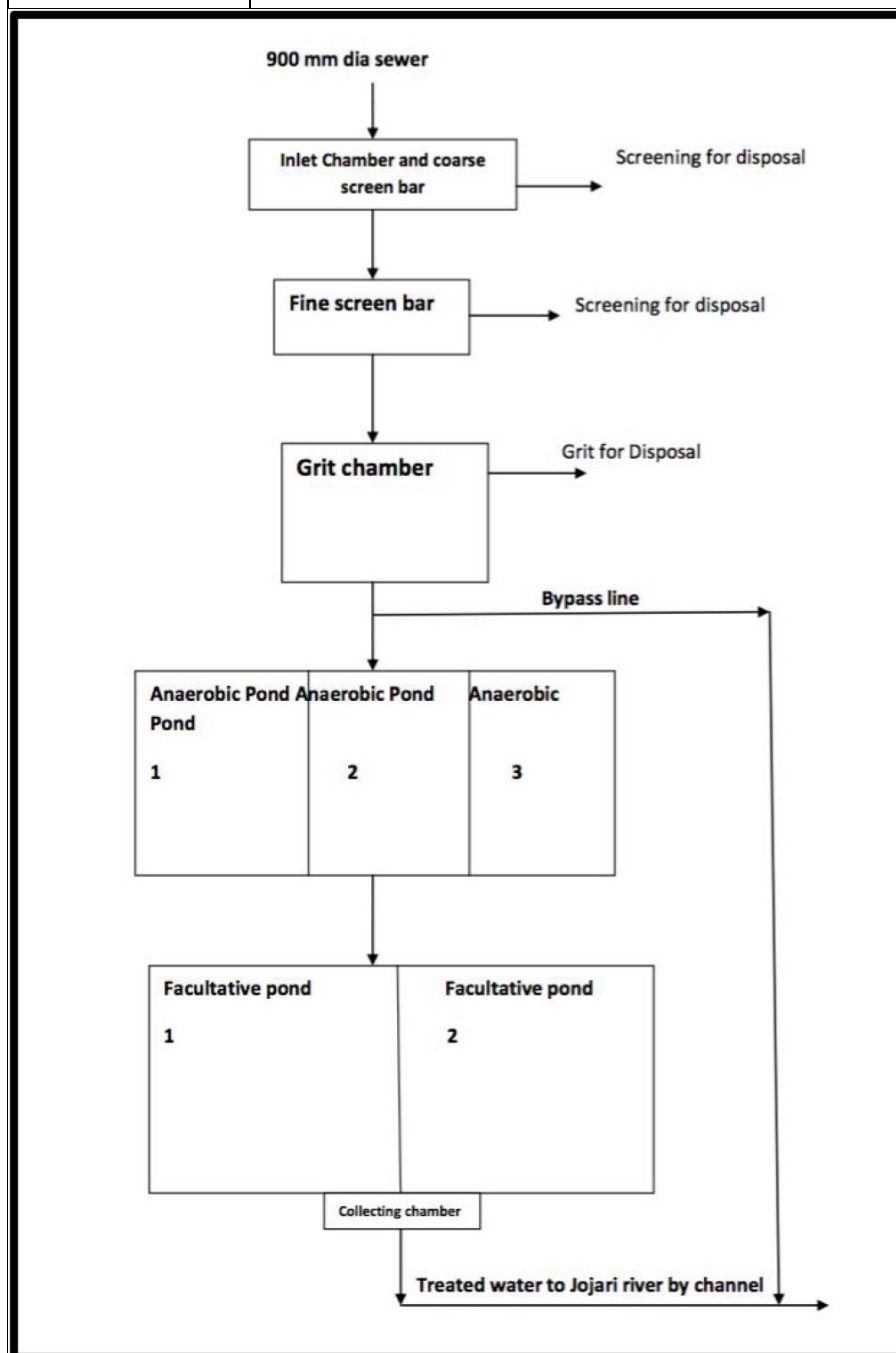
The Sewage collected through drains comes to STP and is treated through the system which comprises of 1 inlet chamber (1 No.), fine screens (2 Nos.), Grit Chamber (2 Nos.), Anaerobic ponds (3 Nos.) & Facultative ponds (2 Nos.).

Description of the Nandri STP

Location	Nandri Village, Jodhpur STP Latitude: 24° 18'14.12" N Longitude: 73° 06' 40.31"E
Start of operation (year)	20 MLD – 2004
Owned by	Municipal Corporation, Jodhpur
Capacity	20 Million liters per day (MLD)
Sewage treatment process	Waste Stabilization Pond (WSP) sewage treatment plant. Facility has the following components: Sewage collected through city comes to STP from 900 mm dia sewer and getting treated at STP consist of following components • Inlet chamber (7.0mx5.5m) with coarse screen bar • Fine Screen bar -02 • Grit Chamber - 02

- Anaerobic pond (92.0 m x 51.0 m each with 2 baffles of 450mm thick)
– 03 nos with one day retention period
- Facultative pond (350mx150m each)– 02 nos
- Collecting chamber
- Finally treated water is sold to farmers and excess water is released to Jojari River

Treatment Process flow diagram:



Treatment efficiency	Normally the treatment capacity varying with temperature variations 90% to 95% treatment efficiency (BOD removal) is expected in Waste Stabilization Ponds process STPs. The STP design parameters are BOD – < 30mg/l COD -< 200 mg/l SS - < 30 mg/l pH - < 6 to 9 These treated effluent are not meeting the standards prescribed by RSPCB/ CPCB
Sludge management	Sludge is withdrawn during cleaning of ponds which is not a daily activity. This sludge is used for fertilization & remaining is disposed to Keru solid waste plant
Treated wastewater (effluent disposal)	The treated effluent from the Nandri STP discharged in to the Jojari river

View of Nandri STP



STP Nandri Google earth image dated 10.10.2021 (24° 18'14.12" N 73° 06' 40.31"E)

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

Law, Rules, and Regulations	Description and Requirement	STP at Nandri
		Y = compliant (if applicable, specify expiration date of permit/clearance) ²⁵ N = non-compliant N/A = not applicable (state justification)
EIA Notification	The EIA Notification of 2006 states that environmental clearance is required for certain defined activities/projects.	N/A Environmental clearance is not required as 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 STPs will require clearance from RSPCB and Directorate of Industrial Health and Safety	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	N STP Nandri CTO application under process. It got refused from RSPCB on 03/09/2020, requesting more data
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	Consent to operate from RSPCB	N STP Nandri CTO application under process. It got refused from RSPCB on 03/09/2020, requesting more data.
Environment (Protection) Act, 1986 and CPCB Environmental Standards	Emissions and discharges from the facilities to be created, refurbished, or augmented shall comply with the notified standards. a. Wastewater disposal standards	N The current STP at Nandri is not meeting the National effluent discharge standards
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010	Applicable ambient noise standards with respect to noise for different areas/zones	Y No source of noise
National Institute of Occupational Safety and Health (NIOSH) Publication No. 2002-149	Compliance with NIOSH Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids	N Training and proper PPEs are required
Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended	As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the central government.	N/A
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	N/A

²⁵Compliant = There is sufficient and appropriate evidence to demonstrate that the particular regulatory requirement has been complied with; non-compliant = clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

Law, Rules, and Regulations	Description and Requirement	STP at Nandri
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant ²⁵ N/A = not applicable (state justification)
	Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.	
The Child Labor (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.	STP is operated by contract staff. No children are engaged.

Institutional Arrangement

Parameter	STP
Operations	Continuous operation; involves mechanical and electrical operation; Except manual operation for removal of debris from the screen and removal of collected grit from grit chamber, no interference is required in operation of STP.
Estimated number of technical employees on-site per shift	20MLD Plant Supervisor -01 Chemist -1 Operator – 03 Helpers -02 Mistry -01
Estimated number of laborers on-site per shift	
Estimated number of employees in charge of environmental management and monitoring	Nil
Frequency of waste water quality monitoring (raw)	Daily in Inhouse Laboratory
Frequency of wastewater quality monitoring (treated)	Daily in Inhouse Laboratory
Frequency of sludge quality monitoring	not conducted
In-house laboratory for water quality analyses (Yes/None). If none, provide name of third-party laboratory.	In-house laboratory is available at the STP; apparatus to conduct pH, BOD, COD and TSS available Laboratories of RSPCB available in Jodhpur

Corrective Action Plan

Corrective actions to address gap in treatment capacity, improve treatment efficiency to treat the sewage to stipulated standards are already undertaken by Nagar Nigam Jodhpur to improve overall treatment capacity of STP.

NNJ has awarded works for upgradation of STP under AMRUT Scheme contract package AMRUT/RJ/SEW-06 of amounting Rs. 12.08 Cr. (including O&M) vide work order no. 4649, dt. 01.06.2018 based on Phyto-reed bed based. To achieve the treated effluent quality parameters as per the latest applicable revised norms prescribed by CPCB / RSPCB. Construction works are

expected to complete in December 2022. No additional corrective actions are needed; however, it is critical that these actions are completed on time.

Appendix 7: Biodiversity Assessment Report (IBAT analysis) for Sewerage System of Jodhpur

IBAT analysis report for proposed STP at Jodhpur



Integrated Biodiversity Assessment Tool

World Bank Group Biodiversity Risk Screen

JODHPUR SEWERAGE SUBPROJECT_STP

Country: India

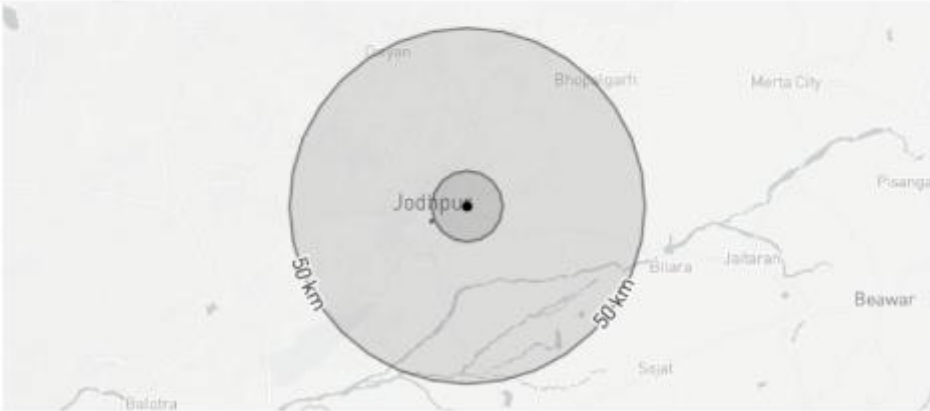
Location: [26.3, 73.1]

IUCN Red List Biomes: Terrestrial, Freshwater

Created by: Noime Walican

Overlaps with:

Protected Areas	1 km: 0	10 km: 0	50 km: 0	0
World Heritage (WH)	1 km: 0	10 km: 0	50 km: 0	0
Key Biodiversity Areas	1 km: 0	10 km: 0	50 km: 1	1
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0
IUCN Red List	15			
Critical Habitat	Unclassified			



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

 WORLD BANK GROUP

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

 KNOW YOUR ENVIRONMENT

 Biodiversity

 CONSERVATION INTERNATIONAL

 UN WOMEN

 WCMC

Jodhpur Sewerage Subproject_STP | Page 1 of 8



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
<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 indicus</i>	Indian Vulture	AVES	CR	Decreasing	Terrestrial
<i>Manis crassicaudata</i>	Indian Pangolin	MAMMALIA	EN	Decreasing	Terrestrial
<i>Varanus flavescens</i>	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial



Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Nilssonina gangetica</i>	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Oxyura leucocephala</i>	White-headed Duck	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Neophron percnopterus</i>	Egyptian Vulture	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Aquila nipalensis</i>	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
<i>Falco cherrug</i>	Saker Falcon	AVES	EN	Decreasing	Terrestrial, Marine, Freshwater
<i>Leptoptilos dubius</i>	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Tecomella undulata</i>	Desert Teak	MAGNOLIOPSIDA	EN	Decreasing	Terrestrial

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Macrobrachium rosenbergii</i>	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater



Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

There are no protected areas to show for this report.

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
Sardar Samand Lake	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
AVES	263	22	6	5	11	15	226	0
MAMMALIA	56	4	0	1	3	2	50	0
REPTILIA	48	6	0	2	4	2	39	1
MAGNOLIOPSIDA	36	1	0	1	0	0	34	1
LILIOPSIDA	48	1	0	0	1	0	45	2
AGARICOMYCETES	2	0	0	0	0	1	1	0
AMPHIBIA	8	0	0	0	0	0	8	0
INSECTA	39	0	0	0	0	0	38	1



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UN WCMC
World Conservation
Monitoring Centre



Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
GASTROPODA	17	0	0	0	0	0	17	0
ACTINOPTERYGII	31	2	0	0	2	1	28	0
POLYPODIOPSIDA	2	0	0	0	0	0	2	0
BIVALVIA	6	0	0	0	0	0	6	0
MALACOSTRACA	2	0	0	0	0	0	2	0



Recommended citation

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Recommended Experts and Organizations

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

Birdlife Partners

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

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

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

IBAT analysis report for proposed SPS at Jodhpur

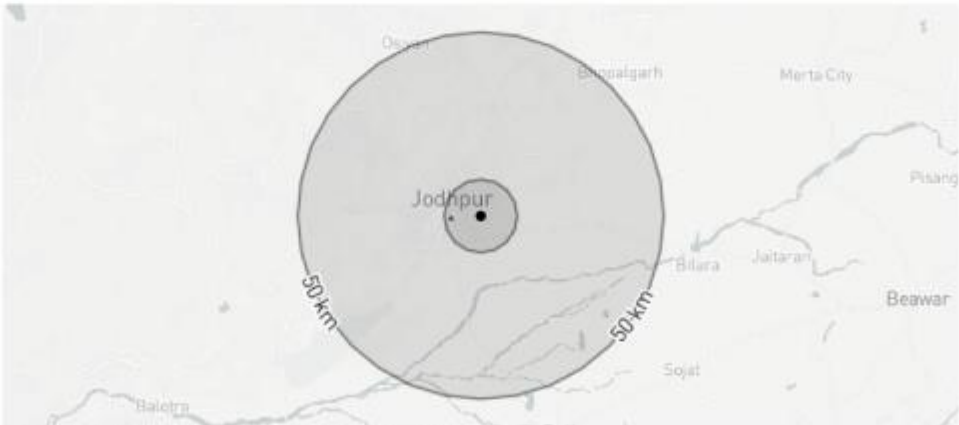


Integrated Biodiversity Assessment Tool
World Bank Group Biodiversity Risk Screen
JODHPUR SPS SITE

- Country: India
- Location: [26.3, 73.1]
- IUCN Red List Biomes: Freshwater, Terrestrial
- Created by: Noime Walican

Overlaps with:

Protected Areas	1 km: 0	10 km: 0	50 km: 0	0
World Heritage (WH)	1 km: 0	10 km: 0	50 km: 0	0
Key Biodiversity Areas	1 km: 0	10 km: 0	50 km: 2	2
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0
IUCN Red List	15			
Critical Habitat	Unclassified			



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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IUCN Red List of Threatened Species - CR & EN

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<i>Nilssoniana gangetica</i>	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
<i>Oxyura leucocephala</i>	White-headed Duck	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



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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Gyps bengalensis</i>	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
<i>Sarcogyps calvus</i>	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
<i>Gyps indicus</i>	Indian Vulture	AVES	CR	Decreasing	Terrestrial
<i>Manis crassicaudata</i>	Indian Pangolin	MAMMALIA	EN	Decreasing	Terrestrial
<i>Varanus flavescens</i>	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
<i>Aquila nipalensis</i>	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
<i>Tecomella undulata</i>	Desert Teak	MAGNOLIOPSIDA	EN	Decreasing	Terrestrial

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Macrobrachium rosenbergii</i>	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater



Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

There are no protected areas to show for this report.

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
Kharda Dam	50 km	Yes	No	 Assess for critical habitat
Sardar Samand Lake	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	48	6	0	2	4	2	39	1
AVES	263	22	6	5	11	15	226	0
MAMMALIA	56	4	0	1	3	2	50	0
ACTINOPTERYGII	31	2	0	0	2	1	28	0
AMPHIBIA	8	0	0	0	0	0	8	0
INSECTA	39	0	0	0	0	0	38	1
GASTROPODA	17	0	0	0	0	0	17	0



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CONSERVATION
INTERNATIONAL



UN WCMC
world conservation
monuments
programme



Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
POLYPODIOPSIDA	2	0	0	0	0	0	2	0
MAGNOLIOPSIDA	36	1	0	1	0	0	34	1
LILIOPSIDA	48	1	0	0	1	0	45	2
BIVALVIA	6	0	0	0	0	0	6	0
MALACOSTRACA	2	0	0	0	0	0	2	0
AGARICOMYCETES	2	0	0	0	0	1	1	0



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Common Appendices C1 – C25 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

Appendix C-25 Management of Work Plan during festivals and fairs (melas)