Initial Environmental Examination

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India: Rajasthan Urban Sector Development Investment Program - Jhalawar & Jhalarapatan Sewerage and Sanitation (Tr-02)

Prepared by Local Self Government Department

For the Government of Rajasthan
Rajasthan Urban Infrastructure Development Project

ABBREVIATIONS

ADB	—	Asian Development Bank
AC	—	Asbestos cement
CFE	—	Consent for Establishment
CFO	—	Consent for Operation
CLC	—	City Level Committees
CLIP	—	City Level Investment Plan
DSC	—	Design and Supervision Consultants
EARF	—	Environmental Assessment Resettlement Framework
EC	-	Environmental Clearance
EIA	—	Environmental Impact Assessment
EMP	—	Environmental Management Plan
EMS	—	Environmental Monitoring Specialist
GRC	—	Grievance Redress Committee
H&S	—	Health and safety
IEE	—	Initial Environmental Examination
IPIU	—	Investment Program Implementation Unit
IPMC	—	Investment Program Management Consultants
IPMU	—	Investment Program Project Management Unit
ITI	—	Industrial training institutes
JMB	—	Jhalawar Municipal Board
JNNURM	—	Jawaharlal Nehru National Urban Renewal Mission
LSGD	—	Local Self Government Department
MFF	—	Multitranche financing facility
MLD	—	Million liters per day
MOEF	—	National Ministry of Environment and Forests
NAAQS	—	National Ambient Air Quality Standards
NGO	—	Nongovernmental organization
O&M	—	Operation and maintenance
PHED	—	Public Health Engineering Department
PIU	—	Project Implementation Unit
PMU	—	Project Management Unit
ROW	—	Right of way
RPCB	—	Rajasthan State Pollution Control Board
RUIDP	—	Rajasthan Urban Infrastructure Development Project
RUSDIP	—	Rajasthan Urban Sector Development Investment Program
SEIAA	—	State Environment Impact Assessment Authority
SPS	—	Safeguard Policy Statement
STP	—	Sewage treatment plant
TOR	—	Terms of reference
UIDSSMT	—	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB	—	Urban local body
USEPA	—	United States Environmental Protection Agency

WEIGHTS AND MEASURES

lakh	–	100 thousand = 100,000
crore	–	100 lakhs = 10,000,000
$\mu g/m^3$	–	micrograms per cubic meter
km	–	kilometer
lpd	–	liters per day
m	–	meter
mg/l	–	milligrams per liter
mm	–	millimeter
ppm	–	parts per million

NOTE{S}

(i) In this report, "$" refers to US dollars.
(ii) “INR” and “Rs” refer to Indian rupees

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EXECUTIVE SUMMARY

1. Rajasthan Urban Sector Development Investment Program (RUSDIP) is intended to optimize social and economic development in 15 selected towns in the State, particularly district headquarters and towns with significant tourism potential. RUSDIP Phase II is being implemented over a seven year period beginning in 2008, and being funded by a Multitranche Financing Facility (MFF) loan from the Asian Development Bank (ADB). The Executing Agency is the Local Self-Government Department (LSGD) of the Government of Rajasthan; and the Implementing Agency is the Project Management Unit (PMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP). ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

2. This Initial Environmental Examination (IEE) has been prepared for the Jhalawar & Jhalarapatan Sewerage and Sanitation Subproject as part of RUSDIP Tranche 2. The subproject covers (i) providing & laying of sewer line, manholes and allied works (ii) providing house connections. The subproject is needed due to lack of integrated sewerage and sanitary system in Jhalawar and Jhalarapatan resulting to unsanitary conditions prevailing in the town. Wastewater commonly overflows to the drainage system, which is under-designed and not maintained, causing unhygienic and odorous pools forming on roads and other depressions. The groundwater table is also likely to be contaminated due to seepage of wastewater.

3. Detailed design has begun in the 1st quarter of 2012 and been completed in March 2012. Implementation will be started in mid 2012 after obtaining all necessary approval and completing other formalities and likely to be completed in two years i.e. by mid of 2014.

4. The subproject sites (sewer lines) are located in Jhalawar and Jhalarapat, a built-up area in Jhalawar town. The subproject sites, being located in the town area, are generally flat. The subproject sites are not located in areas prone to water-logging, salinasation, flash flood. There are no protected areas, wetlands, mangroves, or estuaries in the subproject sites. Trees, vegetation (mostly shrubs and grasses), and animals are those commonly found in urban areas. The subproject sites are not located in or near any historically-, culturally-, archaeologically- or architecturally-significant or tourists area.

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5. Site for STP is already selected & work of STP is in progress under UIDSSMT project.

6. This scheme comprises of 2 separate towns i.e. conglomerates of Jhalawar & Jhalarapatan with a distance of about 5 Km in between. The planning of Sewerage system is carried out in totality of the Town.

7. No potential impacts were identified as being due to the subproject design but were identified in relation to construction and operation of the infrastructure. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. An Environmental Management Plan (EMP) is proposed as part of this IEE which includes (i) mitigation measures for significant environmental impacts during implementation, (ii) environmental monitoring program, and the responsible entities for mitigation, monitoring, and reporting; (iii) public consultation and information disclosure; and grievance redress mechanism. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. A number of impacts and their significance have already been reduced by amending the designs.

8. During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and import a similar amount of sand to support the sewer pipes in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for mitigation.

9. The use of asbestos cement (AC) pipes in the existing water distribution network presents a particular risk to workers and the public if disturbed, as inhalation of asbestos dust, which is carcinogenic. These systems will not be disturbed under the project and kept in place. Moreover, special measures were developed to protect workers and the public from exposure to carcinogenic asbestos fibres in the event that AC pipes used in the existing water supply system are uncovered accidentally during excavation work.

10. Specific measures have been developed to avoid damaging important remains in case of chance archaeological finds during excavation work.

11. The project will employ persons from the local workforce who live in the vicinity of construction sites to provide them with a short-term economic gain; and ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

12. Once the system is operating, the facilities (sewer network) will operate with routine maintenance. Leaks in the sewer network will be monitored and repaired. It will also be conducted in areas that have already been excavated, so there will be no need to protect archaeological material.

13. The main impacts of the operating sewerage system will be beneficial as the citizens of Jhalawar city will be provided with an underground sewage system, which will serve a greater proportion of the population, including slum-dwellers. This will improve the quality of life of people as well as benefiting both individual and public health as the improvements in hygiene will reduce the incidence of disease associated with poor sanitation.

14. Mitigation will be assured by a program of environmental monitoring to be conducted during construction and operation to ensure that all measures are implemented, and to determine whether the environment is protected as intended. Corrective measures to be taken as necessary. This will include observations on- and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the Investment Program Management Unit (IPMU).

15. The stakeholders were involved in developing the IEE through face-to-face discussions on site and a large public meeting held in the town, after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation by a nationally-recognized NGO appointed to handle this key element and to ensure stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

16. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken.

I. INTRODUCTION

A. Purpose of the Report

1. Rajasthan Urban Sector Development Investment Program (RUSDIP) is intended to optimize social and economic development in fifteen selected towns in the State, particularly district headquarters and towns with significant tourism potential. This will be achieved through investments in urban infrastructure (water supply; sewerage and sanitation; solid waste management; urban drainage; urban transport and roads), urban community upgrading (community infrastructure; livelihood promotion) and civic infrastructure (art, culture, heritage and tourism; medical services and health; fire services; and other services). RUSDIP will also provide policy reforms to strengthen urban governance, management, and support for urban infrastructure and services. The assistance will be based on the State-level framework for urban reforms, and institutional and governance reforms recommended by the Government of India through the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

2. RUSDIP Phase II is being implemented over a seven year period beginning in 2008, and being funded by a loan via the Multitranche Financing Facility (MFF) of Asian Development Bank (ADB). The Executing Agency is the Local Self-Government Department (LSGD) of the Government of Rajasthan; and the Implementing Agency is the Investment Program Management Unit (IPMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP).

3. This Initial Environmental Examination (IEE) has been prepared for the Jhalawar Waste water Subproject as part of RUSDIP Tranche II. The subproject covers (i) providing & laying of sewer line, manholes and allied works (ii) providing house connections.

4. This IEE report covers the general environmental profile of Jhalawar and Jhalarapan and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the subproject's influence area during design, construction, and operation stages. An Environmental Management Plan (EMP) is also proposed as part of this report which includes mitigation measures for significant environmental impacts during implementation of the Project, environmental monitoring program, and the responsible entities for mitigation and monitoring.

B. Extent of the IEE Study

5. This IEE report was prepared on the basis of detailed screening and analysis of all environmental parameters, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation per ADB's Environmental Policy (2002) and Government of India Environmental Impact Assessment (EIA) Notification of 2006.

1. ADB Policy

6. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for Environmental Assessment are described in ADB's Environmental Policy (2002). This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

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

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

8. **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.

9. **Public Disclosure.** As per ADB Operation Manual and Environmental Policy 2006, public consultations and disclosure is essential for all projects funded by ADB. The consultation needs to be carried out as early as possible in the project cycle so that views of affected groups are taken into account in the design of the project and its environment mitigation measures. Such consultation will also take place during project implementation to identify and help address environmental issues that arise.ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) Environmental Monitoring Reports submitted by Investment Program Implementation Unit (IPIU) during project implementation upon receipt.

2. National Law

10. 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 categorised as A or B depending on the scale of the project and the nature of its impacts.

11. Categories A projects require Environmental Clearance from the National Ministry of Environment and Forests (MOEF). The proponent is required to provide preliminary details of

the project in the form of a Notification, after which an Expert Appraisal Committee (EAC) of the MOEF prepares comprehensive Terms of Reference (TOR) for the EIA study, which are finalized within 60 days. On completion of the study and review of the report by the EAC, MOEF considers the recommendation of the EAC and provides the Environmental Clearance if appropriate.

12. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorises 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.

13. The only type of infrastructure provided by the RUSDIP that is specified in the EIA Notification is solid waste management, where EC is required for all Common[1] Municipal Solid Waste Management Facilities (CMSWMF).

3. Others

14. Actions required for establishment of the STP in Jhalawar & Jhalarapatan (Table 2 of the Environmental Assessment Resettlement Framework [EARF]) includes obtaining from Rajasthan State Pollution Control Board (RSPCB) (i) Consent for Establishment (CFE) before construction; and (ii) Consent for Operation (CFO) after construction prior to operation of the sewage treatment plant. In order to apply for the CFE, the land is to be acquired and receipt of a land allotment letter is to be submitted as part of the application. These two STPs are being taken under UIDSSMT project and therefore will be taken separately apart of RUSDIP.

[1] "For the purpose of EIA Notification, common municipal solid waste management facilities may be referred as centralized MSW facility for an given town, city, region. It is further to mention a common facility need not have surrounding ULBs included."

(Technical EIA Guidance Manual for CMSWMF)

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

15. **Type**. This is an urban sewerage subproject intended to improve the current environment in Jhalawar. This is one of a series of subprojects designed by the RUSDIP that are intended to raise the standards of the municipal infrastructure and services of Jhalawar City and the other urban centres to those expected of modern Asian towns.

16. **Category**. Environmental examination indicates the proposed subproject falls within ADB's environmental Category B projects. The Project components will only have small-scale, localized impacts on the environment, and can be mitigated. Under ADB procedures such projects require an IEE to identify and mitigate the impacts, and to determine whether further study or a more detailed EIA may be required.

17. **Need.** The subproject is needed due to lack of integrated sewerage and sanitary system in Jhalawar resulting to unsanitary conditions prevailing in the town. Wastewater commonly overflows to the drainage system, which is under-designed and not maintained, causing unhygienic and odorous pools forming on roads and other depressions. The groundwater table is also contaminated due to seepage of wastewater through leaky and broken sewerage pipe lines. Improvement in the sewerage system was identified as a key priority (after water supply) in the City Level Investment Plan (CLIP) prepared for Jhalawar town. The CLIP has been discussed at the City Level Committee (CLC) meeting comprising of the major stakeholders, who reinforced /confirmed that the proposed water supply subproject is a priority for the town.

B. Location and Implementation Schedule

18. The subproject is located in Jhalawar & Jhalarapatan towns of Jhalawar District, in the Rajasthan in north-western India. The proposed infrastructures (sewer lines) will be located in and around the urban areas of the town.

Photographs of project sites are attached as **Appendix 4** with this report

19. Detailed design has begun in the 1st quarter of 2012 and been completed in March 2012. Implementation will be started in Mid 2012 and likely to be completed by Mid of 2014.

C. Description of the Subproject

1. Existing Sewerage System

20. As per record of Municipal Board and survey conducted by the consultants it is revealed that about 20% population is having conservancy latrines/ dry latrines emptied by scavengers. 30% population either do not have latrines in their houses or are using public latrines constructed by Nagar Palika at 11 different locations (list enclosed) in the city. These public latrines are also in depleted conditions and most of them are casually falling out of use. As a consequence of which the people are compelled to defecate in open. In some of the houses pour flush laterins with soakage pits have been constructed. In most of the offices and institutions the flush type laterins have been constructed and disposal is made into septic tanks. The wastewater from the septic tanks passes into the open drains.

21. The town does not have a properly designed underground sewerage system for collection and conveyance of wastewater. Also there are no facilities for treatment and safe

disposal of wastewater. Most of the houses have water flush latrine system with septic tanks. Sullage and other wastewater are discharged into storm water drains. Some of this wastewater gets collected in water ponds which are formed at many locations in the town. Wastewater from some parts of the town which are having high population densities find its way in the River Kalisindh, a water body of historic and heritage importance for the town.

22. Practically every storm water drain is filled with wastewater. This unplanned discharge of wastewater cause unhygienic conditions in city and spoiling the aesthetics of this town. Present arrangement of wastewater collection and disposal is unsafe and issue requires to be addressed on urgent basis.

2. Proposed Sewerage System

23. The proposed sewerage network in this project is in Jhalawar and Jhalarapatan. The proposed sewerage network is given in detail as below-

A. Jhalawar:

200 mm dia RCC pipe	:	10717 m
350 mm dia RCC pipe	:	433 m
400 mm dia RCC pipe	:	806 m
450 mm dia RCC pipe	:	338 m
500 mm dia RCC pipe	:	1934 m
Total	**:**	**14228 m**
PVC-U pipe	:	6960 m
RR Stone masonry Manholes & RCC Pre-Cast Manholes	:	696 Nos.
Vent Shaft	:	10 Nos

B. Jhalarapatan:

200 mm dia RCC pipe	:	4896 m
250 mm dia RCC pipe	:	147 m
300 mm dia RCC pipe	:	252 m
Total	**:**	**5295 m**
PVC-U pipe	:	2880 m
RR Stone masonry Manholes & RCC Pre-Cast Manholes	:	288 Nos.
Vent Shaft	:	1 Nos.

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Administrative Boundaries

24. Jhalawar District is located in the south-east of Rajasthan, between the longitudes of 75° 27' 35" to 76° 56' 48" East and latitudes of 23° 45' 20" to 24° 52' 17" North, adjoining the neighbouring state of Madhya Pradesh (Figure 1). Jhalawar Town is the district headquarters and lies towards the centre, with the smaller Jhalarapatan 20 km to the south-east. The two towns share a single municipal boundary, which is why they are considered jointly by RUSDIP. The municipality is an average of 316 m above Mean Sea Level, and the State capital Jaipur lies 330 km to the north and the town of Kota is 85 km to the north-west.

25. Jhalrapatan is located in the Jhalawar district about 7 km towards the South direction of Jhalawar and covers an area of 20.95 Sq. Km. The importance of the city is heightened due to location of famous heritage tourist sites like Sun Temple, Jain Temple, Chandrabhaga Temple and remains of Chandravati.

Location of Jhalawar and Jhalarapatan is shown in **Figure 1**.

2. Topography, Drainage and Natural Hazards

26. **Topography.** Both towns are located in the Jhalawar Plain, which is bounded in the north, south and east by the Mukundara hills. This is a fertile plain of mainly alluvial soil and is crossed by the Kalisindhi and Ahu rivers and a number of smaller streams. North-east of Jhalawar, between two ridges of hills, lies a long valley containing the artificial lakes of Kadila and Manasarowar.

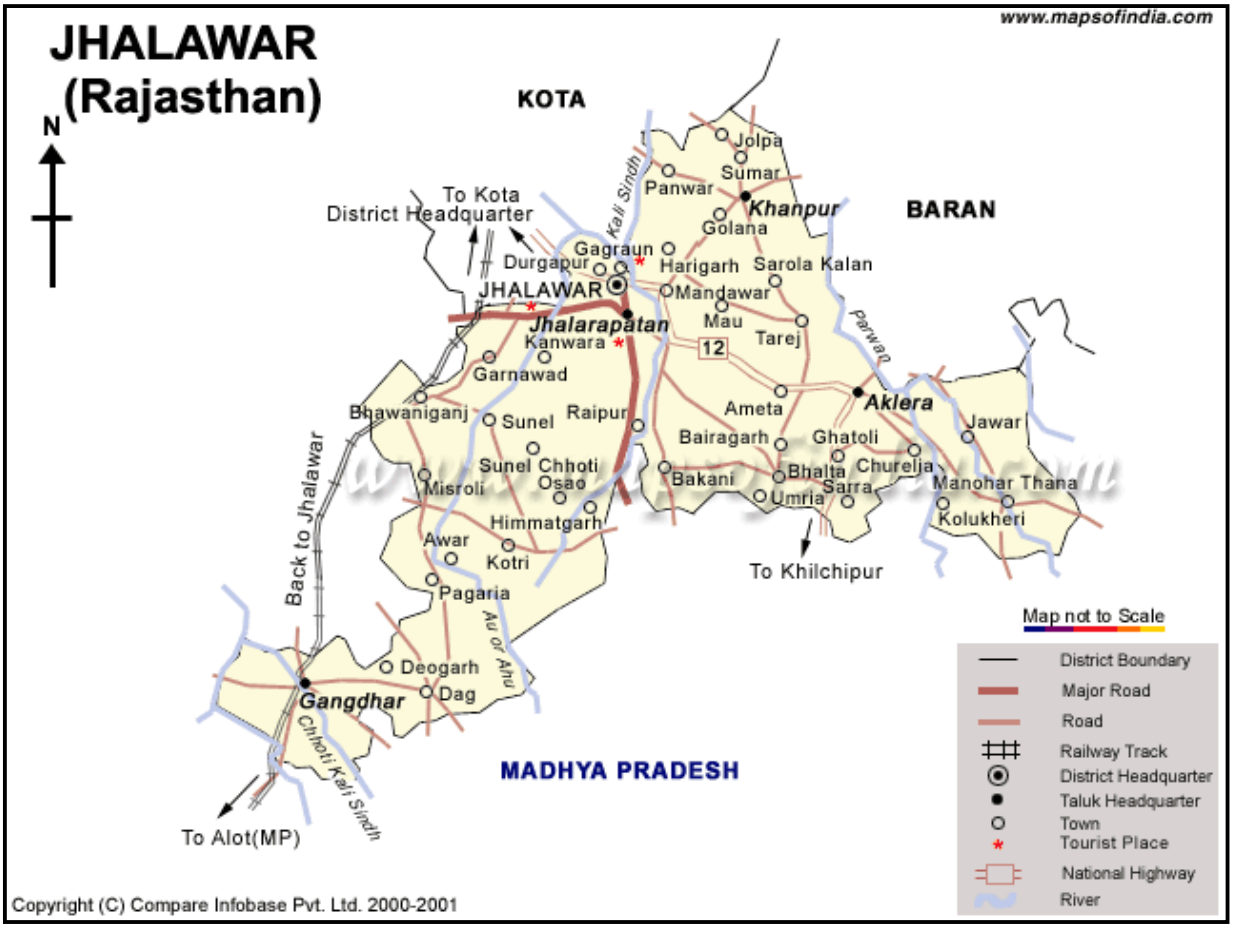


Figure 1: Location Map of Jhalawar and Jhalarapatan

27. **Drainage.** Jhalawar town itself is undulating town, the higher areas are located in an around the fort at an elevation of 316.00m and towards the north east areas having level of 304.00m. Whereas eastern areas having lowest level of upto 302.00m. Likewise in south of the town again the ground rises to the level of 315.00 and drains towards the nallahs located in between Jhalarapatan & Jhalawar. The major portion of the city area has the slope towards river Kalisindhi differing in grades from 1:50 to 1:500.

28. **Natural Hazards.** According to the Vulnerability Atlas of India, Jhalawar District is in an area of low earthquake risk (Zone II), characterised by old and geologically stable rock formations. Rajasthan has not experienced a major earthquake in the recent past, but there have been 37 events with a magnitude of 5-7 since 1720. The most recent occurred in 2001 and measured 6.9 on the Richter Scale, but because the epicentre was in neighbouring Gujarat, there was only limited damage in Rajasthan, and none reported in Jhalawar or Jhalrapatan.

3. Geology, Geomorphology, Mineral Resources, and Soils

29. **Geology.** Jhalawar District is at the edge of the Malawa plateau on Vindhyan strata at the northern edge of the great spread of basaltic rocks known as the Deccan trap formation. There are vast deposits of sandstone lying in horizontal strata around Jhalawar and

Jhalrapatan (Photo 7), below which is a hard black rock stratum. Soil is mainly dark in colour produced by weathering of the underlying rock, and is generally high in organic matter but low in nitrogen. The influence of the sandstone is also seen in places, where soil is looser and granular, with a more sandy texture. The primary rock formation for these regions is basalt. Apart from these, there are vast deposits of sandstones in almost horizontal stratification having underlying hard formation. At certain places, due to tectonic upheaval, such strata are broken and sheet of shale is also seen

30. **Geomorphology.** The district is classified into structural plain, structural hills, structural ridge and valley, denudational ridge and valley, plain and plateau on Deccan Trap, highly dissected pediment, and un dissected pediment. The Aravali hills, which are the most ancient folded mountain range in India, cross the region, roughly dividing the plains of hadoti from the Malwa plateau. These hills and the surrounding areas were once thickly forested and teemed with wildlife. The area classified into two hydrological domain (of fissured formation on hilly area) with ground water potential ranging from less than one to five liters per second (lps) .

31. **Mineral Resources.** Sizeable reserves of good quality clay, kota stone, limestone, rock phosphates, and building stones are found in the district. The sites covered in the subproject site is in the built-up portion of the Garh Palace and Jhalarpatan Fort thus does not have mineral resources.

32. **Soils.** Soil is mainly dark in colour produced by weathering of the underlying rock, and is generally high in organic matter but low in nitrogen. The influence of the sandstone is also seen in places, where soil is looser and granular, with a more sandy texture.

4. Climate

33. Like most of Rajasthan the climate of Jhalawar and Jhalrapatan is mainly dry, with significant rainfall only during the monsoon season. Winter extends from November to March, and the coolest period occurs in January when daytime temperatures average around 25 °C and often fall below 10 °C at night. Temperatures begin to rise in March and peak in May-June, when daytime values sometimes reach 48 °C. The south-west monsoon arrives in June, causing a sudden drop in temperature and increase in humidity. The long-term average rainfall is 844 mm, of which over 90% falls in the monsoon period. However, like the rest of Rajasthan rainfall has been relatively low in the past few years, and was above average only in 2003 (Figure 6). The monsoon ends in mid-September and air temperatures rise briefly, only to fall again a few weeks later with the onset of winter. Winds are generally light and northerly or north-easterly in winter and moderate to strong from the west and south-west in the monsoon.

5. Air Quality

34. Air Quality for Jhalawar was carried out during the period of 03-05 October 2011 at 3 locations of Jhalawar viz. Near bus stand, near Government Hospital and near Gagron Road (Near STP site). The monitoring locations are located within 2 Kms aerial distance from proposed sites. Monitoring locations are shown in **Appendix 6**. The results are shown in the table 1 below-

Table1: Ambient Air Quality Monitoring Results in Jhalawar

Location	Date	Monitoring Time (Hrs)	Concentration*				
			PM_{10}	$PM_{2.5}$	SO_2	NOx	CO
Near Bus Stand	03.10.2011 to 04.10.2011	10.30 am to 06.30 pm	210	129	12.3	1.24	39.5
		06.30 pm to 02.30 am	172	102	10.3	1.02	28.4
		02.30 am to 10.30 am	97	69	<5.0	0.96	19.4
	04.10.2011 to 05.10.2011	10.30 am to 06.30 pm	196	112	10.4	1.31	36.2
		06.30 pm to 02.30 am	179	108	8.4	0.94	26.7
		02.30 am to 10.30 am	112	87	<5.0	0.83	24.3
Near Govt. Hospital	03.10.2011 to 04.10.2011	11.00 am to 07.00 pm	245	151	13.7	1.11	41.3
		07.00 pm to 3.00 am	164	111	11.7	0.97	37.5
		3.00 am to 11.00 am	110	71	<5.0	0.76	22.6
	04.10.2011 to 05.10.2011	11.00 am to 07.00 pm	236	147	11.0	1.31	37.4
		07.00 pm to 3.00 am	176	116	9.5	1.20	32.9
		3.00 am to 11.00 am	135	80	<5.0	0.82	22.6
Gagron Road (Near STP Site)	03.10.2011 to 04.10.2011	12.00 am to 8.00 pm	142	91	7.5	1.22	21.3
		08.00 pm to 04.00 am	97	68	<5.0	1.07	18.4
		04.00 am to 12.00 pm	84	45	<5.0	1.03	15.4
	04.10.2011 to 05.10.2011	12.00 am to 8.00 pm	140	83	6.9	1.19	25.2
		08.00 pm to 04.00 am	106	73	<0.0	1.12	21.3
		04.00 am to 12.00 pm	90	56	<0.0	0.95	17.8
National Ambient Air Quality Standards (NAAQS) 2009 for 24 hrs monitoring and 8 hrs monitoring for CO			100	60	80	80	02

* All units are in $\mu g/m^3$ except CO which is in mg/m^3

35. Traffic is the only significant pollutant in Jhalawar, so levels of oxides of sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS).

6. Surface Water

36. Jhalawar District receives the most rainfall in Rajasthan and is relatively well provided with surface water as a result. All of the rivers and streams are part of the Chambal system, which is the only perennial river in the state. Kalisindhi and Ahu are the main rivers and both originate in Madhya Pradesh and flow north through Jhalawar into Kota District. All of the rivers and streams are full and swiftly flowing in the monsoon, but most are dry throughout the rest of the year, except for the Kalisindhi and Ahu, which retain water in depressions known locally as deh. These areas were the main source of water supply for Jhalawar and Jhalrapatan until recently, when two weirs were constructed in the Kalisindhi to provide a more secure supply, at Manpur 4 km northeast of Jhalawar (2001), and at Bhawrasa 6 km southeast of Jhalrapatan (2004).

7. Groundwater

37. Jhalawar and Jhalrapatan are in the south-eastern plateau region of Rajasthan, where groundwater is mainly found in layers of basalt, sandstone and shale, intercalated with sandstone. The groundwater resource of the Jhalrapatan block covers over 1300 km2, but is

heavily exploited, mainly by abstraction for agricultural use. The water table varies from 7 m to 15 m below ground level, and rises to 2-7 m after the monsoon.

8. Noise

38. Ambient Noise Quality for Jhalawar was carried out during the period of 03-05 October 2011 at 3 locations of Jhalawar viz. Near bus stand, near Government Hospital and near Gagron road (near STP site). These sites are located within 2 Kms aerial distance from proposed sites. The results are shown in the table 1A below-

Table 1A: Noise Monitoring Results In Jhalawar

S.No.	Location	$L_{eq\ dB(A)}$	$L_{day\ dB(A)}$	$L_{night\ dB(A)}$
1	Near Bus Stand, Jhalawar	65.7	67.4	50.2
2	Near Govt. Hospital, Jhalawar	63.7	65.1	48.3
3.	Gagron Road (Near STP Site)	56.1	57.6	47.1

Note: These areas comes under residential areas (except Gagron road), for which National standard is 55 dB(A) for day and 45 dB(A) for night time. Monitoring locations are shown in **Appendix 6**.

B. Biological Resources

39. There are no protected areas, wetlands, mangroves, or estuarines in or within the subproject site. Jhalawar and Jhalrapatan are both urban areas surrounded by land that was converted for agricultural use many years ago. There is no remaining natural habitat in either town, where the flora is limited to artificially planted trees and shrubs, and the fauna comprises domesticated animals.

40. **Flora.** There are reserve forest areas in the north and north-east of Jhalawar and the northwest and south-east of Jhalrapatan, and although protected from building and most other types of activity, these contain little of ecological interest. Vegetation is sparse and comprises mainly domesticated species.

41. **Fauna.** The fauna is also very limited. There are fish in most of the rivers and tanks outside the towns, but no aquatic areas are protected; rahu (*Labeo rihita*) and sanwal are the most common fish species. The subproject sites are in the built-up area of Jhalawar and Jhalarpatan therefore animals are those commonly found in urban areas. Domesticated animals (cows, goats, pigs and chickens), plus other species able to live close to humans (urban birds, rodents and some insects) are among them.

C. Economic Development

42. Economic base of a town reflects its prosperity. Jhalawar being district headquarter, has been functioning as administrative city with sustained growth in tertiary economic activities. The major economic activities are agriculture, trade and commerce, thus it offers a number of wholesale and retail markets which act as a distribution center for near by towns and villages. Agricultural arena of the district is very rich. Major productions in the district are of Soyabean, Citrus, Opium, Wheat, and Dhania. Many of the small-scale industries running in the district are

totally dependent on the agricultures. District has its name in exporting various productions like Synthetic yarns, Oranges, Fiber Yarns, Kota Stone etc.

1. Land use

43. Jhalawar Local Planning Area covers 33.09 km2 and includes both Jhalawar (12.94 km2) and Jhalrapatan (20.95 km2). According to the Master Plan for 1991-2011 the main land use is residential (29%) and there are also relatively large areas of industry (15%), public land (14%), transportation (12%) and open space (14%) .

2. Commerce, Industry and Agriculture

44. **Commerce.** The main retail and wholesale business activities of the town are carried out at Bada Bazar main market in Jhalawar, where retail and transport-oriented businesses are located. In Jhalarpatan there are also commercial activities like whole sale and retail business of fabrics, cloths, electronics, general items and cereals, pulses and oil etc taking place.

45. **Industrials Development.** Both Jhalawar and Jhalrapatan are emerging as growing centres of commerce and industry. There are three industrial estates in Jhalawar and two in Jhalrapatan, which cover a total of 59 ha; and Rajasthan Industrial Infrastructure Corporation (RIICO) has also developed an industrial growth centre, which is currently partially occupied. Stone cutting and polishing is one of the main industries because of the large amounts of sandstone and other decorative materials quarried in surrounding hillsides, and also because of the proximity to Kota, which isfamous for its stonework. There is also a large textile mill and various units related to fabrication, including PVC, agricultural accessories and handicrafts.

46. **Agriculture.** Agriculture is also important, because of the fertile plains and reasonably good rainfall, and Jhalawar District is the largest producer of coriander in the country and the second largest producer of oranges. Jhalawar and Jhalrapatan produce significant quantities of both of these crops, together with soya bean, wheat and opium. Many areas practice double cropping, and the main seasons are kharif (April-September: cotton, jowar, maize and groundnut) and rabi (October-March: wheat, gram, coriander, linseed, opium and sugarcane).The subproject site is not located in an agricultural land.

3. Infrastructure

47. **Water supply**. PHED provides a piped municipal water supply to both towns, which is extracted from the Kalisindhi River via two separate intakes at a rate of 6 MLD (Jhalawar) and 3.5 MLD (Jhalrapatan). In the dry season water is trapped in natural depressions in the riverbed, and also by means of the two man-made weirs at Manpur and Bhawrasa mentioned above. Water is treated by chlorination at a Water Treatment Plant in each town, and the piped distribution system reaches 90% of the population. However because of system losses (estimated at 40%), water is available for only 1-2 hours per day, and only on alternate days in the summer. Under RUSDIP project rehabilitation works in both the WTP have been taken up along improved water supply network and construction of 5 new OHSRs in both the towns.

48. **Sewerage and Sanitation**. There is no sewerage system in Jhalawar or Jhalrapatan, and although around one third of houses have individual sanitation facilities (septic tanks or pit latrines), the rest of the population uses community toilets provided by the Municipal Boards, illegal connections from latrines to storm water drains, or practice open defecation. A sewerage system with Sewage Treatment Plant is being developed by UIDSSMT under RUIDP project.

49. **Drainage**. There are roadside drains in many areas, alongside 30% of the roads in Jhalawar and 75% of the roads in Jhalrapatan. This includes both earth and concrete drains, but these are often poorly designed with inadequate gradients, and are frequently clogged with solid waste and polluted by sewage. There is also no drainage outfall, and water discharges onto areas of low-lying land in the town.

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

51. **Solid Waste**. There is no proper solid waste management system in the towns, and although the Municipal Boards have designated 25 open collection points in Jhalawar and 15 in Jhalrapatan, refuse is mainly discarded in the streets and drains, and dumped on vacant plots of land. Jhalawar generates around 16 tons of solid waste per day and Jhalrapatan 9 tons, of which around 60% is collected, by manual street sweepers and irregular municipal collections by truck. Collected waste is transported on open vehicles to the outskirts of each town, where it is dumped on open ground. Under RUSDIP works improved solid waste management system is proposed with procurement of solid waste management equipments and construction of a new land fill site in Jhalawar and Jhalarapatan.

52. **Transportation.** In both towns roads are very narrow and congested in the older central areas, and as these house most of the commercial activity, there is considerable pedestrian and vehicular traffic. There are 53 km of roads in Jhalawar and 19 km in Jhalrapatan, of which around 30-40% are surfaced with bitumen/tar, 20-40% are concrete, < 3% are WBM (Waterborne Macadam) and the remainder (20-30%) are unpaved earth roads. All roads in Jhalrapatan and 90% of the roads in Jhalawar are maintained by the Municipal Board, and the rest are maintained by the Public Works Department (PWD). The condition of the roads is generally poor, and many are in need of repairs and resurfacing.

D. Social and Cultural Resources

53. **Demography**. According to the national census the population of Jhalawar was 38,671 in 1991 and 48,054 in 2001, an annual growth of 2.3% over the decade; whereas in Jhalrapatan there were 23,067 people in 1991 and 30,103 in 2001, a growth of 2.9%. With a combined total of 78,157 people in a municipal area of 33.12 km2, the population density in 2001 was 2,360 persons per km2.

54. **Health and Educational Facilities.** As the district headquarters town, Jhalawar is the main centre for health facilities in the area. There are four hospitals (including the district hospital that is presently being upgraded to 300 bed capacity), plus a special TB hospital, two dispensaries, a mother and child welfare centre, two family welfare centres and three homeopathic hospitals. There are good basic educational facilities in Jhalawar and Jhalrapatan, which serve both townspeople and inhabitants of surrounding villages and towns in the hinterland. There are 31 primary schools, 52 secondary schools and 18 higher secondary schools in the twin towns, plus two general degree colleges and a professional training institute. The towns also benefit from the proximity of Kota city, which is one of the most important educational centres in Rajasthan.

55. **History, Culture, and Tourism.** Jhalawar was named after its founder, Jhala Zalim Singh (I), who was the Dewan of Kota State and established the town in 1796 as a cantonment (administrative and military area) near the existing Jhalrapatan Fort. Jhalawar state separated

from Kota state in 1838 under the rule of Jhala Madan Singh (grandson of Jhala Zalim Singh), who built the famous Garh Palace in 1840-1845.

56. Interlinked over the centuries, the two towns have a rich cultural heritage which includes a number of sites that are of interest both historically and more recently to tourists. These include.

- The Garh Palace (otherwise known as Jhalawar Fort), which currently houses the district collectorate and other government administrative offices, these offices are being shifting to newly constructed administrative block in the campus of Mini Secretariat
- The 14th century Gagroan Fort, 12 km north of Jhalawar is in a spectacular location on a remote hillside overlooking the Kalisindhi River, and is visible from the municipal water supply intakes
- The ruins of the old city of Chandravati, which was largely demolished during the Muslim period, is on the left bank of the Chandrabagha River just south of Jhalrapatan;
- The 10th century Surya temple in the centre of Jhalrapatan, which contains one of the country's best preserved Surya (sun god) idols the 11th century Shantinath Jain Temple; and the 14th century Chandrabhaga Temple also in Jhalrapatan;
- There are also many events and festivals that attract visitors, of which the Kartik Fair held in Jhalrapatan in October and November is one of the most prominent, featuring earthen statues depicting the Hindu Ramayana epic

57. The subproject sites are not located in or near any archaeologically or architecturally significant areas. Historical Garh Palace (Jhalawar), Padmanabhi Sun Temple, Jain Temple and Jhalarapatan fort (Jhalarapatan) are the only historical and culturally important monuments near the sewer lines of the proposed sub project will fall. A list of environmentally sensitive receptors near this subproject is attached with report as Appendix 5.

IV. ANTICIPATED IMPACTS AND MITIGATION MEASURES

58. This section of the IEE reviews possible subproject-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB's Environmental Policy (2002) requires that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the subproject's area of influence. As defined previously, the primary impact areas are (i) the sites for secondary and tertiary sewerage network; (ii) main routes/intersections which will be traversed by construction vehicles; and (ii) quarries and borrow pits as sources of construction materials. The secondary impact areas are: (i) entire Jhalawar area outside of the delineated primary impact area; and (ii) entire Jhalawar district in terms of over-all environmental improvement.

59. The ADB Rapid Environmental Assessment (REA) Checklist for Wastewater found in the Environmental Assessment Guidelines (2003) was used to screen the subproject for environmental impacts and to determine the scope of the IEE investigation. The completed Checklist is attached as **Appendix 1.** All the proposed subproject components will interact physically with the environment.

60. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward 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 the built-up area of Jhalawar, will not cause direct impact on biodiversity values. Access to the subproject area is through public rights-of-way and existing roads hence there will be negligible impact due to plying of construction vehicles.

A. Pre construction – Design and Location

61. **Design of the proposed components.** The subproject has been designed for 30-years life. Accordingly, it is proposed that the subproject be commissioned by the year 2013 and the plan horizon year will be 2043. The design was based on a population forecast and demand calculations for the mid period, year 2028.

62. **Location and planning of .Sewerage Network.** Sewerage network shall comprise the urban inhabited areas of Jhalawar and Jhalarapatan. The planning of Sewerage system is carried out in totality of the Town. After detailed topographical Survey of town it is found that the natural terrain for flow of Municipal Waste Water of major portion main city of Jhalawar is towards *Ayurvedic Hospital*. From *mamabhanja Chauraha*, there is a ridge line. The southern side Municipal waste flow towards Bhawanimandi side & other side flow from Mangalpura & then bada bazaar, municipality office & then Balazi temple & then finally goes towards Ahu river.

63. Similarly, in Jhalarapatan Town it is found that the natural terrain for flow of wastewater of major portion main city of Jhalarapatan is towards Chandrabhaga River.

64. Jhalawar and Jhalarapatan is two interconnected town. As already discussed in the Report, it is proposed that Sewerage system is designed for both of the town. The topography of the area is such that the drainage water & wastewaters all flow towards river Kalisindh, which is the nearest drainage line of the area. Jhalawar town itself is undulating town, the higher areas are located in an around the fort at a elevation of 316.00m and the towards north east areas are having a level of 304.00m. Whereas eastern areas having lowest level of upto 302.00m.

Likewise in south of the town again the ground rises to the level of 315.00 and drains towards the nallahs located in between Jhalarapatan & Jhalawar.

65. Jhalarapatan is higher than Jhalawar with the higher levels going up to levels of 324.00m & sullage water naturally flow towards the nalla at a distance of 2.00 Km.

66. **Utilities.** Telephone lines, electric poles and wires, water and sewer lines within the existing right-of-way (ROW) may be damaged. To mitigate the adverse impacts due to relocation of the utilities, DSC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) require construction contractors to prepare a contingency plan

67. **Asbestos Cement (AC) Pipes.** An additional, particularly acute health risk presented by this subproject derives from the fact that, the existing water supply system comprises mainly AC pipes, so there is a risk of contact with carcinogenic material if these pipes are uncovered in the course of the work. Precautions have already been introduced into the design of the project to avoid this, of which the most important are that:

(i) No work is proposed on those parts of the existing system that contains AC pipes (ring, carrier, and distribution mains), and these will be left in-situ undisturbed, so there will be no deliberate excavation of AC pipes; and
(ii) The locations of the new network has been planned to avoid all locations of existing AC pipes so these pipes will not be discovered accidentally.

68. However unlikely, the design consultant should develop a protocol to be applied in any instance that AC pipes are found, to ensure that appropriate action is taken. This should be based on the approach recommended by the United States Environmental Protection Agency (USEPA),[2] and amongst other things, should involve:

(i) Develop reporting procedures to inform management immediately if AC pipes are encountered; and
(ii) Require construction consultants to develop and apply an AC Management Plan, as part of the over-all health and safety (H&S) plan, to protect both workers and citizens in case accidental uncovering of AC pipes. This AC Management Plan should also contain national and international standards for safe removal and long-term disposal of all asbestos-containing material encountered.

69. **Social and Cultural Resources.** Jhalawar and Jhalarapat is the area of rich and varied cultural heritage which includes forts and palaces from the Rajput and Mughal periods, and large numbers of temples and other religious sites, so there is a risk that any work involving ground disturbance can uncover and damage cultural and historical remains. For this subproject, excavation will occur in and around existing ROWs, so it could be that there is a low risk of such impacts. Nevertheless, IPIU/DSC will:

(i) Consult local authorities to access cultural and religious potential of the site;
(ii) Consider alternatives if the site is found to be of medium or high risk;

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

(iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and

(iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

70. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate camps near the project area. 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 in order to protect the communities (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near water bodies, religious places or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings.

71. **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 included in the design specifications and on plan drawings. Priority would be sites already permitted by Mining Department. If other sites are necessary, these would to be located away from population centres, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas even if some distance from construction activities. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Urban Local Body. 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 Jhalawar Municipal Council (JMB).

B. Construction

1. Screening of No Significant Impacts

72. The construction work is not expected to cause major negative impacts, mainly because:

(i) Most of the activities will be on the built-up areas of Jhalawar & Jhalarapatan town thus could be constructed without causing impacts to biodiversity;

(ii) The site is located on an government-owned land (Roads) which is not occupied or used for any other purpose;

(iii) Overall construction program will be relatively short and is expected to be completed in 24 months, with activities to conducted by small teams working on short lengths at a time so most impacts will be localized and short in duration; and

(iv) Most of the predicted impacts associated with the construction process are produced because the process is invasive, such as involving earth-moving and excavation. However the routine nature of the impacts means that most can be easily mitigated and the impacts are clearly a result of the construction process rather than the design or location, as impacts will not occur if excavation or other ground disturbance is not involved.

73. As a result, there are several aspects of the environment which are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These are shown in **Table 2**. These environmental factors are screened out presently but will be assessed again before starting of the construction activities.

Table 2: Fields in which construction is not expected to have significant impacts

Field	Rationale
Topography, Drainage, and Natural Hazards	Activities are not large enough to affect these features.
Geology, Geomorphology, Mineral Resources, and Soils	Activities are not large enough to affect these features. No mineral resources in the subproject sites.
Climate	Activities are not large enough to affect this feature.
Air Quality	Short-term production of dust is the only effect on atmosphere
Geohydrology and Groundwater	Activities will not be large enough to affect these features
Protected Areas	No protected areas within 1 km of the proposed project location
Flora and Fauna	No rare or endangered species.
Land Use	No change in major land use
Socio-economic	Subproject site is located mostly on government-owned land so there is need to acquire land from private owners.
Commerce, Industry, and Agriculture	Activities are not large enough to affect these features
Population	Activities are not large enough to affect this feature.
Health and education facilities	Activities are not large enough to affect this feature.
Archaeological, Paleontological, or Architectural sites	No scheduled or unscheduled archaeological, paleontological, or architectural sites

2. Construction method

74. For sewerage pipe laying most pipes will be buried in trenches immediately adjacent to roads, in the un-used area within the ROW, alongside the edge of the tarmac. The econdary network will be located alongside main roads, where there is generally more than enough free space to accommodate the pipeline. However in parts of the tertiary network where roads are narrow, this area is occupied by drains or the edges of shops and houses etc., so the trenches may have to be dug into the edge of the road.

75. Trenches will be dug by backhoe digger and/or supplemented by manual digging where necessary. Excavated soil will be placed nearby, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by crane or using a small rig. After the pipes are joined, loose soil will be shovelled back into the trench, and the surface layer will be compacted by hand-operated compressor.

76. Pipes are normally covered by 1.2 m of soil, and a clearance of 100 mm is left between the pipe and each side of the trench to allow backfilling. Trenches will therefore be quite large, a minimum of 1.5 m deep and 0.4 m wide for the secondary/ tertiary network.

77. At intervals, small chambers (ca 1-2 m3) will be created to allow inspection and clearance of blockages and sediment during operation. These will be excavated by backhoe and hardcore and concrete (mixed on site) will be tipped in to form the base. Brick or stone sides will then be added by masons by hand, and the top will be sealed at ground level by a metal manhole cover.

78. As noted above, some of the narrower roads are constructed of concrete and have no available space at the edge because of the presence of drains, or shop- and house-fronts encroaching into the ROW. In these places it may be necessary to break open the surface of the road using hand-held pneumatic drills, after which the trench and pipeline will be constructed as described above. On completion, a concrete layer will be re-applied to the surface to repair the road.

3. Anticipated Impacts and Mitigation Measures

79. Although construction of the subproject components involves quite simple techniques, the invasive nature of excavation, and in this case the relatively smaller size and length of the pipes, means that there will be some physical disturbance in the built-up areas of Jhalawar and Jhalarapatan towns where there are a variety of human activities.

80. Physical impacts will be reduced by the method of working, whereby the trenches will be (i) constructed by small teams working on short lengths at a time; (ii) refilled and compacted after pipes are installed; and (iii) if trenching done on roads, repaired to pre-construction conditions.

81. **Sources of Materials.** Significant amount of gravel, sand, and cement will be required for this subproject. The construction contractor will be required to:

(i) Use quarry sites and sources permitted by government;
(ii) Verify suitability of all material sources and obtain approval of Investment Program Management Unit (IPIU);
(iii) If additional quarries will be required after construction has started, obtain written approval from IPMU; and
(iv) Submit to DSC on a monthly basis documentation of sources of materials.

82. **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, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) but temporary and during construction activities only. To mitigate the impacts, construction contractors will be required to:

(i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
(ii) Excavate the trenches only when pipes are readily available to lay immediately after trenching so that dug material is used immediately to cover the pipes, avoiding the need to stockpile on site;
(iii) Damp down exposed soil and any stockpiled on site by spraying with water when 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; and
(vi) Ambient air quality monitoring as per EMP.

83. **Surface Water Quality.** Construction activities will be conducted near the drains flowing to *nallahs*, although dried up during the summer period, has significant amount of silt materials.

Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality. These potential impacts are temporary and short-term duration only and to ensure these are mitigated, construction contractor will be required to:

(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
(ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas;
(iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(v) Dispose any wastes generated by construction activities in designated sites; and
(vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

84. **Noise Levels.** There are no any scheduled or unscheduled archaeological, paleontological, or architectural sites near the construction sites. However, construction works particularly pipe laying work will be on settlements, near some health facilities, religious sites (temples), along schools, and areas with small-scale businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by earth-moving and excavation equipment, and the transportation of equipment, materials, and people. Impact is negative, short-term, and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
(iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.
(v) Ambient noise monitoring at the sensitive locations during implementation phase as per EMP

85. **Existing Infrastructure and Facilities.** Excavation works can damage existing infrastructure located alongside roads, in particular water supply pipes and drainage. It will be particularly important to avoid damaging existing water pipes as these are mainly manufactured from Asbestos Cement (AC), which can be carcinogenic if inhaled, so there are serious health risks for both workers and the public. It is therefore important that construction contractors will be required to:

(i) Obtain from IPIU and/or DSC the list of affected utilities and operators;
(ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services. and
(iii) Develop and implement an AC Pipes Management Plan

86. **Landscape and Aesthetics.** The construction works will produce excess excavated soils, excess construction materials, and solid waste such as removed concrete, wood, trees and plants, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. These impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Prepare and implement Waste Management Plan;
(ii) Avoid stockpiling of excess excavated soils;
(iii) Coordinate with Jhalawar Municipal Board(JMB) 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 (such as buildings, shelters, and latrines) which are no longer required; and
(vii) Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

87. **Surface and Groundwater Quality.** Another physical impact that is often associated with large-scale excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. However, this should not be a problem in this subproject, given the low rainfall and deep water table in this area. To ensure that water will not pond in pits and voids near subproject sites, the construction contractor will be required to conduct excavation works on non-monsoon season.

88. **Accessibility.** Hauling of construction materials and operation of equipment on-site can cause traffic problems and conflicts in ROW. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

(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;
(vi) Coordinate with Jhalawar Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

89. **Socio-Economic – Income.** The subproject components will be located on government lands (roads) and ROWs, so there will be no need to acquire land, and thus there will be no impacts on the asset or landowners or tenants. However construction works will impede the access of residents and customers to nearby shops. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

(i) Leave spaces for access between mounds of soil;
(ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles;

(iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
(iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
(v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

90. **Socio-Economic – Employment.** Manpower will be required during the 24-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

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

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

(ii) Develop and implement site-specific Health and Safety (H&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) health and safety Training[3] 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 can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
(iv) Provide medical insurance coverage for workers;
(v) Secure all installations from unauthorized intrusion and accident risks;
(vi) Provide supplies of potable drinking water;
(vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
(viii) Provide health and safety orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
(ix) 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;
(x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
(xi) Ensure moving equipment is outfitted with audible back-up alarms;

3 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.

(xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
(xiii) 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.

92. A particular acute health risk presented by this subproject the risk of contact with carcinogenic material if the AC pipes are uncovered in the course of work. Precautions have already been introduced into the design of the subproject to avoid uncovering of these AC pipes. However unlikely, the construction contractor will be required to:

(i) Train all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ;
(ii) Report to management immediately if AC pipes are encountered;
(iii) Develop and apply AC Management Plan.

93. **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 IPIU/DSC 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 dangerous conditions.

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

(i) Consult with IPIU/DSC before locating project offices, sheds, and construction plants;
(ii) Minimize removal of vegetation and disallow cutting of trees;
(iii) Provide water and sanitation facilities for employees;
(iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
(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 following preference hierarchy: reuse, recycling and disposal to designated areas;
(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
(ix) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

95. **Social and Cultural Resources.** For this subproject, excavation will occur in and around existing roads ROWs, so it could be that there is a low risk of such impacts. Nevertheless, the construction contractor will be required to:

(i) Strictly follow the protocol for chance finds in any excavation work;
(ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation;
(iii) Stop work immediately to allow further investigation if any finds are suspected; and
(iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.

C. Operation and Maintenance

1. Screening out areas of no significant impact

96. Although the sewerage system will need regular maintenance when it is operating, with a few simple precautions this can be conducted without major environmental impacts (see below). There are therefore several environmental factors which should be unaffected by this system once it begins to function. These are identified in **Table 3** below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be discussed further.

Table 3: Fields in which operation and maintenance of the completed sewerage system is not expected to have significant impacts

Field	Rationale
Climate, topography, geology, seismology	There are no known instances where the operation of a relatively small sewerage system has affected these factors
Fisheries and aquatic biology	No fishery nearby the project location
Wildlife, forests, rare species, protected areas	There are no wildlife, forests, rare species, and protected areas at sub-project locations
Coastal resources	Jhalawar is not located in a coastal area

2. Operation and Maintenance of the Sewerage System

The new sewerage system will collect and treat all surface water, domestic wastewater and sewage produced by most of the town, and the remainder of the inhabited area and future expansion will be served by additional sewers provided via subsequent tranches of funds in Phase 3.

97. The sewer pipes will not function without maintenance, as silt inevitably collects in areas of low flow over time. The ULB will therefore provide equipment for cleaning the sewers, including buckets and winches to remove silt via the inspection manholes, diesel-fuelled pumps to remove blockages, and tankers to transport the waste hygienically to the STP.

98. Piped sewers are not 100% watertight and leaks can occur at joints. Any repairs will be conducted by sealing off the affected sewer and pumping the contents into tankers, after which the faulty section will be exposed and repaired following the same basic procedure as when the

sewer was built. Trenches will be dug around the faulty section and the leaking joint will be re-sealed, or the pipe will be removed and replaced.

3. Anticipated Environmental Impacts and Mitigation Measures

99. **General.** If trenches will be dug to locate and repair leaks or remove and replace lengths of pipe or illegal connections, the work will follow the same procedures during the construction stage. JMB needs to require its O&M contractor to:

(i) Refill and re-compact trenches with soil and backfilled sand will be removed to expose the leaking junction or pipe;
(ii) Conduct work during non-monsoon period; and
(iii) Cover or wet excavated material to prevent dusts.

100. **Ecological Resources.** There are no significant ecological resources in or around the project area of the town, so any repairs or maintenance work can be conducted without ecological impacts. As there is no significant flora and fauna in or around project site, there should also not be any ecological impacts from the increase in abstraction.

101. **Economic Development.** Although network repairs could result in shops losing some business if the work means that access is difficult for customers, any losses will be small and short-lived and will probably be at the level of normal business fluctuations. It should therefore not be necessary to compensate for such losses. Nevertheless JMB needs to require its O&M contractor to:

(i) Inform all residents and businesses about the nature and duration of any work well in advance so that they can make preparations if necessary;
(ii) Conduct these works to provide wooden walkways across trenches for pedestrians and metal sheets where vehicle access is required; and
(iii) Consult the local traffic police regarding any such work so that it can be planned to avoid traffic disruption as far as possible, and road diversions can be organised if necessary.

102. The use of local contractors will provide economic benefits to the companies and the workers they employ. There is however little prospect of directing these benefits to persons affected by any maintenance or repair works as contractors will utilise their existing and experienced workforce. To provide at least some economic benefits to affected communities, unskilled persons employed to maintain and operate the sewerage network should be residents of the neighbouring area.

103. **Social and Cultural Resources.** Although there is a low risk of excavation in the town discovering material of historical or archaeological importance, there will be no need to take precautions to protect such material when areas are excavated to repair leaks in the network, as all work will be conducted in trenches that have already been disturbed when the infrastructure was installed.

104. Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, hospitals, temples, tourist sites etc, so the same precautions as employed during the construction period should be adopted. PHED and JMB needs to require its O&M contractor to:

(i) Consult the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
(ii) Complete work in these areas quickly;
(iii) Provide wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required; and
(iv) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

105. The citizens of the town will be the major beneficiaries of the new sewerage system, as human waste from those areas served by the new network will be removed rapidly and treated to an acceptable standard. This should improve the environment of these areas, and in conjunction with the development of other infrastructure (in particular water supply), should deliver major improvements in individual and community health and well-being. Diseases of poor sanitation, such as diarrhea and dysentery, should be reduced, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project Stakeholders

106. The primary stakeholders are:

(i) Residents, shopkeepers and businesspeople who live and work alongside the roads in which improvements will be provided and near sites where facilities will be built;
(ii) Custodians and users of socially and culturally important buildings in affected areas;
(iii) State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts; and
(iv) State and local tourism authorities.

107. The secondary stakeholders are:

(i) LSGD as the Executing Agency;
(ii) Other government institutions whose remit includes areas or issues affected by the subproject (state and local planning authorities such as Public Health Engineering Department, Local Government Department, Ministry of Environment and Forests, Roads and Highways Division);
(iii) Non-government organizations (NGOs) and community-based organizations (CBOs) working in the affected communities;
(iv) Other community representatives (prominent citizens, religious leaders, elders, women's groups);
(v) The beneficiary community in general; and
(vi) ADB, GoI, and Ministry of Finance.

B. Consultations and Disclosures Conducted

108. To comply with ADB's Environmental Policy, some informal discussion was held with the local people during site visit. Issues discussed are:

(i) Awareness and extent of the project and development components;
(ii) Benefits of Project for the economic and social upliftment of community;
(iii) Labor availability in the Project area or requirement of outside labor involvement;
(iv) Local disturbances due to Project Construction Work;
(v) Necessity of tree felling etc. at project sites;
(vi) Water logging and drainage problem if any;
(vii) Drinking water problem;
(viii) Forest and sensitive area nearby the project site; and
(ix) Movement of wild animals nearby the project site.

109. Public consultations and group discussion meetings were conducted by RUIDP on 09th January 2012 under chairmanship of District Collector of Jhalawar in the presence of officials of PHED, RUIDP, Forest, Health Services, Nagar Palika and other departments and public representatives. The objectives were to appraise the stakeholders about the program's environmental and social impacts and present safeguards to mitigate any potential significant impacts.

110. Discussions were held with the local people during site visits for the preparation of this IEE. The major issues raised are related to traffic interferences and possible dust and noise problems during construction phase. Other comments include construction vehicles creating some disturbances to the local people daily activities, necessity of proper safety arrangements, and widening of roads prior to construction activities. The issues and comments have been considered and incorporated in the design of the subproject and mitigation measures for the potential environmental impacts raised during the public consultations. Major outcomes of public discussions were:

(i) Proposed waste water management project should ensure proper hygienic disposal of sewerage water in all wards of city.
(ii) Executive agency should give preference to engage nationally reputed contractor as people do not faith about the local contractors in respect of quality of works as well as timely completion of work;
(iii) Livelihood affected households should be given assistance in the mode of cash compensation;
(iv) Local people should be employed by the contractor during construction work;
(v) Adequate safety measures should be taken during construction work;
(vi) Mobile kiosks/vendors/hawkers have shown willingness to shift in nearby places without taking any compensation and assistance from the Executing Agency;
(vii) Local people have appreciated the waste water management proposal of the government and they have ensured that they will cooperate with the Executing Agency during project implementation.

Records of public consultations are attached as **Appendix 2**.

111. Hindi versions of the Environmental Framework shall be provided during workshops to ensure stakeholders understood the objectives, policy, principles, and procedures. Likewise, English and Hindi versions of the Environmental Framework shall be placed in Urban Local Body (ULB) offices, Investment Program Project Management Unit (IPMU) and IPIU offices, and the town library.

C. Future Consultation and Disclosure

112. Public consultations and information disclosures are to be done during planning and implementation phases as per ADB Environmental Policy 2006.RUSDIP will extend and expand the consultation and disclosure process significantly during implementation of the project. They have appointed an experienced NGO to handle this key aspect of the program. The NGO (Community Awareness Participation Program, CAPP consultant) continuously (i) conducts a wide range of activities in relation to all subprojects in each town; and (ii) ensures the needs and concerns of stakeholders are registered and are addressed in subproject design.

113. For this subproject, the CAPP consultant will develop, in close coordination with IPIU and DSC, a public consultation and disclosure program which is likely to include the following:

(i) Consultation during detailed design:
    (a) Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary; and

(b) Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.

(ii) Consultation during construction:

(a) Public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and

(b) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation;

(ii) Project disclosure:

(a) Public information campaigns (via newspaper, pumplets, TV and radio) to explain the project to the wider town population and prepare them for disruption they may experience once the construction program is underway;

(b) Public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in Hindi; and

(c) Formal disclosure of completed project reports by making copies available at convenient locations in the study towns, informing the public of their availability, and providing a mechanism through which comments can be made.

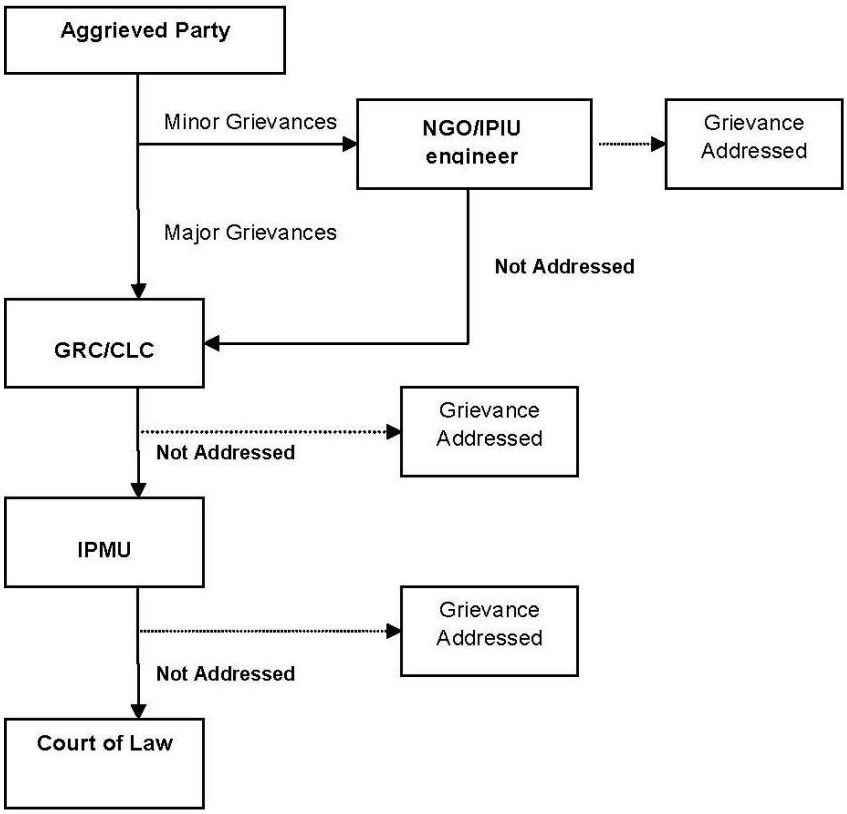
114. Based on ADB requirements, the following will be posted on ADB website: (i) final or updated IEE, (ii) corrective action plan prepared during project implementation, and (iii) environmental monitoring reports, upon receipt.

VI. GRIEVANCE REDRESS MECHANISM

115. Grievances of affected persons will first be brought to the attention of the implementing NGO or IPIU engineer. Grievances not redressed by the NGO or IPIU will be brought to the City Level Committees (CLC) set up to monitor project implementation in each town. The CLC, acting as a grievance redress committee (GRC) is chaired by the District Collector with representatives from the ULB, state government agencies, IPIU, community-based organizations (CBOs) and non-government organizations (NGOs). As GRC, the CLC will meet every month. The GRC will determine the merit of each grievance, and resolve grievances within a month of receiving the complaint, failing which the grievance will be addressed by the inter-ministerial Empowered Committee. The Committee will be chaired by the Minister of Urban Development and LSGD, and members will include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments. Grievance not redressed by the GRC will be referred to the IPMU for action, failure at this level will be referred to the appropriate courts of law. The IPIU will keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The grievance redress process is shown in Figure 2.

116. All costs involved in resolving the complaints will be borne by the IPMU. The GRCs will continue to function throughout the project duration.

Figure 2: Grievance Redress Mechanism – RUSDIP



CLC = City Level Committee, GRC = Grievance Redress Committee, IPIU=Investment Program Implementation Unit, IPMU = Investment Progarm Management Unit, NGO = nongovernmental organization,

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

117. The main agencies involved in managing and implementing the subproject are:

(i) LSGD is responsible for management, coordination, and execution of all activities funded under the loan;
(ii) IPMU is responsible for coordinating construction of subprojects across all towns, and for ensuring consistency of approach and performance;
(iii) IPMC assists IPMU in managing the program and assures technical quality of design and construction;
(iv) DSCs design the infrastructure, manage tendering of Contractors and supervise the construction process;
(v) IPIUs appoint and manage Construction Contractors to build elements of the infrastructure in a particular town.
(vi) An inter-ministerial Empowered Committee[4] (EC) assists LSGD in providing policy guidance and coordination across all towns and subprojects.; and
(vii) CLCs[5] have also been established in each town to monitor project implementation in the town and provide recommendations to the IPIU where necessary.

118. **Figure 3** shows institutional responsibility for implementation of environmental safeguard at different level.

1. Responsible for carrying out mitigation measures

119. During construction stage, implementation of mitigation measures is the construction contractor's responsibility while during operation stage, JMB will be responsible for the conduct of maintenance or repair works.

120. To ensure implementation of mitigation measures during the construction period, contract clauses (**Appendix 3**) for environmental provisions will be part of the civil works contracts. Contractors' conformity with contract procedures and specifications during construction will be carefully monitored by IPIU.

2. Responsible for carrying out monitoring measures

121. During construction, DSC's Environment Safeguard Monitoring Specialist and the designated representative of IPIU will monitor the construction contractor's environmental performance.

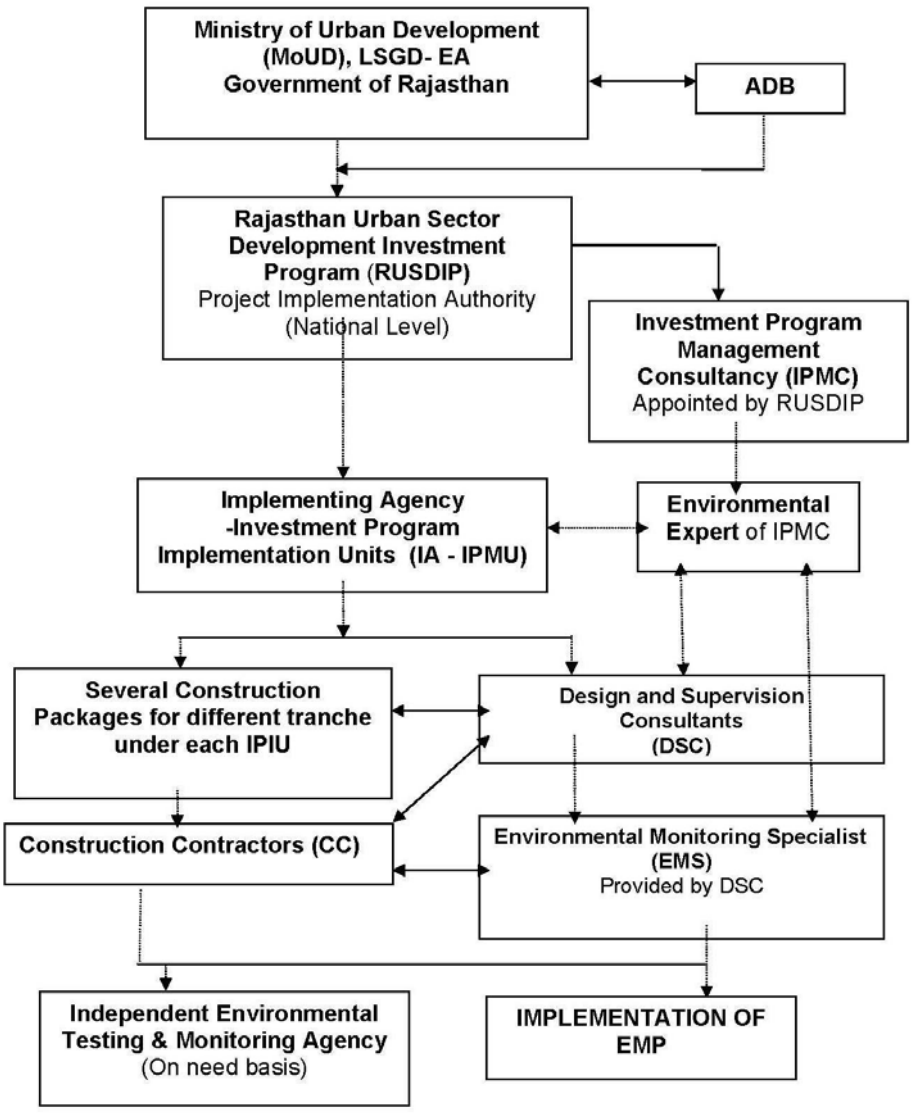
122. During the operation stage, monitoring will be the responsibility of JMB.

4 The EC is chaired by the Minister of Urban Development and LSG, and members include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments.
5 CLCs are chaired by District Collectors, with members including officials of the ULB, local representatives of state government agencies, the IPIU, and local NGOs and CBOs.

3. Responsible for reporting

123. LGSD will submit to ADB quarterly reports on implementation of the EMP and will permit ADB to field semi-annual environmental review missions which will review in detail the environmental aspects of the Project. Any major accidents having serious environmental consequences will be reported immediately.

Figure 3: Institutional Responsibility- RUSDIP



B. Environmental Mitigation Plan

124. **Tables 4 to 6** show the potential adverse environmental impacts, proposed mitigation measures, responsible parties of implementation. This EMP will be included in the bid documents and will be further reviewed and updated during implementation.

C. Environmental Monitoring Program

125. **Tables 7 to 9** show the proposed environmental monitoring program for this subproject. It includes all relevant environmental parameters, description of sampling stations, frequency of monitoring, applicable standards, responsible parties, and estimated cost. Monitoring activities during the detailed engineering design stage will from part of the baseline conditions of the subproject sites and will be used as the reference for acceptance of restoration works by the construction contractors.

Table 4: Anticipated Impacts and Mitigation Measures – Pre-construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Utilities	Telephone lines, electric poles and wires, water and sewer lines within the existing road right-of-way (ROW) may be damaged.	(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 done in case of unintentional interruption of services.	DSC	(i) List of affected utilities and operators; (ii) bid document to include requirement for a contingency plan for service interruptions
Asbestos Cement Pipes	Risk of contact with carcinogenic materials	(i) Require DSC to develop AC Protocol; (ii) Develop reporting procedures to inform management immediately if AC pipes are encountered; and (ii) Require construction consultants to develop and apply an AC Management Plan, as part of the over-all health and safety (H&S) plan, to protect both workers and citizens in case accidental uncovering of AC pipes.	IPIU and DSC	(i) Asbestos Cement Protocol; (ii) requirement for AC Management included in bid documents
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Include state and local cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and (ii) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.	IPIU and DSC	Chance Finds Protocol
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	(i) Prioritize areas within or nearest possible vacant space in the subproject sites; (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems; (iii) Do not consider residential areas; (iv) Take extreme care in selecting sites to avoid direct disposal to water body, religious places or in areas which will inconvenience the community.	IPIU and DSC to determine locations prior to award of construction contracts.	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	(i) Prioritize sites already permitted by the Mining Department; (ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of IPIU; and (iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PMU.	IPIU and DSC to prepare list of approved quarry sites and sources of materials	(i) List of approved quarry sites and sources of materials; (ii) bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.

Table 5: Anticipated Impacts and Mitigation Measures – Construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Sources of Materials	Extraction of rocks and material may cause ground instability	(i) Use quarry sites and sources permitted by government; (ii) Verify suitability of all material sources and obtain approval of Investment Program Implementation Unit (IPIU); (iii) If additional quarries will be required after construction has started, obtain written approval from IPIU; and; (iv) Submit to DSC on a monthly basis documentation of sources of materials.	Construction Contractor	Construction Contractor documentation
Air Quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons)	(i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials; (iii) Damp down exposed soil and any stockpiled on site by spraying with water when 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) Ambient air quality monitoring for SOx, NOx, CO, PM10 and PM2.5 as per NAAQ standards	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices (iii) ambient air monitoring for SOx, NOx, CO, PM_{10} and $PM_{2.5}$; (iv) vehicular emissions such as sulphur dioxide (SO2), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality.	(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas; (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (v) Dispose any wastes generated by construction activities in designated sites; and (vi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of surface water quality inspection; (iv) effectiveness of water management measures
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials,	(i) Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-producing equipment and sound barriers; (iii) Noise monitoring for equivalent day and night time levels

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
	and people	silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s. (v) Noise monitoring at environmentally sensitive receptors during implementation phase for day and night time levels		
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure located alongside roads, in particular water supply pipes and sewer lines.	(i) Obtain from IPIU and/or DSC the list of affected utilities and operators; (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services; and (iii) Develop and implement an AC Pipes Management Plan	Construction Contractor	(i) Existing Utilities Contingency Plan; (ii) Asbestos Cement Pipes Management Plan
Landscape and Aesthetics	Solid wastes as well as excess construction materials	(i) Prepare and implement Waste Management Plan; (ii) Avoid stockpiling of excess excavated soils; (ii) Coordinate with JMB 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 (such as buildings, shelters, and latrines) which are no longer required; and (vii) Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.
Accessibility	Traffic problems and conflicts in right-of-way (ROW)	(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; (vi) Coordinate with Jhalawar Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and (vii) Notify affected sensitive receptors by providing sign boards	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject sites.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		informing nature and duration of construction works and contact numbers for concerns/complaints.		
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles; (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Construction Contractor	(i) Complaints from sensitive receptors; (ii) number of walkways, signages, and metal sheets placed at subproject sites.
Socio-Economic - Employment	Generation of contractual employment and increase in local revenue	(i) Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and (ii) Procure construction materials from local market.	Construction Contractor	(i) Employment records; (ii) records of sources of materials
Occupational Health and Safety	Occupational hazards which can arise from working in infrastructures like roads and bridges	(i) Develop and implement site-specific Health and Safety (H&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) H&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion and accident risks; (v) 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	Construction Contractor	(i) Site-specific Health and Safety (H&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 equipments; (ix) % of moving equipment outfitted with audible back-up alarms; (xi) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		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 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.		
Asbestos Cement Pipes	Health risk	(i) Train all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ; (ii) Report to management immediately if AC pipes are encountered; (iii) Develop and apply AC Management Plan.	Construction Contractor	(i) Records of trainings; (ii) AC Management Plan approved by IPIU/DSC
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians. Work site safety	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with IPIU/DSC 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 dangerous conditions. (v) Provide fences to keep public out of work areas and ensure no trespassing for community safety	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors
Work Camps	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants	(i) Consult with IPIU/DSC before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide water and sanitation facilities for employees; (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood; (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 following preference hierarchy: reuse, recycling and disposal to designated areas; (viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;	Construction Contractor	(i) Complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) IPIU/DSC report in writing that the camp has been vacated and restored to pre-project conditions

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		and (ix) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.		
Social and Cultural Resources	Risk of archaeological chance finds	(i) Strictly follow the protocol for chance finds in any excavation work; (ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation; (iii) Stop work immediately to allow further investigation if any finds are suspected; and (iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.	Construction Contractor	(i)Records of chance finds

Table 6: Anticipated Impacts and Mitigation Measures – Operation and Maintenance Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Water Quality	deterioration of surface and groundwater quality	(i) Ensure no leakage of sewer water during operation and maintenance (ii) If leakage occurs take the immediate actions to stop the leakage and repair/replace the damaged pipes	JMB and O&M Contractors	(i) Physical inspection (ii) complaints from nearby habitants/sensitive receptors
Occupational Health and Safety	Adverse impacts on the appearance of surrounding environment and exposure of workers to hazardous debris and gases from sewage pipeline	(i) Ensure persons employed will be provided with suitable equipment (such as shovels and wheelbarrows); and (ii) Ensure all removed material will be deposited in the municipal waste storage bins. (iii) Arrangement of oxygen and PPE for laborer during repairing work (iv) Train all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ; (v) Report to management immediately if AC pipes are encountered; and (vi) Develop and apply AC Management Plan.	PHED, JMB and O&M Contractors	(i) Records of training; (ii) H&S Plan and AC Management Plan approved by PHED
General maintenance	may cause disturbance to sensitive receptors, dusts, smell, increase in noise level	(i) Refill and re-compact trenches soil and backfilled sand will be removed to expose the leaking junction or pipe; (ii) Conduct work during non-monsoon period; and Cover or wet excavated material to prevent dusts.	PHED, JMB and O&M Contractors	Complaints from sensitive receptors
Economic Development	Impediments to residents and businesses	(i) Inform all residents and businesses about the nature and duration of any work well in advance so that they can make preparations if necessary; (ii) Conduct these works to provide wooden walkways across trenches for pedestrians and metal sheets where vehicle access is required; and	PHED, JMB and O&M Contractors	Complaints from sensitive receptors

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(iii) Consult the local police regarding any such work so that it can be planned to avoid traffic disruption as far as possible, and road diversions can be organised if necessary. (iv) Supply of sewage sludge from STP to farmers for use in farming – economic development through utilization of waste material		
Social and Cultural Resources	Temporary disruption of activities	(i) Consult the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; (ii) Complete work in these areas quickly; (iii) Provide wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required; and (iv) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.	PHED, JMB and O&M Contractors	Complaints from sensitive receptors

Table 7: Pre-construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Utilities	All network area	DSC	(i) list of affected utilities and operators; (ii) bid document to include requirement for a contingency plan for service interruptions	checking of records	(i) list of affected utilities and operators prepared; (ii) requirement for a contingency plan for service interruptions included in bid documents	once	IPMU
Asbestos Cement Pipes	All network area	IPIU and DSC	(i) Asbestos Cement Protocol; (ii) requirement for AC Management included in bid documents	checking of records	(i) AC Protocol prepared; (ii) bid documents include requirements for AC Management Plan	once	IPMU
Social and Cultural Resources	All network area	IPIU and DSC	Chance Finds Protocol	checking of records	Chance Finds Protocol provided to construction contractors prior to commencement of	once	IPMU

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
					activities		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	To be selected	IPIU and DSC to determine locations prior to award of construction contracts.	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	checking of records	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas provided to construction contractors prior to commencement of works.	once	IPMU
Sources of Materials	Quarry sites	IPIU and DSC to prepare list of approved quarry sites and sources of materials	(i) list of approved quarry sites and sources of materials; (ii) bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	checking of records	(i) list of approved quarry sites and sources of materials provided to construction contractors (ii) bid document included requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	once	IPMU
Baseline Environmental Condition – Ambient Air Quality	Subproject sites	DSC	Establish baseline values ofSOx, NOx CO, respirable particulate matter PM_{10} and $PM_{2.5}$	Air sample collection and analyses by in-house laboratory or accredited 3rd party laboratory	GOI Ambient Air Quality Standards	Once prior to start of construction	IPMU

Table 8: Construction Environmental Monitoring Program

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Sources of Materials	quarries and sources of	Construction Contractor	Construction Contractor	(i) checking of records; (ii)	(i) sites are permitted;	monthly submission for	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
	materials		documentation	visual inspection of sites	(ii) report submitted by construction contractor monthly (until such time there is excavation work)	construction contractor as needed for DSC	
Air Quality	construction sites and areas designated for stockpiling of materials	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices (iv) ambient air monitoring for SOx, NOx, CO PM_{10} and $PM_{2.5}$ (v) vehicular emissions such as sulphur dioxide (SO2), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons (HC)	(i) checking of records; (ii) analysis of generated air monitoring results (iii) PUC of vehicles	(i) stockpiles on designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) air pollution control devices working properly; (iv) GOI Ambient Quality Standards for ambient air quality; (iv) GOI Vehicular Emission Standards for SO2, NOx, CO and HC.	monthly for checking records	DSC
Water Quality	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials;	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of surface water quality inspection; (iv) effectiveness of water management measures;	visual inspection	(i) designated areas only; (ii) silt traps installed and functioning; (iii) no noticeable increase in suspended solids and silt from construction activities	monthly	DSC
Noise Levels	(i) construction sites; (ii) areas for	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers	(i) checking of records; (ii) analysis of	(i) complaints from sensitive receptors satisfactorily	monthly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
	stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps		in noise-producing equipment and sound barriers; (iii) Noise monitoring for equivalent day and night time levels	generated noise monitoring results	addressed; and (ii) silencers in noise-producing equipment functioning as design; and (iii) sound barriers installed where necessary		
Existing Infrastructure and Facilities	(i) construction sites; (ii) alignment of affected utilities	Construction Contractor	(i) Existing Utilities Contingency Plan; (ii) Asbestos Cement Pipes Management Plan	(i) checking of records; (ii) visual inspection	implementation according to Utilities Contingency Plan and Asbestos Cement Plan	as needed	DSC
Landscape and Aesthetics	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	(i) checking of records; (ii) visual inspection	(i) no accumulation of solid wastes on-site; (ii) implementation of Waste Management Plan; (iii) complaints from sensitive receptors satisfactorily addressed.	monthly	DSC
Accessibility	(i) construction sites; (ii) traffic routes	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject sites.	visual inspection	(i) implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) signages visible and located in designated areas	monthly	DSC
Socio-economic - Income	construction sites	Construction Contractor	(i) complaints from sensitive receptors; (ii) number of walkways, signages, and metal sheets placed at subproject sites.	visual inspection	(i) complaints from sensitive receptors satisfactorily addressed; (ii) walkways, ramps, and metal sheets provided	quarterly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
					(iii) signages visible and located in designated areas		
AC Pipes	construction sites	Construction Contractors	(i) records of trainings; (ii) AC Management Plan approved by PIU/DSC	checking of records	no exposure to AC pipes	as needed	PIU and DSC
Socio-Economic - Employment	construction sites	Construction Contractor	(i) employment records; (ii) records of sources of materials	checking of records	number of employees from Jhalawar equal or greater than 50% of total work force	quarterly	DSC
Occupational Health and Safety	construction sites	Construction Contractor	(i) site-specific Health and Safety (H&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 equipments; (ix) % of moving equipment outfitted with audible back-up alarms;	(i) checking of records; (ii) visual inspection	(i) implementation of H&S plan; (ii) number of work-related accidents; (iii) % usage of personal protective equipment; (iv) number of first-aid stations, frequency of potable water delivery, provision of clean eating area, and number of sign boards are according to approved plan; (v) % of moving equipment outfitted with audible back-up alarms	quarterly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			(xi) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.				
Community Health and Safety	construction sites	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors	visual inspection	(i) implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed (iii) fences set up to keep public out of construction site.	quarterly	DSC
Work Camps	work camps	Construction Contractor	(i) complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) IPIU/DSC report in writing that the camp has been vacated and restored to pre-project conditions	visual inspection	(i) designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed	quarterly	DSC
Social and Cultural Resources	construction sites	Construction Contractor	records of chance finds	checking of records	Implementation of Chance Finds Protocol	as needed	DSC

Table 9: Operation and Maintenance Environmental Monitoring Program

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Occupational Health and Safety	subproject sites	PHED, JMB and O&M Contractors	complaints from sensitive receptors	(i) records of training; (ii) H&S Plan and AC	(i) complaints from sensitive receptors	as needed	IPMU

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
				Management Plan approved by PHED	satisfactorily addressed; (ii) no exposure to AC pipes		
General maintenance	subproject sites	PHED, JMB and O&M Contractors	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU
Economic Development	subproject sites	PHED, JMB and O&M Contractors	complaints from sensitive receptors	checking of records Use of sludge – observation in field	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU
Social and Cultural Resources	subproject sites	PHED, JMB and O&M Contractors	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU

D. EMP Costs

126. Most of the mitigation measures require the Construction Contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or DSC are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation that is the responsibility of LSGD will be provided as part of their management of the project, so this also does not need to be duplicated here.

127. The remaining actions in the EMP are the various environmental monitoring activities to be conducted by the Environmental Monitoring Specialist. These have not been budgeted elsewhere, and their costs are shown in **Table 10**. The figures show that the total cost of environmental management and monitoring for the subproject as a whole (covering design, 2 years of construction and the first five years of operation) is INR 1.58 million, ie US$ 34,348.

Table 10: Environmental Management and Monitoring Costs (INR)

Item	Quantity	Unit Cost	Total Cost	Sub-total	Source of Funds
1. Implementation of EMP (2 years)					
Domestic Environmental Monitoring Specialist	1 x 2 month	140,000[b]	280,000		DSC
Survey Expenses	Lumpsum	100,000	100,000	380,000	
2. Air Quality (2 years)					Contractor
Ambient Air Quality Monitoring	Lumpsum	40,000	40,000	40,000	
3. Noise Monitoring (2 years)	Lump sum	32,000	32,000	32,000	Contractor
TOTAL				4,52,000	

EMP = Environmental Management Plan.

6 Unit costs of domestic consultants include fee, travel, accommodation and subsistence

VIII. FINDINGS AND RECOMMENDATIONS

A. Findings

128. The environmental impacts of all elements of the infrastructure proposed under the Jhalawar Sewerage and Sanitation (sewerage network) Subproject were assessed. Potential negative impacts were identified in relation to both construction and operation of the improved infrastructure, but no major impacts were identified as being due to either the project design or location. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the outline designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design.

129. During the construction phase, impacts mainly arise from the need to dispose of large quantities of waste soil and import a similar amount of sand to support the pipes in the trenches; and from the disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation.

130. The use of AC pipes in the existing water distribution network presents a particular problem, as workers and the public will need to be protected from inhalation of asbestos dust, which can be carcinogenic. This has been addressed in the EMP.

131. Once the system is operating, most facilities (sewerage network) will operate with routine maintenance, which should not affect the environment. Leaks in the sewage network will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. It will also be conducted in areas that have already been excavated, so there will be no need to protect archaeological material.

132. The main impacts of the operating sewerage system will be beneficial as human waste from those areas served by the new network will be removed rapidly and treated to an acceptable standard. This will improve the environment and appearance of these areas, and the health and quality of life of the citizens. Diseases of poor sanitation should be reduced, which should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

133. Mitigation will be assured by a program of environmental monitoring conducted during both construction and operation to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the IPMU. There will also be longer-term surveys to monitor the quality of discharged treated effluent and health status in vicinity of the facility.

B. Recommendations

134. There are two straightforward but essential recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. These are that LSGD should ensure that:

- All mitigation, compensation and enhancement measures proposed in this IEE report are implemented in full, as described in the text above;
- The Environmental Monitoring Plan proposed in this report is also implemented in full...

IX. CONCLUSIONS

135. The subproject is not determined to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB’s Environmental Policy (2002) or GoI EIA Notification (2006).

Appendix 1

Rapid Environmental Assessment (REA) Checklist

Instructions:

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

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: India/Rajasthan Urban Sector Development Investment Project

Sector Division: Jhalawar Sewerage and Sanitation (Sewerage network)

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area…			
▪ Densely populated?	√		Pipe lines are proposed through the residential areas and market places of Jhalawar and Jhalarapatan towns
▪ Heavy with development activities?		√	Since Jhalawar is one of the least developed areas of Rajasthan, hence it is not loaded with developmental activities. Only small markets may be considered as development activities
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	√		Jhalawar city is one of the less known Historical city of the Rajasthan state. Historical monuments such as Garh Palace in Jhalawar and Naulakha Fort in Jhalarapatan are the only cultural heritage sites in both towns
• Protected Area		√	No protected areas in both the towns
• Wetland		√	-
• Mangrove		√	-
• Estuarine		√	-
• Buffer zone of protected area		√	-

SCREENING QUESTIONS	Yes	No	REMARKS
• Special area for protecting biodiversity		√	-
• Bay		√	-
B. Potential Environmental Impacts Will the Project cause…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	The proposed sewerage network would not cause any impairment on the cultural or historical monuments as all the works are proposed away from Garh Palace and Naulakha fort
▪ interference with other utilities and blocking of access to buildings; nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc.?		√	Only during construction phase interference with other utilities like water supply, drainage may be caused and there may also some disturbances to traffic but for small times and during operation no such impact is expected
▪ dislocation or involuntary resettlement of people		√	Only some temporary disturbance to small business is expected for short times
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	No such impact is expected as this is a small project and affect shall be for short duration
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		√	The proposed STP will provide secondary treatment to the wastewater generated thus minimizing the said problems. Also the treated water can be reused for irrigation purposes downstream.
▪ overflows and flooding of neighbouring properties with raw sewage?		√	Sewerage system has been designed considering the population growth.
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		√	Since the proposed project will involve the construction of underground pipelines so the chances of contamination with industrial waste and other waste will be minimum. Moreover, the system has been designed for domestic wastewater and the connections to the same will be given after permission from competent authority only.
▪ noise and vibration due to blasting and other civil works?		√	Blasting is not proposed in the project, only noise may be generated during construction work. As per the Environment management plan, proper mitigation measures will be taken. Regular monitoring of the same should be done periodically.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical,and biological hazards during project construction and operation?	√		There are risks related to occupational health and safety due to physical hazards during project construction and operation and mitigation plan should be followed according to EMP

SCREENING QUESTIONS	Yes	No	REMARKS
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		√	Since the system will comprise of underground pipelines and only house connections shall be permitted, so discharge of hazardous materials into sewer line and hence the exposure to workers will not occur.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		√	This is only sewerage network project
▪ road blocking and temporary flooding due to land excavation during the rainy season?	√		Road blocking and temporary flooding due to land excavation during the rainy season may occur therefore during rainy season excavation works should be avoided
▪ noise and dust from construction activities?	√		Noise and dust from construction activities is expected and to avoid these problems proper mitigation plans should be followed as per EMP
▪ traffic disturbances due to construction material transport and wastes?	√		To avoid traffic disturbances due to construction material transport and wastes proper mitigation plans should be followed as per EMP
▪ temporary silt runoff due to construction?	√		temporary silt runoff due to construction is expected during work in rainy days
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		√	Overflow flooding and ground water pollution will not arise as this project includes only pipe laying works
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		√	This is only sewerage network project
▪ contamination of surface and ground waters due to sludge disposal on land?		√	This is only sewerage network project
▪ health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		√	This project includes only pipe laying works
▪ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		√	This is small sewerage network project which will not deploy large numbers of workers, only small group of workers shall perform activities during construction phase
▪ social conflicts between construction workers from other areas and community workers?		√	Local labor will be hired minimizing the problem of social conflicts.
▪ 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?		√	This is small sewerage network project which will not include use of large quantities of explosives, fuel and other chemicals during construction and operation

SCREENING QUESTIONS	Yes	No	REMARKS
▪ 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 risks due to accidental hazards is expected therefore proper mitigation plan as per EMP should be followed

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	Remarks
▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?		√	Jhalawar District is in an area of low earthquake risk (Zone II)
▪ Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost?		√	No
▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		√	No
▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)?		√	No

Appendix 2
Public Consultation- Environment

Subproject-: Waste Water (Jhalawar and Jhalarapatan)

Issues discussed

- Awareness and extent of the project and development components
- Benefits of Project for the economic and social Upliftment of Community
- Labor availability in the Project area or requirement of outside labor involvement
- Local disturbances due to Project Construction Work
- Necessity of tree felling etc. at project sites
- Water logging and drainage problem if any
- Drinking water problem
- Forest and sensitive area nearby the project site
- Movement of wild animal if any
- Other problems, encountered, if any

1. Location, Date and time of Consultation:- Jhalawar (different locations) 24.03.2012 at 09.30 AM to 5.30 PM

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	The people of the town are not aware with the proposed sewerage distribution system. As this is new projected, most of people are not aware of the proposed laying of the sewerage line	The nearby residents should be associated at the most by proper discussions with them.
2	In what way they may associate with the project	• The local people are of the view that local people should be hired depending upon their efficiency and expertise. • People of repute in the local area have also assured that if they are well informed on time regarding the project, they will assist accordingly. • People are in the view of getting benefitted by this project	Preference should be given to the local labor during the implementation of the project as per the requirement.
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	During the consultation, it was found that there are no any forest, wildlife or any sensitive areas near the project sites	.
4	Presence of historical/ cultural/ religious sites nearby	There is historical Garh Palace and Natyashala located in Jhalawar under jurisdiction of Nagar Palika	The concerned authorities should be consulted before start of the physical work
5	Unfavorable climatic condition	As per the local people's view, the summer season is not appropriate to commence the work as the temperature reaches about 47°C. During the heavy rains, there may arise some problems in the execution of the project.	Suitable climatic conditions should be considered during the planning and execution stage.
6	Occurrence of flood	No flood occurred in the project areas in last 10 years but during heavy rain sometimes water stagnation occurs at some places due to blockage of drains	Proper actions should be taken during the execution of the project so that the

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
			condition does not worsen due to proposed project.
7	Drainage and sewerage problem facing	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No sewerage system in the project area.	The proposed sewerage system will improve the sewerage conditions.
8	Present drinking water problem – quantity and quality	Most of the areas are supplied water by PHED. Improvement works in water supply under RUSDIP project has helped increasing availability of water in the town	Sewerage pipe lines shall not disturb present water supply networks
9	Present solid waste collection and disposal problem	The Municipal Board takes care of the solid waste management of Jhalawar city. The waste collection facility is appropriate only in city area. Improved Solid Waste Management along with land fill site is also proposed under RUSDIP	Proper solid waste management system should be implemented in order to minimize the nuisance due to waste.
10	Availability of labor during construction time	Sufficient labor is available in this area.	Availability of labor is not a problem here, if required labor from nearby areas will be hired.
11	Access road to project site	Yes, All the sewerage network is proposed in roads only	
12	Perception of villagers on tree felling and afforestation	No tree cutting is proposed	If any tree need to be cut proper mitigation measures as per applicable policy should be followed
13	Dust and noise Pollution and disturbances during construction work	People are aware of the fact that during construction work some amount of dust and noise will arise. But they wanted that It should be minimized as much as possible.	PUC certified vehicles should be used during material handling and transportation activities. Sprinkling of water should be done in order to minimize the fugitive dust emissions.
14	Setting up worker camp site within the village/ project locality	As per the people, local laborers should be hired which will minimize the requirement of setting of a temporary work shelter.	Preference will be given to the local labor during the implementation of the project as per the requirement.
15	Safety of residents During construction phase and plying of vehicle for construction activities	People were of the view that proper safety measures should be adopted and work should be finished quickly in market areas	Safeguard policy should be Implemented in order to minimize the accidents.

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
16	Conflict among Beneficiaries down stream users – water supply project using of river water	Not applicable for this project as this is only sewerage network project	
17	Requirement of enhancement of other facilities	People want proper solid waste management and sewerage system in the city	Actions should be taken in order to improve the standard of living.
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	No land acquisition is proposed for this project as all the works are to be done in existing road ROW	

NAME AND POSITION OF PERSONS CONSULTED:
1. Mahesh, Shop keeper, Main Market, Jhalawar
2. Mukesh, Main Market, near Garh Palace, Jhalawar
3. Pushpa, flower Shopkeeper, Near Garh Palace, Jhalawar
4. Rajkumar, Dobbler, Main Market, Jhalawar

2. Location, Date and time of Consultation:- Jhalarapatan (different locations) 25.03.2012 at 09.30 AM to 5.30 PM

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	The people of the town are not aware with the proposed sewerage distribution system. Instead they are aware of STP construction in Jhalawar	IPIU, DSC and CAPP should do vast public consultation for this project
2	In what way they may associate with the project	People are ready to support the project in all way and bear some disturbance for the same.	More people should be associated with the project by giving chance to work in the project
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	During the consultation, it was found that there are no any forest, wildlife or any sensitive areas near the project sites but there are some open forest areas near the Naulakha Fort	Forest should not be disturbed due to project
4	Presence of historical/ cultural/ religious sites nearby	There is historical Naulakha fort located in Jhalarapatan under jurisdiction of Nagar Palika	The concerned authorities should be consulted before start of the physical work
5	Unfavorable climatic condition	As per the local people's view, the summer season is not appropriate to commence the work as the temperature reaches about 47°C. During the heavy rains, there may arise some problems in the execution of the project.	Suitable climatic conditions should be considered during the planning and execution stage.
6	Occurrence of flood	No flood occurred in the project areas in last 10 years but during heavy rain	Proper actions should be taken during the

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
		sometimes water stagnation occurs at some places due to blockage of drains	execution of the project so that the condition does not worsen due to proposed project.
7	Drainage and sewerage problem facing	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No sewerage system in the project area.	The proposed sewerage system will improve the sewerage conditions.
8	Present drinking water problem – quantity and quality	Most of the areas are supplied water by PHED. Improvement works in water supply under RUSDIP project has helped increasing availability of water in the town	Sewerage pipe lines shall not disturb present water supply networks
9	Present solid waste collection and disposal problem	The Municipal Board takes care of the solid waste management of Jhalarapatan. The waste collection facility is appropriate only in city area. Improved Solid Waste Management along with land fill site is also proposed under RUSDIP	Proper solid waste management system should be implemented in order to minimize the nuisance due to waste.
10	Availability of labor during construction time	Sufficient labor is available in this area.	Availability of labor is not a problem here, if required labor from nearby areas will be hired.
11	Access road to project site	Yes, All the sewerage network is proposed in roads only	
12	Perception of villagers on tree felling and afforestation	No tree cutting is proposed	If any tree need to be cut proper mitigation measures as per applicable policy should be followed
13	Dust and noise Pollution and disturbances during construction work	People are aware of the fact that during construction work some amount of dust and noise will arise. But they wanted that It should be minimized as much as possible. They are ready to bear the situation.	PUC certified vehicles should be used during material handling and transportation activities. Sprinkling of water should be done in order to minimize the fugitive dust emissions.
14	Setting up worker camp site within the village/ project locality	As per the people, local laborers should be hired which will minimize the requirement of setting of a temporary work shelter.	Preference will be given to the local labor during the implementation of the project as per the requirement.
15	Safety of residents During construction phase and plying of	People were of the view that proper safety measures should be adopted and work should be finished quickly in	Safeguard policy should be Implemented in order

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
	vehicle for construction activities	market areas	to minimize the accidents.
16	Conflict among Beneficiaries down stream users – water supply project using of river water	Not applicable for this project as this is only sewerage network project	
17	Requirement of enhancement of other facilities	People want proper solid waste management and sewerage system in the city	Actions should be taken in order to improve the standard of living.
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	No land acquisition is proposed for this project as all the works are to be done in existing road ROW	

NAME AND POSITION OF PERSONS CONSULTED:

1. Ashok Rathore, Shop keeper, Subji Mandi, Jhalarapatan
2. Balchand Patwa, local resident, Subji Mandi, Jhalarapatan
3Jagdish Chandra Rathore, Readymade Garment shop, Jhalarapatan
4. Ritesh Mangal, Mangal Tent House, Suraj Pole gate, Jhalarapatan
5. Rakesh Jain, Jain Kirana Store, Suraj Pole, Jhalarapatan
6. Anil Joshi, Shubham Selections, Rudija Bazar, Jhalarapatan

Summary of out come:

People are not aware much of the proposed project of sewerage network in Jhalawar and Jhalarapatn. But people welcome the project and keenly interested to start the project as they will be benefitted by proper sanitation in the city. They are ready to support the project and want to finish the work quickly. They also want proper safety arrangements during construction phase and maintaining the quality of work.

Appendix 3

Recommended Contract Clauses for Contractors

A. Sources of Materials

- Use quarry sites and sources permitted by government;
- Verify suitability of all material sources and obtain approval of Investment Program Implementation Unit (IPIU);
- If additional quarries will be required after construction has started, obtain written approval from IPMU; and;
- Submit to DSC on a monthly basis documentation of sources of materials.

B. Air Quality

- Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
- Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
- Use tarpaulins to cover sand and other loose material when transported by trucks; and
- Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

C. Surface Water Quality

- Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas;
- Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
- Dispose any wastes generated by construction activities in designated sites; and
- Conduct surface quality inspection according to the Environmental Management Plan (EMP).

D. Noise Levels

- Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
- Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
- 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
- Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

E. Existing Infrastructure and Facilities

- Obtain from IPIU and/or DSC the list of affected utilities and operators;
- Prepare a contingency plan to include actions to be done in case of unintentional interruption of services; and
- Develop and implement an Asbestos Cement Pipes Management Plan

F. Accessibility

- Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
- Schedule transport and hauling activities during non-peak hours;
- Locate entry and exit points in areas where there is low potential for traffic congestion;
- Keep the site free from all unnecessary obstructions;

- Drive vehicles in a considerate manner;
- Coordinate with Jhalawar Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
- (Vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

G. Landscape and Aesthetics

- Prepare and implement Waste Management Plan;
- Recover used oil and lubricants and reuse or remove from the sites; (iii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- (iv)Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

H. Socio-Economic – Income

- Leave spaces for access between mounds of soil;
- Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles;
- Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
- Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

I. Socio-Economic – Employment

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

J. Occupational Health and Safety

- Develop and implement site-specific Health and Safety (H&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) H&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
- Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
- Provide medical insurance coverage for workers;
- Secure all installations from unauthorized intrusion and accident risks;
- Provide supplies of potable drinking water;
- Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
- 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;
- 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;
- Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
- Ensure moving equipment is outfitted with audible back-up alarms;

- Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
- 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.

K. Asbestos Cement Pipes

- Train all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ;
- Report to management immediately if AC pipes are encountered;
- Develop and apply AC Management Plan.

J. Community Health and Safety.

- Plan routes to avoid times of peak-pedestrian activities.
- Liaise with IPIU/DSC in identifying high-risk areas on route cards/maps.
- Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
- Provide road signs and flag persons to warn of dangerous conditions.

L. Work Camps

- Consult with IPIU/DSC before locating project offices, sheds, and construction plants;
- Minimize removal of vegetation and disallow cutting of trees;
- Provide water and sanitation facilities for employees;
- Prohibit employees from poaching wildlife and cutting of trees for firewood;
- Train employees in the storage and handling of materials which can potentially cause soil contamination;
- Recover used oil and lubricants and reuse or remove from the site;
- Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

M. Social and Cultural Resources

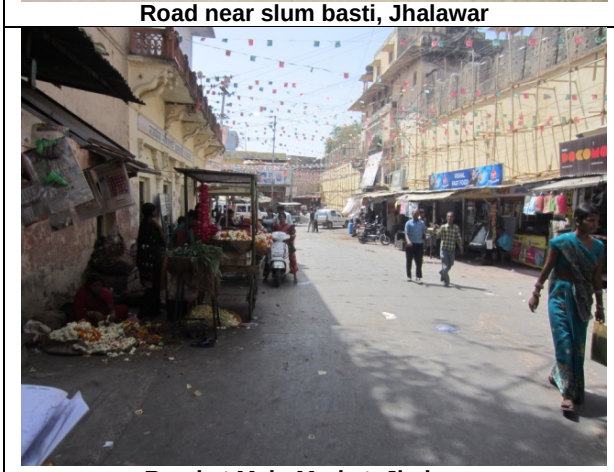
- Strictly follow the protocol for chance finds in any excavation work;
- Request IPIU/DSC or any authorized person with archaeological field training to observe excavation;
- Stop work immediately to allow further investigation if any finds are suspected; and
- Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.

Appendix 4

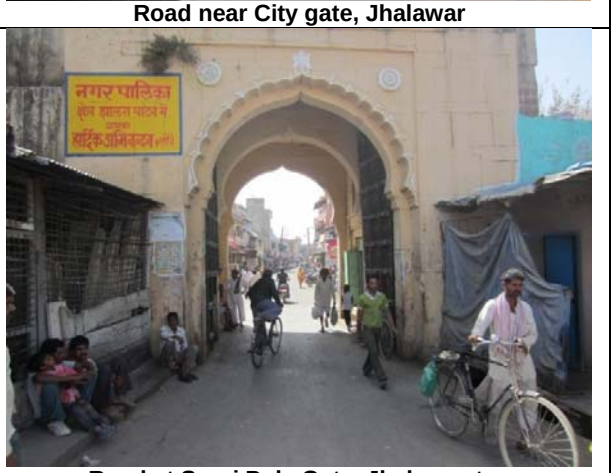
Photographs of project sites

Road near slum basti, Jhalawar

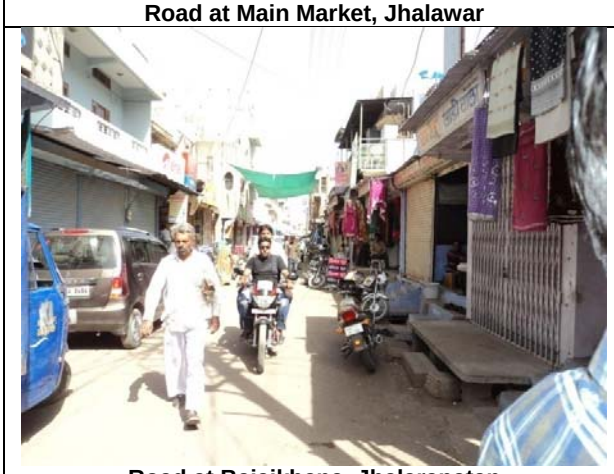
Road near City gate, Jhalawar



Road at Main Market, Jhalawar



Road at Suraj Pole Gate, Jhalarapatan



Road at Bajajkhana, Jhalarapatan

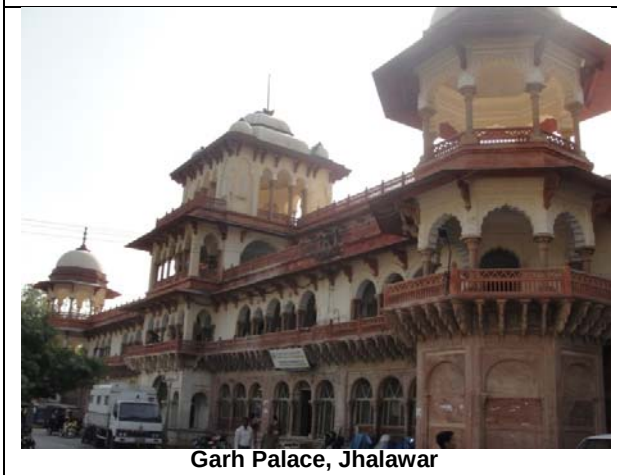
Road at Chipa Mohalla, Jhalarapatan

Road at New Subji Mandi, Jhalarapatan

Road at Surajpole Gate (inside), Jhalarapatan

Road at Main Market, Jhalarapatan

Road near Shila Devi Mandir, Jhalarapatan



Garh Palace, Jhalawar

Heritage works under RUSDIP Project in Naulakha Fort, Jhalarapatan

Appendix 5

List of Environmentally Sensitive Receptors in Jhalawar WW Project

S.No.	Details of lane	Side	Name of structure	Nature of sensitivity
A. Jhalawar				
1	619 to 617	left	Gate & parkota wall of city Garh Palace	Historical Palace under Nagar Palika
2	618 to 617	right	Parkota wall of city Garh Palace	Historical Palace under Nagar Palika
3	339		Burj of parkota wall of city Garh Palace	Historical Palace under Nagar Palika
4	617 to 602	right	Dhokade Ke Balaji Mandir	Religious place (Hindu)
5	332 to 331	right	Saint Terresa School	Private Sr.Secondary school
6	332 to 331	right	Evergreen Public school	Private middle school
7	332 to 331	left	North West Burj of Garh Palace parkota wall	Historical Palace under Nagar Palika
8	345 to 344	right	Karoli wali masjid	Religious place (Muslim)
9	352 to 351	left	Sarvodaya school	Private Secondary school
B . Jhalarapatan				
10	315 to 316	left	Ancient Padmanabhi Sun Temple	Protected by The Department of Archaeology and Musuems, Govt. of Rajasthan
11	316 to 317	left	Shantinath jain mandir	Religious place (Jain)
12	354 TO 68		Surajpole Gate at city parkota wall	Historical place under Nagar Palika
13	430 to 431	right	Government Girls School	Govt. middle school
14	430 to 431	right	Government District Institute of Teachers Education	Government Institute
15	430 to 431	left	Masjid	Religious place (Muslim)
			Vivekanand School	Private middle school
16	421 to 354	right	Masjid near Surajpole	Religious place (Muslim)

Note : - 1. No part of the area taken under sewerage project in phase II, lie in the forest or protected areas
2.The sewerage lines proposed do not pass through sensitive areas as explained above and will be laid along the roads

Appendix 6

Layout showing proposed sewerage network and location of environmental monitoring Station in Jhalawar