Environmental Assessment Document

Initial Environmental Examination: Dholpur Water Supply Subproject
Project Number: 40031
September 2008

India: Rajasthan Urban Sector Development Investment Program

Prepared by Local Self Government Department

For the Government of Rajasthan
Rajasthan Urban Infrastructure Development Project

ABBREVIATION

ADB	Asian Development Bank
CWR	Clear Water Reservoir
DSC	Design and Supervision Consultancy
EA	Executing Agency
EAC	Expert Appraisal Committee
FI	Financial Intermediary
GLSR	Ground Level Service Reservoir
GoI	Government of India
GoR	Government of Rajasthan
GSI	Geological Survey of India
IA	Implementing Agency
IEE	Initial Environmental Examination
IPMC	Investment Programme Management Consultancy
IPMU	Investment Programme Management Unit
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LPCD	Litre Per Capita per Day
LPS	Litre Per Second
LSGD	Local Self-Government Department
MFF	Multitranche Financing Facility
MLD	Million litre Per day
MoEF	Ministry of Environment and Forests
NAAQS	National Ambient Air Quality Standards
OD	Outer Diameter
OHSR	Over Head Service Reservoir
OM	Operations Manual
PHED	Public Health Engineering Department
PMU	Project Management Unit
RCC	Reinforced Cement Concrete
ROW	Right of Way
RPCB	Rajasthan State Pollution Control Board
RSPM	Respirable Suspended Particulate Matter
RUIDP	Rajasthan Urban Infrastructure Development Project
RUSDIP	Rajasthan Urban Sector Development Investment Program
SPM	Suspended Particulate Matter
STP	Sewerage Treatment Plant
ToR	Terms of Reference
UA	Urban Agglomeration

UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
uPVC	Unplasitized Poly Venyl Chloride
USEPA	United States Environmental Protection Agency
WC	Water Closets
WTP	Water Treatment Plant

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

CONTENTS

I. INTRODUCTION

A. Purpose of the report

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. 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 (GoI) through the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

2. RUSDIP Phase II to be implemented over a seven year period beginning in 2008, and will be funded by a loan via the Multi-tranche Financing Facility (MFF) of the ADB. The Executing Agency (EA) is the Local Self-Government Department (LSGD) of the Government of Rajasthan (GoR); and the Implementing Agency (IA) is the Project Management Unit (PMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP), which is currently in the construction stage.

3. RUSDIP will improve infrastructure through the design and implementation of a series of subprojects, each providing improvements in a particular sector (water supply, sewerage, solid waste etc) in one town. RUSDIP has been classified by ADB as environmental assessment category B (some negative impacts but less significant than category A). The impacts of subprojects prepared according to ADB Environment Policy (2002) and Environmental Assessment Guidelines (2003).

B. Extent of the study

4. Indian law and ADB policy require that the environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of lending operations and project development and implementation worldwide.

1. ADB Policy

5. ADB's Environment Policy requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in Operations Manual (OM) 20: Environmental Considerations in ADB Operations. This states that ADB requires environmental assessment of all project loans, programme loans, sector loans, sector development programme loans, financial intermediation loans and private sector investment operations.

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

Category A: Projects that could have significant environmental impacts. An Environmental Impact Assessment (EIA) is required.

Category B: Projects that could have some adverse environmental impacts, but of less significance than those for category A. An Initial Environmental Examination (IEE) is required to determine whether significant impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

Category C: Projects those are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

Category FI: Projects that involve a credit line through a financial intermediary (FI) or an equity investment in a FI. The FI must apply an environmental management system, unless all subprojects will result in insignificant impacts.

7. The Bank has categorised this program as Category B and following normal procedure for MFF loans has determined that one Environmental Examination will be conducted for each subproject, with a subproject being the infrastructure improvements in a particular sector (water supply, sewerage, etc) in one town.

2. National Law

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

9. Category A projects requires 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 EC if appropriate.

10. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares TOR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC 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.

11. 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 Municipal Solid Waste Management Facilities (facilities that are shared by more than one town)[1]. EC

[1] According to the Rajasthan State Pollution Control Board, the MoEF intends to issue a clarification to the EIA Notification in due course, which will add all landfill facilities and Sewage Treatment Plants to the list of projects specified as requiring EC under the Notification. This has not yet been issued, so the text above indicates the correct legal position at the time of writing

is thus not required for the water supply sub-project that is the subject of this Environmental Examination.

3. Review and Approval Procedure

12. For Category B projects the Draft Environmental Status report and its summary (SIEE) are reviewed by ADB's Regional Department sector division and Environment and Social Safeguards Division, and by the Executing Agency, and additional comments may be sought from project affected people and other stakeholders. All comments are incorporated in preparing the final documents, which are reviewed by the Executing Agency and the national environmental protection agency (MoEF in this case). The EA then officially submits the IEE and SIEE reports to ADB for consideration by the Board of Directors. Completed reports are made available worldwide by ADB, via the depository library system and the ADB website.

4. Scope of Study

13. This is the IEE report for the Dholpur water supply sector. It discusses the generic environmental impacts and mitigation measures relating to the location, design, construction and operation of physical works proposed under this subproject.

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

14. This is a water supply sub-project, and as explained above it has been classified by ADB as Category B, because it is not expected to have major negative environmental impacts. 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. The sub-project is needed because the present water supply infrastructure in Dholpur is inadequate for the needs of the growing population. The distribution system supplies less than 80% of the population, but water is available for only 1-2 hours per day, mainly because of system losses (estimated at 40%) and low and unequal network pressure. The distribution system covers 85% of the town and for rest 15%, present distribution system needs to be improved.

15. The provision is also unequal, with un-served areas being mainly the slums and newly-developed areas. 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 Dholpur and the other urban centers to those expected of modern Asian towns.

B. Location, Size and Implementation Schedule

16. The sub-project is located in Dholpur, the headquarters town of Dholpur District, in the Eastern part of Rajasthan (Figure 2.1). Existing and proposed water supply system index plan of Dholpur is given in Figure 2.2. Improvements in the distribution system will affect only certain parts of the town, such as slums and developing areas where a new network will be provided, and certain other locations where 2 clear water reservoirs and 3 nos. overhead storage reservoirs will be built (Figure 2.2, 2.4). Larger-scale facilities, including a new 15 MLD additional WTP at Sagarpada to cover requirement of next 15 years, rising mains/transmission main of 19.90 km and distribution pipelines of 28.150 km are also considered.

Photographs of the project area are attached as Appendix - 1.

C. Description of the Sub-project

1. Service Delivery, existing water supply arrangement

17. The present surface water source is through pumping of water from River Chambal from an intake well. Raw water is then treated at an existing Treatment Plant of capacity 5.4 MLD at PHED campus and other newly constructed Treatment Plant of capacity 9.6 MLD at Sagarpada. Though, the treatment capacity of the existing system is of 15 mld but raw water extracting capacity of existing intake well is of 10 mld. Treated water is being supplied through 9.0 nos. of overhead service reservoirs (OHSR) located at different places in the town. Groundwater, tapped through open wells (8 nos.) and tube-wells (14 nos.) is also supplied to the town. The quality of ground water is not potable and supposed to be abandoned in phase manner. Average Ground water table depth is 20.0 m.

18. The present estimated water production is 10 mld from Chambal River and about 3 mld from existing tube wells and open wells. The losses are reported to be high and in the tune of 40%. Considering the present production level, the per capita net supply works out to be about 68 lpcd for 2007 estimated population of 114,678 souls, which is much lower than the standard indicated in the CPHEEO manual i.e. 135 lpcd. In addition to the inadequate production, the system suffers from old and leaking transmission and distribution lines, inequitable pressure distribution, inadequate storage, lack of metering, etc. There are currently 9 overhead reservoirs of total capacity of 4.2 ML. There are 7,527 connections, out of which 6,900 connections are domestic. However, only 30% are in working condition. Out of remaining 70%, 30% of water meter need to be replaced and 40% would be serviceable on repair. At present, water is being disinfected through application of bleaching powder, which is rudimentary and inefficient. The existing situation warrants urgent source augmentation, rehabilitation / improvement of the existing distribution system, increase in the storage capacity, provision of metering and provision of disinfection facilities.

2. Subproject Description including Detailed Scope of work

19. The Subproject will construct the downstream facilities including construction of 15 mld WTP and strengthen the existing water supply system for the town to receive and distribute the additional 15 mld water supplied through the Chambal- Dholpur- Bharatpur Project implemented by PHED. The Subproject is also expected, inter alia, to reduce the unaccounted for water (UFW) by billing for the actual quantity of water supplied, since the house connections will be expanded to cover at least 90% of the town population, with either new water meters or a rehabilitated water meters. Disinfection facilities, in the form of chlorinator plants at the CWRs, are also proposed and the distribution network will be expanded and strengthened to fully absorb the additional water supply from the Chambal-Dholpur -Bharatpur Project. Detailed plan and commitment to guarantee the required water supply for Dholpur is given in Appendix –2.

20. Scope and components of the works consist of the construction of OHSRs, CWRs, intermediate pump houses, procurement and installation of bulk water meters, etc., detailed as follows:

- Construction of 15 mld WTP at Sagarpada;
- Construction of 3.2 million litre of CWR at Sagarpada and 1.9 million litre of CWR at Bari-Saipau road junction.

- Construction of Pump house at Sagarpada, Provision of 3 nos. (2+1) of Pumps of 86.27 lps for feeder A and 3 nos.(2+1) of Pumps of 16.43 lps for feeder B and 3 nos.(2+1) of Pumps of 89.68 lps for feeder F.
- Construction of Pump house at Bari-Saipau road junction, Provision of 3 nos.(2+1) of Pumps of 61 lps for feeder D and 3 nos.(2+1) of Pumps of 29 lps for feeder E
- Rehabilitation of existing pump house at existing EE campus including replacement of Pumps (3 nos, 2+1, 22 lps discharge)
- Construction 3 nos. of OHSRs at Maharana II, Kaila colony and Krishi Upaz Mandi (2 nos. of 1000 KL and 1 no of 1250 KL, 22 m staging)
- Providing and laying of rising mains/transmission main of 19.90 km and distribution pipelines of 28.150 km
- Procurement and installation of 12700 new household meters and rehabilitation of 2800 nos existing meters.
- Procurement and installation of total 3 nos chlorinator each for Sagarpada, EE campus and Bari-Saipau road.
- Procurement and installation of 6 nos. Electromagnetic flow meter
- Provision for laying of parallel distribution pipe line of uPVC to de-link of old leaking AC pipe line of about 20 km length.

21. Chambal water will be brought up to the proposed WTP at Sagarpada by PHED. From the proposed CWR and Pump house at WTP campus, water will be pumped through three nos. of feeder/ transmission main i.e. A (500/450/350), B (250/200), F (500) water will be transmitted. Feeder A will feed water to the 5 nos. OHSR (2 nos Proposed by RUSDIP at Kaila Colony, Maharana-II, 2 nos Proposed by PHED at Tagawali college, Mahakali Temple and 1 no existing at Mahatma Nand ki Bagichi) . Feeder B will feed water to 2 nos. existing OHSR (Ziroli & Mittal colony). Feeder F will directly feed water to the CWR of IPS at Bari-Saipau road. From this IPS, water will be further pumped through two feeders (E&D). Feeder E will feed water to 1 no RUSDIP proposed OHSR at Krishi upaz Mandi, 1 no PHED proposed OHSR at Prerana nagar and 1 no existing OHSR at Police line. Feeder E will feed water to 3 no existing OHSR at Navodaya Vidyalaya, Purani Chawani, RHB colony, 1 no existing CWR at RECL and 1 no PHED proposed OHSR at ITI. Old Pumps at existing EE, PHED office Campus will be replaced and water will feed to the 2 nos. existing OHSRs at Maharana and PHED campus by feeder C (300/250/200). The total length of Transmission/Rising main is estimated of about 17.50 km. From OHSRs, water will be distributed to the households through the rehabilitated or newly constructed distribution network. 100 % consumer metering will be carried out for the design population of 2011. The bulk meters will be provided at all supply points to measure the quantity of water supply and to enable system monitoring. The replacement in pumping equipment will increase the efficiency of the system and reduce the proportionate O& M cost. The existing sub-surface source will not be in further used in the system with the available surface water.

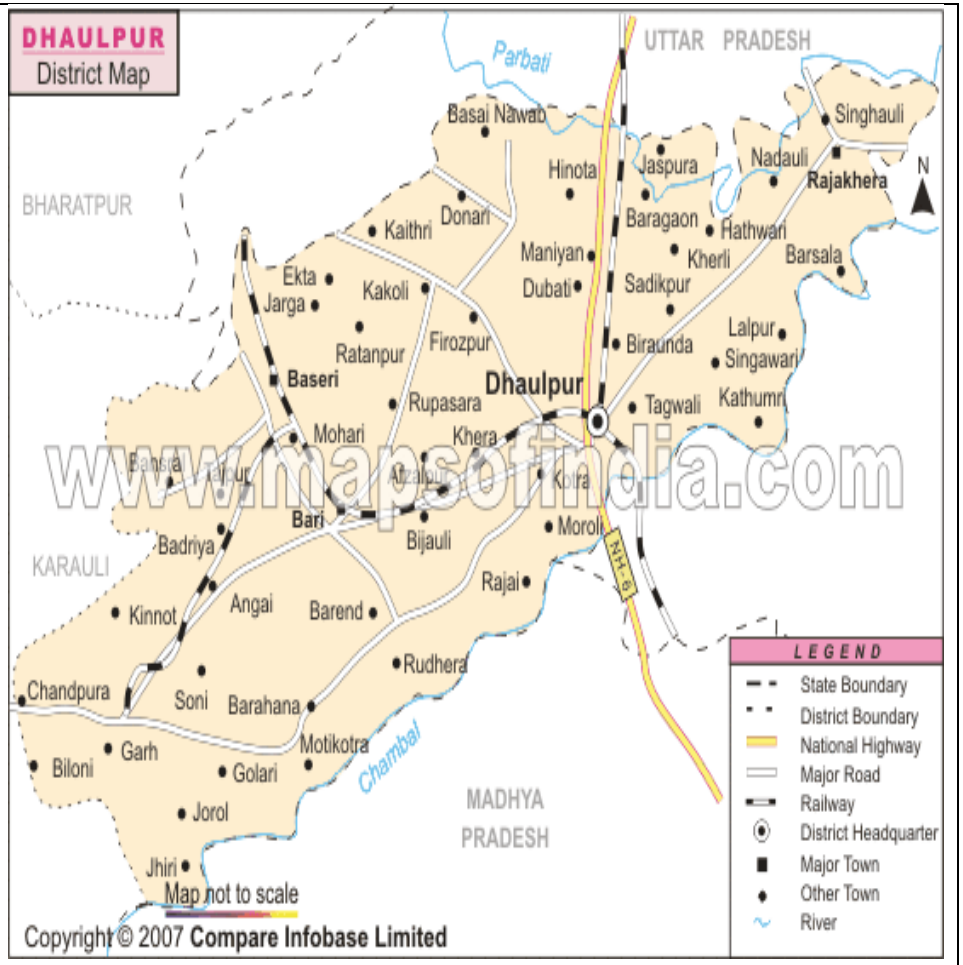
22. A schematic diagram of the proposed water supply system and the proposed layout are shown in Figure 2.2 to 2.4. Water transmission system for Dholpur is also plotted in Survey of India topo-sheet (Figure 2.5).

23. The Subproject is designed for a net water supply of 135 lpcd at the household end, for a design population of 2041, and with physical or system losses maintained at 20% after

the completion of the project. All civil works and pipe sizing are designed to meet 2041 (projected population's) needs, while all mechanical and electrical equipment are designed for 2026 (projected population's) requirement.

24. Table 2.1 shows the nature and size of the various components of the subproject. There are three main elements: augmentation of the water source and supply; treatment facility; expansion/improvement of the distribution network; and reduction of non-revenue water (NRW). The descriptions shown in Table 2.1 are based on the present proposals, which are expected to be substantially correct, although certain details may change as development of the subproject progresses.

Figure 2.1: Map showing the location of the project

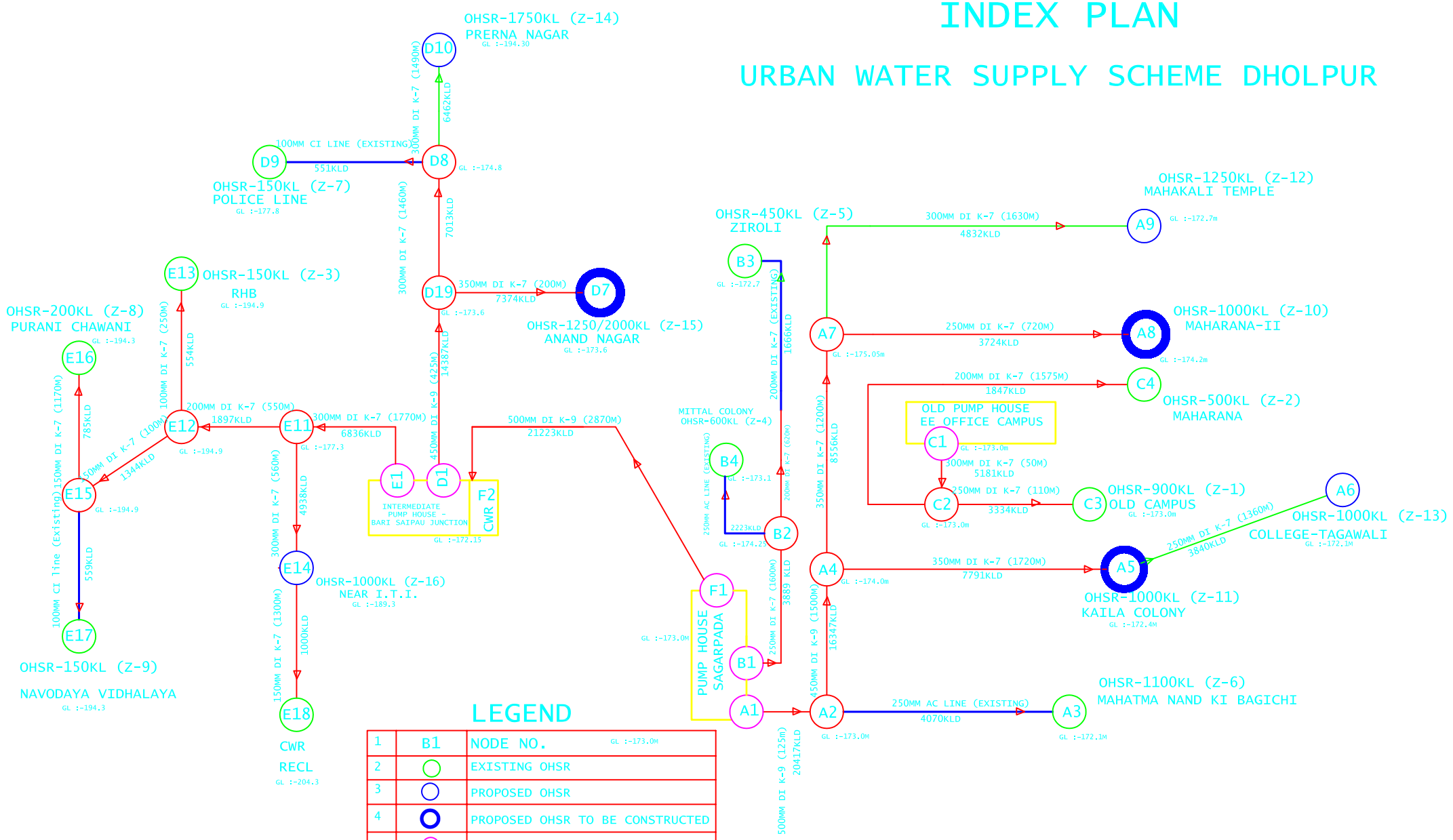


Rajasthan Urban Sector Development Investment Program ADB TA 4814-IND	Govt of Rajasthan Asian Development Bank
Dhaulpur Regional Map	

Figure 2.2: Index map on Existing and proposed water supply system at Dholpur

INDEX PLAN

URBAN WATER SUPPLY SCHEME DHOLPUR

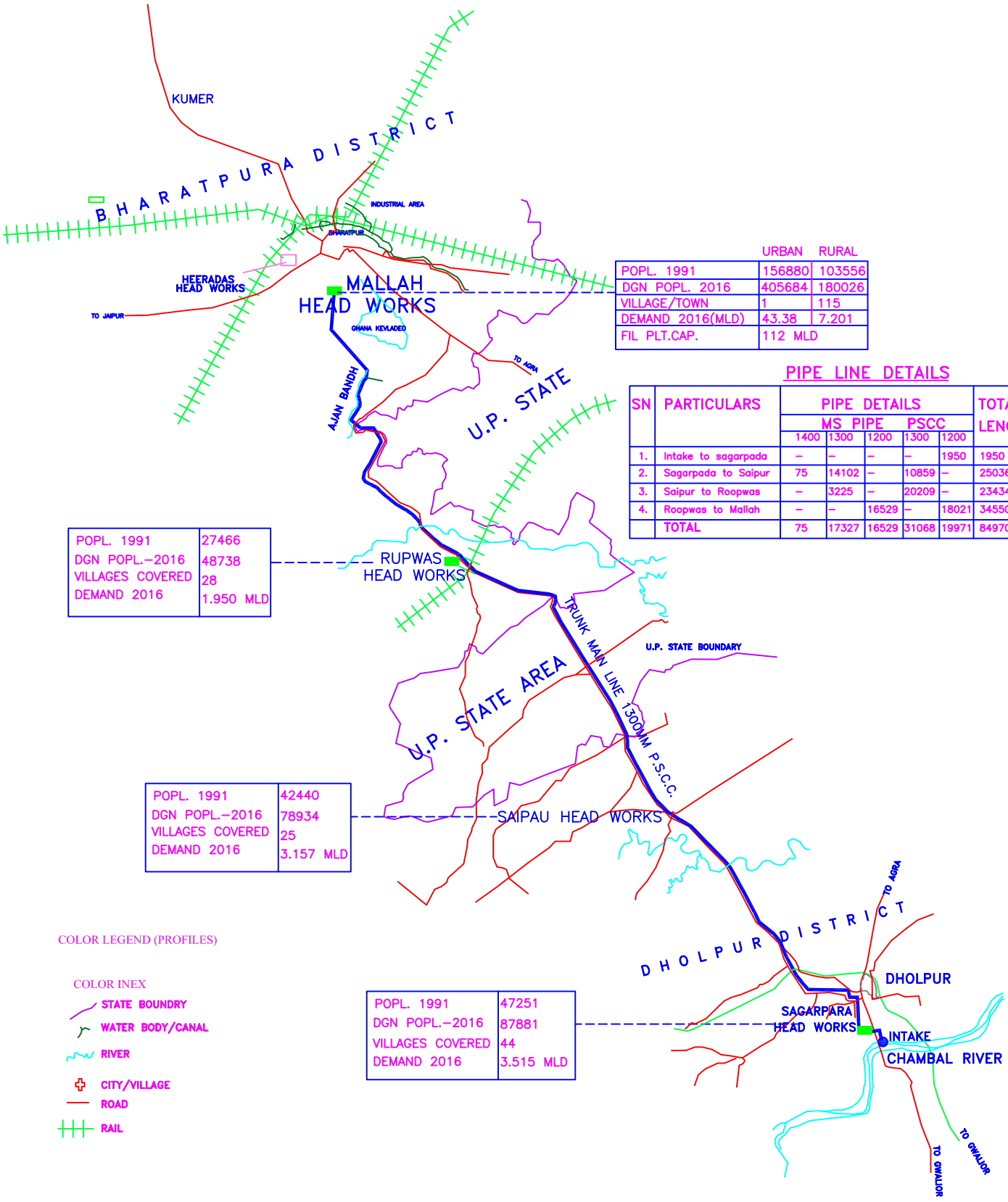


LEGEND

1	B1	NODE NO. GL :-173.0M
2	○	EXISTING OHSR
3	○	PROPOSED OHSR
4	○	PROPOSED OHSR TO BE CONSTRUCTED
5	○	FEEDER START NODE
6	○	JUNCTION POINT
7	—	PROPOSED PIPELINE TO BE LAID
8	—	PROPOSED PIPELINE NOT TO BE LAID
9	—	EXISTING PIPELINE
10	▭	PUMP HOUSE

Figure 2.3: Transmission pipeline from Chambal

CHAMBAL-DHOLPUR-BHARATPUR PROJECT



	URBAN	RURAL
POPL. 1991	156880	103556
DGN POPL. 2016	405684	180026
VILLAGE/TOWN	1	115
DEMAND 2016(MLD)	43.38	7.201
FIL PLT.CAP.	112 MLD	

POPL. 1991	27466
DGN POPL.–2016	48738
VILLAGES COVERED	28
DEMAND 2016	1.950 MLD

POPL. 1991	42440
DGN POPL.–2016	78934
VILLAGES COVERED	25
DEMAND 2016	3.157 MLD

POPL. 1991	47251
DGN POPL.–2016	87881
VILLAGES COVERED	44
DEMAND 2016	3.515 MLD

PIPE LINE DETAILS

SN	PARTICULARS	PIPE DETAILS					TOTAL LENGTH	COLOUR
		MS PIPE			PSCC			
		1400	1300	1200	1300	1200		
1.	Intake to sagarpada	–	–	–	–	1950	1950	
2.	Sagarpada to Saipur	75	14102	–	10859	–	25036	
3.	Saipur to Roopwas	–	3225	–	20209	–	23434	
4.	Roopwas to Mallah	–	–	16529	–	18021	34550	
	TOTAL	75	17327	16529	31068	19971	84970	

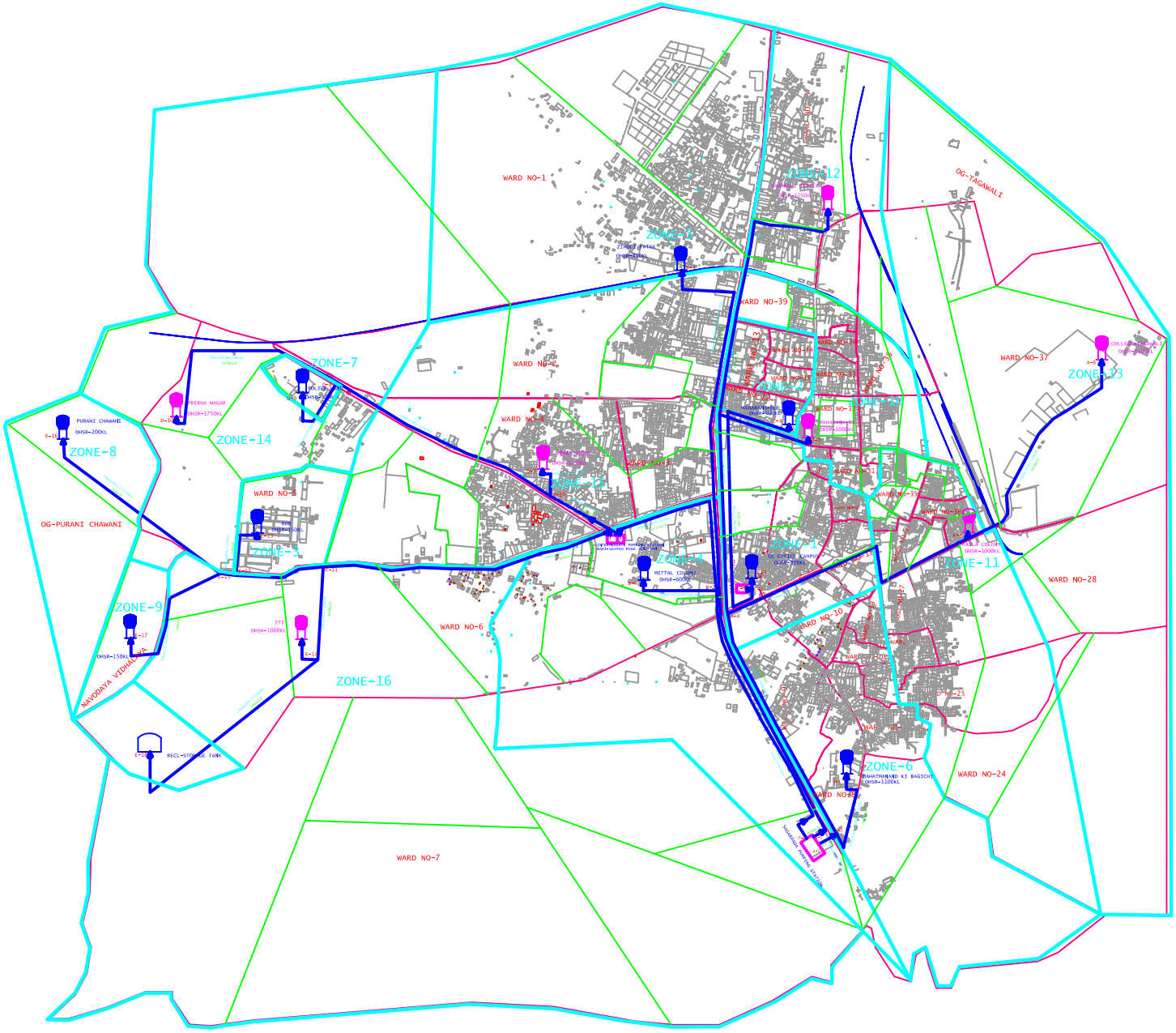
COLOR LEGEND (PROFILES)

COLOR INEX

- STATE BOUNDRY
- WATER BODY/CANAL
- RIVER
- CITY/VILLAGE
- ROAD
- RAIL

Figure 2.4: Pump showing water transmission system from Pump house to water reservoirs

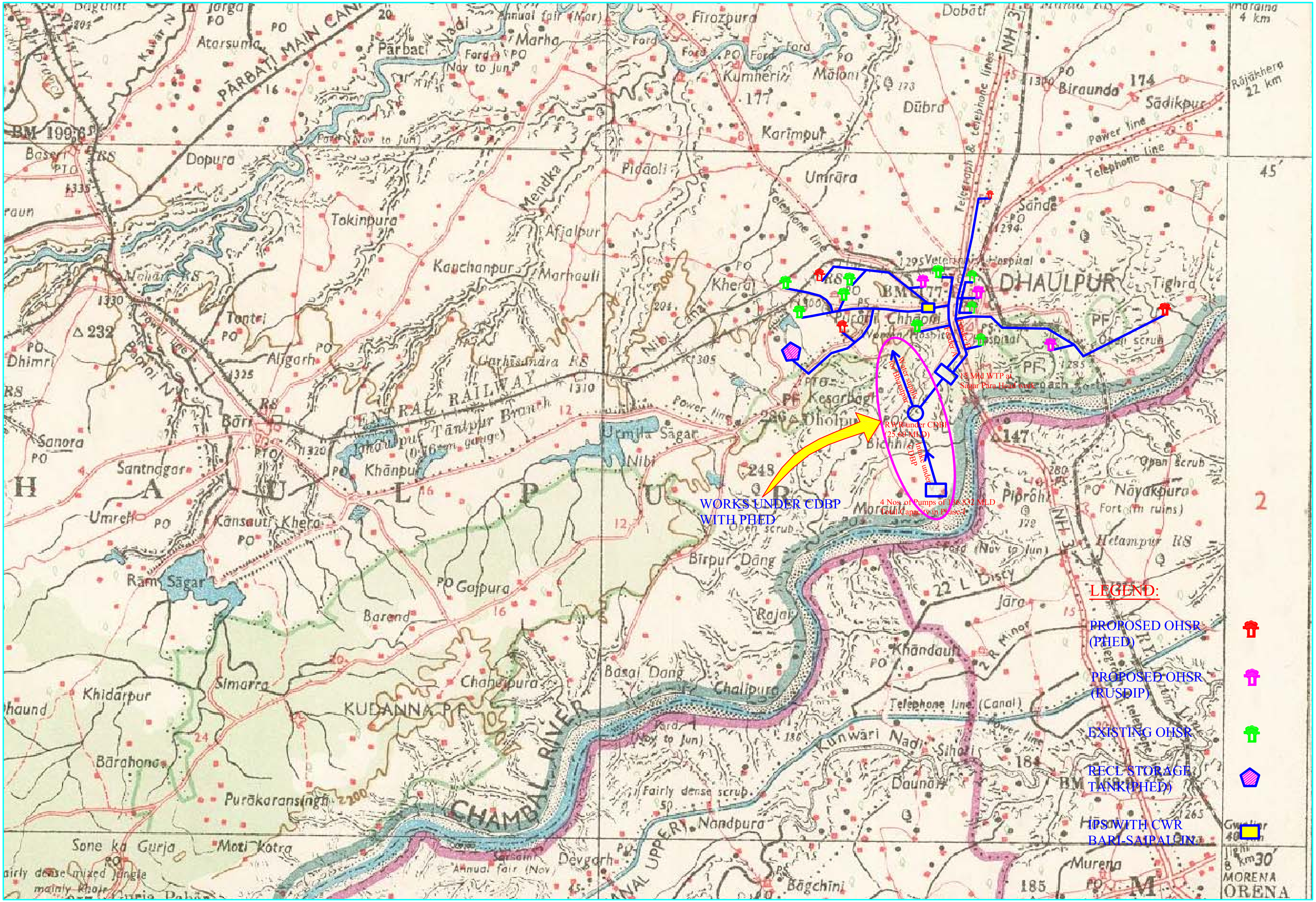
PROPOSED TRANSMISSION SYSTEM FROM PUMP HOUSE TO OHSRs OF UWSS DHOLPUR



INDEX

TRANSMISSION PIPELINE	
PUMPING STATION	
PROPOSED OHSR	
EXISTING OHSR	
ZONE BOUNDARY	
WARD BOUNDARY	
NODE NO.	E-16

Figure 2.5: Location of water supply scheme shown in SOI toposheet



DHAULPUR
CHAMBAL RIVER
CENTRAL RAILWAY
PARBATI MAIN CANAL
Feeder A
Feeder B
Water supply for Bharatpur
15 Mld WTP at Sagar Para Head work
RWR under CDBP (25.60 MLD)
Intake under CDBP
4 Nos. of Pumps of 136.832 MLD Total Capacity in Phase-I
WORKS UNDER CDBP WITH PHED
LEGEND:
PROPOSED OHSR (PHED)
PROPOSED OHSR (RUSDIP)
EXISTING OHSR
RECL STORAGE TANK(PHED)
IPS WITH CWR BARI-SAIPAU JN.

Table 2.1: Improvements in water supply infrastructure proposed in Dholpur

Infrastructure	Function	Description	Location
1. Source and Supply Augmentation			
WTP	Raw water to get from the intake near Sagarpada.	Additional 15 MLD WTP proposed under RUSDIP adjacent to the existing WTP location	Near Sagarpada
2. Expansion of Distribution Network			
Transmission/ raising mains	Supply water to newly developed area	19.9 km of new pipe line of different diameter to be laid	Different part
Distribution	Supply water to newly developed area	Distribution pipelines of 28.150 km	Uncovered zone of the city
Clear Water Reservoirs	Storage of Clean and treated water	New 2 nos. R. C. C. clear water reservoir proposed.	Construction of 3.2 million litre of CWR at Sagarpada and 1.9 million litre of CWR at Bari-Saipau road junction
Overhead Reservoirs	Increase water supply to regulate water supply	3 nos. of OHSRs	At Maharana II, Kaila colony and Krishi Upaz Mandi (2 nos. of 1000 KL and 1 no of 1250 KL, 22 m staging)
New pump house	For pumping of water	2 pump houses Construction of Pump house at Sagarpada, Provision of 3 nos. (2+1) of Pumps of 86.27 lps for feeder A and 3 nos.(2+1) of Pumps of 16.43 lps for feeder B and 3 nos.(2+1) of Pumps of 89.68 lps for feeder F. Construction of new Pump house at Bari-Saipau road junction Provision of 3 nos.(2+1) of Pumps of 61 lps for feeder D and 3 nos.(2+1) of Pumps of 29 lps for feeder E	At Sagarpada and Bari Saipau
Rehabilitation of existing pump house		Replacement of Pumps (3 nos, 2+1, 22 lps discharge)	At existing EE campus
Chlorination plant	For disinfection of water	Provision for total 3 no chlorinators	Each for Sagarpada, EE campus and Bari-Saipau road
Upvc distribution pipeline	Reduce loss of water	Provision for laying of parallel distribution pipe line of uPVC to de-link of old leaking AC pipe line of about 20 km length.	Specified location of the city

Infrastructure	Function	Description	Location
3. Meters and House Connections			
Bulk flow meters & consumers meters	Monitor water flow in the improved network	Provision for 6 nos. of electromagnetic Bulk flow meter& consumers meters	Location will be finalizes after detail survey
New house connection	Measured water supply to household	Procurement and installation of 12700 new household meters and rehabilitation of 2800 nos. existing meters.	At different parts of the city

III. DESCRIPTION OF THE ENVIRONMENT

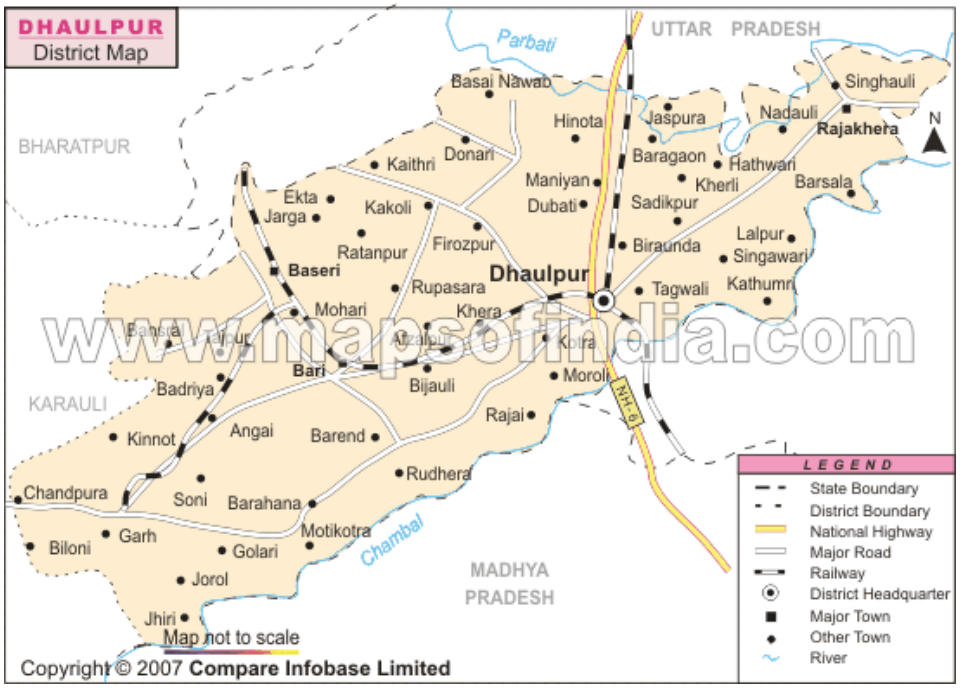
A. Physical Resources

1. Location

25. The Urban Agglomeration (UA) of Dholpur is located abutting territories of Uttar Pradesh and Madhya Pradesh and is Eastern gateway of Rajasthan. Dholpur is 270 kms from state capital Jaipur whereas the world famous Taj Mahal at Agra is only 55 Kms. The Gwalior city of Madhya Pradesh is at 60 kms on the south. A bridge over river Parvati connects Dholpur with Uttar Pradesh and another bridge on river Chambal links it with Madhya Pradesh. National Highway number 3 passes through Dholpur and it is well connected with Agra, Gwalior and major cities of Rajasthan like Bharatpur, Alwar, Jaipur etc. by road network. It also falls on the rail network and is well connected with cities of North as well as South India. Dholpur is located on highlands along River Chambal and comprises of three kinds of landforms. The North & Northwest part is sandy, Western part is hilly and the South & Southeast part falls under Chambal Valley. The ravenous landform along River Chambal called 'Daang' in local dialect used to be famous hideout for dreaded dacoits of Chambal region. Dholpur is an important centre for trade and commerce in the District. Applique works occupies an important place in the city economy and basically the craft includes stone carving.

26. This town has an historic famous fort named Shergadh rebuilt by then ruler Shershah Suri. There is one palace which was built by Mughals. This town has been of historic importance and there are offices of Archeological Department of Govt. of India who are care takers of makbara's Masjid. There are three historic gates which surround the city - Delhi Gate in north east, Udaibhan gate in north and Gwalior gate in south east. The district map of Dholpur is shown in **Figure 3.1**.

Figure 3.1: District map of Dholpur



2. Topography, Drainage, Natural hazard and Drought

27. Topography: The Dholpur city is located at 770 53' E Longitude and 260 24' N Latitude. The average elevation is 502 m above the mean sea level. Dholpur is located in high level terrain of Chambal valley and is having rocky formation of disintegrated rock and not a much fertile zone. The Dholpur city is divided into three main topographies viz., the northern region is characterized by sand dunes, western by hilly ranges, there is perennial river namely Chambal river at eastern to south western region. The area is plain having alluvial and sandy soil ands slopes towards eastern direction.

28. Drainage: The general slope of the city is from west to east, which is also the direction of drainage. Nearly, all ephemeral streams flow in this direction. The old settlement area was originally located on the rocky side to provide an easy drainage system on either side but the future expansion of the city took place towards the northern and southern direction.

29. Natural Hazards- Earthquake: Dholpur town lies in low damage risk zone with of Zone II. The area is less prone to earthquakes as it is located on relatively stable geological plains based on evaluation of the available earthquake zone information. Figure 3.2 depicts the earthquake zones of Rajasthan. Figure 3.3 indicates natural hazard zones of Dholpur.

30. Drought: Low rainfall coupled with erratic behavior of the monsoon in the State makes Rajasthan the most vulnerable to drought. Based upon the discussion with PHED officials the water table in the city continuously decreases by 1-2 meter on an annual basis combined with significant drawdown conditions.

Figure 3.2: Earthquake zones of Rajasthan

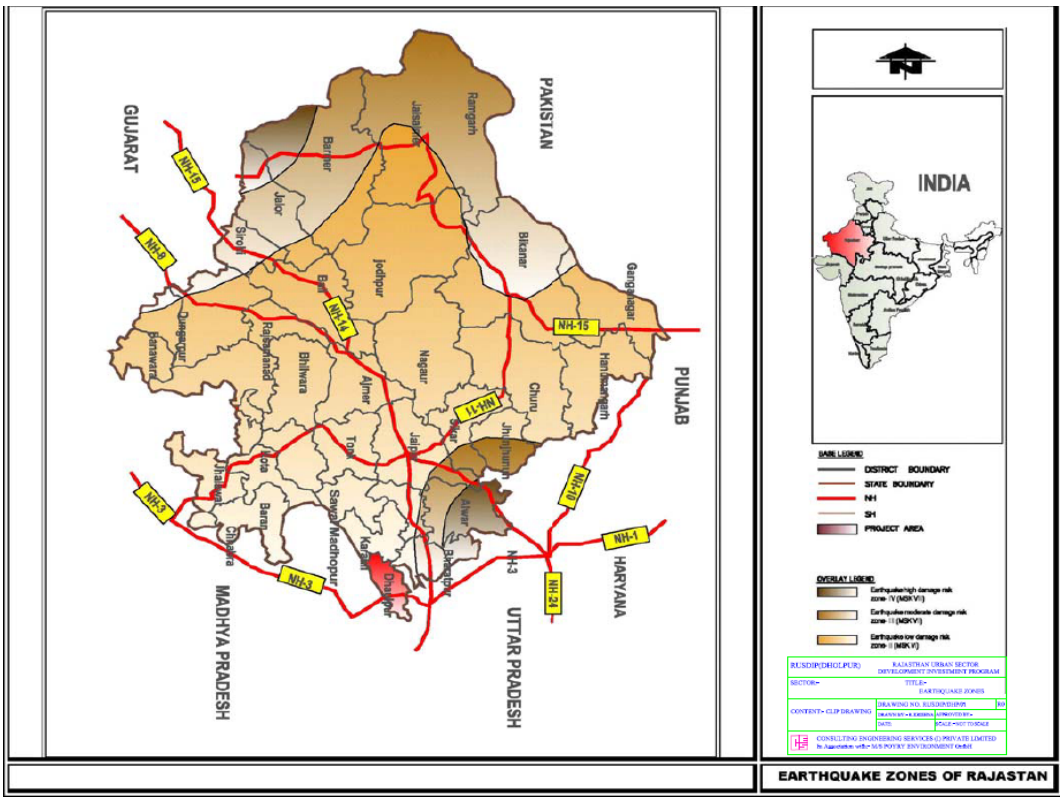
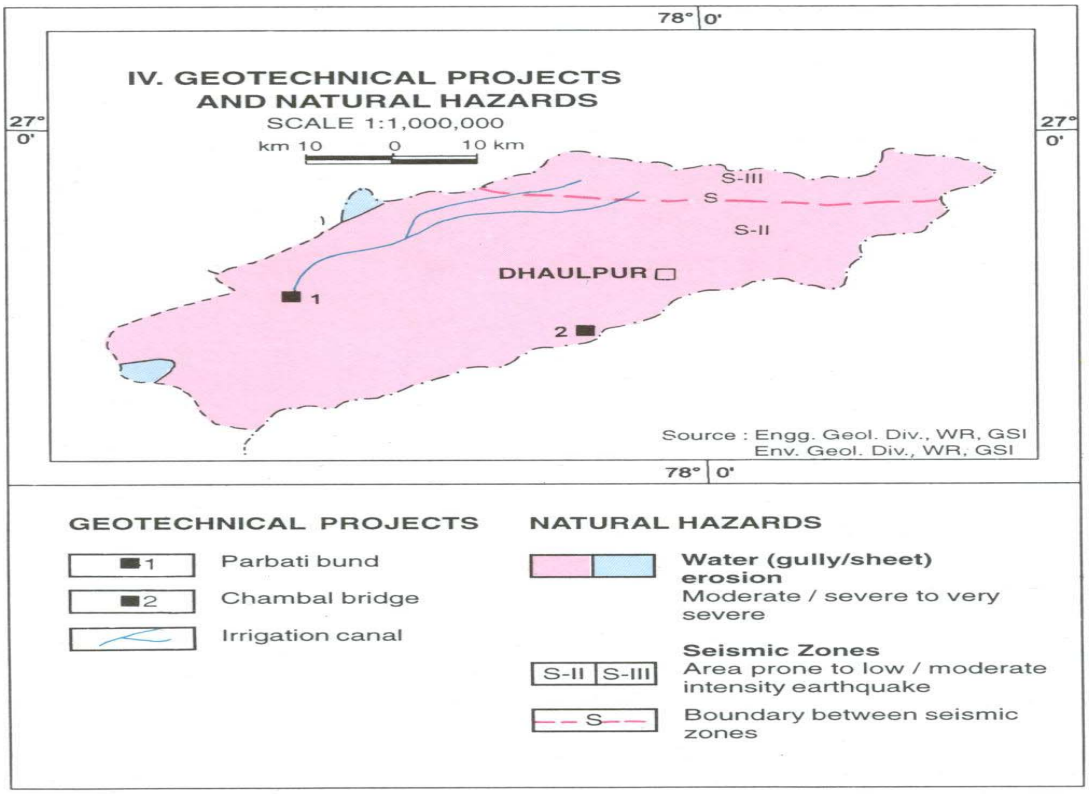


Figure 3.3: natural hazard map of Dholpur (Source: GSI resource map)



3. Geology, geomorphology, mineral resources and soil

31. Major parts of the district falls within the flood plain of the Chambal river system .As such much of the district is covered by Alluvium and Aeolian sand of Quaternary age. The area experiences semi-arid climate and the annual rain fall is 657 mm.

32. The southern part of the district exposes the Rewa and Bhander Groups of Rocks belonging to the Vindhyan Super Group .The Rewa Group is represented by the Inargarh sandstone. Its outcrops are exposed west of Baseri and northwest of Sepau. The shirbu shale occurs with interbeds of limestone which are exposed west of Baseri and north-west of Border. Geology and mineral map of Dholpur shown in Figure 3.4, while geomorphological map of Dholpur depicted in Figure 3.5.

33. Mineral Resources: Dholpur district is a leading producer of sandstone .The white – spotted reddish sandstone of the Upper Bhander Group is extensively quarried as building stone southwest of Dholpur and in other Parts of the district. The different quarries produce 30 to 60 cm wide and 2 to 3 m long slabs and tiles .The district has yielded excellent stones for the monumental structures in Delhi Agra and other cities of Northern India.

Figure 3.4: Geology and mineral map of Dholpur district (source: GSI Resource map)

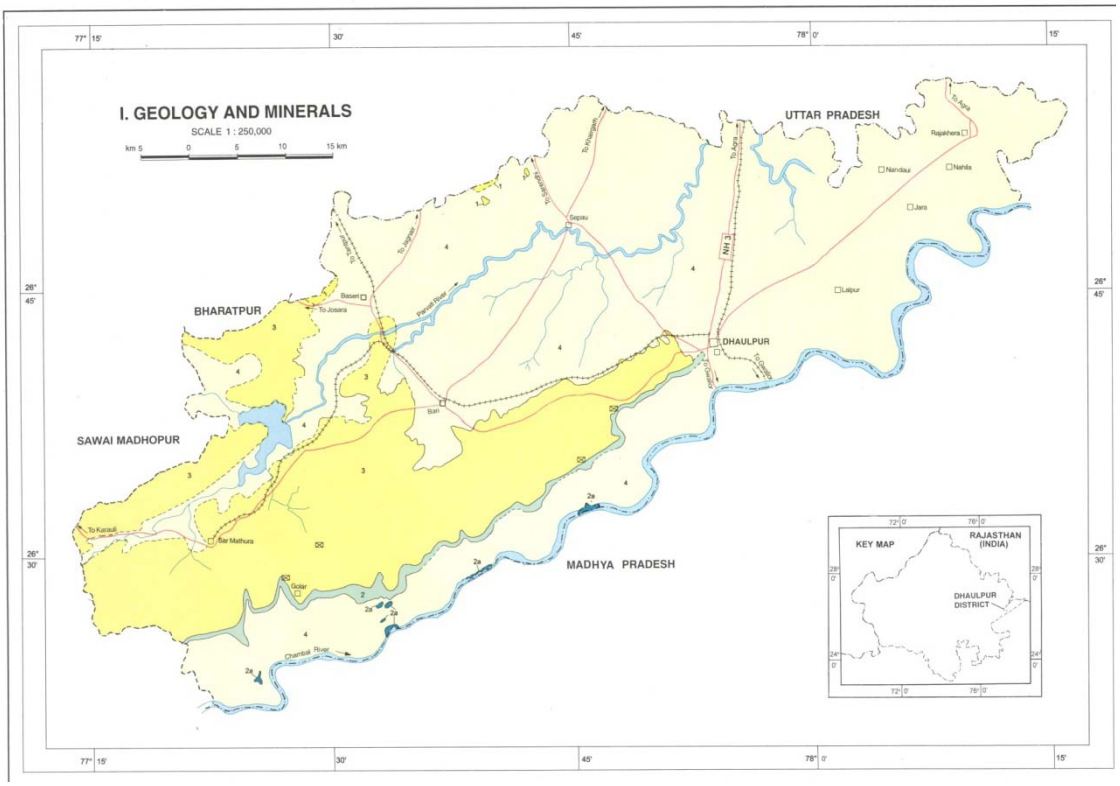
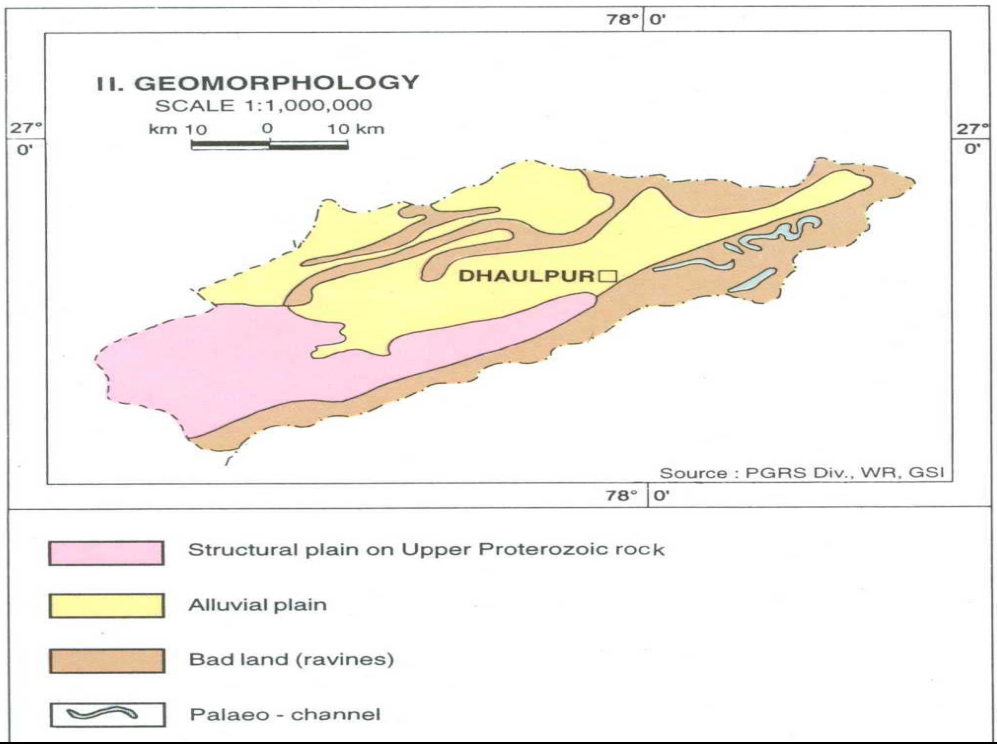


Figure 3.5: Geomorphology of Dholpur district (source: GSI Resource map)



34. Soil characteristics: Soil of the region falls within rainfall zone of 500- 700 mm. The soil is generally alluvial in nature which prone to water logging. Also nature of recently

alluvial calcareous has been observed. Table 3.1 shows nutrient level in the Dholpur soil including area coverage of saline and sodic soil. The nutrient status of the Dholpur soil is graded as low to medium level.

Table 3.1: Fertility status – major nutrients and problematic soils of Dholpur district

	Nutrient			Saline Soil(Ha)	Sodic or Alkali(Ha)
	N	P	K		
Status	L	M	M	5373	20121

(Source: Vital Agricultural Statistics 2004-05, Directorate of Agriculture, Rajasthan)

4. Climate

35. The climate of Dholpur city is generally dry. The average maximum temperature during summer is 48°C and minimum during winter can go down to nearly 2°C. Humidity in air has been known to drop to as low as 20 percent. It is only during the southwest monsoon that the humidity increases to nominal levels of 70 percent or more. The normal annual rainfall is 614.74 mm and the highest rainfall was recorded as 1,032.2 mm in 1995. The prevailing wind direction is generally from southwest to northeast in summer and north to northwest during winter.

36. The rainfall over Dholpur is scanty and is concentrated over three month i.e. from June to August. The rains are erratic and so is the distribution of the rainfall. However agriculture and the animal wealth are dependent on rains to large extent. The total rainfall over last 20 years is compiled and shown in Table 3.2. Seasonal Rainfall data for the recent year (2005-2006) shown in Table 3.3. Figure 3.6 shows yearly variation (1997-2007) of rainfall at Dholpur

Table 3.2: Rainfall data of Dholpur

S. No.	Year	Rainfall in mm
1	1984	579.5
2	1985	772.4
3	1986	333.0
4	1987	303.0
5	1988	705.6
6	1989	503.6
7	1990	829.1
8	1991	262.4
9	1992	853.7
10	1993	898.9
11	1994	549.2
12	1995	1032.2
13	1996	803.7
14	1997	678.8
15	1998	775.6
16	1999	613.6
17	2000	443.5
18	2001	409.0
19	2002	299.5
20	2003	649.4
	Average of 20 years	**12294.8 / 20 =614.74 mm**

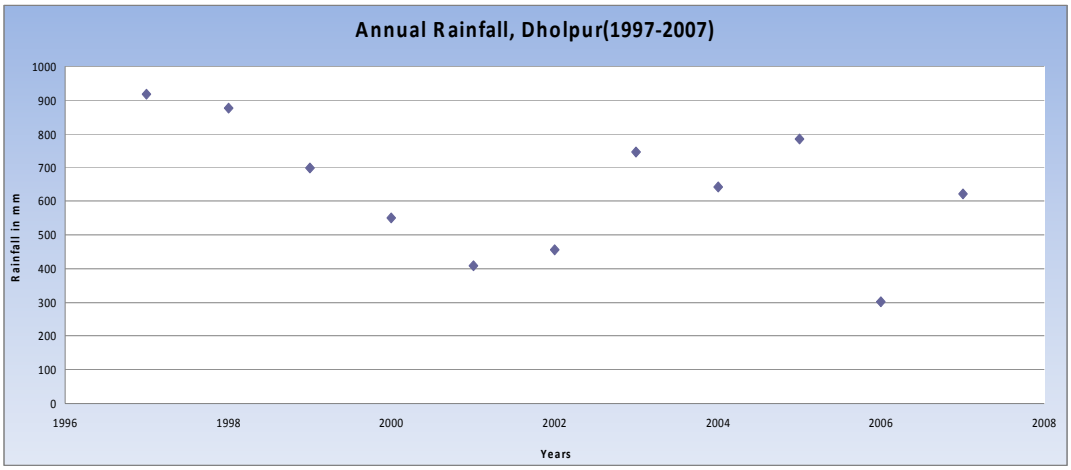
(Source: Irrigation Department, Govt. of Rajasthan)

Table 3.3: Rainfall at Dholpur in recent years (2005-06)

	Months	**Rainfall (mm)**
1	June	84.5
2	July	446.2
3	August	122.0
4	September	70.0
5	October	0
6	November	0
7	December	0
8	January	0
9	February	0
10	March	12.6
11	April	0.2
12	May	18
13	**Monsoon Rainfall**	722.7
14	**Non monsoon rainfall**	30.8
15	**Annual Rainfall**	753.5

(Source: Irrigation Department, Govt. of Rajasthan)

Figure 3.6: Rainfall at Dholpur during 1997 to 2007



Source: Deputy Director hydrology water resources ID and R, Jaipur

5. Air Quality

37. There are no data on ambient air quality of Dholpur Town, which is not subject to monitoring by the Rajasthan State Pollution Control Board (RPCB) as there are no major industries. The nearest station is located at Alwar (230 km from Dholpur). Traffic is the only significant pollutant in Dholpur, so levels of oxides of sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS). The ambient air quality data is depicted in Table 3.4.

Table 3.4: Ambient Air Quality in Alwar (Annual Average, 2004; units in µg/m3)

Monitoring Station	Land use	SOx	NOx	RSPM	SPM
Alwar Residential, Rural and others area	Residential	8.1	11.6	175.0	302.0
NAAQ Standard	*Residential*	*60*	*60*	*60*	*140*
Alwar Industrial area	Industrial	7.6	12.4	107.0	182.0
NAAQ Standard	*Industrial*	*80*	*80*	*120*	*360*

RSPM: Respirable Suspended Particulate Matter; SPM: Suspended Particulate Matter
Source: Annual Report 2005-2006 Rajasthan State Pollution Control Board

5. Surface Water

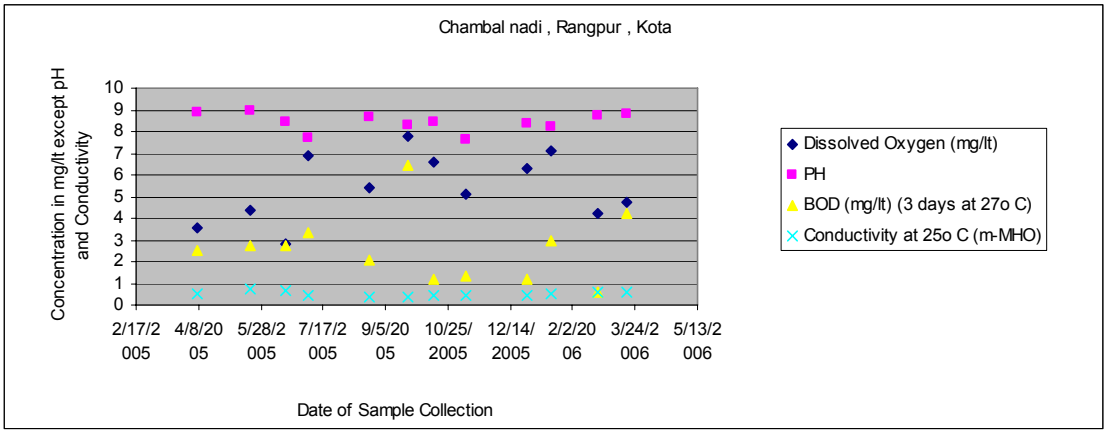
38. The Chambal River is passing through Dholpur district. But there is no monitoring station at Dholpur. The monitoring has been carried out by pollution control board at Rangpur Kota. The data on DO, pH, BOD and Electrical conductivity is given in Table 3.5. During 2005 to 2006 DO, pH and BOD ranged from 2.82 – 7.75 mg/l, 7.7 – 8.94 and 0.6 – 6.41 mg/l respectively.

Table 3.5: Chambal River Water Quality

Date of Sample Collection	Dissolved Oxygen (mg/lt)	P^H	BOD (mg/lt) (3 days at 27° C)	Conductivity at 25° C (m-MHO)
4/7/2005	3.59	8.92	2.53	0.51
5/20/2005	4.4	8.94	2.73	0.75
6/17/2005	2.82	8.47	2.74	0.68
7/5/2005	6.89	7.7	3.36	0.47
8/23/2005	5.38	8.7	2.1	0.4
9/23/2005	7.75	8.28	6.41	0.35
10/13/2005	6.62	8.42	1.16	0.42
11/8/2005	5.12	7.65	1.36	0.45
12/27/2005	6.3	8.37	1.15	0.44
1/16/2006	7.1	8.21	3	0.5
2/22/2006	4.2	8.76	0.6	0.59
3/17/2006	4.72	8.79	4.24	0.61

Source: Annual Report 2005-2006 Rajasthan State Pollution Control Board

Figure 3.7: Variation of water quality parameters



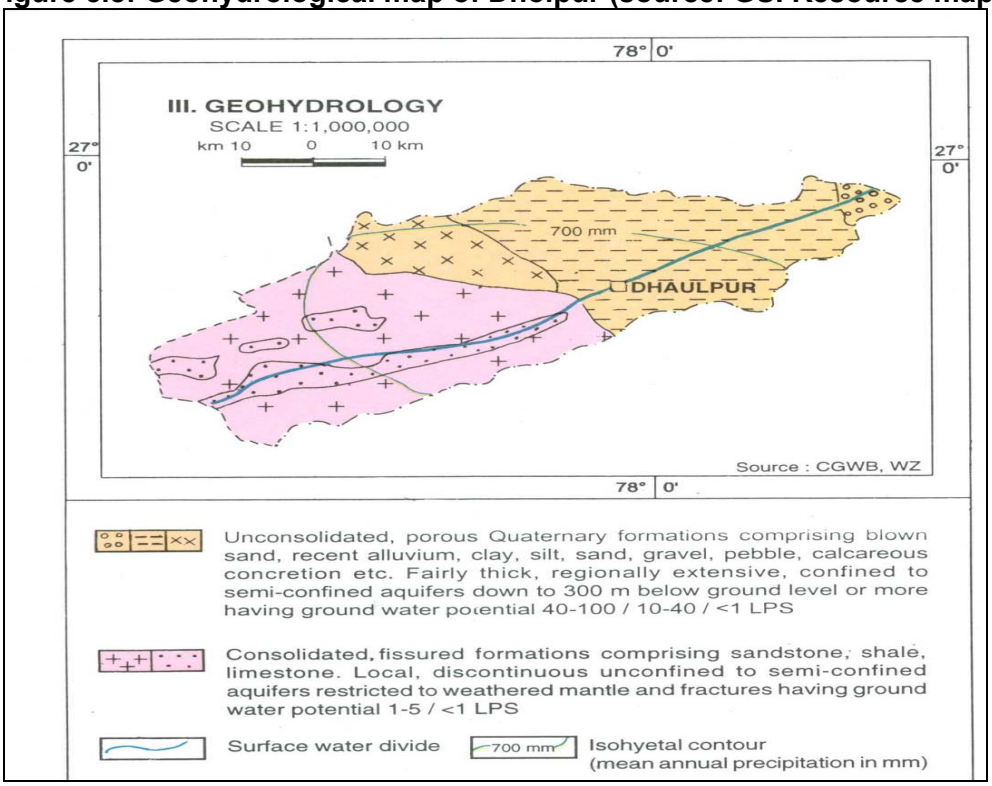
6. Geohydrology and Groundwater

39. Geohydrological map of the Dholpur district is shown in Figure 3.8. For broadly grouping geological formations from ground water occurrence and movement considerations, the various lithological units have been classified into two groups on the basis of their degree of consolidation and related parameters. These are,

- Porous Formations- unconsolidated formations
- Fissured formations – consolidated sedimentary rocks.

40. On an average 60-70 % of the district area (mostly north and eastern part of the district) covered with porous formations.

Figure 3.8: Geohydrological map of Dholpur (source: GSI Resource map)



41. There are number of National Hydrographic monitoring stations of Central Ground Water Board in and around Dholpur. Fluctuation of ground water level is shown in Table 3.6. In most of the cases ground water table ranged between 10-20 m bgl.

Table 3.6: Number and Percentage of National Hydrograph Network Stations with water fluctuation range

Period	No of wells analysed	Range		0-2 m		2-5 m		5-10m		10-20m		20-60m		>60 m	
		Min	Max	No	%	No	%	No	%	No	%	No	%	No	%
Jan-06	18	6.29	30.08	0	0	0	0	3	16.67	11	61.11	4	22.22	0	0
Nov-05	17	3.39	27.17	0	0	2	11.76	1	5.88	10	58.82	4	23.53	0	0
Aug-05	17	3.36	28.09	0	0	1	5.88	2	11.76	10	58.82	4	23.53	0	0
May-05	20	5.99	42.47	0	0	0	0	5	25	10	50	5	25	0	0

Source: Ground water year book 2005-06 Rajasthan, Central Ground Water Board, Jaipur (2007)

42. The Central Ground Water Board carried out chemical testing of tube well water seasonally. The average concentrations of major constituents are shown in **Table 3.7**.

Table 3.7: Ground Water Quality in and around Dholpur

Parameters	Maximum Level	Minimum Level	Standard of Drinking water (IS: 10500: 1991)	
			Desirable limit (mg/l)	Maximum Permissible limit (mg/l)
pH	9.18	7.5		
EC	15380	390		
Cl (mg/l)	5964	21	250	1000
SO_4(mg/l)	630	5	200	400 (if Mg does not exceeds 30 ppm)
NO_3(mg/l)	715	3.5	-	100
PO_4(mg/l)	1.2	0		
Total Hardness(mg/l)	3360	100	300	600
Ca(mg/l)	240	8	75	200
Mg(mg/l)	691	17	30	100
Na(mg/l)	2668	8	-	-
K(mg/l)	41	0.78	-	-
F(mg/l)	3.7	0.49	1.0	1.5
Fe(mg/l)	3.01	0.01	0.3	1.0
SiO_2(mg/l)	42	5		
TDS	9997	254	500	2000

Note: Total – 18 nos. samples
Source: Ground water year book 2005-06 Rajasthan, Central Ground Water Board, Jaipur (2007)

43. Water quality (tested by PHED) from existing tube wells, especially around the city centre, has deteriorated significantly with a total dissolved solids having increased from 1000 ppm to 3500 ppm thereby rendering water unsuitable for human consumption. The results also indicate higher concentration of nitrate (10 percent samples) and iron (30 percent samples) than recommended levels prescribed by the Indian standards on drinking water. As reported by PHED, the turbidity of raw water from Chambal varies widely in rainy

season due to flood. It is therefore recommended that as far as possible existing tube wells should be abandoned.

44. Table below shows chemical quality of supply water (2007) as recently measured by PHED. It is noted that TDS level is more or less high. Also it is observed that at present supply water contains fluoride.

Table 3.8: Present supply water quality at Dholpur

Total supply per day (lac liter)	Type of Sources Surface / Ground	Ground	Surface	No. of CWR	No. of SR	F^- Min	F^- Max	TDS Min	TDS Max	NO_3^- Min	NO_3^- Max
120	Both (G:S 9.1:90.9)	9.1	90.9	4	7	0.4	0.7	547	1292	10	80

B Ecological Resources

45. FLORA: The common species of this region found in this district are kumta, babul (*Accasia nilotica*), Arunj (*Terminalia arjuna*), Dhok (*Anogeissus pendula*), Bekal, chhonkar (*Prosopis cineraria*), Pilu (*Salvadora oleoides*), Kair (*Accacia catechu*), shisham (*Dalbergia sissoo)*, Siris (*Albizzia lebbek*), Thor (*Euphorbia royleana*), and Dhamasa *(Fangonia arabica*).

46. FAUNA: The typical fauna of the Oriental region in this district is represented by ghadiyal (*Tomistoma schlegelii)*, mor (*Pavo cristatus*), Bandar (*Macaca mulatta*), langur (*Presbytis entellus*), bagh (*Panthera tigris*), baghera (*Panthera pardus*) and kala hiran (*Antilope cervicapra*).

47. Wildlife and wild lands go together. The district has varied wildlife because there are different habitats varying from thick dhok forests to open thorn forests, from hills to ravines and flat lands, numerous wetlands in the form of perennial rivers; seasonal rivulets; extensive agricultural fields to grasslands and naturally the variety of wildlife is equally variable.

48. In and around the sub-project area no endangered species of flora and fauna has been reported

C. Economic Development

49. Dholpur, being the district headquarters for Dholpur District, performs all administrative and revenue functions required of a district center. Traditionally, Dholpur is a commercial town and the main occupation of the people is agriculture and commercial. However some developments can be seen now adays in the town in form of industries and commercial activities. Dholpur is also a cultural town depicting original rajasthani heritage.

50. According to the Census of 2001, the work force participation ratio in Dholpur is 24.25 percent, which is marginally lower when compared with cities such as Kota (27.6%), Jaipur (27.0%), Udaipur (28.0) and the state of Rajasthan (26.6%).

51. Power generation status of the area: Presently there is no power generating unit at Dholpur but one power generation unit is under commissioning process. The consumption of electricity by different sectors is shown in Table below.

Table 3.9: Consumption of Electricity in Million Kwh (2003-04)

District	Domestic	Non-Domestic (Commercial)	Industrial	Public Lighting	Public Water Works	District	Domestic
			Small	Medium	Large		
Dholpur	14.128	3.854	6.11	6.549	15.52	0.012	3.943

(Source: District statistics book)

1. Land use

52. Under the Rajasthan Urban Improvement Act, 1959, the Master plan for Dholpur is prepared for the year 1999-2023. The state Government issued a notification, under Sec 3(1) of Rajasthan Urban Improvement Act, 1959 and required preparation of the Dholpur Master Plan comprising 32 revenue villages. This was required to ensure that housing schemes and industrial development should occur in a concurrent manner with efficient provision of basic urban facilities such as housing, schools, dispensaries, parks and recreation centre etc. A survey had been carried out by the Town planning Department, Bharatpur on various physical and socio-economic characteristics of Dholpur town to prepare the Draft Master Plan. The Draft Master Plan was notified in January, 1998 for public objections and suggestions. Finally the government approved the Master Plan as per the said Act and notified the same under Section 7 of the said act on May, 2000 with a projection that the city population in 2023 will grow to 1.68 lakhs. Out of the total area of 32.03 Sq. km (3200 ha), only 700 ha area is urbanized, the southern portion is covered by rocky ground and the northern portion is agriculture area. Out of total developed area of 593 ha, 50.1% are is under residential and 14.9% area is under commercial and industrial development.

Table 3.10: Dholpur Urban Area Land use pattern

Land Use	**1999**	
	Area in acres	***% of developed area***
Residential	743	50.1
Commercial	80	5.4
Industrial	140	9.5
Government	24	1.6
Recreation	21	1.4
Public/Semi Public	204	13.8
Circulation/Transport	270	18.2
Developed Area	1482	100
Agriculture	80	-
Government reserved area	142	-
Other vacant and undeveloped land	40	-
Urbanized Area	1744	-

Source: Dholpur Master Plan, 1999-2023

Figure 3.9: Land use proportion for Dholpur Developed area

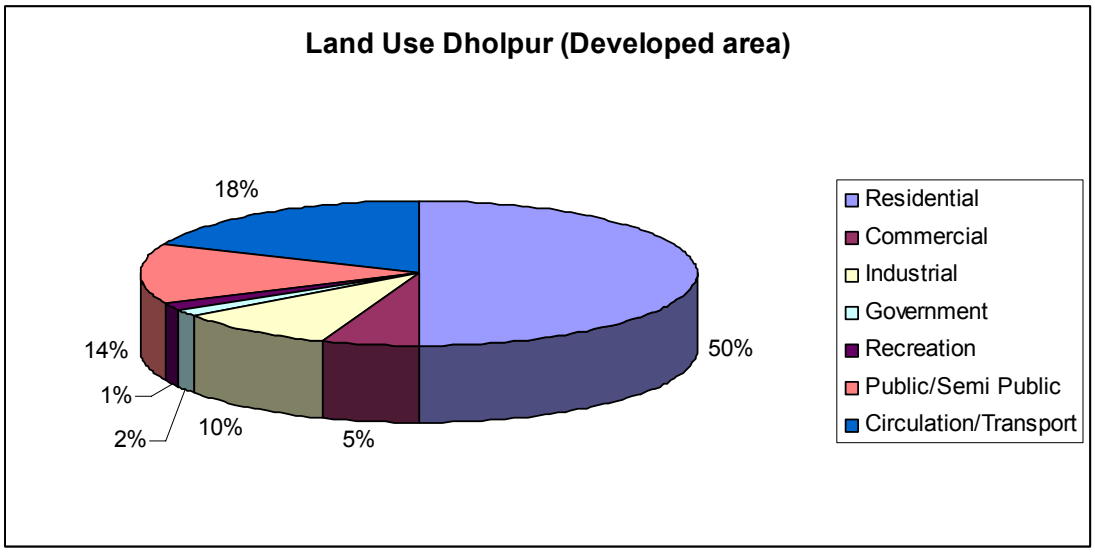
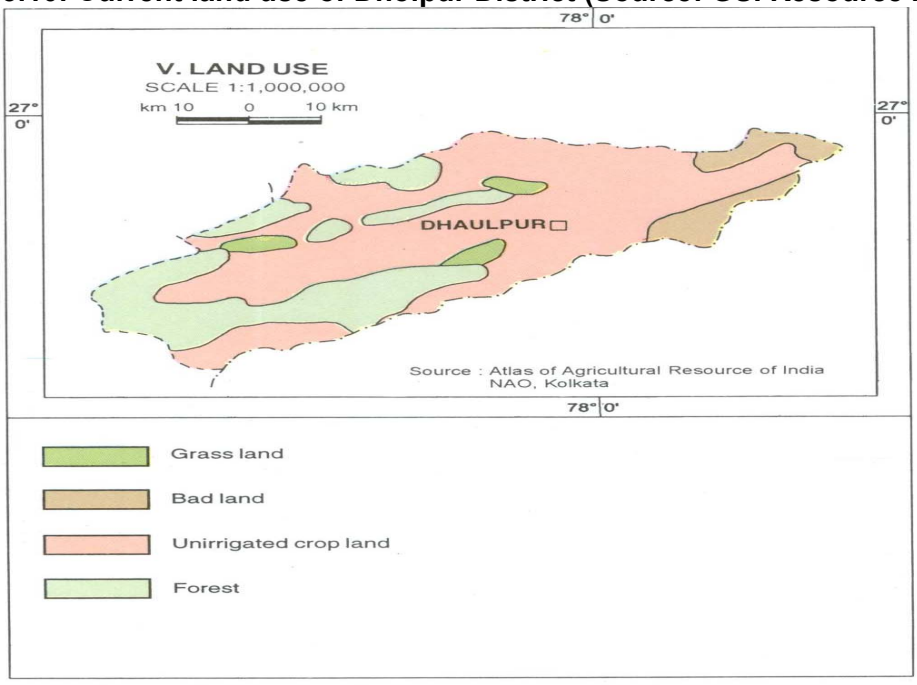


Figure 3.10: Current land use of Dholpur District (Source: GSI Resource map)



2. Commerce, Industry and Agriculture

53. Dholpur is an important center for trade and commerce in the District. Art works occupies an important place in the city economy and basically the craft includes stone carving. The trade and commerce activities can be broadly classified into two categories namely the organized and unorganized markets. Presently there are 5 market complexes; Vegetable market at Nusingh road, Lal bazzar, Kirana Bazzar and few general stores at Hospital road, medical shops are functioning in the town. Also street shops have developed along some of the major road, such as Collectorate office, along NH-3. Other than the organized sector, there are a number of unorganized markets in the town. There has been a rapid growth in the commercial sector during the recent past. Hotel and transportation based units have shown appreciable growth. In addition, food & grocery items and clothes are the other organized commercial sectors showing an increase. Auto spare parts and repair

centers are predominant along NH 3. Several of the commercial activities such as wholesale markets are located close to the city palace. These activities are not related to tourism but attract a number of vehicles for transportation of goods/materials thereby adding to the congestion and traffic problems. Other than the organized sector, there are large numbers of unorganized vendors seen in the town especially in Lal bazaar. Accordingly the field visit and discussion with he various stakeholders, certain degree of concentration has been observed in the location of these unorganized markets and this may pave way for planned construction of market complexes, Kiosks in the developed parts of the town within the framework of the Development plan. Rajasthan's strong economic performance during the 80's and the early 90's reflected well in Dholpur.

54. During the last century, Dholpur remained industrially backward. It mainly depended on agriculture and few cottage industries. Quarrying of building stone was the only activity which provided employment to the comparatively large section of the population. Baroli, Bari, Baseri, Sirmathura were important place where building and millstone were quarried. These quarries have been famous for quality stone and have been worked on for several centuries. Industrial activity in recent year has declined and may spurt pursuant to urbanization along the NH-3 and improved links to other industrial regions of the state.

55. In and around the Dholpur city area, there are about 80% of lands used for agricultural purpose. Crop production statistics as depicted in Table 3.11 indicates double the total crop production during Rabi season in compare to Kharif season and that basically due to oilseed production during Rabi season.

Table 3.11: Crop production in around Dholpur

Type of Crops	Under Rabi Crops 2003-04 (Prod in Tonnes)	Under Kharif Crops 2003-04 (Prod in Tonnes)
Cereals	157133	121431
Pulses	3414	704
Food Grains	160547	122135
Oilseeds	86148	978
Others	2347	4571
Total	249042	127684

(Source: Vital Agricultural Statistics 2004-05, Directorate of Agriculture, Rajasthan)

3. Infrastructure

56. Water supply: Water supply to Dholpur is from two different sources; one source groundwater sources[2] comprising tube well and open wells and other one is surface water from perennial River Chambal. Groundwater is tapped through open wells (8 nos.) and tube-wells (14 nos.).There are no records available for the quantum of ground water supplied to the town. In the case of surface based source, raw water is presently pumped from River Chambal through an intake well constructed 30 years back. Raw water is then treated at an old filter plant of capacity 5.4 MLD is at PHED campus and a newly constructed filter plant of capacity 9.6 MLD is at Sagarpada. Treated water is being supplied through 7.0 nos of overhead service reservoirs (OHSR) to the residents. The present supply of the city is reported as 100 lpcd. Average Ground water table depth is 20.0 m.

57. Sewerage System: There is no underground sewage system in Dholpur City at present. Only few households have covered with individual septic tanks. The disposal of

[2] Groundwater is tapped for both drinking water supply and irrigation purposes by means of dug wells, tube-wells and dug-cum-bore (DCB) wells. As extraction of groundwater is still unregulated in the State, there is no record of groundwater distribution for private drinking water supply and irrigation. The Central Ground Water Board (CGWB), Western Region, indicates that agricultural water use of ground water accounts for more than 80 percent of the total water use in Dholpur.

waste and effluent of septic tank is through the open drains. Presently the open drains, which have been constructed by Municipal Board, convey the sullage and sewage which is leading to unhygienic and unsanitary conditions. As reported by the Dholpur MC, there is 13,000 nos. individual disposal systems covering 65,000 population & 1000 nos. of septic tanks covering 5000 population. Besides individual disposal systems, 20 nos. seats exists as Public Convenience systems (Sulabh Sauchalaya) covering 500 population.

58. Sanitation: Only 50% of the households reportedly have septic tanks and soak well for sewerage disposal. The remaining accounted households resort to open defecation which is an unacceptable and unhygienic practice. The raw settled sewage from septic tank is periodically flushed out by sanitary workers of the Municipal Board and discharge to open spaces, agricultural lands in an indiscriminate manner. Slum areas were also not equipped with requisite sanitation (LCS etc.) resulting in open defecation.

59. Drainage: Presently the road in Dholpur city is equipped with open drains, but most of the drains are silted resulting in overflow and resulting flooding in monsoon. As reported by DMB, the total length of drains is approximately 20 Km. An efficient network of storm water drains and outfall system is required to drain out storm water runoff. When the rainfall is maximum, main area like Jagan Chourah, Santer road and Gadapura are significantly inundated. The DMB has already reportedly conducted a survey of the entire city to prepare a drainage scheme through local agency in 2004. The general elevation of Dholpur is approximately 502 m above Mean Sea Level and the overall topography is from East to West direction of the City. There is no existence of major drain for catchment area of the City.

60. Industrial Effluents. Small industries exists in under RIICO, which is out side the city area and small amount of effluent disposed scattered in local nallahs. As reported by the local MC, the responsibility of effluent disposal is under RIICO's own and could not be connected to the proposed sewer network. The individual industry are required to treat their effluent to bring it to the required standard before final disposal.

61. Solid Waste: Dholpur generates 39 tons (approximately) of solid waste daily in 2007 and waste collected per day is only 19 tons (approximately). Major source of generation of waste in Dholpur town is Domestic. In addition to household (domestic) solid waste, the main waste generation sources in the town are vegetable and fruit markets, commercial including hotels and eateries, construction activities, and other tourism related activities – Dholpur attracts some number of tourists. Solid waste management activity of Dholpur Municipal Council (MC) are as under,

- 19 nos. of dustbin of 3.0 cum. Capacity each in city area
- There is no house-to-house waste collection system
- Individual households deposit their waste in dust bins / open collection points.
- Commercial and institutional establishments deposit waste at open collection points for further collection and transportation by Dholpur MC.
- Ad-hoc disorganized collection system is seen working for collection of solid waste.
- Street Sweeping

- Dholpur MC carries out street sweeping on a regular basis with frequency varying from daily to weekly/fortnightly. In total road network of 220 Km, only 126 nos. sweepers are engaged
- Fifty Wheel barrows are provided to sweepers to collect sweeping waste.
- Use of short-handled brooms to sweep the streets – waste collected is transported to the nearest dust bins or open collection points for further transportation.
- Beat length allotted to each sweeper varies from 1000 m to 1500 m depending on the population density

62. The street sweeper sweep roads and dumped the waste at different points. The Dholpur MC carries out the waste from the open collection point to dust bin by wheel borrows and the dustbin lifted to the dumper placer and transported to the existing dumping site. Sometimes, the tractor directly carries out the waste from town to disposal point. The waste dumping area along Chambal Ravine and low lying area which is 3.00 km away from the city.

63. Transportation Road Network: Dholpur comprises a road network of 175 km, consisting of 40 km concrete roads, 8 km bituminous roads, and 64 km of water bound macadam roads and earthen road of 63 Km. and 45.5 km of BT road under PWD provides a road surface composition in Dholpur. Physical growth of the city has resulted in a corresponding increase in vehicular traffic greater than that of the city's population growth due to improving economic status of the city. The existing transport network in Dholpur is,

- The road network within town is maintained by Dholpur MB and the PWD
- PWD maintain approximately a total length of 45.50 Km comprising of NH-3 Agra-Gwalior road, Dholpur- Karoli road and SH-5 Gulabbag to Bharatpur road.
- Dholpur MB maintaining 175 Km of road including Kachha road also
- In case of availability of public surface transport system, regular buses ply between Agra, Gwalior, and other major cities like Bharatpur, Alwar, Jaipur etc.
- The present system of traffic management and control at intersections is mostly manual.
- The traffic and transportation system is inadequate and requires significant strengthening and improvement

D. Social and Cultural Resources

1. Demography

64. According to Census 2001, the population of Dholpur Urban Agglomeration is 97,795 and spreads over Dholpur Municipal Council (organized into 37 wards, 35 nos. M & 2 nos OG).The total spread of the Urban Agglomeration is approximately 32.03 sq. km. The UA supports an average density of 3,053 persons per sq. km. While the UA witnessed a high growth between 1981 and 2001 on account of induced industrial development, the growth rate fell substantially during the last decade i.e. 1991-2001, primarily because of the failure of the single most important commercial growth along Bari road and Agra road. Table 3.12

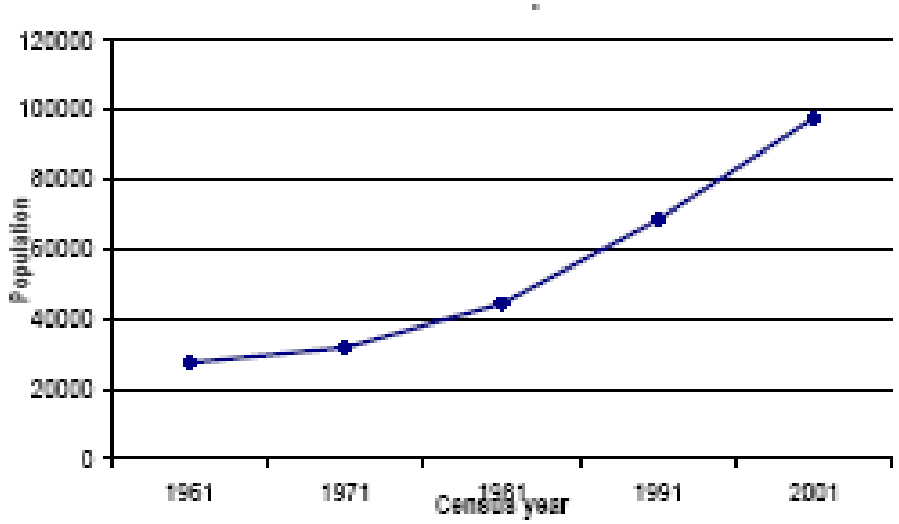
indicates the demographic characteristics for the UA. There are two nos of OG (Tagawali rural and Purani Chhawni) exists in the adjacent of MC area and are considered in the planning.

Table 3.12: Population Growth in Dholpur town

Year	Population *Dholpur Town*	Growth Rate *(%)*	Area *Sq. Km*	Density *Persons / sq. km*
1901	13310			
1911	19922	3.17		
1921	16206	-18.65		
1931	19586	20.86		
1941	21311	8.81		
1951	20651	-3.10		
1961	27412	32.74	-	-
1971	31865	16.24	-	-
1981	44375	39.26	32.03	1385
1991	68533	54.44	32.03	2140
2001	97795	42.70	32.03	3053

Source: Census of India, 2001.

Figure 3.11: Growth trend of Dholpur



65. Occupational structure of Dholpur urban area is given in Table 3.13.

Table 3.13: Occupation Structure in Dholpur UA

S.No.	Category of Business	Working Population as per 1991 census	
1.	Agriculture, agriculture labour, Forestry, mining and allied works	2746	16.42
2.	Industries and cottage industries	3137	18.75
3.	Construction	896	5.36
4.	Business & Trading	2767	16.54
5.	Transport	1206	7.21
6.	Others	5975	35.72

S.No.	Category of Business	Working Population as per 1991 census	
	Total	**16727**	**100.00**

Source: Dholpur Master plan

66. Overall literacy rate in Dholpur district is 60.77%, reported at 75.85% for males and 42.36% for females, which is slightly better than literacy in the state as a whole, which is 60.4% overall, and 75.7% for males and 44.0% for females. In Dholpur town, overall literacy rate is 70.80% of which male 80.51% and female 59.65%.

67. The sex ratio is however significantly below the natural 1:1 ratio; being 827 females per 1000 males, lower than both the state and national averages (921 and 929 respectively).

68. According to the census, in 2001 only 25-30% of the population was in paid employment, significantly lower than both the state and national averages (42.1% and 39.1% respectively). This indicates that most of the townspeople are engaged in the informal sector, earning a living where they can, from small trading, casual labour, etc.

2. Health and educational facilities

69. There are good educational facilities in Dholpur district, which serve both townspeople and inhabitants of surrounding villages and towns in the hinterland. There are 848 primary schools, 169 secondary schools and 57 higher secondary schools, plus four general degree colleges and three industrial training institutes (ITI).

Table 3.14: Educational facility of Dholpur District

Primary School	848
Upper Primary School	561
Secondary School	169
Senior Secondary School	57
Siksha Karmi Vidyalaya	83
Madarasa	32
College	4 (One Govt.)
I.T.I.	3
D.I.E.T.	1
Sanskrit College	1

(Official website Govt. of Rajasthan)

70. As the district headquarters town, Dholpur is the main centre for health facilities in the area and there is a district general hospital, 1 CHC, 22 primary health centers in the district. The detail of the health facilities given in Table 3.15.

Table 3.15: Health facility Dholpur District

General Hospital	1
CHC	3
PHC	22
Sub Centre	156
T.B. Clinic	1
Ayurvedic Hospital	1(A Category)
Ayurvedic Aushadhalya	52
Homoeopathic Hospital	1
Unani Hospital	1

(Official website Govt. of Rajasthan)

3. History, culture and tourism

71. According to the epics, Dholpur was initially known as Dhawalgiri. Sikandar Lodi (of the Delhi sultanate fame) conquered it in 1501. Babur subsequently conquered the city in 1526 and Dholpur was under Mughal rule. It is also believed that during Humayun's rule, the city was moved northwards to avoid erosion by river Chambal.

72. The main attractions in Dholpur are Talab Shahi and Muchkund Lake. This picturesque lake and the palace were built in the year 1617 AD as a shooting Lodge for Mughal Prince Shah Jahan. Muchkund is about 5.0 Km from Dholpur and is named after Raja Muchkund. It was also believed that the Mughal emperor Akbar built the enclosures adjoining the Lake.

73. Dholpur is a good tourist palace and located 55 km away from Agra and 60 km away from Gwalior and NH-3 connect the town to Agra and Gwalior. The tourist flow in the town is limited and still to be accounted.

Muchkund Lake at Dholpur

74. The Department of Tourism through Rajasthan Tourism Development Corporation and Rajasthan State Hotel Corporation Ltd (public sector entities) and Rajasthan Institute of Tourism and Travel Management (society) is responsible for tourism development in the State. The Archaeology Survey of India (ASI) and the State Department of Archaeology and Museums are responsible for conservation of cultural and heritage sites in the State. The Rajasthan Tourism Policy, 2005, provides the framework for tourism development and promotion in the State. The Rajasthan Heritage Conservation Bill, 2005, provides the framework for conservation of cultural and heritage sites in the State.

75. The Department of Tourism has identified that the attraction of Muchkund Lake is now become less due to non availability of water in the lake. During the discussion with the local people it was found that the pathway of water coming to the lake is almost closed due to silting activity and that should be cleared for the want of water during rainy season comes into the Lake, the water can fill the lake and the beautifulness of this lake can modified. The adjoining area to the lake is also required to be modified to increase the attraction to both domestic and foreign tourists.

IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: LOCATION AND DESIGN

76. ADB Environmental Assessment Guidelines require that an IEE should evaluate impacts due to the location, design, construction and operation of the project. Construction and operation are the two activities in which the project interacts physically with the environment, so they are the two activities during which the environmental impacts occur. In assessing the effects of these processes therefore, all potential impacts of the project are identified, and mitigation is devised for any negative impacts. This has been done in Sections IV and V above and no other impacts are expected.

77. In many environmental assessments there are certain effects that, although they will occur during either the construction or operation stage, should be considered as impacts primarily of the location or design of the project, as they would not occur if an alternative location or design was chosen. For example, if a groundwater aquifer was depleted by excessive abstraction this would be an impact of both the location and design, because groundwater may not be depleted if the design had used surface water to augment the supply, and the specific aquifer would not have been depleted if the wellfield was located elsewhere.

78. However in the case of this subproject, no considerable impacts that can clearly be said to result from either the design or location. This is because:

- Most of the individual elements of the subproject are relatively small and involve straightforward construction and operation, so impacts will be mainly localised and not greatly significant;

- Most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving trenching and other excavation. However the routine nature of the impacts means that most can be easily mitigated;

- In one of the major fields in which there could be significant impacts (archaeology), those impacts are clearly a result of the construction process rather than the project design or location, as they would not occur if this did not involve trenching or other ground disturbance.

IV. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: INFRASTRUCTURE CONSTRUCTION

A. Screening out areas of no significant impact

79. From the descriptions given in Section III, it is clear that implementation of the project will affect quite long tracts of land both inside and outside the town where the distribution main and network extensions will be constructed, and also a series of specific locations (eg. the WTP and storage reservoir sites), some of which are quite large (clear water reservoir).

80. However it is not expected that the construction work will cause major negative impacts. This is mainly because:

- Pipelines will be mainly located on unused ground alongside existing roads and can be constructed without causing major disruption to road users and adjacent houses, shops and other businesses;

- New facilities within and outside the town (WTP, clear water reservoir, ORs, etc) will be located on government-owned land that is not occupied or used for any other purpose;

- Most pipeline construction will be conducted by small teams working on short lengths at a time so most impacts will be localised and short in duration;

- The overall construction programme will be relatively short for a project of this nature, and is expected to be completed in 3 years.

81. As a result there are several aspects of the environment that 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 5.1, with an explanation of the reasoning in each case.

Table 5.1: Fields in which construction is not expected to have significant impacts

Field	Rationale
Climate	Short-term production of dust is the only effect on atmosphere
Geology and seismology	Excavation will not be large enough to affect these features
Fisheries & aquatic biology	No rivers or lakes will be affected by the construction work
Wildlife and rare or endangered species	There is no wildlife or rare or endangered species in the town or on the government owned areas outside the town on which facilities will be built
Coastal resources	Dholpur is not located in a coastal area
Population and communities	Construction will not affect population numbers, location or composition

82. These environmental factors have thus been screened out presently but will be assessed again before implementation of project.

83. Appendix 3 shows Rapid Environmental Impact Assessment checklist (REA) for the said sub-project.

B. Source and supply augmentation

1. Construction method

84. As explained above, augmentation of the water source and supply will involve construction of the following:

- 15 MLD additional WTP to cover requirement of next 15 years

2. Physical Resources

85. Excavation for WTP will generate waste soil and stone. There will therefore be quite large physical changes at the construction sites, and this quantity of waste could not be dumped without causing further physical impacts (on air quality, topography, soil quality,

etc) at the point of disposal. The work will probably be conducted in the dry season, so there is also a lot of potential for the creation of dust.

86. Action will therefore be needed to reduce physical impacts at both the construction and disposal sites, by controlling dust and reducing the amount of material to be dumped. The Contractor should therefore be required to:

- Contact the town authorities to find beneficial uses for as much waste material as possible, in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas, such as brickworks;

- Prevent the generation of dust (which could affect surrounding agricultural land and crops) by removing waste material as soon as it is excavated (by loading directly onto trucks), and covering with tarpaulins to prevent dust during transportation.

87. 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 case, given the low rainfall and deep water table (>20 m) in this area, and the fact that the Contractor will almost certainly plan excavation work to avoid the monsoon season.

3. Ecological Resources

88. There are no protected areas or locations of any ecological interest at or near any of the sites affected by these works, so it is unlikely that the construction process will have any ecological impacts. The only concern would be if trees were removed unnecessarily. To avoid this, the Contractor should be required to plant and maintain three new trees for every one that is removed.

4. Economic Development

89. The WTP will be located on government owned land, so there should be no need to acquire land from private owners, which might affect the income and assets of owners and tenants. There should also be no effects on other features with economic implications (such as infrastructure, industry and commerce), as there are none of these facilities on these sites.

90. There could however be significant disruption of traffic, business and other activities, if trucks carrying waste material were allowed to enter Dholpur town or other built-up areas. The transportation of waste will be implemented by the Contractor in liaison with the town authorities, and the following additional precautions should thus be adopted to avoid these impacts:

- Planning transportation routes so that heavy vehicles do not enter Dholpur Town or other built-up areas and do not use narrow local roads, except near delivery sites;

- Scheduling the transportation of waste to avoid peak traffic periods.

5. Social and Cultural Resources

91. Rajasthan is an area with a rich and varied cultural heritage that includes many 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 could uncover and damage archaeological and historical remains. Given that the locations proposed for these facilities are uninhabited and show no obvious signs of having been used to any extent in the past, then it could be that there is a low risk of such impacts at these sites. Nevertheless this should be ascertained by consulting the appropriate authorities, and appropriate steps should be taken according to the nature of the risk. This should involve:

- Consulting historical and archaeological authorities at both national and state level to obtain an expert assessment of the archaeological potential of all proposed sites;

- Selecting alternative sites for any work proposed in areas of medium or high risk;

- Including 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 to the project;

- Developing a protocol for use by the Contractor in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. This should involve:

    - Having excavation observed by a person with archaeological field training;

    - Stopping work immediately to allow further investigation if any finds are suspected;

    - Calling in the state archaeological authority if a find is suspected, and taking any action they require ensuring its removal or protection in situ.

92. There are no modern-day social and cultural resources (such as schools and hospitals) on or near these sites, and no areas that are used for religious or other purposes, so there is no risk of other impacts on such community assets.

93. Finally, there could be some short-term socio-economic benefits from the construction work if local people are able to gain employment in the construction workforce. To ensure that such gains are directed towards communities most directly affected by this part of the scheme, the Contractor should be required to employ at least 50% of this labour force from communities within a radius of say 2 km from each site, if sufficient people are available.

C. Network improvement

1. Construction method

94. Expansion of the distribution network will involve construction of:

- Laying of 19.90 km of new pipe line of different diameter as raising main/transmission mains

- Laying of 28.150 km distribution mains

- Construction of 3 nos. overhead reservoirs
- 2 New R. C. C. clear water reservoirs
- Establishing 3 nos. chlorination plant

95. Reduction of non-revenue water will involve:

- Replacement of approx. 20 km of old leakage pipeline
- Replacement of pumps in the existing pump house
- Installation of bulk flow meters at each storage reservoir and pump station;
- Procurement and installation of 12700 new household meters and rehabilitation of 2800 nos. existing meters

96. These all involve the same type of construction and will produce similar effects on the environment, so their impacts are considered together.

97. It is expected that the distribution/raising mains will be buried in trenches adjacent to roads, in the un-used area within the ROW, at the edge of the tarmac. However the distribution mains will be located in roads and streets in the town, where in some places this area is occupied by drains or the edges of shops and houses etc, so to avoid damage to property some trenches may be dug into the edge of the road.

98. Trenches will be dug using a backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed alongside, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by hand or using a small rig for the larger DI pipes. Pipes will be joined by hand, after which sand from local quarries will be shovelled into the trench beneath and around the pipe for support and protection. Soil will then be replaced manually on top of the pipe and compacted by a vibrating compressor. Where trenches are dug into an existing roadway, the bitumen or concrete surface will be broken by hand-held pneumatic drills, after which the trench will be excavated by backhoe, and the appropriate surface will be reapplied on completion.

99. 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 be smaller for the distribution main (minimum of 1.4 m deep and 0.3 m wide). Old pipes will be replaced by new one after taken out old pipe by digging.

100. New pipes and connections to the distribution main will be provided to house connections, and these will run to individual dwellings in small hand-dug trenches, or on the surface. New consumer meters will be located outside houses, attached to a wall or set onto the ground. In slum areas, water will be provided via community taps from where people can collect their water.

101. Two clear water surface and three overhead reservoirs will be built on government land at Sagarpada and other location in the town. The cavity for the ground reservoirs (GR) and foundations for the overhead reservoirs (OR) will be excavated by backhoe, with soil being loaded onto trucks for disposal. Aggregate and concrete will be tipped into each void to create the foundations and floor, after which metal reinforcing rods will be added to create the outline of the walls of the GR and the vertical supporting pillars of the OR. Sections of reinforcing will then be encased in wooden shuttering and concrete will be poured in, and

this process will be repeated to gradually create each structure from RCC, including the tank of the OR and the above-ground portion of the GR. Surfaces will be smoothed and finished where necessary by hand.

102. Small brick rooms will be built alongside WTP, EE campus and Bari-Saipau road to house the chlorination plant. The foundation will be dug and aggregate and concrete poured in to create the floors, after which the brick walls and roof materials will be added by hand. Chlorine cylinders and other equipment (including flow-meters) will be brought in on trucks and offloaded and attached by hand. A small cavity for the chlorination sump and trenches for pipe-work will also be dug, and the sump will constructed from concrete and brick.

2. Physical Resources

103. Although replacement of parts at the pump house should not have noticeable environmental effects, the remainder of this component involves some quite large-scale excavation, so physical impacts could be significant and will need to be mitigated.

104. This work is similar to the source augmentation component in that construction will involve quite extensive excavation, although in this case it will be spread over various locations, many of which are in the town, so the nature and significance of the impacts could be different.

105. If average trench dimension 1.45 x 0.85 m for the 19.90 km raising/ transmission mains, then trench construction will excavate around 24,526 m^3 of material. After construction, approximately 14% of the trench will be occupied by the pipe, 20% by backfilled sand, and 66% by excavated soil replaced on top and side of the pipe. This means that around 4,905 m^3 of sand will be brought to site, 16,187 m^3 of soil will be retained for replacement in the trench, and 8,339 m^3 of waste material will be left over.

106. If average trench dimension 1.25 x 0.6 m for the 28.15 km distribution mains, then trench construction will excavate around 21,112 m^3 of material. After construction, approximately 7% of the trench will be occupied by the pipe, 15% by backfilled sand, and 78% by excavated soil replaced on top and side of the pipe. This means that around 3,167 m^3 of sand will be brought to site, 16,467 m^3 of soil will be retained for replacement in the trench, and 4645 m^3 of waste material will be left over.

107. Additional smaller quantities of waste will be produced by the other excavation work, in particular the ground storage reservoirs. This is less material than produced by excavation of the WTP but it adds a further to the total waste produced by this subproject, and in this case the impact of dust will be more significant because much of the work will be conducted in inhabited areas. It will thus be very important to limit physical impacts by finding beneficial uses for waste material as recommended above, and to apply additional precautions to limit the production and spread of dust. The Contractor should therefore be required to:

- Contact the town authorities to find beneficial uses for waste material, in construction projects, to raise the level of land prior to construction of roads or buildings, or to fill previously excavated areas, such as brickworks;
- Prevent the generation of dust by removing waste soil as soon as it is excavated;
- Plan the work carefully so that sand is only brought to site when it is needed;

- Cover or damp down sand and soil retained on site to reduce dust in windy weather;

- Use tarpaulins to cover loose material during transportation to and from the site.

108. The other important physical impact associated with excavation (effects on surface and groundwater drainage) should again be negated by the low rainfall and very low water table in this area, and the fact that the Contractor will almost certainly conduct the excavation work in the dry season.

109. Physical impacts will also be reduced by the method of working, whereby the network will probably be constructed by small teams working on short lengths at a time, so that impacts will be mainly localised and short in duration. Physical impacts are also mainly temporary as trenches will be refilled and compacted after pipes are installed, and any disturbed road surfaces will be repaired. Because of these factors and the mitigation measures proposed above, impacts on the physical environment are not expected to be of major significance.

3. Ecological Resources

110. There are no significant ecological resources in the town (protected areas or rare or important species or habitats), so the network improvements should have no ecological impacts. Roadside trees should not be removed unnecessarily to build the trenches, and to mitigate any such losses the Contractor should be required to plant and maintain three new trees (of the same species) for each one that is removed.

4. Economic Development

111. Most of this work will be conducted on government owned land in the ROW of roads, where there is no need to acquire land from private owners. It may be necessary however to acquire small amounts of land in places along the transmission main route to avoid bends along the road and allow the pipeline to follow a more direct path. If this is the case, the government will purchase land through the mechanism of the Land Acquisition Act (1894), where prices are established on the basis of recent transactions. ADB policy on Involuntary Resettlement requires that the owners and users of acquired land do not suffer economically as a result of the project, and a separate Resettlement Plan and Resettlement Framework have been prepared to examine these and related issues. This establishes that no more than 10% of the land of any owner or occupant should be acquired, and that in addition to the price of the land, farmers should be compensated for any standing crops or trees they lose.

112. Although most of the work will not require land acquisition, it could still have economic impacts, if the presence of trenches, excavated material, workers and machinery discourage customers from visiting shops and businesses, which lose income as a result. These losses should be short in duration as most of the pipeline work should last for only a few days at any one site. Nevertheless the loss of income could still be significant for small traders and other businesses that exist on low profit margins. These impacts should therefore be mitigated by:

- Compensating shopkeepers and other affected businesses for lost income;

- Leaving spaces for access between mounds of excavated soil, and providing footbridges so that pedestrians can cross open trenches;

- Increasing the workforce in these areas to ensure that work is completed quickly;

- Consulting affected businesspeople and informing them in advance when work will occur.

113. Excavation work could damage existing infrastructure located alongside roads, such as storm drains where present, and the sewer network inside the fort area. 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 citizens (see below). It will be important therefore to avoid these impacts by:

- Obtaining details from the Municipal Board of the nature and location of all infrastructure, and planning pipeline routes (in and outside the town) to avoid any conflict;

- Integrating construction of the various Dholpur subprojects (in particular water supply and sewerage) so that:

  - Different infrastructure is located on opposite sides of the road where feasible;

  - Roads and inhabitants are not subject to repeated disturbance by trenching in the same area at different times for different purposes.

114. Transport is another type of infrastructure that will be affected by some of the work, particularly construction of pipelines in the narrower streets where there is not enough space for excavated soil to be piled off the road. The road itself may also be excavated in places where there is no available land to locate pipelines alongside. Traffic will therefore be disrupted, and in some very narrow streets the whole road may need to be closed for short periods. The Contractor should therefore plan this work in conjunction with the town authorities and the police force, so that work can be carried out during periods when traffic is known to be lighter, and alternative routes and diversions can be provided where necessary. The Contractor should also increase the workforce in areas such as this, so that the work is completed in the shortest possible time.

115. It is inevitable that there will be an increase in the number of heavy vehicles in the town (particularly trucks removing waste material for disposal), and this could disrupt traffic and other activities, as well as damage fragile buildings if vibration is excessive. These impacts will therefore need to be mitigated by:

- Careful planning of transportation routes with the municipal authorities to avoid sensitive areas as far as possible, including narrow streets, congested roads, important or fragile buildings and key sites of religious, cultural or tourism importance;

- Scheduling the transportation of waste to avoid peak traffic periods, the main tourism season, and other important times.

5. Social and Cultural Resources

116. As was the case for the source and supply augmentation works, there is a significant risk that the network improvements, which involve further extensive disturbance of the ground surface, could damage undiscovered remains, or even unknown sites. The risks are

in fact very much higher in this case, as most of the work will be conducted in Dholpur town, which has been inhabited for a long period, and where there is therefore a greater risk of artefacts being discovered. The preventative measures described in Section V will thus need to be employed and strictly enforced. These are:

- Consulting national and state historical and archaeological authorities to assess the archaeological potential of all construction sites;
- Selecting alternative routes or sites to avoid any areas of medium or high risk;
- Including state and local archaeological, cultural and historical authorities and interest groups as project stakeholders to benefit from their expertise;
- Developing a protocol for use in conducting all excavation, to recognize, protect and conserve any chance finds (see Section IV.B.5 for details).

117. The network improvements will also disturb some more modern-day social and cultural resources, such as schools, hospitals, temples, and also sites that are of tourism importance. Impacts could include noise, dust, and interrupted access for pedestrians and vehicles, and if pneumatic drills are used to break the surface of roads, there could be a risk of damage from vibration. Given the historical importance of Dholpur and any such damage or disruption could be highly significant, so very careful mitigation will be needed to protect these resources and to enable usage by local people and visitors to continue throughout the construction work. This will be achieved through several of the measures recommended above, including:

- Consulting 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;
- Limiting dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering soil and sand when carried on trucks;
- Increasing the workforce in sensitive areas to complete the work quickly;
- Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required (including access to houses);
- Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensuring they are maintained to manufacturers' specifications.

118. In addition the Executing Agency and Contractor should:

- Consult municipal authorities, custodians of important buildings, cultural and tourism authorities, and affected communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

119. A different but no less significant impact is the effect on people and communities if water supplies are closed down for extended periods when work is conducted on the network. This would be inconvenient in the short term, and there could be health risks if the water supply was unavailable for several successive days or longer. It will therefore be important to take the necessary measures to avoid such a situation. This will require:

- Detailed planning of the construction program to keep the cessation of water supplies to the minimum possible (in both area and duration);
- Provision of alternative potable water to affected households and businesses for the duration of the shut-down;
- Liaison with affected persons to inform them of any cessation in advance, and to ensure that they are provided with an alternative supply.

120. There is invariably a safety risk when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to produce and implement a site Health and Safety Plan, and this should include such measures as:

- Excluding the public from the site;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment;
- Health and Safety Training for all site personnel;
- Documented procedures to be followed for all site activities;
- Accident reports and records; etc.

121. An additional, particularly acute health risk presented by this work derives from the fact that, as mentioned above, 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:

- 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;
- The locations of the new network will be planned to avoid all locations of existing AC pipes so AC pipes should also not be discovered accidentally.

122. Given the dangerous nature of this material for both workers and citizens, one additional measure should be taken to protect the health of all parties in the event (however unlikely) that AC pipes are encountered. This is that, during design of the water supply system, 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)[3], and amongst other things, should involve:

[3] 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

- Training of all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ;

- Reporting procedures to inform management immediately if AC pipes are encountered;

- Development and application of a detailed H&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include:

    - Removal of all persons to a safe distance;

    - Usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material;

    - Procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.

123. There could again be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to communities that are affected by the work, as suggested in Section V.B.5, the Contractor should be required to employ at least 50% of his labour force from communities in the vicinity of construction sites. Creating a workforce from mainly local people will bring additional benefits by avoiding problems that can occur if workers are imported; including social difficulties in the host community and issues of health and sanitation in poorly serviced temporary camps.

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES: OPERATION AND MAINTENANCE

A. Screening out areas of no significant impact

124. Because a water supply system should operate without the need for major repair and maintenance (see below), there are several environmental factors which should be unaffected by this system once it begins to function. These are identified in Table 6.1 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 6.1: Fields in which operation and maintenance of the completed water supply system is not expected to have significant impacts

Field	Rationale
Climate	Extraction and use of water from river will not affect climate
Fisheries & aquatic biology	Intake of water do not support a significant aquatic flora or fauna
Wildlife, forests, rare species, protected areas	There are none of these features in or outside the town
Coastal resources	Dholpur is not located in a coastal area
Industries	The water supplied by the new system will not be for industrial use

B. Operation and maintenance of the improved water supply system

125. The new source augmentation works should operate with little maintenance beyond routine actions required to keep the pumps and other equipment in working order at the WR. This will be straightforward, involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts, etc. A small number of men will be employed to operate and maintain the WR site.

126. The main requirement for maintenance of the transmission main and distribution system will be for the detection and repair of leaks. The generally flat topography and the usage of good quality DI and MDPE/UPVC pipes should mean that pipeline breaks are very rare, and that leaks are mainly limited to joints between pipes. The repair of household connections and the provision of new connections to slums and developing areas to increase the number of people supplied should reduce the incidence of illegal connections, which are often a major source of leaks.

127. The bulk meters installed at storage reservoirs and pumping stations will allow amounts of water flowing through individual parts of the network to be monitored, which will pinpoint areas where there are leaks, and/or where water is being taken from the system illegally. A small Leak Detection Team will then visit these areas with audio devices to locate individual leaks, which will then be repaired in essentially the same way that the pipes were installed. Trenches will be dug to reveal the leaking area and the faulty connection will be re-fitted, or the pipe will be removed and replaced if necessary. If illegal connections are found these will be removed and the pipe will be re-sealed, or a new connection with a meter will be provided for the household.

128. There will also be some small scale maintenance required at the new OR and CWGR sites, which will involve the same sort of checking of pumps and other equipment as conducted at the WR, plus the regular replenishment of chlorination cylinders to maintain water treatment. Two or three men will be employed at each site for this purpose.

129. Proper disposal of solid sludge, chlorine cylinder from water treatment plan are most important

C. Environmental impacts and benefits of the operating system

1. Physical Resources

130. If trenches are dug to locate and repair leaks or remove and replace lengths of pipe or illegal connections, the work will follow the same procedure as occurred when the infrastructure was improved. In this case soil and backfilled sand will be removed to expose the leaking junction or pipe, and if necessary a new pipe will be brought to site and replaced. The trench will then be refilled and re-compacted. This work should be very infrequent, and will affect individual small locations for short periods only (an average of a few hours for most repairs). Physical impacts will therefore be negligible. Work will not be conducted during rainfall so there will be no effect on drainage, and the removed material will be replaced in the trench so there will be no waste. There should also be no need to cover excavated material to prevent dust as it will have been wetted by the leaking water.

131. One of the main risks of improving a water supply system through increased abstraction is that the source will be used unsustainably, at a rate that is above the level of natural replenishment, and that the source becomes depleted as a result. That should not be an issue in this case as the water will be extracted from river. There is downstream abstraction and some water is used by local farmers, this requires only a proportion of the volume available, and the Irrigation Department has granted approval for the abstraction for the municipal supply. It should also be noted that water conservation measures included in

the subproject (in particular the replacement of leaking distribution mains and faulty house connections) should significantly reduce system losses, and thus limit the volume needed.

2. Ecological Resources

132. There are no significant ecological resources in or around 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 Chambal River, there should also not be any ecological impacts from the increase in abstraction.

3. Economic Development

133. Although network repairs could result in shops losing some business, if the work will reduce the access to shops making it difficult for customers. However any loss on this account 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 simple steps should be taken to reduce the inconvenience of the works, including:

- Informing all residents and businesses about the nature and duration of any work well in advance so that they can make preparations if necessary;
- Requiring contractors employed to conduct these works to provide wooden walkways across trenches for pedestrians and metal sheets where vehicle access is required;
- Consulting 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 organized if necessary.

134. The provision of an improved and expanded water supply system is not expected to have direct economic benefits for business or industry, as connections will only be provided to domestic users. However businesses will almost certainly benefit from the expected improvement in the health and wellbeing of their workforce (see below) as this should result in fewer days lost through illness, and overall increased productivity.

4. Social and Cultural Resources

135. Although there is a high 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 made when the infrastructure was installed.

136. Repair work 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. These include:

- Consulting 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;
- Completing work in these areas quickly;

- Providing wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required;

- Consulting 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.

137. The responsible authorities will employ local contractors to conduct network repairs, and contractors should be required to operate the same kinds of Health and Safety procedures as used in the construction phase (see Section V.C.5) to protect workers and the public. This should include application of the asbestos protocol if any AC pipes are encountered, and prohibition of the use of AC pipes for any repair or maintenance work.

138. 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 workforce. To provide at least some economic benefits to affected communities, persons employed to maintain the WTP, ORs and CWR should be residents of the neighboring areas.

139. The citizens of the town will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better quality water, piped into their homes. This should improve the social lifestyle in the city, and 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.

VII. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

A. Summary of environmental impacts and mitigation measures

140. Table 7.1 lists the potential adverse impacts of the Dholpur water supply subproject as identified and discussed in Sections IV, V and VI, and the mitigation proposed to reduce these impacts to acceptable levels. The table also shows how the mitigation will be implemented, who will be responsible, and where and when the mitigation activities will take place. The mitigation programme is shown as the quarter of each year in which each activity will occur, which relates to the project programme described in Section II.B. The final column assesses whether the proposed action will successfully mitigate the impact (shown as 0), and indicates that some of the measures will provide an additional benefit (shown as +).

B. Institutional arrangements for project implementation

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

- LSGD is the Executing Agency (EA) responsible for management, coordination and execution of all activities funded under the loan.

- The Implementing Agency (IA) is the Project Management Unit of the ongoing RUIDP, which will be expanded to include a broader range of skills and representation from the Urban Local Bodies (ULB, the local government in each town). Assigned as the RUSDIP Investment Program Management

Unit (IPMU), this body will coordinate construction of subprojects across all towns, and ensure consistency of approach and performance.

- The IPMU will be assisted by Investment Program Management Consultants (IPMC) who will manage the program and assure technical quality of design and construction; and Design and Supervision Consultants (DSC), who will design the infrastructure, manage tendering of Contractors and supervise the construction process.

- Investment Program Implementation Units (IPIU) will be established in seven zones across the State to manage implementation of subprojects in their area. IPIUs will be staffed by professionals seconded from government departments (PHED, PWD), ULBs, and other agencies, and will be assisted by consultants from the IPMC and DSC as necessary.

- The IPMU will appoint Construction Contractors (CC) to build elements of the infrastructure in a particular town. The CCs will be managed by the IPIU, and construction will be supervised by the DSC.

- LSGD will be assisted by an inter-ministerial Empowered Committee (EC), to provide policy guidance and coordination across all towns and subprojects. The EC will be chaired by the Minister of Urban Development and LSG, and members will include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments.

- City Level Committees (CLCs) have also been established in each town, chaired by the District Collector, with members including officials of the ULB, local representatives of state government agencies, the IPIU, and local NGOs and CBOs. The CLCs will monitor project implementation in the town and provide recommendations to the IPIU where necessary.

142. Figure 7.1 shows institutional responsibility for implementation of environmental safeguard at different level.

Figure 7.1: Institutional Responsibility- RUSDIP

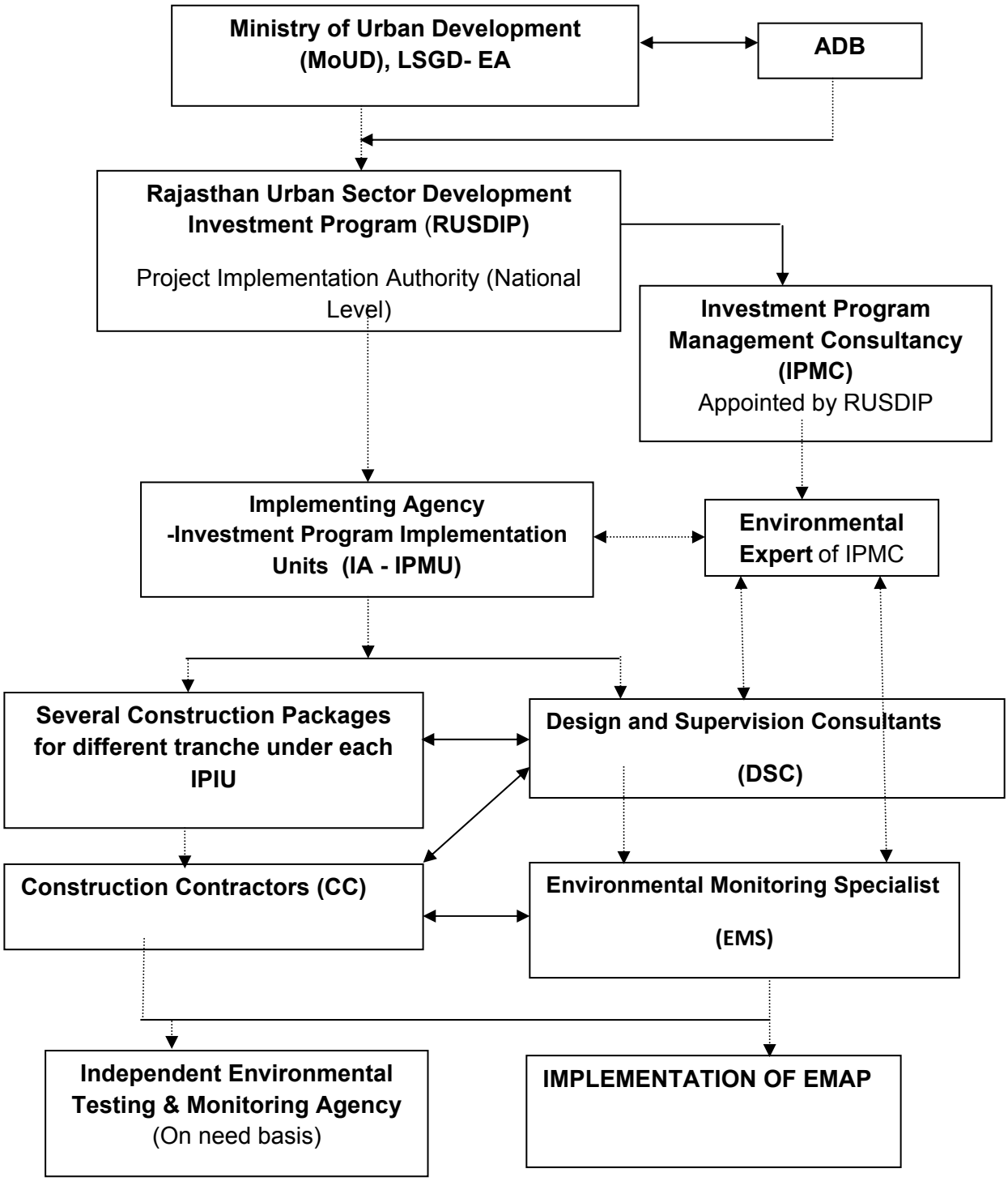


Table 7.1: Environmental impacts and mitigation for the Dholpur Water Supply Subproject (Black = continuous activity; Grey = intermittent)

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	2008		2009					[4]
Construction: Source Augmentation Works						**D**	**D**	**3**	**4**	**1**	**2**	**3**	**Op**	
Excavation of WTP and CWR will produce large amounts of waste soil	M	P	Find beneficial uses for waste soil in construction, land raising and infilling of excavated areas	Contractor	All sites									+
Waste soil could create dust in windy weather	M	T	Remove waste soil as soon as it is excavated	Contractor	All sites									*0*
			Use tarpaulins to cover dry soil when carried on trucks											*0*
Trees may be removed at construction site	M	P	Plant and maintain three trees for every one removed	Contractor	All sites									0
Traffic and activities may be disrupted by trucks carrying waste soil	M	T	Plan routes to avoid Dholpur Town and narrow roads	Contractor	From CWR site									0
			Schedule transportation to avoid peak traffic periods											0
Ground disturbance could damage archaeological and historical remains	S	P	Request state and local archaeological authorities to assess archaeological potential of all work sites	DSC	All sites									0
			Select alternatives if sites have medium-high potential	DSC										0
			Include state and town historical authorities as project stakeholders to benefit from their expertise	LSGD										0
			Develop and apply protocol to protect chance finds (excavation observed by archaeologist; stop work if finds are suspected; state authority to plan appropriate action)	DSC and Contractor										+
Economic benefits if local people are employed in Contractor's workforce	M	T	Contractor should employ at least 50% of workforce from communities in vicinity of work sites	Contractor	All sites									+
Construction: Network Improvements						**D**	**D**	**3**	**4**	**1**	**2**	**3**	**Op**	[5]
Trenching will produce additional amounts of waste soil	M	P	As above: find beneficial uses in construction or infill	Contractor	All sites									+

Sig = Significance of Impact (NS = Not Significant; M = Moderately Significant; S = Significant). Dur = Duration of Impact (T = Temporary; P = Permanent)
D = Detailed Design period; Op = Period when infrastructure is operating
[4] This column shows impacts remaining after mitigation: 0 = zero impact (impact successfully mitigated); + = positive impact (mitigation provides a benefit)
* Mitigation of these impacts will be provided through a separate Resettlement Plan

Sig = Significance of Impact (NS = Not Significant; M = Moderately Significant; S = Significant). Dur = Duration of Impact (T = Temporary; P = Permanent)
D = Detailed Design period; Op = Period when infrastructure is operating
[5] This column shows impacts remaining after mitigation: 0 = zero impact (impact successfully mitigated); + = positive impact (mitigation provides a benefit)
* Mitigation of these impacts will be provided through a separate Resettlement Plan

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	2008				2009				
Construction: Source Augmentation Works						D	D	3	4	1	2	3	Op	[4]
Waste soil and imported sand may create dust	M	T	As above: remove waste quickly, cover/spray stockpiles	Contractor	Network sites									0
			Only bring sand (for backfill) to site when needed											0
			Cover soil and sand when transported on trucks											0
Trees may be removed along pipeline routes	M	P	As above: avoid removing trees, plant 3 for every 1 cut	Contractor	Network									0
Some farm land may need to be acquired where route of transmission main diverges from alongside main road	M	P	*Purchase land as described in Resettlement Framework	LSGD	Where necessary									0
			*Avoid taking >10% of the land of any owner or tenant	DSC										0
			* Compensate farmers in cash for loss of crops and trees	LSGD										0
Shops may lose income if customers' access is impeded	M	T	*Compensate businesses for lost income	LSGD	Network sites									0
			Leave spaces for access between mounds of soil	Contractor										0
			Provide bridges to allow people & vehicles to cross trench	Contractor										0
			Increase workforce in these areas to finish work quickly	Contractor										0
			Inform shopkeepers of work in advance	LSGD										0
Trenching could damage other infrastructure	S	P	Confirm location of infrastructure and avoid these sites	DSC	Network sites									0
			Locate water and sewer pipes on opposite sides of roads	DSC										0
Roads/people may be disturbed by repeated trenching Drilling using pneumatic tools and blasting will increase noise and air pollution	M	T	Integrate subprojects to conduct trenching at same time If drilling cannot be avoided, use high screens to ward of noise and dust	DSC/LGD	Network									0
Traffic will be disrupted if lack of space means that dug soil is placed on road and/or water pipes have to be located in the road itself	M	T	Plan work with town authorities – work when traffic is light	Contractor	Network sites									0
			Ensure police provide traffic diversions when necessary											0
			As above: increase workforce to finish this work quickly											0
Trucks removing waste could disrupt traffic and vibration could damage fragile buildings	M	T	Plan routes to avoid narrow streets, congested roads, important/fragile buildings, key religious & tourism sites	Contractor	Network sites									0
			Plan work to avoid peak traffic, main tourism season	Contractor	Network									0
Major risk that ground disturbance in town could damage archaeological and historical remains	S	P	As above: ask authorities to assess potential of all sites	DSC	All sites									0

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	2008				2009				
Construction: Source Augmentation Works						D	D	3	4	1	2	3	Op	[4]
			As above: alternative sites where risk is high/medium	DSC										0
			As above: include state/local authorities as stakeholders	LSGD										0
			As above: apply protocol to protect chance finds	DSC/CC										+
Sites of social/cultural importance (schools, hospitals, temples, tourism sites) may be disturbed by noise, dust, vibration and impeded access	M	T	Identify buildings at risk from vibration damage and avoid using pneumatic drills or heavy vehicles nearby	Contractor	Network sites									0
			As above: remove waste quickly, cover/spray stockpiles, import sand only when needed, cover soil/sand on trucks											0
			As above: increase workforce to finish work quickly											0
			As above: use bridges to allow access (people/vehicles)											0
			Use modern vehicles/machinery & maintain as specified	Contractor	All sites									0
			Consult relevant authorities, custodians of buildings, local people to address issues & avoid work at sensitive times	Contractor	Network sites									0
People will be inconvenienced and their health may be at risk if water supply system is shut down for long period	M	T	Plan work programme to keep shutdown to minimum	DSC	Network sites									0
			Provide alternative water to affected residents	LSGD										0
			Inform communities of any shutdown in advance	LSGD										0
Workers and the public are at risk from accidents on site	M	T	Prepare and implement a site Health and Safety Plan that includes measures to:	Contractor	All sites									0
			- Exclude the public from all construction sites;											0
			- Ensure that workers use Personal Protective Equipment											0
			- Provide Health & Safety Training (including process of transmission of HIV/AIDS) for all personnel;											0
			- Follow documented procedures for all site activities;											0
			- keep accident reports and records											0
Existing water supply system uses AC pipes, a material that can be carcinogenic if inhaled as dust particles	S	T	Design infrastructure to avoid known locations of AC pipes	DSC	All sites									0
			Train construction personnel in dangers of asbestos and how to recognise AC pipes in situ	Contractor	All sites									0

Potential Negative Impacts	Sig	Dur	Mitigation Activities and Method	Responsibility	Location	2008				2009				[4]
Construction: Source Augmentation Works						D	D	3	4	1	2	3	Op	
			Develop & apply protocol to protect workers and public if AC pipes are encountered. This should include:	DSC and Contractor	Network sites									0
			- immediate reporting of any occurrence to management	Contractor										0
			- removal of all persons to a safe distance											0
			- use of appropriate breathing apparatus and protective suits by workers delegated to deal with AC material											0
			- safe removal and long-term disposal of AC material											+
Economic benefits for people employed in workforce	S	T	As above: 50% of workforce from affected communities	Contractor	All sites									+
Operation and Maintenance														
Shops may lose small amounts of income if customers' access is impeded by network repair works	NS	T	As before: inform shopkeepers of work in advance	GA	Network sites									0
			As before: provide walkways and bridges for vehicles	OMC										0
			As before: request police to divert traffic if necessary	OMC										0
Sites of social/cultural importance may be disturbed by noise, dust, vibration, impeded access for short time during network repairs	NS	T	As before: avoid using drills/trucks near fragile buildings	OMC	Network sites									0
			As before: complete work quickly in sensitive areas	OMC										0
			As before: provide walkways/bridges for people/vehicles	OMC										0
			As before: consult authorities and communities, inform them of work in advance, avoid sensitive periods	GA										0
Health and safety of workers & the public could be at risk from repair work and AC pipes of old water supply system	S	T	Prepare and operate H&S Plan with same measures as used in construction phase	OMC	All sites									0
			Apply previously-developed protocol to protect all persons if AC pipes are encountered											0
Local people will benefit if employed by project	S	P	Workers employed to maintain WTP, ORs and CWGR should be residents of neighbouring communities	GA	All sites									+

OMC: Operation and maintenance contractor

143. Resettlement issues will be coordinated centrally by a Resettlement Specialist within the IPMU/ IPMC, who will ensure consistency of approach between towns. A local Resettlement Specialist will also be appointed to IPIUs of zones in which there are resettlement impacts and they will prepare and implement local Resettlement Plans following the framework established in Tranche 1.

144. Environmental issues will be coordinated by an Environmental Specialist within the IPMU/ IPMC, who will ensure that all subprojects comply with environmental safeguards. An Environmental Monitoring Specialist (EMS) who is part of the DSC team will implement the Environmental Monitoring Plan from each IEE (see below), to ensure that mitigation measures are provided and protect the environment as intended. Domestic Environmental Consultants (DEC) will be appointed by each IPIU to update the existing IEEs in the detailed design stage, and to prepare IEEs or EIAs for new subprojects, where required to comply with national law and/or ADB procedure.

C. Environmental Monitoring Plan

145. Table 7.1 shows that most mitigation activities are the responsibility of the Construction Contractors[6] (CC) employed to build the infrastructure during the construction stage or the O&M Contractors employed to conduct maintenance or repair work when the system is operating. Responsibility for the relevant measures will be assigned to the Contractors via the contracts through which they are appointed (prepared by the DSC during the detailed design stage), so they will be legally required to take the necessary action. There are also some actions that need to be taken by LSGD in their role as project proponent, and some actions related to the design that will be implemented by the DSC.

146. A program of monitoring will be conducted to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. This will be conducted by a qualified Environmental Monitoring Specialist (EMS) from the DSC. The EMS will be responsible for all monitoring activities and reporting the results and conclusions to the IPMU, and will recommend remedial action if measures are not being provided or are not protecting the environment effectively. The EMS may be assisted by environmental specialists in particular technical fields, and junior or medium-level engineers who can make many of the routine observations on site. Post-construction monitoring will be conducted by the relevant Government Agency (GA) to whom responsibility for the infrastructure will pass once it begins to operate7.

147. Table 7.1 shows that most of the mitigation measures are fairly standard methods of minimizing disturbance from building in urban areas (maintaining access, planning work to avoid sensitive times, finding uses for waste material, etc), and experienced Contractors should be familiar with most of the requirements. Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects. There will also be some surveys of residents, as most of the measures are aimed at preventing impacts on people and the human environment.

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[6] During implementation the contractor will submit monthly progress reports, which includes a section on EMP implementation to the IPIU. The IPIU will submit reports to the IPMU for review. The IPMU will review progress reports to ensure that the all mitigation measures are properly implemented. The IPMU will consolidate monthly reports and submit quarterly reports to ADB for review

[7] In the operational period some infrastructure will be the responsibility of the Municipal Boards/Councils, whilst others will be the responsibility of the appropriate branch of the State government (such as PWD, PHED, etc)

148. Table 7.1 shows the proposed Environmental Monitoring Plan (EMP) for this subproject, which specifies the various monitoring activities to be conducted during all phases. Some of the measures shown in Table 7.1 have been consolidated to avoid repetition, and there has been some re-ordering to present together those measures that relate to the same activity or site. The EMP describes: (i) mitigation measures, (ii) location, (iii) measurement method, (iv) frequency of monitoring and (v) responsibility (for both mitigation and monitoring). It does not show specific parameters to be measured because as indicated above, most measures will be checked by simple observation, by checking of records, or by interviews with residents or workers.

149. Given the scale of the investment in providing the infrastructure, LSGD will also wish to conduct monitoring during the operational period to confirm the long-term benefits of the scheme. Table 7.2 shows that this will cover two elements, which will monitor:

- The chemical and bacteriological quality of water provided by the municipal system;
- The health of the population and the prevalence of diseases of poor sanitation.

Table 7.2: Environmental Monitoring Plan

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
CONSTRUCTION					
Find beneficial uses for waste soil (construction, land raising, infill)	All sites	Contractor	Site observations; CC records	Monthly	EMS
Remove waste soil as soon as it is excavated	All sites	Contractor	Site observations	Weekly	EMS
Use tarpaulins to cover dry soil and sand when carried on trucks	All sites	Contractor	Observations on and off site	Weekly	EMS
Cover or damp down soil and sand stockpiled on site	Inhabited areas	Contractor	Site observations	Weekly	EMS
Only bring sand (for backfill) to site when needed	Inhabited areas	Contractor	Site observations; CC records	Weekly	EMS
Leave spaces for access between mounds of soil	Network sites	Contractor	Site observations	Weekly	EMS
Plan truck routes to avoid Dholpur Town, narrow or congested roads, important or fragile buildings, religious and tourist sites	All sites	Contractor	Observations off site; CC record	Weekly	EMS
Plan transport of waste to avoid peak traffic and tourist season	All sites	Contractor	Observations on and off site	Weekly	EMS
Plant and maintain three trees for every one removed	All sites	Contractor	Observations on/off site; CC records	Monthly	EMS
*Acquire land as described in Resettlement Framework	Where required	LSGD	Landowner surveys; LSGD record	As needed	IMA[8]
*Avoid taking >10% of the land of any owner or tenant	Where required	DSC	Owner/tenant surveys; DSC records	As needed	IMA
* Compensate farmers in cash for loss of crops and trees	Where required	LSGD	Farmer surveys; LSGD records	As needed	IMA
*Compensate businesses for lost income	Where required	LSGD	Shopkeeper survey; LSGD record	As needed	IMA
Provide bridges to allow people & vehicles to cross trench	Network sites	Contractor	Site observation; resident survey	Weekly	EMS
Increase workforce in inhabited areas to finish work quickly	Network sites	Contractor	Site observations; CC records	Monthly	EMS
Inform shopkeepers and residents of work in advance	Network sites	LSGD	Resident surveys; CC records	Monthly	EMS
Consult town authority and avoid existing infrastructure	All sites	DSC	Site observation; design reports	Monthly	EMS
Locate water and sewer pipes on opposite sides of roads	Network sites	DSC	Site observation; design reports	Monthly	EMS
Integrate subprojects to conduct trenching at same time	Network sites	DSC/LSGD	Site observation; design reports	Monthly	EMS
Plan work with town authorities – work when traffic is light	Network sites	Contractor	Site observations; CC records	Monthly	EMS
Ensure police provide traffic diversions when necessary	Network sites	Contractor	Site observations; CC records	Monthly	EMS
Request archaeological authorities to assess potential of all sites	All sites	DSC	DSC records; design reports	As needed	EMS
Select alternatives if sites have medium or high potential	All sites	DSC	DSC records; design reports	As needed	EMS
Include state and town historical authorities as stakeholders	All sites	LSGD	CC records; observations at meetings	As needed	EMS
Develop and apply archaeological protocol to protect chance finds	All sites	DSC and CC	DSC and CC records; site observations	Weekly	EMS
Avoid using pneumatic drills near buildings at risk from vibration	All sites	Contractor	Site observations; CC records	Weekly	EMS
Use modern vehicles and machinery and maintain as specified	All sites	Contractor	Site observations; CC records	Monthly	EMS
Consult authorities, custodians of buildings, communities: address key issues, avoid working at sensitive times	Network sites	Contractor	Site observations; CC records; resident surveys	Monthly	EMS

[8] Resettlement issues (asterisked) will be monitored by an Independent Monitoring Agency (IMA) established under the Resettlement Framework

Mitigation Activities and Method	Location	Responsible for Mitigation	Monitoring Method	Monitoring Frequency	Responsible for Monitoring
Plan work to minimise shutdown of water supply system	All sites	DSC	Design reports; resident surveys	Monthly	EMS
Provide alternative water to affected residents	All sites	LSGD	Site observation; resident survey	Weekly	EMS
Inform communities of any shutdown in advance	All sites	LSGD	Site observation; resident survey	Weekly	EMS
Prepare and implement a site H&S Plan including personal protection from transmission of HIV/AIDS (safety of workers/public)	All sites	Contractor	Site observations; CC records	Monthly	EMS
Exclude public from the site	All sites	Contractor	Site observations; CC records	Monthly	EMS
Ensure that workers wear Personal Protective Equipment	All sites	Contractor	Site observations; CC records	Monthly	EMS
Provide Health and Safety training including process of transmission of HIV/AIDS for all personnel	All sites	Contractor	CC records; worker interviews	Monthly	EMS
Follow documented procedures for all site activities	All sites	Contractor	Site observations; CC records	Monthly	EMS
Keep accident reports and records	All sites	Contractor	CC records	Monthly	EMS
Design infrastructure to avoid known locations of AC pipes	Network sites	DSC	DSC records; design reports	As needed	EMS
Train all personnel in dangers and recognition of AC pipes	All sites	Contractor	Site observations; CC records	Monthly	EMS
Develop and apply protocol if AC pipes are encountered	All sites	DSC/CC	DSC & CC records; site observations	Weekly	EMS
If AC pipes are encountered, report to management immediately	All sites	Contractor	Site observations; CC records	Weekly	EMS
Remove all persons to safe distance	All sites	Contractor	Site observations; CC records	Weekly	EMS
Workers handling AC: wear breathing apparatus; protective suits	All sites	Contractor	Site observations; CC records	Weekly	EMS
All AC material must be removed and disposed of safely	All sites	Contractor	Observations on and off site; CC records	As needed	EMS
Employ at least 50% of workforce from communities near sites	All sites	Contractor	CC records; worker interviews	Monthly	EMS
OPERATION AND MAINTENANCE					
Inform shopkeepers and residents of work in advance	Network sites	GA	Resident surveys	Monthly	
Provide walkways and bridges for vehicles	Network sites	OM Contractor	Site observation; resident survey	Monthly	
Request police to divert traffic if necessary	Network sites	OM Contractor	Site observations	Monthly	
Avoid using drills or trucks near fragile buildings	Network sites	OM Contractor	Site observations	Monthly	
Complete work quickly in sensitive areas	Network sites	OM Contractor	Site observations; OMC records	Monthly	
Consult and inform authorities & people, avoid sensitive periods	Network sites	OM Contractor	Site observation; resident survey	Monthly	
Prepare and operate H&S plan to protect workers and citizens	All sites	OM Contractor	Site observations; OMC records	Monthly	
Apply AC protocol to protect all persons if AC pipes encountered	All sites	OM Contractor	Site observations; OMC records	Monthly	
Employ people who live nearby to maintain CWR, OR and GR	All sites	GA	Employer record; worker survey	Monthly	
LONG-TERM SURVEYS					
Survey of chemical and bacteriological quality of municipal water	WTP and Domestic sites	LSGD	Water quality sampling and analysis	Annual for 5 years	Consulting laboratory
Survey of public health and incidence of water borne disease	Dholpur Town	LSGD	Hospital records; resident surveys	Annual for 5 years	Social studies consultant

150. An accredited laboratory will be appointed to monitor the quality of water at the point of supply to consumers (in houses and slums), and a domestic social studies consultant will be appointed to monitor public health and the incidence of disease. These surveys will be conducted annually over the first five years of operation of the system, and require the initial collection of baseline data on pre-project conditions, during the construction period.

D. Environmental management and monitoring costs

151. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the contractors (those employed to construct the infrastructure or the local companies employed to conduct O&M when the system is operating) 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. Costs of acquiring land and compensating shopkeepers and farmers for loss of income (Table 7.1) are calculated separately in the budgets for the Resettlement Framework and Resettlement Plans so are also excluded from this analysis.

152. Since at present all sub-projects are under preliminary design stage the finalization of environmental management and monitoring costs can be done after final designing of the sub-projects.

153. The remaining actions in the Environmental Management Plan are:

- The environmental monitoring during construction, conducted by the EMS; and
- The long-term post-construction surveys that will be commissioned by LSGD.

154. These have not been budgeted elsewhere, and their costs are shown in Table 7.3, with details of the calculations shown in footnotes beneath the table. The figures show that the total cost of environmental management and monitoring for the subproject as a whole (covering design, 1 ½ years of construction and the first five years of operation) is INR 2.52 million, ie US$ 58,604.

Table 7.3: Environmental management and monitoring costs (INR)

Item	Quantity	Unit Cost	Total Cost	Sub-total
1. Implementation of EMP (2 years)				
Domestic Environmental Monitoring Specialist	1 x 3 month	130,000[9]	390,000	
Survey Expenses	Lump sum	120,000	120,000	5,10,000.00
2. Survey of municipal water quality (6 years)				
Domestic Consultant	6 x ½ month	130,000	390,000	
Sample Analysis	6 x 20	4,000[10]	480,000	
Other Expenses	Lump sum	200,000	200,000	10,70,000.00
3. Survey of public health (6 years)				
Domestic Consultant	6 x ½ month	130,000	390,000	
Other Expenses	Lump sum	250,000	250,000	6,40,000.00
4. Environmental mitigation cost including greenery development	Lump sum	300,000	300,000	300,000.00
TOTAL				25,20,000.00

[9] Unit costs of domestic consultants include fee, travel, accommodation and subsistence

[10] Cost of a standard suite of drinking water quality parameters (pH, turbidity, chlorinity, alkalinity, conductivity, TDS, DO, total and faecal coliforms, and selected metals) per sample

E. Associated Facilities

155. There are no upstream associated facilities in this subproject, however, the downstream users of aquifer/river can be considered associated to the facility.

156. Environmentally safe, continuous and reliable water sources and adequate capacity for treatment, transmission, and distribution, as well as properly functioning pumps, reservoirs, and networks are a must for RUIDP to mandate a safe water supply service to the local population. If the water is sourced through the aquifer for drinking water supply, it must be ensured that design extraction/pumping rate must be less than the documented aquifer recharge rate because excessive pumping of aquifers can lower groundwater levels in this water scarce state.

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project stakeholders

157. Most of the main stakeholders have already been identified preliminary. If any other stakeholders that are identified during project implementation will be brought into the process in the future. Primary stakeholders are:

- Residents, shopkeepers and businesspeople who live and work alongside the roads in which network improvements will be provided and near sites where facilities will be built
- Owners and users of any land that is acquired along the transmission main route;
- Custodians and users of socially and culturally important buildings in affected areas;
- State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts;
- State and local tourism authorities.

158. Secondary stakeholders are:

- LSGD as the Executing Agency;
- Other government institutions whose remit includes areas or issues affected by the project (state and local planning authorities, Department of Public Health Engineering, Local Government Dept, Ministry of Environment and Forests, Roads and Highways Division, etc);
- NGOs and CBOs working in the affected communities;
- Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- The beneficiary community in general; and
- The ADB, and Government of India, Ministry of Finance.

B. Consultation and disclosure to date

159. Some informal discussion was held with the local people during site visit. Issues discussed are

- Awareness and extent of the project and development components
- Benefits of Project for the economic and social upliftment of community
- Labour availability in the project area or requirement of outside labour 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 animals nearby the project site

160. Local populations are very much interested on the project and they will help project authorities in all aspects. Public consultation results specifically on environmental issues are shown in Appendix 4.

161. The public Consultation and group discussion meeting were conduct by RUIDP on Date 26 June, 2008 after advertising in Local NEWS papers. The objective of the meeting was to appraise the stakeholders about the environmental and social impacts of the proposed program and the safeguards provided in the program to mitigate the same. In the specific context of Dholpur, the environmental and social impacts of the proposed subprojects under Tranche 2 in Dholpur were discussed.

162. Meetings and individual interviews were held at potentially temporarily affected areas; and local informal interviews were conducted to determine the potential impacts of sub-project construction to prepare the sample Environmental Framework. A town-wise stakeholder consultation workshop was conducted which provided an overview of the Program and sub-projects to be undertaken in Dholpur; and discussed the Government and ADB's Environment policies acts and potential environment impacts of the sub-projects in Dholpur. During the workshop, Hindi versions of the Environmental Framework were provided to ensure participants understood the objectives, policy principles and procedures related to Environment, English and Hindi versions of the Environmental Framework have been placed in the Urban Local Body (ULB) office and Environmental Framework will be provided later on. The NGO to be engaged to implement the Mitigation Measures will continue consultations, information dissemination, and disclosure. The Environmental Framework will be made available in the ULB office, Investment Program Project Management Unit and Implementation Unit (IPMU and IPIU) offices, and the town library. The finalized IEE containing Mitigation Measures will also be disclosed in ADB's website, the State Government website, the local government website, and the IPMU and IPIU websites. ADB review and approval of the RP is required prior to award of civil works contracts.

Major Issues discussed during Public Consultation

(i) Proposed water supply project should ensure enough supply of drinking water in all wards of city.

(ii) Executive agency should give preference to engage internationally reputed contractor like Gammon, HCC, etc as people do not faith about the local contractors in respect of quality of works as well as timely completion of work;

(iii) Efforts should be made by government to supply drinking water round the clock;

(iv) Livelihood affected households should be given assistance in the mode of cash compensation;

(v) Local people should be employed by the contractor during construction work;

(vi) Adequate safety measures should be taken during construction work;

(vii) Mobile kiosks/vendors/hawkers have shown willingness to shift in nearby places without taking any compensation and assistance from the Executing Agency;

(viii) Local people have appreciated the water supply proposal of the government and they have ensured that they will cooperate with the Executing Agency during project implementation.

C. Future consultation and disclosure

163. LSGD will extend and expand the consultation and disclosure process significantly during implementation of RUSDIP. They will appoint an experienced NGO to handle this key aspect of the programme, who will conduct a wide range of activities in relation to all subprojects in each town, to ensure that the needs and concerns of stakeholders are registered, and are addressed in project design, construction or operation where appropriate. The programme of activities will be developed during the detailed design stage, and is likely to include the following:

- <u>Consultation during detailed design:</u>
  - 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;
  - Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.
- <u>Consultation during construction:</u>
  - Public meetings with affected communities to discuss and plan work programmes and allow issues to be raised and addressed once construction has started;

- 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;

➢ Project disclosure:

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

- 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;

164. 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.

IX. FINDINGS AND RECOMMENDATIONS

A. Findings

165. The Project is designed to improve the quality of life of small town residents and enhance the small towns' roles as market, services, and manufacturing centers. . It has a strong community development focus reinforced by integrated poverty reduction, health and hygiene improvement investment projects. The towns' economies will benefit from enhanced productivity as a result of health improvement, time savings in collecting water, as well as from increased urban efficiency arising from improved roads, bridges, drainage, drinking water and sanitation. Residents in towns will also benefit from lower water costs and from savings in health care costs.

166. During project design, community meetings were held with beneficiaries to discuss sanitation, poverty, resettlement, affordability issues, and environmental concerns. Socioeconomic surveys obtained information and individual views on current situations and future preferences. Potential environmental impacts of urban infrastructure improvements are mainly short-term during the construction period and can be minimized by the proposed mitigating measures and environmentally sound engineering and construction practices.

167. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the Dholpur Water Supply Subproject. Potential negative impacts were identified in relation to both construction and operation of the improved infrastructure, but no impacts were identified as being due to either the project design or location. Mitigation measures have been developed in generic way to reduce all negative impacts to acceptable levels. 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. These include:

- Locating all pipelines within the ROW of existing roads, to avoid the need to acquire land or relocate people;

- Locating pipelines on unused land adjacent to roads wherever possible, to avoid damaging roads and disrupting traffic and other activities.

168. This means that the number of impacts and their significance has already been reduced by amending the design.

169. Changes have also been made to the location of elements of the project to further reduce impacts. These include:

- Locating all facilities (WTP, OR, CWR) on government-owned land to avoid the need for land acquisition and relocation of people;
- Locating the distribution / raising main in the ROW alongside a main road, to reduce the acquisition of agricultural land and impacts on livelihoods of farmers and workers.

170. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. This is mainly because of the invasive nature of trenching and other excavation; because the distribution network is located in an ancient town where there are densely populated areas and sites of historical and tourism interest; and because Rajasthan is an area with a rich history, so there is a high risk that ground disturbance may uncover important remains. Because of these factors the most significant impacts are on the physical environment, the human environment, tourism, and the cultural heritage.

171. During the construction phase, impacts mainly arise from the need to dispose of moderate 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. These include:

- Finding beneficial uses for waste material;
- Covering soil and sand during transportation and when stored on site;
- Planning work to minimize disruption of traffic and communities;
- Providing temporary structures to maintain access across trenches where required.

172. There could also be a need to acquire small amounts of farm land along the route of the distribution main, where it is impracticable for the pipeline to follow bends in the road. Such impacts are also frequently encountered and are dealt with by a combination of the legal process and additional measures required by ADB policy on Involuntary Resettlement. Actions are discussed in a separate Resettlement Plan and Resettlement Framework, and include:

- Acquisition of land through the GOI Land Acquisition Act, through which the market value is paid, based on an analysis of recent transactions;
- Ensuring that no more than 10% of the land of a single owner or tenant is acquired;
- Providing additional compensation for loss of standing crops and productive trees.

173. One field in which impacts are much less routine is archaeology, and here a series of specific measures have been developed to avoid damaging important remains. These include:

- Assessing the archaeological potential of all proposed construction sites, and selecting alternative locations to avoid any areas of medium or high risk;
- Including archaeological, cultural and historical authorities and interest groups as project stakeholders to benefit from their expertise;
- Developing a protocol for use in conducting all excavation to ensure that any chance finds are recognized, protected and conserved.

174. 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 will be addressed by a number of measures, including:

- Limiting network improvements to expansion of the area covered, and leaving the existing AC system (ring, carrier and distribution mains) in situ undisturbed;
- Training staff and workers to raise awareness of the dangers of AC and enable early recognition of such pipes if encountered accidentally;
- Development of a protocol based on USEPA guidelines, to protect workers and the public if AC pipes are encountered (including evacuation of the immediate area, use of protective equipment by workers, and safe removal and disposal of AC material).

175. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example it is proposed that the project will:

- Employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain;
- Ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

176. These and the other mitigation and enhancement measures are summarised in Table 7.1, which also shows the location of the impact, the body responsible for the mitigation, and the program for its implementation.

177. Once the system is operating, most facilities (WTP, OR, CWGR) will operate with routine maintenance, which should not affect the environment. Leaks in the 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.

178. The main impacts of the operating water supply system will be beneficial as the citizens of Dholpur will be provided with a constant supply of water, 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 should reduce the incidence of disease associated with poor sanitation. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

179. Table 7.1 also assesses the effectiveness of each mitigation measure in reducing each impact to an acceptable level. This is shown as the level of significance of the residual impact (remaining after the mitigation is applied). This shows that all impacts will be rendered at least neutral (successfully mitigated), and that certain measures will produce a benefit (in addition to the major benefits provided by the operating schemes).

180. Mitigation will be assured by a programme 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 expected improvements in the quality of domestic water and the health of the population.

B. Recommendations

181. 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 draft report **(Table 7.1)** and in the Resettlement Framework for the RUSDIP are implemented in full, as described in these two documents;

- The Environmental Monitoring Plan proposed in Section VII of this report and the internal and external monitoring proposed in the Resettlement Framework are also implemented in full.

X. CONCLUSIONS

182. The environmental status of the proposed improvements in water supply and distribution infrastructure in Dholpur Town has been assessed. Issues related to Involuntary Resettlement were assessed by a process of resettlement planning and will be compensated by measures set out in detail in the Resettlement Framework for the subproject.

183. The overall conclusion of process is that provided the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some small benefits from recommended mitigation and enhancement measures, and major improvements in quality of life and individual and public health once the scheme is in operation.

184. There are no uncertainties in the analysis, and no further studies are required to comply with ADB procedure or national law.

Appendix 1

Photographs

Annexure II A Dholpur Photo Gallery

Proposed OHSR Site

Proposed OHSR Site

Proposed Site for RAW Water Reservoir

Proposed Site for RAW Water Reservoir

Present Water Supply

Present Water Inlet at River Chambal

Appendix 2

PHED LETTER

OFFICE OF THE CHIEF ENGINEER (SPECIAL PROJECT)
PUBLIC HEALT H ENGINEERING DEPARTMENT RAJASTHAN
F – 18, New Building, I Floor, 2, CIVIL LINES - JAIPUR - 302006
0141-2220553 Fax -0141-2222585 email: rj_cesp@water.nic.in

No. CESP/PHED/F.231/RUSDP/2007-08 Dated : 11/7/08

The Project Director,
Rajasthan Urban Infrastructure Development Project,
JLN Marg,
Jaipur (Raj)

SUB : Information required by ADB Mission regarding water supply projects under execution with PHED.

In the meeting held under the Chairmanship of Addl. Project Director, on 30th May 2008, in which the members of ADB Review Mission, Addl. Project Director I and II, Superintending Engineer (Water Supply), RUIDP, and other officers of RUIDP were present. The ADB Mission desired the details of surface water availability in water supply projects under execution with PHED which have been taken as source of water by RUIDP for their projects.

The town wise details are as under :-

1. **Urban Water Supply Scheme, Bharatpur :-** Presently, Bharatpur water supply is dependent upon local tube wells and surface water from Bandh Baretha. PHED is implementing a multi village multi town drinking water supply project from Chambal River as source. The work of main transmission system consisting of intake works, raw water reservoir, raw water transmission main, filter plant etc. is under progress and is likely to be completed by June 2010. This project is designed to cater to a water demand of 43 MLD sufficient upto the year 2031.

2. **Urban Water Supply Scheme, Dholpur :-** Long term demand of Urban Water Supply Scheme, Dholpur, is proposed to be met from the intake works being constructed under Chambal-Dholpur-Bharatpur Drinking Water Supply Project. The total capacity of intake works is to lift 237 MLD of water against which the present system is sufficient to cater to a total water demand of 147 MLD. It is proposed to supply 15 MLD. of raw

water from the intake works to Dholpur Town, sufficient for the year 2031.

3. **Urban Water Supply Scheme, Churu :-** Urban Water Supply Scheme, Churu, is dependent upon local ground water as well as surface water brought through multi town multi village drinking water supply scheme namely; Churu-Bisau Scheme. The scheme provides for a water demand upto 12 MLD for the town likely to be sufficient upto the year 2021, in conjunction with the ground water.

4. **Urban Water Supply Scheme, Barmer :-** The present water supply of Barmer is dependent on ground water, brought to the town from the tube wells situated around Barmer. Ground water is depleting fast and it is difficult to maintain the service level. PHED has taken up a multi village multi town drinking water supply scheme and the work of main transmission system consisting of Intake works at Indira Gandhi Main Canal, raw water reservoir, filter plant, clear water storage, pumping station and pipeline upto Barmer has been awarded. Work is likely to be completed by September 2009. The transmission system provides for the water demand of 120 MLD of Barmer Town and 691 villages of Barmer and Jaisalmer for the year 2036.

5. **Urban Water Supply Scheme, Nagaur :-** Present water supply is dependent upon ground water being brought from a distance of 40 Kms. and source is depleting fast. PHED is implementing a multi town multi village drinking water supply scheme to bring surface water from the Indira Gandhi Canal. The work on main transmission system, consisting of Intake works, raw water reservoirs, WTP, transmission main etc. costing Rs.310.00 Crores is under progress and is likely to be completed by September 2009. The transmission system is sufficient to cater to water demand of Nagaur Town for the year 2031. Nagaur Lift Water Supply Project, Phase-I, is designed to cater 552 MLD demand of five towns namely; Nagaur, Basni, Moondwa, Kuchera and Riyanbari) and 502 villages of District Nagaur.

6. **Urban Water Supply Scheme, Karauli :-** Urban Water Supply Scheme, Karauli, is presently dependent upon ground water. As a long term solution, PHED is implementing a multi town multi village drinking water supply namely; Chambal Sawaimadhopur Nadauti Project with Chambal River as source

he

of water. The work of main transmission system consisting of Intake works, raw water reservoir, WTP, clear water reservoir, pumping station, main transmission pipeline etc. is under execution. The work is likely to be completed by March 2010. This project shall cater to the water demand of 23.26 MLD of Karauli Town for the year 2031.

7. **Urban Water Supply Scheme, Sawaimadhopur :-** Urban Water Supply Scheme, Sawaimadhopur, is presently dependent upon ground water. As a long term solution, PHED is implementing a multi town multi village drinking water supply namely; Chambal Sawaimadhopur Nadauti Project with Chambal River as source of water. The work of main transmission system consisting of Intake works, raw water reservoir, WTP, clear water reservoir, pumping station, main transmission pipeline etc. is under execution. The work is likely to be completed by March 2010. This project shall cater to the water demand of 37.66 MLD of Sawaimadhopur Town for the year 2031.

CHIEF ENGINEER (SP) 11/7/08
PUBLIC HEALTH ENGG. DEPTT.
RAJASTHAN, JAIPUR (RAJ)

Appendix 3

Rapid Environmental Assessment (REA) Checklist - Water Supply

Instructions:					
♦	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:		RUSIDP			
Sector Division		Water supply-Dholpur			
SCREENING QUESTIONS			**Yes**	**No**	**REMARKS**
A.	**Project Siting**				
Is the project area …….			□	□	
♦	Densely populated ?		√	□	
♦	Heavy with development activities?		□	√	
♦	Adjacent to or within any environmentally sensitive area				
	●	Cultural heritage site	√	□	Laswari:Laswari is a historical site of Dholpur where Daulat Rao Scindia was defeated by Lord Lake. Shergarh Fort:Situated south of Dholpur, is the Shergarh Fort which was constructed by Sher Shah Suri on the ruines of Hindu Fortress. The Khanpur MahalThis was a pleasure house for Mughal Emperor Shah Jahan. The Shiva Temple: This is a historical monument which boasts great architectural beauty of all times. The shiva temple is located near the Gwalior Agra Road.All these sites are with in 2km radius of the town Machchhkund (8Km.): Named after Raja Machh Kund, it is an ancient sacred place and it is at a distance of 8 Km from the Dholpur town. The kind Machh Kund was the twenty forth king of the Suryavanshi Dynasty (the solar race).According to legend, Raja Machh Kund was

					sleeping here when demon Kaal Yaman while pursuing Lord Krishna accidentally woke him up. It is a sacted place for pilgrims and had many enclosures arround it which was constructed by the Mughal emperor, Akbar
	●	Protected Area	□	√	Van Vihar Wild Life Sanctuary Just 18 kms of the city lies the Van Vihar Wildlife Sanctuary, This is one of the oldest wildlife reserve of the Dholpur rulers. Spanning over an area of 59. 86 sq km, Van Vihar is located over Vidhyan Plateau
	●	Wetland	□	√	
	●	Mangrove	□	√	
	●	Estuarine	□	√	
	●	Buffer zone of protected area	□	√	
	●	Special area for protecting biodiversity	□	√	
	●	Bay	□	√	
B.	**Potential Environmental Impacts**				
Will the Project cause ……..					
♦	pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		□	√	No such source of pollution at the up stream of the intake point.
♦	impairment of historical/cultural monuments/areas and loss/damage to these sites?		□	√	No impact on any such structures
♦	hazard of land subsidence caused by excessive ground water pumping?		□	√	does not arise because the source of water is river water -Chambal river
♦	social conflicts arising from displacement of communities?		□	√	No impact on community, so no social conflict.
♦	conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		□	√	No such conflict. Sufficient quantity of water in river is available for supply of water to this water supply system

♦	unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents) ?	□	√	Raw water will be treated properly in WTP considering the characteristics of the water. Although provision will be made for regular water quality monitoring
♦	delivery of unsafe water to distribution system?	□	√	Proper care has been taken during design of the system. O&M manual will be prepared , training will be given to the staffs operating the plant and to collect water sample time to time and to analyze the same to ensure the quality of the supplied water
♦	inadequate protection of intake works or wells, leading to pollution of water supply?	□	√	Proper design of the intake will minimize this problems.
♦	over pumping of ground water, leading to salinization and ground subsidence?	□	√	Does not arise because the source of water is river water .
♦	excessive algal growth in storage reservoir?	□	√	The storage reservoirs are covered from top and proper treatment like chlorination of water will not allow algal growth in the reservoirs.
♦	increase in production of sewage beyond capabilities of community facilities?	□	√	Sewage volume will slightly but will not beyond the capabilities of the community facilities.
♦	inadequate disposal of sludge from water treatment plants?	□	√	Sludge will disposed off in designated site.
♦	inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities ?	□	√	Proposed and existing pumping stations are away from settlements and provided with proper enclosures
♦	impairments associated with transmission lines and access roads?	□	√	Impairments may be with access road but it is and can be minimized taking regulatory measures. Temporary in nature.
♦	health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	□	√	Proper storage of chlorine gas will be considered

♦	health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?	□	√	Training will be given to worker on health and safety aspects of application of chlorine for treatment of raw water
♦	dislocation or involuntary resettlement of people	□	√	WTP will be constructed in government acquired land ,Water supply pipes will be layed along the ROW on government land and not impacting any structure , so no issue of R&R.
♦	social conflicts between construction workers from other areas and community workers?		√	Priority will be given to local labour for job as suggested in EMP
♦	noise and dust from construction activities?	√		During civil work noise and dust will be generated but it will be localized and short-term in nature. Proper measure as suggested in EM will minimize the problem.
♦	increased road traffic due to interference of construction activities?	√		Temporary in nature. Work will be carried out in night when traffic is least. Although a traffic management plan will be prepared for the same.
♦	continuing soil erosion/silt runoff from construction operations?	□	√	The project area is urban area the proposed pipelines are underground .so there is no chance of soil erosion during operation. During laying of pipes trenched will be filled and compacted to resource original ground condition. Debris generated due to excavation will be disposed off in designated disposal site.
♦	delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	□	√	Only disinfected water from the WTP will be supplied to the OHSR and to the distribution system .O&M manual

				will be prepared , training will be given to the staffs operating the plant and to collect water sample time to time and to analyze the same to ensure the quality of the supplied water
♦	delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	□	√	Source of water for this subproject is treated water from WTP which is not corrosive in nature. Although DI and PVC pipes has been proposed as a precautionary measures.
♦	accidental leakage of chlorine gas?	□	√	Emergency action plan for accidental leakage of chlorine gas will be prepared
♦	excessive abstraction of water affecting downstream water users?	□	√	Not applicable to this subproject. Source of water for this subproject is treated water from WTP
♦	competing uses of water?	□	√	No such competition is envisaged. Water demand has been calculated considering all types of demand.
♦	increased sewage flow due to increased water supply	√	□	Water supply will slightly increase the sewage volume which will be taken care in the upcoming sewerage design and sewage treatment plant
♦	increased volume of sullage (wastewater from cooking and washing)and sludge from wastewater treatment plant	□	√	The proposed drainage network in the city shall take care of the waste water and sullage. Waste water sullage and storm water will be carried from the residential areas via primary channels. Proposed solid waste management system of the town will take care of the problem

APPENDIX 4 PUBLIC CONSULTATION- ENVIRONMENT

Sub Project-: Water Supply (Dholpur)

Issues discussed

- Awareness and extent of the project and development components
- Benefits of Project for the economic and social upliftment of community
- Labour availability in the Project area or requirement of outside labour 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 near project site

Date & time of Consultation: 22.06.08 at 10.30 AM

Location: Gulab Bagh Chouraha

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	People are aware of the project. DSC consultant informed the people about the proposed projects and invest plan on different component of the project. People were also informed about the phase wise implementation schedule of the sub - projects.	
2	In what way they may associate with the project	• They demand that local people of the area should be engaged during implementation of the same. • Local ward members should be informed during the implementation. They will provide all types of assistance during implementation	
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	During consultation it was found that no such structure is going to be affected. .	
4	Presence of historical/ cultural/ religious sites nearby	No historical or religious building comes on water supply lines.	

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
5	Unfavorable climatic condition	May –to- June there is very hot season; otherwise the condition of climate is favorable for work.	
6	Occurrence of flood	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No report of Flood in the project area.	
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.	Drainage system has to be improved Sewerage system has to be improved
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quantity is not sufficient and quality is not good – hard water with high TDS. To meet the demand local people exploring ground water through hand pumps and wells. People are suffering from various diseases.	Water supply system to be implemented with supply of treated water from surface water source.
9	Present solid waste collection and disposal problem	Municipality takes care of the Solid waste collection, which is manually & disposed off in disposal site.	
10	Availability of labour during construction time	Sufficient labour will be available in this area.	
11	Access road to project site	Road available.	
12	Perception of villagers On tree felling and afforestation	It has been explained that during implementation of the Water supply scheme no tree is going to be affected.	
13	Dust and noise Pollution and disturbances during construction work	People are aware of the problem. It has been explained that as per Safeguard policy of the project for abatement of pollution control system to minimize it. Vehicles movement will be controlled & appropriate measure will be taken to combat the same.	
14	Setting up worker camp site within the village/ project locality	Mainly engaged labors should be nearby villages.	
15	Safety of residents during construction phase and plying of vehicle for construction activities	People are aware of the problem. It has been explained that as per Safeguard policy of the project vehicles movement will be controlled & appropriate measure will be taken to combat the same	

Sr. No.	Key Issues/Demands	Perception of community	Action to be Taken
16	Conflict among beneficiaries downstream users – water supply project using of river water	• The benefits should be equally shared to others. They concern that if PHED Chambal- Dholpur water project is not implemented in time then RUIDP project will be of no use. • They are also concerned on the fact that ground water table of the area is depleting	
17	Requirement of enhancement of other facilities	Yes They Want. They want the conservation of the heritage structures	
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	Yes, people are ready to sacrifice their lands (cultivable or not) for beneficial project after getting proper Compensation	

NAME AND POSITION OF PERSONS CONSULTED:

Mr. Vasudev Prasad Garg, Jaipur Dhaulpur Transport

Mr. Bhagwan Das, Gen. Store,

Mr. Naseeb Khan, Repairing Shop,

Mr. Narendra Sharma, Hotel Chandan

Mr. Puneet, Divya Juice Centre,

Mr. Suresh Goyal, Shiva Medical,

Mr. Ram Gopal, Kumhar,

Mr. N.C. Awasthi,

Mr. Ramesh Kumar, Book Store,

Summary of outcome:

People are well aware about the project through different sources. People are suffering from water supply problem in terms of quantity and quality of the supplied water. People are suffering from various health problems due to consumption of hard water. People are aware that this RUIDP project is dependent on PHED Chambal Bharatpur Dholpur water project. They are concern that if the PHED project will not be successful then RUIDP project has no use. People are ready to extend all types of support to during execution of the project. They also want that sewerage, drainage and solid waste management projects should be taken up as early as possible.

PUBLIC CONSULTATION- ENVIRONMENT

Sub Project-: Water Supply (Dholpur)

Date & time of Consultation, 22.06.08 at 16.30 PM

Location:- Imam Bara, Bazaria Road, Dholpur

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community
1	Awareness of the project –including coverage area	People are aware of the project.
2	In what way they may associate with the project	• They demand that local people of the area should be engaged during implementation of the same. • Local ward members should be informed during the implementation they will provide all types of assistance during implementation
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	During consultation it was found that no such structure is going to be affected. .
4	Presence of historical/ cultural/ religious sites	No historical or religious building comes on water supply lines.
5	Un favorable climatic condition	May –to- June there is very hot season; otherwise the condition of climate is favorable for work.
6	Occurrence of flood	Due to poor drainage condition people suffer from water stagnancy in their area especially in the market area and road side areas. No report of Flood in the project area.
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.
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quantity is not sufficient and quality is not good – hard water with high TDS. To meet the demand local people exploring ground water through hand pumps and wells. People are suffering from various diseases
9	Present solid waste collection and disposal problem	Municipality takes care of the Solid waste collection, which is manually & disposed off in disposal site.
10	Availability of labour during construction time	Sufficient labour will be available in this area.
11	Access road to project site	Road available.
12	Perception of villagers on tree felling and afforestation	It has been explained that during implementation of the Water supply scheme no tree is going to be affected.

Sr. No.	Key Issues/Demands	Perception of community
13	Dust and noise Pollution and disturbances during construction work	People are aware of the problem. It has been explained that as per Safeguard policy of the project for abatement of pollution control system necessary to minimize it. Vehicles movement will be controlled & appropriate measure will be taken to combat the same.
14	Setting up worker camp site within the village/ project locality	Local labours will be engaged
15	Safety of residents during construction phase and plying of vehicle for construction activities	People are aware of the problem. It has been explained that as per Safeguard policy of the project vehicles movement will be controlled & appropriate measure will be taken to combat the same
16	Conflict among beneficiaries downstream users – water supply project using of river water	• The benefits should be equally shared to others. They concern that if PHED Chambal- Dhaulpur water project is not implemented in time then RUIDP project will be of no use. • They are also concerned on the fact that ground water table of the area is depleting.
17	Requirement of enhancement of other facilities	Yes They Want. They want the conservation of the heritage structures,
18	Whether local people agreed to sacrifice their lands (cultivable or not) for beneficial project after getting proper compensation	Yes, people are ready to sacrifice their lands (cultivable or not) for beneficial project after getting proper Compensation.

NAME AND POSITION OF PERSONS CONSULTED:

Mr. Vivek Jain, Cycle Store,

Jai Ambey Vastra Bhandar,

Mrs. Shanti Devi, Industrial Gas Supply,

Mr. Narendra Sharma, Hotel Chandan

Mr. Ramdas, Fruit Hawker,

Mr. Vasudev Prasad Garg, Jaipur Dhaulpur Transport

Summary of outcome:

People are well aware about the project through different sources. People are suffering from water supply problem in terms of quantity and quality of the supplied water. People are suffering from various health problems due to consumption of hard water. People are aware that this RUIDP project is dependent on PHED Chambal Bharatpur Dholpur water project. They are concern that if the PHED project will not be successful then RUIDP project has no use. People are ready to extend all types of support to during execution of the project. They also want that sewerage, drainage and solid waste management projects should be taken up as early as possible.