9.1.8 Projects in Pipeline

Mansi-Wakal Project

RUIDP – under ADB assistance, RUIDP was planned. The major components are as follows Tunnel and Conveyance main from Tunnel to Nandeshwar to carry water from Mansi-Wakal Dam. WTP at Nandeshwar = of capacity of 23.35 MLD and at Titerdee of capacity 13.5 MLD

OHSRs and GLSRs – 16 nos. Rising Mains = 22.47 kms respectively to connect OHSRs and GLSRs. Only a part of distribution system networks from these 13 SRs was sanctioned. Work of rejunivation of pipelines, distribution lines to fully utilize existing and newly constructed SRs could not be sanctioned. As main aim of the project was to bring 23.35 MLD water from Mansi Wakal and construct 2 WTPs to meet existing water demand.

9.1.9 Long Term Scenario

The population figures and demands are as follows:

TABLE 9.1.5 NORMS FOR WATER SUPPLY

Domestic Demand including other non domestic demands	Domestic	85%	135
	Slums	15%	70
	As per actual demands given by the line departments		
	? Within distribution system		15%
	? For Transmission system		2%
	? Within water treatment plant		3%

TABLE 9.1.6 SHOWING WATER DEMAND IN FUTURE

on on	Domestic Demand		Losses in Distribution (15%)	Subtotal (SR capacity)	Bulk Demand		Transmission Losses (2%)	Subtotal (clear water demand)	Ground Water			Sub Total (water required)	Transmis Losses (
	MLD		MLD	MLD	MLD		MLD	MLD	MLD			MLD	MLD
02	62.65	3.52	9.93	76.10	3.59	79.69	1.59	81.28	10	71.28	2.14	83.42	
75	80.98	3.91	12.73	97.63	3.73	101.36	2.03	103.38	10	93.38	2.80	106.19	
81	104.68	4.73	16.41	125.82	4.02	129.84	2.60	132.44	10	122.44	3.67	136.11	
54	135.31	5.2	21.08	161.59	4.18	165.77	3.32	169.09	10	159.09	4.77	173.86	

TABLE 9.1.7 SHOWING WATER DEMAND AND STORAGE CAPACITY AND GAPS FOR FUTURE

Sr. No.				Existing Storage	St R

											KLD	201
1		1.58	7915	10232	13226	17096	1,204	1,545	1,991	2,557		
2		2.76	13807	17848	23071	29822	2,101	2,695	3,473	4,461	2,614	3,96
3		3.58	17894	23131	29900	38649	2,722	3,493	4,501	5,781		
4		3.30	16515	21348	27595	35671	2,512	3,223	4,154	5,335		
5		3.86	19311	24962	32267	41709	2,938	3,769	4,858	6,239		136
6		1.94	9687	12522	16186	20922	1,474	1,891	2,437	3,129		684
7		1.82	9114	11782	15229	19686	1,387	1,779	2,293	2,944		644
8		5.42	27105	35038	45291	58544	4,124	5,290	6,818	8,757	1,362	191
9		2.66	13304	17197	22230	28735	2,024	2,597	3,347	4,298	1,362	939
10		1.57	7829	10121	13082	16911	1,191	1,528	1,969	2,529	454	553
11		1.79	8929	11543	14921	19287	1,358	1,743	2,246	2,885	(920) ?	631
12		4.34	21690	28038	36242	46848	3,300	4,233	5,456	7,007	1,324*	153
13		5.44	27224	35191	45489	58800	4,142	5,314	6,848	8,795	1,362	192
14		1.07	5375	6949	8982	11610	818	1,049	1,352	1,737		380
15		1.84	9222	11921	15409	19918	1,403	1,800	2,320	2,979		651
16		1.52	7621	9852	12735	16462	1,160	1,488	1,917	2,462	45	538
17		0.81	4076	5269	6811	8804	620	796	1,025	1,317	45	288
18		0.51	2541	3285	4246	5488	387	496	639	821	300	179
19		3.21	16056	20755	26829	34679	2,443	3,134	4,039	5,187		113
20		2.69	13476	17421	22518	29108	2,050	2,630	3,390	4,354		952
21		1.94	9697	12536	16204	20946	1,475	1,893	2,439	3,133		685
22		3.28	16391	21188	27388	35402	2,494	3,199	4,123	5,295	1,362	115
23		2.36	11810	15266	19734	25508	1,797	2,305	2,971	3,815	318	834
24		2.07	10357	13388	17306	22370	1,576	2,022	2,605	3,346	454	731
25		1.33	6643	8588	11101	14349	1,011	1,297	1,671	2,146	1,362	469
26		3.28	16394	21192	27394	35410	2,494	3,200	4,124	5,296	1,362	115
27		1.28	6393	8265	10683	13809	973	1,248	1,608	2,065	600	451
28		4.63	23143	29916	38670	49986	3,521	4,517	5,822	7,477	1,362	163
29		2.51	12548	16220	20966	27102	1,909	2,449	3,156	4,054	500	886
30		1.07	5376	6950	8984	11613	818	1,049	1,352	1,737	870	380
31		2.56	12792	16535	21374	27629	1,946	2,497	3,218	4,133	1,200	903
32		0.46	2284	2954	3818	4935	348	446	575	738	300	161
33		5.12	25628	33129	42823	55354	3,899	5,002	6,447	8,279		181
34		1.89	9459	12228	15807	20432	1,439	1,846	2,380	3,056		668
35		1.66	8327	10764	13914	17985	1,267	1,625	2,095	2,690		5
36		2.29	11476	14835	19177	24788	1,746	2,240	2,887	3,708	454	8
37		4.03	20147	26043	33663	43514	3,065	3,932	5,068	6,509		14
38		6.52	32631	42180	54523	70478	4,964	6,369	8,208	10,542	450+ (2270) ?	23
											17,688	35,3

	* - Capacities excluding Treatment Plant Balancing Reservoir ? - Existing GLSRs are in depleted condition. Reconstruction proposed. # - Yadav colony will be fed from Ambaogarh LZ SR

TABLE 9.1.8 RUIDP WORK PACKAGES (ALL FIGURES ARE IN RS. LAKHS)

Package No.		Estimated Cost
UDA/WS/01	Augmentation of Water Supply at Ambamata	68.00
UDA/WS/02	Construction of WTP at Teetardhi	175.00
UDA/WS/03	Construction of rising mains from Dewas to Nandeshwar WTP	1000.00
UDA/WS/04	Rising mains & Gravity feeders- Phase I	350.00
UDA/WS/05	Construction of SRs at various locations - Phase I	120.00
UDA/WS/06	Replacement of worn out pipes	100.00
UDA/WS/07	Rehabitation of existing pumping station including all civil, electrical and mechanical works	
UDA/WS/08	WTP at Nandeshwar (separated from WS/02)	350.00
UDA/WS/09	Rising mains & Gravity feeders - Phase II	850.00
	Construction of SRs at various locations - Phase II (separated from WS/05)	
	Providing, Laying, Jointing of Distribution Mains (Renumbered from Ws/07 to WS/11)	
	Total	**4043.00**

Source: Water Supply Concept Report, RUIDP

Legend	
	Partially taken up in RUIDP
	Taken up in RUIDP
	Dropped / Not Taken up in RUIDP

9.1.10 Goal and Service Out Comes

Considering above challenges, following goals for different horizon years have been identified. The water supply coverage and access to piped water supply in UMC and UIT area needs to be enhanced to 100% by year 2021. Per capita water supply should be maintained at 135 LPCD by increasing hours of supply and decreasing interval of supply from 48hrs to daily by year 2021. Unaccounted for water needs to be determined and reduced to 15% or lower by year 2021.100% O&M Recovery to be achieved by year 2011.

TABLE 9.1.9: VISION TIME LINE FOR DRINKING WATER SUPPLY

S. No		Present Situation	Horizon Period		
			2011	2016	2021
1	Network Coverage	69%	90%	100%	-
2	Access to Piped Water	55%	80%	95%	100%
3	Per Capita Supply	74 LPCD	135 LPCD	135 LPCD	135 LPCD
4	Hours of Supply	1.5 – 3 Hrs	4 Hrs / 48 Hrs	4 Hrs / Day	6 Hrs / Day

5	Non Revenue Water	Not known	15%	12.5%	10%
	Quality of Water	Potable	Potable as per WHO Standards	Potable as per WHO Standards	Potable as per WHO Standards
7	O & M Cost Recovery	20%	100%	100%	100%

9.2 SEWERAGE

9.2.1 Introduction

City of Lakes, Udaipur is one of the important city in the state of Rajasthan. The City is a favorite tourist destination for foreign and local tourists, for its beautiful lake and marvelous palaces. Lakes and gardens in the city besides being beauty spots are also of great ecological significance. The lakes are also principal source of drinking water for the city. Growth of city is however adversely affecting the eco-system of the lakes and there is fear of lakes becoming eutrophic. Survival of Udaipur city as a tourist destination and well being of its residents is essentially linked with preservation of eco system of its lakes.

Flow of domestic wastewater into the lakes is one of the major reasons identified for the deterioration of the condition of the lakes. Absence of underground sewage collections and conveyance system also results in wastewater flowing in the open drain that is marring aesthetics of the city.

City is growing in population and business activities and with the rise in standard of living, water demand of the city residents is further increasing and consequently wastewater flow is increasing. Public Health Engineering Department and Urban Development Department have initiated some projects under RUIDP for augmenting water supply to the City. With implementation of proposed water supply augmentation schemes, water supply to the city will increase from present 75 LPCD to 135 LPCD. Absence of proper sewage collection and conveyance system particularly in the surrounding of lakes will result in further eutrophication of lakes.

Continuous efforts have been made by various concerned Government Department and Local self-Government to protect lakes from pollution and maintaining aesthetic environment in city in general and in the surrounding of the lakes in particular, so that the city retains its historic charm. As a lake protection measure sewerage system was planned from time to time for collection and conveyance of sewage in catchment areas of lakes.

Citizens of Udaipur have always been sensitive about the state of health of their lakes and there were demands for concrete action for their protection. Public interest litigation was also filed in the Rajasthan High Court to protect the lakes from pollution. Honorable Court ordered concerned departments to take appropriate action for the protection of lakes in a time bound manner and is continuously monitoring the progress being made in this matter.

Urban Improvement Trust (UIT) undertook most recent activity in the direction of prevention of pollution of lakes, prior to the present project. Under this activity UIT assigned work of planning and designing of sewerage system to National Environment Engineering Research Institute (NEERI) who studied the project area and prepared a report for preservation of lakes and submitted to UIT for implementation.

NEERI in its report presented a condition assessment of the existing sewerage system, and recommended implementation of proper sewerage network for the City of Udaipur. NEERI prepared detail project report for sewerage network for part of Udaipur (Phase I Part I). For immediate remedial measure to protect the Pichola lake from Pollution and (Phase I Part II) for protecting Lake Fatehsagar and augment the existing main sewer running from Hathi Pole to Manvakhera where the sewage treatment plant is proposed to be constructed. (Phase II) was for remaining part of Udaipur as per development of the city projected for the year 2011.

In Phase I work proposed by NEERI, sewerage system was designed around four lakes, which cover ten wards. Out of this three wards are fully covered and seven are partly covered for the design purpose and this work was executed by UIT Udaipur and simultaneously carried out the work of sewers house connections of the consumers. Government of Rajasthan took a decision to execute the work proposed under Phase-I Part-II in NEERI's report, under waste water sector of ADB project. In addition to providing sewerage system, augment the existing main sewer from Hathi pole to Manwakhera; construction of a 20 MLD capacity sewage treatment plant was also included in the works. Unfortunately no work could be executed under ADB project.

9.2.2 Existing Sewerage System:

Udaipur city is not fully covered by an integrated underground sewerage system. At present, the city has a skeleton existing sewerage system, which covers the high density populated areas of the walled city. The old sewerage system in the catchment areas of the lakes consist of 3500m of sewers varying in diameters from 150-350mm covering a population of about 10,000 in Ambamata, Brahmapuri, Lalghat, Navghat, and Chandpole area. The sewage from these sewers used to flow by Reaping up to Jhatwadi by a pump-house located at Chandpole (ridgeline) from where it was gravitating to Hathipole through 400 mm diameter gravity sewers.

The existing sewerage system spreads in 13 wards out of 50 wards of Municipal area of Udaipur i.e. ward nos. 22, 33 to 37, 42 to 47 & 50 with an outfall of 800mm dia at Manwa Kheda at a distance of 4.5 Km from City. Besides this UIT Udaipur took the execution of sewerage project to protect lake Pichola from pollution. Accordingly an extensive sewerage system was laid in localities surrounding it at an expenditure of Rs. 12.00 Crores under the technical guidance of NEERI. After execution of the project the existing pumping station at chandpole has been abandoned and the entire sewerage generated from the area Mullatalai,

Haridasji Ki Magri, Ambamata Scheme, Raja Colony, Yadav Kachi Basti, Bagore Ki Haveli, Purohit Ji Ki Haveli, Brampole, Gangor Ghat, Lalghat, Gadia Deora etc. Gravitate to Hathipole through 800mm dia sewer line from where it is carried by existing sewer line already functional from Hathipole to Manwa Kheda. In this project one pumping station had to be constructed near Hanuman Temple in Ambamata Area because of low lying area such as Yadav Kachi Basti, Ambavgarh, Part of Ambamata scheme etc. Under this project the main sewer line runs from Mullatalai to Hathipole via Chandpole. The sewer line is telescopic with starting dia meter of 500mm to 800mm at Hathipole. Part of this sewer line has been laid in the bed of Lake Pichola. The ductile Iron (800mm) tube line has been laid in the lake bed. Along with a network of 24 Km sewer line the laid under the NEERI Project about 3400 sewer hose connection have been done simultaneously.

9.2.3 Disposal of sewage

The entire sewage generated in the city finds its way to Ahad River through 800mm dia outfall sewer at Manwa Kheda village. Congested parts of the city areas have extensive network of surface water drains, to which wastewater from houses (including water closets) is directly connected. The surface water drains ultimately discharge into lakes causing lake pollution. There has been an arrangement to collect and convey sewage from community septic tanks at various locations up to nearest natural or constructed drains.

9.2.4 Deficiency Analysis

Sewage collection system

Major deficiencies in the existing sewage collection system are listed below.

Inadequate coverage

The sewage collection system is not laid to cover all areas of the city. In fact it does not fully cover even the areas for which branch and main sewers have been laid.

House Connections

Except the area in which UIT has laid sewer lines does not have sewer house connections, without which the sewer lines cannot function properly. Only about 3600 odd sewer connections exist in the entire city as against 75000 households as per MCU surveys of houses year 2001.

Sewage treatment plant

The city does not have any sewage treatment facility as yet. There had been genuine efforts on behalf of Govt. to acquire land for STP by various agencies but due to public resistance the required laid could not be acquired. Now finally PHED is in last stage of acquiring land in the village Manwa Kheda along the bank of Ayad river.

Existing Outfall Sewers

Size of existing outfall sewer is 800mm dia. RCC NP-2 pipe and was laid in 1985/1986. As per PHED report on Sewerage Scheme, design of outfall sewer was considered for 15 year i.e. upto the demand of year 1999-2000. Design slope of 800mm dia outfall sewer is 1 in 850 and calculated design capacity is 2/15-m3/min. Serving population of 1,28,450. But the projected population in year 2011 and 2041 is 6.46 and 13.96 lacs respectively. Therefore need of a new outfall sewer has to be considered with respect to construction of a Sewage Treatment Plant.

9.2.5 Works proposed to be taken up for the design period 2011

For immediate solution and to prevent pollution in lakes it is proposed to provide sewerage network in entire present development of the town with sewage treatment facility. This will involve laying about 400 km network of sewer lines of sizes 200mm to 1600mm and about 74000 sewer house connections. The sewage treatment plant can be constructed in phased manner. Modular treatment plant of 20 MLD capacity can be built in the first instance and another module of same capacity can be added towards the end of first phase. An special emphasis shall have to be given to the work of sewer house connection which is the key of success of the sewerage system. For this activity an extensive IEC campaign shall have to be taken up to motivate the people and help of NGO shall be required. It is also proposed to employ a design supervision consultant to prepare DPR and supervision of the work. Provision of all above activities has been taken in the proposal whose total cost is envisaged Rs 19041.20 Lakhs.

9.2.6 Works proposed to be taken up for design period 2041

For providing sanitation facilities in the city and to present pollution of lakes it is proposed to provide sewerage network in entire present development and projected development for year 2041. This will involve laying about 1000 km network of sewer lines of sizes 200 mm to 1600mm and about 250000 sewer house connections. The sewage treatment plant of total treatment capacity of 120 MLD can be constructed in phased manner. Modular treatment plant of 20 MLD capacities can be built in the first instance and another modules of same capacity can be added later on as per the requirement. An special emphasis shall have to be plan to the work of sewer house connection which is the key of success of the sewerage system. For this activity an extensive IEC campaign shall have to taken up to motivate the people and help of NGO shall be required. It is also proposed to employ a design supervision consultant to prepare DPR and supervision of the work. The provision of all above activities has been taken in the proposal whose total cost is envisaged Rs 52702.14 Lakhs.

Sewerage: Service Levels, Goals and Outcomes

	Components	Present	Horizon Period

		Situation	2011	2016	2021
1	Network Coverage	42%	70%	90%	100%
2	Treatment & Disposal	Nil	60%	100%	100%
3	Recycle and Reuse	Nil	20%	30%	40%
4	O & M Cost Recovery	Not available	100%	100%	100%

MAP 9.2.1 SEWERAGE NETWORK
Source: RUIDP Estimates

9.3 DRAINAGE

9.3.1 Existing status

Ayad River and its tributaries drain Udaipur city. Kotra River one of the biggest tributary of Ayad commands an extensive catchment area in the southern west part of the city. Most of the rainwater in Kotra River pour into Pichola Lake and enter the river Ayad through Swaroop Sager Lake and Gumania Drain. In general the undulating topography and existence of a number of huge water bodies do not cause any drainage problem. vikas

Most of the existing roads of the city have lined drains alongside and most part of the area run off is discharged into the Ayad River. The city is generally free from prolonged drainage congestion except in few places identified as problematic areas. The main drains leading to storm water receivers are irregular and mostly unlined. The vents of the cross drainage works are almost choked and are not functioning properly resulting sluggish flow. Moreover the service pipes in many places crossing through drains also impede the flow. The internal drainage network also needs to be improved in some places. An inventory of the existing drainage lengths of the city is presented in the table below.

TABLE 9.3.1 INVENTORY OF EXISTING DRAINAGE LENGTH

	Major Primary drains	31 km	20
	Major Secondary drains	1000 km	80

The existing major drains are mostly irregular and unlined. The drains are full of weeds, vegetation, silt and rubbish. The vents are totally choked with reduced cross sections causing sluggish flow. The drains are insufficient to carry the runoff during storm resulting flooding of adjacent roads and colonies. These drains carry the runoff as well as domestic waste water from the city.. Ultimately, these drains lead the total storm water and waste to Ayad River through agricultural lands with no definite alignment. They simply follow the contours of the land.