

## Annex to 3.4.1 Description Of Proposed Measures For Wastewater Collection, Treatment And Disposal

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### **34. WADI ZARQA TREATMENT PLANT**

Wadi Zarqa Treatment Plant is part of the drainage system covering Amman-Zarqa River Basin Area. Long-term development concept for sewerage in this area is described under Section No. 6 together with the proposed As Samra Wastewater Treatment Plant..

The proposed Wadi Zarqa Treatment Plant will receive wastewater flows from the eastern portions of Amman (Tariq and Marka) as well as Zarqa, Russeifa and Hashimiyya via a new gravity conveyance system. The Wadi Zarqa system will also collect and treat wastewater from the presently unsewered Sukhna Municipality (see Figure 34.1 and also Figure 3.1).

A new pumping station to the Wadi Zarqa Plant will discharge wastewater of Sukhna Municipality. In order to minimize the potential for accumulation of grit and solids in the pressure main to the plant construction of a new pretreatment facility at the junction of the proposed West Zarqa and Hasimiyya conveyance lines is proposed.

The new Wadi Zarqa Treatment Plant will be constructed at a site along Wadi Zarqa approximately 15 km downstream of the confluence of the Wadi Dhuleil and the Wadi Zarqa. Treatment facilities to be provided will be based on activated sludge/nitrification/denitrification process with tertiary treatment capability (see Figure 34.2). Facilities providing for effective nitrogen removal were determined (according to Consultant’s Study Report) to be required due to the high concentrations (80 to 100 mg/l) of ammonia in the wastewater from the drainage area. Without effective nitrogen removal, attainment of Jordanian Standards for discharge of wastewater effluent to wadis and catchment areas would not be possible and improvements in water quality along Wadi Zarqa and in the King Talal Reservoir would be limited. Also nitrogen removal will be required for effluent reuse for irrigation purposes assuming existing cropping pattern continues to prevail. Sludge generated at the facility will be thickened, digested anaerobically, dewatered (using vacuum drying beds) and stored on-site for 2 – 3 years prior to disposal through land application. Figure 34.2 shows the proposed new treatment system.

The projection of the wastewater production is shown in the following table (acc. to HARZA Study). Final capacity of the treatment plant will be reached

in 2015 (Phase 1):	146,000 m <sup>3</sup> /d (1,470,000 connected inhabitants)
in 2025 (Phase 2):	227,000 m <sup>3</sup> /d (2,100,000 connected inhabitants)

Effluent of the plant will be discharged to the Wadi Zarqa adjacent to the plant. Finally the treated wastewater will flow into the King Talal Reservoir. From there water will flow to the Jordan Valley for ultimate reuse.

Total investment costs of Phase 1 and 2 (for future rehabilitation, expansion and development measures) based on preliminary design and 1997 prices (HARZA Study) are:

Treatment plant	95.39 million JD
Pre-treatment (Sukhna pretreatment facility)	3.34 million JD
Conveyance (without collection system)	15.54 million JD
Total base costs	114.29 million JD
Physical contingencies	14.28 million JD
Engineering	14.28 million JD
Land acquisition	7.00 million JD
Total investment costs	149.86 million JD
Collection system (Phase 1 and 2)	9.50 million JD

According to the HARZA Study Report proposed measures will be implemented between 2001 and 2005 (Phase 1) and between 2013 and 2015 (Phase 2). However, it seems more realistic that these measures are implemented after 2005.

**Consultant’s Study Report:**

USAID/Harza: “Master plan and feasibility study for the rehabilitation, expansion and development of existing wastewater systems in Amman-Zarqa River Basin Area. Plan Year 2025”, July 1997.

ARD/USAID: “Water resource policy support. Pre-feasibility study. Water reuse for agriculture and/ or forestry in the Amman-Zarqa Highlands (Internal Draft)”, September 2000.

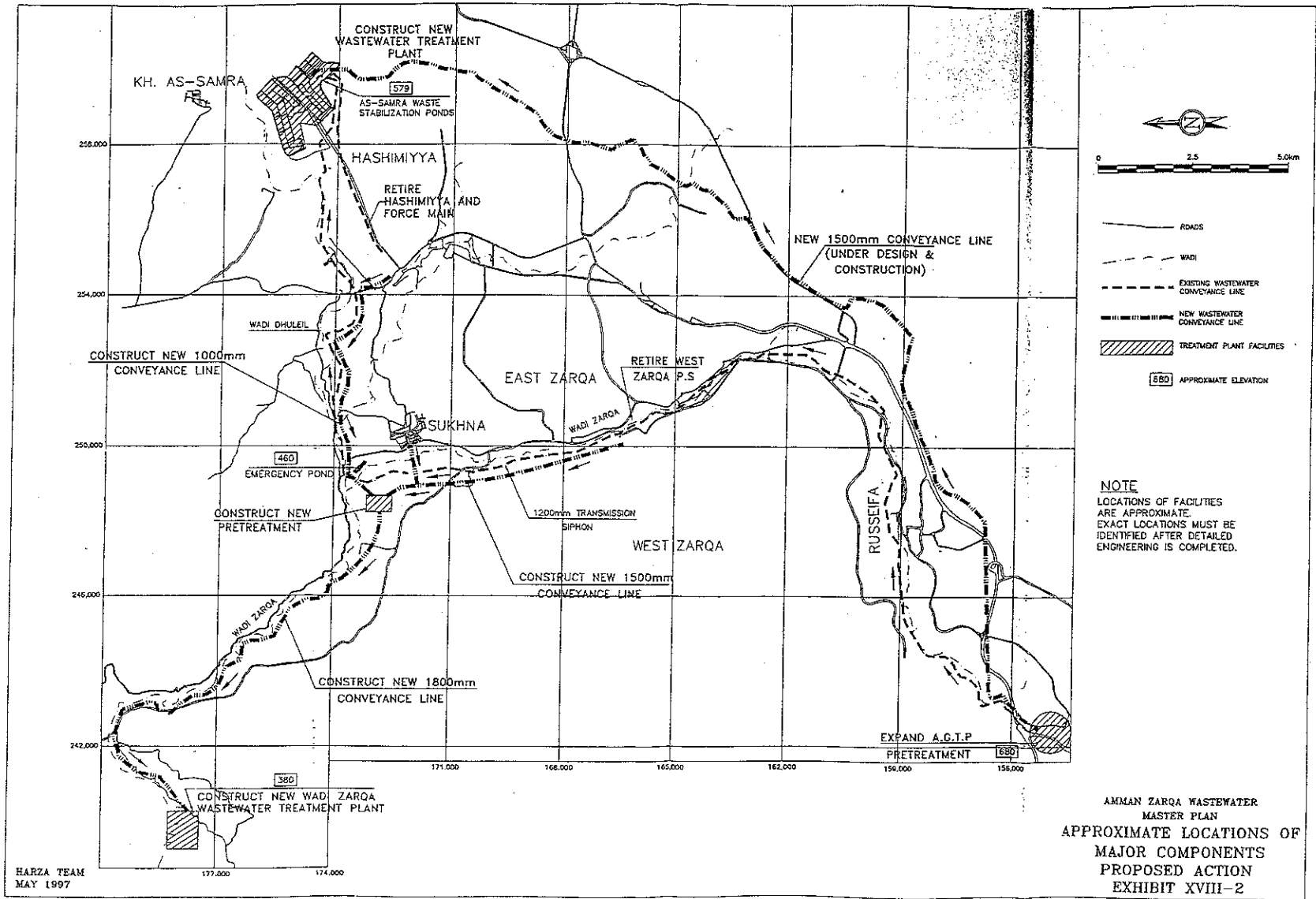
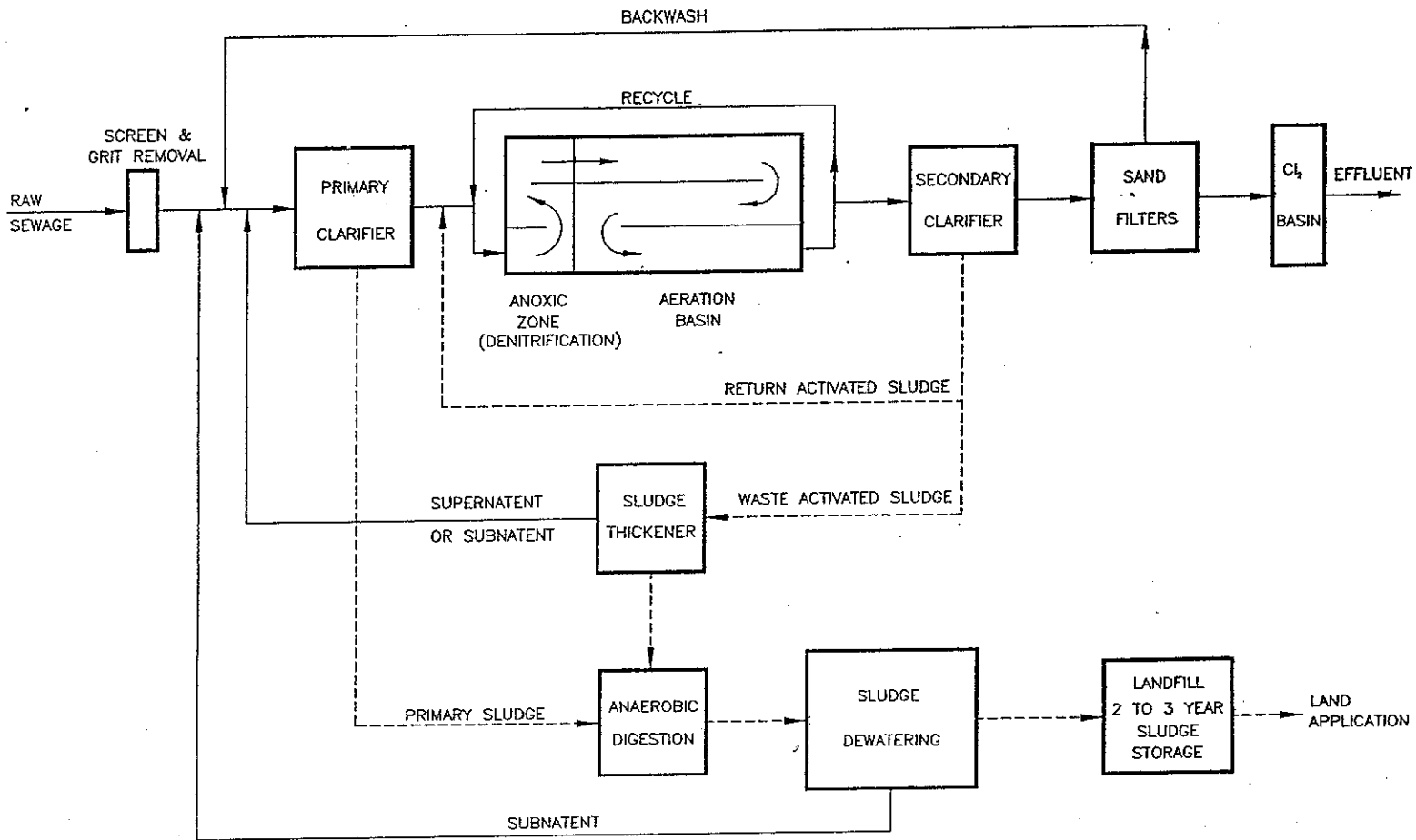


FIGURE 34.1: General Layout of Proposed Sewerage System - WADI ZARQA

SA3-341



AMMAN ZARQA WASTEWATER  
 MASTER PLAN  
 ACTIVATED SLUDGE,  
 NITRIFICATION/DENITRIFICATION  
 SYSTEM  
 EXHIBIT XVIII-3

FIGURE 34.2: Layout of Proposed Wastewater Treatment Plant - WADI ZARQA

**PROJECTION OF WASTEWATER PRODUCTION OF TREATMENT PLANT:**

**34 Wadi Zarqa**

**SCENARIO 0 "Consultants' Study"**

(acc. to Consultant's Study Report)

<b>Basic data:</b>							
	Population in 1994:	0 (population is served by As Samra until 2005)					
	Population in 2005:	963.000 (in ex.drainage areas W.Zarqa/Russeifa,E.Zarqa/Hashimiy					
	Population in 2005:	34.000 (living in newly connected area of Sukhna Municipality) (see also As Samra system)					
	Unit	1994	2000	2005	2010	2015	2020
Growth rate (previous period)	%	-	-	-	4	3,93	3,72
Spec.water demand	l/c/d	-	-	105	109	114	119
Commercial demand	m <sup>3</sup> /d						
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Coverage	%	95,84	95,84	100	100	100	100
Return factor	-	0,87	0,87	0,87	0,87	0,87	0,87
Losses/inflow	%	0	0	0	0	0	0
Specific pollutional load	gBOD <sub>5</sub> /c/d	65	65	65	65	65	65
	Unit	1994	2000	2005	2010	2015	2020
<b>Population</b>	c	0	0	0	1.213.003	1.470.844	1.765.546
Connected (sewerage)	c	0	0	0	1.213.003	1.470.844	1.765.546
Not connected (sewerage)	c	0	0	0	0	0	0
<b>Water demand</b>							
Domestic demand	l/c/d	0	0	105	109	114	119
	m <sup>3</sup> /d	0	0	0	132.217	167.676	210.100
Commercial demand	m <sup>3</sup> /d						
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Total	m <sup>3</sup> /d	0	0	0	132.217	167.676	210.100
<b>Wastewater production</b>							
Return flow (w.demand)	m <sup>3</sup> /d	0	0	0	115.029	145.878	182.787
Losses/inflow	m <sup>3</sup> /d	0	0	0	0	0	0
Total	m <sup>3</sup> /d	0	0	0	115.029	145.878	182.787
	m <sup>3</sup> /month	0	0	0	3.450.872	4.376.348	5.483.609
	m <sup>3</sup> /a	0	0	0	41.985.610	53.245.567	66.717.246
<b>Pollutional load</b>							
Poll. load (dom.demand)	kgBOD <sub>5</sub> /d	0	0	0	78.845	95.605	114.760
Poll. load (com.demand)	kgBOD <sub>5</sub> /d						
Poll. load (small ind.)	kgBOD <sub>5</sub> /d						
Others	kgBOD <sub>5</sub> /d						
Total load	kgBOD <sub>5</sub> /d	0	0	0	78.845	95.605	114.760
<b>Reuse of wastewater</b>							
Inflow to the treatment plant	m <sup>3</sup> /a	0	0	0	41.985.610	53.245.567	66.717.246
Losses in treatment plant	%	25	25	5	5	5	5
(due to infiltr./evap.)	m <sup>3</sup> /a	0	0	0	2.099.281	2.662.278	3.335.862
Effluent of treatment plant	m <sup>3</sup> /a	0	0	0	39.886.330	50.583.289	63.381.384
Net water demand per ha	m <sup>3</sup> /a/ha	-	-	-	-	-	-
Irrigable reuse area	ha	-	-	-	-	-	-

**Water demand for irrigation**

### **35. MAZAR, MUTA, ADNANIYA TREATMENT PLANT**

The project area is located south of City of Karak. Project measures serve particularly for the prevention of the pollution of the aquifer and improvement of sanitation in the urban areas. Due to the construction of the Muta University growth rates of the region have been increasing beyond normal growth pattern in Jordan.

The wastewater collection system will comprise house connections, primary and secondary network. The transmission main will convey sewage of Mazar passing Muta and Adnaniya, where the main will receive the wastewater of these towns (see Figure 35.1).

The site of the treatment plant is proposed north of Adnaniya, approximately 2 km south of the City of Karak (some 500 m west of Karak-Mazar Road). The site lies on the hillside (16 % slope) and extends to a wadi at the west side. Wastewater treatment is based on a stabilization pond system consisting of anaerobic, ponds, followed by facultative ponds and maturation ponds as well as final chlorination of treated effluent (see Figure 35.2). The plant will contain two parallel trains of treatment.

The projection of the wastewater production is shown in the following table. Final capacity of the treatment plant will be reached

in 2020:            3,500 m<sup>3</sup>/d (34,000 connected inhabitants)

The effluents could supply irrigation water for an area of about 75 ha in 2020 taking into account the demand for irrigation of eucalyptus trees (see following table). A suitable area to allow distribution by gravity for irrigation will be downstream of the plant. A 2 km long transmission main will be constructed to discharge treated effluent to the land.

The investment costs based on 2000 prices are roughly estimated to:

Treatment Plant	2.50 million JD
Transmission main	0.90 million JD
Collection network	4.50 million JD
Total Base Costs	7.90 million JD
Physical Contingencies (15 %)	1.19 million JD
Engineering (15 %)	1.19 million JD
Total Investment Costs	10.28million JD

#### **Consultant’s Study Report:**

Jordan Engineer Consult: Unknown title of a study on the wastewater collection, treatment and disposal for Mazar, Muta and Adnaniya in Karak Governorate. Related study of 1985/86 could not be found.

Arab Center for Engineering Studies: “Site investigation for the proposed wastewater treatment plant, Site no. 2. Mazar, Muta and Adnaniya”, July 1986.

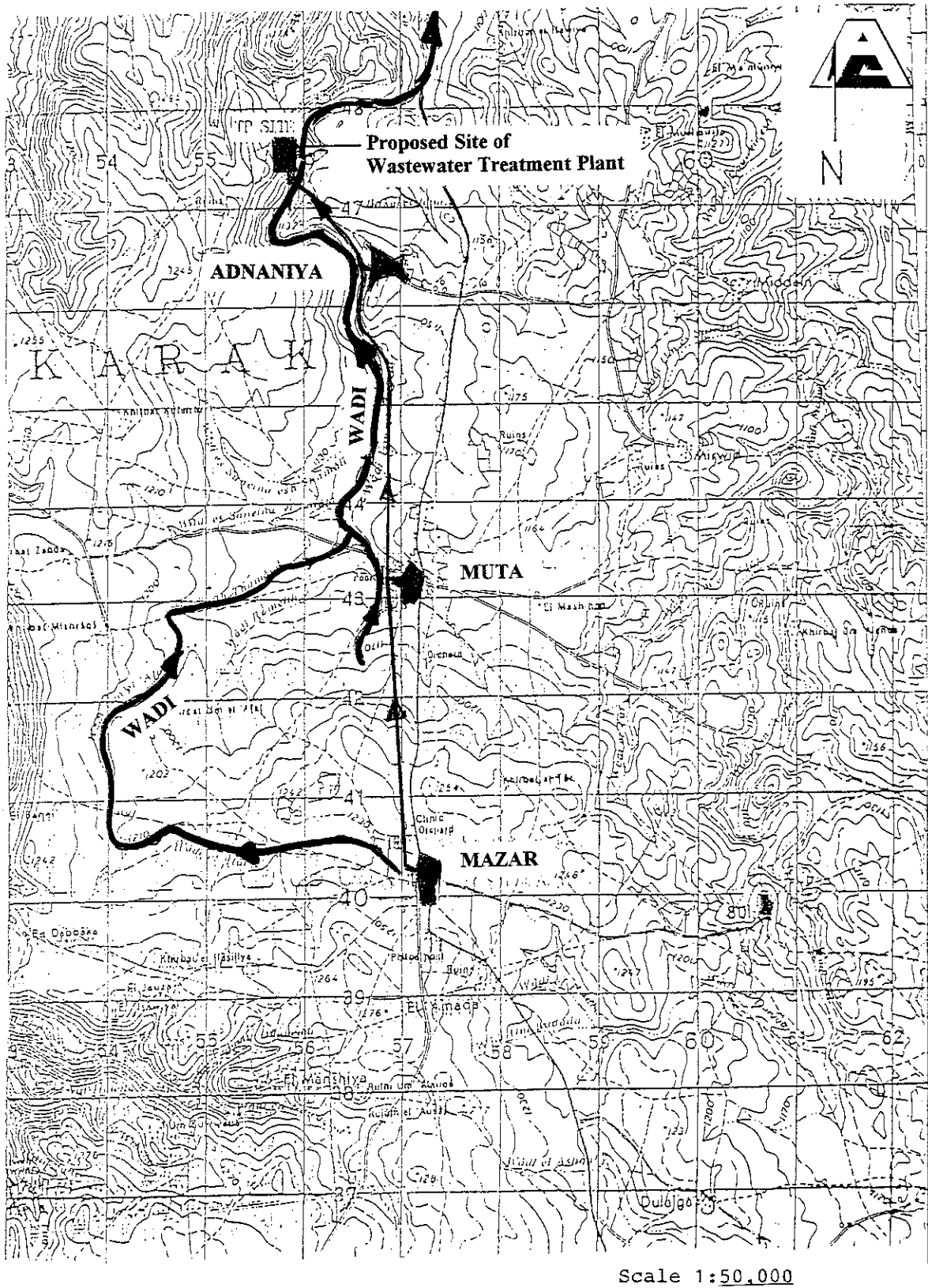


FIGURE 35.1: General Layout of Proposed Sewerage System - MAZAR – MUTA - ADNANIYA



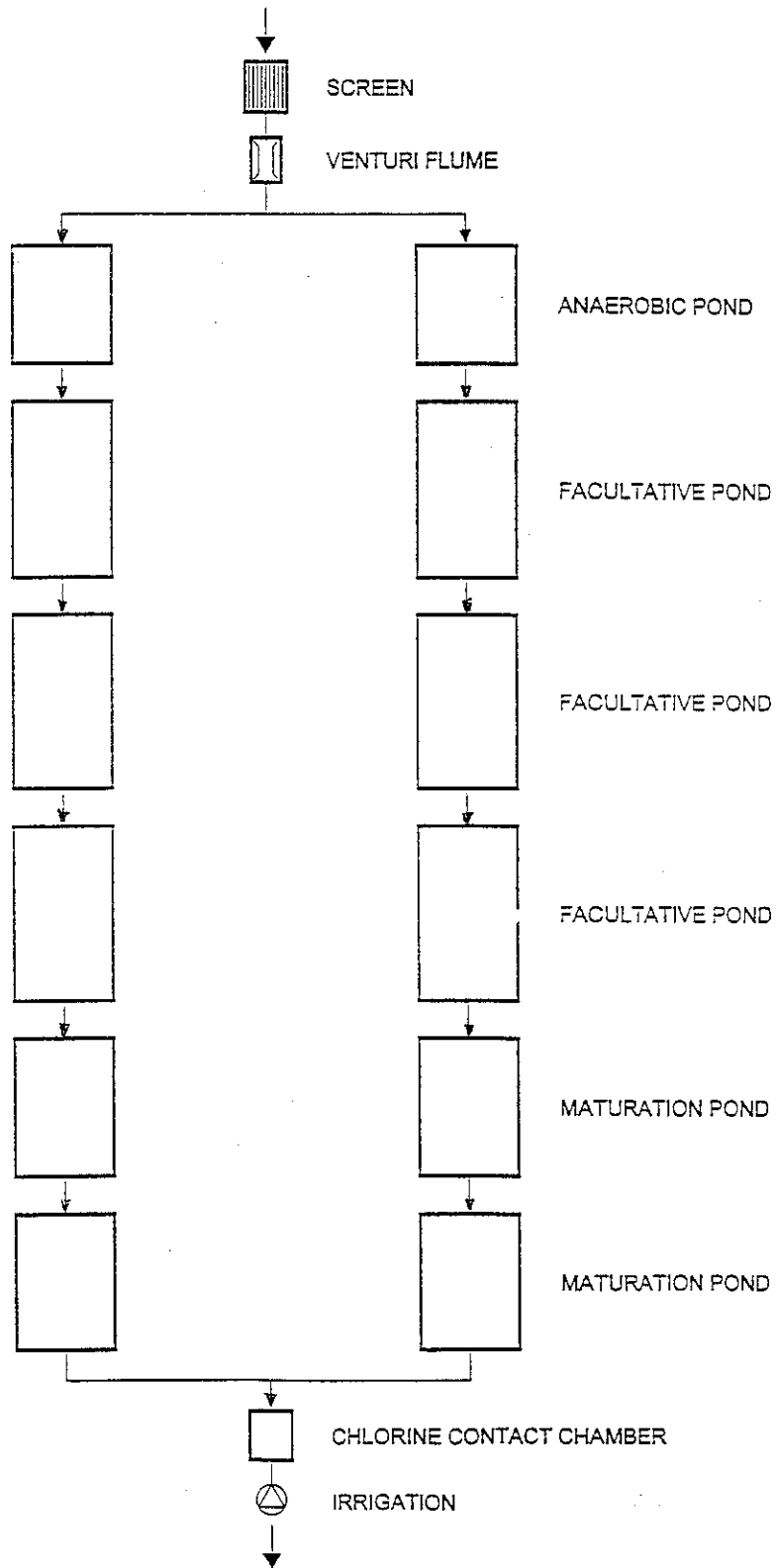


FIGURE 35.2: Layout of Proposed Wastewater Treatment Plant - MAZAR-MUTA-ADNANIYA

## PROJECTION OF WASTEWATER PRODUCTION OF TREATMENT PLANT:

### 35 MAZAR-MUTA-ADNANIYA

#### SCENARIO 0 "Consultants' Study"

(Consultant's Study Report not available)

#### Basic data:

Population in 1994:	18.038	Mazar:	7.855	Muta:	8.207	Aldnaniya:	
	Unit	1994	2000	2005	2010	2015	2020
Growth rate (previous period)	%	-	3,4	3,4	3,1	2,9	2,7
Spec. water demand	l/c/d	-	103	100	129	129	129
Commercial demand	m <sup>3</sup> /d						
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Coverage	%	0	0	0	70	80	85
Return factor	-	0,8	0,8	0,8	0,8	0,8	0,8
Losses/inflow	%	0	0	0	0	0	0
Specific polluttional load	gBOD <sub>5</sub> /c/d	65	65	65	65	65	65

	Unit	1994	2000	2005	2010	2015	2020
<b>Population</b>	c	18.038	22.045	26.056	30.353	35.017	40.007
Connected (sewerage)	c	0	0	0	21.247	28.014	34.006
Not connected (sewerage)	c	18.038	22.045	26.056	9.106	7.003	6.001
<b>Water demand</b>							
Domestic demand	l/c/d	-	103	100	129	129	129
Commercial demand	m <sup>3</sup> /d	0	2.271	2.606	3.916	4.517	5.161
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Total	m <sup>3</sup> /d	0	2.271	2.606	3.916	4.517	5.161
<b>Wastewater production</b>							
Return flow (w.demand)	m <sup>3</sup> /d	0	0	0	2.193	2.891	3.509
Losses/inflow	m <sup>3</sup> /d	0	0	0	0	0	0
Total	m <sup>3</sup> /d	0	0	0	2.193	2.891	3.509
	m <sup>3</sup> /month	0	0	0	65.782	86.731	105.283
	m <sup>3</sup> /a	0	0	0	800.347	1.055.230	1.280.938
<b>Polluttional load</b>							
Poll. load (dom.demand)	kgBOD <sub>5</sub> /d	0	0	0	1.381	1.821	2.210
Poll. load (com.demand)	kgBOD <sub>5</sub> /d						
Poll. load (small ind.)	kgBOD <sub>5</sub> /d						
Others	kgBOD <sub>5</sub> /d						
Total load	kgBOD <sub>5</sub> /d	0	0	0	1.381	1.821	2.210
<b>Reuse of wastewater</b>							
inflow to the treatment plant	m <sup>3</sup> /a	0	0	0	800.347	1.055.230	1.280.938
Losses in treatment plant	%	0	25	25	25	25	25
(due to infiltr./evap.)	m <sup>3</sup> /a	0	0	0	200.087	263.807	320.235
Effluent of treatment plant	m <sup>3</sup> /a	0	0	0	600.260	791.422	960.704
Net water demand per ha	m <sup>3</sup> /d/ha	-	35	35	35	35	35
Irrigable reuse area	ha	-	0	0	47	62	75

**Water demand for irrigation**      Eucalyptus trees      35      m<sup>3</sup>/d/ha

### **36. DEAD SEA EAST COAST TREATMENT PLANT**

The Ministry of Water and Irrigation and the Jordan Valley Authority have completed a Master Plan for the “Tourism Development of the East Coast of the Dead Sea”. In its first phase, the Master Plan addressed a total area of approximately 4,000,000 m<sup>2</sup> along the coast. The implementation of the proposed infrastructure is required to facilitate the growth and development of the area as a major contributor to the national economy of Jordan.

A main interceptor will collect and discharge wastewater generated from the tourist village, Suweimeh Village, along the coastal road of the Dead Sea (see Figure 36.1). The coastal areas shall pump their sewage to the main sewer. Six successive pump stations along the main sewer are proposed until reaching the wastewater treatment plant.

The wastewater treatment plant will be located at a distance of about 4,500 m south of the main development area in Suweimeh (east of the coastal road, see Figure 36.1). Extended aeration is proposed as treatment process. The Consultant recommends in order reaching an effluent quality suitable for landscape irrigation to provide tertiary treatment including filtration in two stages, removal of salts, if necessary, and a pH adjustment. In addition, maturation ponds providing a retention period of not less than 10 days before reuse (see Figure 36.2) will improve the effluent quality. Private treatment plants of the existing hotels will be abandoned after implementation of the wastewater collection and treatment facilities.

The maximum daily sewage produced by the whole Tourist Development Area including Suweimeh Village and nearby private lands is determined by a maximum occupancy rate of 0.8 for the tourist accommodation facilities, while the average discharge is calculated taking into account an average occupancy rate of 0.33. The projection of the wastewater production is shown in the following table. Final capacity of the treatment plant will be reached

in 2010 (Phase 1):	max. daily inflow 4,350 m <sup>3</sup> /d (av.daily inflow 2,000 m <sup>3</sup> /d) including 3,450 connected inhabitants and 12,500 hotel beds
in 2020 (Phase 2):	max. daily inflow 8,500 m <sup>3</sup> /d (av.daily inflow 3,800 m <sup>3</sup> /d) including 4,550 connected inhabitants and 25,000 hotel beds

The wastewater reuse facilities will consist of a pumping station at the treatment plant to pump the treated effluent to a reservoir located at the site through a 1,100 m long pressure line (DN 300). Treated effluent will be reused for landscape (70 ha of parks and green spaces) irrigation within the tourist development area (see Figure 36.1 and 36.3).

The investment costs (acc. to the Consultant’s Study) based on 1996 prices are:

Treatment Plant	5.50 million JD
Main interceptor (force main)	0.61 million JD
Pump stations	0.60 million JD
Reuse system (irrigation main, reservoirs, pump station)	0.42 million JD
<b>Total Base Costs</b>	<b>7.13 million JD</b>

Physical Contingencies (15 %)	1.07 million JD
Engineering (15 %)	1.07 million JD
Total Investment Costs	9.27 million JD

According to the Consultant’s Study Report implementation of proposed construction measures were foreseen before 2000. However, this implementation schedule is not anymore valid. It is more realistic that the measures will be completed end of 2005. At present Terms of Reference are prepared for the implementation of the technical infrastructure as turnkey project.

**Consultant’s Study Report:**

Sigma Consulting Engineers: “Tourism development project of the East Coast of the Dead Sea (SPA). Master plan and detailed design of primary infrastructure networks”, May 1997

Sigma Consulting Engineers: “Tourism development project of the East Coast of the Dead Sea. Water and irrigation network, wastewater collection network and disposal system. Executive summary”, November 1999

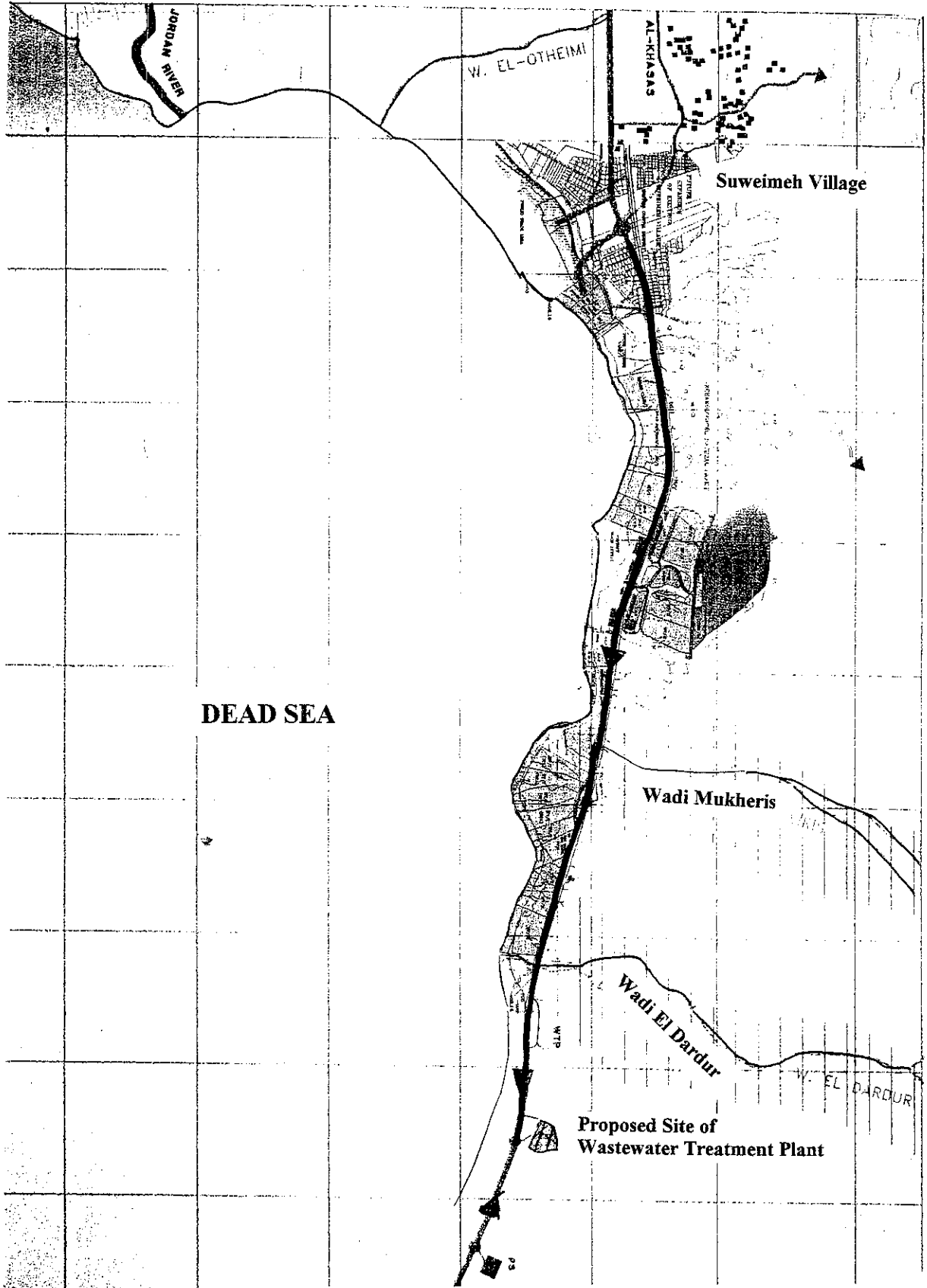
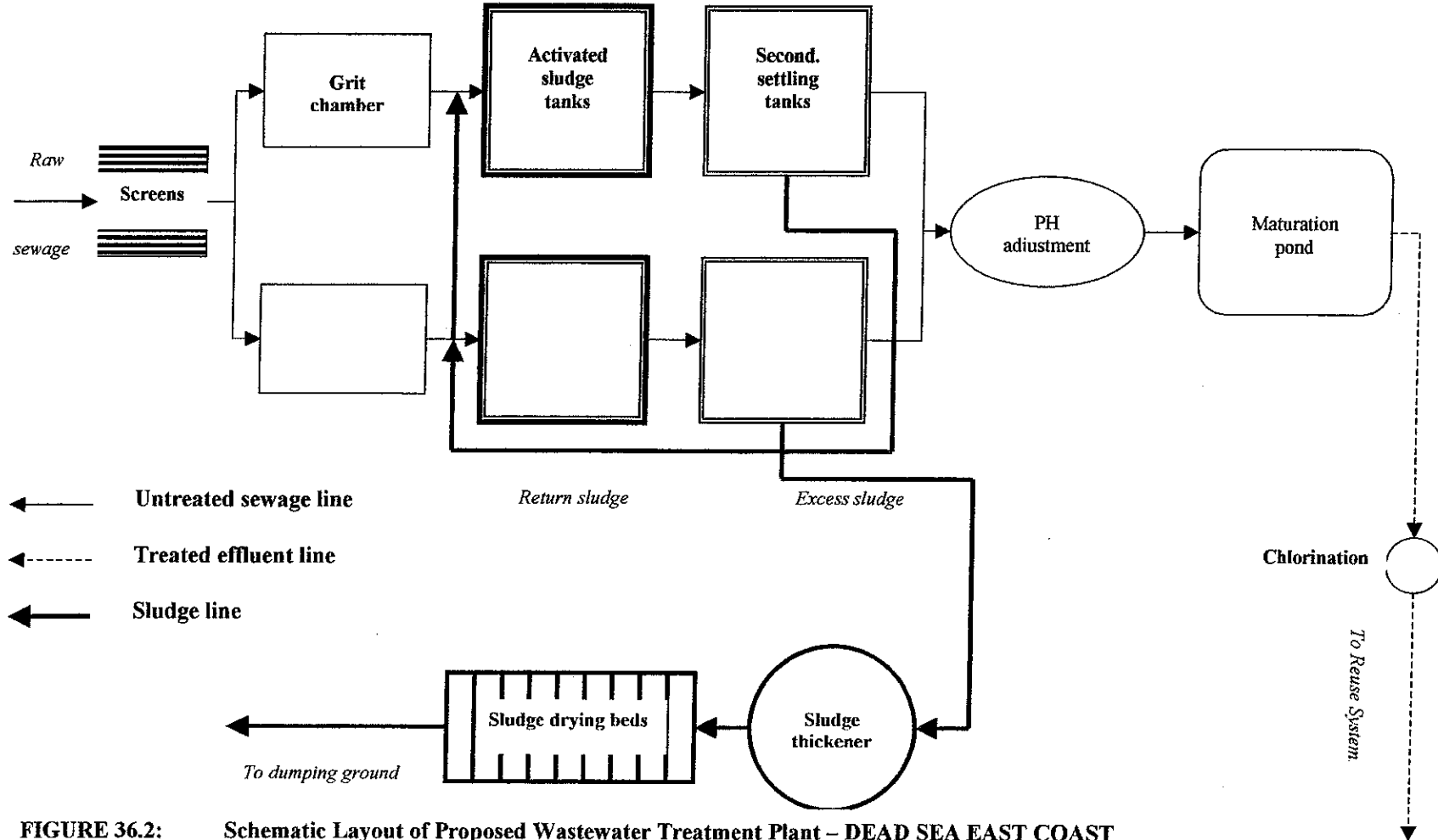


FIGURE 36.1: General Layout of Proposed Sewerage System - DEAD SEA EAST COAST



**FIGURE 36.2: Schematic Layout of Proposed Wastewater Treatment Plant – DEAD SEA EAST COAST**

## PROJECTION OF WASTEWATER PRODUCTION OF TREATMENT PLANT: 36 Dead Sea East Coast

### SCENARIO 0 "Consultants' Study"

(acc. to Consultant's Study Report)

Project will be implemented by Jordan Valley Authority

#### Basic data:

Population in 1994: 2.053 Suweimeh

	Unit	1994	2000	2005	2010	2015	2020
Growth rate (previous period)	%	-	3,4	3,4	3,1	2,9	2,7
Spec.water demand	l/c/d	-	103	100	129	129	129
Commercial demand	m <sup>3</sup> /d						
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Coverage	%	0	0	90	100	100	100
Return factor	-	0,8	0,8	0,8	0,8	0,8	0,8
Losses/inflow	%	0	0	0	0	0	0
Specific pollutional load	gBOD <sub>5</sub> /c/d	65	65	65	65	65	65
	Unit	1994	2000	2005	2010	2015	2020
<b>Population</b>	c	2.053	2.509	2.966	3.455	3.986	4.553
Connected (sewerage)	c	0	0	2.669	3.455	3.986	4.553
Not connected (sewerage)	c	2.053	2.509	297	0	0	0
<b>Water demand</b>							
Domestic demand	l/c/d	-	103	100	129	129	129
Commercial demand	m <sup>3</sup> /d	0	258	297	446	514	587
Small industrial demand	m <sup>3</sup> /d						
Pastoral demand	m <sup>3</sup> /d						
Average tourist demand 1)	m <sup>3</sup> /d			1.030	2.060	3.110	4.120
Total	m <sup>3</sup> /d	0	258	1.327	2.506	3.624	4.707
Max. demand 1)	m <sup>3</sup> /d			2.797	5.446	8.014	10.587
<b>Wastewater production</b>							
Return flow (w.demand)	m <sup>3</sup> /d	0	0	955	2.005	2.899	3.766
Losses/inflow	m <sup>3</sup> /d	0	0	0	0	0	0
Total (average)	m <sup>3</sup> /d	0	0	955	2.005	2.899	3.766
	m <sup>3</sup> /month	0	0	28.654	60.136	86.979	112.977
	m <sup>3</sup> /a	0	0	348.620	731.651	1.058.247	1.374.558
Total (maximum)	m <sup>3</sup> /d	0	0	2.014	4.357	6.411	8.470
<b>Pollutional load</b>							
Poll. load (dom.demand)	kgBOD <sub>5</sub> /d	0	0	173	225	259	296
Poll. load (com.demand)	kgBOD <sub>5</sub> /d						
Poll. load (small ind.)	kgBOD <sub>5</sub> /d						
Others 3)	kgBOD <sub>5</sub> /d	0	0	134	268	402	536
Average total load	kgBOD <sub>5</sub> /d	0	0	308	493	661	832
Max. total load	kgBOD <sub>5</sub> /d			498	875	1.234	1.596
<b>Reuse of wastewater</b>							
Inflow to the treatment plant 2)	m <sup>3</sup> /a	0	0	348.620	731.651	1.058.247	1.374.558
Losses in treatment plant	%	0	10	10	10	10	10
(due to infiltr./evap.)	m <sup>3</sup> /a	0	0	34.862	73.165	105.825	137.456
Effluent of treatment plant	m <sup>3</sup> /a	0	0	313.758	658.486	952.422	1.237.102
Net water demand per ha	m <sup>3</sup> /d/ha	-	50	50	50	50	50
Irrigable reuse area	ha	-	0	17	36	52	68

**Water demand for irrigation**      Green areas      50    m<sup>3</sup>/d/ha

- 1) Average/max. tourist demand taking into account an occupancy rate of 33/80 % and a water demand per bed of 500 l/d/bed (2010: 12,500 beds, 2020: 25,000 beds)
- 2) Average annual inflow taking into account 33 % occupancy rate only
- 3) Pollutional load per bed: 65 g/d/bed      %

**ANNEX to 3.4.2**

**Future Quantities of Wastewater  
Collected, Treated and to be Reused**



Table 1(0): Population connected to treatment plants (Scenario 0 "Consultants' Study")

	Treatment Plant	Governorate (raw sewage generation)	Total population (living in service area)					Connected population				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	22,860	26,811	31,445	36,880	43,254	14,859	20,108	26,728	31,348	36,766
2	Aqaba	Aqaba	79,338	115,605	165,503	235,619	301,433	61,883	115,605	165,503	235,619	301,433
3	As-Samra	Amman	2,019,256	2,480,448	1,867,505	2,277,572	2,761,702	1,877,908	2,356,425	1,867,505	2,277,572	2,761,702
4	Baqa	Balqa	152,575	177,547	206,606	240,421	279,771	143,420	168,669	196,276	228,400	265,782
5	Fuhis	Balqa	20,456	23,901	28,114	33,069	38,898	11,251	20,316	25,302	29,762	35,008
6	Irbid (Central)	Irbid	92,861	107,177	123,706	142,783	164,803	46,431	75,024	111,335	128,505	148,323
7	Jerash (East)	Jerash	51,149	59,354	68,874	79,922	92,741	15,345	29,677	41,325	55,945	74,193
8	Karak	Karak	22,640	31,559	37,121	43,664	51,360	13,131	20,513	24,129	30,565	35,952
9	Kufranja	Ajlun	54,435	64,030	75,315	88,590	104,204	35,383	44,821	60,252	75,302	88,574
10	Ma'an	Ma'an	27,933	32,857	38,648	45,460	53,472	16,760	19,714	27,053	36,368	48,125
11	Madaba	Madaba	63,806	76,148	90,877	108,456	129,436	47,854	57,111	77,246	95,442	116,492
12	Mafraq	Mafraq	38,217	44,089	50,864	58,679	67,696	19,108	22,045	25,432	29,340	33,848
13	Ramtha	Irbid	58,037	68,598	81,080	95,833	113,271	37,724	48,018	64,864	81,458	101,944
14	Salt	Balqa	67,806	78,682	91,302	105,947	122,941	40,683	66,879	77,607	90,055	104,500
15	Tafelah	Tafila	25,334	29,800	35,052	41,230	48,497	12,667	16,390	24,536	28,861	33,948
16	Wadi Arab	Irbid	150,320	186,878	225,188	279,285	346,378	75,160	130,815	202,669	251,357	311,741
17	Wadi Essir	Amman	13,319	15,621	18,321	21,488	25,202	10,655	12,497	15,573	18,265	21,422
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	18,300	21,735	25,814	30,290	35,543	15,555	18,474	21,942	25,747	30,212
19	Wadi Mousa	Ma'an	20,641	24,444	28,948	32,776	37,119	9,495	12,955	17,369	20,649	24,127
	<b>Planned</b>											
20	Al Jeeza	Amman	49,272	56,843	65,578	75,654	87,279	0	56,843	65,578	75,654	87,279
21	Al Mazar Al Shamali	Irbid	25,525	29,763	34,705	40,468	47,187	0	0	29,499	34,398	40,109
22	Dair Abi Said	Irbid	26,987	31,468	36,693	42,786	49,890	0	0	0	36,368	42,407
23	Dair Alla	Balqa	60,258	70,066	81,470	94,731	110,150	0	59,556	69,250	80,521	93,627
24	Jerash West	Jerash	43,109	50,024	58,047	67,358	78,162	0	0	34,828	47,151	62,530
25	Kofur Asad	Irbid	69,873	80,884	93,630	108,385	125,466	0	0	79,586	92,128	106,646
26	Aqaba South Coast	Aqaba	4,341	5,470	6,892	8,683	10,941	0	5,470	6,892	8,683	10,941
27	Naur	Amman	18,602	23,741	30,300	38,672	49,356	0	0	27,270	36,738	46,888
28	North Queen Alia Airport	Amman	159,869	184,434	212,773	245,468	283,185	0	184,434	212,773	245,468	283,185
29	North Jordan Valley	Irbid	69,025	80,369	93,011	106,965	122,224	0	59,473	74,409	85,572	97,779
30	Shuna South	Balqa	38,218	44,349	51,462	59,717	69,295	0	37,696	43,743	50,759	58,901
31	Torra	Irbid	30,620	35,704	41,632	48,545	56,606	0	0	0	41,263	48,115
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	120,806	143,341	169,399	199,111	234,614	0	123,058	145,598	171,335	202,120
34	Wadi Zarqa	Zarqa	0	0	1,213,003	1,470,844	1,765,546	0	0	1,213,003	1,470,844	1,765,546
35	Mazar, Muta, Adnaniya	Karak	22,045	26,056	30,353	35,017	40,007	0	0	21,247	28,014	34,006
36	Dead Sea East Coast	Balqa	2,509	2,966	3,455	3,986	4,553	0	2,669	3,455	3,986	4,553
	<b>Totals</b>		<b>3,740,343</b>	<b>4,530,759</b>	<b>5,512,688</b>	<b>6,644,355</b>	<b>7,952,183</b>	<b>2,505,274</b>	<b>3,785,256</b>	<b>5,099,778</b>	<b>6,279,439</b>	<b>7,558,723</b>

Table 2(0): Wastewater quantities (Scenario 0 "Consultants' Study")

	Treatment Plant	Governorate (TP location)	Wastewater inflow to the treatment plants (m³/a)					Wastewater effluent of the treatment plants (m³/a)				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
<b>Existing</b>												
1	Abu Nuseir	Amman	520,648	839,628	1,116,053	1,308,955	1,535,199	494,616	797,647	1,060,250	1,243,507	1,458,439
2	Aqaba	Aqaba	3,137,941	6,076,200	8,698,855	12,384,127	15,843,302	2,353,456	5,468,580	7,828,969	11,145,715	14,258,972
3	As-Samra	Zarqa	61,175,215	94,283,638	77,686,427	98,361,056	123,653,958	45,881,412	89,569,456	73,802,105	93,443,003	117,471,260
4	Baqa	Balqa	4,187,875	6,895,209	8,023,749	9,336,998	10,865,186	3,769,088	6,205,688	7,622,562	8,870,148	10,321,927
5	Fuhis	Balqa	439,021	628,819	827,490	1,008,102	1,216,452	395,119	565,937	744,741	907,291	1,094,807
6	Irbid (Central)	Irbid	1,626,933	2,804,097	4,226,286	4,380,000	4,380,000	1,545,586	2,663,893	4,014,971	4,161,000	4,161,000
7	Jerash (East)	Jerash	582,490	1,239,190	1,725,547	2,336,045	3,097,996	524,241	1,115,271	1,552,992	2,102,441	2,788,197
8	Karak	Karak	421,782	778,685	1,056,845	1,338,744	1,574,705	379,604	700,817	951,161	1,204,870	1,417,235
9	Kufranja	Ajlun	826,544	1,308,767	2,111,238	2,858,445	3,620,897	785,217	1,243,329	2,005,676	2,715,523	3,439,852
10	Ma'an	Ma'an	623,974	733,952	1,007,201	1,410,388	1,866,349	467,980	550,464	755,401	1,057,791	1,399,761
11	Madaba	Madaba	1,397,342	1,751,019	2,706,695	3,483,619	4,251,980	1,048,007	1,575,917	2,436,025	3,135,257	3,826,764
12	Mafraq	Mafraq	725,354	933,365	1,113,914	1,345,045	1,630,790	544,015	886,697	1,058,218	1,277,793	1,549,250
13	Ramtha	Irbid	826,161	1,261,924	1,894,023	2,497,504	3,274,432	619,621	1,135,732	1,704,621	2,247,754	2,946,989
14	Salt	Balqa	1,187,954	2,343,453	2,945,955	3,681,446	4,271,951	1,069,159	2,109,108	2,651,359	3,313,302	3,844,756
15	Tafielah	Tafielah	332,892	574,297	931,398	1,095,562	1,288,661	299,603	516,867	838,258	986,006	1,159,795
16	Wadi Arab	Irbid	2,414,139	4,889,336	7,693,332	10,039,562	13,084,010	2,293,432	4,644,869	7,308,665	9,537,584	12,429,810
17	Wadi Essir	Amman	342,252	419,654	591,161	762,673	894,496	308,027	377,689	532,045	686,406	805,046
<b>Under construction</b>												
18	Wadi Hassan	Irbid	386,075	485,509	608,667	751,808	926,288	347,468	436,958	547,801	676,627	833,660
19	Wadi Mousa	Ma'an	668,965	918,750	1,239,138	1,502,279	1,786,030	602,068	826,875	1,115,224	1,352,051	1,607,427
<b>Planned</b>												
20	Al Jeeza	Amman	0	1,710,654	2,111,139	2,621,096	3,199,377	0	1,539,588	1,900,025	2,358,986	2,879,440
21	Al Mazar Al Shamali	Irbid	0	0	1,214,553	1,416,221	1,651,374	0	0	1,153,825	1,345,410	1,568,805
22	Dair Abi Said	Irbid	0	0	0	1,550,443	1,807,883	0	0	0	1,472,921	1,717,489
23	Dair Alla	Balqa	0	2,399,862	2,790,481	3,244,680	3,772,808	0	2,279,869	2,650,957	3,082,446	3,584,168
24	Jerash West	Jerash	0	0	1,454,295	1,968,825	2,611,000	0	0	1,381,581	1,870,384	2,480,450
25	Kofur Asad	Irbid	0	0	3,253,472	3,766,176	4,359,675	0	0	3,090,798	3,577,867	4,141,692
26	Aqaba South Coast	Aqaba	0	287,497	362,234	456,399	575,043	0	273,122	344,122	433,579	546,290
27	Naur	Amman	0	0	1,060,229	1,458,663	1,903,527	0	0	954,206	1,312,796	1,713,175
28	North Queen Alia Airport	Amman	0	5,550,394	6,849,811	8,504,418	10,380,714	0	4,995,354	6,164,830	7,653,976	9,342,642
29	North Jordan Valley	Irbid	0	2,206,709	2,942,981	3,554,144	4,282,724	0	2,096,374	2,795,832	3,376,436	4,068,588
30	Shuna South	Balqa	0	1,519,010	1,762,659	2,045,389	2,373,470	0	1,443,059	1,674,526	1,943,120	2,254,796
31	Torra	Irbid	0	0	0	1,759,136	2,051,227	0	0	0	1,671,179	1,948,666
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	0	3,715,470	4,506,552	5,453,261	6,610,136	0	3,343,923	4,055,897	4,907,935	5,949,123
34	Wadi Zarqa	Zarqa	0	0	41,985,610	53,245,567	66,717,246	0	0	39,886,330	50,583,289	63,381,384
35	Mazar, Muta, Aldnaniya	Karak	0	0	800,347	1,055,230	1,280,938	0	0	600,260	791,422	960,704
36	Dead Sea East Coast	Balqa	0	348,620	731,651	1,058,247	1,374,558	0	313,758	658,486	952,422	1,237,102
<b>Totals</b>			<b>81,823,559</b>	<b>146,903,707</b>	<b>198,029,988</b>	<b>253,040,252</b>	<b>314,014,364</b>	<b>63,727,718</b>	<b>137,676,839</b>	<b>185,842,721</b>	<b>237,398,236</b>	<b>294,589,459</b>

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**Table 3(0): Wastewater quantities and population per Governorate (Scenario 0 "Consultants' Study")**

Governorate (TP location)		Wastewater inflow to the treatment plants (m <sup>3</sup> /a)					Wastewater effluent of the treatment plants (m <sup>3</sup> /a)				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	826.544	1.308.767	2.111.238	2.858.445	3.620.897	785.217	1.243.329	2.005.676	2.715.523	3.439.852
2	Amman	862.900	8.520.330	11.728.393	14.655.805	17.913.314	802.643	7.710.278	10.611.357	13.255.672	16.198.742
3	Aqaba	3.137.941	6.363.697	9.061.089	12.840.526	16.418.344	2.353.456	5.741.703	8.173.091	11.579.293	14.805.262
4	Balqa	5.720.774	14.134.972	17.081.985	20.374.862	23.874.425	5.148.697	12.917.419	16.002.631	19.068.729	22.337.555
5	Irbid	5.253.308	15.363.045	26.339.866	35.168.254	42.427.752	4.806.106	14.321.748	24.672.410	32.974.713	39.765.821
6	Jerash	582.490	1.239.190	3.179.842	4.304.870	5.708.996	524.241	1.115.271	2.934.573	3.972.824	5.268.646
7	Karak	421.782	778.685	1.857.192	2.393.974	2.855.643	379.604	700.817	1.551.421	1.996.292	2.377.938
8	Madaba	1.397.342	1.751.019	2.706.695	3.483.619	4.251.960	1.048.007	1.575.917	2.436.025	3.135.257	3.826.764
9	Mafraq	725.354	933.365	1.113.914	1.345.045	1.630.790	544.015	886.697	1.058.218	1.277.793	1.549.250
10	Ma'an	1.292.939	1.652.702	2.246.339	2.912.667	3.652.378	1.070.049	1.377.339	1.870.625	2.409.842	3.007.188
11	Tafielah	332.892	574.297	931.398	1.095.562	1.288.661	299.603	516.867	838.258	986.006	1.159.795
12	Zarqa	61.175.215	94.283.638	119.672.037	151.606.623	190.371.204	45.881.412	89.569.456	113.688.435	144.026.292	180.852.644
Total		81.700.000	146.900.000	198.000.000	253.000.000	314.000.000	63.600.000	137.700.000	185.800.000	237.400.000	294.600.000
Governorate (sewage generation)		Total Population					Connected Population				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	124.366	145.650	169.669	195.740	223.631	35.383	44.821	60.252	75.302	88.574
2	Amman	1.932.563	2.263.302	2.636.549	3.041.675	3.475.082	1.171.038	1.711.301	2.215.427	2.685.045	3.237.243
3	Aqaba	109.837	128.635	149.848	172.873	197.506	61.883	121.075	172.395	244.302	312.373
4	Balqa	337.510	395.272	460.457	531.209	606.901	195.354	355.786	415.632	483.483	562.372
5	Irbid	909.801	1.065.505	1.241.220	1.431.943	1.635.979	174.870	454.863	729.903	948.131	1.129.394
6	Jerash	150.046	175.725	204.704	236.158	269.808	15.345	29.677	76.153	103.096	136.723
7	Karak	205.696	240.899	280.626	323.747	369.877	13.131	20.513	45.376	58.579	69.958
8	Madaba	121.622	142.436	165.926	191.421	218.697	47.854	57.111	77.246	95.442	116.492
9	Mafraq	206.567	241.919	281.815	325.118	371.444	19.108	22.045	25.432	29.340	33.848
10	Ma'an	98.284	115.105	134.087	154.690	176.732	26.255	32.669	44.422	57.017	72.252
11	Tafielah	81.286	95.198	110.897	127.937	146.167	12.667	16.390	24.536	28.861	33.948
12	Zarqa	765.939	897.021	1.044.952	1.205.516	1.377.290	732.384	919.006	1.213.003	1.470.844	1.765.546
Total		5.040.000	5.910.000	6.880.000	7.940.000	9.070.000	2.510.000	3.790.000	5.100.000	6.280.000	7.560.000

Table 4(0): Wastewater reuse (Scenario 0 "Consultants' Study")

	Treatment Plant	Governorate (of raw sewage generation)	Governorate (of treatment plant location)	Wastewater effluent of the treatment plants (m <sup>3</sup> /a)					Wastewater reuse									
				2000	2005	2010	2015	2020	2000	2005	2010	2015	2020					
	<b>Existing</b>																	
1	Abu Nuseir	Amman	Amman	494.616	797.647	1,060.250	1,243.507	1,458.439	4	11	11	11	11					
2	Aqaba	Aqaba	Aqaba	2,353.456	5,468.580	7,828.969	11,145.715	14,258.972	0	12	12	12	12					
3	As-Samra	Amman	Zarqa	45,881.412	89,569.456	73,802.105	93,443.003	117,471.260	4	3	3	3	3					
4	Balqa	Balqa	Balqa	3,769.088	6,205.688	7,622.562	8,870.148	10,321.927	4	4	4	4	4					
5	Fuhis	Balqa	Balqa	310.451	565.937	744.741	907.291	1,094.807	0	11	11	11	11					
6	Irbid (Central)	Irbid	Irbid	1,545.586	2,663.893	4,014.971	4,161.000	4,161.000	2	2	2	2	2					
7	Jerash (East)	Jerash	Jerash	524.241	1,115.271	1,552.992	2,102.441	2,788.197	4	4	4	4	4					
8	Karak	Karak	Karak	379.604	700.817	951.161	1,204.870	1,417.235	0	11	11	11	11					
9	Kufranja	Ajloun	Ajloun	785.217	1,243.329	2,005.676	2,715.523	3,439.852	5	11	11	11	11					
10	Ma'an	Ma'an	Ma'an	467.980	550.464	755.401	1,057.791	1,399.761	0	11	11	11	11					
11	Madaba	Madaba	Madaba	1,048.007	1,575.917	2,436.025	3,135.257	3,826.764	11	11	11	11	11					
12	Mafraq	Mafraq	Mafraq	544.015	886.697	1,058.218	1,277.793	1,549.250	11	11	11	11	11					
13	Ramtha	Irbid	Irbid	619.621	1,135.732	1,704.621	2,247.754	2,946.989	11	11	11	11	11					
14	Salt	Balqa	Balqa	1,069.159	2,109.108	2,651.359	3,313.302	3,844.756	6	6	6	6	6					
15	Tafieilah	Tafieilah	Tafieilah	299.603	516.867	838.258	986.006	1,159.795	0	11	11	11	11					
16	Wadi Arab	Irbid	Irbid	2,293.432	4,644.869	7,308.665	9,537.584	12,429.810	2	2	2	2	2					
17	Wadi Essir	Amman	Amman	308.027	377.689	532.045	686.406	805.046	7	11	11	11	11					
	<b>Under construction</b>																	
18	Wadi Hassan	Irbid	Irbid	347.468	436.958	547.801	676.627	833.660	0	11	11	11	11					
19	Wadi Mousa	Ma'an	Ma'an	602.068	826.875	1,115.224	1,352.051	1,607.427	0	11	11	11	11					
	<b>Planned</b>																	
20	Al Jeeza	Amman	Amman	0	1,539.588	1,900.025	2,358.986	2,879.440	0	11	11	11	11					
21	Al Mazar Al Shamali	Irbid	Irbid	0	0	1,153.825	1,345.410	1,568.805	0	0	0	0	0					
22	Dair Abi Saïd	Irbid	Irbid	0	0	0	1,472.921	1,717.489	0	0	0	12	12					
23	Dair Alla	Balqa	Balqa	0	2,279.869	2,650.957	3,082.446	3,584.168	0	12	12	12	12					
24	Jerash West	Jerash	Jerash	0	0	1,381.561	1,870.364	2,480.450	0	0	4	4	4					
25	Kofur Asad	Irbid	Irbid	0	0	3,090.798	3,577.867	4,141.692	0	0	12	12	12					
26	Aqaba South Coast	Aqaba	Aqaba	0	273.122	344.122	433.579	546.290	0	12	12	12	12					
27	Naur	Amman	Balqa	0	0	954.206	1,312.796	1,713.175	0	0	11	11	11					
28	North Queen Alia Airport	Amman	Amman	0	4,995.354	6,164.830	7,653.976	9,342.642	0	11	11	11	11					
29	North Jordan Valley	Irbid	Irbid	0	2,096.374	2,795.832	3,376.436	4,068.588	0	12	12	12	12					
30	Shuna South	Balqa	Balqa	0	1,443.059	1,674.526	1,943.120	2,254.786	0	12	12	12	12					
31	Torra	Irbid	Irbid	0	0	0	1,671.179	1,948.666	0	0	0	11	11					
32	Um Al Basateen	Amman	Amman	included in Al Jeeza					included in Al Jeeza									
33	Wadi Shalala (Irbid East)	Irbid	Irbid	0	3,343.923	4,055.897	4,907.935	5,949.123	0	11	11	11	11					
34	Wadi Zarqa	Zarqa	Zarqa	0	0	39,886.330	50,583.289	63,381.364	0	0	4	4	4					
35	Mazar, Muta, Adhaniya	Karak	Karak	0	0	600.260	791.422	960.704	0	0	11	11	11					
36	Dead Sea East Coast	Balqa	Balqa	0	313.758	658.486	952.422	1,237.102	0	12	12	12	12					
	<b>Total</b>			<b>63,643.050</b>	<b>137,676.839</b>	<b>185,842.721</b>	<b>237,398.236</b>	<b>294,589.459</b>										
Remarks:																		
1) Indicated reuses are main reuse purposes. Local reuse in the table means that 100 % of the effluent is reused for irrigation in local areas. E.g. at each treatment plant reuse is practised to a certain extent. It is estimated that in addition to that about 8-10 MCM/a more (in 2000) are used for restricted irrigation (close and downstream of the treatment plants, which have to be deducted from the other reuse paths.				Not or only partly used					0									
2) Up/Midland for elevations > +300 m a.s.l.				Local reuse (close to the treatment plant)					1 = 11 + 12									
3) Proposed industrial reuse in MCM/a				Local reuse in Up/Midland 2)					11									
				Local reuse in Jordan Valley incl. Aqaba					12									
				To Jordan Valley via pipe along Wadi Arab					2									
				Reuse of effluent from As Samra Treatment Plant					3 = 31 + 32 + 33									
				Upland areas 2)					31									
				Industrial reuse 3)					32									
				Reuse in Jordan Valley					33									
AMZA				To Jordan Valley via King Talal Reservoir					4									
Irbid				To Jordan Valley via Wadi Kufranja					5									
Aqaba				To Jordan Valley via Shua'ab Reservoir					6									
Total				To Jordan Valley via Kafrein Reservoir					7									

**Table 5(1): Population connected to treatment plants (Scenario 1)**

	Treatment Plant	Governorate (raw sewage generation)	Total population (living in service area)					Connected population				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	23.258	27.238	31.730	36.606	41.822	15.118	20.429	26.971	31.115	35.549
2	Aqaba	Aqaba	76.208	89.251	103.969	119.945	137.036	53.346	89.251	103.969	119.945	137.036
3	As-Samra	Amman	1,932.608	2,263.355	1,573.190	1,814.923	2,073.530	1,797.325	2,150.187	1,573.190	1,814.923	2,073.530
4	Baqa	Balqa	180.549	211.449	246.319	284.168	324.659	169.716	200.876	234.003	269.959	308.426
5	Fuhis	Balqa	22.342	25.595	29.816	34.398	39.299	12.288	21.756	26.835	30.958	35.369
6	Irbid (Central)	Irbid	94.953	111.203	129.542	149.447	170.742	47.476	77.842	116.588	134.502	153.668
7	Jerash (East)	Jerash	52.871	61.920	72.131	83.214	95.071	18.505	37.152	50.492	66.571	76.057
8	Karak	Karak	22.968	32.547	37.915	43.741	49.973	13.781	21.156	24.645	30.618	34.981
9	Kufranja	Ajlun	55.176	64.618	75.275	86.841	99.215	35.864	45.233	60.220	73.815	84.333
10	Ma'an	Ma'an	28.229	33.060	38.512	44.430	50.761	18.349	21.489	26.959	35.544	45.685
11	Madaba	Madaba	68.155	79.819	92.983	107.270	122.555	51.116	59.865	79.035	94.398	110.300
12	Mafraq	Mafraq	39.780	45.572	53.088	61.245	69.972	19.890	22.786	26.544	30.623	34.986
13	Ramtha	Irbid	61.258	70.177	81.750	94.311	107.750	39.818	49.124	65.400	80.165	96.975
14	Salt	Balqa	69.564	81.469	94.904	109.487	125.088	41.738	69.249	80.669	93.064	106.325
15	Taffelah	Taffelah	25.764	30.173	35.149	40.550	46.328	12.882	16.595	24.604	28.385	32.430
16	Wadi Arab	Irbid	172.495	202.016	235.331	271.492	310.176	86.248	141.411	211.798	244.343	279.159
17	Wadi Essir	Amman	10.874	12.735	14.835	17.115	19.553	8.699	10.188	12.610	14.547	16.620
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	18.300	21.432	24.966	28.802	32.907	15.555	18.217	21.221	24.482	27.971
19	Wadi Mousa	Ma'an	20.821	24.385	28.406	32.771	37.440	9.578	12.924	17.044	20.646	24.711
	<b>Planned</b>											
20	Al Jeeza	Amman	51.528	60.346	70.298	81.100	92.656	0	60.346	70.298	81.100	92.656
21	Al Mazar Al Shamali	Irbid	26.231	30.720	35.786	41.285	47.168	0	0	30.418	35.092	40.093
22	Dair Abi Said	Irbid	27.734	32.480	37.836	43.650	49.870	0	0	0	37.103	42.389
23	Dair Alla	Balqa	62.134	72.767	84.768	97.793	111.727	0	61.852	72.053	83.124	94.968
24	Jerash West	Jerash	44.560	52.186	60.792	70.133	80.126	0	0	36.475	49.093	64.101
25	Kofur Asad	Irbid	72.436	84.832	98.822	114.007	130.252	0	0	83.999	96.906	110.714
26	Aqaba South Coast	Aqaba	4.065	4.761	5.546	6.399	7.310	0	4.761	5.546	6.399	7.310
27	Naur	Amman	17.153	20.088	23.401	26.996	30.843	0	0	21.061	25.647	29.301
28	North Queen Alia Airport	Amman	167.188	195.800	228.090	263.138	300.633	0	195.800	228.090	263.138	300.633
29	North Jordan Valley	Irbid	70.564	82.640	96.268	111.061	126.886	0	61.154	77.015	88.849	101.509
30	Shuna South	Balqa	39.505	46.266	53.895	62.177	71.036	0	39.326	45.811	52.850	60.381
31	Torra	Irbid	31.467	36.852	42.929	49.526	56.582	0	0	0	42.097	48.095
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	119.625	140.098	163.202	188.279	215.107	0	120.274	140.272	162.014	185.314
34	Wadi Zarqa	Zarqa	0	0	1,034.612	1,193.588	1,363.661	0	0	1,034.612	1,193.588	1,363.661
35	Mazar, Muta, Adnaniya	Karak	22.289	26.104	30.409	35.081	40.080	0	0	21.286	28.065	34.068
36	Dead Sea East Coast	Balqa	2.537	2.971	3.461	3.993	4.562	0	2.674	3.461	3.993	4.562
	<b>Totals</b>		<b>3,735.189</b>	<b>4,376.928</b>	<b>5,069.930</b>	<b>5,848.962</b>	<b>6,682.378</b>	<b>2,467.293</b>	<b>3,631.917</b>	<b>4,653.193</b>	<b>5,487.660</b>	<b>6,293.864</b>

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Table 6(1): Wastewater quantities (Scenario 1)

	Treatment Plant	Governorate (TP location)	Wastewater inflow to the treatment plants (m <sup>3</sup> /a)					Wastewater effluent of the treatment plants (m <sup>3</sup> /a)				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
<b>Existing</b>												
1	Abu Nuseir	Amman	529,725	620,382	1,015,936	1,235,642	1,380,567	503,238	589,363	965,139	1,173,860	1,311,539
2	Aqaba	Aqaba	2,570,200	4,300,092	5,316,616	6,409,366	7,187,585	1,927,650	3,870,083	4,784,954	5,768,430	6,468,827
3	As-Samra	Zarqa	61,639,991	71,010,357	64,444,089	78,380,704	87,573,783	46,229,993	67,459,840	61,221,884	74,461,669	83,195,094
4	Baqa	Balqa	4,212,360	6,100,207	8,814,430	10,720,630	11,978,026	3,791,124	5,490,186	8,373,709	10,184,599	11,379,125
5	Fuhis	Balqa	369,583	660,689	1,010,812	1,229,409	1,373,604	332,625	594,620	909,731	1,106,468	1,236,243
6	Irbid (Central)	Irbid	1,517,146	2,511,658	4,380,000	4,380,000	4,380,000	1,441,289	2,386,075	4,161,000	4,161,000	4,161,000
7	Jerash (East)	Jerash	556,554	1,128,224	1,901,917	2,643,685	2,953,756	500,898	1,015,401	1,711,726	2,379,316	2,658,380
8	Karak	Karak	440,369	682,611	986,332	1,291,915	1,443,440	396,332	614,350	887,699	1,162,723	1,299,096
9	Kufranja	Ajlun	837,788	1,373,634	2,268,364	2,931,350	3,275,161	795,899	1,304,952	2,154,945	2,784,783	3,111,403
10	Ma'an	Ma'an	626,204	733,373	1,078,947	1,499,747	1,885,104	469,653	550,030	809,210	1,124,810	1,413,828
11	Madaba	Madaba	1,537,380	1,817,967	2,977,100	3,748,722	4,283,592	1,153,035	1,636,171	2,679,390	3,373,850	3,855,233
12	Mafraq	Mafraq	678,802	735,218	1,062,346	1,292,087	1,443,633	509,101	698,457	1,009,228	1,227,483	1,371,452
13	Ramtha	Irbid	872,004	1,491,790	2,463,482	3,183,497	3,766,109	654,003	1,342,611	2,217,134	2,865,147	3,389,499
14	Sait	Balqa	1,333,782	2,234,382	3,228,547	3,926,750	4,387,309	1,200,404	2,010,944	2,905,693	3,534,075	3,948,578
15	Tafielah	Tafielah	338,539	503,966	926,800	1,127,228	1,259,438	304,685	453,569	834,120	1,014,506	1,133,494
16	Wadi Arab	Irbid	2,593,986	4,294,381	8,264,120	10,998,525	12,802,235	2,464,286	4,079,662	7,850,914	10,448,599	12,162,123
17	Wadi Essir	Amman	261,637	309,389	474,989	577,709	645,468	235,474	278,450	427,490	519,938	580,921
<b>Under construction</b>												
18	Wadi Hassan	Irbid	467,832	553,216	799,364	972,234	1,086,265	421,049	497,895	719,428	875,011	977,639
19	Wadi Mousa	Ma'an	566,104	743,776	1,074,741	1,309,210	1,506,983	509,493	669,399	967,267	1,178,289	1,356,285
<b>Planned</b>												
20	Al Jeeza	Amman	0	1,947,140	2,780,399	3,381,685	3,733,335	0	1,752,426	2,502,359	3,043,517	3,360,001
21	Al Mazar Al Shamali	Irbid	0	0	1,145,803	1,393,593	1,557,044	0	0	1,088,512	1,323,913	1,479,192
22	Dair Abi Said	Irbid	0	0	0	1,473,422	1,646,236	0	0	0	1,399,751	1,563,924
23	Dair Alla	Balqa	0	1,878,331	2,714,075	3,301,018	3,688,187	0	1,784,415	2,578,371	3,135,968	3,503,777
24	Jerash West	Jerash	0	0	1,373,950	1,949,592	2,489,434	0	0	1,305,252	1,852,112	2,364,962
25	Kofur Asad	Irbid	0	0	3,164,073	3,848,333	4,299,694	0	0	3,005,870	3,655,916	4,084,709
26	Aqaba South Coast	Aqaba	0	162,660	235,034	285,862	319,390	0	154,527	223,282	271,569	303,420
27	Naur	Amman	0	0	890,024	1,114,737	1,234,192	0	0	801,022	1,003,263	1,110,773
28	North Queen Alia Airport	Amman	0	6,317,697	9,021,295	10,972,231	12,113,195	0	5,685,928	8,119,165	9,875,008	10,901,875
29	North Jordan Valley	Irbid	0	2,432,816	3,742,274	4,481,008	4,927,730	0	2,311,175	3,555,161	4,256,957	4,681,344
30	Shuna South	Balqa	0	1,194,246	1,725,613	2,098,792	2,344,954	0	1,134,533	1,639,332	1,993,852	2,227,706
31	Torra	Irbid	0	0	0	1,671,747	1,867,822	0	0	0	1,588,159	1,774,431
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	0	3,652,482	5,283,764	6,433,902	7,196,873	0	3,287,234	4,755,387	5,790,512	6,477,185
34	Wadi Zarqa	Zarqa	0	0	42,381,783	51,547,226	57,593,073	0	0	40,262,694	48,969,865	54,713,419
35	Mazar, Muta, Adnaniya	Karak	0	0	801,804	1,114,516	1,323,062	0	0	601,353	835,887	992,296
36	Dead Sea East Coast	Balqa	0	622,569	1,032,648	1,361,601	1,380,198	0	560,312	929,383	1,225,441	1,242,179
<b>Totals</b>			<b>81,949,985</b>	<b>120,013,255</b>	<b>188,781,471</b>	<b>234,287,676</b>	<b>262,326,475</b>	<b>63,840,231</b>	<b>112,212,607</b>	<b>176,957,805</b>	<b>219,566,245</b>	<b>245,790,951</b>

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**Table 7(1): Wastewater quantities and population per Governorate (Scenario 1)**

Governorate (TP location)	Wastewater inflow to the treatment plants (m <sup>3</sup> /a)					Wastewater effluent of the treatment plants (m <sup>3</sup> /a)				
	2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1 Ajlun	837.788	1,373.634	2,268.364	2,931.350	3,275.161	795.899	1,304.952	2,154.945	2,784.783	3,111.403
2 Amman	791.362	9,194.608	14,182.643	17,282.005	19,106.756	738.712	8,306.166	12,815.176	15,615.586	17,265.109
3 Aqaba	2,570.200	4,462.752	5,551.650	6,695.228	7,506.975	1,927.650	4,024.610	5,008.236	6,039.999	6,772.247
4 Balqa	5,915.725	12,690.424	18,526.126	22,638.201	25,152.278	5,324.153	11,575.011	17,336.219	21,180.403	23,537.609
5 Irbid	5,450.968	14,936.344	29,242.881	38,836.260	43,530.007	4,980.627	13,904.652	27,353.406	36,364.965	40,751.044
6 Jerash	556.554	1,128.224	3,275.867	4,593.276	5,443.190	500.898	1,015.401	3,016.978	4,231.428	5,023.342
7 Karak	440.369	682.611	1,788.136	2,406.430	2,766.502	396.332	614.350	1,489.052	1,998.610	2,291.392
8 Madaba	1,537.380	1,817.967	2,977.100	3,748.722	4,283.592	1,153.035	1,636.171	2,679.390	3,373.850	3,855.233
9 Mafraq	678.802	735.218	1,062.346	1,292.087	1,443.633	509.101	698.457	1,009.228	1,227.483	1,371.452
10 Ma'an	1,192.308	1,477.149	2,153.687	2,808.957	3,392.088	979.146	1,219.429	1,776.477	2,303.099	2,770.113
11 Taflelah	338.539	503.966	926.800	1,127.228	1,259.438	304.685	453.569	834.120	1,014.506	1,133.494
12 Zarqa	61,639.991	71,010.357	106,825.872	129,927.930	145,166.855	46,229.993	67,459.840	101,484.578	123,431.533	137,908.513
<b>Total</b>	<b>81,900.000</b>	<b>120,000.000</b>	<b>188,800.000</b>	<b>234,300.000</b>	<b>262,300.000</b>	<b>63,800.000</b>	<b>112,200.000</b>	<b>177,000.000</b>	<b>219,600.000</b>	<b>245,800.000</b>
Governorate (sewage generation)	Population					Connected Population				
	2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1 Ajlun	124.366	145.650	169.669	195.740	223.631	35.864	45.233	60.220	73.815	84.333
2 Amman	1,932.563	2,263.302	2,636.549	3,041.675	3,475.082	1,120.185	1,598.378	1,932.220	2,230.470	2,548.289
3 Aqaba	109.837	128.635	149.848	172.873	197.506	53.346	94.012	109.515	126.343	144.346
4 Balqa	337.510	395.272	460.457	531.209	606.901	223.743	395.733	462.831	533.949	610.031
5 Irbid	909.801	1,065.505	1,241.220	1,431.943	1,635.979	189.097	468.022	746.711	945.552	1,085.886
6 Jerash	150.046	175.725	204.704	236.158	269.808	18.505	37.152	86.967	115.665	140.158
7 Karak	205.696	240.899	280.626	323.747	369.877	13.781	21.156	45.931	58.683	69.049
8 Madaba	121.622	142.436	165.926	191.421	218.697	51.116	59.865	79.035	94.398	110.300
9 Mafraq	206.567	241.919	281.815	325.118	371.444	19.890	22.786	26.544	30.623	34.986
10 Ma'an	98.284	115.105	134.087	154.690	176.732	27.927	34.413	44.002	56.190	70.395
11 Taflelah	81.286	95.198	110.897	127.937	146.167	12.882	16.595	24.604	28.385	32.430
12 Zarqa	765.939	897.021	1,044.952	1,205.516	1,377.290	700.957	838.573	1,034.612	1,193.588	1,363.661
<b>Total</b>	<b>5,040.000</b>	<b>5,910.000</b>	<b>6,880.000</b>	<b>7,940.000</b>	<b>9,070.000</b>	<b>2,470.000</b>	<b>3,630.000</b>	<b>4,650.000</b>	<b>5,490.000</b>	<b>6,290.000</b>

**Table 8(1): Wastewater reuse (Scenario 1)**

	Treatment Plant	Governorate (of raw sewage generation)	Governorate (of treatment plant location)	Wastewater effluent of the treatment plants (m <sup>3</sup> /a)					Wastewater reuse				
				2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Existing Abu Nuseir	Amman	Amman	503,238	589,363	965,139	1,173,860	1,311,539	4	11	11	11	11
2	Aqaba	Aqaba	Aqaba	1,927,650	3,870,083	4,784,954	5,768,430	6,468,827	0	12	12	12	12
3	As-Samra	Amman	Zarqa	46,229,993	67,459,840	61,221,884	74,461,669	83,195,094	4	3	3	3	3
4	Baqa	Balqa	Balqa	3,791,124	5,490,186	8,373,709	10,184,599	11,379,125	4	4	4	4	4
5	Fuhis	Balqa	Balqa	332,625	594,620	909,731	1,106,468	1,236,243	0	11	11	11	11
6	Irbid (Central)	Irbid	Irbid	1,441,289	2,386,075	4,161,000	4,161,000	4,161,000	2	2	2	2	2
7	Jerash (East)	Jerash	Jerash	500,898	1,015,401	1,711,726	2,379,316	2,658,380	4	4	4	4	4
8	Karak	Karak	Karak	396,332	614,350	887,699	1,162,723	1,299,096	0	11	11	11	11
9	Kufranja	Ajloun	Ajloun	795,899	1,304,952	2,154,945	2,784,783	3,111,403	5	11	11	11	11
10	Ma'an	Ma'an	Ma'an	469,653	550,030	809,210	1,124,810	1,413,828	0	11	11	11	11
11	Madaba	Madaba	Madaba	1,153,035	1,636,171	2,679,390	3,373,850	3,855,233	11	11	11	11	11
12	Ma'raq	Ma'raq	Ma'raq	509,101	698,457	1,009,228	1,227,483	1,371,452	11	11	11	11	11
13	Ramtha	Irbid	Irbid	654,003	1,342,611	2,217,134	2,865,147	3,389,499	11	11	11	11	11
14	Salt	Balqa	Balqa	1,200,404	2,010,944	2,905,693	3,534,075	3,948,578	6	6	6	6	6
15	Tafelah	Tafelah	Tafelah	304,685	453,569	834,120	1,014,506	1,133,494	0	11	11	11	11
16	Wadi Arab	Irbid	Irbid	2,464,286	4,079,662	7,850,914	10,448,599	12,162,123	2	2	2	2	2
17	Wadi Essir	Amman	Amman	235,474	278,450	427,490	519,938	580,921	7	11	11	11	11
<b>Under construction</b>													
18	Wadi Hassan	Irbid	Irbid	421,049	497,895	719,428	875,011	977,639	0	11	11	11	11
19	Wadi Mousa	Ma'an	Ma'an	509,493	669,399	967,267	1,178,289	1,356,285	0	11	11	11	11
<b>Planned</b>													
20	Al Jeeza	Amman	Amman	0	1,752,426	2,502,359	3,043,517	3,360,001	0	11	11	11	11
21	Al Mazar Al Shamali	Irbid	Irbid	0	0	1,088,512	1,323,913	1,479,192	0	0	0	0	0
22	Dair Abi Sald	Irbid	Irbid	0	0	1,399,751	1,563,924	0	0	0	12	12	12
23	Dair Alla	Balqa	Balqa	0	1,784,415	2,578,371	3,135,968	3,503,777	0	12	12	12	12
24	Jerash West	Jerash	Jerash	0	0	1,305,252	1,852,112	2,364,982	0	0	4	4	4
25	Kofur Asad	Irbid	Irbid	0	0	3,005,870	3,555,916	4,084,709	0	0	12	12	12
26	Aqaba South Coast	Aqaba	Aqaba	0	154,527	223,282	271,569	303,420	0	12	12	12	12
27	Naur	Amman	Balqa	0	0	801,022	1,003,263	1,110,773	0	0	11	11	11
28	North Queen Alia Airport	Amman	Amman	0	5,685,928	8,119,165	9,875,008	10,901,875	0	11	11	11	11
29	North Jordan Valley	Irbid	Irbid	0	2,311,175	3,555,161	4,256,957	4,681,344	0	12	12	12	12
30	Shuna South	Balqa	Balqa	0	1,134,533	1,639,332	1,993,852	2,227,706	0	12	12	12	12
31	Torra	Irbid	Irbid	0	0	0	1,588,159	1,774,431	0	0	0	11	11
32	Um Al Basateen	Amman	Amman	included in Al Jeeza						included in Al Jeeza			
33	Wadi Shallala (Irbid East)	Irbid	Irbid	0	3,287,234	4,755,367	5,790,512	6,477,185	0	11	11	11	11
34	Wadi Zarqa	Zarqa	Zarqa	0	0	40,262,694	48,969,865	54,713,419	0	0	4	4	4
35	Mazar, Muta, Adhaniya	Karak	Karak	0	0	601,353	835,887	992,296	0	0	11	11	11
36	Dead Sea east Coast	Balqa	Balqa	0	560,312	929,383	1,225,441	1,242,179	0	12	12	12	12
<b>Total</b>				<b>63,840,231</b>	<b>112,212,607</b>	<b>176,957,805</b>	<b>219,566,245</b>	<b>245,790,951</b>					
<b>Remarks:</b>													
1) Indicated reuses are main reuse purposes. Local reuse in the table means that 100 % of the effluent is reused for irrigation in local areas. E.g. at each treatment plant reuse is practised to a certain extent. It is estimated that in addition to that about 8-10 MCM/a more (in 2000) are used for restricted irrigation (close and downstream of the treatment plants, which have to be deducted from the other reuse paths.				Not or only partly used					0				
2) Up/Midland for elevations > +300 m a.s.l.				Local reuse (close to the treatment plant) 1)					1 = 11 + 12				
3) Proposed industrial reuse In MCM/a				Local reuse in Up/Midland 2)					11				
				Local reuse in Jordan Valley incl. Aqaba					12				
				To Jordan Valley via pipe along Wadi Arab					2				
				Reuse of effluent from As Samra Treatment Plant					3 = 31 + 32 + 33				
				Upland areas					31				
				Industrial reuse 3)					32				
				Reuse in Jordan Valley					33				
2005				To Jordan Valley via King Talal Reservoir					4				
2010				To Jordan Valley via Wadi Kufranja					5				
2015				To Jordan Valley via Shua'ab Reservoir					6				
2020				To Jordan Valley via Kafrein Reservoir					7				
AMZA	15	15	15	20									
Irbid	0	5	5	5									
Aqaba	0	0	5	5									
Total	15	20	25	30									



Table 9(2): Population connected to treatment plants (Scenario 2)

	Treatment Plant	Governorate (raw sewage generation)	Total population (living in service area)					Connected population				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	23.258	27.238	31.730	36.606	41.822	15.118	20.429	26.971	31.115	35.549
2	Aqaba	Aqaba	76.208	89.251	103.969	119.945	137.036	53.346	89.251	103.969	119.945	137.036
3	As-Samra	Amman	1.932.608	2.263.355	1.573.190	1.814.923	2.073.530	1.797.325	2.150.187	1.573.190	1.814.923	2.073.530
4	Baqa	Balqa	180.549	211.449	246.319	284.168	324.659	169.716	200.876	234.003	269.959	308.426
5	Fuhis	Balqa	22.342	25.595	29.816	34.398	39.299	12.288	21.756	26.835	30.958	35.369
6	Irbid (Central)	Irbid	94.953	111.203	129.542	149.447	170.742	47.476	77.842	116.588	134.502	153.668
7	Jerash (East)	Jerash	52.871	61.920	72.131	83.214	95.071	18.505	37.152	50.492	66.571	76.057
8	Karak	Karak	22.968	32.547	37.915	43.741	49.973	13.781	21.156	24.645	30.618	34.981
9	Kufranja	Ajlun	55.176	64.618	75.275	86.841	99.215	35.864	45.233	60.220	73.815	84.333
10	Ma'an	Ma'an	28.229	33.060	38.512	44.430	50.761	18.349	21.489	26.959	35.544	45.685
11	Madaba	Madaba	68.155	79.819	92.983	107.270	122.555	51.116	59.865	79.035	94.398	110.300
12	Mafraq	Mafraq	39.780	45.572	53.088	61.245	69.972	19.890	22.786	26.544	30.623	34.986
13	Ramtha	Irbid	61.258	70.177	81.750	94.311	107.750	39.818	49.124	65.400	80.165	96.975
14	Salt	Balqa	69.564	81.469	94.904	109.487	125.088	41.738	69.249	80.669	93.064	106.325
15	Tafielah	Tafila	25.764	30.173	35.149	40.550	46.328	12.882	16.595	24.604	28.385	32.430
16	Wadi Arab	Irbid	172.495	202.016	235.331	271.492	310.176	86.248	141.411	211.798	244.343	279.159
17	Wadi Essir	Amman	10.874	12.735	14.835	17.115	19.553	8.699	10.188	12.610	14.547	16.620
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	18.300	21.432	24.966	28.802	32.907	15.555	18.217	21.221	24.482	27.971
19	Wadi Mousa	Ma'an	20.821	24.385	28.406	32.771	37.440	9.578	12.924	17.044	20.646	24.711
	<b>Planned</b>											
20	Al Jeeza	Amman	51.528	60.346	70.298	81.100	92.656	0	60.346	70.298	81.100	92.656
21	Al Mazar Al Shamali	Irbid	26.231	30.720	35.786	41.285	47.168	0	0	30.418	35.092	40.093
22	Dair Abi Said	Irbid	27.734	32.480	37.836	43.650	49.870	0	0	0	37.103	42.389
23	Dair Alla	Balqa	62.134	72.767	84.768	97.793	111.727	0	61.852	72.053	83.124	94.968
24	Jerash West	Jerash	44.560	52.186	60.792	70.133	80.126	0	0	36.475	49.093	64.101
25	Kofur Asad	Irbid	72.436	84.832	98.822	114.007	130.252	0	0	83.999	96.906	110.714
26	Aqaba South Coast	Aqaba	4.065	4.761	5.546	6.399	7.310	0	4.761	5.546	6.399	7.310
27	Naur	Amman	17.153	20.088	23.401	26.996	30.843	0	0	21.061	25.647	29.301
28	North Queen Alia Airport	Amman	167.188	195.800	228.090	263.138	300.633	0	195.800	228.090	263.138	300.633
29	North Jordan Valley	Irbid	70.564	82.640	96.268	111.061	126.886	0	61.154	77.015	88.849	101.509
30	Shuna South	Balqa	39.505	46.266	53.895	62.177	71.036	0	39.326	45.811	52.850	60.381
31	Torra	Irbid	31.467	36.852	42.929	49.526	56.582	0	0	0	42.097	48.095
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	119.625	140.098	163.202	188.279	215.107	0	120.274	140.272	162.014	185.314
34	Wadi Zarqa	Zarqa	0	0	1.034.612	1.193.588	1.363.661	0	0	1.034.612	1.193.588	1.363.661
35	Mazar, Muta, Adnaniya	Karak	22.289	26.104	30.409	35.081	40.080	0	0	21.286	28.065	34.068
36	Dead Sea East Coast	Balqa	2.537	2.971	3.461	3.993	4.562	0	2.674	3.461	3.993	4.562
	<b>Totals</b>		3.735.189	4.376.928	5.069.930	5.848.962	6.682.378	2.467.293	3.631.917	4.653.193	5.487.660	6.293.864

**Table 10(2): Wastewater quantities (Scenario 2)**

	Treatment Plant	Governorate (TP location)	Wastewater inflow to the treatment plants (m³/a)					Wastewater effluent of the treatment plants (m³/a)				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	529,725	620,382	1,015,936	1,362,840	1,608,931	503,238	589,363	965,139	1,294,698	1,528,485
2	Aqaba	Aqaba	2,570,200	4,300,092	5,316,616	6,960,992	8,177,942	1,927,650	3,870,083	4,784,954	6,264,893	7,360,147
3	As-Samra	Zarqa	61,639,991	71,010,357	64,444,089	86,449,306	102,059,672	46,229,993	67,459,840	61,221,884	82,126,840	96,956,688
4	Baqa	Balqa	4,212,360	6,100,207	8,814,430	11,824,224	13,959,354	3,791,124	5,490,186	8,373,709	11,233,013	13,261,386
5	Fuhis	Balqa	369,583	660,689	1,010,812	1,355,966	1,600,816	332,625	594,620	909,731	1,220,369	1,440,735
6	Irbid (Central)	Irbid	1,517,146	2,511,658	4,380,000	4,380,000	4,380,000	1,441,289	2,386,075	4,161,000	4,161,000	4,161,000
7	Jerash (East)	Jerash	556,554	1,128,224	1,901,917	2,915,829	3,442,347	500,898	1,015,401	1,711,726	2,624,246	3,098,113
8	Karak	Karak	440,369	682,611	986,332	1,424,906	1,682,205	396,332	614,350	887,699	1,282,415	1,513,984
9	Kufranja	Ajlun	837,788	1,373,634	2,268,364	3,233,107	3,816,917	795,899	1,304,952	2,154,945	3,071,451	3,626,071
10	Ma'an	Ma'an	626,204	733,373	1,078,947	1,654,132	2,196,926	469,653	550,030	809,210	1,240,599	1,647,695
11	Madaba	Madaba	1,537,380	1,817,967	2,977,100	4,134,620	4,992,156	1,153,035	1,636,171	2,679,390	3,721,158	4,492,940
12	Mafraq	Mafraq	678,802	735,218	1,062,346	1,425,096	1,682,430	509,101	698,457	1,009,228	1,353,842	1,598,308
13	Ramtha	Irbid	872,004	1,491,790	2,463,482	3,511,210	4,389,075	654,003	1,342,611	2,217,134	3,160,089	3,950,167
14	Sait	Balqa	1,333,782	2,234,382	3,228,547	4,330,974	5,113,029	1,200,404	2,010,944	2,905,693	3,897,877	4,601,726
15	Tafielah	Tafila	338,539	503,966	926,800	1,243,267	1,467,766	304,685	453,569	834,120	1,118,940	1,320,990
16	Wadi Arab	Irbid	2,593,986	4,294,381	7,978,013	11,969,111	14,697,191	2,464,286	4,079,662	7,579,113	11,370,656	13,962,331
17	Wadi Essir	Amman	261,637	309,389	474,989	637,180	752,237	235,474	278,450	427,490	573,462	677,013
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	467,832	553,216	799,364	1,072,317	1,265,948	421,049	497,895	719,428	965,085	1,139,353
19	Wadi Mousa	Ma'an	566,104	743,776	1,074,741	1,393,609	1,665,724	509,493	669,399	967,267	1,254,248	1,499,151
	<b>Planned</b>											
20	Al Jeeza	Amman	0	1,947,140	2,780,399	3,729,800	4,350,879	0	1,752,426	2,502,359	3,356,820	3,915,791
21	Al Mazar Al Shamali	Irbid	0	0	1,145,803	1,537,051	1,814,600	0	0	1,088,512	1,460,198	1,723,870
22	Dair Abi Said	Irbid	0	0	0	1,625,097	1,918,545	0	0	0	1,543,842	1,822,618
23	Dair Alla	Balqa	0	1,878,331	2,714,075	3,640,829	4,298,263	0	1,784,415	2,578,371	3,458,788	4,083,350
24	Jerash West	Jerash	0	0	1,373,950	2,150,285	2,901,220	0	0	1,305,252	2,042,771	2,756,159
25	Kofur Asad	Irbid	0	0	3,164,073	4,244,484	5,010,921	0	0	3,005,870	4,032,260	4,760,375
26	Aqaba South Coast	Aqaba	0	162,660	235,034	315,289	372,221	0	154,527	223,282	299,524	353,610
27	Naur	Amman	0	0	890,024	1,219,581	1,422,422	0	0	801,022	1,097,623	1,280,180
28	North Queen Alia Airport	Amman	0	6,317,697	9,021,295	12,101,725	14,116,881	0	5,685,928	8,119,165	10,891,553	12,705,193
29	North Jordan Valley	Irbid	0	2,432,816	3,742,274	4,942,288	5,742,844	0	2,311,175	3,555,161	4,695,174	5,455,701
30	Shuna South	Balqa	0	1,194,246	1,725,613	2,314,844	2,732,841	0	1,134,533	1,639,332	2,199,102	2,596,199
31	Torra	Irbid	0	0	0	1,843,838	2,176,785	0	0	0	1,751,646	2,067,945
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	0	3,652,482	5,283,764	7,096,216	8,387,333	0	3,287,234	4,755,387	6,386,594	7,548,599
34	Wadi Zarqa	Zarqa	0	0	42,381,783	56,853,558	67,119,746	0	0	40,262,694	54,010,880	63,763,759
35	Mazar, Muta, Adnaniya	Karak	0	0	801,804	1,229,245	1,541,914	0	0	601,353	921,934	1,156,436
36	Dead Sea East Coast	Balqa	0	622,569	1,032,648	1,377,924	1,409,503	0	560,312	929,383	1,240,131	1,268,553
	<b>Totals</b>		<b>81,949,985</b>	<b>120,013,255</b>	<b>188,495,363</b>	<b>257,500,741</b>	<b>304,267,583</b>	<b>63,840,231</b>	<b>112,212,607</b>	<b>176,686,004</b>	<b>241,323,723</b>	<b>285,094,623</b>

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**Table 11(2): Wastewater quantities and population per Governorate (Scenario 2)**

Governorate (TP location)		Wastewater inflow to the treatment plants (m <sup>3</sup> /a)					Wastewater effluent of the treatment plants (m <sup>3</sup> /a)				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	837.788	1.373.634	2.268.364	3.233.107	3.816.917	795.899	1.304.952	2.154.945	3.071.451	3.626.071
2	Amman	791.362	9.194.608	14.182.643	19.051.126	22.251.350	738.712	8.306.166	12.815.176	17.214.155	20.106.662
3	Aqaba	2.570.200	4.462.752	5.551.650	7.276.281	8.550.163	1.927.650	4.024.610	5.008.236	6.564.417	7.713.758
4	Balqa	5.915.725	12.690.424	18.526.126	24.844.762	29.113.806	5.324.153	11.575.011	17.336.219	23.249.280	27.251.948
5	Irbid	5.450.968	14.936.344	28.956.773	42.221.612	49.783.242	4.980.627	13.904.652	27.081.604	39.526.545	46.591.962
6	Jerash	556.554	1.128.224	3.275.867	5.066.114	6.343.567	500.898	1.015.401	3.016.978	4.667.017	5.854.271
7	Karak	440.369	682.611	1.788.136	2.654.151	3.224.119	396.332	614.350	1.489.052	2.204.349	2.670.420
8	Madaba	1.537.380	1.817.967	2.977.100	4.134.620	4.992.156	1.153.035	1.636.171	2.679.390	3.721.158	4.492.940
9	Mafraq	678.802	735.218	1.062.346	1.425.096	1.682.430	509.101	698.457	1.009.228	1.353.842	1.598.308
10	Ma'an	1.192.308	1.477.149	2.153.687	3.047.741	3.862.650	979.146	1.219.429	1.776.477	2.494.847	3.146.846
11	Tafielah	338.539	503.966	926.800	1.243.267	1.467.766	304.685	453.569	834.120	1.118.940	1.320.990
12	Zarqa	61.639.991	71.010.357	106.825.872	143.302.864	169.179.418	46.229.993	67.459.840	101.484.578	136.137.721	160.720.447
Total		81.900.000	120.000.000	188.500.000	257.500.000	304.300.000	63.800.000	112.200.000	176.700.000	241.300.000	285.100.000
Governorate (sewage generation)		Population					Connected Population				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	124.366	145.650	169.669	195.740	223.631	35.864	45.233	60.220	73.815	84.333
2	Amman	1.932.563	2.263.302	2.636.549	3.041.675	3.475.082	1.120.185	1.598.378	1.932.220	2.230.470	2.548.289
3	Aqaba	109.837	128.635	149.848	172.873	197.506	53.346	94.012	109.515	126.343	144.346
4	Balqa	337.510	395.272	460.457	531.209	606.901	223.743	395.733	462.831	533.949	610.031
5	Irbid	909.801	1.065.505	1.241.220	1.431.943	1.635.979	189.097	468.022	746.711	945.552	1.085.886
6	Jerash	150.046	175.725	204.704	236.158	269.808	18.505	37.152	86.967	115.665	140.158
7	Karak	205.696	240.899	280.626	323.747	369.877	13.781	21.156	45.931	58.683	69.049
8	Madaba	121.622	142.436	165.926	191.421	218.697	51.116	59.865	79.035	94.398	110.300
9	Mafraq	206.567	241.919	281.815	325.118	371.444	19.890	22.786	26.544	30.623	34.986
10	Ma'an	98.284	115.105	134.087	154.690	176.732	27.927	34.413	44.002	56.190	70.395
11	Tafielah	81.286	95.198	110.897	127.937	146.167	12.882	16.595	24.604	28.385	32.430
12	Zarqa	765.939	897.021	1.044.952	1.205.516	1.377.290	700.957	838.573	1.034.612	1.193.588	1.363.661
Total		5.040.000	5.910.000	6.880.000	7.940.000	9.070.000	2.470.000	3.630.000	4.650.000	5.490.000	6.290.000

Table 12(2): Wastewater reuse (Scenario 2)

	Treatment Plant	Governorate (of raw sewage generation)	Governorate (of treatment plant location)	Wastewater effluent of the treatment plants (m <sup>3</sup> /a)					Wastewater reuse						
				2000	2005	2010	2015	2020	2000	2005	2010	2015	2020		
1	Existing Abu Nuseir	Amman	Amman	503.238	589.363	965.139	1,294.698	1,528.485	4	11	11	11	11		
2	Aqaba	Aqaba	Aqaba	1,927.650	3,870.083	4,784.954	6,264.893	7,360.147	0	12	12	12	12		
3	As-Samra	Amman	Zarqa	46,229.993	67,459.840	61,221.884	82,126.840	96,956.688	4	3	3	3	3		
4	Baqa	Balqa	Balqa	3,791.124	5,490.186	8,373.709	11,233.013	13,261.386	4	4	4	4	4		
5	Fuhis	Balqa	Balqa	332.625	594.620	909.731	1,220.369	1,440.735	0	11	11	11	11		
6	Irbid (Central)	Irbid	Irbid	1,441.289	2,386.075	4,161.000	4,161.000	4,161.000	2	2	2	2	2		
7	Jerash (East)	Jerash	Jerash	500.898	1,015.401	1,711.726	2,624.246	3,098.113	4	4	4	4	4		
8	Karak	Karak	Karak	396.332	614.350	887.699	1,282.415	1,513.984	0	11	11	11	11		
9	Kufranja	Ajloun	Ajloun	795.899	1,304.952	2,154.945	3,071.451	3,626.071	5	11	11	11	11		
10	Ma'an	Ma'an	Ma'an	469.653	550.030	809.210	1,240.599	1,647.695	0	11	11	11	11		
11	Madaba	Madaba	Madaba	1,153.035	1,636.171	2,679.390	3,721.158	4,492.940	11	11	11	11	11		
12	Mafraq	Mafraq	Mafraq	509.101	698.457	1,009.228	1,353.842	1,598.308	11	11	11	11	11		
13	Ramtha	Irbid	Irbid	654.003	1,342.611	2,217.134	3,160.089	3,950.167	11	11	11	11	11		
14	Sait	Balqa	Balqa	1,200.404	2,010.944	2,906.693	3,897.877	4,601.726	6	6	6	6	6		
15	Tafielah	Tafielah	Tafielah	304.685	453.569	834.120	1,118.940	1,320.990	0	11	11	11	11		
16	Wadi Arab	Irbid	Irbid	2,464.286	4,079.662	7,579.113	11,370.656	13,962.331	2	2	2	2	2		
17	Wadi Essir	Amman	Amman	235.474	278.450	427.490	573.462	677.013	7	11	11	11	11		
<b>Under construction</b>															
18	Wadi Hassan	Irbid	Irbid	421.049	497.895	719.428	965.085	1,139.353	0	11	11	11	11		
19	Wadi Mousa	Ma'an	Ma'an	509.493	669.399	967.267	1,254.248	1,499.151	0	11	11	11	11		
<b>Planned</b>															
20	Al Jeeza	Amman	Amman	0	1,752.426	2,502.359	3,356.820	3,915.791	0	11	11	11	11		
21	Al Mazar Al Shamai	Irbid	Irbid	0	0	1,088.512	1,460.198	1,723.870	0	0	0	0	0		
22	Dair Abi Said	Irbid	Irbid	0	0	0	1,543.842	1,822.618	0	0	0	12	12		
23	Dair Alla	Balqa	Balqa	0	1,784.415	2,578.371	3,458.788	4,083.350	0	12	12	12	12		
24	Jerash West	Jerash	Jerash	0	0	1,305.252	2,042.771	2,756.159	0	0	4	4	4		
25	Kofur Asad	Irbid	Irbid	0	0	3,005.870	4,032.260	4,760.375	0	0	12	12	12		
26	Aqaba South Coast	Aqaba	Aqaba	0	154.527	223.282	299.524	353.610	0	12	12	12	12		
27	Naur	Amman	Balqa	0	0	801.022	1,097.623	1,280.180	0	0	11	11	11		
28	North Queen Alia Airport	Amman	Amman	0	5,685.928	8,119.165	10,891.553	12,705.193	0	11	11	11	11		
29	North Jordan Valley	Irbid	Irbid	0	2,311.175	3,555.161	4,695.174	5,455.701	0	12	12	12	12		
30	Shuna South	Balqa	Balqa	0	1,134.533	1,639.332	2,199.102	2,596.199	0	12	12	12	12		
31	Torra	Irbid	Irbid	0	0	0	1,751.646	2,067.945	0	0	0	11	11		
32	Um Al Basateen	Amman	Amman	included in Al Jeeza				included in Al Jeeza							
33	Wadi Shallala (Irbid East)	Irbid	Irbid	0	3,287.234	4,755.387	6,386.594	7,548.599	0	11	11	11	11		
34	Wadi Zarqa	Zarqa	Zarqa	0	0	40,262.694	54,010.880	63,763.759	0	0	4	4	4		
35	Mazar, Muta, Adnaniya	Karak	Karak	0	0	601.353	921.934	1,156.436	0	0	11	11	11		
36	Dead Sea east Coast	Balqa	Balqa	0	560.312	929.383	1,240.131	1,268.553	0	12	12	12	12		
<b>Total</b>				<b>63,840,231</b>	<b>112,212,607</b>	<b>176,686,004</b>	<b>241,323,723</b>	<b>285,094,623</b>							
Remarks:				Not or only partly used					0	4,361.487	0	1,088.512	1,460.198	1,723.870	
1) Indicated reuses are main reuse purposes. Local reuse in the table means that 100 % of the effluent is reused for irrigation in local areas. E.g. at each treatment plant reuse is practised to a certain extent. It is estimated that in addition to that about 8-10 MCM/a more (in 2000) are used for restricted irrigation (close and downstream of the treatment plants, which have to be deducted from the other reuse paths.				Local reuse (close to the treatment plant) 1)					1 = 11 + 12	2,316.139	29,770.499	48,076.421	68,396.242	80,809.591	
2) Up/Midland for elevations > +300 m a.s.l.				Local reuse in Up/Midland 2)					11	2,316.139	19,955.454	31,360.068	44,662.527	53,109.037	
3) Proposed industrial reuse in MCM/a				Local reuse in Jordan Valley incl. Aqaba					12	0	9,815.045	16,716.353	23,733.715	27,700.554	
				To Jordan Valley via pipe along Wadi Arab					2	3,905.575	6,465.737	11,740.113	15,531.656	18,123.331	
				Reuse of effluent from As Samra Treatment Plant					3 = 31 + 32 + 33	0	67,459.840	61,221.884	82,126.840	96,956.688	
				Upland areas					31	0	0	0	0	0	
				Industrial reuse 3)					32	0	15,000.000	15,000.000	15,000.000	20,000.000	
				Reuse in Jordan Valley					33	46,229.993	52,459.840	46,221.884	67,126.840	76,956.688	
AMZA	2005	2010	2015	2020	To Jordan Valley via King Talal Reservoir					4	51,025.254	58,965.427	97,875.265	137,037.750	159,836.105
Irbid	15	15	15	20	To Jordan Valley via Wadi Kufranja					5	795.899	0	0	0	0
Aqaba	0	5	5	5	To Jordan Valley via Shua'ab Reservoir					6	1,200.404	2,010.944	2,905.693	3,897.877	4,601.726
Total	0	0	5	5	To Jordan Valley via Kafrein Reservoir					7	235.474	0	0	0	0

Table 13(3): Population connected to treatment plants (Scenario 3)

	Treatment Plant	Governorate (raw sewage generation)	Total population (living in service area)					Connected population				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	23.003	26.051	29.475	33.024	36.461	14.952	19.539	25.054	28.070	30.992
2	Aqaba	Aqaba	75.373	85.361	96.579	108.208	119.470	52.761	85.361	96.579	108.208	119.470
3	As-Samra	Amman	1,911.437	2,164.726	1,419.261	1,590.159	1,755.664	1,777.636	2,056.490	1,419.261	1,590.159	1,755.664
4	Baqa	Balqa	178.571	202.234	228.810	256.361	283.044	167.857	192.123	217.369	243.543	268.891
5	Fuhis	Balqa	22.098	23.775	26.899	30.138	33.275	12.154	20.209	24.209	27.124	29.947
6	Irbid (Central)	Irbid	93.913	106.357	120.334	134.823	148.856	46.956	74.450	108.300	121.341	133.970
7	Jerash (East)	Jerash	52.292	59.221	67.003	75.072	82.885	18.302	35.533	46.902	60.057	66.308
8	Karak	Karak	22.716	31.897	36.088	40.434	44.642	13.630	20.733	23.457	28.304	31.249
9	Kufranja	Ajlun	54.571	61.803	69.924	78.344	86.498	35.471	43.262	55.939	66.592	73.523
10	Ma'an	Ma'an	27.920	31.620	35.775	40.083	44.254	18.148	20.553	25.042	32.066	39.829
11	Madaba	Madaba	67.409	76.341	86.373	96.774	106.846	50.557	57.256	73.417	85.161	96.161
12	Mafraq	Mafraq	39.345	42.331	47.893	53.660	59.245	19.672	21.165	23.947	26.830	29.623
13	Ramtha	Irbid	60.587	65.185	73.751	82.632	91.232	39.381	45.630	59.001	70.237	82.109
14	Salt	Balqa	68.802	77.919	88.158	98.774	109.054	41.281	66.231	74.935	83.958	92.696
15	Tafelah	Tafila	25.482	28.858	32.651	36.582	40.390	12.741	15.872	22.855	25.608	28.273
16	Wadi Arab	Irbid	165.691	187.647	212.305	237.870	262.627	82.845	131.353	191.075	214.083	236.364
17	Wadi Essir	Amman	10.755	12.180	13.781	15.440	17.047	8.604	9.744	11.714	13.124	14.490
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	18.300	20.725	23.448	26.272	29.006	15.555	17.616	19.931	22.331	24.655
19	Wadi Mousa	Ma'an	20.593	23.322	26.387	29.564	32.641	9.473	12.361	15.832	18.625	21.543
	<b>Planned</b>											
20	Al Jeeza	Amman	50.964	57.717	65.301	73.164	80.779	0	57.717	65.301	73.164	80.779
21	Al Mazar Al Shamali	Irbid	25.944	29.382	33.243	37.245	41.122	0	0	28.256	31.659	34.954
22	Dair Abi Said	Irbid	27.430	31.065	35.147	39.379	43.478	0	0	0	33.472	36.956
23	Dair Alla	Balqa	61.453	69.597	78.742	88.224	97.406	0	59.157	66.931	74.990	82.795
24	Jerash West	Jerash	44.072	49.912	56.471	63.271	69.856	0	0	33.882	44.289	55.885
25	Kofur Asad	Irbid	71.642	81.136	91.798	102.851	113.556	0	0	78.028	87.424	96.523
26	Aqaba South Coast	Aqaba	4.021	4.554	5.152	5.772	6.373	0	4.554	5.152	5.772	6.373
27	Naur	Amman	16.965	19.213	21.737	24.355	26.890	0	0	19.564	23.137	25.545
28	North Queen Alia Airport	Amman	165.356	187.268	211.877	237.390	262.097	0	187.268	211.877	237.390	262.097
29	North Jordan Valley	Irbid	69.791	79.039	89.425	100.193	110.621	0	58.489	71.540	80.154	88.497
30	Shuna South	Balqa	39.072	44.250	50.064	56.093	61.931	0	37.612	42.555	47.679	52.641
31	Torra	Irbid	31.122	35.246	39.878	44.679	49.330	0	0	0	37.977	41.930
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	118.315	133.993	151.601	169.855	187.534	0	115.033	130.301	146.161	161.561
34	Wadi Zarqa	Zarqa	0	0	933.380	1,045.771	1,154.616	0	0	933.380	1,045.771	1,154.616
35	Mazar, Muta, Adnaniya	Karak	22.045	24.966	28.247	31.648	34.942	0	0	19.773	25.319	29.701
36	Dead Sea East Coast	Balqa	2.509	2.842	3.215	3.602	3.977	0	2.557	3.215	3.602	3.977
	<b>Totals</b>		<b>3.689.557</b>	<b>4.177.731</b>	<b>4.630.171</b>	<b>5.187.704</b>	<b>5.727.645</b>	<b>2.437.978</b>	<b>3.467.866</b>	<b>4.244.573</b>	<b>4.863.381</b>	<b>5.390.589</b>

Table 14(3): Wastewater quantities (Scenario 3)

	Treatment Plant	Governorate (TP location)	Wastewater inflow to the treatment plants (m³/a)					Wastewater effluent of the treatment plants (m³/a)				
			2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
	<b>Existing</b>											
1	Abu Nuseir	Amman	523,922	593,348	943,719	1,229,483	1,402,697	497,726	563,681	896,533	1,168,009	1,332,562
2	Aqaba	Aqaba	2,542,044	4,112,710	4,938,688	6,279,843	7,129,684	1,906,533	3,701,439	4,444,820	5,651,859	6,416,715
3	As-Samra	Zarqa	60,964,751	67,915,989	58,138,537	75,743,230	86,414,201	45,723,563	64,520,190	55,231,610	71,956,068	82,093,491
4	Baqa	Balqa	4,166,215	5,834,382	8,187,863	10,667,196	12,170,028	3,749,594	5,250,944	7,778,470	10,133,837	11,561,527
5	Fuhis	Balqa	365,535	613,694	911,909	1,188,040	1,355,415	328,981	552,325	820,718	1,069,236	1,219,874
6	Irbid (Central)	Irbid	1,500,527	2,402,209	4,334,421	4,380,000	4,380,000	1,425,500	2,282,099	4,117,699	4,161,000	4,161,000
7	Jerash (East)	Jerash	550,457	1,079,060	1,766,721	2,630,508	3,001,103	495,411	971,154	1,590,049	2,367,457	2,700,993
8	Karak	Karak	435,545	668,965	938,812	1,317,174	1,502,742	391,990	602,068	844,931	1,185,457	1,352,468
9	Kufranja	Ajlun	828,610	1,313,776	2,107,119	2,916,740	3,327,660	787,180	1,248,087	2,001,763	2,770,903	3,161,277
10	Ma'an	Ma'an	619,344	701,415	1,002,250	1,492,272	1,915,322	464,508	526,061	751,688	1,119,204	1,436,491
11	Madaba	Madaba	1,520,538	1,738,747	2,765,475	3,730,038	4,352,256	1,140,404	1,564,872	2,488,928	3,357,034	3,917,030
12	Mafraq	Mafraq	671,366	682,922	958,400	1,248,609	1,424,518	503,524	648,776	910,480	1,186,179	1,353,292
13	Ramtha	Irbid	862,451	1,385,679	2,222,442	3,076,374	3,716,242	646,839	1,247,111	2,000,198	2,768,736	3,344,618
14	Sait	Balqa	1,319,171	2,137,016	2,999,049	3,907,178	4,457,635	1,187,254	1,923,315	2,699,144	3,516,460	4,011,872
15	Tafielah	Tafielah	334,830	482,005	860,919	1,121,610	1,279,626	301,347	433,804	774,827	1,009,449	1,151,664
16	Wadi Arab	Irbid	2,491,658	3,988,923	7,197,402	10,643,727	12,760,322	2,367,075	3,789,476	6,837,532	10,111,540	12,122,306
17	Wadi Essir	Amman	258,771	295,907	441,225	574,830	655,814	232,894	266,316	397,102	517,347	590,233
	<b>Under construction</b>											
18	Wadi Hassan	Irbid	467,832	534,970	750,767	978,103	1,115,902	421,049	481,473	675,690	880,293	1,004,311
19	Wadi Mousa	Ma'an	562,948	726,674	1,029,105	1,305,123	1,522,366	506,653	654,007	926,195	1,174,611	1,370,129
	<b>Planned</b>											
20	Al Jeeza	Amman	0	1,862,290	2,582,756	3,364,830	3,793,179	0	1,676,061	2,324,481	3,028,347	3,413,861
21	Al Mazar Al Shamali	Irbid	0	0	1,064,354	1,386,647	1,582,002	0	0	1,011,136	1,317,314	1,502,902
22	Dair Abi Said	Irbid	0	0	0	1,466,078	1,672,624	0	0	0	1,392,774	1,588,993
23	Dair Alla	Balqa	0	1,796,481	2,521,147	3,284,566	3,747,307	0	1,706,657	2,395,090	3,120,337	3,559,941
24	Jerash West	Jerash	0	0	1,276,283	1,939,874	2,529,338	0	0	1,212,469	1,842,881	2,402,871
25	Kofur Asad	Irbid	0	0	2,939,157	3,829,152	4,368,616	0	0	2,792,200	3,637,694	4,150,185
26	Aqaba South Coast	Aqaba	0	155,572	218,327	284,437	324,510	0	147,793	207,410	270,215	308,284
27	Naur	Amman	0	0	833,632	1,109,661	1,252,433	0	0	750,269	998,695	1,127,189
28	North Queen Alia Airport	Amman	0	6,042,395	8,380,023	10,917,543	12,307,363	0	5,438,156	7,542,021	9,825,789	11,076,627
29	North Jordan Valley	Irbid	0	2,326,803	3,476,258	4,458,673	5,006,719	0	2,210,463	3,302,445	4,235,740	4,756,384
30	Shuna South	Balqa	0	1,142,205	1,602,949	2,088,331	2,382,543	0	1,085,095	1,522,801	1,983,915	2,263,416
31	Torra	Irbid	0	0	0	1,663,414	1,897,762	0	0	0	1,580,244	1,802,874
32	Um Al Basateen	Amman	included in Al Jeeza					included in Al Jeeza				
33	Wadi Shallala (Irbid East)	Irbid	0	3,493,321	4,908,171	6,401,834	7,312,235	0	3,143,989	4,417,354	5,761,651	6,581,011
34	Wadi Zarqa	Zarqa	0	0	38,234,925	49,812,686	56,830,471	0	0	36,323,179	47,322,052	53,988,948
35	Mazar, Muta, Adnaniya	Karak	0	0	744,808	1,108,961	1,344,270	0	0	558,606	831,721	1,008,202
36	Dead Sea East Coast	Balqa	0	619,031	1,023,381	1,360,811	1,383,038	0	557,128	921,043	1,224,730	1,244,734
	<b>Totals</b>		80,986,516	114,646,489	172,300,995	228,907,577	261,617,942	63,078,026	107,192,539	161,468,880	214,478,776	245,078,275

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**Table 15(3): Wastewater quantities and population per Governorate (Scenario 3)**

Governorate (TP location)		Wastewater inflow to the treatment plants (m <sup>3</sup> /a)					Wastewater effluent of the treatment plants (m <sup>3</sup> /a)				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	828.610	1.313.776	2.107.119	2.916.740	3.327.660	787.180	1.248.087	2.001.763	2.770.903	3.161.277
2	Amman	782.693	8.793.941	13.181.355	17.196.347	19.411.485	730.620	7.944.214	11.910.406	15.538.187	17.540.472
3	Aqaba	2.542.044	4.268.282	5.157.015	6.564.280	7.454.193	1.906.533	3.849.232	4.652.230	5.922.074	6.725.000
4	Balqa	5.850.921	12.142.809	17.246.298	22.496.122	25.495.966	5.265.829	11.075.462	16.137.266	21.048.515	23.861.364
5	Irbid	5.322.469	14.131.904	26.892.971	38.284.002	43.812.424	4.860.463	13.154.611	25.154.254	35.846.986	41.014.584
6	Jerash	550.457	1.079.060	3.043.004	4.570.383	5.530.441	495.411	971.154	2.802.518	4.210.338	5.103.864
7	Karak	435.545	668.965	1.683.621	2.426.135	2.847.012	391.990	602.068	1.403.537	2.017.177	2.360.671
8	Madaba	1.520.538	1.738.747	2.765.475	3.730.038	4.352.256	1.140.404	1.564.872	2.488.928	3.357.034	3.917.030
9	Ma'raq	671.366	682.922	958.400	1.248.609	1.424.518	503.524	648.776	910.480	1.186.179	1.353.292
10	Ma'an	1.182.292	1.428.089	2.031.355	2.797.395	3.437.688	971.162	1.180.068	1.677.882	2.293.815	2.806.621
11	Tafielah	334.830	482.005	860.919	1.121.610	1.279.626	301.347	433.804	774.827	1.009.449	1.151.664
12	Zarqa	60.964.751	67.915.989	96.373.462	125.555.915	143.244.672	45.723.563	64.520.190	91.554.789	119.278.120	136.082.438
Total		81.000.000	114.600.000	172.300.000	228.900.000	261.600.000	63.100.000	107.200.000	161.500.000	214.500.000	245.100.000
Governorate (sewage generation)		Population					Connected Population				
		2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
1	Ajlun	123.910	140.329	158.770	177.888	196.403	35.471	43.262	55.939	66.592	73.523
2	Amman	1.925.480	2.180.631	2.467.183	2.764.265	3.051.971	1.107.914	1.528.726	1.752.770	1.965.044	2.169.567
3	Aqaba	109.435	123.936	140.222	157.107	173.459	52.761	89.915	101.731	113.980	125.843
4	Balqa	336.273	380.833	430.878	482.761	533.008	221.292	377.889	429.213	480.896	530.948
5	Irbid	906.467	1.026.585	1.161.487	1.301.345	1.436.790	184.738	442.570	686.432	844.838	937.519
6	Jerash	149.496	169.306	191.554	214.620	236.957	18.302	35.533	80.785	104.347	122.193
7	Karak	204.942	232.100	262.599	294.220	324.842	13.630	20.733	43.230	53.622	60.950
8	Madaba	121.176	137.233	155.267	173.963	192.069	50.557	57.256	73.417	85.161	96.161
9	Ma'raq	205.810	233.083	263.712	295.466	326.219	19.672	21.165	23.947	26.830	29.623
10	Ma'an	97.924	110.900	125.473	140.582	155.214	27.621	32.913	40.874	50.691	61.372
11	Tafielah	80.989	91.721	103.773	116.269	128.370	12.741	15.872	22.855	25.608	28.273
12	Zarqa	763.131	864.256	977.826	1.095.569	1.209.597	693.278	802.031	933.380	1.045.771	1.154.616
Total		5.030.000	5.690.000	6.440.000	7.210.000	7.960.000	2.440.000	3.470.000	4.240.000	4.860.000	5.390.000

**Table 16(3): Wastewater reuse (Scenario 3)**

	Treatment Plant	Governorate (of raw sewage generation)	Governorate (of treatment plant location)	Wastewater effluent of the treatment plants (m <sup>3</sup> /a)					Wastewater reuse				
				2000	2005	2010	2015	2020	2000	2005	2010	2015	2020
<b>Existing</b>													
1	Abu Nuseir	Amman	Amman	497.726	563.681	896.533	1,168.009	1,332.562	4	11	11	11	11
2	Aqaba	Aqaba	Aqaba	1,906.533	3,701.439	4,444.820	5,651.859	6,416.715	0	12	12	12	12
3	As-Samra	Amman	Zarqa	45,723.563	64,520.190	55,231.610	71,956.068	82,093.491	4	3	3	3	3
4	Baqa	Balqa	Balqa	3,749.594	5,250.944	7,778.470	10,133.837	11,561.527	4	4	4	4	4
5	Fuhis	Balqa	Balqa	328.981	552.325	820.718	1,069.236	1,219.874	0	11	11	11	11
6	Irbid (Central)	Irbid	Irbid	1,425.500	2,282.099	4,117.699	4,161.000	4,161.000	2	2	2	2	2
7	Jerash (East)	Jerash	Jerash	495.411	971.154	1,590.049	2,367.457	2,700.993	4	4	4	4	4
8	Karak	Karak	Karak	391.990	602.068	844.931	1,185.457	1,352.468	0	11	11	11	11
9	Kufranja	Ajloun	Ajloun	787.180	1,248.087	2,001.763	2,770.903	3,161.277	5	11	11	11	11
10	Ma'an	Ma'an	Ma'an	464.508	526.061	751.688	1,119.204	1,436.491	0	11	11	11	11
11	Madaba	Madaba	Madaba	1,140.404	1,564.872	2,488.928	3,357.034	3,917.030	11	11	11	11	11
12	Mafraq	Mafraq	Mafraq	503.524	648.776	910.480	1,186.179	1,353.292	11	11	11	11	11
13	Ramtha	Irbid	Irbid	646.839	1,247.111	2,000.198	2,768.736	3,344.618	11	11	11	11	11
14	Salt	Balqa	Balqa	1,187.254	1,923.315	2,699.144	3,516.460	4,011.872	6	6	6	6	6
15	Tafieleh	Tafieleh	Tafieleh	301.347	433.804	774.827	1,009.449	1,151.664	0	11	11	11	11
16	Wadi Arab	Irbid	Irbid	2,367.075	3,789.476	6,837.532	10,111.540	12,122.306	2	2	2	2	2
17	Wadi Essir	Amman	Amman	232.894	266.316	397.102	517.347	590.233	7	11	11	11	11
<b>Under construction</b>													
18	Wadi Hassan	Irbid	Irbid	421.049	481.473	675.690	880.293	1,004.311	0	11	11	11	11
19	Wadi Mousa	Ma'an	Ma'an	506.653	654.007	926.195	1,174.611	1,370.129	0	11	11	11	11
<b>Planned</b>													
20	Al Jeeza	Amman	Amman	0	1,676.061	2,324.481	3,028.347	3,413.861	0	11	11	11	11
21	Al Mazar Al Shamali	Irbid	Irbid	0	0	1,011.136	1,317.314	1,502.902	0	0	0	0	0
22	Dair Abi Said	Irbid	Irbid	0	0	0	1,392.774	1,588.993	0	0	0	12	12
23	Dair Alla	Balqa	Balqa	0	1,706.657	2,395.090	3,120.337	3,659.941	0	12	12	12	12
24	Jerash West	Jerash	Jerash	0	0	1,212.469	1,842.881	2,402.871	0	0	4	4	4
25	Kofur Asad	Irbid	Irbid	0	0	2,792.200	3,637.694	4,150.185	0	0	12	12	12
26	Aqaba South Coast	Aqaba	Aqaba	0	147.793	207.410	270.215	308.284	0	12	12	12	12
27	Naur	Amman	Balqa	0	0	750.269	998.695	1,127.189	0	0	11	11	11
28	North Queen Alia Airport	Amman	Amman	0	5,438.156	7,542.021	9,825.789	11,076.627	0	11	11	11	11
29	North Jordan Valley	Irbid	Irbid	0	2,210.463	3,302.445	4,235.740	4,756.384	0	12	12	12	12
30	Shuna South	Balqa	Balqa	0	1,085.095	1,522.801	1,983.915	2,263.416	0	12	12	12	12
31	Torra	Irbid	Irbid	0	0	0	1,580.244	1,802.874	0	0	0	11	11
32	Um Al Basateen	Amman	Amman	included in Al Jeeza				included in Al Jeeza					
33	Wadi Shallaia (Irbid East)	Irbid	Irbid	0	3,143.989	4,417.354	5,761.651	6,581.011	0	11	11	11	11
34	Wadi Zarqa	Zarqa	Zarqa	0	0	36,323.179	47,322.052	53,988.948	0	0	4	4	4
35	Mazar, Muta, Adhaniya	Karak	Karak	0	0	558.606	831.721	1,008.202	0	0	11	11	11
36	Dead Sea east Coast	Balqa	Balqa	0	557.128	921.043	1,224.730	1,244.734	0	12	12	12	12
<b>Total</b>				<b>63,078.026</b>	<b>107,192.539</b>	<b>161,468.880</b>	<b>214,478.776</b>	<b>245,078.275</b>					
<b>Remarks:</b>													
1) Indicated reuses are main reuse purposes. Local reuse in the table means that 100 % of the effluent is reused for irrigation in local areas. E.g. at each treatment plant reuse is practised to a certain extend. It is estimated that in addition to that about 8-10 MCM/a more (in 2000) are used for restricted irrigation (close and downstream of the treatment plants, which have to be deducted from the other reuse paths.				Not or only partly used									
2) Up/Midland for elevations > +300 m a.s.l.				Local reuse (close to the treatment plant) 1)									
3) Proposed industrial reuse in MCM/a				Local reuse in Up/Midland 2)									
				Local reuse in Jordan Valley incl. Aqaba									
				To Jordan Valley via pipe along Wadi Arab									
				Reuse of effluent from As Samra Treatment Plant									
				Upland areas									
				Industrial reuse 3)									
				Reuse in Jordan Valley									
				To Jordan Valley via King Talal Reservoir									
				To Jordan Valley via Wadi Kufranja									
				To Jordan Valley via Shua'ab Reservoir									
				To Jordan Valley via Kafrein Reservoir									
AMZA	2005	2010	2015	2020	0			4,321.062	0	1,011.136	1,317.314	1,502.902	
Irbid	15	15	15	20	1 = 11 + 12			2,290.767	28,455.362	44,667.591	61,750.167	70,532.366	
Aqaba	0	5	5	5	11			2,290.767	19,046.788	29,081.783	40,232.904	46,243.714	
Total	0	0	5	5	12			0	9,408.574	15,585.808	21,517.263	24,288.652	
					2			3,792.576	6,071.575	10,955.232	14,272.540	16,283.306	
					3 = 31 + 32 + 33			0	64,520.190	55,231.610	71,956.068	82,093.491	
					31			0	0	0	0	0	
					32			0	15,000.000	15,000.000	15,000.000	20,000.000	
					33			45,723.563	49,520.190	40,231.610	56,956.068	62,093.491	
					4			50,466.294	55,742.287	87,135.777	118,622.294	132,747.829	
					5			787.180	0	0	0	0	
					6			1,187.254	1,923.315	2,699.144	3,516.460	4,011.872	
					7			232.894	0	0	0	0	