

Supporting Report for Chapter 8

“Evaluation of Proposed Management Plans”

Contents

	Page
Annex to 8.1 Economic and Financial Evaluation-----	SA8-1
Annex to 8.1.1 Surface Water Development-----	SA8-7
Annex to 8.1.2 Water Conveyance-----	SA8-21
Annex to 8.1.3 Sea/Brackish Water Desalination-----	SA8-25
Annex to 8.1.4 Wastewater Reuse-----	SA8-29
Annex to 8.1.5 Overall Financial/Economic Evaluation -----	SA8-87
Annex to 8.2.1 Evaluation of Institutional and Legislative----- Measures for Privatization	SA8-107
Annex to 8.3 Environmental Evaluation-----	SA8-110

Economic Analysis (Thousand JD at 2000 Prices)		Item	Percent	Annuity	2010	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																									
Local Components	30%	1,886	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,962	2,962	1,962	0	
Foreign Components	70%	21,735	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,912	6,912	4,912	0	
Duty & Taxes	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Capital Costs		23,621	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,874	9,874	5,874	0	
Operational Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,874	19,747	25,621	29,621	
O & M Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,588	
Total Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,874	9,874	8,874	2,588	
Benefits																									
Municipal Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,001
Unit Benefits of Municipal Water (JD/m³)		0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	
Municipal Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,495
Industrial Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit Benefits of Industrial Water (JD/m³)		2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	
Industrial Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit Benefits of Irrigation Water (JD/m³)		0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	
Irrigation Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,495
Net Cash Flow (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-3,874	-9,874	-9,874	9,901	
Discounting (DR=10%)		0.90909	0.82645	0.75131	0.69111	0.63992	0.58647	0.53136	0.48661	0.442410	0.38554	0.35049	0.31863	0.28966	0.26333	0.23935	0.21793	0.19784	0.17986	0.16351	0.14844	0.13313			
Total Qty Delivered (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,001
EIRR		42%																							
NPV (Thousand JD)		10,413	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,776	-1,614	-1,461	1,339	
FV of Total Costs (Thousand JD)		6,663	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,776	1,614	1,461	351	
FV of Total Qty Delivered (Thousand m³)		23,517	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,297
Unit Water Price (JD/m³)		283																							

Note: Water production cost of 151 JD per m³ was added to the O & M cost

*The Study on Water Resources Management in The Hashemite Kingdom of Jordan
Final Report/Supporting Report Part-A "Master Plan"*

<u>Transfer Line: Houla - Ajloun/Jenin</u>		Allocation	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Item	Hydraulic Analysis (Thousand m ³ /yr)																								
Water Produced	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,033	
Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Municipal Water	1.18		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,033	
Physical Losses (%)	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.033	
Administrative/Managerial Losses (%)	0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.033	
Quality Delivered	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,400	
Quantity Whose Bills are Collected	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,200	
Industrial Water	0.18		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Physical Losses (%)	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administrative/Managerial Losses (%)	0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quality Delivered	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Whose Bills are Collected	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Water	0.18		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Physical Losses (%)	0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administrative/Managerial Losses (%)	0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Delivered	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Whose Bills are Collected	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<u>Financial Analysis (Thousand JD at 2000 Prices)</u>		Percent	Amount	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Item	Financial Analysis (Thousand JD at 2000 Prices)																								
Care																									
Local Components	34%	2,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Components	66%	5,882	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes	8%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		8,862	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corporation Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
O&M Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Revenues																									
Municipal Usage Qty (Thousand m ³)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,200
Municipal Tariff (JD/m ³)	0.294	0.284	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254		
Municipal Revenues (Thousands JD)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941	
Industrial Usage Qty (Thousand m ³)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Industrial Tariff (JD/m ³)	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000	1,111	1,000		
Industrial Revenues (Thousands JD)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Usage Qty (Thousands m ³)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Tariff (JD/m ³)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010		
Irrigation Revenues (Thousands JD)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Revenues (Thousands JD)		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941	
Net Cash Flow (Thousands JD)		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,954	-5,908	413		
Discounting (DR=0.5%)		0.93897	0.89164	0.82765	0.77712	0.72968	0.68550	0.64351	0.60423	0.56725	0.53275	0.50321	0.46966	0.44102	0.41410	0.38893	0.36510	0.34291	0.32189	0.30324	0.28380	0.26948			
Total Qty Whose Bills are Collected (T m ³)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,200	
EIRR	2%																				-393	-1,677	113		
NPV (Thousands JD)	-1,143	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PV of Total Costs (Thousands JD)	4,444	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PV of Total Qty Collected Qty (T m ³)	11,576	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unit Water Price (Fils/m ³)	394																							393	

Economic Analysis (Thousand JD at 2000 Prices)		Period	Amount	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																								
Land Components		3496	2,910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	993	1,887	0	
Foreign Components		66%	5,112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,981	3,921	0	
Duty & Taxes		0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Capital Costs		8,112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,954	5,988	0	
Construction Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,954	5,988	0	
O & M Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	548	
Total Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,954	5,988	548	
Benefit																								
Municipal Usage Qty (Thousands m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,411	
Unit Benefits of Municipal Water (JD/m³)		0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735		
Municipal Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,499	
Industrial Usage Qty (Thousands m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unit Benefits of Industrial Water (JD/m³)		2.740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740		
Industrial Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Usage Qty (Thousands m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unit Benefits of Irrigation Water (JD/m³)		0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283		
Irrigation Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,499	
Net Cash Flow (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,954	-5,908	1,951	
Decreasing (10%+10%)		0.91919	0.92845	0.93711	0.94591	0.95472	0.96447	0.97316	0.98181	0.98946	0.99711	0.99984	0.99994	0.99999	0.99999	0.99999	0.99999	0.99999	0.99999	0.99999	0.99999	0.99999		
Total Qty Delivered (Thousands m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,411	
IRR																								
IRR (%)		20%																			-411	-878	264	
NPV (Thousands JD)		1,137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PV of Total Costs (Thousands JD)		2,120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	411	878	74	
PV of Total Qty Delivered (Thousands m³)		4,783	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	459	
Unit Water Price (JD/m³)		451																						

Note: Water production cost of 150 JD per m³ was added to the O & M cost.

The Study on Water Resources Management in The Hashemite Kingdom of Jordan
Final Report Supporting Report Part-A "Master Plan"

Transfer Line: Dali - Madaba Branch																							
Hydraulic Analysis (Thousand m³/yr)																							
Item	Allocation	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Water Produced		0	0	0	0	0	0	0	0	0	5,000	6,200	7,400	8,600	9,800	11,000	11,800	12,600	13,400	14,200	15,000		
Used		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Municipal Water	1.00	0	0	0	0	0	0	0	0	0	5,000	6,200	7,400	8,600	9,800	11,000	11,800	12,600	13,400	14,200	15,000		
Physical Losses (%)		0.24	0.25	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses		0	0	0	0	0	0	0	0	0	750	930	1,110	1,290	1,470	1,650	1,730	1,890	2,010	2,130	2,250		
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	250	310	370	430	490	550	590	630	670	710	750		
Quality Delivered		0	0	0	0	0	0	0	0	0	4,230	5,270	6,280	7,310	8,330	9,350	10,030	10,710	11,290	12,070	12,750		
Quantity Whose Bills are Collected		0	0	0	0	0	0	0	0	0	4,000	4,900	5,930	6,880	7,840	8,800	9,440	10,080	10,720	11,360	12,000		
Industrial Water	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Physical Losses (%)		0.24	0.25	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Quality Delivered		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Quantity Whose Bills are Collected		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Irrigation Water	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Physical Losses (%)		0.24	0.25	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Quality Delivered		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Quantity Whose Bills are Collected		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Financial Analysis (Thousand JD at 2000 Prices)																							
Item	Percent	Amount	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Credit																							
Local Components	40%	1,387	1	1	1	1	1	1	1	1	0	1,187	0	0	0	0	0	0	0	0	0	0	
Foreign Components	60%	2,041	1	1	1	1	1	1	1	1	0	2,148	0	0	0	0	0	0	0	0	0	0	
Duty & Taxes	0%	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
Total Capital Costs		3,435	1	1	1	1	1	1	1	1	0	3,435	0	0	0	0	0	0	0	0	0	0	
Cumulative Costs		1	1	1	1	1	1	1	1	1	0	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	
O & M Costs		1	1	1	1	1	1	1	1	1	0	128	372	1,116	1,260	1,404	1,548	1,644	1,740	1,836	1,932	2,028	
Total Costs		1	1	1	1	1	1	1	1	1	0	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	3,435	
Revenues																							
Municipal Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	4,000	4,960	5,920	6,880	7,840	8,800	9,440	10,080	10,720	11,360	12,000	
Municipal Tariff (JD/m³)		0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294		
Municipal Revenue (Thousand JD)		0	0	0	0	0	0	0	0	0	0	1,176	1,458	1,740	2,022	2,305	2,587	2,775	2,964	3,152	3,341	3,538	
Industrial Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Industrial Tariff (JD/m³)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
Industrial Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Tariff (JD/m³)		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018		
Irrigation Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Net Cash Flow (Thousand JD)		0	0	0	0	0	0	0	0	0	-1,435	348	406	624	762	901	1,029	1,131	1,223	1,215	1,403	1,500	
Discounting (D=0.5%)		1,92897	1,81166	1,82765	1,77755	1,72958	1,68555	1,64351	1,60423	1,56755	1,53873	1,50031	1,46908	1,44102	1,38883	1,35510	1,34381	1,31189	1,30324	1,28380	1,26645		
Total Qty Whose bills are Collected (T m³)		0	0	0	0	0	0	0	0	0	0	4,000	4,960	5,920	6,880	7,840	8,800	9,440	10,080	10,720	11,360	12,000	
FIRR		23%																					
NPV (Thousand JD)		4,305	0	0	0	0	0	0	0	0	-1,890	174	228	275	316	350	379	394	398	399	400	400	
PV of Total Costs (Thousand JD)		10,885	0	0	0	0	0	0	0	0	0	1,890	414	457	522	546	565	584	593	594	595	596	
PV of Total Bills Collected Qty (T m³)		51,664	0	0	0	0	0	0	0	0	0	0	2,001	2,330	1,611	1,849	1,048	1,213	1,236	1,245	1,224	1,199	
Unit Water Price (JD/m³)		211																					

Economic Analysis (Thousand JD at 2009 Prices)		Item	Percent	Amount																		
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Costs																						
Local Components	40%	1,387	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Foreign Components	60%	2,848	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Duty & Taxes	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Capital Costs		3,435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Construction Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
O & M Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Benefits																						
Municipal Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Unit Benefits of Municipal Water (JD/m³)		0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735		
Municipal Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Industrial Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Unit Benefits of Industrial Water (JD/m³)		2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740		
Industrial Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Irrigation Usage Qty (Thousand m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Unit Benefits of Irrigation Water (JD/m³)		0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283		
Irrigation Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total Benefits (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Net Cash Flow (Thousand JD)		0	0	0	0	0	0	0	0	0	-1,435	2,358	2,855	3,451	4,048	4,645	5,242	5,839	6,437	6,035	6,633	
Discounting (D.R=10%)		1,918.19	0.82645	0.75131	0.68001	0.62092	0.56447	0.51516	0.46651	0.42410	0.38854	0.35345	0.31863	0.28860	0.26033	0.23939	0.21793	0.19764	0.17916	0.16231	0.14864	
Total Qty Delivered (Thousand m³)		0	0	0	0	0	0	0	0	0	4,158	5,270	6,290	7,310	8,331	9,351	10,371	11,391	12,070	12,758		
EIRR		8.6%																				
NPV (Thousand JD)		15,154	0	0	0	0	0	0	0	0	-1,324	791	910	1,000	1,098	1,192	1,241	1,316	1,386	1,456	937	
PV of Total Costs (Thousand JD)		6,474	0	0	0	0	0	0	0	0	1,324	311	325	349	354	355	342	320	303	289		
PV of Total Qty Delivered (Thousand m³)		29,418	0	0	0	0	0	0	0	0	0	1,498	1,679	1,822	1,925	1,994	2,035	1,984	1,926	1,862	1,794	1,733
Unit Water Price (JD/m³)		220																				

Note: Water production cost of 150 JD per m³ was added to the O & M cost.

The Study on Water Resources Management in The Hashemite Kingdom of Jordan
Final Report Supporting Report Part-A "Master Plan"

Transfer Line: Disi - Ma'an Branch

Hydrolic Analysis (Thousand m ³ /yr)																							
Item	Allocation	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Water Produced		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Saved		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Municipal Water		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Physical Losses (%)		0.24	0.23	0.23	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Delivered		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Where Bills are Collected		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Industrial Water		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Physical Losses (%)		0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Delivered		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Where Bills are Collected		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Water		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Physical Losses (%)		0.24	0.23	0.22	0.21	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Administrative/Managerial Losses (%)		0.21	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	
Administrative/Managerial Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Delivered		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Quantity Where Bills are Collected		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Financial Analysis (Thousand JD at 2000 Prices)																							
Item	Percent	Amount	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																							
Local Components		33%	1,737	1,737	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Foreign Components		67%	3,607	3,607	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Duty & Taxes		0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Capital Costs		\$395	1,737	3,607	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Capitalizable Costs																							
O & M Costs																							
Total Costs																							
Revenues																							
Municipal Usage Qty (Thousand m ³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Municipal Tariff (JD/m ³)		0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294	0.294		
Municipal Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Industrial Usage Qty (Thousand m ³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Industrial Tariff (JD/m ³)		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
Industrial Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Usage Qty (Thousand m ³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irrigation Tariff (JD/m ³)		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018		
Irrigation Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Revenues (Thousand JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Net Cash Flow (Thousand JD)		0	0	0	0	0	0	0	0	0	-5,395	3,813	3,813	3,913	3,913	934	874	874	934	934	7,094		
Discounting (DR=6 %)		1,9387	0.68166	0.82795	0.77792	0.72918	1.61533	1.64381	0.60423	0.56735	0.53271	0.50211	1.44668	1.44102	0.41410	0.38883	0.36511	0.34111	1.32189	1.31024	0.28380	0.26648	
Total Qty Where Bills are Collected (T m ³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
FIRR		6%																					
NPV (Thousand JD)		20,764	0	0	0	0	0	0	0	0	-2,874	1,397	1,398	1,726	1,620	1,522	356	334	314	294	276	1,890	
PV of Total Costs (Thousand JD)		9,545	0	0	0	0	0	0	0	0	2,874	444	417	391	367	345	247	232	218	192			
PV of Total Bills Collected Qty (T m ³)		38,346	0	0	0	0	0	0	0	0	0	2,481	2,154	2,117	1,988	1,866	1,466	4,160	4,000	4,000	1,135	2,985	
Unit Water Price (FJD/m ³)		250																					

Economic Analysis (Thousand JD at 2000 Prices)		Item	Percent.	Amount																	
2010	2011	2012	2013	2014	2015	2016	2017	2018	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Costs																					
Local Components	33%	1,787	0	0	0	0	0	0	1	1	1,787	1	0	0	0	0	0	0	0	0	0
Foreign Components	67%	3,607	0	0	0	0	0	0	1	1	3,607	1	0	0	0	0	0	0	0	0	0
Duty & Taxes	0%	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		5,395	0	0	0	0	0	0	1	1	5,395	5,395	5,395	5,395	5,395	5,395	5,395	5,395	5,395	5,395	5,395
Operational Costs		0	0	0	0	0	0	0	1	1	932	932	932	932	932	932	932	932	932	932	932
O & M Costs		0	0	0	0	0	0	0	1	1	932	932	932	932	932	932	932	932	932	932	932
Total Costs		0	0	0	0	0	0	0	1	1	5,395	932	932	932	932	932	932	932	932	932	932
Benefits																					
Municipal Usage Qty (Thousands m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,410	3,410	3,410	3,408	3,408
Unit Benefits of Municipal Water (JD/m³)		0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	0.735	1,735	1,735	1,735	0.735	0.735
Municipal Benefits (Thousands JD)		0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2,499	2,499	2,499	2,499	2,499
Industrial Usage Qty (Thousands m³)		0	0	0	0	0	0	0	1	1	1	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100
Unit Benefits of Industrial Water (JD/m³)		2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	2,740	
Industrial Benefits (Thousands JD)		0	0	0	0	0	0	0	1	1	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974
Irrigation Usage Qty (Thousands m³)		0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
Unit Benefits of Irrigation Water (JD/m³)		0.285	0.285	0.285	0.285	0.285	0.285	0.285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	0.285	0.285	0.285	0.285	0.285
Irrigation Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Benefits (Thousands JD)		0	0	0	0	0	0	0	0	0	0	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974	13,974
Net Cash Flow (Thousands JD)		0	0	0	0	0	0	0	0	0	0	-5,395	13,042	13,042	13,042	13,042	13,042	13,042	13,042	13,042	13,042
Discounting (DR=10%)		0.90903	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.42410	0.38554	0.35049	0.31863	0.28966	0.26133	0.23339	0.21763	0.19794	0.17934	0.16351	0.14864
Total Qty Delivered (Thousands m³)		0	0	0	0	0	0	0	0	0	0	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100	5,100
EIRR		241%																			
NPV (Thousands JD)		41,039	0	0	0	0	0	0	0	0	-1,060	4,571	4,156	3,776	3,434	3,122	2,766	2,398	2,034	1,604	1,184
PV of Total Costs (Thousands JD)		5,841	0	0	0	0	0	0	0	0	2,060	327	297	270	245	223	175	158	145	132	128
PV of Total Qty Delivered (Thousands m³)		21,497	0	0	0	0	0	0	0	0	0	1,788	1,625	1,477	1,343	1,211	915	841	764	695	632
Unit Water Price (Pounds)		272																			

Note: Water production cost of 150 fils per m³ was added to the O & M cost