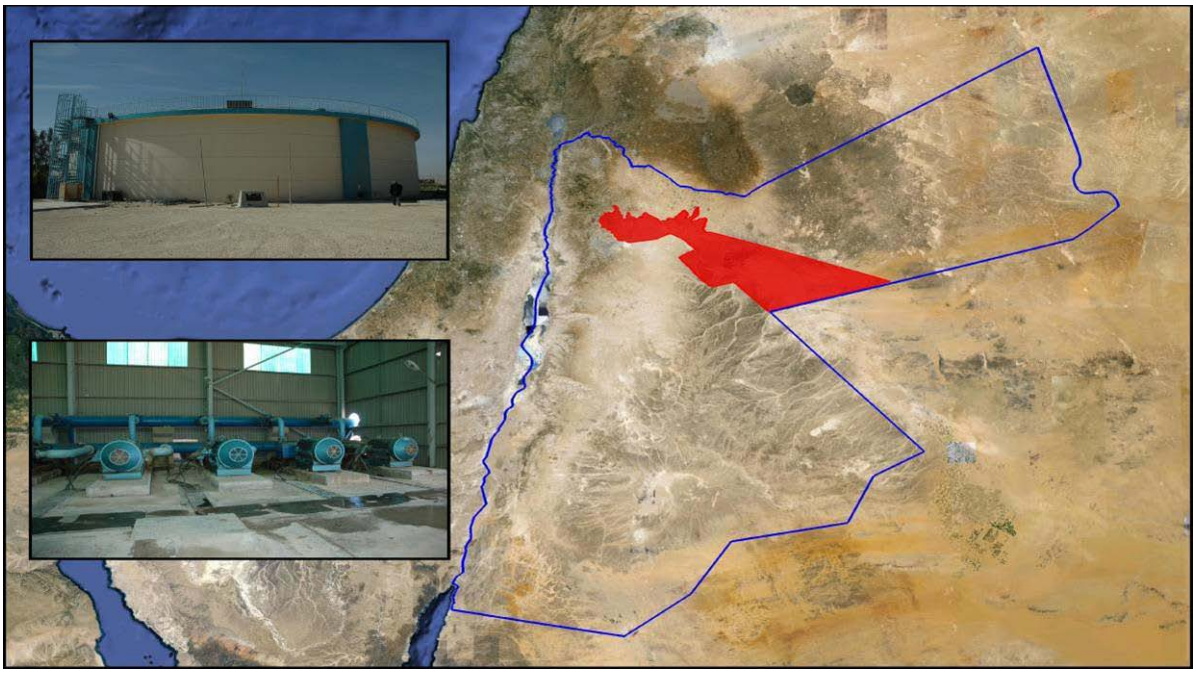
The Hashemite Kingdom of Jordan
Ministry of Water and Irrigation

Millennium Challenge Corporation

PREPARATION OF THE FEASIBILITY STUDY AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR ZARQA GOVERNORATE WATER SYSTEM RESTRUCTURING AND REHABILITATION

INVESTMENT MASTER PLAN
VOLUME 2 - APPENDICES



September 2010 (Final)

Nicholas O'Dwyer
CONSULTING ENGINEERS

AMMAN CONSULTING
Engineering and Planning Office

THE HASHEMITE KINGDOM OF JORDAN
MINISTRY OF WATER AND IRRIGATION

WATER AUTHORITY OF JORDAN

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INVESTMENT MASTER PLAN – VOLUME 2 - APPENDICES

Nicholas O'Dwyer Ltd.
Consulting Engineers
Nutgrove Office Park
Nutgrove Avenue
Dublin 14.
(NOD)

Amman Consulting
Engineering and Planning Office
Abdullah Bin Abbas St
Shmeisani
Amman 11190
(ACEPO)

September 2010

PROJECT NO. 20445					
Revision	**Reason for Revision**	**Prepared by**	**Reviewed by**	**Approved by**	**Issue Date**
-	First Issue - Draft	T. Cuddy	M. McArdle	J. Cronin	03/03/10
A	Issue for Approval	T. Cuddy	M. McArdle	J. Cronin	19/05/10
B	**Final (comprising volumes below)**	**T. Cuddy**	**M. McArdle**	**J. Cronin**	**21/09/10**
Incl.	Volume 1/3: Main Document **Volume 2/3: Appendices** Volume 3/3: Drawings				

APPENDIX 1 – NOTICE TO PROCEED

MINISTRY OF WATER AND IRRIGATION
Water Authority

Ref.: 7/2/12639
Date: 12/10/2009

Nicholas O'Dwyer Consulting Engineers Ltd.
And Amman Consulting Engineering and
Planning Office

Project :Consultancy Services for preparation of the feasibility study and environmental and social impact assessment for Zarqa Governorate Water System Restructuring and rehabilitation .
Subject : Central Tender No. 67/2009 "Notice to Proceed . "

Dear Mr. Richard Crowe ,

Reference to the awarding decision, please be informed that the notice to proceed for contract No. 67/2009 will be 13th.October 2009 .

Minister of Water and Irrigation /WAJ

Eng. Raed Abu Soud

Cc : MCA / Jordan
Cc : Secretary General / WAJ
Cc : Project Manager for P1-B
Cc : File No. (13/1)

h.h/notice to proceed/1

THE HASHEMITE KINGDOM OF JORDAN
TEL: +962 6 5680100 / 5683100 - FAX : +962 6 5679143 - P.O.BOX: 5012 AMMAN 11181 JORDAN - WWW.WAJ.GOV.JO

APPENDIX 2 – SCHEDULE OF REFERENCE DOCUMENTS

SCHEDULE OF REFERENCE DOCUMENTS	
A101	Engicon Feasibility Study 2005: Water Resources Report
A103	Engicon Feasibility Study 2005: Water Systems Map – Zarqa
A104	Engicon Feasibility Study 2005: Hydraulic Network Analysis
A106	Engicon Feasibility Study 2005: Detailed Design Report Pack 3A (Russaifah Priority Areas)
A107	Engicon Feasibility Study 2005: Detailed Design Drawings Pack 3A (Russaifah Priority Areas)
A108	Engicon Feasibility Study 2005: Tender Document Volume 1 Conditions of Contract Pack 3A (Russaifah Priority Areas)
A109	Engicon Feasibility Study 2005: Tender Document Volume 2 Specifications and Bills of Quantities Pack 3A (Russaifah Priority Areas)
A110	Engicon Feasibility Study 2005: Detailed Design Report Pack 3B (Russaifah Remaining Areas)
A111	Engicon Feasibility Study 2005: Detailed Design Drawings Pack 3B (Russaifah Remaining Areas)
A112	Engicon Feasibility Study 2005: Tender Document Volume 1 Conditions of Contract Pack 3B (Russaifah Remaining Areas)
A113	Engicon Feasibility Study 2005: Tender Document Volume 2 Specifications and Bills of Quantities Pack 3B (Russaifah Remaining Areas)
A114	Supporting the implementation of water policies, through the development of a Groundwater management action plan and of a plan for managing water reuse in the Amman Zarqa Basin, ARD Inc. (USAID) 2001
A115	Working PaperNo. (192): Assessment of Pump Efficiency, Pump Operations and Energy Saving Potential in the Middle Governorates. Dorsch Consult Water and Environment, (GTZ) 2008.
A116	Working Paper No. (193): Analysis of Network Maintenance and Repair Activities in Zarqa Governorate. Dorsch Consult Water and Environment, (GTZ) 2008.
A117	Technical Proposal for Consulting Services for Water Management Middle Governorates, Dorsch Consult Water and Environment, (KfW/WAJ) 2008.
A118	Feasibility Study: Jordan Feasibility Study of the Installation of the Main SCADA System for the Integration of the Existing and Future Governorates SCADA's of Jordan. TYPSA (Spanish Government) 2008.
A119	Preliminary Design Report : Project of the Upgrading of the Water Pipe Network for the Low Pressure Reservoir Distribution Zone (Zone B) in Russaifah City of Jordan. Beijing Municipal Institute of Hydraulic Engineering Planning, Design and Research, PRC Consultants (Chinese Government) 2008
A120	Working Paper No. (197). Zarqa Water Administration Profit and Loss Statement for 2007. Dorsch Consult Water and Environment (GTZ) 2008.
A121	Working Paper No. (203). Zarqa Water Administration Profit and Loss Statement for 2006. Dorsch Consult Water and Environment. (GTZ) 2008.
A122	Feasibility Report: Options for Institutional Restructuring the Middle Governorates. Freelance Consultant / Mr. Malcolm Wilkes (GTZ) 2008.
A123	Strategy and Policies: Jordan Water Strategy and Policies 1997 / 2009. Government of Jordan 2008.
A124	Final Report: Socio-Economic Baseline Survey in the Water Supply and Sanitation Sector" Volume I
A126	Final Report: Socio-Economic Baseline Survey in the Water Supply and Sanitation Sector" Volume II. GFA Consulting Group (KfW) 2008.
A127	Survey Report: Customer Satisfaction Survey in the Middle Governorates – Results of Phase 1. Dorsch Consult Water and Environment (GTZ/WAJ) 2008.
A128	Pilot Report: Jordan Pilot Report. Health and Environmental Linkages Initiative - HELI (WHO) 2005.
A129	GIS Data: GIS Data for the Middle Governorates. Dorsch Consult Water and Environment. (GTZ) 2008.
A130	'Study on the Benefits to the Poor of the MCC funded projects in the Water Sector'' : Full Report (not due until early 2010)
A131	'Study on the Benefits to the Poor of the MCC funded projects in the Water Sector'' : Data and Analysis (may be available from commencement of project)
C104	Hard Copy of Topographical Contour Mapping
C105	Public administration boundaries mapping - Digital
D101	Existing water network GIS
D102	Existing water supply zoning boundaries
D105	As-constructed Drawings - WTWs, Reservoirs, Pumping Stations and Pipelines
G101	Organisation Structure and Personnel Organogram for Water Operations Staff
G102	Map showing operation area boundaries and locations of offices, works depots and stores
G103	Names & Contact Details for Water Operations Personnel

G104	List and contact details of other WAJ departments / personnel that NOD/ACEPO should consult.
G105	Names & roles for other relevant public authority personnel - development planning, environment, roads, drainage
H101	Design criteria, standards and specifications
E208	Customer Water meters - Records 1993 - 2009
F201	Water production, Import & Export monthly statistics
F202	Pumping Stations locations and statistics including average daily volume of water, inlet and outlet pressures, electricity tarriffs and costs for each pumping station
F216	Water rationing schedule / time-table / rota - map

APPENDIX 3 – DETAILED TECHNICAL INFORMATION AND LAYOUTS OF EXISTING INSTALLATIONS

ELECTRICAL WORKS

1-AZRAQ PUMPING STATION

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Local concrete reservoir (12000m3) fed from Azraq wells	
2	Discharge to	Through Ultrasonic Flow Meters to Khaw P.S.	Ultrasonic FMs are defected
3	Operation Mode	New P.S. – 4 duty & 1 standby Old P.S. - 3 duty	

Motors & Starter Panels – New P.S.						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	*	550	380	1485	Liquid Start Starter panels are very old and in non acceptable status. To be replaced in case of rehabilitation of P.S.	The PS is named new because it is relatively new compared with the old P.S. The New P.S. is constructed in 1993. There are other 3 pumps not in service. It is recommended to replace all the pumps and their starter panels.
P2	*	550	380	1485		
P3	*	550	380	1485		
P4	*	550	380	1485		
P5	*	550	380	1485		

Motors & Starter Panels – Old P.S.						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	*	850	660	1485	Liquid Start Starter panels are very old and in non acceptable status. To be replaced in case of rehabilitation of P.S. Three starters are supplied with power through 2500A circuit breaker.	There are other 2 pumps. Only 3 of 8 pumps are in service It is recommended to replace all the pumps and their starter panels.
P2	*	850	660	1485		
P3	*	850	660	1485		
P4	*	680	660	1485		
P5	*	680	660	1485		
P6	*	680	660	1485		

Power Supply	
Description	**Remarks**
New pumping station: is supplied with power from (2x1000KVA & 2x1500KVA) distribution transformers with 400V secondary voltage. Old pumping station: is supplied with power from (2x2500KVA) distribution transformers with 660V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	There are 12 old standby generators tendered for sale.

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	2	Defected	At discharge side of the pumps
3	Hydrostatic Level Meter	1	Not Working	In the reservoir
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		In the reservoir
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System		Manual set point for chlorine dosing	
10	Over Head Crane	Two 10 ton	Working	In pump houses of old and new P.S.

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not available	
2	RTU (PLC, Modem & Antenna)	Not available	
3	Telemetry Data Communication System	Not available	Interference problem is expected in case future SCADA system designer go for UHF data communication solution due to the presence of military Communication system in the nearby.
4	Existing Voice Communication System	Available	Telephone line
5	GSM Coverage	Available	Medium quality

* Note: Very old motors and starters and according to the operators, all pumps, motors and their starters will be replaced within 6 months within a project funded by JICA.

2-HALLABAT PUMPING STATION

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Local reservoir (1000m3) fed from several wells through Mechanical Flow Meter (MFM)	
2	Discharge to	Through Electro Magnetic Flow Meter (EFM) P1 & P2 to Khaw P.S. P3 & P4 to local Distribution network (Tafih & Dhlail)	EFM is defected
3	Operation Mode	P1 & P2 both in duty P3 & P4 one duty – one stand by	

Motors & Starter Panels						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	ASYN	160	380	1485	250KW	Starter panels are Acceptable. To be replaced in case of replacing the pumps.
P2	ASYN	200	380	1485	250KW	
P3	DUTCHI	315	380	1485	315KW	
P4	DUTCHI	315	380	1485	315KW	

Power Supply	
Description	**Remarks**
The pumping station is supplied with 2x1000KVA distribution transformers located within the P.S. area. The transformers are connected to different buses of the main distribution board. The tow buses are connected with a manual bus section (tie) circuit breaker.	The MDB status is acceptable and no need for replacement if the load of future design will be within the maximum power of the transformers.
KWH meter Location	Within JEPCO transformer site
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	1	Defected	At discharge side of the pumps
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level Meter	1	Defected	In the reservoir
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	1	Working	In the reservoir
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System		Manual set point for chlorine dosing	
10	Over Head Crane	0	Not Available	

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not available in this site	This site reports to SCADA center in Khaw P.S.
2	RTU (PLC, Modem & Antenna)	Available	In very good conditions but not working. Allen Bradley PLC is used
3	Telemetry Data Communication System	Defected	UHF Radio communicate with Khaw SCADA center through a communication repeater at corridor well no.6 Also the other corridor wells report to Khaw through well no.6. Interference problem was faced due to the presence of military Communication system in the nearby.
4	Existing Voice Communication System	Available	Telephone line
5	GSM Coverage	Available	High quality

3-TAFEH PUMPING STATION

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Local reservoir (200m3) fed from Corridor wells through Mechanical Flow Meter (MFM)	
2	Discharge to	P2 & P2 to (Tafih & Dhlail) Distribution network	
3	Operation Mode	P1 & P2 one duty – one stand by	

Motors & Starter Panels						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	Caprari	90	400	2970	110KW	Starter panels are new. Acceptable.
P2	Caprari	90	400	2970	110KW	

Power Supply	
Description	**Remarks**
The pumping station is supplied with 1x630KVA distribution transformer located within the P.S. area.	
KWH Meter Location	Within JEPCO transformer site
Standby Generator	Not Available

Electrical Instrumentation, Chlorination System & OH Crane				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0	Not Available	
2	Ultrasonic Flow Meter	0	Not Available	
3	Hydrostatic Level Meter	0	Not Available	
4	Ultrasonic Level Meter	1	Working	In the reservoir
5	Electrical Float Switch	0	Not Available	
6	Dry Run	0	Not Available	
7	Chlorination Gas Detectors	2	Working	In chlorination Storage & Control Rooms
8	Chlorination Doors Macro switch	1		In chlorination Control Room
9	Type of chlorination Dosing System		Automatic set point for chlorine dosing	
10	Over Head Crane	One 3 ton		Pumps House

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not available	
2	RTU (PLC, Modem & Antenna)	Not available	
3	Telemetry Data Communication System	Not available	
4	Existing Voice Communication System	Available	Telephone line
5	GSM Coverage	Available	High quality

4-KHAW PUMPING STATION – NEW P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Local concrete reservoir (12000m3) fed from Azraq P.S., Hallabat wells, Corridor wells and Zatary P.S.	
2	Discharge to	Pipe line through Electromagnetic Flow Meters to Zarqa & Batrawi pumping stations Other lines to Hasmieieh, Zarqa and Batrawi Pumping Stations	Ultrasonic FMs are defected
3	Operation Mode	Maximum 4 pumps in duty.	

Motors & Starter Panels						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	SCHNEIDER	320	380	1490	Liquid Start	ATR: Auto Transformer Status : Motors & Starters are acceptable 3 Spare pump set foundations are available
P2	SCHNEIDER	320	380	1490	Liquid Start	
P3	BETRIEBSTUN	355	380	1480	ATR Start 350KW	
P4	KMER	185	380	1485	ATR Start 200KW	
P5	SIEMENS	200	380	1485	ATR Start 200KW	
P6	SHORCH	355	380	1485	Liquid Start	

Power Supply	
Description	**Remarks**
New pumping station: is supplied with power from 2 transformers with 400V secondary voltage. Rated power for transformers is not known, because JEPCO site is locked.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	2	working	One is reading the flow of the suction side of the pumps, the other is measuring the discharge flow to Zarqa and Batrawi pumping stations.
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level Meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	0		
10	Over Head Crane	1	5 ton - Working	In pump house

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not available	Refer to Old P.S.
2	RTU (PLC, Modem & Antenna)	Not available	Refer to Old P.S.
3	Telemetry Data Communication System	Not available	Refer to Old P.S.
4	Existing Voice Communication System	Not Available	Telephone line
5	GSM Coverage	Available	Bad quality

5-KHAW PUMPING STATION – OLD P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Local concrete reservoir (12000m3) fed from Azraq P.S., Hallabat wells, Corridor wells and Zatary P.S.	
2	Discharge to	Amman	Ultrasonic FMs are defected
3	Operation Mode	Maximum 4 pumps in duty.	

Motors & Starter Panels						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	LEECHUN	663	380	1475	See the remarks	Only 4 motors working and not defected. There are (2x750KW + 2x630KW) ATR working and acceptable starters. Starters are not related to pumps. The operators frequently the starters to different pumps. There are also (1x750KW ATR & 2x700 KW liquid start) defected starters
P2	SCHNEIDER	420	380	1485	See the remarks	
P3	ABB	710	400	1489	See the remarks	
P4	ABB	710	400	1489	See the remarks	

Power Supply	
Description	**Remarks**
Old pumping station: is supplied with power from (6x100KVA & 1x1500KVA) transformers with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		pumps, the other is measuring the discharge flow to Zarqa and Batrawi pumping stations.
2	Ultrasonic Flow Meter	1	working	One is measuring the inlet flow of 12000m3 water reservoir.
3	Hydrostatic Level Meter	0		
4	Ultrasonic Level Meter	1	Working	
5	Electrical Float Switch	0		
6	Dry Run	1	Not working	
7	Chlorination Gas Detectors	1	Not Working	In gas storage room
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	0		
10	Over Head Crane	2	Working	5 ton - in pump house & 2.5 ton in chlorine storage room

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not working	Not connected
2	RTU (PLC, Modem & Antenna)	Not working	Available only the modem & antenna. PLC is not available
3	Telemetry Data Communication System	Not working	UHF telemetry communication system
4	Existing Voice Communication System	Not Available	Telephone line
5	GSM Coverage	Available	Bad quality

6-ZARQA DESALINATION PLANT & P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Zarqa wells # 14, 14A & 16	
2	Discharge to	Zarqa P.S.	
3	Operation Mode	Small 2 pumps are working simultaneously due to the water quantity limitation	The site is operated and maintained through maintenance & operation contract

Motors & Starter Panels						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	Not visible nameplate	55	400	2975	60KW ATR	Acceptable Panels There is no starter panel for P3. The starter panel for P1 is used to operate P3
P2	ARKINSON	144	380	1485	150KW ATR	
P3	ZSE PRAHA	90	400	1480	-	
Well-14	-	-	-	-	250KW ATR	
Well-16	-	-	-	-	150KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1x1000KVA transformer with 400V secondary voltage.	The current demand for New and old desalination units are 120A and 85A consequently
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level Meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	1	Manual	
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Not Available	The telephone network is close to the site
5	GSM Coverage	Available	Good quality

7-ZARQA P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Zarqa Desalination Plant, Khaw P.S., and Hashmieh wells	
2	Discharge to	*Internal Pumps*: to Batrawi & Zarqa Local *External Pumps:*: Russaifa (3 pumps), Zarqa Local (2 pumps)	
3	Operation Mode	*Internal Pumps*: All internal pumps are working simultaneously. *External Pumps:*: 5 external pumps are working simultaneously.1 standby on site, the other in workshop for maintenance.	

Motors & Starter Panel – Internal Pumps						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	CAPRARI	160	400	2975	200KW ATR	Very Old Panels. Not Acceptable
P2	SIEMENSE	160	400	1485	200KW ATR	
P3	CAMAK	132	380	1480	300KW ATR	
P4	ASYN	160	400	1485	275KW ATR	

Motors & Starter Panel – External Pumps						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P5	ABB	500	380	1489	550KW LIQUID	Starter Panels are not acceptable Panels.
P6	JERMOUNT SCHNEIDER	500	380	1485	750KW LIQUID	
P7	FELM	250	380	2983	350KW LIQUID	
P8	LEROY	500	380	1489	ATR - REMOVED	
P9	NO PUMP	-	-	-	-	
P10	BAHAMA	160	380	1485	175 KW ATR	
P11	ZSE	160	380	2976	175KW ATR	
-	FELM	365	380	2985	Without Starter	

Power Supply	
Description	**Remarks**
The site is supplied with power from 4x1000KVA transformers with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	3	Working	On the inlet pipes of 4500m3 reservoir
3	Level measurement	1	Working	in the inlet pipes of 4500m3 reservoir. Type is not known.
4	Ultrasonic Level Meter	-		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	1	Manual	
10	Over Head Crane	1	2 ton	In chlorine storage room

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Telephone	The telephone network is close to the site
5	GSM Coverage	Good	

8-TAMWEEN P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 1000m3 reservoir	
2	Discharge to	Russaifah P.S. & Amman	
3	Operation Mode	*4* pumps are working simultaneously.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	DEFENG	250	380	2980	200KW ATR	Motors and Starters are acceptable.
P2	DEFENG	250	380	2980	200KW ATR	
P3	BAHAMA	160	380	2980	200KW ATR	
P4	SCHORCH	220	380	2975	250KW ATR	
P5	No pump set	-	-	-	Only pump foundation. Defected starter panel	
P6	AEG	210	380	1485	The pump set and the starter are not used since 5 years	
Well	-	-	-	-	75KW ATR	Working
well	-	-	-	-	60KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 2 transformers with 400V secondary voltage. Rated power for them is unknown, JEPCO site is closed.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	1	Working – not accurate	On the discharge line
3	Hydrostatic Level meter	0		In the inlet pipes of 4500m3 reservoirs. Type is not known.
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	1	working	
8	Chlorination Doors Macro switch	1	working	
9	Type of chlorination Dosing System	1	Automatic – Working manually	
10	Over Head Crane	1	5 ton	In pump house

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Not Available	
5	GSM Coverage	Good	

9-MERHEB P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 1000m3 reservoir	
2	Discharge to	Berin & Awajan reservoirs	
3	Operation Mode	4 pumps duty & 1 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	VEM	75	380	2900	75KW ATR	Motors and Starters are acceptable.
P2	EMTAS	55	415	1470	75KW ATR	
P3	EMTAS	110	415	1475	110KW ATR	
P4	DAF	75	380	2965	90KW ATR	
P5	CAMAK	132	380	2980	160KW ATR	
Well 2	-	-	-	-	30KW ATR	Working
Well 2A	-	-	-	-	30KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X1000KVA transformer with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	3	Working	2 on the discharge lines of the pumps & 1 on the discharge line of Well#2
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	1	Not working	In chlorinator room
8	Chlorination Doors Macro switch	1	working	
9	Type of chlorination Dosing System	1	Manual – Working	
10	Over Head Crane	1	5 ton	In pump house

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

10-UM RUMMANEH P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 500m3 reservoir	
2	Discharge to	2 pipes. First to local distribution. Second to local distribution and Jerash.	
3	Operation Mode	2 pumps duty & 1 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	SEIPEE	200	400	2975	100KW ATR	Motors and Starters are acceptable.
P2	MAS	75	380	2970	200KW ATR	
P3	BAHAMA	132	380	2980	250KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X250KVA transformer with 400V secondary voltage.	
KWH Meter Location	In pumping station
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	1	Working	1 on the discharge line to the local distribution
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	1	Defected	
9	Type of chlorination Dosing System	1	Manual – Working	
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

11-SARROUT P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 100m3 under ground reservoir	
2	Discharge to	Sarrout reservoir	
3	Operation Mode	1 pumps duty & 1 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	FELM	55	380	2870	135KW ATR	Motors and Starters are NOT acceptable.
P2	FELM	55	400	2900	120KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X250KVA transformer with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0	Locked doors	
8	Chlorination Doors Macro switch	0	Locked doors	
9	Type of chlorination Dosing System	0	Locked doors	
10	Over Head Crane	0	Locked doors	

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Not Available	
5	GSM Coverage	Good	

12-ALOUK P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 85m3 reservoir	
2	Discharge to	Local Network	
3	Operation Mode	Unknown.	Locked site. 2 sites separated by a street. First site includes pumps and reservoir. Second site includes the control panels and chlorination system.

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	DAF	37	380	2950		Starters are not known due to locked site.
P2	WAT	37	380	2945		

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X100KVA common transformer with 400V secondary voltage.	
KWH Meter Location	Locked site
Standby Generator	Locked site

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter		Locked site	
2	Ultrasonic Flow Meter		Locked site	
3	Hydrostatic Level meter		Locked site	
4	Ultrasonic Level Meter		Locked site	
5	Electrical Float Switch		Locked site	
6	Dry Run		Locked site	
7	Chlorination Gas Detectors		Locked site	
8	Chlorination Doors Macro switch		Locked site	
9	Type of chlorination Dosing System		Locked site	
10	Over Head Crane		Locked site	

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA		Locked site
2	RTU (PLC, Modem & Antenna)		Locked site
3	Telemetry Data Communication System		Locked site
4	Existing Voice Communication System		Locked site
5	GSM Coverage	Good	

13-ALGNAYYA P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site desalinated water reservoir	The site includes desalination plant. There is another under construction desalination plant. It is expected it will be supplied with power from the old P.S.
2	Discharge to	P2 & P3 discharges to Zarqa . P1 to Mafraq.	
3	Operation Mode	2 duty & standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	INVERUNO	160	380	1490	200KW ATR	Starter for P2 is used to operate P3. Old starter panels acceptable.
P2	CHINA	132	380	2980	175KW ATR	
P3	BROOK CROMPTON	75	380	1475	No starter panel	
	2 submersible pumps				35KW ATR	Located in under ground reservoir fed from Gnayya well and supply the desalination plant with water
	Desalination Plant				Main MCCB 200A	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X1500KVA transformer with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	2	Working	In desalinated water reservoir
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	1	Defected	
9	Type of chlorination Dosing System	1	Manual – Working	
10	Over Head Crane	1	0	

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Bad	

14-ALHASHMIEH P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Pipeline coming from Khaw P.S.	
2	Discharge to	Sukhneh P.S & Hararieh reservoir (2 pumps) Hashmieh local network (2 pumps)	
3	Operation Mode	*Sukhneh P.S & Hararieh reservoir:* 1 pump duty & 1 standby. *Hashmieh:* 1 pump duty & 1 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	GUANGLV	110	400	2980	160KW ATR	Motors and Starters are not acceptable.
P2	SIEMENS	110	380	1485	160KW ATR	
P3	CAMAK	75	380	1475	75KW ATR	
P4	BHAMA	132	380	2980	200KW ATR	
Well					150KW ATR	In site well

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X1500KVA transformer with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	0	Manual – Working	
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

15-Al-Sukhneh P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Hasmeieh Booster	
2	Discharge to	Bani Hashem & Abu Zeighan Network	
3	Operation Mode	1 duty & 1 Standby	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	SCHORCH	55	380	1470	75KW ATR	Motors and Starters are not acceptable.
P2	FELM	90	400	2980	100KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1x1000KV common transformers with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0	Working – not accurate	On the discharge line
3	Hydrostatic Level meter	0		In the inlet pipes of 4500m3 reservoirs. Type is not known.
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0	working	
8	Chlorination Doors Macro switch	0	working	
9	Type of chlorination Dosing System	1	Manual	Not Acceptable
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

16-ALBASATEEN P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 500m3 reservoir	
2	Discharge to	Rusaifah, Hi Al-Rasheed, Yajouz and Hai Ja'afar Hitteen Resrevoir Hai Ja'far, Almsheirfeh and Jabal Feisal	
3	Operation Mode	4 pumps duty & 2 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	SIEMENS	280	380	1487	250KW ATR	Motors and Starters are working, but not acceptable.
P2	Unknown	313	380	1460	315KW ATR	
P3	BROOK CROMPTON	225	380	1480	350KW ATR	
P4	GEMONT SCHNEIDER	320	380	1490	300KW ATR	
P5	CAMAK	320	380	1490	350KW ATR	
P6	BROOK CROMPTON	225	-	1480	250KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X1500KVA transformer with 400V secondary voltage.	
KWH Meter Location	Within JEPCO site Location
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0	Working	
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	2	working	In 500m3 reservoir for operation of P1 & P6
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	1	Manual – Working	
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

17-AWAJAN BOOSTER

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	Stored outside motor	Not working
2	Discharge to		
3	Operation Mode		

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
Awaj-an well # 21					150KW ATR	Pump to Zarqa P.S., Basateen P.S. and Hai AlHussain
Awaj-an well # 21					200KW ATR	

Power Supply	
Description	**Remarks**
No information	No information
KWH Meter Location	No information
Standby Generator	No information

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	0		
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	0		
8	Chlorination Doors Macro switch	0		
9	Type of chlorination Dosing System	0		
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

18-AWAJAN UPPER RESERVOIR

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 4500m3 reservoir	
2	Discharge to	Awajan local network	
3	Operation Mode	Unknown	Unknown. Operator is not at site.

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	CAMAK	30	380	1460	50& 30 KW ATR. Pump for P2 is dismantled	Motors are outdoor in bad condition. Starters are not acceptable.
P2	EMTAS	30	415	1455		

Power Supply	
Description	**Remarks**
The site is supplied with power from local JEPCO network	
KWH Meter Location	Unknown. Operator is not at site.
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	0		
2	Ultrasonic Flow Meter	0	Working	2 on the discharge lines of the pumps & 1 on the discharge line of Well#2
3	Hydrostatic Level meter	1	Type is unknown	Water sensor is in the round shape reservoir constructed by JICA
4	Ultrasonic Level Meter			
5	Electrical Float Switch	0		
6	Dry Run	0		
7	Chlorination Gas Detectors	-	Unknown	
8	Chlorination Doors Macro switch		Unknown	
9	Type of chlorination Dosing System		Unknown	
10	Over Head Crane		Unknown	Unknown

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	The site is on highest level location compared with the surrounding area. Many telecommunication companies had installed their telecommunication towers in the nearby.
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	

19-BATRAWI P.S.

Pumps Water Flow			
Item No.	**Description**	**Status**	**Remarks**
1	Suction from	In site 4000m3 reservoir – square shape (Old tank)	There is an other circular shape reservoir (new tank) under construction reservoir – By JICA
2	Discharge to	Batrawi high area local network Zarqa local network Jabal Al-Mugheer local network High Ma'soom local network	
3	Operation Mode	1 pumps duty & 1 standby.	

Motors & Starter Panel						
Item	**Manufacturer**	**Rated Power (KW)**	**Rated Voltage (V)**	**R.P.M.**	**Starter Panel**	**Remarks**
P1	TOSHIBA	132	400	1480	132KW ATR	Motors and Starters are acceptable.
P2	TOSHIBA	132	400	1480	132KW ATR	

Power Supply	
Description	**Remarks**
The site is supplied with power from 1X1000KVA common transformer with 400V secondary voltage.	
KWH Meter Location	In MCC in electrical room
Standby Generator	Not Available

Electrical Instrumentation & Chlorination System				
Item No.	**Instrument Type**	**Quantity**	**Status**	**Location**
1	Electro Magnetic Flow Meter	1	Working	On the discharge line
2	Ultrasonic Flow Meter	0		
3	Hydrostatic Level meter	0		
4	Ultrasonic Level Meter	1	Working	In 4000 m3 reservoir
5	Electrical Float Switch	3	Working	In 4000 m3 reservoir
6	Dry Run	0		
7	Chlorination Gas Detectors	1	Working	In chlorinator room
8	Chlorination Doors Macro switch	2	working	In chlorinator & storage rooms
9	Type of chlorination Dosing System	1	Automatic – Working	
10	Over Head Crane	0		

SCADA, Telemetry & Communications			
Item No.	**Description**	**Status**	**Remarks**
1	SCADA	Not Available	
2	RTU (PLC, Modem & Antenna)	Not Available	
3	Telemetry Data Communication System	Not Available	
4	Existing Voice Communication System	Available	Telephone
5	GSM Coverage	Good	
	MIMIC Panel	Working	Discharge Flow Display Discharge flow Totalizer display Discharge flow chart recorder Inlet flow display Old Tank Level display New tank level display Pump status indication lamp Flow display from Khaw inlet pipe
	Water quantity (m3) display	Working	In the old tank and depend on the ultrasonic level measurement in the old tank

Azraq

Plate 1: Chlorine dosing points

Plate 2: Chlorine Dosing Building

Plate 3: Instrumentation Panels

Plate 4: New Pumping Station

Plate 5: Chlorine Dosing Cylinders

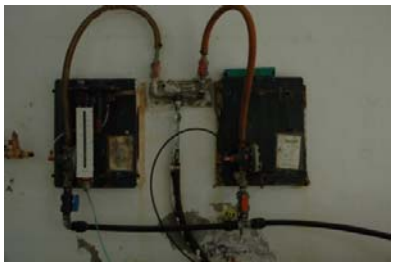
Plate 6: Chlorine dosing points

Plate 7: 12,000m^3 Reservoir

Plate 8: 2,800 & 5,000m^3 out of service

Plate 9: Access road to Azraq Site

Plate 10: New Pumping Station

Azraq (Contd)

Plate 11: Pipework at side of new pumping station

Plate 12: External pipework on Azraq site

Hallabat

Plate 1: Pumping Station

Plate 2: External Pipework

Plate 3: Cracking on Pumping Station wall.

Plate 4: Chlorine dosing points

Plate 5: Hoist in Chlorine Dosing Building

Plate 6: Chlorine Cylinders

Plate 7: Chlorine Dosing Building

Plate 8: 1,000m^3 Reservoir

Hallabat (Contd)

Plate 9: 1,000m^3 Reservoir

Plate 10: 1,000m^3 Reservoir

Plate 11: Hallabat Pumps

Plate 12: Condition of Hallabat Pumps

Tafeh

Plate 1: 200m^3 Reservoir

Plate 2: Tafeh Pumping Station

Plate 3: Entrance to Tafeh Site

Plate 4: Site Fencing arounf Tafeh Site

Plate 5: Road along Tafeh Site

Plate 6: 200m^3 Reservoir & Pipework

Khaw

Plate 1: Pumping Station

Plate 2: Instrumentation Panels

Plate 3: Old Pumping Station

Plate 4: 12,000m^3 Reservoir

Plate 5: Leak in 12,000m^3 Reservoir

Plate 6: Leak in 12,000m^3 Reservoir

Plate 7: Old Pumping Station

Plate 8: Khaw Site Layout

Plate 9: Pumps at Khaw Site

Plate 10: Access road to Khaw Site

Khaw (Contd)

Plate 11: Pipework in Khaw Pumping Station

Plate 12: Leaking Pump in Pumping Station

Plate 13: 4,00m^3 dis-used reservoir & 12,000m^3

Zarqa

Plate 1: External Pipework & Fittings

Plate 2: Zarqa Pumping Station

Plate 3: Zarqa Pumping Station

Plate 4: Zarqa Pumping Station

Plate 5: 500m^3 Reservoir out of service

Plate 6: 4,500m^3 Reservoir

Plate 7: Chlorine dosing cylinders

Plate 8: Chlorine dosing points

Zarqa (Contd)

Plate 9: Chlorine dosing points

Plate 10: Chlorine dosing facility

Plate 11: Chlorine dosing facility

Tamween

Plate 1: Tamween Site

Plate 2: Tamween Pumping Station

Plate 3: Tamween Pumps

Plate 4: Instrumentation panels

Plate 5: Gantry Crane in pumping station

Plate 6: 1,000m^3 Reservoir

Plate 7: Instrumentation panels

Plate 8: Pipework in Pumping Station

Tamween (Contd)

Plate 9: 1,000m^3 Reservoir & Pipework

Plate 10: Water Level in reservoir

Plate 11: Condition of pipework in pumping station

Plate 12: External pipework on site

Merhib

Plate 1: Hoist in Chlorine Dosing Building

Plate 2: Instrumentation Panels

Plate 3: Extraction fan in Chlorine Dosing Building

Plate 4: Chlorine dosing points

Plate 5: Pressure gauge

Plate 6: Entrance to Chlorine Dosing Building

Plate 7: Inside Pumping Station

Plate 8: Instrumentation Panel

Merhib (Contd)

Plate 9: Leaking Pumps

Plate 10: Leak from Pump

Plate 11: Merhib Well and Pipework

Plate 12: Pumping Station

Plate 13: 1,000m^3 Reservoir

Plate 14: Entrance to Merhib Site

Plate 15: Merhib Chlorine Dosing Building

Um Rumanneh

Plate 1: Um Rumanneh Pumps

Plate 2: Um Rumanneh Pumping Station

Plate 3: External Pipework

Plate 4: 500m^3 Reservoir

Plate 5: 500m^3 Reservoir

Plate 6: Entrance to Um Rumanneh

Sarout

Plate 1: Sarout Site

Plate 2: Sarout Site Layout

Plate 3: 400m^3 Reservoir

Plate 4: 400m^3 Reservoir

Alouk

Plate 1: Alouk 85m^3 Reservoir

Plate 2: Alouk Site Layout

Plate 3: Alouk Chlorination building

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Plate 5: 4,500 & 6,300m^3 Reservoirs

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Plate 2: Inlet Pipe and access ladder

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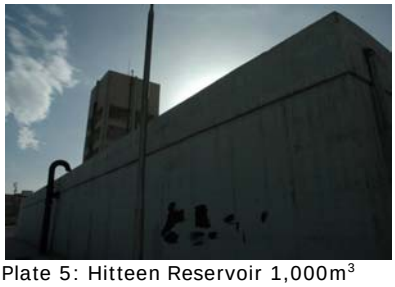

Plate 5: Hitteen Reservoir 1,000m^3

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Plate 3: Awajan Low Reservoir 1,600m^3

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Pipe Leaks, Repairs and Meters (Contd)

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APPENDIX 4 – CURRENT WATER TARIFF STRUCTURE

Current Water Tariff Structure

J.D Including Sewage	J.D without Sewage	Quantity	J.D Including Sewage	J.D without Sewage	Quantity	J.D Including Sewage	J.D without Sewage	Quantity
102.932	71.896	134	32.444	23.594	77	4.422	3.75	001-20
104.550	73.006	135	33.313	24.188	78	6.036	5.325	21
106.180	74.124	136	34.196	24.792	79	6.150	5.400	22
107.824	75.251	137	35.091	25.404	80	6.265	5.475	23
109.481	76.388	138	35.999	26.026	81	6.379	5.550	24
111.150	77.533	139	36.921	26.657	82	6.493	5.625	25
112.833	78.688	140	37.856	27.296	83	6.607	5.700	26
114.530	79.852	141	38.803	27.945	84	6.721	5.775	27
116.239	81.024	142	39.764	28.603	85	6.836	5.850	28
117.961	82.206	143	40.738	29.269	86	6.950	5.925	29
119.697	83.397	144	41.726	29.945	87	7.064	6.000	30
121.445	84.596	145	42.726	30.630	88	7.173	6.075	31
123.207	85.805	146	43.739	31.324	89	7.292	6.150	32
124.982	87..023	147	44.766	32.027	90	7.407	6.225	33
126.770	88.25	148	45.806	32.738	91	7.521	6.300	34
128.571	89.486	149	46.859	33.459	92	7.635	6.375	35
130.385	90.731	150	47.925	34.189	93	7.749	6.450	36
132.213	91.984	151	49.004	34.928	94	7.863	6.525	37
134.053	93.247	152	50.096	35.666	95	7.978	6.600	38
135.907	94.519	153	51.201	36.483	96	8.092	6.675	39
137.774	95.800	154	52.320	37.199	97	8.206	6.750	40
139.653	97.091	155	53.451	37.975	98	9.902	8.210	41
141.546	98.39	156	54.596	38.759	99	10.298	8.479	42
143.453	99.698	157	55.754	39.552	100	10.708	8.758	43
145.371	101.015	158	55.925	40.354	101	11.13	9.045	44
147.304	102.341	159	58.109	41.165	102	11.555	9.341	45
149.250	103.676	160	59.306	41.985	103	12.015	9.647	46
151.208	105.021	161	60.517	42.615	104	12.477	9.961	47
153.180	106.374	162	61.740	43.654	105	12.952	10.285	48
155.165	107.736	163	62.977	44.501	106	13.441	10.617	49
157.163	109.108	164	64.227	45.357	107	13.942	10.959	50
159.174	110.488	165	65.489	46.223	108	14.457	11.309	51
161.199	111.878	166	66.765	47.097	109	14.985	11.669	52
163.236	113.276	167	68.055	47.981	110	15.525	12.037	53
165.287	114.684	168	69.357	48.873	111	16.079	12.418	54
167.350	116.100	169	70.671	49.775	112	16.646	12.802	55
169.427	117.526	170	72.001	50.686	113	17.227	13.197	56
171.517	118.96	171	73.342	51.605	114	17.82	13.602	57
173.620	120.404	172	74.697	52.534	115	18.427	14.016	58
175.736	121.857	173	76.065	53.472	116	19.046	14.439	59

177.866	123.318	174	77.446	54.519	117	19.679	14.870	60
180.008	124.789	175	78.84	55.374	118	20.325	15.311	61
182.164	126.269	176	80.248	56.339	119	20.984	15.761	62
184.332	127.758	117	81.668	57.313	120	21.656	16.220	63
186.514	129.256	178	83.102	58.296	121	22.341	16.688	64
188.709	130.762	179	84.548	59.288	122	23.039	17.165	65
190.917	132.278	180	86.008	60.289	123	23.751	17.651	66
193.139	133.803	181	87.481	61.299	124	24.476	18.146	67
195.373	135.328	182	88.967	62.318	125	25.214	18.650	68
197.620	136.880	183	90.466	63.346	126	25.964	19.164	69
199.881	138.432	184	91.979	64.383	127	26.729	19.686	70
202.155	139.994	185	93.504	65.429	128	27.506	20.217	71
235.962	163.05	186	95.043	66.485	129	28.296	20.757	72
237.204	163.900	187	96.594	67.549	130	29.099	21.306	73
238.446	164.75	188	98.159	68.622	131	29.916	21.865	74
239.688	165.600	189	99.737	69.704	132	30.746	22.432	75
240.930	166.45	190	101.328	70.796	133	31.588	23.009	76

APPENDIX 5 – NETWORK MODEL OUTPUTS

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5.1. Hydraulic Model Data and Results for the Existing 2008 Model at Average Demand and Peak Demand

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- Khaw to Batrawi to Zarqa High
- Khaw to Russaifah
- Russaifah to Russaifah High
- Basateem to Russaifah Low
- Corridor Wells to Khaw
- Khaw to Awajan Hub
- Awajan Hub to Awajan Low
- Awajan High to Awajan West
- Awajan Hub to Awajan High
- Awajan Low to Awajan North
- Supply Profile: Azraq-Khaw-Russaifah
- Supply Profile: Khaw-Awajan-Awajan High-Awajan West / Awajan-Awajan Low-Awajan North

5.1 Hydraulic Model Data and Results for the Existing 2008 Model at Average Demand and Peak Demand

Existing Model Tank Information

ID	Label	Elevation (Base) (m)	Elevation (Minimum) (m)	Elevation (Initial) (m)	Elevation (Maximum) (m)	Diameter (m)	Flow (Out net) (L/s)
4023	Zarqa Reservoir	572	573	575	576	37.85	898.52
4051	Batrawi Reservoir	651	652	654	654.5	38.15	-1330.3
4066	Khaw Reservoir	599.6	601	606	607.4	44.25	394.55
4090	Hitten Reservoir	763.2	764	765	766.2	41.2	2.08
4091	Hitten Tower	764	784	786	787	6.5	-3.09
4108	Russaifah High	803	803	805	806.2	26.76	29.95
4112	Russaifah Low	751	751	753	754.2	49.67	-19.77
4128	Merhib Reservoir	633.5	634	636	636.5	20.6	9.83
4140	Berein Reservoir	867	867	869	870.5	19.07	-29.64
4144	Rummaneh Reservoir	762.9	763	765	766.2	13.89	-1.86
4153	Sarout Reservoir	769	769	770.5	771.5	14.27	-1.64
4154	Awajan High Square	697.5	699	700	702	35.68	-31.74
4155	Awajan High Circular	695.5	697	700	701	38.19	0
4156	Awajan Low	640	641	643	643.5	24.12	-9.48
4157	Qunaya Reservoir	577	578	579	580	14.57	-12.69
4167	Hashmeya Reservoir	621	622	623	624.2	24.43	23.64
4171	Hallabat Reservoir	597	598	599	600	20.6	-12.71
4265	Zarqa High Reservoir	716	717	718	719	32.57	-133.08
4279	Sukhna Reservoir	572	573	575	576	17.84	3.48
4590	Tamween Reservoir	611.5	613	615	615.5	17.84	93.89
4597	Basateen Reservoir	630.5	631	633	634	13.49	145.32
4638	Tafeh Reservoir	598	598	600	601	9.2	-0.45

Existing Model Pump Information

ID	Label	Elevation (m)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (m)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)
4720	Alouk Pump	604	Alouk PS	On	606.92	888.07	4.39	281.15
4204	Awajan Booster Station (f	582.02	Awajan Booster	Off	692.66	692.68	0	0
4423	azraq new 1	558	Azraq to Khaw New	On	572.06	1001.69	46.95	429.63
4419	azraq new 2	558	Azraq to Khaw New	On	572.06	1001.69	46.95	429.63
4406	azraq new 3	558	Azraq to Khaw New	On	572.06	1001.69	46.95	429.63
4413	azraq new 4	558	Azraq to Khaw New	On	572.06	1001.69	46.95	429.63
4420	azraq new 5	558	Azraq to Khaw New	On	572.06	1001.69	46.95	429.64
4383	azraq to khaw 2	563	Azraq to Khaw Old	On	572.13	1001.71	78.3	429.58
4386	azraq to khaw 3	563	Azraq to Khaw Old	On	572.13	1001.71	78.3	429.58
4376	Azraq to Khaw PS	563	Azraq to Khaw Old	On	572.13	1001.71	78.3	429.58
4247	Basteen PS to Hitten 2	631	Basteen to Hitten 2	On	632.53	882.49	68.04	249.97
4553	basteen to hitten 1	631	Basteen to Hitten 2	On	632.51	882.49	68.04	249.98
4556	basteen to hitten 3	631	Basteen to Hitten 1	On	632.46	882.56	75.69	250.1
4252	Basteen to Jabal Al Sham	631	Basteen to Hitten 1	Off	633	693.43	0	0
4255	Basteen to Russaifah	631	Basteen to Hitten 1	On	632.66	956.99	61.36	324.33
4268	Batrawi PS	646	Batrawi PS	On	653.68	753.8	134.69	100.12
4275	Batrawi PS (200)	646	Batrawi PS	On	653.52	770.87	114.92	117.34
4228	Hallabat to Hallabat	596	Hallabat to Hallabat	On	597.66	1262.18	48.43	664.52
4225	Hallabat to Khaw	596	Hallabat to Khaw	On	598.97	752.42	133.14	153.45
4431	Hallabat to khaw 2	596	Hallabat to Khaw	Off	599	752.4	0	0
4524	Hashmeya PS	538	Hashimeya PS	On	600.67	711.84	55.53	111.17
4803	Hashmeya to Zarqa	538	Hashimeya to Zarqa	On	539.99	612.76	98.27	72.77
4101	Hitten Tower Pump	764.25	Hitten Tower PS	On	747.22	786.02	19.3	38.79
4442	Khaw New 1	590	Khaw to Hall & Batrawi New PS	On	604.98	677.41	221.84	72.43
4465	Khaw New 2	590	Khaw to Hall & Batrawi New PS	On	604.98	677.41	221.84	72.43
4468	Khaw new 3	590	Khaw to Hall & Batrawi New PS	On	604.98	677.41	221.84	72.43
4471	Khaw New 4	590	Khaw to Hall & Batrawi New PS	On	604.98	677.41	221.83	72.43
4523	Merhib to Awajan	631	Merheb to Awajan	Off	635.94	697.32	0	0
4522	Merhib to Berein	631	Merheb to Beirein	On	635.85	876.21	31.88	240.36
4441	Old Khaw 1	596	Khaw to Amman Old PS 1	On	605	966.16	52.83	361.16
4452	Old Khaw 2	596	Khaw to Amman Old PS 2	On	604.99	966.17	118.8	361.17
4456	Old Khaw 3	596	Khaw to Amman Old PS 3&4	On	604.99	966.17	132.06	361.18
4459	Old Khaw 4	596	Khaw to Amman Old PS 3&4	On	604.99	966.17	132.06	361.18
4633	Russaifah Booster	750	Russaifah Booster	On	804.85	895.36	41.69	90.52
4641	Sukhna Pumps	490	Sukhna Pumps	On	524.51	855.26	23.17	330.75
4190	Tafeh PS	598	Tafeh PS	On	599	772.32	1.55	173.32
4507	Tamwn 1	610	Tamween PS	On	615	934.07	6.4	319.07
4087	Tamwn 2	610	Tamween PS	On	615	934.07	6.4	319.07
4510	Tamwn 3	610	Tamween PS 2	On	614.63	934.5	79.84	319.86
4514	Tamwn 4	610	Tamween PS 2	On	614.63	934.51	79.84	319.88
4519	to beirein	760	Rummaneh Beirein	On	764.86	1062.52	45.3	297.67
4147	Um Rummaneh PS	760	Rummaneh to Rummaneh	On	764.99	1158.05	7.31	393.06
4479	Zargq Int 2	570	Zarqa Internal 2	On	573.57	776.48	80.55	202.91
4491	Zarqa Ext 1	570	Zarqa Ext 1	On	572.74	747.14	146.44	174.4
4035	Zarqa Ext 2	570	Zarqa Ext 2&3	On	572.7	747.18	292.74	174.49
4494	Zarqa Ext 3	570	Zarqa Ext 2&3	On	572.69	747.19	292.71	174.5
4497	Zarqa Ext 4	570	Zarqa Ext 4	On	572.68	775.68	251.63	202.99
4038	Zarqa Ext 5	570	Zarqa Ext 5	On	572.77	775.63	80.57	202.86
4045	Zarqa Int 1	570	Zarqa Internal 1	On	573.57	776.48	80.55	202.91
4483	Zarqa Int 3	570	Zarqa Internal 3	On	573.57	710.76	98.3	137.19
4048	Zarqa Int 4	570	Zarqa Internal 4	On	573.56	710.76	119.14	137.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
477	J-288	680	<None>	0	726.18	46.1
478	J-289	680	<None>	0	726.18	46.1
780	J-475	563	<None>	0	572.13	9.1
781	J-476	563	<None>	0	572.15	9.1
876	J-532	680	<None>	0	727.64	47.5
877	J-533	680	<None>	0	727.64	47.5
1000	J-608	700	<None>	0	730.21	30.1
1183	J-717	732.28	<None>	0	825.29	92.8
1184	J-718	732.37	<None>	0	825.27	92.7
1942	J-1151	680	<None>	0	727.58	47.5
2299	J-1328	709.19	<None>	0	830.81	121.4
2300	J-1329	706.5	<None>	0	830.86	124.1
2692	J-1504	680	<None>	0	726.35	46.3
2815	J-1553	680	<None>	0	727.84	47.7
2839	J-1562	680	<None>	0	727.58	47.5
2970	J-1611	680	<None>	0	727.84	47.7
3523	J-1809	700.07	<None>	0	832.85	132.5
3528	J-1812	733.09	<None>	0	785.63	52.4
3548	J-1820	595.68	<None>	0	622.98	27.2
3681	J-1869	686	<None>	0	727.84	41.8
3789	J-1906	668	<None>	0	727.58	59.5
3810	J-1915	596.47	<None>	0	623.17	26.6
3888	J-1943	559.9	<None>	0	983.94	423.2
3889	J-1944	563	<None>	0	1001.71	437.8
3891	J-1945	591	<None>	0	716.13	124.9
3892	J-1946	593	<None>	0	711.47	118.2
3921	J-1959	595.97	<None>	0	623	27
3923	J-1960	558	<None>	0	572.06	14
3927	J-1961	582.11	<None>	0	607.56	25.4
3932	J-1964	625	<None>	0	744.44	119.2
4397	J-2014	560	<None>	0	572.4	12.4
4402	J-2015	558	<None>	0	1001.69	442.8
4798	J-2057	543.8	<None>	0	611.36	67.4
799	J-486	602.51	KABA City	0.06	744.09	141.3
800	J-487	602.68	KABA City	0.06	744.09	141.1
825	J-501	596.92	KABA City	0.06	744.1	146.9
826	J-502	597.03	KABA City	0.06	744.1	146.8
842	J-511	596.73	KABA City	0.06	744.11	147.1
843	J-512	596.81	KABA City	0.06	744.11	147
897	J-546	598.81	KABA City	0.06	744.1	145
898	J-547	598.72	KABA City	0.06	744.1	145.1
983	J-598	598.92	KABA City	0.06	744.1	144.9
1186	J-719	599.49	KABA City	0.06	744.1	144.3
1187	J-720	599.65	KABA City	0.06	744.1	144.2
1226	J-744	594.53	KABA City	0.06	744.11	149.3
1227	J-745	594.85	KABA City	0.06	744.11	149
1321	J-801	601.48	KABA City	0.06	744.1	142.3
1322	J-802	601.64	KABA City	0.06	744.09	142.2
1731	J-1040	595.83	KABA City	0.06	744.1	148
1732	J-1041	596.18	KABA City	0.06	744.1	147.6
2013	J-1183	597.62	KABA City	0.06	744.1	146.2
2014	J-1184	598.19	KABA City	0.06	744.1	145.6
2185	J-1273	601.92	KABA City	0.06	744.09	141.9
2186	J-1274	602.62	KABA City	0.06	744.09	141.2
2413	J-1381	598.54	KABA City	0.06	744.1	145.3
2446	J-1399	605.17	KABA City	0.06	744.09	138.6

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2478	J-1411	603.99	KABA City	0.06	744.09	139.8
2675	J-1497	610	KABA City	0.06	934.06	323.4
2872	J-1573	599.16	KABA City	0.06	744.1	144.6
2903	J-1583	619.53	KABA City	0.06	938.72	318.5
2904	J-1584	617.74	KABA City	0.06	939.55	321.2
3112	J-1659	599.43	KABA City	0.06	744.1	144.4
3118	J-1660	596.3	KABA City	0.06	744.14	147.5
3457	J-1787	610.83	KABA City	0.06	939.55	328.1
3563	J-1825	631.21	KABA City	0.06	688.09	56.8
3639	J-1852	599.17	KABA City	0.06	744.14	144.7
3640	J-1853	596.31	KABA City	0.06	744.14	147.5
3845	J-1929	610.91	KABA City	0.06	615	4.1
4743	J-2037	596	KABA City	0.06	744.1	147.8
4749	J-2039	606	KABA City	0.06	744.02	137.7
4750	J-2040	599	KABA City	0.06	744.02	144.7
4751	J-2041	598	KABA City	0.06	744.02	145.7
4752	J-2042	598	KABA City	0.06	744.02	145.7
4753	J-2043	596	KABA City	0.06	744.03	147.7
4754	J-2044	605	KABA City	0.06	744.09	138.8
4755	J-2045	581	KABA City	0.06	744.02	162.7
4757	J-2047	592	KABA City	0.06	744.1	151.8
4758	J-2048	587	KABA City	0.06	744.1	156.8
4759	J-2049	576	KABA City	0.06	744.1	167.8
4760	J-2050	589	KABA City	0.06	744.1	154.8
4766	J-2052	609	KABA City	0.06	744.02	134.7
4768	J-2053	602	KABA City	0.06	744.02	141.7
4789	J-2055	606	KABA City	0.06	744.02	137.7
4792	J-2056	576	KABA City	0.06	744.1	167.8
27	J-2	575.16	North Region	0.31	617.77	42.5
30	J-3	538.04	North Region	0.31	617.44	79.2
31	J-4	538.02	North Region	0.31	617.43	79.2
41	J-10	575.06	North Region	0.31	617.77	42.6
49	J-15	575.27	North Region	0.31	617.77	42.4
51	J-16	540.19	North Region	0.31	836.27	295.5
52	J-17	540.2	North Region	0.31	836.21	295.4
57	J-20	544.05	North Region	0.31	834.42	289.8
58	J-21	543.98	North Region	0.31	834.41	289.8
60	J-22	575.2	North Region	0.31	617.77	42.5
62	J-23	548.69	North Region	0.31	617.63	68.8
63	J-24	548.61	North Region	0.31	617.63	68.9
65	J-25	591.23	North Region	0.31	618.16	26.9
66	J-26	591.14	North Region	0.31	618.16	27
68	J-27	567.27	North Region	0.31	617.53	50.2
69	J-28	567.17	North Region	0.31	617.53	50.3
82	J-36	559.99	North Region	0.31	617.56	57.5
83	J-37	560.05	North Region	0.31	617.56	57.4
109	J-54	528.17	North Region	0.31	833.05	304.3
110	J-55	528.2	North Region	0.31	833.05	304.2
115	J-58	575.45	North Region	0.31	617.78	42.2
117	J-59	548.49	North Region	0.31	616.83	68.2
118	J-60	548.41	North Region	0.31	616.83	68.3
123	J-63	530.05	North Region	0.31	833	302.3
124	J-64	530.11	North Region	0.31	833	302.3
138	J-73	548.32	North Region	0.31	616.83	68.4
167	J-91	564.99	North Region	0.31	617.42	52.3

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
168	J-92	565.08	North Region	0.31	617.42	52.2
176	J-97	533.86	North Region	0.31	616.36	82.3
177	J-98	533.8	North Region	0.31	616.36	82.4
194	J-109	559.91	North Region	0.31	617.56	57.5
199	J-112	540.71	North Region	0.31	615.81	75
200	J-113	540.69	North Region	0.31	615.81	75
205	J-116	591.25	North Region	0.31	618.16	26.9
210	J-119	538.31	North Region	0.31	616.4	77.9
211	J-120	538.22	North Region	0.31	616.4	78
261	J-152	562.07	North Region	0.31	617.58	55.4
262	J-153	561.99	North Region	0.31	617.58	55.5
281	J-165	574.96	North Region	0.31	617.76	42.7
285	J-167	561.91	North Region	0.31	617.58	55.6
290	J-170	564.79	North Region	0.31	617.41	52.5
292	J-171	557.1	North Region	0.31	617.57	60.3
293	J-172	557.05	North Region	0.31	617.57	60.4
339	J-202	554.86	North Region	0.31	617.56	62.6
340	J-203	554.89	North Region	0.31	617.56	62.5
342	J-204	551.04	North Region	0.31	617.47	66.3
343	J-205	551.12	North Region	0.31	617.47	66.2
351	J-210	533.94	North Region	0.31	616.36	82.3
370	J-222	591.02	North Region	0.31	618.15	27.1
392	J-235	585.68	North Region	0.31	618.7	33
393	J-236	585.69	North Region	0.31	618.68	32.9
398	J-239	554.25	North Region	0.31	617.75	63.4
399	J-240	554.51	North Region	0.31	617.75	63.1
431	J-260	539.77	North Region	0.31	836.2	295.8
444	J-268	543.91	North Region	0.31	834.41	289.9
482	J-291	538.27	North Region	0.31	616.36	77.9
483	J-292	538.15	North Region	0.31	616.38	78.1
504	J-305	585.91	North Region	0.31	618.67	32.7
532	J-322	543.83	North Region	0.31	834.41	290
578	J-350	557.57	North Region	0.31	617.61	59.9
579	J-351	557.49	North Region	0.31	617.61	60
613	J-372	537.98	North Region	0.31	617.37	79.2
614	J-373	537.96	North Region	0.31	617.36	79.2
625	J-380	544.75	North Region	0.31	834.85	289.5
654	J-397	572.34	North Region	0.31	617.56	45.1
655	J-398	572.11	North Region	0.31	617.56	45.4
682	J-414	528.45	North Region	0.31	835.7	306.6
683	J-415	528.75	North Region	0.31	835.7	306.3
711	J-432	584.58	North Region	0.31	617.88	33.2
712	J-433	584.1	North Region	0.31	617.88	33.7
717	J-436	528.28	North Region	0.31	833.21	304.3
718	J-437	528.26	North Region	0.31	833.2	304.3
733	J-446	547.56	North Region	0.31	617.59	69.9
734	J-447	547.38	North Region	0.31	617.59	70.1
789	J-480	572.63	North Region	0.31	617.56	44.8
805	J-489	554.94	North Region	0.31	617.75	62.7
858	J-521	545.82	North Region	0.31	617.4	71.4
859	J-522	545.92	North Region	0.31	617.4	71.3
885	J-538	530.58	North Region	0.31	822.83	291.7
886	J-539	530.46	North Region	0.31	822.83	291.8
891	J-542	517.74	North Region	0.31	644.87	126.9
892	J-543	518.24	North Region	0.31	644.87	126.4
918	J-559	555.41	North Region	0.31	617.73	62.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
970	J-590	528.03	North Region	0.31	835.69	307
1018	J-619	530.2	North Region	0.31	822.83	292
1019	J-620	529.9	North Region	0.31	822.83	292.3
1024	J-622	546.18	North Region	0.31	615.83	69.5
1025	J-623	546.39	North Region	0.31	615.83	69.3
1027	J-624	517.26	North Region	0.31	835.16	317.3
1028	J-625	517.15	North Region	0.31	835.18	317.4
1033	J-628	527.94	North Region	0.31	835.7	307.1
1092	J-664	554.24	North Region	0.31	617.56	63.2
1118	J-679	576.04	North Region	0.31	619.56	43.4
1119	J-680	576.48	North Region	0.31	619.56	43
1131	J-687	527.01	North Region	0.31	835.7	308.1
1142	J-693	543.88	North Region	0.31	611.38	67.4
1143	J-694	543.8	North Region	0.31	611.38	67.4
1160	J-703	524.54	North Region	0.31	835.56	310.4
1161	J-704	525.08	North Region	0.31	835.58	309.9
1163	J-705	543.2	North Region	0.31	616.8	73.5
1164	J-706	542.84	North Region	0.31	616.8	73.8
1208	J-733	546.52	North Region	0.31	615.83	69.2
1283	J-778	576.44	North Region	0.31	619.56	43
1293	J-784	537.99	North Region	0.31	616.86	78.7
1294	J-785	537.96	North Region	0.31	616.88	78.8
1305	J-792	543.59	North Region	0.31	617.23	73.5
1306	J-793	543.22	North Region	0.31	617.23	73.9
1336	J-810	555.51	North Region	0.31	617.99	62.4
1381	J-837	543.68	North Region	0.31	617.52	73.7
1382	J-838	543.79	North Region	0.31	617.51	73.6
1384	J-839	533.45	North Region	0.31	556.75	23.2
1385	J-840	533.34	North Region	0.31	556.75	23.4
1408	J-853	517.28	North Region	0.31	835.12	317.2
1417	J-858	530.85	North Region	0.31	822.84	291.4
1418	J-859	530.59	North Region	0.31	822.83	291.7
1473	J-892	527.2	North Region	0.31	835.65	307.8
1493	J-904	516.92	North Region	0.31	835.2	317.6
1506	J-911	596	North Region	0.31	966.16	369.4
1507	J-912	596	North Region	0.31	605.12	9.1
1511	J-914	544.61	North Region	0.31	834.49	289.3
1552	J-935	546.14	North Region	0.31	617.4	71.1
1580	J-952	550.54	North Region	0.31	615.82	65.1
1581	J-953	550.05	North Region	0.31	615.82	65.6
1589	J-957	582.93	North Region	0.31	676.89	93.8
1590	J-958	590	North Region	0.31	677.38	87.2
1601	J-964	490	North Region	0.31	854.8	364.1
1602	J-965	490	North Region	0.31	524.92	34.8
1607	J-967	542.35	North Region	0.31	617.23	74.7
1608	J-968	541.78	North Region	0.31	617.23	75.3
1610	J-969	538.18	North Region	0.31	616.8	78.5
1611	J-970	538.07	North Region	0.31	616.82	78.6
1614	J-971	520.49	North Region	0.31	833.08	312
1615	J-972	521.2	North Region	0.31	833.07	311.2
1649	J-992	589.97	<None>	0.31	582.44	-7.5
1650	J-993	591.41	<None>	0.31	582.44	-8.9
1654	J-995	554.06	North Region	0.31	618.02	63.8
1655	J-996	553.46	North Region	0.31	618.02	64.4
1675	J-1008	518.52	North Region	0.31	643.65	124.9
1676	J-1009	517.23	North Region	0.31	643.65	126.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1690	J-1017	544.48	North Region	0.31	649.69	105
1691	J-1018	545.31	North Region	0.31	650.34	104.8
1702	J-1024	529.64	North Region	0.31	845.8	315.5
1703	J-1025	529.25	North Region	0.31	846.77	316.9
1762	J-1056	546.65	North Region	0.31	617.58	70.8
1766	J-1058	546.36	North Region	0.31	617.56	71.1
1771	J-1061	528.49	North Region	0.31	833.03	303.9
1781	J-1067	538.82	North Region	0.31	616.44	77.5
1786	J-1070	528.8	North Region	0.31	833.02	303.6
1813	J-1084	537.94	North Region	0.31	616.92	78.8
1825	J-1091	525.45	North Region	0.31	833.05	307
1826	J-1092	526.37	North Region	0.31	833.05	306.1
1834	J-1095	571.68	North Region	0.31	619.56	47.8
1835	J-1096	570.75	North Region	0.31	619.56	48.7
1853	J-1107	524.45	North Region	0.31	833.05	308
1859	J-1110	530.82	North Region	0.31	833	301.6
1867	J-1114	527.39	North Region	0.31	833.05	305
1883	J-1121	545.45	North Region	0.31	617.4	71.8
1888	J-1123	529.86	North Region	0.31	844.56	314.1
1898	J-1128	529.33	North Region	0.31	833.01	303.1
1910	J-1133	522.29	North Region	0.31	833.06	310.1
1911	J-1134	523.29	North Region	0.31	833.06	309.1
1926	J-1143	539.39	North Region	0.31	615.79	76.2
1927	J-1144	538.42	North Region	0.31	615.79	77.2
1964	J-1159	572.94	North Region	0.31	619.56	46.5
1981	J-1167	544.65	North Region	0.31	834.6	289.4
2037	J-1195	529.58	North Region	0.31	842.98	312.8
2046	J-1198	544.96	North Region	0.31	835.77	290.2
2047	J-1199	544.92	North Region	0.31	835.59	290.1
2070	J-1210	516.11	North Region	0.31	835.23	318.5
2077	J-1214	532.52	North Region	0.31	616.56	83.9
2078	J-1215	532.57	North Region	0.31	616.6	83.9
2082	J-1217	515.89	North Region	0.31	643.66	127.5
2091	J-1222	544.87	North Region	0.31	617.45	72.4
2092	J-1223	544.99	North Region	0.31	617.44	72.3
2124	J-1241	547.48	North Region	0.31	615.82	68.2
2136	J-1247	544.24	North Region	0.31	617.48	73.1
2153	J-1256	557.93	North Region	0.31	617.55	59.5
2205	J-1282	541.93	North Region	0.31	834.29	291.8
2221	J-1290	557.81	North Region	0.31	617.59	59.7
2223	J-1291	553.71	North Region	0.31	616.98	63.1
2252	J-1304	544.86	North Region	0.31	835.36	289.9
2254	J-1305	542.07	North Region	0.31	615.81	73.6
2269	J-1313	543.58	North Region	0.31	617.4	73.7
2270	J-1314	543.81	North Region	0.31	617.4	73.4
2306	J-1332	536.83	North Region	0.31	615.79	78.8
2341	J-1348	548.73	North Region	0.31	615.82	67
2370	J-1360	541.7	North Region	0.31	616.04	74.2
2371	J-1361	543.4	North Region	0.31	615.91	72.4
2387	J-1368	544.79	North Region	0.31	835.08	289.7
2390	J-1370	544.61	North Region	0.31	654.7	109.9
2399	J-1374	591.61	North Region	0.31	618.09	26.4
2415	J-1382	532.19	North Region	0.31	832.99	300.2
2416	J-1383	532.04	North Region	0.31	832.99	300.3
2437	J-1394	548.82	North Region	0.31	617.26	68.3
2438	J-1395	546.87	North Region	0.31	617.25	70.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2442	J-1397	520.27	North Region	0.31	833.87	313
2443	J-1398	524.59	North Region	0.31	833.76	308.5
2452	J-1401	545.35	North Region	0.31	617.54	72
2453	J-1402	544.9	North Region	0.31	617.52	72.5
2476	J-1410	548.73	North Region	0.31	617.56	68.7
2490	J-1415	532.5	North Region	0.31	833.58	300.5
2491	J-1416	531.93	North Region	0.31	833.75	301.2
2493	J-1417	527.6	North Region	0.31	833.75	305.5
2504	J-1421	534.69	North Region	0.31	615.79	80.9
2509	J-1424	573.57	North Region	0.31	617.56	43.9
2522	J-1430	536.06	North Region	0.31	616.71	80.5
2601	J-1463	550.35	North Region	0.31	617.28	66.8
2608	J-1466	528.48	North Region	0.31	822.83	293.8
2651	J-1487	544.35	North Region	0.31	617.4	72.9
2662	J-1490	544.57	North Region	0.31	617.4	72.7
2710	J-1511	559.48	North Region	0.31	618.33	58.7
2719	J-1515	556.51	North Region	0.31	617.53	60.9
2720	J-1516	555.85	North Region	0.31	617.53	61.6
2752	J-1530	531.76	North Region	0.31	833.75	301.4
2760	J-1533	562.56	North Region	0.31	617.53	54.9
2783	J-1541	550.09	North Region	0.31	615.82	65.6
2792	J-1545	522.16	North Region	0.31	835.42	312.6
2820	J-1555	530.38	North Region	0.31	836	305
2897	J-1581	548.47	North Region	0.31	617.41	68.8
2945	J-1601	564.62	North Region	0.31	618.04	53.3
2946	J-1602	556.95	North Region	0.31	618.03	61
2972	J-1612	566.96	North Region	0.31	582.5	15.5
2973	J-1613	570.97	North Region	0.31	582.48	11.5
2986	J-1615	549.65	North Region	0.31	617.52	67.7
3022	J-1625	555.04	North Region	0.31	617.33	62.2
3027	J-1626	532.4	North Region	0.31	833.58	300.6
3029	J-1627	520.7	North Region	0.31	834.14	312.8
3043	J-1630	556.32	North Region	0.31	582.94	26.6
3044	J-1631	558.51	North Region	0.31	582.73	24.2
3060	J-1635	528	North Region	0.31	833.58	305
3065	J-1638	572.68	North Region	0.31	617.53	44.8
3083	J-1647	590.65	North Region	0.31	618.13	27.4
3084	J-1648	591.58	North Region	0.31	618.4	26.8
3103	J-1656	571.69	North Region	0.31	619.56	47.8
3104	J-1657	569.26	North Region	0.31	618.91	49.5
3108	J-1658	565.34	North Region	0.31	617.52	52.1
3137	J-1667	576.31	North Region	0.31	618.06	41.7
3158	J-1675	580.09	North Region	0.31	582.45	2.4
3193	J-1689	591.37	North Region	0.31	622.75	31.3
3194	J-1690	589.5	North Region	0.31	622.75	33.2
3268	J-1716	513.1	North Region	0.31	643.97	130.6
3295	J-1729	539.97	North Region	0.31	605.1	65
3336	J-1744	583.94	North Region	0.31	605.01	21
3337	J-1745	589.83	North Region	0.31	605.07	15.2
3357	J-1751	565.45	North Region	0.31	582.73	17.2
3448	J-1783	571.98	North Region	0.31	619.58	47.5
3518	J-1807	590.91	North Region	0.31	618.15	27.2
3519	J-1808	575.32	North Region	0.31	617.79	42.4
3535	J-1815	550.97	North Region	0.31	644.86	93.7
3544	J-1819	578.42	North Region	0.31	605.06	26.6
3549	J-1821	573.29	North Region	0.31	620.19	46.8

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3575	J-1829	575.96	North Region	0.31	618.06	42
3576	J-1830	564.88	North Region	0.31	618.05	53.1
3579	J-1831	517.29	North Region	0.31	835.04	317.1
3588	J-1834	538	North Region	0.31	711.76	173.4
3589	J-1835	543.98	North Region	0.31	654.92	110.7
3595	J-1836	538	North Region	0.31	600.74	62.6
3596	J-1837	543.76	North Region	0.31	617.51	73.6
3620	J-1846	558.38	North Region	0.31	584.48	26
3621	J-1847	549.32	North Region	0.31	585.28	35.9
3646	J-1855	539.8	North Region	0.31	833.57	293.2
3648	J-1856	575.1	North Region	0.31	617.43	42.2
3649	J-1857	537.94	North Region	0.31	617.43	79.3
3688	J-1872	507.04	North Region	0.31	643.97	136.7
3705	J-1876	582.53	North Region	0.31	676.83	94.1
3706	J-1877	581.08	North Region	0.31	674.51	93.2
3724	J-1882	551.16	North Region	0.31	588.15	36.9
3744	J-1890	543.98	North Region	0.31	656.4	112.2
3745	J-1891	571.15	North Region	0.31	656.4	85.1
3750	J-1893	553.1	North Region	0.31	584.14	31
3779	J-1902	569.91	North Region	0.31	647.1	77
3780	J-1903	571.48	North Region	0.31	634.25	62.6
3786	J-1905	576.16	North Region	0.31	643.59	67.3
3791	J-1907	517.43	North Region	0.31	643.58	125.9
3792	J-1908	576.23	North Region	0.31	643.59	67.2
3811	J-1916	546.68	North Region	0.31	647.46	100.6
3872	J-1936	533.47	North Region	0.31	589.09	55.5
3881	J-1940	523.19	North Region	0.31	822.81	299
3901	J-1950	546.77	North Region	0.31	706.36	159.3
3902	J-1951	595.6	<None>	0.31	706.32	110.5
3905	J-1952	596	North Region	0.31	966.06	369.3
3914	J-1955	582.65	North Region	0.31	676.58	93.7
3916	J-1956	582.85	North Region	0.31	676.85	93.8
3920	J-1958	555.04	North Region	0.31	620.03	64.9
3929	J-1962	584.38	North Region	0.31	605.17	20.7
3931	J-1963	584.6	North Region	0.31	605.31	20.7
3964	J-1966	557.43	North Region	0.31	584.47	27
3966	J-1967	555.75	North Region	0.31	584.46	28.7
3969	J-1968	559.64	North Region	0.31	582.72	23
3971	J-1969	563.43	North Region	0.31	582.69	19.2
3973	J-1970	566	North Region	0.31	582.66	16.6
3975	J-1971	568.67	North Region	0.31	582.64	13.9
3977	J-1972	565.25	North Region	0.31	582.61	17.3
4289	J-2004	571.89	North Region	0.31	619.56	47.6
4295	J-2006	543.76	North Region	0.31	611.22	67.3
4344	J-2009	575	North Region	0.31	617.78	42.7
4354	J-2010	576	North Region	0.31	620.12	44
4357	J-2011	576	North Region	0.31	620.19	44.1
4526	J-2018	545	<None>	0.31	648.64	103.4
88	J-40	609.87	Tatweer	0.35	687.01	77
89	J-41	609.92	Tatweer	0.35	687.01	76.9
164	J-89	613.58	Tatweer	0.35	687.07	73.3
165	J-90	613.62	Tatweer	0.35	687.08	73.3
188	J-105	612.5	Tatweer	0.35	687.23	74.6
189	J-106	612.47	Tatweer	0.35	687.23	74.6
253	J-147	613.68	Tatweer	0.35	687.08	73.3
258	J-150	610.03	Tatweer	0.35	687.01	76.8

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
259	J-151	610.01	Tatweer	0.35	687.01	76.8
348	J-208	610.08	Tatweer	0.35	687.01	76.8
349	J-209	610.06	Tatweer	0.35	687.01	76.8
377	J-226	610.09	Tatweer	0.35	687.01	76.8
446	J-269	616.72	Tatweer	0.35	687.85	71
447	J-270	616.72	Tatweer	0.35	687.87	71
460	J-278	616.72	Tatweer	0.35	687.84	71
755	J-460	616.7	Tatweer	0.35	687.69	70.8
756	J-461	616.72	Tatweer	0.35	687.71	70.8
912	J-555	609.7	Tatweer	0.35	687.01	77.2
913	J-556	609.69	Tatweer	0.35	687.01	77.2
947	J-577	629.28	Tatweer	0.35	688.09	58.7
948	J-578	629.53	Tatweer	0.35	688.09	58.4
955	J-582	652.53	<None>	0.35	867.8	214.8
956	J-583	652.98	<None>	0.35	867.8	214.4
960	J-585	616.71	Tatweer	0.35	687.92	71.1
993	J-604	616.73	Tatweer	0.35	687.81	70.9
1003	J-610	629.79	Tatweer	0.35	688.09	58.2
1069	J-650	653.5	<None>	0.35	867.8	213.9
1108	J-673	628.97	Tatweer	0.35	688.09	59
1361	J-824	610.69	Tatweer	0.35	687.02	76.2
1362	J-825	611.15	Tatweer	0.35	687.03	75.7
1490	J-902	609.89	Tatweer	0.35	687.01	77
1491	J-903	609.79	Tatweer	0.35	687.01	77.1
1587	J-956	613.94	Tatweer	0.35	687.1	73
1820	J-1088	616.7	Tatweer	0.35	688.1	71.3
1861	J-1111	615.53	Tatweer	0.35	687.5	71.8
1862	J-1112	613.98	Tatweer	0.35	687.43	73.3
1938	J-1149	612.83	Tatweer	0.35	687.36	74.4
1970	J-1162	612.9	Tatweer	0.35	687.19	74.1
1991	J-1171	612.55	Tatweer	0.35	687.29	74.6
2150	J-1255	616.58	Tatweer	0.35	688.21	71.5
2174	J-1267	630.89	<None>	0.35	868.9	237.5
2175	J-1268	629.55	<None>	0.35	868.99	239
2272	J-1315	613.66	Tatweer	0.35	687.5	73.7
2324	J-1341	627.09	Tatweer	0.35	688.09	60.9
2539	J-1436	627.39	<None>	0.35	868.41	240.5
2540	J-1437	625.59	<None>	0.35	868.49	242.4
2621	J-1472	620.7	Tatweer	0.35	688.1	67.3
3003	J-1620	625.27	<None>	0.35	869.32	243.6
3017	J-1624	631.43	<None>	0.35	868.68	236.8
3173	J-1683	595.27	Tatweer	0.35	692.28	96.8
3271	J-1717	628.54	<None>	0.35	868.25	239.2
3313	J-1736	650	<None>	0.35	868.13	217.7
3368	J-1755	646.86	<None>	0.35	867.79	220.5
3486	J-1796	609.67	Tatweer	0.35	688.87	79
4318	J-2008	626.77	<None>	0.35	869.55	242.3
3467	J-1790	938.08	West Region	0.73	1157.21	218.7
566	J-342	573.04	East - Dulail	0.77	1101.46	527.4
567	J-343	573.2	East - Dulail	0.77	1101.46	527.2
1423	J-862	590.47	East - Dulail	0.77	1082.44	491
1424	J-863	590.51	East - Dulail	0.77	1082.46	491
1497	J-906	555	East - Dulail	0.77	970.9	415.1
1498	J-907	555	East - Dulail	0.77	970.9	415.1
1528	J-922	588.34	East - Dulail	0.77	1083.21	493.9
1529	J-923	588.22	East - Dulail	0.77	1083.25	494

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1554	J-936	555	East - Dulail	0.77	981.92	426.1
1555	J-937	555	East - Dulail	0.77	981.92	426.1
1585	J-955	555	East - Dulail	0.77	981.92	426.1
1617	J-973	555	East - Dulail	0.77	970.9	415.1
1638	J-985	555	East - Dulail	0.77	969.43	413.6
1639	J-986	555	East - Dulail	0.77	969.41	413.6
1660	J-999	579.58	East - Dulail	0.77	1016.69	436.2
1661	J-1000	579.22	East - Dulail	0.77	1016.69	436.6
1720	J-1034	579.98	East - Dulail	0.77	1016.7	435.8
1757	J-1053	590.57	East - Dulail	0.77	1082.56	491
1758	J-1054	590.54	East - Dulail	0.77	1082.6	491.1
1832	J-1094	555	East - Dulail	0.77	971.04	415.2
1840	J-1099	555	East - Dulail	0.77	970.83	415
1845	J-1102	555	East - Dulail	0.77	973.87	418
1846	J-1103	555	East - Dulail	0.77	973.87	418
1857	J-1109	555	East - Dulail	0.77	969.4	413.6
1976	J-1165	555	East - Dulail	0.77	974.24	418.4
2020	J-1187	555	East - Dulail	0.77	969.4	413.6
2042	J-1197	555	East - Dulail	0.77	969.4	413.6
2072	J-1211	577.83	East - Dulail	0.77	1017.6	438.9
2202	J-1280	576.2	East - Dulail	0.77	1117.6	540.3
2203	J-1281	575.62	East - Dulail	0.77	1116.65	539.9
2242	J-1299	590.39	East - Dulail	0.77	1082.67	491.3
2433	J-1392	555	East - Dulail	0.77	973.05	417.2
2434	J-1393	555	East - Dulail	0.77	972.59	416.7
2488	J-1414	555	East - Dulail	0.77	970.69	414.9
2687	J-1502	586.55	East - Dulail	0.77	1083.72	496.2
2688	J-1503	586.12	East - Dulail	0.77	1083.96	496.8
2746	J-1529	587.43	East - Dulail	0.77	1083.46	495
2829	J-1558	596.83	East - Dulail	0.77	1189.6	591.6
2830	J-1559	594.85	East - Dulail	0.77	1187.08	591
2889	J-1578	574.93	East - Dulail	0.77	1114.36	538.3
2909	J-1586	585.8	East - Dulail	0.77	1084.31	497.5
2927	J-1594	602.94	East - Dulail	0.77	1081.99	478.1
2928	J-1595	597.67	East - Dulail	0.77	1082.06	483.4
2959	J-1607	593.78	East - Dulail	0.77	702.74	108.7
2960	J-1608	593.73	East - Dulail	0.77	702.74	108.8
2982	J-1614	592.52	East - Dulail	0.77	1183.99	590.3
2995	J-1619	585.38	East - Dulail	0.77	1084.76	498.4
3286	J-1724	591.86	East - Dulail	0.77	1082.2	489.3
3494	J-1799	596	East - Dulail	0.77	598.99	3
3495	J-1800	594.68	East - Dulail	0.77	598.97	4.3
3505	J-1804	579.27	East - Dulail	0.77	1124.62	544.2
3525	J-1810	596	East - Dulail	0.77	752.4	156.1
3526	J-1811	594.82	East - Dulail	0.77	701.4	106.4
3530	J-1813	582.52	East - Dulail	0.77	1101.39	517.8
3582	J-1832	615.87	East - Dulail	0.77	1081.33	464.5
3644	J-1854	592.46	East - Dulail	0.77	702.73	110
3655	J-1859	584.84	East - Dulail	0.77	1101.36	515.5
3660	J-1861	585.63	East - Dulail	0.77	1086.55	499.9
3712	J-1879	590.36	East - Dulail	0.77	1170.4	578.9
3727	J-1883	596	East - Dulail	0.77	599	3
3728	J-1884	594.4	East - Dulail	0.77	599	4.6
3742	J-1889	609.23	East - Dulail	0.77	1206.17	595.7
3767	J-1900	570.53	East - Dulail	0.77	1036.23	464.8
3784	J-1904	585.73	East - Dulail	0.77	1087.99	501.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3801	J-1911	636.34	East - Dulail	0.77	1080.04	442.8
3802	J-1912	616.28	East - Dulail	0.77	1079.29	462.1
3848	J-1930	617.57	East - Dulail	0.77	772.27	154.4
3874	J-1937	585.72	East - Dulail	0.77	1087.47	500.7
3894	J-1947	596	East - Dulail	0.77	1261.84	664.5
4183	J-2002	598	East - Dulail	0.77	1079.01	480
4186	J-2003	598	East - Dulail	0.77	772.31	174
4367	J-2012	592	East - Dulail	0.77	702.74	110.5
35	J-6	611.34	Zarqa	0.8	692.54	81
36	J-7	611.38	Zarqa	0.8	692.54	81
46	J-13	599.43	Zarqa	0.8	685.89	86.3
47	J-14	599.48	Zarqa	0.8	685.9	86.2
54	J-18	620.83	Zarqa	0.8	689.14	68.2
55	J-19	620.86	Zarqa	0.8	689.14	68.1
71	J-29	594.84	Zarqa	0.8	686.95	91.9
72	J-30	594.88	Zarqa	0.8	686.96	91.9
77	J-33	599.36	Zarqa	0.8	685.88	86.3
79	J-34	622.16	Zarqa	0.8	689.06	66.8
80	J-35	622.13	Zarqa	0.8	689.03	66.8
85	J-38	598.28	Zarqa	0.8	690.72	92.3
86	J-39	598.18	Zarqa	0.8	690.72	92.4
91	J-42	594.96	Zarqa	0.8	689.6	94.5
92	J-43	595.03	Zarqa	0.8	689.6	94.4
94	J-44	607.06	Zarqa	0.8	690.53	83.3
95	J-45	607.13	Zarqa	0.8	690.55	83.2
103	J-50	590.71	Zarqa	0.8	690.68	99.8
104	J-51	590.78	Zarqa	0.8	690.69	99.7
129	J-67	577.04	Zarqa	0.8	691.48	114.2
130	J-68	577.01	Zarqa	0.8	691.48	114.2
135	J-71	618.89	Zarqa	0.8	689.22	70.2
136	J-72	618.8	Zarqa	0.8	689.22	70.3
140	J-74	601.48	Zarqa	0.8	690.75	89.1
141	J-75	601.58	Zarqa	0.8	690.76	89
146	J-78	591.1	Zarqa	0.8	690.69	99.4
148	J-79	611.42	Zarqa	0.8	692.67	81.1
150	J-80	602.69	Zarqa	0.8	691.69	88.8
151	J-81	602.78	Zarqa	0.8	691.68	88.7
153	J-82	618.7	Zarqa	0.8	689.22	70.4
158	J-85	570	Zarqa	0.8	744.19	173.8
159	J-86	570	Zarqa	0.8	744.19	173.8
161	J-87	562.89	Zarqa	0.8	661.24	98.2
162	J-88	562.63	Zarqa	0.8	661.23	98.4
173	J-95	584.28	Zarqa	0.8	690.99	106.5
174	J-96	584.1	Zarqa	0.8	691	106.7
179	J-99	607.65	Zarqa	0.8	691.43	83.6
180	J-100	607.58	Zarqa	0.8	691.43	83.7
191	J-107	623.78	Zarqa	0.8	689.02	65.1
192	J-108	623.78	Zarqa	0.8	689.02	65.1
196	J-110	598.54	Zarqa	0.8	687.2	88.5
197	J-111	598.64	Zarqa	0.8	687.2	88.4
202	J-114	584.28	Zarqa	0.8	705.91	121.4
203	J-115	584.07	Zarqa	0.8	705.78	121.5
213	J-121	622.12	Zarqa	0.8	688.87	66.6
214	J-122	622.17	Zarqa	0.8	688.87	66.6
216	J-123	553.15	Zarqa	0.8	660.92	107.6
217	J-124	553.06	Zarqa	0.8	660.92	107.6

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ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
219	J-125	601.19	Zarqa	0.8	690.75	89.4
224	J-128	622.06	Zarqa	0.8	688.87	66.7
241	J-139	635.17	Zarqa	0.8	668.31	33.1
242	J-140	635	Zarqa	0.8	668.46	33.4
250	J-145	600.92	Zarqa	0.8	691.37	90.3
251	J-146	601.05	Zarqa	0.8	691.39	90.1
255	J-148	592.01	Zarqa	0.8	705.25	113
256	J-149	591.88	Zarqa	0.8	705.26	113.1
273	J-160	586.3	Zarqa	0.8	689.75	103.2
274	J-161	586.3	Zarqa	0.8	689.75	103.2
278	J-163	601.26	Zarqa	0.8	690.7	89.3
279	J-164	601.31	Zarqa	0.8	690.7	89.2
287	J-168	595.54	Zarqa	0.8	690.68	94.9
288	J-169	595.92	Zarqa	0.8	690.68	94.6
295	J-173	563.99	Zarqa	0.8	661.25	97.1
296	J-174	563.8	Zarqa	0.8	661.25	97.3
298	J-175	605.81	Zarqa	0.8	689.87	83.9
299	J-176	605.68	Zarqa	0.8	689.87	84
301	J-177	599.27	Zarqa	0.8	691.58	92.1
302	J-178	598.98	Zarqa	0.8	691.58	92.4
304	J-179	599.53	Zarqa	0.8	687.34	87.6
305	J-180	599.52	Zarqa	0.8	687.34	87.6
307	J-181	617.46	Zarqa	0.8	670.86	53.3
308	J-182	617.69	Zarqa	0.8	670.8	53
316	J-187	602.91	Zarqa	0.8	677.63	74.6
317	J-188	603.21	Zarqa	0.8	677.62	74.3
319	J-189	612.04	Zarqa	0.8	683.06	70.9
320	J-190	611.93	Zarqa	0.8	683.14	71.1
324	J-192	597.67	Zarqa	0.8	691.58	93.7
325	J-193	597.42	Zarqa	0.8	691.59	94
327	J-194	620.28	Zarqa	0.8	688.38	68
328	J-195	620.35	Zarqa	0.8	688.38	67.9
330	J-196	610.2	Zarqa	0.8	692.35	82
331	J-197	610.31	Zarqa	0.8	692.46	82
333	J-198	621.25	Zarqa	0.8	679.66	58.3
334	J-199	621.09	Zarqa	0.8	679.69	58.5
336	J-200	570	Zarqa	0.8	693.89	123.6
337	J-201	570	Zarqa	0.8	693.93	123.7
356	J-213	589.73	Zarqa	0.8	689.55	99.6
357	J-214	589.81	Zarqa	0.8	689.55	99.5
359	J-215	588.18	Zarqa	0.8	674.27	85.9
360	J-216	587.98	Zarqa	0.8	674.24	86.1
362	J-217	613.5	Zarqa	0.8	692.1	78.4
363	J-218	613.64	Zarqa	0.8	692.16	78.4
365	J-219	599.21	Zarqa	0.8	691.58	92.2
366	J-220	599.48	Zarqa	0.8	691.61	91.9
368	J-221	563.78	Zarqa	0.8	661.25	97.3
372	J-223	570	Zarqa	0.8	690.66	120.4
373	J-224	570	Zarqa	0.8	690.72	120.5
375	J-225	613.78	Zarqa	0.8	692.22	78.3
381	J-228	588.96	Zarqa	0.8	690.6	101.4
382	J-229	589.47	Zarqa	0.8	690.6	100.9
395	J-237	619.02	Zarqa	0.8	689.06	69.9
396	J-238	619.09	Zarqa	0.8	689.06	69.8
404	J-243	634.79	Zarqa	0.8	668.65	33.8
406	J-244	619.04	Zarqa	0.8	689.22	70

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
408	J-245	575.98	Zarqa	0.8	691.47	115.3
409	J-246	576.08	Zarqa	0.8	691.47	115.2
411	J-247	611.89	Zarqa	0.8	692.73	80.7
412	J-248	611.74	Zarqa	0.8	692.68	80.8
414	J-249	585.76	Zarqa	0.8	690.2	104.2
415	J-250	585.81	Zarqa	0.8	690.2	104.2
417	J-251	617.03	Zarqa	0.8	676.48	59.3
418	J-252	616.83	Zarqa	0.8	676.48	59.5
425	J-256	622.58	Zarqa	0.8	689.18	66.5
426	J-257	622.68	Zarqa	0.8	689.17	66.4
428	J-258	603.64	Zarqa	0.8	675.42	71.6
429	J-259	603.88	Zarqa	0.8	675.33	71.3
436	J-263	622.24	Zarqa	0.8	689.05	66.7
438	J-264	624.85	Zarqa	0.8	689	64
439	J-265	624.87	Zarqa	0.8	689	64
441	J-266	619.23	Zarqa	0.8	685.35	66
442	J-267	619.05	Zarqa	0.8	685.35	66.2
449	J-271	600.74	Zarqa	0.8	683.09	82.2
450	J-272	600.57	Zarqa	0.8	683.09	82.4
455	J-275	607.1	Zarqa	0.8	691.39	84.1
456	J-276	607.32	Zarqa	0.8	691.41	83.9
458	J-277	635.18	Zarqa	0.8	668.15	32.9
465	J-281	622.05	Zarqa	0.8	688.99	66.8
467	J-282	611.2	Zarqa	0.8	692.53	81.2
469	J-283	601.23	Zarqa	0.8	688.51	87.1
470	J-284	601.27	Zarqa	0.8	688.53	87.1
472	J-285	637.2	Zarqa	0.8	675.97	38.7
473	J-286	637.1	Zarqa	0.8	675.98	38.8
493	J-298	570	Zarqa	0.8	690.56	120.3
494	J-299	570	Zarqa	0.8	690.56	120.3
496	J-300	620.2	Zarqa	0.8	688.37	68
501	J-303	646	Zarqa	0.8	654.05	8
502	J-304	646	Zarqa	0.8	654.19	8.2
506	J-306	599.64	Zarqa	0.8	685.94	86.1
508	J-307	646	Zarqa	0.8	654.69	8.7
509	J-308	646	Zarqa	0.8	654.04	8
513	J-310	584.92	Zarqa	0.8	705.67	120.5
514	J-311	584.94	Zarqa	0.8	705.67	120.5
519	J-314	622.33	Zarqa	0.8	689.04	66.6
524	J-317	624.76	Zarqa	0.8	689.06	64.2
526	J-318	610.12	Zarqa	0.8	691.59	81.3
527	J-319	610.13	Zarqa	0.8	691.58	81.3
529	J-320	620.65	Zarqa	0.8	689.16	68.4
530	J-321	620.74	Zarqa	0.8	689.14	68.3
539	J-326	609.32	Zarqa	0.8	694.24	84.7
540	J-327	609.11	Zarqa	0.8	694.48	85.2
543	J-328	646	Zarqa	0.8	654.05	8
544	J-329	646	Zarqa	0.8	654.17	8.2
557	J-337	577.57	Zarqa	0.8	691.43	113.6
559	J-338	572.94	Zarqa	0.8	690.66	117.5
560	J-339	573.12	Zarqa	0.8	690.66	117.3
572	J-346	595.26	Zarqa	0.8	708.23	112.7
573	J-347	595.15	Zarqa	0.8	708.09	112.7
584	J-354	623.67	Zarqa	0.8	689.09	65.3
585	J-355	623.59	Zarqa	0.8	689.09	65.4
587	J-356	595.31	Zarqa	0.8	690.68	95.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
589	J-357	623.78	Zarqa	0.8	689.01	65.1
594	J-360	583.03	Zarqa	0.8	690.13	106.9
595	J-361	583.21	Zarqa	0.8	690.11	106.7
597	J-362	600.89	Zarqa	0.8	689.76	88.7
598	J-363	601.07	Zarqa	0.8	689.76	88.5
600	J-364	612.18	Zarqa	0.8	682.96	70.6
605	J-367	620.16	Zarqa	0.8	688.37	68.1
606	J-368	620.11	Zarqa	0.8	688.37	68.1
608	J-369	588.31	Zarqa	0.8	675.15	86.7
609	J-370	588.44	Zarqa	0.8	675.2	86.6
611	J-371	601.27	Zarqa	0.8	691.41	90
616	J-374	588.96	Zarqa	0.8	688.89	99.7
617	J-375	588.32	Zarqa	0.8	688.89	100.4
622	J-378	587.71	Zarqa	0.8	691.41	103.5
623	J-379	587.43	Zarqa	0.8	691.5	103.9
628	J-382	622.08	Zarqa	0.8	689.11	66.9
629	J-383	622.17	Zarqa	0.8	689.11	66.8
631	J-384	613.83	Zarqa	0.8	692.16	78.2
633	J-385	582.85	Zarqa	0.8	690.17	107.1
640	J-389	601.18	Zarqa	0.8	688.5	87.1
642	J-390	601.38	Zarqa	0.8	690.69	89.1
643	J-391	601.46	Zarqa	0.8	690.69	89
645	J-392	592.49	Zarqa	0.8	705.05	112.3
647	J-393	610.15	Zarqa	0.8	691.58	81.3
649	J-394	601.28	Zarqa	0.8	690.75	89.3
657	J-399	608.29	Zarqa	0.8	689.68	81.2
658	J-400	608.17	Zarqa	0.8	689.69	81.4
660	J-401	637.26	Zarqa	0.8	675.95	38.6
665	J-404	582.92	Zarqa	0.8	690.17	107
671	J-407	607.87	Zarqa	0.8	690.37	82.3
672	J-408	608.07	Zarqa	0.8	690.35	82.1
674	J-409	618.83	Zarqa	0.8	685.36	66.4
689	J-418	589.87	Zarqa	0.8	689.55	99.5
691	J-419	617.02	Zarqa	0.8	689.32	72.2
692	J-420	617.21	Zarqa	0.8	689.32	72
700	J-425	550.83	Zarqa	0.8	661.11	110.1
701	J-426	550.39	Zarqa	0.8	661.11	110.5
705	J-428	603.42	Zarqa	0.8	689.06	85.5
706	J-429	603.48	Zarqa	0.8	689.1	85.4
720	J-438	607.97	Zarqa	0.8	689.67	81.5
724	J-440	617.89	Zarqa	0.8	746.52	128.4
725	J-441	617.6	Zarqa	0.8	746.22	128.4
727	J-442	592.08	Zarqa	0.8	678.04	85.8
728	J-443	591.64	Zarqa	0.8	678.07	86.3
730	J-444	575.45	Zarqa	0.8	691.21	115.5
731	J-445	575.42	Zarqa	0.8	691.21	115.6
736	J-448	620.85	Zarqa	0.8	679.74	58.8
738	J-449	557.81	Zarqa	0.8	661.12	103.1
739	J-450	557.22	Zarqa	0.8	661.11	103.7
741	J-451	599.98	Zarqa	0.8	690.02	89.9
742	J-452	600.18	Zarqa	0.8	690.03	89.7
744	J-453	599.15	Zarqa	0.8	685.89	86.6
758	J-462	611.76	Zarqa	0.8	683.31	71.4
766	J-467	587.44	Zarqa	0.8	683.07	95.4
767	J-468	587.18	Zarqa	0.8	683.07	95.7
774	J-472	589.72	Zarqa	0.8	688.9	99

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
776	J-473	612.38	Zarqa	0.8	682.96	70.4
783	J-477	620.97	Zarqa	0.8	689.13	68
785	J-478	599.38	Zarqa	0.8	687.32	87.8
797	J-485	622.36	Zarqa	0.8	689.19	66.7
807	J-490	623.66	Zarqa	0.8	689.02	65.2
815	J-495	614.17	Zarqa	0.8	681.12	66.8
816	J-496	614.08	Zarqa	0.8	681.12	66.9
821	J-499	594.3	Zarqa	0.8	689.45	95
822	J-500	594.76	Zarqa	0.8	689.45	94.5
828	J-503	595.72	Zarqa	0.8	690.68	94.8
845	J-513	594.72	Zarqa	0.8	689.59	94.7
847	J-514	607.96	Zarqa	0.8	689.74	81.6
848	J-515	608.2	Zarqa	0.8	689.74	81.4
850	J-516	608.41	Zarqa	0.8	689.8	81.2
855	J-519	552.47	Zarqa	0.8	660.9	108.2
856	J-520	552.37	Zarqa	0.8	660.89	108.3
864	J-525	577.25	Zarqa	0.8	691.46	114
866	J-526	600.1	Zarqa	0.8	662.57	62.3
867	J-527	600.53	Zarqa	0.8	662.6	61.9
873	J-530	640.8	Zarqa	0.8	770.02	129
874	J-531	640.91	Zarqa	0.8	769.96	128.8
882	J-536	595.32	Zarqa	0.8	687.09	91.6
883	J-537	595.48	Zarqa	0.8	687.15	91.5
888	J-540	588.53	Zarqa	0.8	691.08	102.3
889	J-541	588.91	Zarqa	0.8	691.09	102
901	J-548	591.86	Zarqa	0.8	690.4	98.3
902	J-549	591.22	Zarqa	0.8	690.4	99
904	J-550	595.87	Zarqa	0.8	707.93	111.8
938	J-572	576.81	Zarqa	0.8	640.38	63.4
940	J-573	610.32	Zarqa	0.8	686.12	75.6
941	J-574	610.04	Zarqa	0.8	686.07	75.9
945	J-576	599.5	Zarqa	0.8	687.19	87.5
953	J-581	588.12	Zarqa	0.8	675.07	86.8
958	J-584	614.12	Zarqa	0.8	692.16	77.9
962	J-586	617.28	Zarqa	0.8	676.49	59.1
988	J-601	570	Zarqa	0.8	693.96	123.7
990	J-602	605.98	Zarqa	0.8	691.42	85.3
991	J-603	605.6	Zarqa	0.8	691.42	85.6
995	J-605	559.35	Zarqa	0.8	691.16	131.5
996	J-606	559.68	Zarqa	0.8	691.16	131.2
998	J-607	587.91	Zarqa	0.8	691.5	103.4
1011	J-615	616.45	Zarqa	0.8	663.65	47.1
1012	J-616	615.99	Zarqa	0.8	663.59	47.5
1016	J-618	637.46	Zarqa	0.8	675.94	38.4
1021	J-621	588.13	Zarqa	0.8	674.99	86.7
1040	J-632	624.43	Zarqa	0.8	689.18	64.6
1041	J-633	624.59	Zarqa	0.8	689.19	64.5
1046	J-635	610.17	Zarqa	0.8	691.86	81.5
1047	J-636	609.96	Zarqa	0.8	691.84	81.7
1052	J-639	584.91	Zarqa	0.8	690.43	105.3
1053	J-640	584.82	Zarqa	0.8	690.43	105.4
1055	J-641	584.02	Zarqa	0.8	705.77	121.5
1057	J-642	595.72	Zarqa	0.8	687.24	91.3
1058	J-643	595.92	Zarqa	0.8	687.26	91.2
1060	J-644	614.48	Zarqa	0.8	676.45	61.8
1061	J-645	614.03	Zarqa	0.8	676.45	62.3

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1066	J-648	586.21	Zarqa	0.8	661.98	75.6
1067	J-649	586.37	Zarqa	0.8	661.99	75.5
1071	J-651	616.73	Zarqa	0.8	689.33	72.5
1073	J-652	620.27	Zarqa	0.8	688.37	68
1075	J-653	602.44	Zarqa	0.8	690.76	88.1
1077	J-654	605.03	Zarqa	0.8	689.58	84.4
1078	J-655	604.69	Zarqa	0.8	689.59	84.7
1083	J-658	570	Zarqa	0.8	581.15	11.1
1084	J-659	570	Zarqa	0.8	581.19	11.2
1101	J-669	562.86	Zarqa	0.8	661.23	98.2
1106	J-672	623.62	Zarqa	0.8	689.09	65.3
1121	J-681	570	Zarqa	0.8	744.41	174.1
1125	J-683	641.7	Zarqa	0.8	769.74	127.8
1126	J-684	641.89	Zarqa	0.8	769.74	127.6
1136	J-690	564.96	Zarqa	0.8	661.24	96.1
1140	J-692	592.3	Zarqa	0.8	690.69	98.2
1145	J-695	570	Zarqa	0.8	658.33	88.1
1146	J-696	570	Zarqa	0.8	658.33	88.1
1168	J-708	612.7	Zarqa	0.8	682.96	70.1
1170	J-709	622.93	Zarqa	0.8	688.64	65.6
1171	J-710	623.12	Zarqa	0.8	688.66	65.4
1194	J-724	599.75	Zarqa	0.8	690.69	90.8
1195	J-725	600.2	Zarqa	0.8	690.69	90.3
1205	J-731	570	Zarqa	0.8	573.58	3.6
1206	J-732	570	Zarqa	0.8	573.63	3.6
1210	J-734	606.96	Zarqa	0.8	688.25	81.1
1211	J-735	606.7	Zarqa	0.8	688.28	81.4
1216	J-738	575.81	Zarqa	0.8	691.44	115.4
1218	J-739	581.5	Zarqa	0.8	691.33	109.6
1219	J-740	581.24	Zarqa	0.8	691.41	110
1221	J-741	605.08	Zarqa	0.8	691.18	85.9
1223	J-742	636.34	Zarqa	0.8	658.39	22
1224	J-743	636.88	Zarqa	0.8	769.75	132.6
1229	J-746	570	Zarqa	0.8	658.33	88.1
1234	J-749	593.55	Zarqa	0.8	689.57	95.8
1235	J-750	593.94	Zarqa	0.8	689.57	95.4
1258	J-764	575.75	Zarqa	0.8	691.42	115.4
1260	J-765	618.85	Zarqa	0.8	676.82	57.9
1261	J-766	619.15	Zarqa	0.8	676.8	57.5
1265	J-768	607.9	Zarqa	0.8	691.45	83.4
1267	J-769	599.73	Zarqa	0.8	689.51	89.6
1268	J-770	600.08	Zarqa	0.8	689.51	89.2
1270	J-771	577.11	Zarqa	0.8	691.19	113.9
1271	J-772	576.69	Zarqa	0.8	691.2	114.3
1276	J-775	603.28	Zarqa	0.8	689	85.5
1281	J-777	612.29	Zarqa	0.8	692.81	80.4
1285	J-779	577.05	Zarqa	0.8	690.96	113.7
1286	J-780	576.46	Zarqa	0.8	690.96	114.3
1288	J-781	570	Zarqa	0.8	575.14	5.1
1289	J-782	570	Zarqa	0.8	575.04	5
1296	J-786	614.76	Zarqa	0.8	743.25	128.2
1297	J-787	614.19	Zarqa	0.8	742.64	128.2
1308	J-794	598.71	Zarqa	0.8	685.92	87
1329	J-806	606.49	Zarqa	0.8	688.21	81.6
1331	J-807	595.97	Zarqa	0.8	690.68	94.5
1333	J-808	570	Zarqa	0.8	743.42	173.1

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ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1334	J-809	570	Zarqa	0.8	743.42	173.1
1340	J-812	570	Zarqa	0.8	744.67	174.3
1342	J-813	637.43	Zarqa	0.8	770.37	132.7
1343	J-814	636.76	Zarqa	0.8	764.38	127.4
1347	J-816	623.19	Zarqa	0.8	688.67	65.4
1349	J-817	623.4	Zarqa	0.8	689.04	65.5
1351	J-818	600.56	Zarqa	0.8	689.51	88.8
1353	J-819	584.66	Zarqa	0.8	691.01	106.1
1372	J-831	621.45	Zarqa	0.8	688.56	67
1373	J-832	621.36	Zarqa	0.8	688.56	67.1
1391	J-843	611.91	Zarqa	0.8	693.39	81.3
1397	J-846	629.18	Zarqa	0.8	663.97	34.7
1398	J-847	629.93	Zarqa	0.8	769.74	139.5
1400	J-848	581.35	Zarqa	0.8	688.87	107.3
1401	J-849	579.54	Zarqa	0.8	688.86	109.1
1405	J-851	565.62	Zarqa	0.8	663.69	97.9
1406	J-852	565.22	Zarqa	0.8	663.4	98
1420	J-860	570	Zarqa	0.8	575.49	5.5
1421	J-861	570	Zarqa	0.8	575.59	5.6
1431	J-867	611.04	Zarqa	0.8	676.44	65.3
1432	J-868	610.25	Zarqa	0.8	676.44	66.1
1437	J-871	603.5	Zarqa	0.8	688.78	85.1
1438	J-872	603.2	Zarqa	0.8	688.84	85.5
1450	J-878	607.3	Zarqa	0.8	688.33	80.9
1452	J-879	609.5	Zarqa	0.8	689.63	80
1453	J-880	609.17	Zarqa	0.8	689.64	80.3
1458	J-883	570	Zarqa	0.8	574.65	4.6
1471	J-891	622.44	Zarqa	0.8	689.12	66.5
1481	J-897	623.42	Zarqa	0.8	688.69	65.1
1485	J-899	570	Zarqa	0.8	690.71	120.5
1486	J-900	570	Zarqa	0.8	690.71	120.5
1525	J-920	646	Zarqa	0.8	770.7	124.4
1526	J-921	646	Zarqa	0.8	770.56	124.3
1534	J-926	617.36	Zarqa	0.8	689.3	71.8
1557	J-938	580.04	Zarqa	0.8	692.74	112.5
1558	J-939	580.02	Zarqa	0.8	692.66	112.4
1560	J-940	619.94	Zarqa	0.8	676.7	56.6
1561	J-941	619.5	Zarqa	0.8	676.61	57
1563	J-942	621.27	Zarqa	0.8	689.08	67.7
1564	J-943	621.55	Zarqa	0.8	689.08	67.4
1571	J-947	637.77	Zarqa	0.8	769.75	131.7
1573	J-948	597.39	Zarqa	0.8	707.19	109.6
1583	J-954	589.31	Zarqa	0.8	689.57	100.1
1598	J-962	570	Zarqa	0.8	742.33	172
1599	J-963	570	Zarqa	0.8	742.33	172
1604	J-966	614.41	Zarqa	0.8	681.12	66.6
1622	J-976	581.17	Zarqa	0.8	693.46	112.1
1623	J-977	581.91	Zarqa	0.8	693.63	111.5
1625	J-978	624.54	Zarqa	0.8	689.58	64.9
1630	J-981	583.22	Zarqa	0.8	691.03	107.6
1634	J-983	570	Zarqa	0.8	743.42	173.1
1647	J-991	564.87	Zarqa	0.8	661.24	96.2
1652	J-994	639.85	Zarqa	0.8	770.11	130
1666	J-1003	598.3	Zarqa	0.8	690.71	92.2
1667	J-1004	598.88	Zarqa	0.8	690.71	91.6
1683	J-1013	610.71	Zarqa	0.8	665.5	54.7

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1684	J-1014	611.85	Zarqa	0.8	665.21	53.2
1686	J-1015	583.96	Zarqa	0.8	690	105.8
1705	J-1026	584.73	Zarqa	0.8	689.91	105
1711	J-1029	599.08	Zarqa	0.8	771.9	172.5
1712	J-1030	600.84	Zarqa	0.8	771.8	170.6
1722	J-1035	570	Zarqa	0.8	693.46	123.2
1724	J-1036	570	Zarqa	0.8	658.25	88.1
1726	J-1037	611.09	Zarqa	0.8	683.14	71.9
1728	J-1038	596.92	Zarqa	0.8	687.07	90
1729	J-1039	596.94	Zarqa	0.8	687.08	90
1738	J-1044	598.38	Zarqa	0.8	772.04	173.3
1744	J-1047	570	Zarqa	0.8	572.77	2.8
1746	J-1048	641.85	Zarqa	0.8	769.99	127.9
1748	J-1049	592.45	Zarqa	0.8	688.93	96.3
1752	J-1051	617.86	Zarqa	0.8	689.22	71.2
1754	J-1052	604.83	Zarqa	0.8	689.68	84.7
1760	J-1055	575.82	Zarqa	0.8	691.47	115.4
1768	J-1059	581.21	Zarqa	0.8	690.61	109.2
1769	J-1060	584.31	Zarqa	0.8	690.6	106.1
1773	J-1062	616.94	Zarqa	0.8	666.8	49.8
1774	J-1063	614.66	Zarqa	0.8	666.51	51.7
1789	J-1071	575.39	Zarqa	0.8	691.46	115.8
1795	J-1074	578.5	Zarqa	0.8	730.17	151.4
1796	J-1075	579.47	Zarqa	0.8	730.17	150.4
1800	J-1077	597.84	Zarqa	0.8	691.1	93.1
1801	J-1078	598.89	Zarqa	0.8	691.18	92.1
1803	J-1079	570	Zarqa	0.8	692.27	122
1811	J-1083	598.44	Zarqa	0.8	690.68	92
1815	J-1085	570.77	Zarqa	0.8	667.84	96.9
1816	J-1086	572.6	Zarqa	0.8	667.83	95
1818	J-1087	608.5	Zarqa	0.8	690.69	82
1830	J-1093	608.93	Zarqa	0.8	676.44	67.4
1872	J-1116	575.33	Zarqa	0.8	690.92	115.4
1877	J-1119	581.1	Zarqa	0.8	691.07	109.7
1885	J-1122	570	Zarqa	0.8	747.11	176.8
1894	J-1126	589.1	Zarqa	0.8	662.03	72.8
1908	J-1132	640.91	Zarqa	0.8	769.72	128.6
1913	J-1135	635.18	Zarqa	0.8	764.38	128.9
1914	J-1136	633.64	Zarqa	0.8	762.78	128.9
1921	J-1140	579.99	Zarqa	0.8	692.51	112.3
1922	J-1141	578.84	Zarqa	0.8	692.38	113.3
1924	J-1142	594.61	Zarqa	0.8	677.93	83.2
1934	J-1147	625.39	Zarqa	0.8	688.54	63
1940	J-1150	617.92	Zarqa	0.8	670.14	52.1
1951	J-1154	559.33	Zarqa	0.8	661.11	101.6
1955	J-1156	585.58	Zarqa	0.8	691.49	105.7
1960	J-1158	595.52	Zarqa	0.8	690.71	95
1966	J-1160	597.56	Zarqa	0.8	686.03	88.3
1968	J-1161	580.76	Zarqa	0.8	661.81	80.9
1972	J-1163	601.71	Zarqa	0.8	675.42	73.6
1978	J-1166	592.38	Zarqa	0.8	689.56	97
1984	J-1168	600.16	Zarqa	0.8	689.78	89.4
1987	J-1169	603.26	Zarqa	0.8	690.85	87.4
1993	J-1172	606.51	Zarqa	0.8	690.06	83.4
2008	J-1180	568.26	Zarqa	0.8	690.68	122.2
2009	J-1181	572.91	Zarqa	0.8	690.64	117.5

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2016	J-1185	602.8	Zarqa	0.8	662.76	59.8
2018	J-1186	588.03	Zarqa	0.8	689.64	101.4
2023	J-1188	582.58	Zarqa	0.8	673.5	90.7
2024	J-1189	579.76	Zarqa	0.8	673.21	93.3
2026	J-1190	619.47	Zarqa	0.8	689.26	69.7
2028	J-1191	599.41	Zarqa	0.8	686.53	86.9
2039	J-1196	587.04	Zarqa	0.8	690.41	103.2
2049	J-1200	590.84	Zarqa	0.8	689.55	98.5
2053	J-1202	636.33	Zarqa	0.8	675.95	39.5
2100	J-1227	641.06	Zarqa	0.8	769.68	128.4
2102	J-1228	597.62	Zarqa	0.8	662.44	64.7
2104	J-1229	609	Zarqa	0.8	692.41	83.2
2105	J-1230	607.99	Zarqa	0.8	692.38	84.2
2117	J-1237	580.71	Zarqa	0.8	703.83	122.9
2122	J-1240	597.35	Zarqa	0.8	690.69	93.1
2129	J-1244	585.07	Zarqa	0.8	705.78	120.5
2131	J-1245	570	Zarqa	0.8	744.41	174.1
2141	J-1250	623.8	Zarqa	0.8	688.9	65
2143	J-1251	582.58	Zarqa	0.8	691.49	108.7
2148	J-1254	598.17	Zarqa	0.8	689.54	91.2
2157	J-1258	638.93	Zarqa	0.8	769.74	130.5
2159	J-1259	612.65	Zarqa	0.8	689.5	76.7
2160	J-1260	611.65	Zarqa	0.8	689.54	77.7
2162	J-1261	619.86	Zarqa	0.8	689.19	69.2
2166	J-1263	578.71	Zarqa	0.8	691.18	112.2
2179	J-1270	551.67	Zarqa	0.8	660.86	109
2180	J-1271	550.06	Zarqa	0.8	660.79	110.5
2191	J-1277	603.15	Zarqa	0.8	689.71	86.4
2197	J-1279	580.09	Zarqa	0.8	691.56	111.2
2207	J-1283	609.15	Zarqa	0.8	683.12	73.8
2212	J-1285	636.96	Zarqa	0.8	674.03	37
2215	J-1286	622.57	Zarqa	0.8	702.85	80.1
2216	J-1287	622.35	Zarqa	0.8	701.84	79.3
2218	J-1288	547.69	Zarqa	0.8	660.44	112.5
2219	J-1289	549.81	Zarqa	0.8	660.44	110.4
2234	J-1296	598.86	Zarqa	0.8	677.77	78.8
2236	J-1297	593.61	Zarqa	0.8	686.65	92.8
2256	J-1306	554.47	Zarqa	0.8	660.98	106.3
2260	J-1308	599.21	Zarqa	0.8	689.83	90.4
2261	J-1309	599.25	Zarqa	0.8	689.87	90.4
2263	J-1310	615.12	Zarqa	0.8	664.75	49.5
2277	J-1318	617.13	Zarqa	0.8	689.06	71.8
2280	J-1319	587.3	Zarqa	0.8	690.52	103
2282	J-1320	621.35	Zarqa	0.8	700.79	79.3
2283	J-1321	620.9	Zarqa	0.8	699.83	78.8
2288	J-1323	593.36	Zarqa	0.8	678.33	84.8
2295	J-1326	618.08	Zarqa	0.8	676.56	58.4
2296	J-1327	616.13	Zarqa	0.8	676.52	60.3
2302	J-1330	602.03	Zarqa	0.8	689.76	87.5
2304	J-1331	595.73	Zarqa	0.8	686.23	90.3
2315	J-1336	595.95	Zarqa	0.8	678.55	82.4
2329	J-1343	574.1	Zarqa	0.8	690.86	116.5
2330	J-1344	573.09	Zarqa	0.8	690.82	117.5
2335	J-1346	609.19	Zarqa	0.8	692.36	83
2336	J-1347	608.34	Zarqa	0.8	692.21	83.7
2345	J-1350	597.2	Zarqa	0.8	686.85	89.5

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ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2346	J-1351	596.9	Zarqa	0.8	686.94	89.9
2351	J-1354	606.36	Zarqa	0.8	663.05	56.6
2353	J-1355	623.34	Zarqa	0.8	689.04	65.6
2357	J-1356	646	Zarqa	0.8	770.71	124.5
2361	J-1358	606.65	Zarqa	0.8	692.33	85.5
2364	J-1359	614.84	Zarqa	0.8	689.06	74.1
2376	J-1363	645.4	Zarqa	0.8	769.76	124.1
2384	J-1367	623.1	Zarqa	0.8	689.18	65.9
2424	J-1387	596.79	Zarqa	0.8	678.63	81.7
2425	J-1388	598	Zarqa	0.8	679.4	81.2
2427	J-1389	619.42	Zarqa	0.8	694.04	74.5
2428	J-1390	616.85	Zarqa	0.8	693.61	76.6
2431	J-1391	619.39	Zarqa	0.8	668.75	49.3
2448	J-1400	608.61	Zarqa	0.8	677.47	68.7
2455	J-1403	648.82	Zarqa	0.8	769.81	120.8
2458	J-1404	591.33	Zarqa	0.8	662.11	70.6
2466	J-1406	605.55	Zarqa	0.8	690.75	85
2471	J-1408	593.49	Zarqa	0.8	690.83	97.1
2474	J-1409	623.51	Zarqa	0.8	688.78	65.1
2498	J-1419	582.02	Zarqa	0.8	690.17	107.9
2502	J-1420	570.95	Zarqa	0.8	690.66	119.5
2518	J-1428	593.03	Zarqa	0.8	691.42	98.2
2536	J-1435	605.31	Zarqa	0.8	691.57	86.1
2552	J-1441	568.18	Zarqa	0.8	666.14	97.8
2554	J-1442	604.23	Zarqa	0.8	689.58	85.2
2563	J-1446	606.92	Zarqa	0.8	676.44	69.4
2564	J-1447	601.55	Zarqa	0.8	676.44	74.7
2574	J-1451	599.44	Zarqa	0.8	678.9	79.3
2577	J-1452	570	Zarqa	0.8	658.58	88.4
2579	J-1453	575.45	Zarqa	0.8	691.1	115.4
2580	J-1454	574.35	Zarqa	0.8	691.03	116.4
2595	J-1460	609.68	Zarqa	0.8	685.88	76.1
2596	J-1461	609.43	Zarqa	0.8	688.1	78.5
2599	J-1462	584.77	Zarqa	0.8	690.18	105.2
2603	J-1464	548.57	Zarqa	0.8	660.46	111.7
2610	J-1467	604.71	Zarqa	0.8	692.28	87.4
2624	J-1473	647.39	Zarqa	0.8	769.76	122.1
2630	J-1476	582.55	Zarqa	0.8	697.16	114.4
2640	J-1482	630.51	Zarqa	0.8	672.61	42
2646	J-1485	601.07	Zarqa	0.8	689.1	87.8
2648	J-1486	573.42	Zarqa	0.8	688.86	115.2
2660	J-1489	610.6	Zarqa	0.8	676.47	65.7
2670	J-1494	612.98	Zarqa	0.8	677.18	64.1
2671	J-1495	614.66	Zarqa	0.8	677	62.2
2673	J-1496	605.33	Zarqa	0.8	691.58	86.1
2677	J-1498	549.82	Zarqa	0.8	660.56	110.5
2678	J-1499	548.47	Zarqa	0.8	660.5	111.8
2683	J-1501	589.77	Zarqa	0.8	690.42	100.5
2694	J-1505	599.57	Zarqa	0.8	691.91	92.2
2703	J-1508	606.7	Zarqa	0.8	678.53	71.7
2706	J-1509	599.7	Zarqa	0.8	687.78	87.9
2712	J-1512	590.96	Zarqa	0.8	676.23	85.1
2714	J-1513	618.77	Zarqa	0.8	687.92	69
2715	J-1514	615.35	Zarqa	0.8	687.13	71.6
2725	J-1518	610.18	Zarqa	0.8	693.21	82.9
2726	J-1519	612.22	Zarqa	0.8	693.14	80.8

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ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2736	J-1524	570	Zarqa	0.8	575.27	5.3
2740	J-1526	587.71	Zarqa	0.8	705.52	117.6
2776	J-1537	555.29	Zarqa	0.8	691.16	135.6
2781	J-1540	577.93	Zarqa	0.8	691.94	113.8
2788	J-1543	617.05	Zarqa	0.8	745.73	128.4
2789	J-1544	620.42	Zarqa	0.8	739.37	118.7
2811	J-1551	615.16	Zarqa	0.8	695.33	80
2818	J-1554	603.82	Zarqa	0.8	699.98	96
2841	J-1563	600.63	Zarqa	0.8	692.19	91.4
2847	J-1566	583.76	Zarqa	0.8	707.88	123.9
2848	J-1567	583.59	Zarqa	0.8	706.37	122.5
2893	J-1579	580.03	Zarqa	0.8	667.81	87.6
2907	J-1585	620.5	Zarqa	0.8	688.55	67.9
2911	J-1587	582.26	Zarqa	0.8	691.18	108.7
2919	J-1591	622.48	Zarqa	0.8	688.6	66
2923	J-1592	589.46	Zarqa	0.8	689.47	99.8
2948	J-1603	637.57	Zarqa	0.8	769.7	131.9
3036	J-1628	605.36	Zarqa	0.8	687.6	82.1
3062	J-1636	618.89	Zarqa	0.8	688.34	69.3
3063	J-1637	618.88	Zarqa	0.8	688.33	69.3
3072	J-1642	611.39	Zarqa	0.8	689.39	77.8
3078	J-1645	582.22	Zarqa	0.8	691.35	108.9
3080	J-1646	605.5	Zarqa	0.8	690.25	84.6
3090	J-1651	576.39	Zarqa	0.8	691.44	114.8
3099	J-1655	585.59	Zarqa	0.8	705.71	119.9
3131	J-1665	574.38	Zarqa	0.8	691.12	116.5
3132	J-1666	577.04	Zarqa	0.8	691.11	113.8
3143	J-1670	635.79	Zarqa	0.8	670.05	34.2
3144	J-1671	633.88	Zarqa	0.8	675.66	41.7
3146	J-1672	578.76	Zarqa	0.8	691.76	112.8
3162	J-1677	602.36	Zarqa	0.8	686.51	84
3174	J-1684	590.23	Zarqa	0.8	692.11	101.7
3210	J-1697	570	Zarqa	0.8	710.75	140.5
3216	J-1698	570	Zarqa	0.8	776.48	206.1
3217	J-1699	583.76	Zarqa	0.8	774.82	190.7
3219	J-1700	602.92	Zarqa	0.8	691.15	88
3233	J-1704	636.5	Zarqa	0.8	665.53	29
3234	J-1705	639.11	Zarqa	0.8	664.82	25.7
3266	J-1715	618.95	Zarqa	0.8	683.86	64.8
3311	J-1735	579.73	Zarqa	0.8	691.6	111.6
3321	J-1738	597.31	Zarqa	0.8	703.24	105.7
3343	J-1746	590.22	Zarqa	0.8	667.8	77.4
3385	J-1760	584.88	Zarqa	0.8	686.27	101.2
3408	J-1772	627.82	Zarqa	0.8	676.92	49
3435	J-1780	624.56	Zarqa	0.8	714.49	89.7
3470	J-1792	616.87	Zarqa	0.8	689.86	72.8
3539	J-1817	664.29	Zarqa	0.8	769.68	105.2
3567	J-1827	620.85	Zarqa	0.8	689.74	68.7
3657	J-1860	567.43	Zarqa	0.8	691.13	123.4
3691	J-1873	570	Zarqa	0.8	775.63	205.2
3723	J-1881	570.66	Zarqa	0.8	588.15	17.5
3842	J-1927	646	Zarqa	0.8	753.75	107.5
3843	J-1928	700	Zarqa	0.8	718.42	18.4
3855	J-1934	646	Zarqa	0.8	654.01	8
3899	J-1949	545.36	Zarqa	0.8	651.41	105.8
4056	J-1990	646	Zarqa	0.8	654.01	8

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ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
4060	J-1991	646	Zarqa	0.8	654.03	8
4756	J-2046	592	KABA City	0.8	743.88	151.6
38	J-8	746.61	Russaifah	0.9	764.14	17.5
39	J-9	746.73	Russaifah	0.9	764.15	17.4
43	J-11	702.41	Russaifah	0.9	712.69	10.3
44	J-12	702.53	Russaifah	0.9	712.69	10.1
97	J-46	610.71	Russaifah	0.9	751.38	140.4
98	J-47	610.46	Russaifah	0.9	751.38	140.6
106	J-52	633.38	Russaifah	0.9	921.77	287.8
107	J-53	633.47	Russaifah	0.9	922.09	288
126	J-65	631	Russaifah	0.9	632.69	1.7
127	J-66	631	Russaifah	0.9	632.82	1.8
132	J-69	656	Russaifah	0.9	755.58	99.4
133	J-70	655.92	Russaifah	0.9	755.6	99.5
143	J-76	684.9	Russaifah	0.9	693.44	8.5
144	J-77	684.88	Russaifah	0.9	693.44	8.5
155	J-83	667.28	Russaifah	0.9	752.38	84.9
156	J-84	667.34	Russaifah	0.9	752.37	84.9
170	J-93	774.01	Russaifah	0.9	888.76	114.5
171	J-94	773.75	Russaifah	0.9	888.74	114.8
226	J-129	749.71	Russaifah	0.9	764.51	14.8
227	J-130	749.85	Russaifah	0.9	764.5	14.6
232	J-133	706.83	Russaifah	0.9	706.57	-0.3
233	J-134	706.75	Russaifah	0.9	706.5	-0.3
238	J-137	668.46	Russaifah	0.9	752.93	84.3
239	J-138	668.34	Russaifah	0.9	693.43	25
244	J-141	667.5	Russaifah	0.9	755.26	87.6
245	J-142	667.41	Russaifah	0.9	755.26	87.7
247	J-143	679.4	Russaifah	0.9	693.43	14
248	J-144	679.43	Russaifah	0.9	693.43	14
264	J-154	658.31	Russaifah	0.9	782.55	124
265	J-155	659.02	Russaifah	0.9	782.55	123.3
267	J-156	698.11	Russaifah	0.9	704.41	6.3
268	J-157	697.93	Russaifah	0.9	704.38	6.4
270	J-158	729.96	Russaifah	0.9	764.1	34.1
271	J-159	730.18	Russaifah	0.9	764.09	33.8
276	J-162	684.86	Russaifah	0.9	693.44	8.6
313	J-185	721.5	Russaifah	0.9	764.19	42.6
314	J-186	721.63	Russaifah	0.9	764.18	42.5
353	J-211	716.23	Russaifah	0.9	874.76	158.2
354	J-212	715.76	Russaifah	0.9	874.72	158.6
384	J-230	684.92	Russaifah	0.9	693.44	8.5
389	J-233	705.93	Russaifah	0.9	714.05	8.1
390	J-234	705.86	Russaifah	0.9	714.05	8.2
420	J-253	715.26	Russaifah	0.9	874.69	159.1
422	J-254	737.31	Russaifah	0.9	764	26.6
423	J-255	737.61	Russaifah	0.9	764	26.3
433	J-261	716.08	Russaifah	0.9	740.95	24.8
434	J-262	715.76	Russaifah	0.9	740.95	25.1
452	J-273	662.09	Russaifah	0.9	784.29	122
453	J-274	661.28	Russaifah	0.9	784.41	122.9
462	J-279	622.93	Russaifah	0.9	783.26	160
463	J-280	622.7	Russaifah	0.9	783.26	160.2
475	J-287	656.15	Russaifah	0.9	755.58	99.2
480	J-290	685.12	Russaifah	0.9	724.74	39.5
485	J-293	679.35	Russaifah	0.9	751.91	72.4

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
486	J-294	678.95	Russaifah	0.9	751.9	72.8
498	J-301	717.8	Russaifah	0.9	764.27	46.4
499	J-302	717.66	Russaifah	0.9	764.26	46.5
511	J-309	706.64	Russaifah	0.9	706.4	-0.2
516	J-312	621.68	Russaifah	0.9	693.52	71.7
517	J-313	621.08	Russaifah	0.9	693.45	72.2
521	J-315	659.42	Russaifah	0.9	736.09	76.5
522	J-316	659.24	Russaifah	0.9	736.09	76.7
537	J-325	697.68	Russaifah	0.9	704.35	6.7
546	J-330	727.37	Russaifah	0.9	877.63	150
547	J-331	727.14	Russaifah	0.9	877.63	150.2
549	J-332	691.13	Russaifah	0.9	776.46	85.2
550	J-333	690.58	Russaifah	0.9	776.46	85.7
564	J-341	698.36	Russaifah	0.9	704.46	6.1
569	J-344	759.6	Russaifah	0.9	785.82	26.2
570	J-345	759.87	Russaifah	0.9	785.82	25.9
575	J-348	699.92	Russaifah	0.9	797.68	97.6
576	J-349	698.77	Russaifah	0.9	797.81	98.8
581	J-352	643.03	Russaifah	0.9	877.71	234.2
582	J-353	643.2	Russaifah	0.9	878.32	234.7
591	J-358	669.54	Russaifah	0.9	752.9	83.2
592	J-359	669.36	Russaifah	0.9	752.93	83.4
619	J-376	729.99	Russaifah	0.9	764.23	34.2
620	J-377	729.86	Russaifah	0.9	764.23	34.3
635	J-386	746.12	Russaifah	0.9	764.14	18
637	J-387	773.12	Russaifah	0.9	888.7	115.4
638	J-388	772.41	Russaifah	0.9	888.67	116
651	J-395	659.29	Russaifah	0.9	752.07	92.6
652	J-396	659.08	Russaifah	0.9	752.05	92.8
662	J-402	709.83	Russaifah	0.9	763.79	53.9
663	J-403	709.6	Russaifah	0.9	763.79	54.1
676	J-410	670.28	Russaifah	0.9	752.31	81.9
677	J-411	670.29	Russaifah	0.9	752.31	81.9
686	J-416	696.22	Russaifah	0.9	703.75	7.5
687	J-417	696.35	Russaifah	0.9	703.75	7.4
694	J-421	656.69	Russaifah	0.9	751.88	95
695	J-422	656.56	Russaifah	0.9	751.88	95.1
703	J-427	730.23	Russaifah	0.9	764.23	33.9
708	J-430	716.78	Russaifah	0.9	874.75	157.7
709	J-431	716.57	Russaifah	0.9	874.75	157.9
714	J-434	701.17	Russaifah	0.9	763.77	62.5
715	J-435	700.85	Russaifah	0.9	763.77	62.8
722	J-439	697.9	Russaifah	0.9	704.38	6.5
752	J-458	688.66	Russaifah	0.9	743.32	54.5
753	J-459	689.24	Russaifah	0.9	743.32	54
760	J-463	624.34	Russaifah	0.9	770.87	146.2
761	J-464	623.82	Russaifah	0.9	770.87	146.7
763	J-465	732.1	Russaifah	0.9	764.06	31.9
764	J-466	732.14	Russaifah	0.9	764.06	31.9
772	J-471	732.5	Russaifah	0.9	764.05	31.5
778	J-474	717.96	Russaifah	0.9	764.26	46.2
787	J-479	705.74	Russaifah	0.9	714.05	8.3
791	J-481	649.44	Russaifah	0.9	771.71	122
792	J-482	649.96	Russaifah	0.9	771.79	121.6
809	J-491	646.24	Russaifah	0.9	752.1	105.6
810	J-492	646.32	Russaifah	0.9	752.09	105.6

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
818	J-497	666.66	Russaifah	0.9	752.31	85.5
819	J-498	667.56	Russaifah	0.9	752.35	84.6
833	J-506	760.33	Russaifah	0.9	785.82	25.4
835	J-507	665.97	Russaifah	0.9	781.15	114.9
836	J-508	665.82	Russaifah	0.9	781.14	115.1
839	J-509	684.58	Russaifah	0.9	753.63	68.9
840	J-510	684.92	Russaifah	0.9	753.89	68.8
852	J-517	674.59	Russaifah	0.9	755.18	80.4
853	J-518	675.59	Russaifah	0.9	755.18	79.4
861	J-523	651.67	Russaifah	0.9	770.86	119
862	J-524	652.28	Russaifah	0.9	770.86	118.3
869	J-528	656.37	Russaifah	0.9	751.88	95.3
894	J-544	715.19	Russaifah	0.9	728.67	13.5
895	J-545	715.1	Russaifah	0.9	728.98	13.9
906	J-551	641.49	Russaifah	0.9	770.1	128.4
907	J-552	641.76	Russaifah	0.9	770.16	128.1
926	J-564	706.27	Russaifah	0.9	706.18	-0.1
927	J-565	706.07	Russaifah	0.9	706.18	0.1
929	J-566	702.68	Russaifah	0.9	752.92	50.1
930	J-567	702.32	Russaifah	0.9	877.98	175.3
932	J-568	776.81	Russaifah	0.9	889.51	112.5
933	J-569	776.89	Russaifah	0.9	889.45	112.3
943	J-575	690.38	Russaifah	0.9	776.95	86.4
950	J-579	668.05	Russaifah	0.9	736.28	68.1
951	J-580	668.34	Russaifah	0.9	736.28	67.8
968	J-589	747.38	Russaifah	0.9	877.63	130
978	J-595	619.57	Russaifah	0.9	770.82	150.9
979	J-596	618.68	Russaifah	0.9	770.82	151.8
981	J-597	749.74	Russaifah	0.9	764.5	14.7
985	J-599	742.68	Russaifah	0.9	792.96	50.2
986	J-600	743.07	Russaifah	0.9	792.96	49.8
1008	J-613	616.89	Russaifah	0.9	765.75	148.6
1009	J-614	617.34	Russaifah	0.9	765.76	148.1
1030	J-626	712.55	Russaifah	0.9	764.12	51.5
1031	J-627	712.12	Russaifah	0.9	764.12	51.9
1035	J-629	623.21	Russaifah	0.9	802.02	178.4
1036	J-630	623.04	Russaifah	0.9	752.82	129.5
1043	J-634	690.3	Russaifah	0.9	743.32	52.9
1049	J-637	757.3	Russaifah	0.9	823.75	66.3
1050	J-638	757.27	Russaifah	0.9	823.76	66.3
1086	J-660	737.5	Russaifah	0.9	800.2	62.6
1087	J-661	738.46	Russaifah	0.9	800.27	61.7
1094	J-665	660.26	Russaifah	0.9	727.87	67.5
1095	J-666	660.03	Russaifah	0.9	728.02	67.9
1103	J-670	630.94	Russaifah	0.9	854.75	223.4
1104	J-671	631.22	Russaifah	0.9	854.73	223.1
1112	J-675	750.6	Russaifah	0.9	805	54.3
1113	J-676	749.86	Russaifah	0.9	805	55
1115	J-677	686.56	Russaifah	0.9	751.87	65.2
1116	J-678	686.83	Russaifah	0.9	751.92	65
1123	J-682	633.85	Russaifah	0.9	923.57	289.1
1128	J-685	720.59	Russaifah	0.9	742.69	22.1
1129	J-686	721.28	Russaifah	0.9	742.78	21.4
1133	J-688	714.46	Russaifah	0.9	736.09	21.6
1134	J-689	714.34	Russaifah	0.9	736.18	21.8
1138	J-691	743.53	Russaifah	0.9	793.28	49.6

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1151	J-699	746.29	Russaifah	0.9	764.15	17.8
1155	J-700	720.18	Russaifah	0.9	742.54	22.3
1166	J-707	667.13	Russaifah	0.9	755.26	88
1173	J-711	701.57	Russaifah	0.9	830.55	128.7
1174	J-712	702	Russaifah	0.9	830.55	128.3
1180	J-715	712.46	Russaifah	0.9	736.75	24.2
1181	J-716	712.17	Russaifah	0.9	736.85	24.6
1189	J-721	767.6	Russaifah	0.9	804.99	37.3
1190	J-722	768.21	Russaifah	0.9	891.89	123.4
1197	J-726	685.87	Russaifah	0.9	743.31	57.3
1198	J-727	687.06	Russaifah	0.9	743.36	56.2
1213	J-736	668.45	Russaifah	0.9	742.74	74.1
1214	J-737	668.84	Russaifah	0.9	742.78	73.8
1231	J-747	620.79	Russaifah	0.9	751.39	130.3
1232	J-748	619.61	Russaifah	0.9	751.39	131.5
1242	J-754	610.99	Russaifah	0.9	765.65	154.4
1243	J-755	610.14	Russaifah	0.9	765.66	155.2
1245	J-756	685.14	Russaifah	0.9	702.74	17.6
1246	J-757	685.93	Russaifah	0.9	702.75	16.8
1248	J-758	665.56	Russaifah	0.9	781.14	115.3
1253	J-761	688.11	Russaifah	0.9	752.69	64.4
1254	J-762	686.94	Russaifah	0.9	752.69	65.6
1256	J-763	665.29	Russaifah	0.9	781.14	115.6
1279	J-776	659.86	Russaifah	0.9	736.35	76.3
1291	J-783	661.79	Russaifah	0.9	782.31	120.3
1299	J-788	730.94	Russaifah	0.9	785.61	54.6
1300	J-789	731.8	Russaifah	0.9	785.61	53.7
1316	J-798	745	Russaifah	0.9	747.32	2.3
1317	J-799	745	Russaifah	0.9	747.31	2.3
1319	J-800	679.51	Russaifah	0.9	693.43	13.9
1338	J-811	745	Russaifah	0.9	747.24	2.2
1345	J-815	687.38	Russaifah	0.9	743.31	55.8
1355	J-820	704.85	Russaifah	0.9	763.87	58.9
1356	J-821	705.07	Russaifah	0.9	763.85	58.7
1358	J-822	638.98	Russaifah	0.9	752.86	113.6
1359	J-823	639.38	Russaifah	0.9	752.86	113.3
1364	J-826	705.16	Russaifah	0.9	706.39	1.2
1365	J-827	705.77	Russaifah	0.9	706.39	0.6
1367	J-828	667.98	Russaifah	0.9	693.43	25.4
1410	J-854	705.29	Russaifah	0.9	705.98	0.7
1426	J-864	706.67	Russaifah	0.9	706.18	-0.5
1428	J-865	700.62	Russaifah	0.9	811.24	110.4
1429	J-866	701.46	Russaifah	0.9	811.24	109.6
1455	J-881	683.63	Russaifah	0.9	784.98	101.1
1456	J-882	682.73	Russaifah	0.9	784.98	102
1469	J-890	600.05	Russaifah	0.9	851.69	251.1
1475	J-893	714.88	Russaifah	0.9	720.56	5.7
1476	J-894	715.32	Russaifah	0.9	721.15	5.8
1478	J-895	622.57	Russaifah	0.9	765.87	143
1479	J-896	624.68	Russaifah	0.9	765.92	141
1483	J-898	658.3	Russaifah	0.9	784.88	126.3
1488	J-901	686.66	Russaifah	0.9	751.8	65
1495	J-905	698.39	Russaifah	0.9	704.35	5.9
1504	J-910	617.75	Russaifah	0.9	751.39	133.4
1516	J-916	621.08	Russaifah	0.9	765.83	144.5
1520	J-918	699.24	Russaifah	0.9	704.63	5.4

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1541	J-930	692.03	Russaifah	0.9	693.44	1.4
1542	J-931	691.51	Russaifah	0.9	693.44	1.9
1566	J-944	710.85	Russaifah	0.9	764.08	53.1
1592	J-959	711.83	Russaifah	0.9	736.75	24.9
1594	J-960	683.8	Russaifah	0.9	702.74	18.9
1619	J-974	646.68	Russaifah	0.9	751.63	104.7
1620	J-975	645.01	Russaifah	0.9	751.61	106.4
1627	J-979	771.47	Russaifah	0.9	891.38	119.7
1628	J-980	773.06	Russaifah	0.9	891.14	117.8
1663	J-1001	634.73	Russaifah	0.9	759.48	124.5
1664	J-1002	633.84	Russaifah	0.9	759.62	125.5
1672	J-1007	668.76	Russaifah	0.9	752.87	83.9
1693	J-1019	611.75	Russaifah	0.9	751.38	139.3
1695	J-1020	655.95	Russaifah	0.9	772.95	116.8
1696	J-1021	658.04	Russaifah	0.9	773.25	115
1698	J-1022	777.39	Russaifah	0.9	889.69	112.1
1700	J-1023	702.15	Russaifah	0.9	752.92	50.7
1714	J-1031	668.44	Russaifah	0.9	752.33	83.7
1740	J-1045	669.69	Russaifah	0.9	742.87	73
1750	J-1050	722.37	Russaifah	0.9	743.03	20.6
1764	J-1057	655.2	Russaifah	0.9	782.58	127.1
1783	J-1068	684.09	Russaifah	0.9	752.46	68.2
1784	J-1069	685.2	Russaifah	0.9	693.44	8.2
1798	J-1076	663.41	Russaifah	0.9	752.16	88.6
1807	J-1081	700.29	Russaifah	0.9	704.34	4.1
1822	J-1089	682.21	Russaifah	0.9	693.46	11.2
1823	J-1090	681.77	Russaifah	0.9	693.46	11.7
1848	J-1104	661.65	Russaifah	0.9	782.31	120.4
1874	J-1117	732.11	Russaifah	0.9	764.09	31.9
1875	J-1118	730.78	Russaifah	0.9	764.09	33.2
1881	J-1120	693.9	Russaifah	0.9	798.89	104.8
1890	J-1124	701.46	Russaifah	0.9	746.13	44.6
1891	J-1125	702.53	Russaifah	0.9	746.36	43.7
1896	J-1127	662.97	Russaifah	0.9	782.31	119.1
1903	J-1129	703.95	Russaifah	0.9	804.81	100.7
1904	J-1130	702.04	Russaifah	0.9	804.81	102.6
1906	J-1131	703.68	Russaifah	0.9	705.59	1.9
1916	J-1137	595.79	Russaifah	0.9	758.55	162.4
1917	J-1138	596.68	Russaifah	0.9	758.55	161.5
1919	J-1139	697.79	Russaifah	0.9	704.38	6.6
1929	J-1145	660.8	Russaifah	0.9	781.91	120.9
1931	J-1146	610.32	Russaifah	0.9	765.48	154.9
1936	J-1148	731.36	Russaifah	0.9	764.25	32.8
1947	J-1152	678.36	Russaifah	0.9	693.43	15
1948	J-1153	678.25	Russaifah	0.9	693.43	15.1
1953	J-1155	682.73	Russaifah	0.9	784.98	102
1958	J-1157	621.38	Russaifah	0.9	770.87	149.2
1974	J-1164	724.83	Russaifah	0.9	764.15	39.2
1989	J-1170	714.87	Russaifah	0.9	735.25	20.3
1995	J-1173	763.01	Russaifah	0.9	785.8	22.7
1996	J-1174	764.5	Russaifah	0.9	785.79	21.2
2006	J-1179	668.12	Russaifah	0.9	783.32	115
2011	J-1182	629.14	Russaifah	0.9	766.07	136.6
2051	J-1201	636.35	Russaifah	0.9	759.23	122.6
2055	J-1203	646.04	Russaifah	0.9	749.73	103.5
2056	J-1204	644.47	Russaifah	0.9	749.7	105

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2058	J-1205	626.13	Russaifah	0.9	762.73	136.3
2059	J-1206	627.72	Russaifah	0.9	762.73	134.7
2063	J-1207	678.62	Russaifah	0.9	752.04	73.3
2064	J-1208	680.99	Russaifah	0.9	752.01	70.9
2074	J-1212	616.74	Russaifah	0.9	770.87	153.8
2075	J-1213	618.08	Russaifah	0.9	770.87	152.5
2080	J-1216	690.22	Russaifah	0.9	752.65	62.3
2088	J-1220	765.4	Russaifah	0.9	887.56	121.9
2089	J-1221	759.82	Russaifah	0.9	886.75	126.7
2094	J-1224	642.25	Russaifah	0.9	749.68	107.2
2098	J-1226	683.11	Russaifah	0.9	702.42	19.3
2107	J-1231	618.42	Russaifah	0.9	770.81	152.1
2108	J-1232	616.92	Russaifah	0.9	770.8	153.6
2110	J-1233	716.5	Russaifah	0.9	722.81	6.3
2112	J-1234	711.32	Russaifah	0.9	727.76	16.4
2113	J-1235	711.68	Russaifah	0.9	728.11	16.4
2115	J-1236	709.15	Russaifah	0.9	764.01	54.7
2138	J-1248	730.21	Russaifah	0.9	763.99	33.7
2139	J-1249	733.57	Russaifah	0.9	763.99	30.4
2155	J-1257	666.49	Russaifah	0.9	782.24	115.5
2168	J-1264	713.44	Russaifah	0.9	775.3	61.7
2169	J-1265	715.09	Russaifah	0.9	774.12	58.9
2172	J-1266	647.53	Russaifah	0.9	783.62	135.8
2182	J-1272	777.52	Russaifah	0.9	889.12	111.4
2188	J-1275	673.15	Russaifah	0.9	693.43	20.2
2189	J-1276	675.58	Russaifah	0.9	693.43	17.8
2195	J-1278	744.62	Russaifah	0.9	794.89	50.2
2225	J-1292	720.79	Russaifah	0.9	743.53	22.7
2240	J-1298	692.51	Russaifah	0.9	702.41	9.9
2247	J-1301	659.03	Russaifah	0.9	751.88	92.7
2266	J-1311	759.35	Russaifah	0.9	785.62	26.2
2267	J-1312	761.93	Russaifah	0.9	785.62	23.6
2274	J-1316	698.94	Russaifah	0.9	752.92	53.9
2275	J-1317	700.48	Russaifah	0.9	752.92	52.3
2286	J-1322	615.43	Russaifah	0.9	765.48	149.8
2317	J-1337	733.3	Russaifah	0.9	764.09	30.7
2322	J-1340	643.91	Russaifah	0.9	770.63	126.5
2327	J-1342	719.84	Russaifah	0.9	744.1	24.2
2332	J-1345	712.89	Russaifah	0.9	737.46	24.5
2343	J-1349	714.2	Russaifah	0.9	764.17	49.9
2373	J-1362	651.26	Russaifah	0.9	751.69	100.2
2378	J-1364	708.34	Russaifah	0.9	715.99	7.6
2392	J-1371	656.58	Russaifah	0.9	751.92	95.2
2393	J-1372	654.95	Russaifah	0.9	751.83	96.7
2395	J-1373	714.85	Russaifah	0.9	772.47	57.5
2401	J-1375	626.99	Russaifah	0.9	759.23	132
2403	J-1376	760.32	Russaifah	0.9	785.79	25.4
2410	J-1379	636.55	Russaifah	0.9	751.51	114.7
2411	J-1380	633.24	Russaifah	0.9	751.47	118
2421	J-1386	711.56	Russaifah	0.9	727.75	16.2
2440	J-1396	779.32	Russaifah	0.9	890.23	110.7
2480	J-1412	730.57	Russaifah	0.9	878.71	147.8
2515	J-1427	626.68	Russaifah	0.9	760.33	133.4
2525	J-1431	709.91	Russaifah	0.9	786.25	76.2
2526	J-1432	706.48	Russaifah	0.9	786.25	79.6
2532	J-1433	728.89	Russaifah	0.9	764.33	35.4

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2533	J-1434	723.26	Russaifah	0.9	764.3	41
2543	J-1438	750.68	Russaifah	0.9	764.44	13.7
2572	J-1450	652.94	Russaifah	0.9	749.81	96.7
2582	J-1455	716.01	Russaifah	0.9	742.69	26.6
2592	J-1459	739.83	Russaifah	0.9	764.11	24.2
2627	J-1474	666.31	Russaifah	0.9	750.17	83.7
2628	J-1475	661.65	Russaifah	0.9	749.99	88.2
2632	J-1477	699.92	Russaifah	0.9	752.41	52.4
2633	J-1478	702.02	Russaifah	0.9	752.39	50.3
2635	J-1479	692.03	Russaifah	0.9	830.49	138.2
2636	J-1480	697.3	Russaifah	0.9	830.51	132.9
2642	J-1483	764.06	Russaifah	0.9	785.98	21.9
2654	J-1488	666.19	Russaifah	0.9	752.73	86.4
2664	J-1491	711.76	Russaifah	0.9	798.21	86.3
2668	J-1493	695.58	Russaifah	0.9	703.67	8.1
2680	J-1500	699.19	Russaifah	0.9	745.48	46.2
2708	J-1510	725.69	Russaifah	0.9	785.61	59.8
2728	J-1520	702.9	Russaifah	0.9	709.12	6.2
2731	J-1521	681.65	Russaifah	0.9	693.43	11.8
2733	J-1522	698.13	Russaifah	0.9	775.04	76.8
2734	J-1523	699.93	Russaifah	0.9	774.47	74.4
2743	J-1527	661.99	Russaifah	0.9	752.18	90
2744	J-1528	658	Russaifah	0.9	752.14	93.9
2769	J-1535	658.92	Russaifah	0.9	755.4	96.3
2773	J-1536	697.9	Russaifah	0.9	752.92	54.9
2798	J-1546	679.1	Russaifah	0.9	751.53	72.3
2809	J-1550	689.76	Russaifah	0.9	830.49	140.4
2825	J-1556	684.39	Russaifah	0.9	753.34	68.8
2826	J-1557	670.81	Russaifah	0.9	753.75	82.8
2833	J-1560	697.64	Russaifah	0.9	877.99	180
2844	J-1564	777.52	Russaifah	0.9	872.09	94.4
2845	J-1565	777.26	Russaifah	0.9	872.07	94.6
2850	J-1568	688.18	Russaifah	0.9	776.57	88.2
2851	J-1569	694.34	Russaifah	0.9	775.89	81.4
2868	J-1572	660.55	Russaifah	0.9	755.14	94.4
2876	J-1574	765.6	Russaifah	0.9	823.75	58
2879	J-1575	752.86	Russaifah	0.9	798.95	46
2881	J-1576	712.89	Russaifah	0.9	739.53	26.6
2913	J-1588	614.84	Russaifah	0.9	766.85	151.7
2916	J-1589	745.77	Russaifah	0.9	785.64	39.8
2917	J-1590	738.59	Russaifah	0.9	785.63	46.9
2925	J-1593	699.95	Russaifah	0.9	804.81	104.6
2930	J-1596	734.86	Russaifah	0.9	882.15	147
2932	J-1597	759.34	Russaifah	0.9	785.64	26.2
2937	J-1599	742.53	Russaifah	0.9	764.35	21.8
2940	J-1600	620.89	Russaifah	0.9	770.81	149.6
2953	J-1605	669.36	Russaifah	0.9	750.52	81
2962	J-1609	637.82	Russaifah	0.9	766.69	128.6
2990	J-1616	651.83	Russaifah	0.9	752.09	100.1
2991	J-1617	656.31	Russaifah	0.9	752.1	95.6
2993	J-1618	699.48	Russaifah	0.9	724.88	25.4
3007	J-1621	750.29	Russaifah	0.9	804.58	54.2
3050	J-1632	753.59	Russaifah	0.9	804.96	51.3
3058	J-1634	686.67	Russaifah	0.9	693.46	6.8
3067	J-1639	676.42	Russaifah	0.9	753.15	76.6
3069	J-1640	755.05	Russaifah	0.9	804.99	49.8

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3070	J-1641	750.17	Russaifah	0.9	805	54.7
3123	J-1661	677.2	Russaifah	0.9	752.92	75.6
3125	J-1662	675.21	Russaifah	0.9	752.73	77.4
3140	J-1668	717.81	Russaifah	0.9	753	35.1
3155	J-1674	661.07	Russaifah	0.9	751.83	90.6
3185	J-1686	606.18	Russaifah	0.9	756.5	150
3187	J-1687	643.18	Russaifah	0.9	751.87	108.5
3188	J-1688	618.38	Russaifah	0.9	751.87	133.2
3200	J-1692	610.46	Russaifah	0.9	765.64	154.9
3206	J-1695	631	Russaifah	0.9	783.26	152
3208	J-1696	631	Russaifah	0.9	783.25	151.9
3225	J-1702	631	Russaifah	0.9	882.29	250.8
3229	J-1703	743.36	Russaifah	0.9	764.42	21
3237	J-1706	659.81	Russaifah	0.9	922.08	261.7
3243	J-1707	649.77	Russaifah	0.9	768.17	118.2
3249	J-1708	746.8	Russaifah	0.9	785.81	38.9
3250	J-1709	743.42	Russaifah	0.9	785.82	42.3
3252	J-1710	643.85	Russaifah	0.9	757.17	113.1
3258	J-1711	685.01	Russaifah	0.9	752.66	67.5
3259	J-1712	679.51	Russaifah	0.9	752.67	73
3261	J-1713	759.31	Russaifah	0.9	785.69	26.3
3278	J-1719	712.99	Russaifah	0.9	726.45	13.4
3280	J-1720	607.68	Russaifah	0.9	760.76	152.8
3281	J-1721	608.81	Russaifah	0.9	761.86	152.7
3283	J-1722	749.65	Russaifah	0.9	805	55.2
3284	J-1723	735.97	Russaifah	0.9	804.99	68.9
3291	J-1727	690.33	Russaifah	0.9	878.06	187.4
3305	J-1733	698.83	Russaifah	0.9	785.12	86.1
3308	J-1734	676.68	Russaifah	0.9	751.9	75.1
3324	J-1739	675.13	Russaifah	0.9	780.16	104.8
3325	J-1740	675.41	Russaifah	0.9	780.15	104.5
3329	J-1742	675.56	Russaifah	0.9	765.97	90.2
3333	J-1743	749.91	Russaifah	0.9	895.22	145
3373	J-1756	663.55	Russaifah	0.9	698.81	35.2
3374	J-1757	676.98	Russaifah	0.9	698.8	21.8
3378	J-1758	681.87	Russaifah	0.9	812.61	130.5
3390	J-1763	760.26	Russaifah	0.9	802.57	42.2
3396	J-1766	730.8	Russaifah	0.9	782.66	51.8
3400	J-1768	725.9	Russaifah	0.9	788.34	62.3
3401	J-1769	739.5	Russaifah	0.9	794.97	55.4
3406	J-1771	760	Russaifah	0.9	765	5
3416	J-1773	688.52	Russaifah	0.9	810.59	121.8
3417	J-1774	673.82	Russaifah	0.9	820.25	146.1
3426	J-1777	711.04	Russaifah	0.9	786.67	75.5
3428	J-1778	645.22	Russaifah	0.9	837.04	191.4
3446	J-1782	686.75	Russaifah	0.9	723.72	36.9
3452	J-1784	612.65	Russaifah	0.9	853.97	240.8
3453	J-1785	599.53	Russaifah	0.9	853.56	253.5
3473	J-1793	702.86	Russaifah	0.9	748.96	46
3480	J-1794	652.84	Russaifah	0.9	751.81	98.8
3483	J-1795	723.74	Russaifah	0.9	762.9	39.1
3489	J-1797	663.38	Russaifah	0.9	694.79	31.4
3490	J-1798	659.65	Russaifah	0.9	693.71	34
3502	J-1803	642.83	Russaifah	0.9	754.15	111.1
3556	J-1823	694.41	Russaifah	0.9	832.83	138.1
3565	J-1826	618.16	Russaifah	0.9	752.82	134.4

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3570	J-1828	602.19	Russaifah	0.9	693.17	90.8
3599	J-1838	695.8	Russaifah	0.9	752.36	56.4
3612	J-1843	686.41	Russaifah	0.9	693.47	7
3618	J-1845	618.06	Russaifah	0.9	783.26	164.9
3627	J-1848	810	Russaifah	0.9	869.81	59.7
3628	J-1849	828.75	Russaifah	0.9	869.53	40.7
3633	J-1851	699.65	Russaifah	0.9	785.6	85.8
3673	J-1864	669.83	Russaifah	0.9	693.46	23.6
3678	J-1867	715.43	Russaifah	0.9	752.97	37.5
3679	J-1868	717.47	Russaifah	0.9	753	35.5
3686	J-1871	726.61	Russaifah	0.9	832.43	105.6
3739	J-1888	631	Russaifah	0.9	693.43	62.3
3754	J-1894	631	Russaifah	0.9	956.83	325.2
3757	J-1895	717.41	Russaifah	0.9	752.86	35.4
3764	J-1899	736.47	Russaifah	0.9	804.79	68.2
3770	J-1901	838.17	Russaifah	0.9	869.39	31.2
3819	J-1920	749.33	Russaifah	0.9	804.92	55.5
3820	J-1921	717.89	Russaifah	0.9	797.69	79.6
3823	J-1922	750.25	Russaifah	0.9	805.06	54.7
3837	J-1926	794.45	Russaifah	0.9	873.05	78.4
3859	J-1935	760	Russaifah	0.9	765.02	5
3897	J-1948	662.55	Russaifah	0.9	770.86	108.1
4601	J-2020	755	<None>	0.9	785.85	30.8
4604	J-2021	755	<None>	0.9	785.86	30.8
4613	J-2023	686	<None>	0.9	693.47	7.5
4690	J-2032	700	<None>	0.9	709.12	9.1
120	J-61	516.61	Azraq	0.92	570.2	53.5
121	J-62	516.55	Azraq	0.92	570.2	53.6
345	J-206	510.3	Azraq	0.92	572.25	61.8
346	J-207	510.27	Azraq	0.92	572.25	61.9
667	J-405	516.77	Azraq	0.92	570.2	53.3
697	J-423	512.06	Azraq	0.92	570.26	58.1
698	J-424	512.07	Azraq	0.92	570.26	58.1
749	J-456	510.49	Azraq	0.92	572.26	61.6
750	J-457	510.47	Azraq	0.92	572.27	61.7
1014	J-617	510.41	Azraq	0.92	572.27	61.7
1063	J-646	510.16	Azraq	0.92	572.27	62
1064	J-647	510.14	Azraq	0.92	572.26	62
1389	J-842	512.09	Azraq	0.92	570.26	58.1
1395	J-845	510.18	Azraq	0.92	572.25	61.9
1466	J-888	510.4	Azraq	0.92	572.25	61.7
2313	J-1335	513.6	Azraq	0.92	570.25	56.5
2462	J-1405	513.82	Azraq	0.92	570.2	56.3
2837	J-1561	511.19	Azraq	0.92	572.27	61
2887	J-1577	515.11	Azraq	0.92	570.25	55
3012	J-1623	514.54	Azraq	0.92	570.31	55.7
3160	J-1676	510.16	Azraq	0.92	572.17	61.9
3708	J-1878	511.33	Azraq	0.92	570.58	59.1
3761	J-1897	511.93	Azraq	0.92	571.52	59.5
3762	J-1898	510.49	Azraq	0.92	571.1	60.5
915	J-557	711.84	West Region	1.1	879.83	167.6
916	J-558	712.02	West Region	1.1	879.83	167.5
923	J-562	657.28	West Region	1.1	767.16	109.7
924	J-563	657.24	West Region	1.1	767.16	109.7
935	J-570	631	West Region	1.1	635.94	4.9
936	J-571	631	West Region	1.1	635.96	4.9

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1038	J-631	712.3	West Region	1.1	879.78	167.1
1148	J-697	692.5	West Region	1.1	879.31	186.4
1149	J-698	693.01	West Region	1.1	879.31	185.9
1200	J-728	899.7	West Region	1.1	1157.24	257
1201	J-729	900.81	West Region	1.1	1157.24	255.9
1434	J-869	631	West Region	1.1	876.1	244.6
1435	J-870	632	West Region	1.1	876.08	243.6
1442	J-874	632	West Region	1.1	876.08	243.6
3468	J-1791	969.55	West Region	1.1	1157.2	187.3
3606	J-1840	799.7	West Region	1.1	1157.76	357.3
3607	J-1841	816.39	West Region	1.1	1157.58	340.5
3651	J-1858	760	West Region	1.1	1158.05	397.2
3665	J-1863	631	West Region	1.1	697.32	66.2
3759	J-1896	669.97	West Region	1.1	879.23	208.8
3834	J-1924	762.96	West Region	1.1	870.47	107.3
3835	J-1925	818.68	West Region	1.1	869.01	50.2
3850	J-1931	819.09	West Region	1.1	869.04	49.9
3852	J-1932	710.31	West Region	1.1	860.86	150.2
3853	J-1933	819.4	West Region	1.1	868.96	49.5
3876	J-1938	760	West Region	1.1	765.54	5.5
3878	J-1939	760	West Region	1.1	1062.43	301.8
3883	J-1941	616.81	West Region	1.1	887.84	270.5
3884	J-1942	699.76	West Region	1.1	887.78	187.6
3911	J-1954	500.11	North Region	1.1	556.33	56.1
4158	J-1999	520	North Region	1.1	573.13	53
4160	J-2000	500	North Region	1.1	578.52	78.4
4713	J-2034	604	<None>	1.1	887.99	283.4
4716	J-2036	604	<None>	1.1	887.91	283.3
74	J-31	596.48	Awajan	1.49	692.18	95.5
75	J-32	596.62	Awajan	1.49	692.18	95.4
100	J-48	577.57	Awajan	1.49	691.77	114
101	J-49	577.57	Awajan	1.49	691.76	114
112	J-56	602.07	Awajan	1.49	850.96	248.4
113	J-57	602.13	Awajan	1.49	850.96	248.3
182	J-101	687.93	Awajan	1.49	699.93	12
183	J-102	687.89	Awajan	1.49	699.92	12
185	J-103	575.03	Awajan	1.49	640.96	65.8
186	J-104	574.96	Awajan	1.49	640.95	65.9
207	J-117	688	Awajan	1.49	699.99	12
208	J-118	688.09	Awajan	1.49	699.98	11.9
229	J-131	577.75	Awajan	1.49	691.67	113.7
230	J-132	577.64	Awajan	1.49	691.69	113.8
235	J-135	573.94	Awajan	1.49	639.78	65.7
236	J-136	573.92	Awajan	1.49	639.67	65.6
283	J-166	577.68	Awajan	1.49	691.77	113.9
310	J-183	605.07	Awajan	1.49	632.75	27.6
311	J-184	604.77	Awajan	1.49	632.78	28
322	J-191	687.84	Awajan	1.49	699.92	12.1
379	J-227	687.99	Awajan	1.49	699.95	11.9
488	J-295	596.15	Awajan	1.49	692.18	95.8
534	J-323	607.98	Awajan	1.49	724.11	115.9
535	J-324	607.88	Awajan	1.49	723.49	115.4
553	J-334	601.7	Awajan	1.49	639.78	38
554	J-335	601.83	Awajan	1.49	850.96	248.6
556	J-336	577.4	Awajan	1.49	691.48	113.9
562	J-340	605.47	Awajan	1.49	632.72	27.2

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
602	J-365	611.52	Awajan	1.49	697.09	85.4
603	J-366	611.28	Awajan	1.49	697.08	85.6
669	J-406	607.7	Awajan	1.49	723.49	115.6
679	J-412	584.58	Awajan	1.49	851.73	266.6
680	J-413	584.44	Awajan	1.49	691.51	106.9
746	J-454	641.94	Awajan	1.49	847.77	205.4
747	J-455	641.36	Awajan	1.49	847.78	206
769	J-469	621.99	Awajan	1.49	698.36	76.2
770	J-470	621.99	Awajan	1.49	698.36	76.2
803	J-488	608.17	Awajan	1.49	725.03	116.6
812	J-493	603.13	Awajan	1.49	707.01	103.7
813	J-494	602.82	Awajan	1.49	706.3	103.3
830	J-504	687.12	Awajan	1.49	702.43	15.3
831	J-505	687.62	Awajan	1.49	702.42	14.8
871	J-529	602.87	Awajan	1.49	850.88	247.5
879	J-534	573.8	Awajan	1.49	639.13	65.2
880	J-535	573.91	Awajan	1.49	639.09	65
965	J-587	579.4	Awajan	1.49	691.99	112.4
966	J-588	579.43	Awajan	1.49	692	112.3
1005	J-611	627.46	Awajan	1.49	636.16	8.7
1006	J-612	627.28	Awajan	1.49	636.16	8.9
1080	J-656	563.94	Awajan	1.49	640.15	76.1
1081	J-657	563.53	Awajan	1.49	640.13	76.4
1089	J-662	559.25	Awajan	1.49	639.45	80
1090	J-663	558.74	Awajan	1.49	639.6	80.7
1098	J-667	605.8	Awajan	1.49	632.65	26.8
1099	J-668	606.55	Awajan	1.49	632.66	26.1
1110	J-674	605.07	Awajan	1.49	632.64	27.5
1177	J-713	600.16	Awajan	1.49	692.88	92.5
1178	J-714	600.22	Awajan	1.49	757.32	156.8
1192	J-723	688.38	Awajan	1.49	702.41	14
1237	J-751	687.59	Awajan	1.49	702.41	14.8
1239	J-752	621.76	Awajan	1.49	698.36	76.4
1240	J-753	621.35	Awajan	1.49	698.36	76.9
1273	J-773	582.08	Awajan	1.49	692.68	110.4
1274	J-774	582.24	Awajan	1.49	692.68	110.2
1314	J-797	686.16	Awajan	1.49	702.43	16.2
1324	J-803	576.63	Awajan	1.49	640.38	63.6
1412	J-855	578.26	Awajan	1.49	691.58	113.1
1448	J-877	687.55	Awajan	1.49	702.41	14.8
1468	J-889	600.45	Awajan	1.49	851.35	250.4
1509	J-913	573.69	Awajan	1.49	638.96	65.1
1518	J-917	603.76	Awajan	1.49	632.64	28.8
1545	J-933	583.48	Awajan	1.49	692.62	108.9
1568	J-945	562.65	Awajan	1.49	642.47	79.7
1569	J-946	566.02	Awajan	1.49	642.47	76.3
1596	J-961	600.33	Awajan	1.49	757.4	156.8
1632	J-982	620.63	Awajan	1.49	698.36	77.6
1641	J-987	641.11	Awajan	1.49	698.36	57.1
1642	J-988	641.76	Awajan	1.49	698.36	56.5
1644	J-989	575.89	Awajan	1.49	640.38	64.4
1645	J-990	575.46	Awajan	1.49	640.42	64.8
1657	J-997	598.19	Awajan	1.49	692.88	94.5
1658	J-998	599.21	Awajan	1.49	692.88	93.5
1681	J-1012	606.92	Awajan	1.49	723.48	116.3
1688	J-1016	605.12	Awajan	1.49	850.63	245

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1842	J-1100	585.26	Awajan	1.49	637.03	51.7
1843	J-1101	581.3	Awajan	1.49	637.19	55.8
1851	J-1106	583.15	Awajan	1.49	692.65	109.3
2001	J-1177	604.64	Awajan	1.49	697.36	92.5
2002	J-1178	603.42	Awajan	1.49	697.36	93.8
2034	J-1194	576.18	Awajan	1.49	640.38	64.1
2066	J-1209	582.95	Awajan	1.49	692.66	109.5
2084	J-1218	620.08	Awajan	1.49	636.2	16.1
2085	J-1219	617.66	Awajan	1.49	636.23	18.5
2096	J-1225	604.46	Awajan	1.49	851.27	246.3
2134	J-1246	577.65	Awajan	1.49	691.76	113.9
2145	J-1252	588.3	Awajan	1.49	636.63	48.2
2146	J-1253	585.6	Awajan	1.49	636.75	51
2209	J-1284	629.92	Awajan	1.49	636.16	6.2
2244	J-1300	604.3	Awajan	1.49	851.17	246.4
2258	J-1307	579.37	Awajan	1.49	691.8	112.2
2290	J-1324	589.15	Awajan	1.49	690.55	101.2
2291	J-1325	587.4	Awajan	1.49	690.66	103
2348	J-1352	567.42	Awajan	1.49	641.19	73.6
2349	J-1353	571.66	Awajan	1.49	641.31	69.5
2380	J-1365	644.51	Awajan	1.49	698.42	53.8
2381	J-1366	643.84	Awajan	1.49	698.48	54.5
2547	J-1439	560.39	Awajan	1.49	639.67	79.1
2556	J-1443	601.41	Awajan	1.49	697.35	95.7
2570	J-1449	642.52	Awajan	1.49	698.63	56
2585	J-1456	582.66	Awajan	1.49	691.51	108.6
2588	J-1457	590.31	Awajan	1.49	692.81	102.3
2589	J-1458	583.78	Awajan	1.49	692.77	108.8
2612	J-1468	632.45	Awajan	1.49	636.34	3.9
2613	J-1469	635.66	Awajan	1.49	636.25	0.6
2615	J-1470	565.31	Awajan	1.49	638.31	72.9
2618	J-1471	560.73	Awajan	1.49	640.05	79.2
2638	J-1481	566.56	Awajan	1.49	640.26	73.6

Existing Model Node Information AVEAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2644	J-1484	581.1	Awajan	1.49	691.22	109.9
2722	J-1517	584.79	Awajan	1.49	691.29	106.3
2763	J-1534	596.8	Awajan	1.49	633.75	36.9
2778	J-1538	602.44	Awajan	1.49	701.15	98.5
2779	J-1539	605.28	Awajan	1.49	699.34	93.9
2785	J-1542	627.79	Awajan	1.49	636.54	8.7
2800	J-1547	582.04	Awajan	1.49	699.57	117.3
2813	J-1552	584.28	Awajan	1.49	699.57	115.1
2862	J-1570	605.22	Awajan	1.49	696.91	91.5
2863	J-1571	601.82	Awajan	1.49	696.84	94.8
2895	J-1580	567.06	Awajan	1.49	639.77	72.6
2900	J-1582	633.92	Awajan	1.49	636.17	2.3
2934	J-1598	623.28	Awajan	1.49	698.54	75.1
2950	J-1604	643.3	Awajan	1.49	698.36	55
2956	J-1606	650.56	Awajan	1.49	699.93	49.3
2964	J-1610	628.28	Awajan	1.49	848	219.3
3009	J-1622	582.07	Awajan	1.49	692.06	109.8
3040	J-1629	605.02	Awajan	1.49	692.88	87.7
3052	J-1633	570.75	Awajan	1.49	640.72	69.8
3096	J-1654	579.82	Awajan	1.49	691.93	111.9
3128	J-1663	606.72	Awajan	1.49	697.34	90.4
3129	J-1664	616.24	Awajan	1.49	697.33	80.9
3141	J-1669	715.46	Awajan	1.49	753	37.5
3166	J-1679	619.18	Awajan	1.49	697.56	78.2
3167	J-1680	626.34	Awajan	1.49	697.49	71
3179	J-1685	617.13	Awajan	1.49	757.47	140.1
3222	J-1701	591.9	Awajan	1.49	696.81	104.7
3288	J-1725	610.52	Awajan	1.49	632.19	21.6
3289	J-1726	602.84	Awajan	1.49	632.15	29.3
3293	J-1728	621.53	Awajan	1.49	698.23	76.5
3362	J-1752	601.07	Awajan	1.49	637.3	36.2
3364	J-1753	598.02	Awajan	1.49	706.02	107.8
3365	J-1754	602.61	Awajan	1.49	706.1	103.3
3387	J-1761	607.09	Awajan	1.49	698.04	90.8
3388	J-1762	595.03	Awajan	1.49	697.92	102.7
3398	J-1767	596.3	Awajan	1.49	705.99	109.5
3403	J-1770	652.69	Awajan	1.49	847.43	194.3
3423	J-1776	560.45	Awajan	1.49	639.6	79
3432	J-1779	643.26	Awajan	1.49	699.23	55.9
3464	J-1789	602.9	Awajan	1.49	699.62	96.5
3497	J-1801	610.47	Awajan	1.49	749.62	138.9
3500	J-1802	635.72	Awajan	1.49	699.05	63.2
3533	J-1814	579.59	Awajan	1.49	691.68	111.9
3584	J-1833	610.88	Awajan	1.49	697.74	86.7
3616	J-1844	602.17	Awajan	1.49	852.93	250.3
3631	J-1850	632.72	Awajan	1.49	697.32	64.5
3662	J-1862	628.72	Awajan	1.49	698.27	69.4
3693	J-1874	587.42	Awajan	1.49	691.58	103.9
3696	J-1875	640	Awajan	1.49	643.38	3.4
3732	J-1885	572.79	Awajan	1.49	705.97	132.9
3830	J-1923	640	Awajan	1.49	642.99	3
4020	J-1988	639.08	Awajan	1.49	710.07	70.8
4546	J-2019	690	<None>	1.49	696.93	6.9
4623	J-2026	582.46	<None>	1.49	699.57	116.9
4674	J-2030	660	<None>	1.49	711.48	51.4
3150	J-1673	719.28	<None>	222	824.94	105.4

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
29	pipe-2301	2.26	J-3	J-4	125	120	1	6.3	0.51	3.158
34	pipe-21605	1.63	J-6	J-7	400	100	7	112.56	0.9	3.205
37	pipe-15829	1.66	J-8	J-9	150	120	1	-4.53	0.26	0.715
40	pipe-14379	2.74	J-2	J-10	200	120	1	4.88	0.16	0.19
42	pipe-24210	1.98	J-11	J-12	150	120	1	-0.42	0.02	0
45	pipe-13489	2	J-13	J-14	150	100	7	-11.38	0.64	5.468
48	pipe-7460	2.06	J-15	J-2	200	120	1	5.19	0.17	0.234
50	pipe-1448	2.04	J-16	J-17	125	120	1	21.29	1.73	30.212
53	pipe-17360	2.05	J-18	J-19	150	120	1	4.02	0.23	0.545
56	pipe-2683	2.05	J-20	J-21	150	120	1	8.71	0.49	2.359
59	pipe-7305	2.11	J-15	J-22	150	100	9	6.38	0.36	1.867
61	pipe-7007	2.13	J-23	J-24	125	120	1	4.71	0.38	1.856
64	pipe-7461	2.25	J-25	J-26	150	100	9	6.19	0.35	1.752
67	pipe-3119	2.39	J-27	J-28	125	120	1	-0.93	0.08	0.078
70	pipe-16864	2.44	J-29	J-30	150	100	7	-10.55	0.6	4.728
73	pipe-24449	2.45	J-31	J-32	400	100	7	1.49	0.01	0
76	pipe-13467	2.47	J-33	J-13	150	100	7	-10.57	0.6	4.767
78	pipe-18437	2.54	J-34	J-35	150	120	1	17.41	0.99	8.539
81	pipe-2939	2.58	J-36	J-37	125	120	1	-3.13	0.26	0.865
84	pipe-19457	2.64	J-38	J-39	150	100	7	-0.8	0.05	0.028
87	pipe-3723	2.68	J-40	J-41	150	100	7	-1.76	0.1	0.167
90	pipe-19459	2.71	J-42	J-43	150	100	7	4.02	0.23	0.795
93	pipe-16577	2.75	J-44	J-45	150	100	7	-12.32	0.7	6.313
96	pipe-24133	2.76	J-46	J-47	200	100	7	0.9	0.03	0
99	pipe-8872	3.33	J-48	J-49	400	120	1	54.16	0.43	0.58
102	pipe-9681	2.84	J-50	J-51	150	100	7	-6.01	0.34	1.68
105	pipe-3682	2.89	J-52	J-53	150	100	7	-57.76	3.27	110.617
108	pipe-2204	2.89	J-54	J-55	125	130	8	2.82	0.23	0.617
111	pipe-9511	3.01	J-56	J-57	600	120	1	-183.98	0.65	0.79
114	pipe-14428	3.02	J-58	J-15	200	120	1	11.88	0.38	1.036
116	pipe-7360	3.04	J-59	J-60	125	130	8	1.62	0.13	0.22
119	pipe-15793	3.04	J-61	J-62	400	100	7	-1.83	0.01	0
122	pipe-160	3.06	J-63	J-64	125	130	8	1.25	0.1	0.121
125	pipe-8693	3.12	J-65	J-66	300	100	7	-212.67	3.01	42.243
128	pipe-8599	3.14	J-67	J-68	400	100	7	23.26	0.19	0.166
131	pipe-24501	3.16	J-69	J-70	200	100	7	-24.09	0.77	5.386
134	pipe-18396	3.2	J-71	J-72	150	120	1	2.41	0.14	0.209
137	pipe-14140	3.27	J-60	J-73	125	130	8	1.3	0.11	0.148
139	pipe-10235	3.27	J-74	J-75	200	100	7	-11.82	0.38	1.458
142	pipe-8055	3.27	J-76	J-77	400	120	1	-11.69	0.09	0.023
145	pipe-9978	3.27	J-51	J-78	150	100	7	-0.96	0.05	0.045
147	pipe-21787	3.3	J-79	J-6	300	100	7	201.67	2.85	38.284
149	pipe-16389	3.35	J-80	J-81	300	100	7	31.74	0.45	1.244
152	pipe-9546	3.35	J-72	J-82	150	120	1	1.61	0.09	0.111
154	pipe-24140	3.37	J-83	J-84	300	120	1	58.26	0.82	2.742
157	pipe-15931	3.76	J-85	J-86	300	120	1	-4.44	0.06	0.02
160	pipe-23878	3.38	J-87	J-88	150	100	7	8.84	0.5	3.409
163	pipe-3736	3.4	J-89	J-90	150	100	7	-3.15	0.18	0.526
166	pipe-7304	3.46	J-91	J-92	125	130	8	2.35	0.19	0.441
169	pipe-25004	3.47	J-93	J-94	200	120	1	27.29	0.87	4.844
172	pipe-56	3.49	J-95	J-96	200	120	1	-15.78	0.5	1.771
175	pipe-7457	3.49	J-97	J-98	150	100	9	0.31	0.02	0.011
178	pipe-9571	3.52	J-99	J-100	300	100	7	11.88	0.17	0.212
181	pipe-19461	3.54	J-101	J-102	400	100	7	95.41	0.76	2.351
184	pipe-14792	3.64	J-103	J-104	300	100	7	32.76	0.46	1.31
187	pipe-10861	3.77	J-105	J-106	150	100	7	-4.9	0.28	1.145
190	pipe-9505	3.77	J-107	J-108	150	120	1	5.37	0.3	0.967
193	pipe-2944	3.83	J-36	J-109	125	120	1	2.82	0.23	0.71
195	pipe-17116	3.83	J-110	J-111	300	100	7	-34.66	0.49	1.478
198	pipe-7189	3.84	J-112	J-113	125	130	8	1.57	0.13	0.204
201	pipe-8444	3.87	J-114	J-115	200	100	7	66.06	2.1	34.933
204	pipe-13648	3.89	J-25	J-116	200	120	1	10.7	0.34	0.852
206	pipe-23755	3.89	J-117	J-118	400	100	7	133.16	1.06	4.378
209	pipe-6819	3.91	J-119	J-120	125	130	8	-2.29	0.19	0.418
212	pipe-19576	3.92	J-121	J-122	150	120	1	-1.61	0.09	0.095
215	pipe-15051	3.94	J-123	J-124	200	100	7	8.05	0.26	0.7
218	pipe-10013	3.94	J-125	J-74	150	100	7	-4.18	0.24	0.85
223	pipe-19577	4.08	J-128	J-121	150	120	1	-0.8	0.05	0.036
225	pipe-8817	4.09	J-129	J-130	250	120	1	16.38	0.33	0.637
228	pipe-9067	4.11	J-131	J-132	150	100	7	-11.62	0.66	5.684
231	pipe-24745	4.19	J-133	J-134	150	120	1	25.93	1.47	17.908
234	pipe-6237	4.2	J-135	J-136	150	100	7	26.8	1.52	26.691
237	pipe-8561	4.21	J-137	J-138	400	120	1	0	0	0
240	pipe-12571	4.21	J-139	J-140	200	100	7	-65.71	2.09	34.586
243	pipe-7966	4.23	J-141	J-142	200	100	7	1.8	0.06	0.053
246	pipe-9040	4.27	J-143	J-144	400	120	1	-7.2	0.06	0.017
249	pipe-21172	4.31	J-145	J-146	150	100	7	-9.08	0.51	3.589
252	pipe-3690	4.32	J-90	J-147	150	100	7	-3.5	0.2	0.603
254	pipe-11345	4.36	J-148	J-149	200	120	1	-12.82	0.41	1.195
257	pipe-4061	4.37	J-150	J-151	150	100	7	0.33	0.02	0
260	pipe-7289	4.38	J-152	J-153	125	130	8	3.28	0.27	0.816
263	pipe-23379	4.39	J-154	J-155	300	100	7	27.75	0.39	0.984
266	pipe-24852	4.45	J-156	J-157	150	120	1	15.14	0.86	6.618
269	pipe-15825	4.48	J-158	J-159	200	120	1	7.2	0.23	0.415
272	pipe-8781	4.51	J-160	J-161	150	100	7	0.8	0.05	0.033
275	pipe-12923	4.51	J-77	J-162	400	120	1	-12.59	0.1	0.05
277	pipe-11857	4.53	J-163	J-164	150	100	7	-5.23	0.3	1.298
280	pipe-7458	4.55	J-22	J-165	150	100	9	6.06	0.34	1.702
282	pipe-8657	4.59	J-166	J-48	400	100	7	19.12	0.15	0.13
284	pipe-7290	4.58	J-153	J-167	125	130	8	2.97	0.24	0.682
286	pipe-7923	4.59	J-168	J-169	150	100	7	0.4	0.02	0.016
289	pipe-14386	4.64	J-92	J-170	150	100	9	7.78	0.44	2.704
291	pipe-4540	4.64	J-171	J-172	150	120	1	1.25	0.07	0.064
294	pipe-8138	4.69	J-173	J-174	150	100	7	1.92	0.11	0.206
297	pipe-9601	4.7	J-175	J-176	150	120	1	-1.61	0.09	0.111
300	pipe-17316	4.71	J-177	J-178	150	100	7	-1.06	0.06	0.079
303	pipe-8893	4.71	J-179	J-180	300	100	7	20.23	0.29	0.538
306	pipe-19834	4.72	J-181	J-182	150	100	7	18.41	1.04	13.301
309	pipe-19651	4.74	J-183	J-184	150	100	7	-11.91	0.67	5.949
312	pipe-8710	4.78	J-185	J-186	200	120	1	10.76	0.34	0.855

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
315	pipe-12278	4.79	J-187	J-188	200	120	1	16.9	0.54	2.003
318	pipe-12853	4.82	J-189	J-190	200	120	1	-53.31	1.7	16.751

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
321	pipe-19470	4.82	J-101	J-191	300	100	7	33.27	0.47	1.359
323	pipe-9093	4.84	J-192	J-193	150	100	7	-2.67	0.15	0.369
326	pipe-20565	4.9	J-194	J-195	150	120	1	-5.63	0.32	1.063
329	pipe-9475	4.92	J-196	J-197	200	120	1	-62.17	1.98	22.275
332	pipe-8131	4.95	J-198	J-199	250	100	7	-46.07	0.94	6.049
335	pipe-15734	4.95	J-200	J-201	150	100	7	-14.4	0.82	8.443
338	pipe-2252	4.98	J-202	J-203	150	120	1	-0.31	0.02	0.007
341	pipe-5092	4.99	J-204	J-205	125	120	1	-1.88	0.15	0.336
344	pipe-9176	5	J-206	J-207	200	100	7	-1.83	0.06	0.052
347	pipe-4062	5.09	J-208	J-209	150	100	7	1.03	0.06	0.073
350	pipe-13848	5.1	J-210	J-97	150	100	9	0.63	0.04	0.029
352	pipe-24704	5.11	J-211	J-212	150	120	1	15.6	0.88	6.991
355	pipe-15806	5.11	J-213	J-214	150	100	7	3.22	0.18	0.524
358	pipe-14583	5.13	J-215	J-216	200	100	7	26.87	0.86	6.59
361	pipe-21398	5.16	J-217	J-218	300	100	7	-108.54	1.54	12.158
364	pipe-17301	5.17	J-219	J-220	150	100	7	-11.6	0.66	5.658
367	pipe-8899	5.18	J-221	J-173	150	100	7	4.33	0.25	0.905
369	pipe-7251	2.65	J-26	J-222	150	100	9	5.88	0.33	1.614
371	pipe-8447	5.27	J-223	J-224	200	100	7	-33.95	1.08	10.185
374	pipe-8757	5.27	J-218	J-225	300	100	7	-110.95	1.57	12.667
376	pipe-4058	5.28	J-226	J-208	150	100	7	1.38	0.08	0.099
378	pipe-19469	5.29	J-227	J-101	400	100	7	130.18	1.04	4.204
380	pipe-9622	5.29	J-228	J-229	150	100	7	0.43	0.02	0.014
383	pipe-8056	5.31	J-230	J-76	400	120	1	-10.79	0.09	0.028
388	pipe-8399	5.32	J-233	J-234	150	120	1	-0.9	0.05	0.042
391	pipe-6077	7.41	J-235	J-236	200	120	1	17.83	0.57	2.208
394	pipe-19019	5.36	J-237	J-238	200	120	1	-2.41	0.08	0.056
397	pipe-4571	5.37	J-239	J-240	125	120	1	-0.31	0.03	0.014
403	pipe-8156	5.38	J-140	J-243	200	100	7	-66.51	2.12	35.378
405	pipe-9603	5.41	J-244	J-71	150	120	1	-6.26	0.35	1.279
407	pipe-8880	5.45	J-245	J-246	400	100	7	-0.61	0	0
410	pipe-9474	5.49	J-247	J-248	200	100	7	33.99	1.08	10.209
413	pipe-20741	5.5	J-249	J-250	150	100	7	-2.56	0.15	0.352
416	pipe-18819	5.53	J-251	J-252	150	120	1	4.17	0.24	0.619
419	pipe-9015	5.53	J-212	J-253	150	120	1	14.7	0.83	6.254
421	pipe-15839	5.54	J-254	J-255	150	120	1	-2.7	0.15	0.282
424	pipe-8146	5.55	J-256	J-257	150	120	1	6.98	0.4	1.581
427	pipe-15867	5.55	J-258	J-259	150	100	7	20.02	1.13	15.545
430	pipe-1462	5.59	J-260	J-17	150	120	1	-6.61	0.37	1.425
432	pipe-24146	5.6	J-261	J-262	200	100	7	0.9	0.03	0.013
435	pipe-9468	5.61	J-34	J-263	400	100	7	30.48	0.24	0.278
437	pipe-16180	5.62	J-264	J-265	400	100	7	-19.81	0.16	0.119
440	pipe-9589	5.63	J-266	J-267	400	100	7	-40.8	0.32	0.489
443	pipe-2685	5.63	J-21	J-268	150	120	1	0.63	0.04	0.026
445	pipe-3649	5.67	J-269	J-270	150	100	7	-8.73	0.49	3.346
448	pipe-24065	5.68	J-271	J-272	200	100	7	2.41	0.08	0.079
451	pipe-14524	5.69	J-273	J-274	150	100	7	-23.56	1.33	21.013
454	pipe-21186	5.7	J-275	J-276	200	100	7	-15.84	0.5	2.495
457	pipe-16504	5.7	J-277	J-139	400	120	1	-444.53	3.54	29.078
459	pipe-3648	5.71	J-278	J-269	150	100	7	-8.38	0.47	3.103
461	pipe-23372	5.71	J-279	J-280	150	100	7	2.7	0.15	0.378
464	pipe-8147	5.72	J-35	J-281	150	120	1	16.61	0.94	7.852
466	pipe-16388	5.73	J-6	J-282	400	100	7	88.3	0.7	2.051
468	pipe-2132	5.74	J-283	J-284	150	100	7	-8.01	0.45	2.853
471	pipe-8125	5.75	J-285	J-286	200	120	1	-19.21	0.61	2.523
474	pipe-9214	5.78	J-287	J-69	200	100	7	-11.1	0.35	1.288
476	pipe-2136	5.78	J-288	J-289	150	120	1	0	0	0
479	pipe-9042	5.8	J-290	J-77	200	100	7	0	0	0
481	pipe-6822	5.84	J-291	J-292	125	130	8	-5.63	0.46	2.222
484	pipe-8428	5.86	J-293	J-294	300	100	7	6.3	0.09	0.063
487	pipe-11582	5.87	J-295	J-31	400	100	7	2.98	0.02	0
492	pipe-8448	5.87	J-298	J-299	200	120	1	-13.42	0.43	1.306
495	pipe-8143	5.88	J-300	J-194	150	120	1	-4.83	0.27	0.798
497	pipe-8963	5.88	J-301	J-302	200	120	1	10.79	0.34	0.873
500	pipe-645	5.95	J-303	J-304	400	100	7	-334.11	2.66	24.018
503	pipe-6079	5.95	J-236	J-305	200	120	1	17.52	0.56	2.131
505	pipe-6233	5.96	J-14	J-306	150	100	7	-12.18	0.69	6.204
510	pipe-24858	5.99	J-134	J-309	150	120	1	25.03	1.42	16.776
512	pipe-8088	5.99	J-310	J-311	150	100	7	0.8	0.05	0.05
515	pipe-9291	6	J-312	J-313	200	100	7	37.8	1.2	12.427
518	pipe-9467	6.04	J-314	J-263	150	120	1	-8.25	0.47	2.144
520	pipe-19472	6.05	J-315	J-316	150	100	7	0.9	0.05	0.049
523	pipe-9584	6.05	J-317	J-264	400	100	7	203.75	1.62	9.603
525	pipe-9620	6.1	J-318	J-319	300	100	7	31.12	0.44	1.196
528	pipe-9593	6.11	J-320	J-321	150	120	1	7.67	0.43	1.876
531	pipe-1192	6.11	J-268	J-322	150	120	1	0.31	0.02	0
533	pipe-22160	6.12	J-323	J-324	150	100	7	55.08	3.12	101.302
536	pipe-9283	6.13	J-157	J-325	150	120	1	12.44	0.7	4.59
538	pipe-12221	6.19	J-326	J-327	200	100	7	-69.73	2.22	38.618
541	pipe-9550	6.22	J-321	J-18	150	120	1	4.83	0.27	0.802
542	pipe-644	6.23	J-328	J-329	400	100	7	-297.79	2.37	19.422
545	pipe-8254	6.24	J-330	J-331	150	100	7	1.8	0.1	0.179
548	pipe-3679	6.24	J-332	J-333	150	100	7	-0.9	0.05	0.06
551	pipe-19450	6.24	J-118	J-227	400	100	7	131.67	1.05	4.28
552	pipe-8315	6.24	J-334	J-335	300	120	1	0	0	0
555	pipe-8775	6.29	J-336	J-337	150	100	7	13.2	0.75	7.194
558	pipe-8604	6.36	J-338	J-339	200	100	7	0.8	0.03	0.012
561	pipe-19649	6.39	J-340	J-183	150	100	7	-10.42	0.59	4.637
563	pipe-24749	6.4	J-341	J-156	150	120	1	16.04	0.91	7.357
565	pipe-7998	6.62	J-342	J-343	150	100	7	-2.32	0.13	0.281
568	pipe-14500	6.43	J-344	J-345	150	120	1	3.6	0.2	0.463
571	pipe-12249	6.46	J-346	J-347	200	120	1	60.94	1.94	21.459
574	pipe-3675	6.47	J-348	J-349	150	100	7	-23.4	1.32	20.762
577	pipe-4135	6.47	J-350	J-351	150	120	1	-3.13	0.18	0.357
580	pipe-15802	6.48	J-352	J-353	150	100	7	-53.26	3.01	95.196
583	pipe-8656	6.48	J-354	J-355	150	120	1	0.8	0.05	0.023
586	pipe-9875	6.49	J-356	J-168	200	100	7	-0.8	0.03	0.011
588	pipe-96	6.5	J-108	J-357	150	120	1	8.41	0.48	2.222
590	pipe-23039	6.52	J-358	J-359	150	100	7	-10.95	0.62	5.094
593	pipe-23308	6.53	J-360	J-361	150	100	7	10.13	0.57	4.407

Existing Model Pipe Information AVERAGE DEMAND

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596	pipe-13580	6.54	J-362	J-363	200	100	7	3.22	0.1	0.125
599	pipe-8134	6.54	J-364	J-189	200	120	1	-52.51	1.67	16.295

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601	pipe-19273	6.56	J-365	J-366	150	100	7	5.96	0.34	1.645
604	pipe-22705	6.59	J-367	J-368	150	120	1	2.41	0.14	0.215
607	pipe-15471	6.62	J-369	J-370	200	100	7	-30.09	0.96	8.14
610	pipe-9096	6.65	J-146	J-371	150	100	7	-9.88	0.56	4.208
612	pipe-13922	6.67	J-372	J-373	125	130	8	5.05	0.41	1.814
615	pipe-135	6.72	J-374	J-375	150	100	7	3.22	0.18	0.532
618	pipe-8973	6.72	J-376	J-377	200	120	1	4.65	0.15	0.188
621	pipe-9580	6.77	J-378	J-379	150	100	7	-18.71	1.06	13.714
627	pipe-8153	6.85	J-382	J-383	200	120	1	-0.8	0.03	0
630	pipe-21400	6.86	J-218	J-384	150	100	7	1.61	0.09	0.141
632	pipe-9200	6.87	J-385	J-360	150	100	7	10.94	0.62	5.068
634	pipe-15828	6.87	J-386	J-8	150	120	1	-3.63	0.21	0.465
636	pipe-15778	6.88	J-387	J-388	200	120	1	25.49	0.81	4.275
639	pipe-8774	6.9	J-389	J-283	150	100	7	-7.21	0.41	2.342
641	pipe-2177	6.9	J-390	J-391	150	100	7	-2.01	0.11	0.227
644	pipe-12178	6.94	J-392	J-148	200	120	1	-72.15	2.3	29.341
646	pipe-8840	6.97	J-319	J-393	300	100	7	16.64	0.24	0.384
648	pipe-10012	7	J-394	J-74	200	100	7	-6.84	0.22	0.521
650	pipe-24443	7	J-395	J-396	200	100	7	12.59	0.4	1.616
653	pipe-3069	7	J-397	J-398	200	120	1	-0.94	0.03	0.011
656	pipe-8141	7.02	J-399	J-400	400	100	7	-52.62	0.42	0.785
659	pipe-8127	7.02	J-285	J-401	200	120	1	18.4	0.59	2.341
661	pipe-8943	7.03	J-402	J-403	150	120	1	2.7	0.15	0.275
664	pipe-8782	7.03	J-385	J-404	150	100	7	-0.15	0.01	0
666	pipe-8049	7.07	J-405	J-61	400	100	7	-0.92	0.01	0
668	pipe-7933	7.08	J-324	J-406	150	100	7	2.98	0.17	0.462
670	pipe-8137	7.09	J-407	J-408	150	120	1	10.09	0.57	3.118
673	pipe-16181	7.15	J-267	J-409	300	100	7	-41.61	0.59	2.06
675	pipe-7963	7.16	J-410	J-411	150	100	7	-2.37	0.13	0.301
678	pipe-8771	7.23	J-412	J-413	400	120	1	0	0	0
681	pipe-1463	7.32	J-414	J-415	150	120	1	-5.04	0.29	0.865
684	pipe-9465	7.33	J-300	J-367	150	120	1	3.22	0.18	0.376
685	pipe-24752	7.34	J-416	J-417	150	120	1	0.9	0.05	0.041
688	pipe-8780	7.36	J-213	J-418	150	100	7	0.48	0.03	0.02
690	pipe-9545	7.38	J-419	J-420	200	120	1	10.2	0.32	0.786
693	pipe-8207	7.5	J-421	J-422	300	100	7	1.8	0.03	0
696	pipe-8328	7.53	J-423	J-424	250	100	7	3.67	0.07	0.059
699	pipe-8903	7.55	J-425	J-426	200	100	7	0.8	0.03	0.01
702	pipe-15831	7.59	J-427	J-376	200	120	1	-7.23	0.23	0.421
704	pipe-15225	7.59	J-428	J-429	150	100	7	-9.9	0.56	4.214
707	pipe-8296	7.63	J-430	J-431	150	120	1	-0.9	0.05	0.039
710	pipe-7866	7.64	J-432	J-433	200	120	1	9.76	0.31	0.721
713	pipe-8941	7.65	J-434	J-435	150	120	1	0.9	0.05	0.029
716	pipe-156	7.65	J-436	J-437	150	100	7	5.95	0.34	1.644
719	pipe-17476	7.65	J-400	J-438	300	100	7	53.5	0.76	3.276
721	pipe-7171	7.65	J-157	J-439	150	100	7	1.8	0.1	0.175
723	pipe-12720	7.66	J-440	J-441	200	120	1	84.51	2.69	39.336
726	pipe-12474	7.71	J-442	J-443	200	100	7	-20.12	0.64	3.859
729	pipe-8097	7.74	J-444	J-445	150	100	7	2.41	0.14	0.308
732	pipe-11669	7.76	J-446	J-447	125	120	1	2.49	0.2	0.566
735	pipe-12812	7.76	J-199	J-448	250	100	7	-46.88	0.95	6.242
737	pipe-15047	7.79	J-449	J-450	200	100	7	10.46	0.33	1.156
740	pipe-13444	7.83	J-451	J-452	200	100	7	-9.47	0.3	0.96
743	pipe-8759	7.88	J-33	J-453	150	100	7	-5.72	0.32	1.53
745	pipe-9539	7.89	J-454	J-455	250	120	1	-22.55	0.46	1.151
748	pipe-9173	7.9	J-456	J-457	200	100	7	-4.58	0.15	0.25
751	pipe-8224	7.97	J-458	J-459	150	100	7	-0.9	0.05	0.047
754	pipe-3645	7.98	J-460	J-461	150	100	7	-7.34	0.42	2.425
757	pipe-9480	8	J-190	J-462	200	120	1	-58.95	1.88	20.186
759	pipe-8196	9.04	J-463	J-464	300	120	1	10.79	0.15	0.123
762	pipe-15823	8.02	J-465	J-466	200	120	1	5.4	0.17	0.241
765	pipe-23365	8.09	J-467	J-468	200	100	7	0.8	0.03	0.009
768	pipe-8830	8.12	J-469	J-470	300	100	7	-4.22	0.06	0.037
771	pipe-8038	8.18	J-466	J-471	150	120	1	4.5	0.25	0.692
773	pipe-9631	8.23	J-472	J-374	150	100	7	4.02	0.23	0.795
775	pipe-9479	8.18	J-473	J-364	200	100	7	-1.61	0.05	0.036
777	pipe-8964	8.22	J-474	J-301	200	120	1	-8.81	0.28	0.598
779	pipe-8002	8.22	J-475	J-476	600	100	7	-234.91	0.83	1.738
782	pipe-122	8.22	J-19	J-477	150	120	1	3.22	0.18	0.38
784	pipe-7984	12.42	J-478	J-179	300	100	7	-36.27	0.51	1.6
786	pipe-12921	8.35	J-234	J-479	150	120	1	-1.8	0.1	0.125
788	pipe-5534	8.37	J-480	J-397	200	120	1	-0.63	0.02	0.004
790	pipe-24550	8.42	J-481	J-482	150	100	7	-14.56	0.82	8.617
796	pipe-9507	8.46	J-485	J-256	200	120	1	8.59	0.27	0.572
798	pipe-8805	8.61	J-486	J-487	150	120	1	0.66	0.04	0.017
801	pipe-15779	8.62	J-94	J-387	200	120	1	26.39	0.84	4.56
802	pipe-22418	8.68	J-488	J-323	150	100	7	56.57	3.2	106.437
804	pipe-4567	8.59	J-240	J-489	125	120	1	-3.43	0.28	1.023
806	pipe-8149	8.59	J-108	J-490	150	120	1	-3.84	0.22	0.52
808	pipe-23337	8.65	J-491	J-492	150	100	7	0.91	0.05	0.052
811	pipe-8707	8.7	J-493	J-494	150	100	7	49.13	2.78	81.964
814	pipe-9478	8.72	J-495	J-496	250	100	7	-1.61	0.03	0.017
817	pipe-15878	8.74	J-497	J-498	200	100	7	-23.08	0.73	4.978
820	pipe-15808	8.78	J-499	J-500	150	100	7	0.8	0.05	0.034
823	pipe-15886	8.83	J-84	J-498	300	120	1	49.42	0.7	2.023
824	pipe-9565	8.79	J-501	J-502	200	120	1	-0.13	0	0
827	pipe-9998	8.86	J-168	J-503	200	100	7	-2.01	0.06	0.05
829	pipe-8572	8.86	J-504	J-505	150	120	1	6.86	0.39	1.528
832	pipe-7559	8.86	J-506	J-344	200	120	1	4.5	0.14	0.168
834	pipe-6203	8.88	J-507	J-508	150	100	7	2.7	0.15	0.377
837	pipe-9087	8.96	J-276	J-99	200	100	7	-16.65	0.53	2.717
838	pipe-24773	8.97	J-509	J-510	150	100	7	-28.21	1.6	29.335
841	pipe-9605	8.98	J-511	J-512	150	120	1	-0.56	0.03	0.017
844	pipe-15815	8.99	J-513	J-42	150	100	7	-4.35	0.25	0.919
846	pipe-13582	9.07	J-514	J-515	200	100	7	1.61	0.05	0.033
849	pipe-17477	9.11	J-400	J-516	300	100	7	-106.93	1.51	11.827
851	pipe-9218	9.12	J-517	J-518	200	100	7	-5.71	0.18	0.375
854	pipe-21311	9.14	J-519	J-520	200	100	7	6.44	0.2	0.464
857	pipe-3362	9.18	J-521	J-522	125	120	1	-0.54	0.04	0.036
860	pipe-740	10.06	J-523	J-524	200	100	7	0.9	0.03	0.015

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863	pipe-8663	9.24	J-68	J-525	200	100	7	12.62	0.4	1.626
865	pipe-19993	9.25	J-526	J-527	150	100	7	-7.95	0.45	2.806

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868	pipe-8519	9.32	J-422	J-528	300	100	7	0.9	0.01	0.008
870	pipe-9531	9.28	J-529	J-57	250	120	1	-68.48	1.4	8.986
872	pipe-8090	9.3	J-530	J-531	150	100	7	11.9	0.67	5.921
875	pipe-2142	9.3	J-532	J-533	150	120	1	0	0	0
878	pipe-21148	9.33	J-534	J-535	150	100	7	10.13	0.57	4.41
881	pipe-14825	9.34	J-536	J-537	150	100	7	-12.16	0.69	6.173
884	pipe-2214	9.35	J-538	J-539	150	100	9	-0.31	0.02	0.008
887	pipe-9578	9.38	J-540	J-541	200	100	7	-8.29	0.26	0.746
890	pipe-8108	9.39	J-542	J-543	125	100	7	0.63	0.05	0.063
893	pipe-14487	9.4	J-544	J-545	150	120	1	-36.13	2.04	33.113
896	pipe-9564	9.4	J-546	J-547	200	120	1	1.11	0.04	0.008
899	pipe-4060	9.42	J-209	J-150	150	100	7	0.68	0.04	0.032
900	pipe-8164	12.27	J-548	J-549	150	100	7	-0.8	0.05	0.036
903	pipe-12250	9.45	J-346	J-550	400	100	7	387.68	3.09	31.636
905	pipe-24519	9.53	J-551	J-552	150	100	7	-11.86	0.67	5.893
911	pipe-3730	9.6	J-555	J-556	150	100	7	-1.06	0.06	0.07
914	pipe-8412	9.62	J-557	J-558	250	100	7	4.39	0.09	0.077
917	pipe-5090	9.62	J-559	J-489	150	120	1	-10.02	0.57	3.074
922	pipe-15848	9.72	J-562	J-563	150	100	7	1.1	0.06	0.077
925	pipe-8651	9.75	J-564	J-565	150	100	7	-1.8	0.1	0.176
928	pipe-8272	9.78	J-566	J-567	150	100	7	0	0	0
931	pipe-25001	9.79	J-568	J-569	200	120	1	29.99	0.95	5.778
934	pipe-8692	9.79	J-570	J-571	300	100	7	-32.97	0.47	1.338
937	pipe-24130	9.83	J-67	J-572	300	120	1	0	0	0
939	pipe-9472	9.83	J-573	J-574	150	120	1	13.39	0.76	5.269
942	pipe-24814	13.44	J-575	J-333	150	100	7	31.8	1.8	36.634
944	pipe-8772	9.96	J-180	J-576	150	100	7	19.43	1.1	14.705
946	pipe-20144	9.99	J-577	J-578	200	120	1	-1.05	0.03	0.015
949	pipe-24461	10	J-579	J-580	150	100	7	0.9	0.05	0.045
952	pipe-14908	10.01	J-581	J-369	200	100	7	-29.28	0.93	7.748
954	pipe-707	10.05	J-582	J-583	125	100	7	0.7	0.06	0.074
957	pipe-21399	10.1	J-384	J-584	150	100	7	0.8	0.05	0.044
959	pipe-3651	10.11	J-270	J-585	150	100	7	-10.8	0.61	4.954
961	pipe-18830	10.13	J-586	J-251	150	120	1	4.98	0.28	0.838
963	pipe-13872	10.15	J-119	J-292	150	100	9	6.89	0.39	2.155
964	pipe-11799	10.17	J-587	J-588	400	100	7	-39.5	0.31	0.461
967	pipe-15774	10.2	J-331	J-589	150	100	7	0.9	0.05	0.051
969	pipe-1457	10.34	J-590	J-414	150	120	1	-4.73	0.27	0.763
977	pipe-6209	10.45	J-595	J-596	150	100	7	1.8	0.1	0.178
980	pipe-8970	10.47	J-129	J-597	350	100	7	24.1	0.25	0.355
982	pipe-9563	10.48	J-598	J-546	200	120	1	1.56	0.05	0.028
984	pipe-19822	10.55	J-599	J-600	150	120	1	-0.9	0.05	0.035
987	pipe-25083	10.57	J-201	J-601	200	100	7	-15.21	0.48	2.301
989	pipe-9521	10.61	J-602	J-603	300	100	7	15.03	0.21	0.309
992	pipe-3647	10.61	J-604	J-278	150	100	7	-8.03	0.45	2.867
994	pipe-8096	10.62	J-605	J-606	150	120	1	1.61	0.09	0.105
997	pipe-8883	10.62	J-607	J-379	400	100	7	35.68	0.28	0.378
1002	pipe-20143	10.62	J-578	J-610	200	120	1	-1.39	0.04	0.014
1004	pipe-23818	10.66	J-611	J-612	150	100	7	-1.78	0.1	0.182
1007	pipe-20959	10.74	J-613	J-614	150	100	7	-4.66	0.26	1.046
1010	pipe-15865	10.77	J-615	J-616	150	100	7	11.17	0.63	5.277
1013	pipe-9172	10.8	J-457	J-617	600	100	7	0.92	0	0
1015	pipe-15870	10.81	J-618	J-401	300	120	1	-22.43	0.32	0.468
1017	pipe-2679	10.87	J-619	J-620	150	120	1	1.57	0.09	0.096
1020	pipe-15389	11.02	J-581	J-621	200	100	7	28.48	0.91	7.35
1022	pipe-8100	11.03	J-298	J-223	200	100	7	-33.15	1.06	9.743
1023	pipe-7221	11.09	J-622	J-623	125	130	8	1.4	0.11	0.168
1026	pipe-23525	11.36	J-624	J-625	125	120	1	-5.38	0.44	2.364
1029	pipe-8960	11.18	J-626	J-627	200	120	1	8.1	0.26	0.513
1032	pipe-1464	11.19	J-628	J-415	150	120	1	-0.63	0.04	0.02
1034	pipe-3687	11.19	J-629	J-630	300	100	7	0	0	0
1037	pipe-14470	11.2	J-557	J-631	250	100	7	38.71	0.79	4.378
1039	pipe-8478	13.81	J-632	J-633	200	120	1	-8.05	0.26	0.507
1042	pipe-8223	11.1	J-634	J-459	150	100	7	3.07	0.17	0.483
1044	pipe-9085	11.28	J-391	J-163	150	100	7	-2.82	0.16	0.409
1045	pipe-8594	11.31	J-635	J-636	300	100	7	32.72	0.46	1.323
1048	pipe-8310	11.36	J-637	J-638	200	120	1	-1.8	0.06	0.033
1051	pipe-8010	11.37	J-639	J-640	150	100	7	-3.22	0.18	0.53
1054	pipe-8157	11.52	J-115	J-641	150	100	7	3.22	0.18	0.53
1056	pipe-8769	11.42	J-642	J-643	200	100	7	-13.77	0.44	1.915
1059	pipe-23355	11.46	J-644	J-645	150	120	1	2.56	0.14	0.247
1062	pipe-8042	11.51	J-646	J-647	250	120	1	13.75	0.28	0.459
1065	pipe-23456	11.55	J-648	J-649	150	100	7	-4.73	0.27	1.076
1068	pipe-706	11.62	J-583	J-650	125	100	7	0.35	0.03	0.026
1070	pipe-8150	11.65	J-419	J-651	300	120	1	-17.66	0.25	0.3
1072	pipe-8191	11.73	J-652	J-300	150	120	1	-0.8	0.05	0.025
1074	pipe-10237	11.87	J-75	J-653	150	100	7	1.61	0.09	0.144
1076	pipe-9610	11.92	J-654	J-655	300	120	1	-30.2	0.43	0.812
1079	pipe-24045	11.94	J-656	J-657	300	100	7	26.8	0.38	0.91
1082	pipe-23561	12.02	J-658	J-659	400	120	1	-146.85	1.17	3.739
1085	pipe-24876	12.09	J-660	J-661	150	100	7	-12	0.68	6.024
1088	pipe-7987	12.1	J-662	J-663	150	100	7	-17.87	1.01	12.592
1091	pipe-2253	12.1	J-664	J-203	150	120	1	-0.31	0.02	0.006
1093	pipe-8425	12.1	J-665	J-666	150	100	7	-17.72	1	12.394
1096	pipe-9016	12.2	J-431	J-211	150	120	1	-1.8	0.1	0.128
1097	pipe-7990	12.28	J-667	J-668	150	100	7	-4.47	0.25	0.97
1100	pipe-8111	12.32	J-221	J-669	200	100	7	13.68	0.44	1.89
1102	pipe-15889	12.33	J-670	J-671	600	120	1	220.01	0.78	1.099
1105	pipe-118	12.37	J-672	J-354	150	120	1	1.61	0.09	0.108
1107	pipe-8791	12.39	J-673	J-577	200	120	1	-0.7	0.02	0.006
1109	pipe-7989	12.39	J-674	J-667	150	100	7	-2.98	0.17	0.456
1111	pipe-19451	12.44	J-675	J-676	400	120	1	-5.4	0.04	0.012
1114	pipe-19478	12.53	J-677	J-678	150	100	7	-9.81	0.56	4.15
1117	pipe-2284	12.53	J-679	J-680	200	100	7	0.63	0.02	0.009
1120	pipe-9652	13.21	J-681	J-86	400	100	7	275.23	2.19	16.778
1122	pipe-3681	12.61	J-53	J-682	150	100	7	-59.56	3.37	117.089
1124	pipe-8467	12.64	J-683	J-684	150	100	7	-3.22	0.18	0.53
1127	pipe-8553	12.67	J-685	J-686	200	120	1	-33.39	1.06	7.043
1130	pipe-1459	12.68	J-687	J-628	150	120	1	-0.31	0.02	0.006
1132	pipe-9077	12.7	J-688	J-689	200	100	7	-27.4	0.87	6.846

Existing Model Pipe Information AVERAGE DEMAND

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1135	pipe-8116	14.98	J-173	J-690	150	100	7	1.61	0.09	0.149
1137	pipe-25024	12.73	J-600	J-691	150	120	1	-30.91	1.75	24.797

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1139	pipe-8023	12.9	J-78	J-692	150	100	7	-1.76	0.1	0.173
1141	pipe-8695	12.99	J-693	J-694	300	100	7	-0.31	0	0
1144	pipe-8092	12.95	J-695	J-696	400	100	7	-0.8	0.01	0
1147	pipe-8411	12.97	J-697	J-698	150	100	7	2.2	0.12	0.264
1150	pipe-8816	13.05	J-9	J-699	200	120	1	-5.43	0.17	0.245
1152	pipe-8477	13.12	J-633	J-317	400	100	7	204.55	1.63	9.685
1153	pipe-9083	13.12	J-537	J-642	150	100	7	-12.96	0.73	6.946
1154	pipe-8591	13.14	J-700	J-685	200	100	7	-35.5	1.13	11.057
1159	pipe-1887	13.18	J-703	J-704	125	120	1	-3.79	0.31	1.237
1162	pipe-7482	13.23	J-705	J-706	125	130	8	0.68	0.06	0.042
1165	pipe-8518	13.24	J-142	J-707	200	100	7	0.9	0.03	0.011
1167	pipe-8132	13.23	J-708	J-473	200	100	7	-0.8	0.03	0.011
1169	pipe-19072	13.27	J-709	J-710	150	120	1	-7.24	0.41	1.688
1172	pipe-24090	13.32	J-711	J-712	150	120	1	-3.6	0.2	0.464
1175	pipe-8173	13.33	J-335	J-56	600	120	1	-1.49	0.01	0
1176	pipe-8177	13.37	J-713	J-714	300	120	1	0	0	0
1179	pipe-7980	13.38	J-715	J-716	200	100	7	-30.1	0.96	8.146
1182	pipe-8248	13.38	J-717	J-718	500	100	7	154.51	0.79	1.941
1185	pipe-10665	13.39	J-719	J-720	200	120	1	0.93	0.03	0.011
1188	pipe-24147	13.45	J-721	J-722	200	120	1	0	0	0
1191	pipe-8573	13.48	J-505	J-723	150	120	1	2.39	0.14	0.215
1193	pipe-9874	13.5	J-724	J-725	150	100	7	-0.8	0.05	0.039
1196	pipe-8582	13.63	J-726	J-727	200	100	7	-18.84	0.6	3.423
1199	pipe-8376	13.66	J-728	J-729	200	100	7	2.92	0.09	0.109
1202	pipe-8277	13.72	J-117	Awajan High Square	600	120	1	-134.64	0.48	0.439
1204	pipe-8833	13.75	J-731	J-732	600	100	7	-379.34	1.34	4.218
1207	pipe-7220	13.84	J-622	J-733	125	130	8	1.07	0.09	0.099
1209	pipe-9615	13.98	J-734	J-735	150	100	7	-6.87	0.39	2.14
1212	pipe-8218	14	J-736	J-737	200	100	7	-16.51	0.53	2.679
1215	pipe-8785	14.03	J-246	J-738	200	100	7	13.13	0.42	1.756
1217	pipe-11957	14.03	J-739	J-740	150	100	7	-11.99	0.68	6.019
1220	pipe-21176	14.04	J-603	J-741	150	100	7	21.04	1.19	17.038
1222	pipe-7918	14.08	J-742	J-743	200	120	1	0	0	0
1225	pipe-10659	14.1	J-744	J-745	150	120	1	-0.43	0.02	0.011
1228	pipe-8476	14.22	J-696	J-746	400	100	7	-1.61	0.01	0
1230	pipe-22824	15.37	J-747	J-748	200	100	7	4.5	0.14	0.242
1233	pipe-15816	14.39	J-749	J-750	150	100	7	-2.74	0.16	0.393
1236	pipe-8403	14.44	J-505	J-751	150	120	1	2.98	0.17	0.325
1238	pipe-8831	14.46	J-752	J-753	300	100	7	8.69	0.12	0.113
1241	pipe-24175	14.48	J-754	J-755	150	100	7	-1.97	0.11	0.211
1244	pipe-8569	14.5	J-756	J-757	150	100	7	-1.8	0.1	0.18
1247	pipe-24417	14.85	J-508	J-758	150	100	7	1.8	0.1	0.18
1252	pipe-8222	15.26	J-761	J-762	150	100	7	-0.9	0.05	0.049
1255	pipe-8607	15.27	J-758	J-763	150	100	7	0.9	0.05	0.049
1257	pipe-1997	15.36	J-738	J-764	200	100	7	12.33	0.39	1.56
1259	pipe-23595	15.37	J-765	J-766	200	120	1	12.88	0.41	1.206
1264	pipe-21380	15.47	J-768	J-99	300	100	7	29.33	0.41	1.078
1266	pipe-9202	20.84	J-769	J-770	150	100	7	1.61	0.09	0.146
1269	pipe-8662	15.51	J-771	J-772	150	100	7	-2.41	0.14	0.307
1272	pipe-6242	15.51	J-773	J-774	400	100	7	-1.49	0.01	0
1275	pipe-8890	15.6	J-428	J-775	300	100	7	61.8	0.87	4.284
1277	pipe-8650	15.62	J-309	J-565	150	120	1	22.34	1.26	13.584
1278	pipe-19474	15.62	J-315	J-776	150	100	7	-20.41	1.16	16.117
1280	pipe-8136	15.7	J-777	J-247	400	100	7	146.32	1.16	5.203
1282	pipe-2285	17.81	J-680	J-778	200	100	7	0.31	0.01	0
1284	pipe-9489	15.77	J-779	J-780	200	100	7	3.1	0.1	0.118
1287	pipe-8449	20.25	J-781	J-782	400	100	7	139.59	1.11	4.772
1290	pipe-23378	15.97	J-155	J-783	300	100	7	120.81	1.71	14.824
1292	pipe-6730	16.05	J-784	J-785	125	130	8	-4.11	0.34	1.24
1295	pipe-21924	16.16	J-786	J-787	200	120	1	82.9	2.64	37.952
1298	pipe-8622	16.34	J-788	J-789	200	100	7	-0.02	0	0
1304	pipe-7706	16.45	J-792	J-793	150	100	9	0.94	0.05	0.052
1307	pipe-14183	16.7	J-453	J-794	150	100	7	-6.52	0.37	1.947
1312	pipe-8172	16.91	J-668	J-340	150	100	7	-8.93	0.51	3.489
1313	pipe-8571	16.93	J-797	J-504	150	120	1	-2.39	0.14	0.215
1315	pipe-8801	16.94	J-798	J-799	300	100	7	21.1	0.3	0.589
1318	pipe-9039	16.99	J-144	J-800	400	120	1	-8.1	0.06	0.018
1320	pipe-10669	17	J-801	J-802	200	120	1	0.8	0.03	0.004
1323	pipe-6230	18.53	J-572	J-803	300	120	1	-0.8	0.01	0
1328	pipe-9079	17.17	J-806	J-734	200	100	7	-15.38	0.49	2.349
1330	pipe-9999	17.31	J-503	J-807	200	100	7	-2.82	0.09	0.103
1332	pipe-23541	21.87	J-808	J-809	300	120	1	0.8	0.01	0
1335	pipe-7906	17.46	J-489	J-810	125	120	1	-13.76	1.12	13.456
1337	pipe-8037	24.75	J-811	J-799	200	120	1	-20.2	0.64	2.776
1339	pipe-9443	15.49	J-812	J-681	400	100	7	276.84	2.2	16.959
1344	pipe-8996	17.82	J-815	J-726	150	100	7	0.37	0.02	0.008
1346	pipe-19069	17.91	J-816	J-710	150	120	1	4.63	0.26	0.735
1348	pipe-17870	18.01	J-490	J-817	150	120	1	-4.65	0.26	0.744
1350	pipe-9203	17.99	J-770	J-818	150	100	7	0.8	0.05	0.041
1352	pipe-54	18.04	J-96	J-819	200	100	7	-6.68	0.21	0.499
1354	pipe-8945	23.35	J-820	J-821	150	120	1	4.5	0.25	0.698
1357	pipe-24216	18.15	J-822	J-823	150	100	7	0.76	0.04	0.033
1360	pipe-3720	18.24	J-824	J-825	150	100	7	-2.46	0.14	0.318
1363	pipe-7172	18.33	J-826	J-827	150	100	7	-0.9	0.05	0.049
1366	pipe-8562	18.46	J-138	J-828	400	120	1	-0.9	0.01	0
1371	pipe-17394	18.61	J-831	J-832	150	120	1	1.61	0.09	0.104
1380	pipe-11755	18.75	J-837	J-838	125	120	1	2.5	0.2	0.573
1383	pipe-9296	18.76	J-839	J-840	150	100	7	0.31	0.02	0.008
1388	pipe-8327	18.8	J-424	J-842	250	100	7	0.92	0.02	0.004
1390	pipe-21607	18.8	J-843	J-79	300	100	7	202.47	2.86	38.58
1394	pipe-9175	18.93	J-207	J-845	200	100	7	0.92	0.03	0.014
1396	pipe-8126	18.99	J-846	J-847	200	120	1	0	0	0
1399	pipe-16673	18.99	J-848	J-849	150	100	7	1.61	0.09	0.145
1404	pipe-17884	19.26	J-851	J-852	150	100	7	19.62	1.11	14.985
1407	pipe-1441	19.29	J-853	J-624	125	120	1	-5.06	0.41	2.114
1409	pipe-8652	19.35	J-565	J-854	150	120	1	19.64	1.11	10.7
1411	pipe-9068	19.43	J-855	J-131	150	100	7	-10.13	0.57	4.401
1416	pipe-2680	19.57	J-858	J-859	150	120	1	2.19	0.12	0.186
1419	pipe-9442	20.33	J-860	J-861	400	100	7	-141.2	1.12	4.873
1422	pipe-4380	19.69	J-862	J-863	200	100	7	-8.19	0.26	0.733

Existing Model Pipe Information AVERAGE DEMAND

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1425	pipe-7549	19.7	J-864	J-564	150	100	7	-0.9	0.05	0.053
1427	pipe-8311	19.78	J-865	J-866	300	120	1	0.9	0.01	0

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1430	pipe-19151	19.79	J-867	J-868	150	120	1	0.95	0.05	0.038
1433	pipe-8733	19.82	J-869	J-870	300	100	7	30.78	0.44	1.179
1436	pipe-17473	19.86	J-871	J-872	150	100	7	-8.48	0.48	3.163
1441	pipe-8729	19.89	J-874	J-870	300	100	7	-1.1	0.02	0.004
1446	pipe-8995	23.46	J-459	J-815	150	100	7	1.27	0.07	0.095
1447	pipe-8575	19.99	J-751	J-877	150	120	1	1.49	0.08	0.089
1449	pipe-13590	19.99	J-878	J-734	150	100	7	9.31	0.53	3.771
1451	pipe-17344	20.03	J-879	J-880	400	100	7	-51.01	0.41	0.739
1454	pipe-3673	20.08	J-881	J-882	150	100	7	0.9	0.05	0.052
1457	pipe-8702	20.21	J-732	J-883	600	100	7	-1445.05	5.11	50.206
1465	pipe-8039	20.35	J-888	J-206	200	100	7	-0.92	0.03	0.011
1467	pipe-8179	20.5	J-889	J-890	200	100	7	-44.09	1.4	16.522
1470	pipe-18967	20.52	J-383	J-891	200	120	1	-6.44	0.2	0.334
1472	pipe-195	20.53	J-892	J-590	125	120	1	-4.42	0.36	1.642
1474	pipe-14490	20.54	J-893	J-894	150	120	1	-33.44	1.89	28.675
1477	pipe-23993	20.87	J-895	J-896	150	100	7	-7.36	0.42	2.439
1480	pipe-25082	20.88	J-710	J-897	150	120	1	-6.64	0.38	1.436
1482	pipe-14521	20.89	J-274	J-898	150	100	7	-24.45	1.38	22.52
1484	pipe-629	20.99	J-899	J-900	300	100	7	0.8	0.01	0.004
1487	pipe-19479	28.97	J-677	J-901	150	100	7	7.11	0.4	2.289
1489	pipe-3816	21.12	J-902	J-903	150	100	7	-0.37	0.02	0.011
1492	pipe-1648	21.19	J-625	J-904	125	120	1	-2.54	0.21	0.59
1494	pipe-14025	21.29	J-325	J-905	150	100	7	1.8	0.1	0.178
1496	pipe-2202	21.41	J-906	J-907	125	130	8	1.55	0.13	0.202
1503	pipe-22801	21.68	J-748	J-910	200	100	7	3.6	0.11	0.158
1508	pipe-21145	21.58	J-534	J-913	150	100	7	13.7	0.77	7.698
1510	pipe-2682	27.74	J-914	J-20	150	120	1	9.02	0.51	2.535
1512	pipe-8900	21.7	J-174	J-87	150	100	7	1.12	0.06	0.075
1515	pipe-20953	21.75	J-916	J-895	150	100	7	-6.46	0.37	1.916
1517	pipe-8170	21.79	J-917	J-674	150	100	7	-1.49	0.08	0.126
1519	pipe-15854	21.83	J-918	J-341	150	120	1	16.94	0.96	8.138
1521	pipe-9092	21.94	J-178	J-192	150	100	7	-1.86	0.11	0.19
1524	pipe-631	22.08	J-920	J-921	200	100	7	25.58	0.81	6.026
1527	pipe-4428	22.03	J-922	J-923	200	100	7	-12.06	0.38	1.496
1533	pipe-18738	22.34	J-926	J-419	400	100	7	-55.25	0.44	0.859
1540	pipe-15896	22.54	J-930	J-931	400	120	1	-0.9	0.01	0
1548	pipe-8877	23.84	J-336	J-67	400	120	1	24.06	0.19	0.134
1549	pipe-9514	22.72	J-136	J-534	150	100	7	25.32	1.43	24.006
1550	pipe-9190	41.22	J-470	J-753	300	100	7	-5.71	0.08	0.052
1551	pipe-12030	22.83	J-935	J-522	125	120	1	0.85	0.07	0.078
1553	pipe-680	22.85	J-936	J-937	125	130	8	1.55	0.13	0.205
1556	pipe-11958	22.93	J-938	J-939	150	120	1	11.18	0.63	3.771
1559	pipe-9413	23.11	J-940	J-941	150	120	1	11.27	0.64	3.823
1562	pipe-16086	23.19	J-942	J-943	200	120	1	-4.02	0.13	0.141
1565	pipe-24192	23.25	J-627	J-944	150	120	1	7.2	0.41	1.667
1567	pipe-1	23.3	J-945	J-946	125	120	1	1.49	0.12	0.22
1570	pipe-23368	23.39	J-743	J-947	200	120	1	-0.8	0.03	0.006
1572	pipe-25096	23.49	J-550	J-948	400	100	7	386.87	3.08	31.521
1579	pipe-13708	23.89	J-952	J-953	125	130	8	0.59	0.05	0.033
1582	pipe-12774	23.91	J-213	J-954	150	100	7	-4.5	0.25	0.977
1584	pipe-679	23.98	J-937	J-955	125	130	8	0.77	0.06	0.056
1586	pipe-3705	24.02	J-147	J-956	150	100	7	-3.85	0.22	0.734
1588	pipe-8323	24.26	J-957	J-958	600	100	Steel	-887.03	3.14	20.335
1591	pipe-12926	30.54	J-715	J-959	200	120	1	0.9	0.03	0.01
1593	pipe-14024	24.31	J-960	J-756	150	100	7	-0.9	0.05	0.049
1595	pipe-14517	24.37	J-714	J-961	300	120	1	-66.61	0.94	3.512
1597	pipe-19320	24.43	J-962	J-963	200	120	1	0.8	0.03	0.006
1603	pipe-8135	24.5	J-966	J-495	250	100	7	-0.8	0.02	0.003
1605	pipe-9082	24.55	J-30	J-536	150	100	7	-11.35	0.64	5.437
1606	pipe-6178	24.72	J-967	J-968	150	100	9	0.31	0.02	0.006
1609	pipe-13912	24.79	J-969	J-970	125	130	8	-3.49	0.28	0.913
1612	pipe-9579	24.88	J-541	J-378	150	100	7	-17.91	1.01	12.647
1613	pipe-188	25.84	J-971	J-972	125	130	8	1.93	0.16	0.308
1616	pipe-2203	25.15	J-907	J-973	125	130	8	0.77	0.06	0.056
1618	pipe-22804	25.28	J-974	J-975	200	100	7	8.1	0.26	0.715
1621	pipe-11360	25.29	J-976	J-977	150	100	7	-12.79	0.72	6.782
1624	pipe-23605	37.7	J-978	J-633	400	100	7	213.41	1.7	10.474
1626	pipe-24999	25.4	J-979	J-980	200	120	1	38.99	1.24	9.385
1629	pipe-550	25.51	J-981	J-96	200	100	7	9.91	0.32	1.042
1631	pipe-8703	25.64	J-753	J-982	300	100	7	1.49	0.02	0.006
1633	pipe-23533	25.86	J-983	J-962	400	100	7	451.03	3.59	41.879
1637	pipe-688	26.45	J-985	J-986	125	130	8	3.09	0.25	0.734
1640	pipe-24170	26.45	J-987	J-988	150	100	7	-1.49	0.08	0.127
1643	pipe-6231	26.55	J-989	J-990	300	100	7	-35.05	0.5	1.497
1646	pipe-9493	30.58	J-690	J-991	150	100	7	0.8	0.05	0.039
1648	pipe-22355	26.77	J-992	J-993	125	130	8	0.31	0.03	0.011
1651	pipe-12645	26.78	J-530	J-994	200	120	1	-23.16	0.74	3.579
1653	pipe-14116	26.8	J-995	J-996	150	100	9	0.31	0.02	0.007
1656	pipe-8686	26.87	J-997	J-998	400	100	7	-1.49	0.01	0.003
1659	pipe-677	27.01	J-999	J-1000	125	130	8	0.77	0.06	0.055
1662	pipe-19816	27.07	J-1001	J-1002	200	120	1	-28.58	0.91	5.284
1665	pipe-6216	27.08	J-1003	J-1004	200	100	7	-5.23	0.17	0.319
1671	pipe-24213	27.25	J-1007	J-358	150	100	7	-4.66	0.26	1.043
1673	pipe-7076	28.73	J-4	J-372	125	130	8	5.36	0.44	2.028
1674	pipe-9418	27.33	J-1008	J-1009	150	100	7	0.31	0.02	0.005
1680	pipe-9536	28.21	J-406	J-1012	150	100	7	1.49	0.08	0.127
1682	pipe-23642	38.59	J-1013	J-1014	150	100	7	13.58	0.77	7.576
1685	pipe-9201	28.13	J-361	J-1015	150	100	7	9.33	0.53	3.778
1687	pipe-9532	28.15	J-1016	J-529	250	120	1	-67	1.36	8.626
1689	pipe-8691	28.22	J-1017	J-1018	200	100	7	-53.02	1.69	23.25
1692	pipe-24137	28.45	J-46	J-1019	200	100	7	0.9	0.03	0.01
1694	pipe-24510	28.47	J-1020	J-1021	150	100	7	-16.36	0.93	10.694
1697	pipe-24992	29	J-1022	J-568	200	120	1	30.89	0.98	6.097
1699	pipe-8326	28.78	J-866	J-1023	300	120	1	0	0	0
1701	pipe-2742	28.89	J-1024	J-1025	125	120	1	-22.54	1.84	33.574
1704	pipe-23305	28.94	J-1015	J-1026	150	100	7	8.52	0.48	3.198
1706	pipe-15814	28.99	J-750	J-513	150	100	7	-3.55	0.2	0.631
1710	pipe-2207	31.71	J-1029	J-1030	600	100	7	329.78	1.17	3.254
1713	pipe-24138	29.36	J-498	J-1031	300	100	7	25.44	0.36	0.826
1718	pipe-2711	29.5	J-859	J-619	150	120	1	1.88	0.11	0.139

Existing Model Pipe Information AVERAGE DEMAND

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1719	pipe-676	29.51	J-1034	J-999	125	130	8	1.55	0.13	0.202
1721	pipe-10361	29.52	J-601	J-1035	200	100	7	44.42	1.41	16.746

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1723	pipe-8475	29.62	J-1036	J-746	700	120	1	-510.72	1.33	2.462
1725	pipe-13083	29.64	J-190	J-1037	200	100	7	4.83	0.15	0.276
1727	pipe-17136	29.66	J-1038	J-1039	400	100	7	-33.05	0.26	0.331
1730	pipe-10661	29.66	J-1040	J-1041	200	120	1	-0.01	0	0
1733	pipe-8649	29.69	J-827	J-309	150	100	7	-1.8	0.1	0.18
1737	pipe-2206	40.78	J-1044	J-1029	600	100	7	330.59	1.17	3.268
1739	pipe-9023	29.94	J-737	J-1045	200	100	7	-17.41	0.55	2.955
1743	pipe-8451	30.31	J-1047	J-732	600	100	7	-1064.9	3.77	28.526
1745	pipe-12647	30.47	J-1048	J-530	200	120	1	-10.46	0.33	0.821
1747	pipe-20874	30.5	J-1049	J-472	150	100	7	4.83	0.27	1.115
1749	pipe-8554	34.65	J-686	J-1050	200	120	1	-34.29	1.09	7.403
1751	pipe-19585	30.67	J-82	J-1051	150	120	1	0.8	0.05	0.029
1753	pipe-13372	32.13	J-1052	J-655	200	100	7	17.47	0.56	2.974
1755	pipe-4534	30.76	J-351	J-171	150	120	1	6.26	0.35	1.288
1756	pipe-4382	30.78	J-1053	J-1054	200	100	7	-9.74	0.31	1.008
1759	pipe-8879	31.18	J-1055	J-245	400	100	7	0.19	0	0
1761	pipe-4821	31.12	J-447	J-1056	125	120	1	2.17	0.18	0.442
1763	pipe-23376	34.17	J-1057	J-154	300	100	7	22.72	0.32	0.671
1765	pipe-11701	31.23	J-1056	J-1058	125	120	1	1.86	0.15	0.331
1767	pipe-98	31.46	J-1059	J-1060	150	100	7	2.04	0.12	0.225
1770	pipe-165	31.54	J-55	J-1061	125	130	8	2.5	0.2	0.493
1772	pipe-23640	31.6	J-1062	J-1063	150	100	7	15.19	0.86	9.324
1780	pipe-13873	31.92	J-1067	J-119	150	100	9	4.91	0.28	1.153
1782	pipe-24106	31.93	J-1068	J-1069	150	100	7	0	0	0
1785	pipe-164	32.08	J-1061	J-1070	125	130	8	2.19	0.18	0.387
1787	pipe-8799	32.13	J-359	J-137	400	120	1	-17.25	0.14	0.072
1788	pipe-8666	32.17	J-1055	J-1071	300	100	7	8.84	0.13	0.118
1790	pipe-6729	32.28	J-970	J-784	125	130	8	-3.8	0.31	1.07
1794	pipe-8638	32.53	J-1074	J-1075	400	100	7	-0.8	0.01	0
1797	pipe-15879	32.64	J-1076	J-497	200	100	7	-22.18	0.71	4.628
1799	pipe-14559	32.68	J-1077	J-1078	150	100	7	-7.47	0.42	2.505
1802	pipe-10351	33.02	J-1079	J-224	150	100	7	36.37	2.06	46.955
1806	pipe-9284	33.35	J-905	J-1081	150	100	7	0.9	0.05	0.051
1810	pipe-9086	33.75	J-169	J-1083	150	100	7	-0.4	0.02	0.011
1812	pipe-6731	33.69	J-785	J-1084	125	130	8	-4.42	0.36	1.419
1814	pipe-8115	33.84	J-1085	J-1086	150	100	7	2.41	0.14	0.308
1817	pipe-13371	33.85	J-1087	J-407	200	100	7	32.38	1.03	9.327
1819	pipe-3637	33.86	J-585	J-1088	150	100	7	-11.15	0.63	5.262
1821	pipe-15899	34.11	J-1089	J-1090	400	120	1	-0.9	0.01	0.002
1824	pipe-171	34.32	J-1091	J-1092	125	130	8	0.37	0.03	0.013
1827	pipe-11359	34.55	J-977	J-200	150	100	7	-13.6	0.77	7.595
1828	pipe-8190	34.1	J-921	J-813	200	100	7	24.77	0.79	5.68
1829	pipe-23361	34.76	J-868	J-1093	150	120	1	0.15	0.01	0.002
1831	pipe-2201	34.83	J-1094	J-906	125	130	8	7.74	0.63	3.997
1833	pipe-1230	35.01	J-1095	J-1096	200	100	7	-0.63	0.02	0.006
1839	pipe-2195	35.02	J-906	J-1099	125	130	8	5.42	0.44	2.063
1841	pipe-8705	39.83	J-1100	J-1101	150	100	7	-9.55	0.54	3.944
1844	pipe-682	35.43	J-1102	J-1103	125	130	8	0.77	0.06	0.057
1847	pipe-24135	35.78	J-783	J-1104	300	120	1	1.8	0.03	0.004
1852	pipe-172	36.18	J-1107	J-1091	125	130	8	0.68	0.06	0.045
1856	pipe-687	36.36	J-986	J-1109	125	130	8	1.55	0.13	0.203
1858	pipe-182	36.38	J-64	J-1110	125	130	8	0.31	0.03	0.01
1860	pipe-11441	36.48	J-1111	J-1112	150	100	7	6.29	0.36	1.822
1863	pipe-3700	36.56	J-41	J-824	150	100	7	-2.11	0.12	0.24
1866	pipe-167	36.98	J-1114	J-54	125	130	8	-0.26	0.02	0.006
1870	pipe-15050	37.52	J-124	J-519	200	100	7	7.24	0.23	0.583
1871	pipe-2006	37.56	J-780	J-1116	200	100	7	9.28	0.3	0.923
1873	pipe-15826	37.41	J-1117	J-1118	150	120	1	-0.93	0.05	0.038
1876	pipe-369	40.55	J-1119	J-981	200	100	7	10.72	0.34	1.202
1878	pipe-169	37.47	J-1092	J-1114	125	130	8	0.06	0	0
1879	pipe-8991	37.72	J-566	J-1023	400	100	7	-2.7	0.02	0.004
1880	pipe-8709	48.56	J-349	J-1120	150	100	7	-24.3	1.38	22.26
1882	pipe-3351	38	J-1121	J-521	125	120	1	-0.23	0.02	0.007
1886	pipe-3639	38.26	J-461	J-604	150	100	7	-7.69	0.43	2.639
1887	pipe-2743	38.16	J-1123	J-1024	125	120	1	-22.23	1.81	32.714
1889	pipe-24654	38.12	J-1124	J-1125	200	100	7	-25.51	0.81	5.998
1892	pipe-3707	38.2	J-556	J-40	150	100	7	-1.41	0.08	0.115
1893	pipe-2205	38.49	J-1126	J-648	150	100	7	5.41	0.31	1.377
1895	pipe-22772	38.54	J-1104	J-1127	300	120	1	0.9	0.01	0.002
1897	pipe-159	38.59	J-1128	J-63	125	130	8	1.57	0.13	0.208
1899	pipe-3821	38.65	J-151	J-902	150	100	7	-0.02	0	0
1900	pipe-7524	38.71	J-793	J-967	150	100	9	0.63	0.04	0.026
1901	pipe-2897	38.87	J-351	J-559	150	120	1	-9.7	0.55	2.901
1902	pipe-24104	37.87	J-1129	J-1130	150	100	7	0.9	0.05	0.051
1905	pipe-24743	39.03	J-854	J-1131	150	120	1	18.74	1.06	9.812
1907	pipe-10333	39.25	J-1132	J-683	150	100	7	-2.41	0.14	0.309
1909	pipe-174	39.19	J-1133	J-1134	125	130	8	1.31	0.11	0.15
1912	pipe-23543	39.26	J-1135	J-1136	200	120	1	86.12	2.74	40.727
1915	pipe-8685	39.35	J-1137	J-1138	300	120	1	-0.9	0.01	0.002
1918	pipe-8567	39.39	J-439	J-1139	150	100	7	0.9	0.05	0.049
1920	pipe-11471	45.08	J-1140	J-1141	150	120	1	9.57	0.54	2.828
1923	pipe-16473	39.63	J-442	J-1142	200	120	1	19.31	0.61	2.555
1925	pipe-7180	40.28	J-1143	J-1144	125	130	8	0.94	0.08	0.08
1928	pipe-22774	39.94	J-1145	J-783	300	120	1	-118.11	1.67	10.143
1930	pipe-24168	40.27	J-1146	J-754	300	120	1	-73.5	1.04	4.213
1932	pipe-9174	54.18	J-207	J-456	200	100	7	-3.67	0.12	0.165
1933	pipe-9585	40.52	J-264	J-1147	400	100	7	222.76	1.77	11.34
1935	pipe-8972	52.69	J-1148	J-376	250	120	1	12.78	0.26	0.401
1937	pipe-9663	41.17	J-1112	J-1149	150	100	7	5.94	0.34	1.639
1939	pipe-23641	53.87	J-182	J-1150	150	100	7	17.61	1	12.253
1941	pipe-2141	40.7	J-533	J-1151	600	120	1	261.26	0.92	1.508
1943	pipe-1902	40.94	J-539	J-620	150	100	9	-0.63	0.04	0.025
1944	pipe-8465	41.15	J-814	J-1135	200	120	1	-0.8	0.03	0.005
1945	pipe-12404	41.47	J-872	J-775	150	100	7	-9.28	0.53	3.744
1946	pipe-8870	41.59	J-1152	J-1153	400	120	1	-4.5	0.04	0.005
1949	pipe-9876	41.79	J-725	J-163	150	100	7	-1.61	0.09	0.146
1950	pipe-21314	41.82	J-88	J-1154	150	100	7	8.03	0.45	2.865
1952	pipe-3674	41.82	J-881	J-1155	150	100	7	0.9	0.05	0.05
1954	pipe-8882	41.95	J-379	J-1156	400	100	7	16.16	0.13	0.089
1956	pipe-177	42.37	J-972	J-1133	125	130	8	1.62	0.13	0.22

Existing Model Pipe Information AVERAGE DEMAND

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1957	pipe-8197	47.03	J-1157	J-595	150	100	7	4.5	0.25	0.979
1959	pipe-9981	42.47	J-692	J-1158	150	100	7	-2.57	0.15	0.347

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1961	pipe-173	42.64	J-1134	J-1107	125	130	8	1	0.08	0.089
1962	pipe-162	42.85	J-1070	J-1128	125	130	8	1.88	0.15	0.29
1963	pipe-2396	42.89	J-1159	J-1095	200	100	7	-0.31	0.01	0.002
1965	pipe-9633	43.03	J-794	J-1160	150	100	7	-7.33	0.41	2.418
1967	pipe-23455	44.47	J-648	J-1161	150	100	7	9.33	0.53	3.78
1969	pipe-11422	43.23	J-1162	J-105	150	100	7	-4.55	0.26	0.998
1971	pipe-15868	43.33	J-258	J-1163	300	120	1	0.8	0.01	0.002
1973	pipe-8031	43.46	J-186	J-1164	200	120	1	9.86	0.31	0.736
1975	pipe-704	43.49	J-1165	J-1102	125	130	8	11.61	0.95	8.469
1977	pipe-15819	43.61	J-1166	J-749	150	100	7	-1.94	0.11	0.205
1979	pipe-8446	43.73	J-224	J-899	200	100	7	1.61	0.05	0.036
1980	pipe-2763	44.3	J-1167	J-914	150	120	1	9.34	0.53	2.701
1982	pipe-3710	44.89	J-903	J-555	150	100	7	-0.71	0.04	0.031
1983	pipe-13583	44.88	J-362	J-1168	200	100	7	-6.25	0.2	0.443
1985	pipe-11591	44.89	J-939	J-1140	150	120	1	10.38	0.59	3.286
1986	pipe-23838	45.13	J-75	J-1169	200	100	7	-14.23	0.45	2.035
1988	pipe-14484	45.2	J-1170	J-688	150	120	1	-26.5	1.5	18.644
1990	pipe-10707	45.36	J-1171	J-106	150	100	7	5.25	0.3	1.301
1992	pipe-15914	45.38	J-1172	J-176	200	100	7	20.68	0.66	4.066
1994	pipe-7564	45.54	J-1173	J-1174	150	120	1	1.8	0.1	0.127
2000	pipe-23699	46.07	J-1177	J-1178	300	100	7	8.54	0.12	0.11
2003	pipe-17300	46.08	J-220	J-193	400	100	7	39.95	0.32	0.472
2005	pipe-8605	49.79	J-1179	J-273	150	100	7	-22.66	1.28	19.546
2007	pipe-7919	46.84	J-1180	J-1181	150	100	7	3.65	0.21	0.664
2010	pipe-20956	47.2	J-896	J-1182	150	100	7	-8.26	0.47	3.019
2012	pipe-10678	47.63	J-1183	J-1184	250	120	1	-0.32	0.01	0
2015	pipe-17665	47.84	J-527	J-1185	150	100	7	-8.75	0.5	3.358
2017	pipe-23298	48.42	J-1186	J-954	150	100	7	5.3	0.3	1.329
2019	pipe-686	48.12	J-1109	J-1187	125	130	8	0.77	0.06	0.056
2021	pipe-9621	48.3	J-1060	J-228	150	100	7	1.23	0.07	0.089
2022	pipe-14585	48.37	J-1188	J-1189	200	100	7	25.26	0.8	5.889
2025	pipe-18735	48.37	J-1190	J-320	150	120	1	8.48	0.48	2.259
2027	pipe-16956	48.83	J-576	J-1191	150	100	7	18.62	1.05	13.598
2029	pipe-8237	50.23	J-395	J-1076	200	100	7	-13.49	0.43	1.844
2033	pipe-9197	49.15	J-1194	J-989	300	120	1	-3.78	0.05	0.018
2035	pipe-11439	49.59	J-1149	J-1171	150	100	7	5.59	0.32	1.466
2036	pipe-1623	49.54	J-1195	J-1123	125	120	1	-21.91	1.79	31.865
2038	pipe-2123	50.05	J-549	J-1196	150	100	7	-1.61	0.09	0.146
2040	pipe-10677	49.82	J-502	J-1183	250	120	1	-0.26	0.01	0.001
2041	pipe-685	49.92	J-986	J-1197	125	130	8	0.77	0.06	0.055
2043	pipe-23534	50.25	J-983	J-808	300	120	1	1.61	0.02	0.003
2044	pipe-22894	51.13	J-614	J-916	150	100	7	-5.56	0.31	1.451
2045	pipe-1600	50.37	J-1198	J-1199	150	120	1	10.9	0.62	3.597
2048	pipe-20779	50.4	J-418	J-1200	150	100	7	-0.33	0.02	0.007
2050	pipe-19811	50.51	J-1201	J-1001	200	120	1	-27.68	0.88	4.978
2052	pipe-15871	50.83	J-401	J-1202	300	120	1	-4.83	0.07	0.028
2054	pipe-22312	51.49	J-1203	J-1204	150	100	7	3.29	0.19	0.548
2057	pipe-24149	58.91	J-1205	J-1206	150	120	1	0.9	0.05	0.035
2060	pipe-1886	51.8	J-704	J-892	125	120	1	-4.1	0.33	1.432
2061	pipe-8894	51.92	J-1191	J-33	150	100	7	17.82	1.01	12.529
2062	pipe-9433	52.04	J-1207	J-1208	300	100	7	19.71	0.28	0.516
2065	pipe-23532	51.93	J-1209	J-1106	400	100	7	27.74	0.22	0.239
2067	pipe-10676	52.19	J-1184	J-546	250	120	1	-0.39	0.01	0
2068	pipe-15785	52.26	J-722	J-979	200	120	1	39.89	1.27	9.791
2069	pipe-193	52.51	J-904	J-1210	125	120	1	-2.85	0.23	0.728
2071	pipe-675	52.75	J-1211	J-1034	125	130	8	17.02	1.39	17.213
2073	pipe-24108	53.07	J-1212	J-1213	600	100	7	0.9	0	0
2076	pipe-6820	55.15	J-1214	J-1215	125	130	8	-2.91	0.24	0.654
2079	pipe-25057	53.06	J-762	J-1216	150	100	7	3.6	0.2	0.648
2081	pipe-23694	65.43	J-1008	J-1217	150	100	7	-1.57	0.09	0.139
2083	pipe-21124	53.35	J-1218	J-1219	150	100	7	-3.59	0.2	0.644
2086	pipe-17345	53.46	J-880	J-399	400	100	7	-51.82	0.41	0.761
2087	pipe-25011	53.7	J-1220	J-1221	150	120	1	23.69	1.34	15.153
2090	pipe-12056	53.8	J-1222	J-1223	125	120	1	1.56	0.13	0.239
2093	pipe-23990	53.8	J-1204	J-1224	150	100	7	2.39	0.14	0.303
2095	pipe-8904	53.83	J-889	J-1225	600	120	1	256.93	0.91	1.463
2097	pipe-8402	53.84	J-1226	J-797	150	120	1	-0.9	0.05	0.036
2099	pipe-9460	54.42	J-531	J-1227	150	100	7	11.09	0.63	5.207
2101	pipe-19992	54.26	J-1228	J-526	150	100	7	-7.14	0.4	2.306
2103	pipe-23536	54.82	J-1229	J-1230	400	100	7	47.75	0.38	0.654
2106	pipe-24219	55.55	J-1231	J-1232	150	100	7	0.9	0.05	0.05
2109	pipe-14489	55.06	J-894	J-1233	150	120	1	-34.33	1.94	30.117
2111	pipe-9044	55.61	J-1234	J-1235	150	100	7	-12.29	0.7	6.294
2114	pipe-24191	55.91	J-944	J-1236	150	120	1	6.3	0.36	1.302
2116	pipe-19828	62.56	J-115	J-1237	200	100	7	62.04	1.97	31.096
2121	pipe-10213	56.51	J-1240	J-1003	200	100	7	-4.42	0.14	0.234
2123	pipe-7229	56.49	J-623	J-1241	125	130	8	1.09	0.09	0.106
2128	pipe-9496	56.75	J-1244	J-114	200	100	7	-15.23	0.48	2.308
2130	pipe-8834	56.8	J-1245	J-681	400	100	7	-0.8	0.01	0.001
2132	pipe-9609	59.35	J-176	J-1052	200	100	7	18.27	0.58	3.233
2133	pipe-8341	57.49	J-166	J-1246	400	100	7	23.29	0.19	0.173
2135	pipe-5474	58.84	J-838	J-1247	125	120	1	2.19	0.18	0.447
2137	pipe-8034	57.98	J-1248	J-1249	150	120	1	-0.9	0.05	0.036
2140	pipe-9504	58.11	J-357	J-1250	150	120	1	7.6	0.43	1.846
2142	pipe-18597	60.07	J-1156	J-1251	400	100	7	15.35	0.12	0.079
2144	pipe-23832	61.51	J-1252	J-1253	150	100	7	-6.57	0.37	1.973
2147	pipe-23201	79.33	J-1254	J-769	150	100	7	2.41	0.14	0.309
2149	pipe-3735	58.51	J-1088	J-1255	200	100	7	-13.66	0.43	1.886
2151	pipe-23302	59.04	J-1026	J-160	150	100	7	7.72	0.44	2.662
2152	pipe-4531	61.85	J-1256	J-109	125	120	1	-1.26	0.1	0.161
2154	pipe-22777	59.19	J-1257	J-1179	150	100	7	-21.76	1.23	18.135
2156	pipe-8460	59.31	J-1258	J-684	200	120	1	-1.61	0.05	0.025
2158	pipe-8683	59.31	J-1259	J-1260	400	100	7	-49.4	0.39	0.696
2161	pipe-9547	59.39	J-1261	J-71	400	100	7	-44.97	0.36	0.585
2165	pipe-8661	59.85	J-1263	J-771	150	100	7	-1.61	0.09	0.145
2167	pipe-24958	59.87	J-1264	J-1265	150	120	1	27.32	1.55	19.72
2170	pipe-23597	59.96	J-252	J-644	150	120	1	3.37	0.19	0.407
2171	pipe-23374	66.87	J-898	J-1266	150	100	7	22.16	1.25	18.767
2173	pipe-689	60.39	J-1267	J-1268	125	100	7	-3.49	0.28	1.484
2178	pipe-15741	60.37	J-1270	J-1271	150	100	7	4.83	0.27	1.116

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
2181	pipe-15783	60.4	J-569	J-1272	200	120	1	29.09	0.93	5.457
2183	pipe-17028	77.99	J-111	J-478	300	100	7	-35.47	0.5	1.531

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ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
2184	pipe-10671	60.93	J-1273	J-1274	200	120	1	0.67	0.02	0.005
2187	pipe-9026	60.99	J-1275	J-1276	400	120	1	-2.7	0.02	0.002
2190	pipe-9611	68.24	J-655	J-1277	200	100	7	-13.54	0.43	1.855
2192	pipe-9677	62.29	J-1196	J-639	150	100	7	-2.41	0.14	0.309
2193	pipe-24209	61.93	J-12	J-479	150	120	1	-28.94	1.64	21.942
2194	pipe-8250	61.58	J-691	J-1278	150	120	1	-31.81	1.8	26.153
2196	pipe-11956	61.52	J-740	J-1279	150	100	7	-7.16	0.41	2.315
2198	pipe-24105	61.64	J-1069	J-931	400	120	1	-14.39	0.11	0.051
2199	pipe-10662	61.99	J-1041	J-501	200	120	1	-0.07	0	0
2200	pipe-4535	62.07	J-37	J-171	200	120	1	-4.7	0.15	0.186
2201	pipe-8535	62.24	J-1280	J-1281	200	100	7	42.24	1.34	15.258
2204	pipe-2852	62.25	J-21	J-1282	150	120	1	7.77	0.44	1.922
2206	pipe-13122	62.6	J-1037	J-1283	200	100	7	4.02	0.13	0.196
2208	pipe-23542	67.3	J-1284	J-611	150	100	7	-0.29	0.02	0.006
2210	pipe-9569	62.75	J-603	J-371	300	100	7	4.26	0.06	0.031
2211	pipe-8456	62.77	J-1202	J-1285	400	100	7	380.43	3.03	30.554
2213	pipe-15373	62.9	J-1078	J-145	150	100	7	-8.27	0.47	3.025
2214	pipe-20927	63.22	J-1286	J-1287	400	100	7	267.57	2.13	15.922
2217	pipe-15275	63.25	J-1288	J-1289	150	100	7	0.8	0.05	0.04
2220	pipe-2966	63.51	J-350	J-1290	150	120	1	2.82	0.16	0.293
2222	pipe-14387	63.73	J-1291	J-59	150	100	9	7.16	0.41	2.314
2224	pipe-8555	63.99	J-1050	J-1292	200	120	1	-35.19	1.12	7.763
2228	pipe-8864	64.65	J-774	J-1209	400	100	7	29.23	0.23	0.264
2229	pipe-15805	64.71	J-160	J-1186	150	100	7	6.11	0.35	1.725
2233	pipe-12488	64.8	J-1296	J-187	200	120	1	17.7	0.56	2.175
2235	pipe-15023	73.68	J-1297	J-29	150	100	7	-9.74	0.55	4.095
2237	pipe-7563	65.71	J-345	J-1173	150	120	1	2.7	0.15	0.272
2238	pipe-9236	65.59	J-595	J-1231	150	100	7	1.8	0.1	0.179
2239	pipe-8574	65.34	J-723	J-1298	150	120	1	0.9	0.05	0.035
2241	pipe-4407	65.22	J-1054	J-1299	200	100	7	-10.51	0.33	1.162
2243	pipe-9509	72.04	J-1300	J-1225	600	120	1	-255.44	0.9	1.446
2245	pipe-8606	65.31	J-507	J-1257	150	100	7	-20.86	1.18	16.77
2246	pipe-24414	86.65	J-421	J-1301	300	100	7	2.7	0.04	0.013
2251	pipe-2777	65.66	J-1199	J-1304	150	120	1	10.59	0.6	3.409
2253	pipe-13705	65.81	J-1305	J-112	125	130	8	-0.04	0	0
2255	pipe-15504	66.46	J-1306	J-123	200	100	7	8.85	0.28	0.845
2257	pipe-20152	65.84	J-1307	J-166	400	100	7	43.9	0.35	0.559
2259	pipe-9636	65.87	J-1308	J-1309	200	100	7	-7.86	0.25	0.677
2262	pipe-23593	67.26	J-1014	J-1310	150	100	7	12.78	0.72	6.767
2264	pipe-8901	66.39	J-669	J-449	200	100	7	12.88	0.41	1.69
2265	pipe-8620	66.79	J-1311	J-1312	200	100	7	-1.82	0.06	0.045
2268	pipe-5420	69.41	J-1313	J-1314	125	120	1	0.23	0.02	0.007
2271	pipe-11423	70.27	J-1315	J-1111	150	100	7	-0.35	0.02	0.008
2273	pipe-23689	66.94	J-1316	J-1317	400	100	7	-4.5	0.04	0.009
2276	pipe-723	67	J-1318	J-237	200	120	1	-1.61	0.05	0.026
2278	pipe-8464	67.6	J-994	J-813	200	120	1	-23.97	0.76	3.812
2279	pipe-9679	67.15	J-1319	J-229	150	100	7	-4.83	0.27	1.116
2281	pipe-8670	67.31	J-1320	J-1321	400	100	7	253.04	2.01	14.358
2284	pipe-9680	67.57	J-229	J-50	150	100	7	-5.21	0.29	1.284
2285	pipe-24169	67.5	J-1146	J-1322	200	120	1	0.9	0.03	0.009
2287	pipe-8162	90.47	J-1323	J-443	200	120	1	20.92	0.67	2.964
2289	pipe-9071	67.89	J-1324	J-1325	150	100	7	-5.66	0.32	1.499
2292	pipe-12279	67.91	J-1142	J-1296	200	120	1	18.51	0.59	2.363
2293	pipe-8253	68.42	J-388	J-1220	150	120	1	24.59	1.39	16.235
2294	pipe-19105	68.37	J-1326	J-1327	150	120	1	3.88	0.22	0.53
2297	pipe-10670	68.72	J-802	J-1273	200	120	1	0.74	0.02	0.006
2298	pipe-8865	68.65	J-1328	J-1329	150	120	1	-4.5	0.25	0.698
2301	pipe-8668	68.58	J-1277	J-1330	200	100	7	-7.72	0.25	0.655
2303	pipe-14166	68.72	J-1160	J-1331	150	100	7	-8.13	0.46	2.931
2305	pipe-7178	68.94	J-1144	J-1332	125	130	8	0.63	0.05	0.038
2310	pipe-8671	69.27	J-1287	J-1320	400	100	7	260.14	2.07	15.113
2311	pipe-8667	69.35	J-1330	J-362	200	100	7	-2.22	0.07	0.065
2312	pipe-8050	69.37	J-424	J-1335	150	100	7	1.83	0.1	0.186
2314	pipe-25085	69.45	J-1336	J-1323	200	120	1	21.73	0.69	3.179
2316	pipe-24197	69.64	J-1337	J-1117	150	120	1	-0.03	0	0
2321	pipe-24547	70.18	J-552	J-1340	150	100	7	-12.76	0.72	6.751
2323	pipe-23096	70.36	J-1341	J-673	200	120	1	-0.35	0.01	0.001
2325	pipe-15838	70.06	J-1249	J-254	150	120	1	-1.8	0.1	0.127
2326	pipe-8556	70.22	J-1292	J-1342	200	120	1	-36.09	1.15	8.136
2328	pipe-2087	70.47	J-1343	J-1344	200	100	7	7.67	0.24	0.647
2331	pipe-13723	70.68	J-716	J-1345	200	100	7	-31	0.99	8.604
2333	pipe-9549	70.65	J-321	J-1261	400	100	7	-46.65	0.37	0.627
2334	pipe-16582	71.92	J-1346	J-1347	400	100	7	86.69	0.69	1.975
2337	pipe-24991	71.03	J-1272	J-93	200	120	1	28.19	0.9	5.149
2338	pipe-18825	90.49	J-766	J-940	200	120	1	12.07	0.38	1.071
2339	pipe-9078	77.59	J-689	J-715	200	100	7	-28.3	0.9	7.269
2340	pipe-13709	71.48	J-1241	J-1348	125	130	8	0.78	0.06	0.056
2342	pipe-8961	72.3	J-1349	J-626	200	120	1	9	0.29	0.621
2344	pipe-23657	71.84	J-1350	J-1351	300	100	7	-31.44	0.44	1.225
2347	pipe-8868	71.69	J-1352	J-1353	300	100	7	-38.03	0.54	1.744
2350	pipe-23643	73.19	J-1185	J-1354	150	100	7	-9.56	0.54	3.953
2352	pipe-18590	72.03	J-1355	J-263	400	100	7	-21.42	0.17	0.149
2354	pipe-9657	72.12	J-407	J-1172	200	100	7	21.49	0.68	4.365
2355	pipe-23535	72.17	J-1106	J-933	400	100	7	34.55	0.27	0.36
2356	pipe-8105	107.29	J-1356	J-1135	200	100	7	87.73	2.79	59.079
2360	pipe-9422	72.72	J-1230	J-1358	400	100	7	46.94	0.37	0.633
2362	pipe-18800	72.83	J-941	J-1326	150	120	1	4.68	0.26	0.753
2363	pipe-8145	73.13	J-1359	J-1318	200	120	1	-0.8	0.03	0.007
2365	pipe-16027	73.15	J-375	J-848	150	100	7	2.41	0.14	0.309
2366	pipe-9421	73.6	J-197	J-1229	400	100	7	48.55	0.39	0.675
2367	pipe-8094	73.66	J-860	J-781	400	100	7	140.39	1.12	4.823
2368	pipe-8445	73.78	J-1035	J-1079	200	100	7	43.61	1.39	16.191
2369	pipe-7202	73.96	J-1360	J-1361	125	130	8	5.01	0.41	1.786
2372	pipe-22916	74.01	J-1362	J-974	200	100	7	9	0.29	0.871
2374	pipe-24139	94.83	J-1031	J-410	200	100	7	3.93	0.13	0.188
2375	pipe-8462	74.47	J-684	J-1363	200	120	1	-5.63	0.18	0.261
2377	pipe-12920	74.82	J-479	J-1364	150	120	1	-31.64	1.79	25.881
2379	pipe-8512	74.69	J-1365	J-1366	150	100	7	-4.19	0.24	0.858
2382	pipe-16906	75.21	J-645	J-867	150	120	1	1.76	0.1	0.123
2383	pipe-8140	75.46	J-256	J-1367	200	120	1	0.8	0.03	0.007

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
2385	pipe-2083	76.9	J-1116	J-1343	200	100	7	8.47	0.27	0.779
2386	pipe-2851	76.14	J-1368	J-380	150	120	1	9.96	0.56	3.045

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
2391	pipe-23735	76.39	J-1371	J-1372	200	100	7	10.79	0.34	1.22
2394	pipe-24925	89.14	J-1265	J-1373	150	120	1	26.42	1.49	18.534
2396	pipe-12719	76.78	J-441	J-786	200	120	1	83.71	2.66	38.639
2397	pipe-9977	77.23	J-1158	J-125	150	100	7	-3.37	0.19	0.573
2398	pipe-7774	78.21	J-116	J-1374	200	120	1	10.39	0.33	0.811
2400	pipe-24150	78.35	J-1201	J-1375	200	100	7	0.9	0.03	0.012
2402	pipe-7565	80.6	J-1174	J-1376	150	120	1	0.9	0.05	0.035
2407	pipe-3353	78.91	J-1247	J-1222	125	120	1	1.88	0.15	0.336
2408	pipe-15881	79.18	J-910	J-46	200	100	7	2.7	0.09	0.094
2409	pipe-22793	79.23	J-1379	J-1380	200	100	7	6.3	0.2	0.45
2412	pipe-10664	79.54	J-1381	J-719	200	120	1	0.99	0.03	0.01
2414	pipe-183	79.86	J-1382	J-1383	125	130	8	0.31	0.03	0.01
2420	pipe-14022	80.67	J-1386	J-1234	150	100	7	-0.9	0.05	0.05
2422	pipe-10663	112.02	J-547	J-1381	200	120	1	1.05	0.03	0.012
2423	pipe-15421	81.77	J-1387	J-1388	200	100	7	-32.5	1.03	9.392
2426	pipe-12918	81.88	J-1389	J-1390	400	100	7	147.93	1.18	5.313
2429	pipe-17037	82.37	J-1039	J-110	300	100	7	-33.86	0.48	1.406
2430	pipe-15866	190.39	J-1391	J-1062	150	100	7	16	0.91	10.259
2432	pipe-713	83.57	J-1392	J-1393	125	130	8	9.28	0.76	5.601
2435	pipe-6234	83.83	J-1181	J-1059	150	100	7	2.84	0.16	0.418
2436	pipe-7506	83.79	J-1394	J-1395	150	100	9	1.57	0.09	0.139
2439	pipe-24998	83.9	J-1396	J-1022	200	120	1	31.79	1.01	6.431
2441	pipe-196	83.95	J-1397	J-1398	125	120	1	3.81	0.31	1.25
2444	pipe-1203	84.09	J-380	J-1167	150	120	1	9.65	0.55	2.87
2445	pipe-9562	120.56	J-487	J-1399	150	120	1	0.59	0.03	0.017
2447	pipe-2464	84.62	J-188	J-1400	200	120	1	16.1	0.51	1.823
2449	pipe-9198	84.68	J-803	J-1194	300	120	1	-2.29	0.03	0.007
2450	pipe-11424	84.99	J-1111	J-460	150	100	7	-6.99	0.4	2.213
2451	pipe-11763	85.67	J-1401	J-1402	125	120	1	1.24	0.1	0.155
2454	pipe-12634	85.49	J-1363	J-1403	200	120	1	-8.85	0.28	0.602
2456	pipe-9639	85.64	J-1168	J-1308	200	100	7	-7.05	0.22	0.554
2457	pipe-8139	87.69	J-649	J-1404	150	100	7	-5.53	0.31	1.437
2459	pipe-9993	85.88	J-1004	J-394	200	100	7	-6.03	0.19	0.415
2461	pipe-8854	86.14	J-1405	J-423	150	100	7	-3.67	0.21	0.67
2463	pipe-9420	86.23	J-247	J-197	400	100	7	111.52	0.89	3.149
2464	pipe-14953	86.55	J-282	J-1346	400	100	7	87.49	0.7	2.008
2465	pipe-10238	86.55	J-653	J-1406	150	100	7	0.8	0.05	0.041
2467	pipe-8159	113.16	J-941	J-586	150	120	1	5.78	0.33	1.111
2470	pipe-23842	86.82	J-51	J-1408	150	100	7	-5.86	0.33	1.597
2472	pipe-8154	87.65	J-496	J-364	200	100	7	-50.1	1.59	20.929
2473	pipe-17516	95.84	J-1250	J-1409	150	120	1	6.24	0.35	1.279
2475	pipe-7013	117.71	J-1410	J-24	125	120	1	-2.51	0.2	0.575
2477	pipe-10672	88.07	J-1274	J-1411	200	120	1	0.61	0.02	0.004
2479	pipe-15775	88.55	J-1412	J-330	150	120	1	21	1.19	12.113
2481	pipe-2776	88.45	J-1304	J-1368	150	120	1	10.27	0.58	3.224
2482	pipe-15744	88.55	J-520	J-1270	200	100	7	5.63	0.18	0.366
2483	pipe-7956	89.05	J-998	J-713	400	100	7	1.49	0.01	0.002
2484	pipe-9570	88.89	J-100	J-603	300	100	7	11.07	0.16	0.177
2487	pipe-2194	89.6	J-1099	J-1414	125	130	8	4.64	0.38	1.552
2489	pipe-1581	90.04	J-1415	J-1416	150	120	1	-7.51	0.43	1.806
2492	pipe-2677	90.12	J-1398	J-1417	125	120	1	0.99	0.08	0.103
2497	pipe-20482	90.46	J-1419	J-385	150	100	7	-0.8	0.05	0.04
2499	pipe-24136	90.72	J-898	J-155	300	100	7	162.45	2.3	25.659
2500	pipe-8570	90.84	J-757	J-504	150	120	1	10.73	0.61	3.496
2501	pipe-8531	90.92	J-1420	J-338	200	100	7	1.61	0.05	0.036
2503	pipe-6834	91.32	J-1332	J-1421	125	130	8	0.31	0.03	0.011
2508	pipe-3068	100.19	J-1424	J-480	200	120	1	-0.31	0.01	0.001
2510	pipe-8032	92.77	J-1164	J-158	200	120	1	8.96	0.29	0.617
2514	pipe-9669	100.06	J-1205	J-1427	150	120	1	30.38	1.72	24.014
2516	pipe-22333	93.05	J-396	J-1371	200	100	7	11.69	0.37	1.415
2517	pipe-9568	93.1	J-371	J-1428	300	100	7	-6.43	0.09	0.065
2521	pipe-5645	94.49	J-1430	J-969	125	130	8	-3.54	0.29	0.938
2523	pipe-4217	99.86	J-1402	J-837	125	120	1	0.92	0.08	0.09
2524	pipe-19826	94.25	J-1431	J-1432	150	100	7	0.9	0.05	0.05
2527	pipe-10198	94.33	J-807	J-1240	200	100	7	-3.62	0.12	0.161
2528	pipe-24142	94.52	J-162	J-1069	400	120	1	-13.49	0.11	0.045
2529	pipe-23385	125.79	J-1002	J-1427	200	120	1	-29.48	0.94	5.594
2530	pipe-8163	95.5	J-71	J-926	400	100	7	-54.45	0.43	0.835
2531	pipe-8967	95.56	J-1433	J-1434	350	100	7	21.4	0.22	0.284
2534	pipe-9032	95.83	J-1276	J-1152	400	120	1	-3.6	0.03	0.004
2535	pipe-21363	95.94	J-81	J-1435	300	100	7	30.94	0.44	1.189
2537	pipe-8815	96.13	J-158	J-1337	150	120	1	0.87	0.05	0.033
2538	pipe-2183	96.22	J-1436	J-1437	125	100	7	-2.44	0.2	0.766
2541	pipe-23377	130.95	J-1266	J-1057	150	120	0	16.77	0.95	7.985
2542	pipe-24194	118.55	J-130	J-1438	250	120	1	15.48	0.32	0.572
2544	pipe-23829	96.96	J-1253	J-1100	150	100	7	-8.06	0.46	2.88
2546	pipe-8511	112.8	J-1439	J-663	300	100	7	20.85	0.29	0.573
2550	pipe-5608	97.74	J-1348	J-952	125	130	8	0.46	0.04	0.022
2551	pipe-8896	97.81	J-1085	J-1441	150	100	7	21.23	1.2	17.336
2553	pipe-2160	98.58	J-429	J-1442	150	100	7	-10.71	0.61	4.878
2555	pipe-8398	98.4	J-1178	J-1443	300	100	7	7.05	0.1	0.076
2557	pipe-8887	98.52	J-225	J-7	400	100	7	-111.76	0.89	3.161
2561	pipe-15820	109.65	J-1200	J-1166	150	100	7	-1.13	0.06	0.077
2562	pipe-9501	99.39	J-1446	J-1447	150	120	1	0.8	0.05	0.029
2565	pipe-17137	99.54	J-1351	J-1038	300	100	7	-32.25	0.46	1.284
2568	pipe-15824	100.63	J-159	J-465	200	120	1	6.3	0.2	0.321
2569	pipe-8513	101.29	J-1366	J-1449	150	100	7	-5.68	0.32	1.508
2571	pipe-22315	100.89	J-1450	J-1203	150	100	7	4.19	0.24	0.858
2573	pipe-8161	101.33	J-1451	J-1336	200	120	1	22.53	0.72	3.4
2575	pipe-15784	101.92	J-980	J-1396	200	120	1	38.09	1.21	8.988
2576	pipe-8189	102.11	J-746	J-1452	700	120	1	-513.14	1.33	2.485
2578	pipe-2001	102.13	J-1453	J-1454	200	100	7	7.79	0.25	0.667
2581	pipe-7983	103.71	J-1455	J-685	200	120	1	3	0.1	0.081
2583	pipe-15415	102.95	J-621	J-215	200	100	7	27.67	0.88	6.973
2584	pipe-8861	102.47	J-413	J-1456	400	120	1	-1.49	0.01	0.001
2586	pipe-24087	102.44	J-956	J-1162	150	100	7	-4.2	0.24	0.862
2587	pipe-23527	103.83	J-1457	J-1458	400	100	7	33.69	0.27	0.343
2590	pipe-18484	102.46	J-1409	J-816	150	120	1	5.43	0.31	0.99
2591	pipe-24196	102.54	J-1459	J-386	150	120	1	-2.73	0.15	0.277
2593	pipe-8118	112.37	J-449	J-425	200	100	7	1.61	0.05	0.036

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2594	pipe-23646	104.45	J-1460	J-1461	200	120	1	-60.56	1.93	21.216
2598	pipe-20754	103.39	J-1462	J-249	150	100	7	-1.76	0.1	0.172

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2600	pipe-7500	103.57	J-1463	J-1394	150	100	9	1.88	0.11	0.194
2602	pipe-23625	104.1	J-1464	J-1288	150	100	7	1.61	0.09	0.146
2606	pipe-20094	123.29	J-1150	J-1391	150	100	7	16.8	0.95	11.236
2607	pipe-2681	105.73	J-620	J-1466	150	100	9	0.63	0.04	0.025
2609	pipe-9423	105.02	J-1358	J-1467	400	100	7	41.8	0.33	0.512
2611	pipe-22604	105.21	J-1468	J-1469	150	100	7	4.17	0.24	0.852
2614	pipe-17876	106.32	J-1470	J-662	150	100	7	-16.38	0.93	10.721
2616	pipe-15885	123.98	J-411	J-83	150	100	7	-3.26	0.18	0.541
2617	pipe-17659	106.78	J-657	J-1471	300	100	7	25.32	0.36	0.82
2619	pipe-9572	106.37	J-1435	J-768	300	100	7	30.13	0.43	1.133
2620	pipe-23022	106.75	J-1472	J-1088	200	100	7	-2.15	0.07	0.061
2622	pipe-5217	113.08	J-1058	J-1401	125	120	1	1.55	0.13	0.236
2623	pipe-12641	107.14	J-1473	J-1363	200	120	1	-2.41	0.08	0.054
2625	pipe-8653	107.35	J-1131	J-918	150	120	1	17.84	1.01	8.956
2626	pipe-22320	108.71	J-1474	J-1475	150	100	7	5.99	0.34	1.662
2629	pipe-630	108.06	J-1476	J-601	200	100	7	60.43	1.92	29.619
2631	pipe-24664	108.46	J-1477	J-1478	150	100	7	1.8	0.1	0.179
2634	pipe-1369	108.96	J-1479	J-1480	150	120	1	-1.8	0.1	0.128
2637	pipe-20118	109.96	J-1481	J-656	300	100	7	28.29	0.4	1.008
2639	pipe-12680	109.66	J-243	J-1482	200	100	7	-67.32	2.14	36.175
2643	pipe-9069	110.17	J-1484	J-855	150	100	7	-8.64	0.49	3.28
2645	pipe-7999	110.33	J-1485	J-1049	150	100	7	5.63	0.32	1.485
2647	pipe-7996	110.4	J-849	J-1486	150	100	7	0.8	0.05	0.04
2649	pipe-10362	118.18	J-938	J-976	150	100	7	-11.99	0.68	6.014
2650	pipe-4219	111.74	J-1121	J-1487	125	120	1	-0.09	0.01	0.001
2653	pipe-22826	112.16	J-1488	J-83	300	120	1	62.43	0.88	3.114
2655	pipe-3694	117.19	J-825	J-89	150	100	7	-2.81	0.16	0.408
2656	pipe-10673	122.53	J-1411	J-486	200	120	1	0.55	0.02	0.004
2657	pipe-9678	114.33	J-640	J-1319	150	100	7	-4.02	0.23	0.796
2658	pipe-8665	124.52	J-772	J-1453	200	100	7	8.59	0.27	0.799
2659	pipe-16916	113.3	J-1489	J-1446	150	120	1	2.27	0.13	0.196
2661	pipe-4898	115.23	J-1490	J-1487	125	120	1	0.4	0.03	0.019
2663	pipe-24701	118.55	J-1491	J-348	150	100	7	10.2	0.58	4.46
2667	pipe-24526	114.38	J-1493	J-416	150	120	1	-4.59	0.26	0.725
2669	pipe-23592	114.97	J-1494	J-1495	200	120	1	14.49	0.46	1.5
2672	pipe-44	115.21	J-1496	J-177	150	100	7	-0.25	0.01	0.005
2676	pipe-17887	116.25	J-1498	J-1499	150	100	7	3.22	0.18	0.527
2679	pipe-9674	116.63	J-1500	J-1124	200	100	7	-24.61	0.78	5.61
2681	pipe-15841	121.03	J-471	J-255	150	120	1	3.6	0.2	0.462
2682	pipe-9072	152.83	J-1501	J-1324	150	100	7	-4.17	0.24	0.852
2684	pipe-9217	165.73	J-518	J-141	200	100	7	-6.61	0.21	0.491
2686	pipe-4503	116.99	J-1502	J-1503	200	100	7	-14.38	0.46	2.074
2689	pipe-15821	117.06	J-43	J-1254	150	100	7	3.22	0.18	0.527
2690	pipe-1460	117.11	J-17	J-1198	150	120	1	11.21	0.63	3.791
2691	pipe-2137	117.18	J-1504	J-288	600	120	1	261.26	0.92	1.508
2693	pipe-8767	118.05	J-1505	J-80	300	100	7	39.39	0.56	1.861
2695	pipe-23745	120.82	J-482	J-1020	150	100	7	-15.46	0.87	9.631
2696	pipe-19945	119.56	J-1063	J-1013	150	100	7	14.39	0.81	8.43
2700	pipe-9506	118.55	J-257	J-107	150	120	1	6.18	0.35	1.256
2701	pipe-15345	118.71	J-216	J-1188	200	100	7	26.06	0.83	6.24
2702	pipe-12268	118.58	J-1508	J-1451	200	120	1	-21.62	0.69	3.15
2704	pipe-15864	118.83	J-1354	J-616	150	100	7	-10.36	0.59	4.591
2705	pipe-12997	118.72	J-1509	J-179	300	100	7	57.31	0.81	3.725
2707	pipe-24434	119.76	J-1510	J-788	200	100	7	0.88	0.03	0.012
2709	pipe-13714	136.44	J-1511	J-810	200	120	1	19.1	0.61	2.503
2711	pipe-15425	120.03	J-370	J-1512	200	100	7	-30.89	0.98	8.549
2713	pipe-9470	120.24	J-1513	J-1514	150	120	1	15	0.85	6.494
2716	pipe-8761	119.98	J-1331	J-1297	150	100	7	-8.94	0.51	3.491
2717	pipe-10668	148.85	J-720	J-801	200	120	1	0.86	0.03	0.008
2718	pipe-6928	128.58	J-1515	J-1516	125	120	1	-0.51	0.04	0.03
2721	pipe-8918	128.73	J-1517	J-1456	200	120	1	-15.84	0.5	1.771
2723	pipe-13332	124.54	J-462	J-1460	200	120	1	-59.75	1.9	20.696
2724	pipe-21392	122.55	J-1518	J-1519	400	100	7	47.35	0.38	0.644
2727	pipe-8401	133.48	J-1520	J-133	150	120	1	26.83	1.52	19.079
2729	pipe-10660	122.74	J-745	J-511	150	120	1	-0.5	0.03	0.012
2730	pipe-9038	123.07	J-800	J-1521	400	120	1	-9	0.07	0.021
2732	pipe-20666	124	J-1522	J-1523	300	100	7	64	0.91	4.571
2735	pipe-23560	167.98	J-658	J-1524	400	100	7	409.35	3.26	34.995
2739	pipe-11341	123.94	J-1526	J-1244	200	100	7	-14.43	0.46	2.086
2741	pipe-17528	124.11	J-819	J-540	200	100	7	-7.48	0.24	0.619
2742	pipe-8825	124.74	J-1527	J-1528	150	100	7	2.7	0.15	0.382
2745	pipe-4501	124.71	J-923	J-1529	200	100	7	-12.83	0.41	1.68
2747	pipe-6204	125.58	J-755	J-613	150	100	7	-3.77	0.21	0.705
2748	pipe-683	125.45	J-1102	J-1392	125	130	8	10.06	0.82	6.496
2749	pipe-8962	126.62	J-302	J-1349	200	120	1	9.9	0.31	0.74
2750	pipe-4381	126.5	J-863	J-1053	200	100	7	-8.96	0.29	0.864
2751	pipe-1651	126.41	J-1417	J-1530	125	120	1	0.68	0.06	0.052
2755	pipe-8565	127.04	J-1521	J-230	400	120	1	-9.9	0.08	0.025
2756	pipe-17336	127.16	J-1260	J-879	400	100	7	-50.21	0.4	0.718
2759	pipe-6882	162.59	J-1516	J-1533	125	120	1	0.13	0.01	0.002
2761	pipe-8902	128.64	J-450	J-1306	200	100	7	9.66	0.31	0.992
2762	pipe-19656	132.25	J-1534	J-184	150	100	7	13.4	0.76	7.393
2764	pipe-6229	128.26	J-1454	J-780	200	100	7	6.98	0.22	0.544
2765	pipe-8873	128.37	J-49	J-132	400	120	1	52.67	0.42	0.56
2766	pipe-8261	129.19	J-1372	J-1362	200	100	7	9.9	0.31	1.038
2767	pipe-8654	129.23	J-34	J-321	400	100	7	-48.69	0.39	0.679
2768	pipe-9216	150.02	J-141	J-1535	200	100	7	-9.3	0.3	0.926
2770	pipe-7219	131.16	J-1361	J-622	125	130	8	2.78	0.23	0.601
2771	pipe-8966	133.91	J-1434	J-301	350	100	7	20.5	0.21	0.262
2772	pipe-23691	131.13	J-1536	J-566	400	100	7	-1.8	0.01	0.001
2774	pipe-15298	131.7	J-1499	J-1464	150	100	7	2.41	0.14	0.31
2775	pipe-9456	130.14	J-605	J-1537	200	120	1	0.8	0.03	0.007
2777	pipe-23754	130.34	J-1538	J-1539	200	100	7	40.19	1.28	13.917
2780	pipe-11954	130.44	J-1540	J-1141	150	100	7	-8.77	0.5	3.371
2782	pipe-5648	247.23	J-1541	J-952	125	130	8	0.44	0.04	0.02
2784	pipe-20213	131.54	J-1542	J-1468	150	100	7	5.66	0.32	1.5
2786	pipe-8595	131.21	J-741	J-1485	150	100	7	20.23	1.14	15.851
2787	pipe-10516	131.47	J-1543	J-1544	400	100	7	487.67	3.88	48.397
2790	pipe-8148	131.45	J-122	J-1250	150	120	1	-2.41	0.14	0.221
2791	pipe-194	133.93	J-1545	J-703	125	120	1	-3.48	0.28	1.053

Existing Model Pipe Information AVERAGE DEMAND

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2793	pipe-8778	173.11	J-39	J-219	150	100	7	-10.79	0.61	4.949
2794	pipe-7935	153.33	J-988	J-1365	150	100	7	-2.7	0.15	0.38

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
2795	pipe-9682	133.41	J-1408	J-1077	150	100	7	-6.66	0.38	2.026
2796	pipe-9497	137.31	J-1495	J-765	200	120	1	13.68	0.44	1.349
2797	pipe-19821	134.03	J-901	J-1546	200	100	7	14.16	0.45	2.015
2802	pipe-8944	134.25	J-821	J-402	150	120	1	3.6	0.2	0.462
2805	pipe-7501	135.07	J-1395	J-792	150	100	9	1.25	0.07	0.092
2806	pipe-8192	142	J-149	J-1526	200	100	7	-13.62	0.43	1.876
2807	pipe-8158	135.39	J-347	J-148	200	120	1	60.13	1.91	20.941
2808	pipe-4384	136.25	J-1550	J-1479	150	120	1	-0.9	0.05	0.035
2810	pipe-21606	136.31	J-1551	J-843	400	100	7	251.43	2	14.189
2812	pipe-6241	145.94	J-1552	J-1547	300	100	7	2.98	0.04	0.016
2814	pipe-2143	136.71	J-1553	J-533	600	120	1	261.26	0.92	1.508
2816	pipe-9022	136.79	J-1045	J-726	200	100	7	-18.31	0.58	3.246
2817	pipe-8473	139.57	J-327	J-1554	200	100	7	-70.54	2.25	39.443
2819	pipe-1193	154.4	J-260	J-1555	150	120	1	6.29	0.36	1.301
2821	pipe-11955	137.46	J-1279	J-1540	150	100	7	-7.96	0.45	2.819
2822	pipe-8480	145.21	J-943	J-383	200	120	1	-4.83	0.15	0.196
2823	pipe-8814	150.31	J-185	J-474	200	120	1	-7.91	0.25	0.489
2824	pipe-24184	180.08	J-1556	J-1557	200	100	7	-15.09	0.48	2.268
2827	pipe-8946	139.29	J-1236	J-820	150	120	1	5.4	0.31	0.979
2828	pipe-8307	140.4	J-1558	J-1559	200	100	7	46.1	1.47	17.946
2831	pipe-4502	139.14	J-1529	J-1502	200	100	7	-13.61	0.43	1.872
2832	pipe-23388	156.77	J-567	J-1560	150	100	7	-0.9	0.05	0.049
2834	pipe-14390	140.35	J-1430	J-1215	125	130	8	3.23	0.26	0.79
2835	pipe-24516	141.01	J-1340	J-481	150	100	7	-13.66	0.77	7.659
2836	pipe-8366	140.15	J-1561	J-457	600	100	7	6.42	0.02	0.002
2838	pipe-2139	140.14	J-1151	J-1562	200	120	1	0	0	0
2840	pipe-24862	166.44	J-1467	J-1563	400	100	7	41	0.33	0.494
2842	pipe-3421	141.05	J-1533	J-27	125	120	1	-0.19	0.02	0.005
2843	pipe-22726	141.45	J-1564	J-1565	125	100	7	0.9	0.07	0.12
2846	pipe-12245	141.42	J-1566	J-1567	400	100	7	215.82	1.72	10.694
2849	pipe-20669	141.99	J-1568	J-1569	300	100	7	65.8	0.93	4.811
2852	pipe-19477	141.77	J-678	J-293	300	100	7	8.1	0.11	0.1
2853	pipe-22318	143.09	J-1475	J-1450	150	100	7	5.09	0.29	1.229
2854	pipe-19261	183.82	J-1310	J-615	150	100	7	11.97	0.68	5.999
2855	pipe-8592	151.19	J-261	J-700	200	100	7	-34.6	1.1	10.545
2856	pipe-15827	148.47	J-1118	J-1459	150	120	1	-1.83	0.1	0.132
2857	pipe-9510	144.22	J-57	J-1300	600	120	1	-253.95	0.9	1.431
2858	pipe-7190	145.18	J-113	J-1143	125	130	8	1.25	0.1	0.137
2859	pipe-6556	144.83	J-733	J-1541	125	130	8	0.75	0.06	0.053
2860	pipe-10862	185.38	J-1018	J-1370	200	100	7	-53.34	1.7	23.505
2861	pipe-9452	145.45	J-1570	J-1571	150	100	7	2.98	0.17	0.456
2864	pipe-24122	145.09	J-1480	J-711	150	120	1	-2.7	0.15	0.271
2865	pipe-9090	145.12	J-45	J-319	150	100	7	-13.12	0.74	7.108
2866	pipe-21119	145.56	J-612	J-1218	150	100	7	-2.1	0.12	0.239
2867	pipe-8205	146.37	J-1572	J-517	200	100	7	-4.81	0.15	0.273
2869	pipe-7864	146.1	J-433	J-58	200	120	1	9.45	0.3	0.68
2870	pipe-9487	169.91	J-1180	J-1420	200	100	7	2.41	0.08	0.076
2871	pipe-8804	227.81	J-1573	J-502	300	120	1	-0.06	0	0
2873	pipe-13614	178.91	J-1309	J-451	200	100	7	-8.66	0.28	0.811
2874	pipe-8563	146.71	J-828	J-1275	400	120	1	-1.8	0.01	0.001
2875	pipe-8636	163.97	J-1574	J-637	200	120	1	-0.9	0.03	0.009
2877	pipe-9419	151.29	J-1390	J-777	400	100	7	147.13	1.17	5.26
2878	pipe-9242	147.53	J-1278	J-1575	150	120	1	-32.71	1.85	27.538
2880	pipe-24145	147.95	J-1576	J-261	200	100	7	-32.8	1.04	9.552
2882	pipe-8898	154.7	J-852	J-221	150	100	7	18.82	1.07	13.864
2883	pipe-9676	154.27	J-1083	J-390	150	100	7	-1.21	0.07	0.086
2884	pipe-8479	148.63	J-891	J-632	200	120	1	-7.24	0.23	0.416
2885	pipe-9215	160.96	J-1535	J-287	200	100	7	-10.2	0.32	1.099
2886	pipe-8054	158.74	J-1335	J-1577	250	100	7	0.92	0.02	0.004
2888	pipe-7582	155.27	J-1281	J-1578	200	100	7	41.46	1.32	14.743
2890	pipe-9469	150.2	J-281	J-1513	150	120	1	15.8	0.89	7.155
2891	pipe-9091	150.31	J-319	J-1496	150	100	7	0.55	0.03	0.02
2892	pipe-15993	150.39	J-1086	J-1579	150	100	7	1.61	0.09	0.146
2894	pipe-19740	151.06	J-1580	J-1439	300	100	7	22.34	0.32	0.651
2896	pipe-4885	151.35	J-1581	J-1490	125	120	1	0.71	0.06	0.056
2898	pipe-8897	152.39	J-1441	J-851	150	100	7	20.43	1.16	16.14
2899	pipe-22602	200.08	J-1469	J-1582	150	100	7	2.69	0.15	0.376
2901	pipe-9035	153.13	J-1153	J-143	400	120	1	-6.3	0.05	0.011
2902	pipe-8321	152.68	J-1583	J-1584	600	100	7	-434.99	1.54	5.434
2905	pipe-12452	177.08	J-1400	J-1494	200	120	1	15.29	0.49	1.658
2906	pipe-9502	153.18	J-832	J-1585	150	120	1	0.8	0.05	0.029
2908	pipe-4504	153.21	J-1503	J-1586	200	100	7	-15.15	0.48	2.286
2910	pipe-8779	153.63	J-1587	J-1263	150	100	7	-0.8	0.05	0.041
2912	pipe-9668	154.17	J-1588	J-1205	150	120	1	32.18	1.82	26.714
2914	pipe-1454	216.06	J-16	J-1195	125	120	1	-21.6	1.76	31.028
2915	pipe-24439	155.13	J-1589	J-1590	200	100	7	0.9	0.03	0.012
2918	pipe-25081	155.43	J-710	J-1591	150	120	1	3.22	0.18	0.376
2920	pipe-19538	155.29	J-358	J-762	150	100	7	5.4	0.31	1.371
2921	pipe-4554	239.18	J-204	J-1581	125	120	1	1.57	0.13	0.241
2922	pipe-23351	155.87	J-1592	J-499	150	100	7	1.61	0.09	0.146
2924	pipe-24103	157.92	J-1593	J-1129	200	120	1	-1.8	0.06	0.032
2926	pipe-4378	158.54	J-1594	J-1595	200	100	7	-5.87	0.19	0.394
2929	pipe-15776	263.16	J-1596	J-1412	150	120	1	21.9	1.24	13.091
2931	pipe-8634	159.28	J-1597	J-1589	200	100	7	1.8	0.06	0.044
2933	pipe-9192	170.59	J-1598	J-752	300	100	7	28.81	0.41	1.042
2935	pipe-7083	160.96	J-291	J-1360	125	130	8	5.32	0.43	1.998
2936	pipe-24195	163.84	J-1438	J-1599	250	120	1	14.58	0.3	0.512
2938	pipe-14491	167.86	J-1364	J-893	150	120	1	-32.54	1.84	27.261
2939	pipe-8975	161.96	J-596	J-1600	150	100	7	0.9	0.05	0.05
2941	pipe-8891	162	J-775	J-389	300	100	7	51.71	0.73	3.08
2942	pipe-8758	162.34	J-1388	J-33	150	100	7	-33.31	1.88	39.903
2943	pipe-53	169.73	J-95	J-779	200	100	7	3.9	0.12	0.185
2944	pipe-7248	162.39	J-1601	J-1602	150	100	9	0.94	0.05	0.054
2947	pipe-10331	163.66	J-1603	J-1132	150	100	7	-1.61	0.09	0.146
2949	pipe-24172	163.57	J-988	J-1604	150	100	7	-0.28	0.02	0.005
2951	pipe-7003	173.08	J-810	J-23	125	120	1	5.03	0.41	2.084
2952	pipe-8266	163.75	J-1605	J-1474	150	100	7	6.89	0.39	2.154
2954	pipe-9500	164.25	J-1327	J-1489	150	120	1	3.07	0.17	0.345
2955	pipe-22553	167.3	Awajan High Square	J-1606	200	120	1	7.45	0.24	0.437
2957	pipe-2945	165.53	J-28	J-109	125	120	1	-1.24	0.1	0.157

Existing Model Pipe Information AVERAGE DEMAND

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2958	pipe-2162	165.54	J-1607	J-1608	600	120	1	0.77	0	0
2961	pipe-23996	170.87	J-1182	J-1609	150	100	7	-9.16	0.52	3.655

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2963	pipe-9538	168.11	J-455	J-1610	250	120	1	-24.04	0.49	1.293
2965	pipe-17412	170.73	J-366	J-1570	150	100	7	4.47	0.25	0.966
2966	pipe-8773	171.35	J-1442	J-44	150	100	7	-11.51	0.65	5.578
2967	pipe-7359	172.32	J-170	J-1291	150	100	9	7.47	0.42	2.505
2968	pipe-9471	172.56	J-1514	J-573	150	120	1	14.19	0.8	5.864
2969	pipe-2152	172.7	J-1553	J-1611	150	120	1	0	0	0
2971	pipe-22359	173.66	J-1612	J-1613	125	130	8	1.25	0.1	0.137
2974	pipe-3574	174.58	J-1516	J-1256	125	120	1	-0.95	0.08	0.095
2975	pipe-24525	173.6	J-1493	J-757	150	120	1	13.43	0.76	5.297
2976	pipe-9235	178.09	J-1157	J-1212	600	100	7	4.5	0.02	0.001
2977	pipe-8128	173.85	J-304	J-742	400	100	7	-334.92	2.67	24.131
2978	pipe-8832	175.98	J-1161	J-87	150	100	7	8.53	0.48	3.199
2979	pipe-12179	176.3	J-1554	J-392	200	120	1	-71.34	2.27	28.738
2980	pipe-8942	177.79	J-403	J-434	150	120	1	1.8	0.1	0.128
2981	pipe-8303	177.45	J-1559	J-1614	200	100	7	45.33	1.44	17.392
2983	pipe-5643	177.06	J-706	J-969	125	130	8	0.37	0.03	0.014
2984	pipe-24215	181.9	J-822	J-630	150	100	7	1.8	0.1	0.179
2985	pipe-7253	177.47	J-152	J-1615	200	120	1	6.93	0.22	0.383
2987	pipe-14485	177.57	J-1520	J-12	150	120	1	-27.61	1.56	20.121
2988	pipe-22570	179.39	J-1582	J-1284	150	100	7	1.2	0.07	0.084
2989	pipe-8827	178.89	J-1616	J-1617	150	100	7	-0.89	0.05	0.049
2992	pipe-12925	179.26	J-1618	J-290	200	100	7	8.69	0.28	0.816
2994	pipe-4130	178.54	J-1586	J-1619	200	100	7	-15.93	0.51	2.507
2996	pipe-9604	178.6	J-817	J-244	150	120	1	-5.45	0.31	0.997
2997	pipe-15863	178.86	J-1404	J-1228	150	100	7	-6.34	0.36	1.848
2998	pipe-8427	180.1	J-1569	J-1522	300	100	7	64.9	0.92	4.691
2999	pipe-8664	183.84	J-525	J-772	200	100	7	11.81	0.38	1.441
3000	pipe-2741	232.93	J-1025	J-964	125	120	1	-22.85	1.86	34.441
3001	pipe-15792	196.04	J-62	J-1405	400	100	7	-2.75	0.02	0.003
3002	pipe-673	181.65	J-1268	J-1620	125	100	7	-3.83	0.31	1.77
3004	pipe-23983	182.55	J-975	J-1379	200	100	7	7.2	0.23	0.576
3005	pipe-9462	188.71	J-238	J-942	200	120	1	-3.22	0.1	0.093
3006	pipe-9241	194.51	J-1575	J-1621	150	120	1	-33.61	1.9	28.957
3008	pipe-21440	183.03	J-588	J-1622	400	120	1	-40.99	0.33	0.352
3010	pipe-8886	183.41	J-1347	J-635	400	100	7	85.88	0.68	1.941
3011	pipe-8047	186.14	J-1623	J-423	250	100	7	8.25	0.17	0.25
3013	pipe-8655	185.36	J-477	J-672	150	120	1	2.41	0.14	0.22
3014	pipe-14488	185.58	J-1233	J-544	150	120	1	-35.23	1.99	31.596
3015	pipe-8312	185.66	J-1023	J-1316	400	100	7	-3.6	0.03	0.005
3016	pipe-640	186.57	J-1624	J-1267	125	100	7	-3.14	0.26	1.22
3018	pipe-8706	190.23	J-324	J-493	150	100	7	50.61	2.86	86.62
3019	pipe-9466	187.42	J-195	J-709	150	120	1	-6.44	0.36	1.357
3020	pipe-8892	187.17	J-389	J-1509	300	100	7	58.11	0.82	3.823
3021	pipe-6184	191.04	J-1625	J-1463	150	100	9	2.19	0.12	0.258
3023	pipe-8837	187.97	J-1285	J-139	400	100	7	379.62	3.02	30.435
3024	pipe-8889	188.36	J-438	J-428	300	100	7	52.7	0.75	3.19
3025	pipe-8760	188.98	J-735	J-871	150	100	7	-7.67	0.43	2.63
3026	pipe-185	286.02	J-436	J-1626	150	120	1	-6.26	0.35	1.288
3028	pipe-192	190.98	J-1397	J-1627	125	120	1	-4.13	0.34	1.446
3030	pipe-9499	250.07	J-1093	J-1446	150	120	1	-0.66	0.04	0.02
3031	pipe-6973	193.22	J-205	J-1410	125	120	1	-2.19	0.18	0.449
3032	pipe-8888	191.55	J-516	J-217	300	100	7	-107.73	1.52	11.992
3033	pipe-9595	203.51	J-248	J-1087	200	100	7	33.19	1.06	9.763
3035	pipe-21238	192.21	J-1628	J-1485	150	100	7	-13.79	0.78	7.797
3037	pipe-671	192.51	J-1437	J-1624	125	100	7	-2.79	0.23	0.981
3038	pipe-8461	195.82	J-847	J-1258	200	120	1	-0.8	0.03	0.007
3039	pipe-8316	196.76	J-1629	J-1457	400	100	7	35.18	0.28	0.372
3041	pipe-9508	192.95	J-420	J-485	200	120	1	9.39	0.3	0.673
3042	pipe-23123	197.17	J-1630	J-1631	125	130	8	3.76	0.31	1.048
3045	pipe-8317	193.77	J-464	J-1157	600	100	7	9.9	0.03	0.005
3046	pipe-8078	194.09	J-410	J-1527	150	100	7	3.6	0.2	0.649
3047	pipe-13331	195.6	J-1461	J-196	200	120	1	-61.36	1.95	21.74
3048	pipe-8826	229.03	J-492	J-1616	150	100	7	0.01	0	0
3049	pipe-25043	199.08	J-1632	J-675	200	120	1	-4.5	0.14	0.172
3051	pipe-9543	195.31	J-104	J-1633	300	100	7	31.27	0.44	1.214
3053	pipe-8000	195.48	J-404	J-1462	150	100	7	-0.95	0.05	0.056
3054	pipe-17519	197.35	J-897	J-314	150	120	1	-7.45	0.42	1.776
3055	pipe-9432	197.76	J-1208	J-678	300	100	7	18.81	0.27	0.473
3056	pipe-9199	197.85	J-337	J-385	150	100	7	12.4	0.7	6.399
3057	pipe-12922	199.49	J-1634	J-1090	400	120	1	-5.38	0.04	0.008
3059	pipe-1426	295.16	J-1635	J-1415	150	120	1	-0.63	0.04	0.018
3061	pipe-9463	203.16	J-1636	J-1637	150	120	1	0.8	0.05	0.029
3064	pipe-3117	223.49	J-1638	J-27	125	120	1	-0.43	0.04	0.022
3066	pipe-8202	205.02	J-1639	J-1556	150	100	7	-4.35	0.25	0.922
3068	pipe-8249	244.22	J-1640	J-1641	200	120	1	-1.8	0.06	0.031
3071	pipe-9613	201.15	J-651	J-1642	300	120	1	-18.47	0.26	0.326
3073	pipe-9619	201.15	J-636	J-318	300	100	7	31.92	0.45	1.26
3077	pipe-10360	202.23	J-739	J-1645	200	120	1	-3.04	0.1	0.084
3079	pipe-9634	202.32	J-452	J-1646	200	100	7	-10.27	0.33	1.112
3082	pipe-7879	219.21	J-1647	J-1648	200	120	1	-12.85	0.41	1.201
3085	pipe-24178	369.08	J-1266	J-279	150	100	7	4.5	0.25	0.979
3089	pipe-16007	207.19	J-1651	J-1071	300	100	7	-8.04	0.11	0.098
3091	pipe-9503	208.81	J-1591	J-831	150	120	1	2.41	0.14	0.221
3095	pipe-24057	217.42	J-1654	J-587	400	120	1	-38.02	0.3	0.306
3097	pipe-8884	209.29	J-193	J-607	400	100	7	36.48	0.29	0.398
3098	pipe-8442	208.07	J-641	J-1655	150	100	7	2.41	0.14	0.309
3101	pipe-15880	232.4	J-1380	J-747	200	100	7	5.4	0.17	0.338
3102	pipe-13713	245.37	J-1656	J-1657	200	120	1	19.72	0.63	2.657
3105	pipe-2387	209.76	J-203	J-172	150	120	1	-0.94	0.05	0.038
3106	pipe-8203	211.65	J-1556	J-1068	150	100	7	9.84	0.56	4.169
3107	pipe-2434	254.46	J-1658	J-1515	125	120	1	-0.2	0.02	0.005
3110	pipe-1803	212.85	J-1545	J-1210	125	120	1	3.16	0.26	0.885
3111	pipe-10675	214.42	J-1659	J-598	200	120	1	1.63	0.05	0.026
3113	pipe-8114	238.56	J-1189	J-1085	150	100	7	24.45	1.38	22.517
3114	pipe-9477	214.97	J-448	J-496	250	100	7	-47.68	0.97	6.441
3115	pipe-8920	299.35	J-1458	J-774	400	100	7	32.21	0.26	0.315
3116	pipe-8619	224.02	J-1312	J-1597	200	100	7	-2.72	0.09	0.095
3117	pipe-8806	215.61	J-1660	J-512	200	120	1	3.45	0.11	0.105
3119	pipe-15898	215.73	J-931	J-1634	400	120	1	-16.19	0.13	0.063
3120	pipe-8443	219.94	J-1237	J-1476	200	100	7	61.23	1.95	30.354

Existing Model Pipe Information AVERAGE DEMAND

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3121	pipe-4572	216.5	J-240	J-446	125	120	1	2.8	0.23	0.706
3122	pipe-6244	231.83	J-1661	J-1536	400	100	7	-0.9	0.01	0.001

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3124	pipe-24211	218.43	J-1662	J-1007	150	100	7	-3.61	0.2	0.653
3126	pipe-12057	228.4	J-1223	J-935	125	120	1	1.25	0.1	0.158
3127	pipe-8395	220.2	J-1663	J-1664	300	100	7	4.08	0.06	0.028
3130	pipe-8098	279.27	J-1665	J-1666	150	100	7	0.8	0.05	0.041
3133	pipe-13947	222.1	J-1615	J-3	200	120	1	6.62	0.21	0.351
3134	pipe-7306	222.87	J-165	J-92	150	100	9	5.75	0.33	1.543
3135	pipe-8971	224.93	J-1599	J-1148	250	120	1	13.68	0.28	0.455
3136	pipe-7249	222.79	J-1667	J-1601	150	100	9	1.25	0.07	0.092
3138	pipe-5116	223.08	J-1657	J-1511	200	120	1	19.41	0.62	2.579
3139	pipe-16	262.15	J-1668	J-1669	400	100	7	1.49	0.01	0.001
3142	pipe-23553	230.18	J-1670	J-1671	400	100	7	-336.52	2.68	24.346
3145	pipe-10357	230.23	J-1672	J-740	150	100	7	5.64	0.32	1.486
3147	pipe-8985	298.12	J-1572	J-69	200	100	7	-12.08	0.38	1.503
3148	pipe-8024	228.24	J-1345	J-1576	200	100	7	-31.9	1.02	9.072
3149	pipe-8187	228.25	J-1673	J-717	600	100	7	-222	0.79	1.564
3151	pipe-6210	228.51	J-1528	J-491	150	100	7	1.8	0.1	0.18
3152	pipe-7307	227.86	J-10	J-152	200	120	1	10.53	0.34	0.831
3153	pipe-8568	234.13	J-325	J-1493	150	120	1	9.74	0.55	2.921
3156	pipe-157	240.65	J-64	J-1382	125	130	8	0.63	0.05	0.038
3157	pipe-23174	234.68	J-1675	J-992	125	130	8	0.63	0.05	0.038
3159	pipe-15799	234.64	J-647	J-1676	250	120	1	12.83	0.26	0.404
3161	pipe-9473	290.61	J-1677	J-1350	300	100	7	-30.64	0.43	1.168
3165	pipe-9184	338.06	J-1679	J-1680	300	100	7	11.52	0.16	0.191
3171	pipe-5194	241.63	J-1581	J-1313	125	120	1	0.54	0.04	0.034
3172	pipe-9063	282.27	J-1683	J-1684	400	100	7	46.19	0.37	0.616
3175	pipe-9632	238.1	J-306	J-1628	150	100	7	-12.99	0.73	6.976
3176	pipe-15830	238.78	J-699	J-427	200	120	1	-6.33	0.2	0.323
3177	pipe-15807	241.99	J-214	J-1592	150	100	7	2.41	0.14	0.309
3178	pipe-9535	290.41	J-1685	J-488	150	100	7	58.06	3.29	111.687
3180	pipe-176	291.85	J-437	J-971	125	130	8	2.25	0.18	0.405
3181	pipe-7789	242.23	J-1648	J-235	200	120	1	-13.16	0.42	1.256
3182	pipe-10236	240.94	J-1169	J-275	200	100	7	-15.04	0.48	2.254
3183	pipe-9612	241.06	J-1642	J-654	300	120	1	-29.39	0.42	0.772
3184	pipe-22492	243.34	J-714	J-1686	300	120	1	65.12	0.92	3.368
3186	pipe-22654	338.16	J-1687	J-1688	300	100	7	0.9	0.01	0.002
3189	pipe-9616	241.96	J-1642	J-878	150	100	7	10.12	0.57	4.394
3190	pipe-9070	244.82	J-1325	J-1484	150	100	7	-7.15	0.4	2.311
3191	pipe-7252	248.27	J-305	J-25	200	120	1	17.21	0.55	2.063
3192	pipe-2310	260.81	J-1689	J-1690	200	100	7	-0.31	0.01	0.002
3195	pipe-8463	252.96	J-1403	J-1048	200	120	1	-9.66	0.31	0.708
3196	pipe-20247	247.36	J-1353	J-103	300	100	7	34.25	0.48	1.436
3199	pipe-24176	372.66	J-755	J-1692	150	120	1	0.9	0.05	0.035
3201	pipe-9577	249.95	J-764	J-1119	200	100	7	11.52	0.37	1.376
3205	pipe-23373	250.63	J-1695	J-280	400	100	7	-0.9	0.01	0.001
3207	pipe-24179	251.07	J-279	J-1696	150	100	7	0.9	0.05	0.05
3209	pipe-9394	266.51	J-1697	J-1566	400	100	7	216.63	1.72	10.768
3211	pipe-5653	273.31	J-1374	J-432	200	120	1	10.08	0.32	0.766
3212	pipe-166	253.74	J-437	J-54	150	100	7	3.39	0.19	0.579
3213	pipe-8089	254	J-1655	J-310	150	100	7	1.61	0.09	0.146
3214	pipe-1496	254.81	J-1555	J-415	150	120	1	5.98	0.34	1.184
3215	pipe-9391	269.06	J-1698	J-1699	400	100	7	160.3	1.28	6.165
3218	pipe-10392	254.28	J-1700	J-80	150	100	7	-6.84	0.39	2.128
3220	pipe-5617	284.27	J-167	J-91	125	130	8	2.66	0.22	0.553
3221	pipe-9193	268.83	J-1571	J-1701	150	100	7	1.49	0.08	0.126
3224	pipe-7944	267.77	J-629	J-1702	200	100	7	-210.87	6.71	299.767
3226	pipe-12029	258.08	J-1314	J-935	125	120	1	-0.08	0.01	0.001
3227	pipe-9614	258.4	J-419	J-1259	400	100	7	-48.6	0.39	0.676
3228	pipe-8969	259.24	J-597	J-1703	350	100	7	23.2	0.24	0.329
3230	pipe-13581	260.23	J-363	J-514	200	100	7	2.41	0.08	0.076
3231	pipe-3423	262.2	J-1638	J-1658	125	120	1	0.12	0.01	0.002
3232	pipe-11819	260.87	J-1704	J-1705	150	100	7	7.82	0.44	2.726
3235	pipe-7921	268.12	J-1512	J-1387	200	100	7	-31.7	1.01	8.966
3236	pipe-3683	368.65	J-53	J-1706	150	120	1	0.9	0.05	0.035
3238	pipe-13871	263.63	J-292	J-210	150	100	9	0.94	0.05	0.054
3239	pipe-10391	263.91	J-164	J-1700	150	100	7	-6.04	0.34	1.688
3240	pipe-7945	415.45	J-898	J-629	300	100	7	-209.97	2.97	41.267
3241	pipe-10358	268.38	J-1079	J-1672	150	100	7	6.44	0.36	1.903
3242	pipe-22309	339.79	J-1609	J-1707	150	100	7	-10.06	0.57	4.348
3244	pipe-9513	285.09	J-913	J-1101	150	100	7	12.21	0.69	6.218
3246	pipe-5613	306.24	J-120	J-1214	125	130	8	-2.6	0.21	0.53
3247	pipe-15891	269.38	J-843	J-1518	400	100	7	48.15	0.38	0.665
3248	pipe-8617	271.54	J-1708	J-1709	150	100	7	-0.9	0.05	0.05
3251	pipe-8984	271.55	J-70	J-1710	200	100	7	-24.98	0.8	5.771
3253	pipe-8429	330.73	J-1301	J-1687	300	100	7	1.8	0.03	0.006
3254	pipe-5635	271.51	J-373	J-1084	125	130	8	4.74	0.39	1.611
3255	pipe-9488	272.19	J-1344	J-1180	200	100	7	6.86	0.22	0.527
3256	pipe-18025	272.25	J-1283	J-271	200	100	7	3.22	0.1	0.13
3257	pipe-24617	272.69	J-1711	J-1712	150	100	7	-0.9	0.05	0.05
3262	pipe-4179	320.65	J-24	J-837	125	120	1	1.89	0.15	0.341
3265	pipe-12671	274.47	J-1715	J-326	200	100	7	-68.93	2.19	37.792
3267	pipe-23695	274.69	J-1217	J-1716	150	100	7	-4.86	0.27	1.128
3269	pipe-5121	276.32	J-73	J-705	125	130	8	0.99	0.08	0.089
3270	pipe-2199	276.64	J-1717	J-1436	125	100	7	-2.09	0.17	0.576
3272	pipe-14486	358.37	J-545	J-1170	150	120	1	-25.6	1.45	17.489
3275	pipe-8878	287.27	J-68	J-1055	400	100	7	9.84	0.08	0.035
3276	pipe-9567	278.83	J-1428	J-1651	300	100	7	-7.23	0.1	0.081
3277	pipe-9043	278.56	J-1719	J-1234	150	100	7	-10.49	0.59	4.695
3279	pipe-23416	279.25	J-1720	J-1721	300	120	1	-70.8	1	3.932
3282	pipe-17	490.08	J-1722	J-1723	200	100	7	0.9	0.03	0.012
3285	pipe-4379	279.2	J-1595	J-1724	200	100	7	-6.64	0.21	0.496
3287	pipe-9180	279.94	J-1725	J-1726	150	100	7	1.49	0.08	0.126
3290	pipe-24421	419.68	J-1560	J-1727	150	100	7	-1.8	0.1	0.179
3292	pipe-9191	281.05	J-752	J-1728	300	100	7	18.63	0.26	0.465
3299	pipe-14118	283.35	J-1602	J-995	150	100	9	0.63	0.04	0.025
3302	pipe-9590	283.55	J-1147	J-266	400	100	7	221.95	1.77	11.264
3303	pipe-2931	287.16	J-398	J-37	200	120	1	-1.25	0.04	0.016
3304	pipe-19825	289.14	J-1733	J-1431	150	100	7	-9.53	0.54	3.932
3306	pipe-3688	291.13	J-754	J-1588	300	120	1	-72.43	1.02	4.101
3307	pipe-9290	288.63	J-293	J-1734	300	100	7	0.9	0.01	0.002
3309	pipe-10674	289.23	J-512	J-1659	200	120	1	1.69	0.05	0.028

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3310	pipe-8875	292.7	J-132	J-1735	400	120	1	39.56	0.31	0.329
3312	pipe-2198	314.2	J-1736	J-1717	125	100	7	-1.74	0.14	0.411

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3314	pipe-8968	290.88	J-1703	J-1433	350	100	7	22.3	0.23	0.306
3315	pipe-8974	323.05	J-377	J-185	200	120	1	3.75	0.12	0.123
3316	pipe-15777	325.97	J-1221	J-1596	150	120	1	22.79	1.29	14.105
3317	pipe-8112	293.27	J-1271	J-1498	150	100	7	4.02	0.23	0.796
3320	pipe-12553	294.56	J-1567	J-1738	400	100	7	215.02	1.71	10.62
3322	pipe-9234	334.51	J-1710	J-1201	200	100	7	-25.88	0.82	6.161
3323	pipe-23383	325.09	J-1739	J-1740	150	100	7	0.9	0.05	0.05
3328	pipe-3678	318.9	J-333	J-1742	150	100	7	30.01	1.7	32.891
3330	pipe-9464	301.4	J-368	J-1636	150	120	1	1.61	0.09	0.104
3331	pipe-8472	304.22	J-1482	J-1715	200	100	7	-68.12	2.17	36.979
3332	pipe-24148	325.81	J-722	J-1743	200	120	1	-40.79	1.3	10.203
3334	pipe-5564	302.92	J-59	J-1067	150	100	9	5.23	0.3	1.293
3335	pipe-9045	302.96	J-1744	J-1745	600	100	7	-70.37	0.25	0.186
3338	pipe-15773	306.46	J-330	J-211	150	120	1	18.3	1.04	9.388
3339	pipe-9588	331.04	J-409	J-574	300	100	7	-42.41	0.6	2.134
3340	pipe-8217	305.53	J-1712	J-1662	150	100	7	-1.8	0.1	0.18
3341	pipe-9533	318.9	J-1610	J-1016	250	120	1	-65.51	1.33	8.275
3342	pipe-9481	305.58	J-1579	J-1746	150	100	7	0.8	0.05	0.04
3344	pipe-2684	305.59	J-1282	J-1416	150	120	1	7.46	0.42	1.781
3348	pipe-19836	310.41	J-259	J-181	150	100	7	19.21	1.09	14.408
3349	pipe-8885	322.46	J-635	J-220	400	100	7	52.35	0.42	0.776
3352	pipe-23539	399.52	J-574	J-1677	300	100	7	-29.83	0.42	1.112
3353	pipe-19473	340.23	J-776	J-579	150	100	7	1.8	0.1	0.179
3356	pipe-23027	308.87	J-1631	J-1751	125	130	8	0.31	0.03	0.01
3358	pipe-14522	313.97	J-961	J-1138	300	120	1	-68.1	0.96	3.659
3359	pipe-8853	314.52	J-265	J-1355	400	100	7	-20.62	0.16	0.138
3360	pipe-9641	315.32	J-1321	J-1551	400	100	7	252.23	2.01	14.274
3361	pipe-21885	330	J-1752	J-1542	150	100	7	7.15	0.4	2.311
3363	pipe-21773	329.02	J-1753	J-1754	200	100	7	-4.47	0.14	0.238
3366	pipe-8881	329.7	J-246	J-1251	400	100	7	-14.55	0.12	0.072
3367	pipe-641	568.8	J-1755	J-582	125	100	7	-0.35	0.03	0.021
3369	pipe-6560	321.47	J-1361	J-112	125	130	8	1.91	0.16	0.301
3370	pipe-8704	326.28	J-1219	J-1252	150	100	7	-5.08	0.29	1.225
3371	pipe-11800	322.59	J-1622	J-295	400	120	1	-42.48	0.34	0.376
3372	pipe-24205	341.44	J-1756	J-1757	150	100	7	0.9	0.05	0.05
3375	pipe-714	323.96	J-1393	J-1094	125	130	8	8.51	0.69	4.768
3376	pipe-12669	324.61	J-947	J-1473	200	120	1	-1.61	0.05	0.026
3377	pipe-24423	349.4	J-1758	J-865	400	120	1	150.91	1.2	3.933
3379	pipe-22354	331.46	J-1613	J-1675	125	130	8	0.94	0.08	0.08
3382	pipe-8471	331.23	J-277	J-307	400	100	7	443.72	3.53	40.63
3383	pipe-15894	331.69	J-1443	J-1663	300	100	7	5.57	0.08	0.05
3384	pipe-8629	338.89	J-1760	J-298	200	120	1	-45.77	1.46	12.63
3386	pipe-7997	332.48	J-1761	J-1762	300	100	7	15.99	0.23	0.35
3389	pipe-8294	334.47	J-661	J-1763	150	100	7	-12.9	0.73	6.888
3391	pipe-17418	510.99	J-469	J-365	150	100	7	7.45	0.42	2.489
3395	pipe-24960	351.44	J-1766	J-1264	150	120	1	28.22	1.6	20.94
3397	pipe-21801	335.25	J-1753	J-1767	200	120	1	2.98	0.09	0.08
3399	pipe-23381	339	J-1768	J-1769	150	100	7	-22.66	1.28	19.559
3402	pipe-23710	338.79	J-1770	J-454	250	120	1	-21.06	0.43	1.012
3404	pipe-7930	354.17	Awajan High Square	J-1770	250	120	1	0	0	0
3405	pipe-8036	507.37	J-1771	J-129	350	100	7	41.38	0.43	0.962
3407	pipe-9404	343.04	J-286	J-1772	200	120	1	-20.01	0.64	2.73
3409	pipe-8251	344.78	J-1640	J-721	200	120	1	0.9	0.03	0.009
3410	pipe-9292	345.85	J-494	J-1538	200	100	7	41.68	1.33	14.888
3411	pipe-3672	354.67	J-1733	J-881	150	100	7	2.7	0.15	0.38
3412	pipe-5649	358.13	J-953	J-1305	125	130	8	0.28	0.02	0.008
3413	pipe-8860	361.44	J-412	J-889	600	120	1	214.33	0.76	1.045
3414	pipe-8219	370.91	J-736	J-1455	200	120	1	3.9	0.12	0.132
3415	pipe-9019	380.26	J-1773	J-1774	150	100	7	-26.1	1.48	25.407
3418	pipe-8866	366.2	J-712	J-1328	150	120	1	-4.5	0.25	0.698
3422	pipe-7986	366.52	J-663	J-1776	300	100	7	1.49	0.02	0.004
3424	pipe-8876	364.85	J-1735	J-336	400	120	1	38.76	0.31	0.317
3425	pipe-24477	358.8	J-1777	J-1768	150	100	7	-10.43	0.59	4.65
3427	pipe-9020	620.68	J-1774	J-1778	150	100	7	-27	1.53	27.053
3431	pipe-23708	388.7	J-1779	J-102	150	100	7	-6.2	0.35	1.774
3433	pipe-5563	365.3	J-222	J-1667	150	100	9	2.19	0.12	0.258
3434	pipe-19132	425.05	J-1780	J-1389	400	100	7	486.07	3.87	48.102
3438	pipe-8271	388.41	J-510	J-1742	150	100	7	-29.11	1.65	31.088
3439	pipe-9196	475.28	J-990	J-1352	300	100	7	-36.54	0.52	1.619
3440	pipe-8708	381.54	J-660	J-1491	150	100	7	11.1	0.63	5.215
3441	pipe-8470	371.54	J-198	J-266	400	100	7	-261.95	2.08	15.309
3442	pipe-13721	393.37	J-1618	J-1719	150	100	7	-9.59	0.54	3.976
3443	pipe-7574	381.34	J-646	J-1561	600	100	7	7.33	0.03	0.003
3444	pipe-9061	381.73	J-1471	J-1580	300	100	7	23.83	0.34	0.733
3445	pipe-7973	377.46	J-290	J-1782	150	100	7	7.79	0.44	2.706
3449	pipe-8609	379.78	J-1707	J-551	150	100	7	-10.96	0.62	5.095
3450	pipe-11820	379.83	J-1705	J-846	150	100	7	7.02	0.4	2.229
3451	pipe-23446	380.34	J-1784	J-1785	600	120	1	218.21	0.77	1.081
3456	pipe-15888	380.96	J-1787	J-1584	300	100	7	-0.06	0	0
3458	pipe-3671	385.14	J-1431	J-1768	150	100	7	-11.33	0.64	5.416
3462	pipe-3680	404.35	J-353	J-52	150	100	7	-56.86	3.22	107.451
3463	pipe-6240	617.23	J-1552	J-1789	250	100	7	-4.47	0.09	0.08
3465	pipe-9073	392.61	J-250	J-1501	150	100	7	-3.37	0.19	0.573
3466	pipe-8836	409.46	J-1790	J-1791	200	100	7	1.1	0.03	0.018
3469	pipe-9602	400.83	J-1792	J-175	150	120	1	-0.8	0.05	0.029
3471	pipe-8133	401.4	J-272	J-467	200	100	7	1.61	0.05	0.036
3472	pipe-9675	405.99	J-1125	J-1793	200	100	7	-26.41	0.84	6.394
3474	pipe-8349	403.6	J-1724	J-862	200	100	7	-7.42	0.24	0.609
3475	pipe-8466	406.24	J-1136	J-440	200	120	1	85.32	2.72	40.026
3476	pipe-9594	406.68	J-408	J-1190	150	120	1	9.28	0.53	2.672
3477	pipe-17608	414.05	J-1633	J-1481	300	100	7	29.78	0.42	1.109
3478	pipe-9066	511.29	J-1684	J-1307	400	100	7	45.39	0.36	0.596
3479	pipe-19476	421.04	J-1794	J-1674	150	100	7	-0.9	0.05	0.05
3481	pipe-4427	410.54	J-1299	J-922	200	100	7	-11.29	0.36	1.324
3482	pipe-24631	550.42	J-1373	J-1795	150	120	1	25.52	1.44	17.383
3484	pipe-9495	414.03	J-1645	J-444	200	120	1	6.44	0.2	0.334
3485	pipe-24470	465.45	J-1255	J-1796	200	120	1	-14	0.45	1.409
3487	pipe-19456	440.89	J-1778	J-352	150	100	7	-52.36	2.96	92.242
3488	pipe-6818	434.37	J-1797	J-1798	200	100	7	15.92	0.51	2.503
3491	pipe-19458	428.64	J-39	J-42	150	120	1	9.18	0.52	2.618

Existing Model Pipe Information AVERAGE DEMAND

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3492	pipe-23714	447.86	J-1539	J-312	200	100	7	38.7	1.23	12.978
3493	pipe-8363	519.85	J-1799	J-1800	150	100	7	0.77	0.04	0.038

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3496	pipe-23987	450.15	J-1224	J-1801	150	100	7	1.49	0.08	0.126
3498	pipe-23382	460.22	J-155	J-1739	300	100	7	68.5	0.97	5.184
3499	pipe-23705	448.21	J-1802	J-1598	300	100	7	30.3	0.43	1.144
3501	pipe-22789	443.28	J-1803	J-1488	300	120	1	63.32	0.9	3.198
3503	pipe-7955	443.39	J-1629	J-998	400	100	7	4.47	0.04	0.008
3504	pipe-8537	444.57	J-1804	J-1280	200	100	7	43.01	1.37	15.779
3506	pipe-9080	446.25	J-643	J-806	200	100	7	-14.57	0.46	2.126
3509	pipe-19823	463.94	J-600	J-1766	150	120	1	29.12	1.65	22.193
3512	pipe-8839	491.03	J-1120	J-1773	150	100	7	-25.2	1.43	23.81
3513	pipe-9188	471.94	J-1728	J-1761	300	100	7	17.48	0.25	0.413
3514	pipe-16959	481.21	J-742	J-1670	400	100	7	-335.72	2.67	24.239
3515	pipe-678	805.26	J-936	J-1165	125	130	8	12.38	1.01	9.543
3516	pipe-9458	576.91	J-445	J-1665	150	100	7	1.61	0.09	0.146
3520	pipe-9520	466.55	J-393	J-602	300	100	7	15.83	0.22	0.344
3521	pipe-24107	492.14	J-1639	J-822	150	100	7	3.45	0.2	0.6
3522	pipe-23687	469.29	J-1329	J-1809	600	100	7	-381.01	1.35	4.251
3527	pipe-8618	494.48	J-1590	J-1812	200	100	7	0	0	0
3529	pipe-8536	485.28	J-1813	J-342	150	100	7	-1.55	0.09	0.136
3531	pipe-14519	488.25	J-1588	J-463	300	120	1	-105.51	1.49	8.232
3532	pipe-24201	488.9	J-1246	J-1814	400	100	7	21.8	0.17	0.153
3534	pipe-15861	550.9	J-543	J-1815	125	100	7	0.31	0.03	0.017
3538	pipe-8107	496.85	J-1817	J-1603	150	100	7	-0.8	0.05	0.04
3542	pipe-8838	490.34	J-727	J-1500	200	100	7	-21.36	0.68	4.317
3543	pipe-9648	490.67	J-1819	J-1745	150	100	7	-0.31	0.02	0.007
3545	pipe-8175	494.94	J-1754	J-494	200	100	7	-5.96	0.19	0.405
3546	pipe-7988	507.26	J-1534	J-1470	150	100	7	-14.89	0.84	8.986
3552	pipe-19475	1049.4	J-776	J-1546	150	120	0	-23.11	1.31	14.471
3553	pipe-3676	537.37	J-348	J-575	150	100	7	32.7	1.85	38.579
3554	pipe-8423	515.62	J-1544	J-1780	400	100	7	486.87	3.87	48.249
3555	pipe-23688	606.27	J-1809	J-1823	150	120	1	0.9	0.05	0.035
3559	pipe-8796	514.4	J-1031	J-1207	300	100	7	20.61	0.29	0.56
3560	pipe-24171	700.62	J-1604	J-1756	150	100	7	-3.6	0.2	0.647
3562	pipe-21130	523.65	J-1825	J-610	300	120	1	-0.06	0	0
3564	pipe-24132	525.45	J-630	J-1826	300	100	7	0.9	0.01	0.002
3566	pipe-8770	524.73	J-515	J-1827	200	100	7	0.8	0.03	0.01
3568	pipe-8450	528.22	J-299	J-739	200	120	1	-14.23	0.45	1.451
3569	pipe-8413	533.49	J-313	J-1828	400	100	7	42.04	0.33	0.517
3571	pipe-8206	549.21	J-1557	J-1572	200	100	7	-15.99	0.51	2.525
3572	pipe-23613	601.15	J-1563	J-1505	400	100	7	40.2	0.32	0.476
3573	pipe-9021	686.96	J-1793	J-509	200	100	7	-27.31	0.87	6.803
3574	pipe-7815	536.93	J-1829	J-1830	125	130	8	0.31	0.03	0.01
3577	pipe-8185	544.7	J-535	J-1752	150	100	7	8.64	0.49	3.28
3578	pipe-1497	540.4	J-1627	J-1831	125	120	1	-4.44	0.36	1.656
3581	pipe-8356	537.64	J-1594	J-1832	150	100	7	5.1	0.29	1.233
3583	pipe-9185	741.62	J-1833	J-1679	300	100	7	13.01	0.18	0.239
3585	pipe-8457	547.86	J-1772	J-1508	200	120	1	-20.82	0.66	2.936
3586	pipe-9459	548.89	J-444	J-605	200	120	1	3.22	0.1	0.093
3590	pipe-8431	584.46	J-294	J-421	300	100	7	5.4	0.08	0.047
3591	pipe-14523	574.74	J-1138	J-1720	300	120	1	-69.9	0.99	3.84
3592	pipe-12631	582.25	J-329	J-1704	400	100	7	-298.59	2.38	19.51
3593	pipe-8424	594.49	J-666	J-315	150	100	7	-18.61	1.05	13.585
3597	pipe-9596	578.48	J-1646	J-95	200	100	7	-11.07	0.35	1.279
3598	pipe-24659	571.16	J-1478	J-1838	150	100	7	0.9	0.05	0.05
3601	pipe-10882	568.03	J-48	J-1654	400	120	1	-36.53	0.29	0.284
3602	pipe-8608	668.39	J-1021	J-507	150	100	7	-17.26	0.98	11.809
3605	pipe-8379	575.01	J-1840	J-1841	200	100	7	5.12	0.16	0.306
3611	pipe-15900	589.92	J-1090	J-1843	400	120	1	-7.18	0.06	0.014
3614	pipe-8453	603.52	J-1451	J-1760	200	120	1	-44.96	1.43	12.222
3615	pipe-8844	580.51	J-1785	J-1844	600	120	1	217.31	0.77	1.072
3617	pipe-6205	644.19	J-280	J-1845	400	100	7	0.9	0.01	0
3619	pipe-2	600.29	J-1846	J-1847	150	100	7	-5.32	0.3	1.336
3622	pipe-7940	694.5	J-191	J-1802	300	100	7	31.78	0.45	1.251
3623	pipe-8514	588.78	J-1449	Awajan High Square	150	100	7	-7.17	0.41	2.32
3624	pipe-8919	593.4	J-1828	J-1629	400	100	7	41.14	0.33	0.497
3626	pipe-20643	651.59	J-1848	J-1849	125	100	7	1.8	0.15	0.436
3630	pipe-23698	697.36	J-1664	J-1850	300	100	7	2.59	0.04	0.012
3632	pipe-8338	624	J-1851	J-1510	200	100	7	-0.9	0.03	0.012
3634	pipe-8997	632.84	J-1216	J-1477	150	100	7	2.7	0.15	0.38
3635	pipe-9285	1158.54	J-1617	J-410	150	100	7	-1.79	0.1	0.178
3636	pipe-23531	687.54	J-933	J-295	400	100	7	46.95	0.37	0.634
3637	pipe-708	1191.74	J-582	J-1736	125	100	7	-1.39	0.11	0.272
3638	pipe-8803	655.84	J-1852	J-1853	300	120	1	-0.06	0	0
3641	pipe-15859	637.8	J-1716	J-542	150	100	7	-5.48	0.31	1.412
3642	pipe-9187	631.39	J-1762	J-1833	300	100	7	14.5	0.21	0.292
3643	pipe-8626	640.2	J-1811	J-1854	600	100	7	-258.16	0.91	2.068
3645	pipe-335	1129.49	J-1855	J-1635	150	120	1	-0.31	0.02	0.005
3650	pipe-12928	658.62	J-1858	J-1840	200	100	7	6.22	0.2	0.439
3652	pipe-8130	686.93	J-1704	J-198	400	100	7	-307.22	2.44	20.566
3654	pipe-8627	701.04	J-1859	J-1813	150	100	7	-0.77	0.04	0.038
3656	pipe-9455	969.38	J-606	J-1860	150	120	1	0.8	0.05	0.029
3658	pipe-12248	819.86	J-962	J-346	400	100	7	449.42	3.58	41.602
3659	pipe-7577	655.39	J-1619	J-1861	200	100	7	-16.7	0.53	2.737
3661	pipe-24173	658.72	J-1604	J-1862	150	120	1	1.83	0.1	0.132
3663	pipe-9049	682.53	J-1727	J-353	150	100	7	-2.7	0.15	0.38
3664	pipe-8393	767.9	J-1850	J-1863	300	100	7	1.1	0.02	0.002
3666	pipe-8375	690.83	J-729	J-1790	200	100	7	1.83	0.06	0.045
3667	pipe-8102	702.89	J-787	J-114	200	100	7	82.1	2.61	52.245
3670	pipe-8174	716.48	J-1686	J-1803	300	120	1	64.22	0.91	3.282
3671	pipe-8337	728.82	J-1739	J-1568	300	100	7	66.7	0.94	4.934
3677	pipe-8559	746.83	J-1867	J-1868	500	100	7	-19.05	0.1	0.04
3680	pipe-2153	701.82	J-1611	J-1869	150	120	1	0	0	0
3682	pipe-15890	704.75	J-671	J-1784	600	120	1	219.11	0.77	1.089
3685	pipe-19455	1164.46	J-1871	J-1778	200	120	1	-24.46	0.78	3.959
3687	pipe-8333	725.99	J-1872	J-1716	150	100	7	-0.31	0.02	0.007
3689	pipe-8308	779.2	J-718	J-638	500	100	7	154.51	0.79	1.942
3690	pipe-23651	1095.21	J-1873	J-1044	600	100	7	331.39	1.17	3.284
3692	pipe-11362	778.6	J-1456	J-1874	400	120	1	-18.82	0.15	0.083
3694	pipe-8469	752	J-1671	J-1389	400	100	7	-337.33	2.68	24.454
3697	pipe-10658	771.83	J-1814	J-1874	400	100	7	20.31	0.16	0.134
3698	pipe-8421	750.34	J-989	J-135	300	120	1	29.78	0.42	0.791

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3699	pipe-9581	752.15	J-284	J-541	150	100	7	-8.82	0.5	3.404
3701	pipe-7943	817.23	J-469	J-1779	150	100	7	-4.71	0.27	1.067

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3702	pipe-8314	1139.24	J-1844	J-412	600	120	1	215.82	0.76	1.059
3704	pipe-8858	775.07	J-1876	J-1877	400	100	7	108.53	0.86	2.994
3707	pipe-8329	886.91	J-1878	J-1623	250	100	7	9.17	0.19	0.304
3709	pipe-24174	822.97	J-84	J-901	200	100	7	7.95	0.25	0.692
3710	pipe-6183	799.65	J-1290	J-1625	150	100	9	2.5	0.14	0.331
3711	pipe-8005	806.95	J-1614	J-1879	200	100	7	44.56	1.42	16.846
3713	pipe-2138	810.36	J-1151	J-1504	600	120	1	261.26	0.92	1.508
3714	pipe-24141	900.42	J-1546	J-1068	200	100	7	-9.85	0.31	1.03
3715	pipe-8621	866.45	J-789	J-1311	200	100	7	-0.92	0.03	0.013
3716	pipe-241	835.87	J-17	J-625	125	100	7	3.15	0.26	1.231
3720	pipe-9183	873.7	J-1680	J-1177	300	100	7	10.03	0.14	0.148
3721	pipe-23023	835.35	J-610	J-1472	300	120	1	-1.81	0.03	0.004
3722	pipe-24222	887.98	J-1881	J-1882	150	120	1	0.31	0.02	0.005
3725	pipe-4328	858.06	J-1497	J-1583	600	100	7	-434.93	1.54	5.433
3726	pipe-8625	1160.24	J-1883	J-1884	300	100	7	0.77	0.01	0.001
3729	pipe-14518	901.2	J-1721	J-1146	300	120	1	-71.7	1.01	4.025
3730	pipe-9444	865.82	J-86	J-1075	400	100	7	269.98	2.15	16.19
3731	pipe-8342	871.34	J-1767	J-1885	200	120	1	1.49	0.05	0.022
3735	pipe-13726	951.33	J-137	J-1867	500	100	7	-18.15	0.09	0.037
3738	pipe-19452	1075.14	J-1153	J-1888	300	120	1	0.9	0.01	0.001
3740	pipe-7580	906.4	J-1578	J-343	200	100	7	40.69	1.3	14.238
3741	pipe-8004	895.56	J-1889	J-1558	200	100	7	46.88	1.49	18.508
3743	pipe-2342	930.49	J-1890	J-1891	200	100	7	0.31	0.01	0.002
3746	pipe-8318	940.16	J-558	J-697	150	100	7	3.29	0.19	0.55
3749	pipe-23024	986.94	J-1893	J-1630	125	130	8	4.07	0.33	1.216
3753	pipe-15902	1121.93	J-682	J-1894	200	100	7	-60.46	1.92	29.647
3756	pipe-8557	1029.01	J-1342	J-1895	200	120	1	-36.99	1.18	8.515
3758	pipe-8410	1006.04	J-698	J-1896	150	100	7	1.1	0.06	0.072
3760	pipe-8731	975.01	J-1897	J-1898	250	100	7	11	0.22	0.426
3763	pipe-8247	1668.79	J-1899	J-1593	200	120	1	-0.9	0.03	0.009
3765	pipe-8452	994.82	J-948	J-1202	400	100	7	386.07	3.07	31.398
3766	pipe-667	996.71	J-1900	J-1211	125	130	8	17.8	1.45	18.688
3768	pipe-8798	1018.94	J-1864	J-313	400	100	7	5.14	0.04	0.011
3769	pipe-22721	1144.56	J-1849	J-1901	125	100	7	0.9	0.07	0.121
3771	pipe-7991	1036.3	J-668	J-1725	150	100	7	2.98	0.17	0.456
3772	pipe-7552	1075.37	J-1798	J-1843	300	120	1	15.02	0.21	0.223
3774	pipe-7927	1045.64	J-1606	J-1789	200	120	1	5.96	0.19	0.289
3776	pipe-8990	1071.01	J-1317	J-359	400	100	7	-5.4	0.04	0.012
3777	pipe-8117	1093.04	J-846	J-1126	150	100	7	6.21	0.35	1.779
3778	pipe-9651	1068.16	J-1902	J-1903	300	100	7	107.91	1.53	12.028
3782	pipe-15786	1314.61	J-1129	J-1632	200	120	1	-3.6	0.11	0.114
3783	pipe-7579	1095.47	J-343	J-1904	200	100	7	37.59	1.2	12.297
3785	pipe-9298	1096.14	J-1905	J-1008	150	100	7	-0.94	0.05	0.054
3787	pipe-14520	1104.02	J-463	J-1145	300	120	1	-117.21	1.66	10.001
3788	pipe-2140	1090.23	J-1562	J-1906	150	120	1	0	0	0
3790	pipe-8748	1114.59	J-1907	J-1908	150	120	1	-0.31	0.02	0.005
3795	pipe-684	1143.15	J-1414	J-985	125	130	8	3.87	0.32	1.107
3796	pipe-23696	1503.57	J-1217	J-945	125	120	1	2.98	0.24	0.791
3797	pipe-15869	1197.25	J-618	J-258	300	120	1	21.63	0.31	0.437
3800	pipe-7575	1190.63	J-1911	J-1912	150	100	7	3.55	0.2	0.631
3803	pipe-12246	1295.09	J-1738	J-978	400	100	7	214.21	1.7	10.547
3809	pipe-25108	1513.58	J-1915	J-1916	200	120	1	-52.08	1.66	16.048
3817	pipe-7994	1367.83	J-1519	J-1683	400	100	7	46.54	0.37	0.624
3818	pipe-8258	1436.1	J-1920	J-1921	300	120	1	80.9	1.14	5.033
3822	pipe-8313	1607.05	J-865	J-1922	400	120	1	149.11	1.19	3.847
3824	pipe-24221	1314.6	J-1881	J-659	400	100	7	147.66	1.18	5.295
3825	pipe-8730	1317.31	J-1676	J-1897	250	100	7	11.92	0.24	0.494
3827	pipe-8309	1337.17	J-717	J-1329	600	100	7	-376.51	1.33	4.159
3828	pipe-7576	1415.39	J-1832	J-1911	150	100	7	4.32	0.24	0.909
3829	pipe-8430	1606	J-1923	J-1353	400	120	1	73.77	0.59	1.045
3831	pipe-8330	1912.43	J-1903	J-694	300	100	7	107.59	1.52	11.963
3832	pipe-15798	1439.66	J-1898	J-1878	250	100	7	10.08	0.21	0.363
3833	pipe-8734	1521.9	J-1924	J-1925	300	100	7	27.49	0.39	0.955
3836	pipe-22725	2203.89	J-1926	J-1564	125	100	7	1.8	0.15	0.436
3838	pipe-20676	1638.85	J-1796	J-1517	200	120	1	-14.35	0.46	1.475
3839	pipe-9512	1524.08	J-135	J-334	300	120	1	1.49	0.02	0.003
3840	pipe-23380	1567.34	J-154	J-1733	150	100	7	-5.93	0.34	1.634
3841	pipe-643	1970.3	J-1927	J-1928	300	100	7	133.88	1.89	17.934
3844	pipe-4331	1910.03	Tamween Reservoir	J-1929	150	120	1	0.06	0	0
3846	pipe-625	1568.2	J-608	J-1553	600	120	1	261.26	0.92	1.508
3849	pipe-8388	2586.71	J-631	J-1931	250	100	7	37.62	0.77	4.152
3851	pipe-14469	2605.09	J-1932	J-1933	250	100	7	-32.17	0.66	3.108
3854	pipe-12721	1725.53	J-1934	J-1036	700	120	1	-509.92	1.32	2.456
3856	pipe-8378	1752.98	J-1841	J-728	200	100	7	4.02	0.13	0.196
3857	pipe-8630	1706.48	J-1075	J-1286	400	100	7	268.37	2.14	16.011
3858	pipe-8623	2123.49	J-1523	J-1935	300	100	7	63.1	0.89	4.453
3862	pipe-23375	1916.66	J-1057	J-1777	150	100	7	-6.85	0.39	2.135
3863	pipe-9297	1976.39	J-840	J-1905	150	100	7	0	0	0
3865	pipe-9644	2266.17	J-1877	J-1902	300	100	7	108.22	1.53	12.092
3866	pipe-9606	3209.63	J-1853	J-85	300	120	1	-3.64	0.05	0.016
3868	pipe-9656	2801.74	J-638	J-1758	400	120	1	151.81	1.21	3.977
3869	pipe-2187	2650.61	J-1034	J-936	125	130	8	14.7	1.2	13.119
3870	pipe-23021	2400.45	Tamween Reservoir	J-1825	300	120	1	0	0	0
3871	pipe-8331	2563.63	J-1847	J-1936	150	100	7	-5.63	0.32	1.486
3873	pipe-2188	2534.01	J-1937	J-1900	125	130	8	18.57	1.51	20.221
3875	pipe-14466	2716.36	J-1938	J-1932	150	100	7	-31.07	1.76	35.09
3877	pipe-12929	2709.12	J-557	J-1939	150	100	7	-44.2	2.5	67.403
3879	pipe-9646	3156.76	J-1729	J-1881	400	100	7	148.78	1.18	5.369
3880	pipe-8755	2834	J-1940	J-1466	150	100	7	-0.31	0.02	0.007
3885	pipe-15847	2955.22	J-563	J-1941	150	100	7	0	0	0
3886	pipe-8304	2807.27	J-1879	J-1804	200	100	7	43.78	1.39	16.308
3890	pipe-606	3086.28	J-1945	J-1946	600	120	1	261.26	0.92	1.508
3893	pipe-8350	2918.01	J-1947	J-1889	200	100	7	47.65	1.52	19.077
3898	pipe-15860	3452.95	J-542	J-1949	150	100	7	-6.42	0.36	1.893
3900	pipe-2304	3794.95	J-1950	J-1951	125	130	8	0.31	0.03	0.011
3904	pipe-8320	4875.25	J-1584	J-1952	600	100	7	-435.12	1.54	5.437
3906	pipe-8387	5464.64	J-870	J-1924	300	100	7	28.58	0.4	1.027
3907	pipe-8859	5127.78	J-1809	J-670	600	100	7	-381.91	1.35	4.27
3910	pipe-8746	5777.36	J-1954	J-839	150	100	7	-1.1	0.06	0.072
3913	pipe-8093	6174.71	J-1955	J-658	400	100	7	263.3	2.1	15.456

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
3915	pipe-8122	7332.54	J-1956	J-1452	700	120	1	513.94	1.34	2.492
3924	pipe-604	6664.9	J-288	J-1945	600	120	1	261.26	0.92	1.508

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
3926	pipe-9649	13195.1	J-1745	J-1961	600	100	7	-71	0.25	0.189
3928	pipe-9642	21702.64	J-1811	J-1962	600	100	7	389.76	1.38	4.434
3930	pipe-8324	22213.86	J-1963	J-1964	600	100	7	-469.65	1.66	6.263
3933	pipe-8631	38240.43	J-1964	J-1943	600	100	7	-469.65	1.66	6.263
3940	P-1	205.45	Azraq Res.	J-476	600	120	Ductile Iron	234.91	0.83	1.239
3957	P-8	5.04	J-475	Azraq to Khaw PS	600	120	Ductile Iron	78.3	0.28	0.162
3958	P-9	5.19	Azraq to Khaw PS	J-1944	600	120	Ductile Iron	78.3	0.28	0.158
3965	P-12	11.08	J-1846	J-1966	152.4	120	Ductile Iron	5.01	0.27	0.789
3967	P-13	20.27	J-1966	J-1967	152.4	120	Ductile Iron	4.7	0.26	0.699
3968	P-14	47.98	J-1967	J-1893	100	100	Steel	4.38	0.56	6.723
3970	P-15	32.01	J-1631	J-1968	152.4	120	Ductile Iron	3.13	0.17	0.33
3972	P-16	116.25	J-1968	J-1969	152.4	120	Ductile Iron	2.82	0.15	0.272
3974	P-17	137.59	J-1969	J-1970	152.4	120	Ductile Iron	2.5	0.14	0.219
3976	P-18	110.55	J-1970	J-1971	152.4	120	Ductile Iron	2.19	0.12	0.171
3978	P-19	207.52	J-1971	J-1972	152.4	120	Ductile Iron	1.88	0.1	0.128
3979	P-20	109.4	J-1972	J-1612	100	100	Steel	1.57	0.2	0.999
4017	P-43	1737.34	J-1396	J-1926	100	100	Steel	5.4	0.69	9.886
4018	P-44	1182.04	J-1926	J-1848	100	100	Steel	2.7	0.34	2.739
4019	P-45	696.04	J-1862	J-1728	100	100	Steel	0.34	0.04	0.059
4022	P-47	571.77	J-1154	J-1949	100	100	Steel	7.23	0.92	16.974
4026	P-48	10.4	J-695	Zarqa Reservoir	400	120	Ductile Iron	0	0	0
4027	P-49	10.88	J-1524	Zarqa Reservoir	400	120	Ductile Iron	408.55	3.25	24.875
4028	P-50	12.1	J-782	Zarqa Reservoir	400	120	Ductile Iron	138.78	1.1	3.367
4029	P-51	9.75	Zarqa Reservoir	J-883	600	120	Ductile Iron	1445.85	5.11	35.858
4036	P-56	5.41	J-1047	Zarqa Ext 2	400	120	Ductile Iron	292.74	2.33	13.417
4037	P-57	5.31	Zarqa Ext 2	J-1122	400	120	Ductile Iron	292.74	2.33	13.418
4039	P-58	7.76	J-1047	Zarqa Ext 5	600	120	Ductile Iron	80.57	0.28	0.168
4040	P-59	7.52	Zarqa Ext 5	J-1873	600	120	Ductile Iron	80.57	0.28	0.168
4046	P-63	2.07	J-731	Zarqa Int 1	400	120	Ductile Iron	80.55	0.64	1.239
4047	P-64	1.73	Zarqa Int 1	J-1698	400	120	Ductile Iron	80.55	0.64	1.247
4049	P-65	5.52	J-731	Zarqa Int 4	400	120	Ductile Iron	119.14	0.95	2.54
4050	P-66	4.79	Zarqa Int 4	J-1697	400	120	Ductile Iron	119.14	0.95	2.546
4052	P-67	5.5	J-1934	Batrawi Reservoir	700	120	Ductile Iron	509.11	1.32	2.45
4054	P-69	3.15	J-308	J-303	700	120	Ductile Iron	-630.29	1.64	3.641
4055	P-70	2.02	J-303	J-328	700	120	Ductile Iron	-296.98	0.77	0.885
4057	P-71	2.89	J-1990	Batrawi Reservoir	700	120	Ductile Iron	627.88	1.63	3.606
4061	P-74	4.39	J-1990	J-1991	700	120	Ductile Iron	-628.68	1.63	3.625
4062	P-75	2.78	J-1991	J-308	700	120	Ductile Iron	-629.49	1.64	3.62
4064	P-77	30.68	J-1963	J-912	600	100	Steel	469.34	1.66	6.256
4065	P-78	18.26	J-911	J-1952	600	100	Steel	435.43	1.54	5.444
4067	P-79	50.11	J-1744	Khaw Reservoir	600	100	Steel	70.06	0.25	0.185
4068	P-80	38.51	J-1962	Khaw Reservoir	600	100	Steel	389.45	1.38	4.428
4069	P-81	18.53	J-912	Khaw Reservoir	600	100	Steel	469.03	1.66	6.248
4072	P-83	11.71	Khaw Reservoir	Old Khaw 1	600	100	Steel	52.83	0.19	0.108
4073	P-84	11.8	Old Khaw 1	J-911	600	100	Steel	52.83	0.19	0.107
4075	P-86	20.9	J-957	J-1876	400	100	Steel	108.85	0.87	3.008
4076	P-87	19.84	J-957	J-1955	400	100	Steel	263.62	2.1	15.488
4077	P-88	15.46	J-957	J-1956	700	120	Ductile Iron	514.26	1.34	2.493
4079	P-89	12.77	Khaw Reservoir	Khaw New 1	600	100	Steel	221.84	0.78	1.562
4082	P-91	11.54	J-911	FCV-3	600	100	7	0	0	0
4083	P-92	10.01	FCV-3	J-912	600	100	7	0	0	0
4084	P-93	15.89	Khaw New 1	J-958	600	100	Steel	221.84	0.78	1.564
4088	P-95	62.06	J-1497	Tamwn 2	300	100	7	-6.4	0.09	0.065
4089	P-96	53.54	Tamwn 2	Tamween Reservoir	300	100	7	-6.4	0.09	0.064
4100	P-103	9.43	Hitten Tower	J-1483	200	100	Steel	16.21	0.52	2.59
4102	P-104	4.49	J-811	Hitten Tower Pump	200	100	Steel	19.3	0.61	3.583
4103	P-105	4.69	Hitten Tower Pump	Hitten Tower	200	100	Steel	19.3	0.61	3.571
4104	P-106	6.23	Hitten Reservoir	J-1771	350	120	Ductile Iron	42.28	0.44	0.717
4105	P-107	6.02	J-1935	Hitten Reservoir	300	120	Ductile Iron	62.2	0.88	3.092
4107	P-108	9.24	J-1574	Hitten Reservoir	200	120	Ductile Iron	0	0	0
4109	P-109	11.57	Russaifah High	J-1920	300	100	Steel	81.8	1.16	7.2
4110	P-110	17.98	Russaifah High	J-1722	200	100	Steel	1.8	0.06	0.046
4116	P-114	16.45	Russaifah Low	J-1668	400	100	Steel	2.39	0.02	0.005
4117	P-115	15.44	Russaifah Low	J-1895	200	120	Ductile Iron	37.89	1.21	8.904
4122	P-118	8.48	Russaifah Low	J-1868	500	100	Steel	19.95	0.1	0.044
4124	P-119	10.44	Basateen Reservoir	J-66	400	100	Steel	274.92	2.19	16.744
4129	P-121	31.09	Merhib Reservoir	J-571	300	100	Steel	34.07	0.48	1.422
4135	P-125	10.49	J-570	Merhib to Berein	200	100	Steel	31.88	1.01	9.061
4136	P-126	11.28	Merhib to Berein	J-869	200	100	Steel	31.88	1.01	9.061
4138	P-127	3.96	J-570	Merhib to Awajan	200	100	Steel	0	0	0
4139	P-128	3.69	Merhib to Awajan	J-1863	200	100	Steel	0	0	0
4141	P-129	13.25	J-1925	Berein Reservoir	300	100	Steel	26.39	0.37	0.887
4142	P-130	9.78	Berein Reservoir	J-1931	250	100	Steel	-36.52	0.74	3.932
4143	P-131	13.2	Berein Reservoir	J-1933	250	100	Steel	33.27	0.68	3.308
4145	P-132	17.87	J-1938	Um Rummaneh Reservoir	152.4	100	Steel	29.97	1.64	30.385
4148	P-134	11.29	Um Rummaneh Reservoir	Um Rummaneh PS	200	100	Steel	7.31	0.23	0.593
4149	P-135	7.74	Um Rummaneh PS	J-1858	200	100	Steel	7.31	0.23	0.587
4152	P-137	1787	J-562	Sarout Reservoir	100	100	Steel	-2.2	0.28	1.869
4159	P-138	13718.33	J-839	J-1999	100	100	Steel	-1.72	0.22	1.194
4161	P-139	1813.53	J-1999	J-2000	100	100	Steel	-2.82	0.36	2.975
4162	P-140	87.13	J-2000	Qunaya Reservoir	100	100	Steel	-3.92	0.5	5.467
4165	P-142	18.07	J-1836	Hashmeya PS	300	100	Steel	55.53	0.79	3.516
4166	P-143	23.49	Hashmeya PS	J-1834	300	100	Steel	55.53	0.79	3.516
4168	P-144	10.74	J-1915	Hashmeya Reservoir	200	120	Ductile Iron	52.08	1.66	16.049
4169	P-145	5.51	Hashmeya Reservoir	J-1959	300	120	Ductile Iron	20.94	0.3	0.412
4170	P-146	9.08	Hashmeya Reservoir	J-1820	300	120	Ductile Iron	54.78	0.78	2.443
4174	P-149	89.32	Hallabat Reservoir	J-1799	152.4	120	Ductile Iron	1.55	0.08	0.09
4177	P-152	91.84	J-1883	Hallabat Reservoir	300	100	Steel	-1.55	0.02	0.004
4184	P-156	703.41	J-1912	J-2002	150	100	7	2.77	0.16	0.4
4187	P-158	52.92	J-2002	J-2003	150	100	7	0	0	0
4188	P-159	963.88	J-2003	J-1930	150	100	7	0.77	0.04	0.038
4192	P-162	80.68	Tafeh PS	J-2003	152.4	120	Ductile Iron	1.55	0.08	0.089
4205	P-164	38.81	J-1209	Awajan Booster Station (from	400	100	Steel	0	0	0
4206	P-165	29.33	Awajan Booster Station (fro	J-773	400	100	Steel	0	0	0
4208	P-166	261.54	J-890	FCV-7	200	100	7	-44.99	1.43	17.151
4209	P-167	56.84	FCV-7	Well 23	200	100	7	-44.99	1.43	17.151
4211	P-168	39.92	Well 24	FCV-8	100	100	Steel	0	0	0
4212	P-169	496.02	FCV-8	J-1457	100	100	Steel	0	0	0
4214	P-170	12.91	Well 21	Well 21 Awajan	150	100	7	13.89	0.79	7.9
4215	P-171	15.47	Well 21 Awajan	J-933	150	100	7	13.89	0.79	7.902

Existing Model Pipe Information AVERAGE DEMAND

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4218	P-172	159.61	J-1547	J-2026	300	100	7	1.49	0.02	0.004
4226	P-177	40.63	J-1810	Hallabat to Khaw	600	100	Steel	-133.14	0.47	0.608

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
4227	P-178	52.97	Hallabat to Khaw	Hallabat Reservoir	600	100	Steel	-133.14	0.47	0.607
4229	P-179	68.15	Hallabat Reservoir	Hallabat to Hallabat	200	100	Steel	48.43	1.54	19.655
4230	P-180	17.39	Hallabat to Hallabat	J-1947	200	100	Steel	48.43	1.54	19.659
4248	P-186	4.52	J-65	Basteen PS to Hitten 2	200	100	Steel	68.04	2.17	36.906
4249	P-187	5.47	Basteen PS to Hitten 2	J-1702	200	100	Steel	68.04	2.17	36.89
4253	P-189	7.71	J-1888	Basteen to Jabal Al Shamali	300	100	Steel	0	0	0
4254	P-190	7.46	Basteen to Jabal Al Shama	Basateen Reservoir	300	100	Steel	0	0	0
4256	P-191	7.57	J-66	Basteen to Russaifah	200	120	Ductile Iron	61.36	1.95	21.741
4257	P-192	7.18	Basteen to Russaifah	J-1894	200	120	Ductile Iron	61.36	1.95	21.738
4266	P-194	32.92	Zarqa High Reservoir	J-1928	300	120	Ductile Iron	-133.08	1.88	12.652
4269	P-196	24.61	Batrawi Reservoir	Batrawi PS	300	120	Ductile Iron	134.69	1.91	12.938
4270	P-197	3.78	Batrawi PS	J-1927	300	120	Ductile Iron	134.69	1.91	12.945
4277	P-201	2.18	Batrawi PS (200)	J-1356	200	120	Ductile Iron	114.92	3.66	69.474
4278	P-202	16.96	J-307	Batrawi Reservoir	400	100	Steel	442.92	3.52	40.493
4281	P-204	115.07	J-1861	J-1937	152.4	120	Ductile Iron	-17.48	0.96	7.981
4282	P-205	16.25	J-1937	J-1904	152.4	120	Ductile Iron	-36.82	2.02	31.726
4283	P-206	2401	J-1936	J-1837	100	100	Steel	-5.95	0.76	11.834
4284	P-207	53.07	J-1834	J-1950	150	100	7	55.21	3.12	101.76
4286	P-209	5.09	J-1416	J-1530	100	100	Steel	-0.37	0.05	0.073
4287	P-210	254.49	J-858	J-1398	50	130	PVC	-2.5	1.28	42.925
4288	P-211	6.18	J-1783	J-1656	200	120	Ductile Iron	22.23	0.71	3.312
4290	P-212	57.65	J-1096	J-2004	200	100	7	-0.94	0.03	0.013
4291	P-213	136.99	J-2004	J-679	200	100	7	0.94	0.03	0.013
4292	P-214	5.11	J-1656	J-2004	200	120	Ductile Iron	2.19	0.07	0.051
4296	P-216	574.16	J-1836	J-2006	200	120	1	-55.84	1.78	18.257
4299	P-219	13.89	J-853	J-1831	100	120	Ductile Iron	4.75	0.6	5.57
4300	P-220	332.78	Sukhna Reservoir	J-965	100	100	Steel	23.48	2.99	150.49
4304	P-223	24.51	J-1905	J-1908	100	100	Steel	0.63	0.08	0.182
4305	P-224	11.23	J-676	Russaifah High	200	120	Ductile Iron	-6.3	0.2	0.318
4306	P-225	15.08	J-1922	Russaifah High	400	120	Ductile Iron	148.21	1.18	3.804
4307	P-226	20.38	Russaifah High	J-1641	200	100	Steel	2.7	0.09	0.095
4308	P-227	14.87	J-1621	Russaifah High	152.4	120	Ductile Iron	-34.51	1.89	28.146
4309	P-228	501.4	J-1950	J-1890	150	100	7	54.59	3.09	99.634
4310	P-229	15.23	J-1890	J-1835	150	100	7	53.96	3.05	97.526
4311	P-230	630.32	J-1856	J-4	150	130	8	-0.31	0.02	0.004
4312	P-231	9.1	J-4	J-1857	150	130	8	0.31	0.02	0.004
4313	P-232	6.12	J-1597	J-1713	100	120	Ductile Iron	-5.42	0.69	7.094
4314	P-233	550.08	J-1510	J-1777	100	120	Ductile Iron	-2.68	0.34	1.93
4315	P-234	8.27	J-1829	J-1667	152.4	120	Ductile Iron	-0.63	0.03	0.018
4316	P-235	2.64	J-1807	J-222	125	130	8	-0.31	0.03	0.014
4317	P-236	508.27	J-222	J-1808	125	130	8	3.06	0.25	0.717
4319	P-237	1488.6	J-670	J-2008	600	100	7	-602.81	2.13	9.944
4320	P-238	6398.21	J-2008	J-1497	600	100	7	-607.34	2.15	10.083
4321	P-239	113.01	J-1620	J-2008	125	100	Steel	-4.18	0.34	2.079
4322	P-240	6981.85	J-1958	J-1690	300	120	1	-20.31	0.29	0.389
4323	P-241	606.37	J-1690	J-1959	300	120	1	-20.94	0.3	0.412
4324	P-242	83.99	J-1076	J-1605	100	100	Steel	7.79	0.99	19.488
4325	P-243	7.47	J-1697	J-809	300	120	Ductile Iron	0	0	0
4326	P-244	3.42	J-1660	J-1853	152.4	120	Ductile Iron	-3.51	0.19	0.413
4327	P-245	3.16	J-1626	J-1415	152.4	120	Ductile Iron	-6.57	0.36	1.295
4328	P-246	3133.68	J-1212	J-523	600	100	7	2.7	0.01	0
4329	P-247	403.63	J-523	J-1948	600	100	7	0.9	0	0
4333	P-249	8.46	J-1923	Awajan Low	400	120	Ductile Iron	-75.26	0.6	1.082
4334	P-250	9.62	J-1875	Awajan Low	200	120	Ductile Iron	84.75	2.7	39.533
4343	P-252	3.01	J-58	J-1808	100	100	Steel	-2.75	0.35	2.834
4345	P-253	847.02	J-1837	J-2009	200	120	1	-6.26	0.2	0.317
4346	P-254	310.31	J-2009	J-1647	200	120	1	-12.53	0.4	1.147
4347	P-255	9.84	J-10	J-2009	200	120	Ductile Iron	-5.96	0.19	0.287
4348	P-256	66.09	J-1370	J-1835	300	100	7	-53.65	0.76	3.297
4349	P-257	10.2	J-1835	J-693	300	100	7	0	0	0
4352	P-259	63.57	J-1017	J-2018	200	120	Ductile Iron	52.71	1.68	16.408
4353	P-260	72.88	J-2018	J-1916	200	120	Ductile Iron	52.4	1.67	16.226
4355	P-261	226.51	J-235	J-2010	200	120	1	-31.3	1	6.251
4356	P-262	157.89	J-2010	J-1783	200	120	1	22.54	0.72	3.402
4358	P-263	1140.84	J-1820	J-2011	300	120	1	54.78	0.78	2.445
4359	P-264	93.39	J-2011	J-1821	300	120	1	0.31	0	0
4360	P-265	4.18	J-2010	J-2011	200	120	Ductile Iron	-54.16	1.72	17.247
4368	P-266	5789.69	J-1946	J-2012	600	120	1	261.26	0.92	1.508
4369	P-267	685.01	J-2012	J-1607	600	120	1	1.55	0.01	0
4370	P-268	8.23	J-1854	J-2012	600	120	Ductile Iron	-258.94	0.92	1.474
4372	P-269	5.38	Awajan High Square	FCV-15	600	120	1	-181	0.64	0.761
4373	P-270	1214.74	FCV-15	J-56	600	120	1	-181	0.64	0.764
4384	P-275	6.54	J-475	azraq to khaw 2	600	120	Ductile Iron	78.3	0.28	0.159
4385	P-276	6.23	azraq to khaw 2	J-1944	600	120	Ductile Iron	78.3	0.28	0.155
4387	P-277	9.03	J-475	azraq to khaw 3	600	120	Ductile Iron	78.3	0.28	0.161
4388	P-278	8.32	azraq to khaw 3	J-1944	600	120	Ductile Iron	78.3	0.28	0.161
4393	P-281	8.5	J-813	FCV-16	200	120	Ductile Iron	0	0	0
4394	P-282	8.91	FCV-16	J-814	200	120	Ductile Iron	0	0	0
4400	P-286	49.08	Azraq Res.	J-2014	600	100	Steel	22	0.08	0.022
4401	P-287	195.07	Azraq Res.	J-1960	600	100	Steel	234.74	0.83	1.734
4404	P-289	8.91	J-2015	J-1944	600	100	7	-234.91	0.83	1.737
4407	P-291	11.71	J-1960	azraq new 3	600	100	Steel	46.95	0.17	0.089
4408	P-292	11.61	azraq new 3	J-2015	600	100	Steel	46.95	0.17	0.09
4414	P-297	18.96	J-1960	azraq new 4	600	100	Steel	46.95	0.17	0.088
4415	P-298	17.93	azraq new 4	J-2015	600	100	Steel	46.95	0.17	0.087
4417	P-299	14.6	J-1960	azraq new 2	600	100	Steel	46.95	0.17	0.089
4418	P-300	14.68	azraq new 2	J-2015	600	100	Steel	46.95	0.17	0.086
4421	P-301	28.24	J-1960	azraq new 5	600	100	Steel	46.95	0.17	0.088
4422	P-302	23.51	azraq new 5	J-2015	600	100	Steel	46.95	0.17	0.089
4424	P-303	17.67	J-1960	azraq new 1	600	100	Steel	46.95	0.17	0.088
4425	P-304	17.27	azraq new 1	J-2015	600	100	Steel	46.95	0.17	0.086
4428	P-305	38.46	Corridor Wellfield	FCV-17	600	100	Steel	261.26	0.92	2.113
4429	P-306	17.81	FCV-17	J-608	600	100	Steel	261.26	0.92	2.11
4432	P-308	58.24	Hallabat Reservoir	Hallabat to khaw 2	600	100	Steel	0	0	0
4433	P-309	42.2	Hallabat to khaw 2	J-1810	600	100	Steel	0	0	0
4439	P-312	7.73	J-1810	FCV-19	600	100	7	132.37	0.47	0.596
4440	P-313	544.62	FCV-19	J-1811	600	100	7	132.37	0.47	0.6
4453	P-319	11.38	Khaw Reservoir	Old Khaw 2	600	100	Steel	118.8	0.42	0.49
4454	P-320	14.41	Old Khaw 2	J-911	600	100	Steel	118.8	0.42	0.491
4457	P-321	13.62	Khaw Reservoir	Old Khaw 3	600	100	Steel	132.06	0.47	0.598

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
4458	P-322	13.27	Old Khaw 3	J-911	600	100	Steel	132.06	0.47	0.594
4460	P-323	15.83	Khaw Reservoir	Old Khaw 4	600	100	Steel	132.06	0.47	0.597

Existing Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
4461	P-324	17.03	Old Khaw 4	J-911	600	100	Steel	132.06	0.47	0.599
4466	P-328	12.56	Khaw Reservoir	Khaw New 2	600	100	Steel	221.84	0.78	1.562
4467	P-329	15.65	Khaw New 2	J-958	600	100	Steel	221.84	0.78	1.564
4469	P-330	12.75	Khaw Reservoir	Khaw new 3	600	100	Steel	221.84	0.78	1.562
4470	P-331	15.24	Khaw new 3	J-958	600	100	Steel	221.84	0.78	1.563
4472	P-332	12.75	Khaw Reservoir	Khaw New 4	600	100	Steel	221.83	0.78	1.561
4473	P-333	16.88	Khaw New 4	J-958	600	100	Steel	221.83	0.78	1.561
4480	P-336	2.83	J-731	Zargq Int 2	400	120	Ductile Iron	80.55	0.64	1.235
4481	P-337	2.87	Zargq Int 2	J-1698	400	120	Ductile Iron	80.55	0.64	1.22
4484	P-338	4.83	J-731	Zarqa Int 3	400	120	Ductile Iron	98.3	0.78	1.779
4485	P-339	3.22	Zarqa Int 3	J-1697	400	120	Ductile Iron	98.3	0.78	1.778
4486	P-340	23.82	J-1122	J-812	400	100	7	731.09	5.82	102.44
4487	P-341	29.71	J-812	J-983	400	100	7	453.45	3.61	42.296
4492	P-345	7.42	J-1047	Zarqa Ext 1	400	120	Ductile Iron	146.44	1.17	3.718
4493	P-346	6.78	Zarqa Ext 1	J-1122	400	120	Ductile Iron	146.44	1.17	3.719
4495	P-347	6.03	J-1047	Zarqa Ext 3	400	120	Ductile Iron	292.71	2.33	13.411
4496	P-348	5.8	Zarqa Ext 3	J-1122	400	120	Ductile Iron	292.71	2.33	13.413
4498	P-349	8.8	J-1047	Zarqa Ext 4	400	120	Ductile Iron	251.63	2	10.138
4499	P-350	4.3	Zarqa Ext 4	J-1873	400	120	Ductile Iron	251.63	2	10.15
4508	P-354	55.55	Tamween Reservoir	Tamwn 1	300	100	Steel	6.4	0.09	0.064
4509	P-355	61.95	Tamwn 1	J-1497	300	100	Steel	6.4	0.09	0.065
4511	P-356	53.17	Tamween Reservoir	Tamwn 3	300	100	Steel	79.84	1.13	6.886
4512	P-357	63.24	Tamwn 3	J-1497	300	100	Steel	79.84	1.13	6.886
4515	P-358	54.09	Tamween Reservoir	Tamwn 4	300	100	Steel	79.84	1.13	6.885
4516	P-359	64.66	Tamwn 4	J-1497	300	100	Steel	79.84	1.13	6.885
4520	P-361	8.32	Um Rummaneh Reservoir	to beirein	200	100	Steel	45.3	1.44	17.371
4521	P-362	5.42	to beirein	J-1939	200	100	Steel	45.3	1.44	17.383
4528	P-364	1.86	Awajan High Circular	FCV-20	600	120	1	0	0	0
4529	P-365	1725.3	FCV-20	J-1828	600	120	1	0	0	0
4531	P-366	13.45	J-102	FCV-21	400	100	7	0	0	0
4532	P-367	1.99	FCV-21	Awajan High Circular	400	100	7	0	0	0
4534	P-368	20.27	J-191	FCV-22	300	120	0	0	0	0
4535	P-369	2.94	FCV-22	Awajan High Circular	300	120	0	0	0	0
4538	P-371	3.99	FCV-23	Awajan High Circular	200	120	1	0	0	0
4543	P-374	817.88	J-572	FCV-25	300	120	1	0	0	0
4544	P-375	2.41	FCV-25	J-48	300	120	1	0	0	0
4547	P-376	1311.62	J-1875	J-2019	200	120	1	-86.23	2.74	40.828
4548	P-377	12.62	J-2019	FCV-23	200	120	1	0	0	0
4549	P-378	18.87	J-102	J-2019	152.4	120	Ductile Iron	87.72	4.81	158.39
4554	P-381	4.91	J-65	basteen to hitten 1	200	100	Steel	68.04	2.17	36.905
4555	P-382	5.41	basteen to hitten 1	J-1702	200	100	Steel	68.04	2.17	36.888
4557	P-383	5.13	J-65	basteen to hitten 3	200	100	Steel	75.69	2.41	44.949
4558	P-384	5.94	basteen to hitten 3	J-1702	200	100	Steel	75.69	2.41	44.937
4559	P-385	8.56	J-2006	J-694	200	120	1	-56.15	1.79	18.446
4560	P-386	5.8	J-694	J-1837	200	120	1	0	0	0
4561	P-387	3.58	J-1356	J-920	200	120	Ductile Iron	26.38	0.84	4.558
4580	P-389	12.56	Hallabat Wellfield	FCV-26	600	120	Ductile Iron	197.37	0.7	0.894
4581	P-390	13.15	FCV-26	Hallabat Reservoir	600	120	Ductile Iron	197.37	0.7	0.897
4585	P-392	5.13	Merhib Wells	FCV-27	300	120	Ductile Iron	24.24	0.34	0.536
4586	P-393	4.37	FCV-27	Merhib Reservoir	300	120	Ductile Iron	24.24	0.34	0.545
4594	P-396	23.75	Tamween Wells	FCV-28	300	120	1	78.68	1.11	4.781
4595	P-397	22.38	FCV-28	Tamween Reservoir	300	120	1	78.68	1.11	4.781
4599	P-398	13.65	Rusaifah Wells	FCV-29	400	100	Steel	129.6	1.03	4.16
4600	P-399	31.22	FCV-29	Basateen Reservoir	400	100	Steel	129.6	1.03	4.159
4602	P-400	189.86	J-1709	J-2020	150	100	7	-1.8	0.1	0.18
4603	P-401	91.2	J-2020	J-1713	150	100	7	6.31	0.36	1.835
4605	P-402	68.89	J-1483	J-2021	200	120	1	15.31	0.49	1.662
4606	P-403	168.94	J-2021	J-506	200	120	1	5.4	0.17	0.241
4607	P-404	9.51	J-2020	J-2021	200	100	Steel	-9.01	0.29	0.869
4608	P-405	6130.79	J-2014	J-646	600	100	Steel	22	0.08	0.022
4616	P-411	13.83	J-1843	J-2023	400	120	1	6.94	0.06	0.011
4617	P-412	707.94	J-2023	J-1864	400	120	1	6.04	0.05	0.01
4618	P-413	232.35	J-677	J-1674	152.4	100	Steel	1.8	0.1	0.166
4625	P-416	12.6	Well 22	FCV-30	152.4	120	Ductile Iron	8.3	0.46	2.008
4626	P-417	21.53	FCV-30	J-1106	152.4	120	Ductile Iron	8.3	0.46	2.008
4631	P-421	2.04	J-1711	J-230	152.4	100	Steel	0	0	0
4632	P-422	4.55	J-1634	J-1782	152.4	100	Steel	0	0	0
4634	P-423	10.3	Russaifah High	Russaifah Booster	200	100	Steel	41.69	1.33	14.894
4635	P-424	9.84	Russaifah Booster	J-1743	200	100	Steel	41.69	1.33	14.892
4637	P-425	6.91	Batrawi Reservoir	Batrawi PS (200)	200	120	Ductile Iron	114.92	3.66	69.489
4640	P-427	21.51	Tafeh Reservoir	Tafeh PS	152.4	120	Ductile Iron	1.55	0.08	0.09
4642	P-428	13.08	J-964	Sukhna Pumps	125	120	1	-23.17	1.89	35.319
4643	P-429	11.55	Sukhna Pumps	J-965	125	120	1	-23.17	1.89	35.318
4647	P-430	27.47	J-2002	FCV-31	152.4	120	Ductile Iron	2	0.11	0.144
4648	P-431	29.86	FCV-31	Tafeh Reservoir	152.4	120	Ductile Iron	2	0.11	0.145
4650	P-432	6.14	J-1921	FCV-32	300	100	Steel	80	1.13	6.915
4651	P-433	6.66	FCV-32	Russaifah Low	300	100	Steel	80	1.13	6.914
4657	P-436	4.42	Hitten Reservoir	FCV-34	300	120	Ductile Iron	22	0.31	0.454
4658	P-437	3.54	FCV-34	J-798	300	120	Ductile Iron	22	0.31	0.441
4660	P-438	12.81	J-1958	FCV-35	300	120	Ductile Iron	20	0.28	0.377
4661	P-439	11.23	FCV-35	Sukhna Reservoir	300	120	Ductile Iron	20	0.28	0.378
4663	P-440	4604.54	J-1896	FCV-36	150	100	7	0	0	0
4664	P-441	34.82	FCV-36	J-562	150	100	7	0	0	0
4668	P-443	1806.77	Sarrout Source	Sarout Reservoir	100	100	Steel	3.84	0.49	5.258
4669	P-444	673.01	J-1235	J-1795	100	100	Steel	-13.19	1.68	51.704
4670	P-445	854.73	J-1795	J-545	100	100	Steel	11.43	1.46	39.685
4675	P-448	572.06	J-416	J-2030	100	100	Steel	-6.39	0.81	13.512
4676	P-449	1549.44	J-2030	J-1988	100	100	Steel	1.49	0.19	0.911
4677	P-450	3407.43	Russaifah High	J-2030	100	100	Steel	9.37	1.19	27.446
4683	P-455	1187.71	J-736	J-1634	100	100	Steel	11.71	1.49	41.497
4684	P-456	729.12	J-1662	J-1068	100	100	Steel	0.92	0.12	0.37
4685	P-457	1262.28	J-823	J-1007	100	100	Steel	-0.14	0.02	0.012
4686	P-458	709.6	J-11	J-1782	100	100	Steel	-6.89	0.88	15.537
4687	P-459	407.77	J-1797	J-665	100	100	Steel	-16.82	2.14	81.106
4688	P-460	1282.19	J-253	J-1763	100	100	Steel	13.8	1.76	56.241
4691	P-462	262.5	J-11	J-2032	100	100	Steel	6.41	0.82	13.606
4692	P-463	1043.34	J-2032	J-1756	100	100	Steel	5.4	0.69	9.879
4693	P-464	167.04	J-1520	J-2032	100	100	Steel	-0.12	0.02	0.008
4697	P-466	36.08	Zatari Import	FCV-37	600	120	Ductile Iron	71	0.25	0.134
4698	P-467	32.25	FCV-37	J-1961	600	120	Ductile Iron	71	0.25	0.135

Existing Model Pipe Information AVERAGE DEMAND

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4700	P-468	2829.49	J-1943	FCV-38	600	100	7	-469.65	1.66	6.263
4701	P-469	4.65	FCV-38	J-2015	600	100	7	-469.65	1.66	6.271

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4705	P-471	8.99	Qunaya Well	FCV-39	100	100	Steel	16.61	2.11	79.282
4706	P-472	833.19	FCV-39	Qunaya Reservoir	100	100	Steel	16.61	2.11	79.279
4710	P-474	9.54	Um Rummaneh (Berein) W	FCV-40	100	100	Steel	24.5	3.12	162.841
4711	P-475	8.53	FCV-40	Um Rummaneh Reservoir	100	100	Steel	24.5	3.12	162.847
4717	P-477	1005.79	J-1941	J-2036	150	100	7	-1.1	0.06	0.072
4718	P-478	1833.88	J-2036	J-1942	150	100	7	1.1	0.06	0.072
4719	P-479	20.5	J-2034	J-2036	100	100	Steel	3.29	0.42	3.963
4721	P-480	11.59	Alouk Spring	Alouk Pump	100	100	Steel	4.39	0.56	6.748
4722	P-481	12.16	Alouk Pump	J-2034	100	100	Steel	4.39	0.56	6.748
4727	P-483	5.32	Zarqa Wells	FCV-41	400	100	Steel	142	1.13	4.922
4728	P-484	10.64	FCV-41	J-861	400	100	Steel	142	1.13	4.925
4744	P-486	26.37	J-512	J-2037	100	120	Ductile Iron	1.14	0.14	0.395
4745	P-487	735	J-2037	J-486	100	120	Ductile Iron	0.17	0.02	0.012
4761	P-490	335.02	J-2037	J-2045	100	120	Ductile Iron	0.9	0.12	0.257
4764	P-492	650.94	J-2045	J-2046	100	120	Ductile Iron	0.8	0.1	0.208
4767	P-494	304.22	J-2039	J-2052	100	120	Ductile Iron	0.04	0.01	0.001
4769	P-495	629.19	J-2045	J-2053	100	120	Ductile Iron	0.04	0	0.001
4770	P-496	104.08	J-2053	J-2039	100	120	Ductile Iron	-0.05	0.01	0.001
4771	P-497	788.31	J-2052	J-2053	100	120	Ductile Iron	-0.02	0	0
4772	P-498	229.14	J-2039	J-2040	100	120	Ductile Iron	-0.15	0.02	0.009
4773	P-499	105.61	J-2040	J-2041	100	120	Ductile Iron	-0.07	0.01	0.002
4777	P-502	465.55	J-2042	J-2041	100	120	Ductile Iron	0.12	0.02	0.006
4778	P-503	249.42	J-2042	J-2043	100	120	Ductile Iron	-0.26	0.03	0.025
4779	P-504	1021.79	J-2043	J-2040	100	120	Ductile Iron	0.15	0.02	0.009
4780	P-505	782.04	J-2043	J-2044	100	120	Ductile Iron	-0.47	0.06	0.076
4781	P-506	48.03	J-2044	J-1399	100	120	Ductile Iron	-0.53	0.07	0.096
4782	P-507	637.72	J-1040	J-2047	100	120	Ductile Iron	-0.06	0.01	0.002
4783	P-508	93.96	J-2047	J-2050	100	120	Ductile Iron	-0.15	0.02	0.01
4784	P-509	88.27	J-2050	J-2048	100	120	Ductile Iron	-0.31	0.04	0.035
4785	P-510	304.1	J-2048	J-744	100	120	Ductile Iron	-0.25	0.03	0.024
4786	P-511	1275.68	J-744	J-2048	100	120	Ductile Iron	0.12	0.01	0.006
4788	P-513	966.64	J-2049	J-2047	100	120	Ductile Iron	-0.03	0	0.001
4790	P-514	637.85	J-2041	J-2055	100	120	Ductile Iron	-0.01	0	0
4791	P-515	1242.47	J-2055	J-2042	100	120	Ductile Iron	-0.07	0.01	0.002
4793	P-516	328.02	J-2050	J-2056	100	120	Ductile Iron	0.09	0.01	0.004
4794	P-517	690.06	J-2056	J-2049	100	120	Ductile Iron	0.03	0	0
4796	P-518	494.83	J-1699	J-1030	400	100	7	159.5	1.27	6.108
4797	P-519	536.98	J-1030	J-1543	400	100	7	488.48	3.89	48.545
4799	P-520	5.22	J-694	J-2057	300	100	7	50.81	0.72	2.982
4800	P-521	285.84	J-2057	J-1729	300	100	7	149.09	2.11	21.888
4804	P-523	3.75	Hashmeya Wells	Hashmeya to Zarqa	400	100	Steel	98.27	0.78	2.492
4805	P-524	560.34	Hashmeya to Zarqa	J-2057	400	100	Steel	98.27	0.78	2.491
4809	P-525	725.06	J-270	J-226	100	100	Steel	1.73	0.22	1.196
4810	P-526	837.35	J-1770	J-1685	100	100	Steel	19.57	2.49	107.43
4811	P-527	224.47	J-1685	J-1610	100	100	Steel	-39.98	5.09	403.282
4812	P-528	36.4	J-727	J-634	100	100	Steel	1.62	0.21	1.069
4815	P-530	1019.57	J-1500	J-634	100	100	Steel	2.35	0.3	2.114
4816	P-531	247.27	J-1871	J-1769	100	100	Steel	23.56	3	151.495
4817	P-532	1759.28	J-1101	J-612	100	100	Steel	1.17	0.15	0.584
4818	P-533	837.42	J-1330	J-1320	100	100	Steel	-6.3	0.8	13.179
4819	P-534	840.71	J-1277	J-1287	100	100	Steel	-6.62	0.84	14.426
4820	P-535	477.05	J-1358	J-1261	100	100	Steel	4.33	0.55	6.584
4821	P-536	212.85	J-1261	J-1250	100	100	Steel	1.85	0.24	1.362
4822	P-537	2400.12	J-1645	J-1227	100	100	Steel	-10.29	1.31	32.637

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
477	J-288	680	<None>	0	725.01	44.9
478	J-289	680	<None>	0	725.01	44.9
780	J-475	563	<None>	0	572.13	9.1
781	J-476	563	<None>	0	572.15	9.1
876	J-532	680	<None>	0	726.47	46.4
877	J-533	680	<None>	0	726.47	46.4
1000	J-608	700	<None>	0	729.04	29
1183	J-717	732.28	<None>	0	820.5	88
1184	J-718	732.37	<None>	0	820.48	87.9
1942	J-1151	680	<None>	0	726.41	46.3
2299	J-1328	709.19	<None>	0	825.46	116
2300	J-1329	706.5	<None>	0	825.58	118.8
2692	J-1504	680	<None>	0	725.19	45.1
2815	J-1553	680	<None>	0	726.68	46.6
2839	J-1562	680	<None>	0	726.41	46.3
2970	J-1611	680	<None>	0	726.68	46.6
3523	J-1809	700.07	<None>	0	827.43	127.1
3528	J-1812	733.09	<None>	0	782.76	49.6
3548	J-1820	595.68	<None>	0	622.94	27.2
3681	J-1869	686	<None>	0	726.68	40.6
3789	J-1906	668	<None>	0	726.41	58.3
3810	J-1915	596.47	<None>	0	623.16	26.6
3888	J-1943	559.9	<None>	0	983.94	423.2
3889	J-1944	563	<None>	0	1001.71	437.8
3891	J-1945	591	<None>	0	714.96	123.7
3892	J-1946	593	<None>	0	710.3	117.1
3921	J-1959	595.97	<None>	0	623	27
3923	J-1960	558	<None>	0	572.06	14
3927	J-1961	582.11	<None>	0	607.56	25.4
3932	J-1964	625	<None>	0	744.44	119.2
4397	J-2014	560	<None>	0	572.4	12.4
4402	J-2015	558	<None>	0	1001.69	442.8
4798	J-2057	543.8	<None>	0	610.92	67
799	J-486	602.51	KABA City	0.1	734.25	131.5
800	J-487	602.68	KABA City	0.1	734.25	131.3
825	J-501	596.92	KABA City	0.1	734.27	137.1
826	J-502	597.03	KABA City	0.1	734.27	137
842	J-511	596.73	KABA City	0.1	734.3	137.3
843	J-512	596.81	KABA City	0.1	734.3	137.2
897	J-546	598.81	KABA City	0.1	734.27	135.2
898	J-547	598.72	KABA City	0.1	734.27	135.3
983	J-598	598.92	KABA City	0.1	734.27	135.1
1186	J-719	599.49	KABA City	0.1	734.26	134.5
1187	J-720	599.65	KABA City	0.1	734.26	134.3
1226	J-744	594.53	KABA City	0.1	734.3	139.5
1227	J-745	594.85	KABA City	0.1	734.3	139.2
1321	J-801	601.48	KABA City	0.1	734.26	132.5
1322	J-802	601.64	KABA City	0.1	734.26	132.3
1731	J-1040	595.83	KABA City	0.1	734.27	138.2
1732	J-1041	596.18	KABA City	0.1	734.27	137.8
2013	J-1183	597.62	KABA City	0.1	734.27	136.4
2014	J-1184	598.19	KABA City	0.1	734.27	135.8
2185	J-1273	601.92	KABA City	0.1	734.26	132.1

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2186	J-1274	602.62	KABA City	0.1	734.26	131.4
2413	J-1381	598.54	KABA City	0.1	734.26	135.4
2446	J-1399	605.17	KABA City	0.1	734.25	128.8
2478	J-1411	603.99	KABA City	0.1	734.25	130
2675	J-1497	610	KABA City	0.1	929.49	318.9
2872	J-1573	599.16	KABA City	0.1	734.27	134.8
2903	J-1583	619.53	KABA City	0.1	934.28	314.1
2904	J-1584	617.74	KABA City	0.1	935.13	316.8
3112	J-1659	599.43	KABA City	0.1	734.28	134.6
3118	J-1660	596.3	KABA City	0.1	734.36	137.8
3457	J-1787	610.83	KABA City	0.1	935.13	323.6
3563	J-1825	631.21	KABA City	0.1	657.69	26.4
3639	J-1852	599.17	KABA City	0.1	734.36	134.9
3640	J-1853	596.31	KABA City	0.1	734.36	137.8
3845	J-1929	610.91	KABA City	0.1	615	4.1
4743	J-2037	596	KABA City	0.1	734.28	138
4749	J-2039	606	KABA City	0.1	734.06	127.8
4750	J-2040	599	KABA City	0.1	734.06	134.8
4751	J-2041	598	KABA City	0.1	734.06	135.8
4752	J-2042	598	KABA City	0.1	734.07	135.8
4753	J-2043	596	KABA City	0.1	734.09	137.8
4754	J-2044	605	KABA City	0.1	734.24	129
4755	J-2045	581	KABA City	0.1	734.06	152.7
4757	J-2047	592	KABA City	0.1	734.27	142
4758	J-2048	587	KABA City	0.1	734.28	147
4759	J-2049	576	KABA City	0.1	734.27	157.9
4760	J-2050	589	KABA City	0.1	734.27	145
4766	J-2052	609	KABA City	0.1	734.06	124.8
4768	J-2053	602	KABA City	0.1	734.06	131.8
4789	J-2055	606	KABA City	0.1	734.06	127.8
4792	J-2056	576	KABA City	0.1	734.27	157.9
27	J-2	575.16	North Region	0.52	609.79	34.6
30	J-3	538.04	North Region	0.52	608.94	70.8
31	J-4	538.02	North Region	0.52	608.92	70.8
41	J-10	575.06	North Region	0.52	609.79	34.7
49	J-15	575.27	North Region	0.52	609.79	34.4
51	J-16	540.19	North Region	0.52	599.82	59.5
52	J-17	540.2	North Region	0.52	599.67	59.3
57	J-20	544.05	North Region	0.52	595.12	51
58	J-21	543.98	North Region	0.52	595.11	51
60	J-22	575.2	North Region	0.52	609.78	34.5
62	J-23	548.69	North Region	0.52	609.42	60.6
63	J-24	548.61	North Region	0.52	609.41	60.7
65	J-25	591.23	North Region	0.52	610.76	19.5
66	J-26	591.14	North Region	0.52	610.75	19.6
68	J-27	567.27	North Region	0.52	609.17	41.8
69	J-28	567.17	North Region	0.52	609.17	41.9
82	J-36	559.99	North Region	0.52	609.25	49.2
83	J-37	560.05	North Region	0.52	609.25	49.1
109	J-54	528.17	North Region	0.52	591.68	63.4
110	J-55	528.2	North Region	0.52	591.67	63.3
115	J-58	575.45	North Region	0.52	609.8	34.3
117	J-59	548.49	North Region	0.52	607.4	58.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
118	J-60	548.41	North Region	0.52	607.39	58.9
123	J-63	530.05	North Region	0.52	591.55	61.4
124	J-64	530.11	North Region	0.52	591.55	61.3
138	J-73	548.32	North Region	0.52	607.39	58.9
167	J-91	564.99	North Region	0.52	608.9	43.8
168	J-92	565.08	North Region	0.52	608.89	43.7
176	J-97	533.86	North Region	0.52	606.22	72.2
177	J-98	533.8	North Region	0.52	606.22	72.3
194	J-109	559.91	North Region	0.52	609.24	49.2
199	J-112	540.71	North Region	0.52	604.83	64
200	J-113	540.69	North Region	0.52	604.83	64
205	J-116	591.25	North Region	0.52	610.75	19.5
210	J-119	538.31	North Region	0.52	606.31	67.9
211	J-120	538.22	North Region	0.52	606.32	68
261	J-152	562.07	North Region	0.52	609.31	47.1
262	J-153	561.99	North Region	0.52	609.3	47.2
281	J-165	574.96	North Region	0.52	609.76	34.7
285	J-167	561.91	North Region	0.52	609.29	47.3
290	J-170	564.79	North Region	0.52	608.86	44
292	J-171	557.1	North Region	0.52	609.28	52.1
293	J-172	557.05	North Region	0.52	609.28	52.1
339	J-202	554.86	North Region	0.52	609.26	54.3
340	J-203	554.89	North Region	0.52	609.26	54.3
342	J-204	551.04	North Region	0.52	609.02	57.9
343	J-205	551.12	North Region	0.52	609.02	57.8
351	J-210	533.94	North Region	0.52	606.22	72.1
370	J-222	591.02	North Region	0.52	610.74	19.7
392	J-235	585.68	North Region	0.52	612.13	26.4
393	J-236	585.69	North Region	0.52	612.09	26.4
398	J-239	554.25	North Region	0.52	609.72	55.4
399	J-240	554.51	North Region	0.52	609.72	55.1
431	J-260	539.77	North Region	0.52	599.65	59.8
444	J-268	543.91	North Region	0.52	595.11	51.1
482	J-291	538.27	North Region	0.52	606.23	67.8
483	J-292	538.15	North Region	0.52	606.26	68
504	J-305	585.91	North Region	0.52	612.06	26.1
532	J-322	543.83	North Region	0.52	595.11	51.2
578	J-350	557.57	North Region	0.52	609.37	51.7
579	J-351	557.49	North Region	0.52	609.38	51.8
613	J-372	537.98	North Region	0.52	608.78	70.7
614	J-373	537.96	North Region	0.52	608.75	70.6
625	J-380	544.75	North Region	0.52	596.21	51.4
654	J-397	572.34	North Region	0.52	609.24	36.8
655	J-398	572.11	North Region	0.52	609.24	37.1
682	J-414	528.45	North Region	0.52	598.36	69.8
683	J-415	528.75	North Region	0.52	598.38	69.5
711	J-432	584.58	North Region	0.52	610.06	25.4
712	J-433	584.1	North Region	0.52	610.05	25.9
717	J-436	528.28	North Region	0.52	592.08	63.7
718	J-437	528.26	North Region	0.52	592.05	63.7
733	J-446	547.56	North Region	0.52	609.33	61.7
734	J-447	547.38	North Region	0.52	609.32	61.8
789	J-480	572.63	North Region	0.52	609.24	36.5

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
805	J-489	554.94	North Region	0.52	609.74	54.7
858	J-521	545.82	North Region	0.52	608.85	62.9
859	J-522	545.92	North Region	0.52	608.85	62.8
885	J-538	530.58	North Region	0.52	565.83	35.2
886	J-539	530.46	North Region	0.52	565.83	35.3
891	J-542	517.74	North Region	0.52	583.77	65.9
892	J-543	518.24	North Region	0.52	583.77	65.4
918	J-559	555.41	North Region	0.52	609.67	54.2
970	J-590	528.03	North Region	0.52	598.34	70.2
1018	J-619	530.2	North Region	0.52	565.84	35.6
1019	J-620	529.9	North Region	0.52	565.84	35.9
1024	J-622	546.18	North Region	0.52	604.88	58.6
1025	J-623	546.39	North Region	0.52	604.87	58.4
1027	J-624	517.26	North Region	0.52	597	79.6
1028	J-625	517.15	North Region	0.52	597.07	79.8
1033	J-628	527.94	North Region	0.52	598.38	70.3
1092	J-664	554.24	North Region	0.52	609.26	54.9
1118	J-679	576.04	North Region	0.52	614.29	38.2
1119	J-680	576.48	North Region	0.52	614.29	37.7
1131	J-687	527.01	North Region	0.52	598.38	71.2
1142	J-693	543.88	North Region	0.52	610.93	66.9
1143	J-694	543.8	North Region	0.52	610.93	67
1160	J-703	524.54	North Region	0.52	598.03	73.3
1161	J-704	525.08	North Region	0.52	598.07	72.8
1163	J-705	543.2	North Region	0.52	607.33	64
1164	J-706	542.84	North Region	0.52	607.33	64.4
1208	J-733	546.52	North Region	0.52	604.88	58.2
1283	J-778	576.44	North Region	0.52	614.29	37.8
1293	J-784	537.99	North Region	0.52	607.47	69.3
1294	J-785	537.96	North Region	0.52	607.52	69.4
1305	J-792	543.59	North Region	0.52	608.42	64.7
1306	J-793	543.22	North Region	0.52	608.42	65.1
1336	J-810	555.51	North Region	0.52	610.33	54.7
1381	J-837	543.68	North Region	0.52	609.14	65.3
1382	J-838	543.79	North Region	0.52	609.11	65.2
1384	J-839	533.45	North Region	0.52	522.74	-10.7
1385	J-840	533.34	North Region	0.52	522.74	-10.6
1408	J-853	517.28	North Region	0.52	596.9	79.5
1417	J-858	530.85	North Region	0.52	565.86	34.9
1418	J-859	530.59	North Region	0.52	565.85	35.2
1473	J-892	527.2	North Region	0.52	598.26	70.9
1493	J-904	516.92	North Region	0.52	597.1	80
1506	J-911	596	North Region	0.52	962.46	365.7
1507	J-912	596	North Region	0.52	605.12	9.1
1511	J-914	544.61	North Region	0.52	595.3	50.6
1552	J-935	546.14	North Region	0.52	608.85	62.6
1580	J-952	550.54	North Region	0.52	604.84	54.2
1581	J-953	550.05	North Region	0.52	604.84	54.7
1589	J-957	582.93	North Region	0.52	676.76	93.6
1590	J-958	590	North Region	0.52	677.25	87.1
1601	J-964	490	North Region	0.52	646.65	156.3
1602	J-965	490	North Region	0.52	448.4	-41.5
1607	J-967	542.35	North Region	0.52	608.42	65.9

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1608	J-968	541.78	North Region	0.52	608.42	66.5
1610	J-969	538.18	North Region	0.52	607.32	69
1611	J-970	538.07	North Region	0.52	607.38	69.2
1614	J-971	520.49	North Region	0.52	591.75	71.1
1615	J-972	521.2	North Region	0.52	591.73	70.4
1649	J-992	589.97	<None>	0.52	520.47	-69.4
1650	J-993	591.41	<None>	0.52	520.47	-70.8
1654	J-995	554.06	North Region	0.52	610.41	56.2
1655	J-996	553.46	North Region	0.52	610.41	56.8
1675	J-1008	518.52	North Region	0.52	580.69	62
1676	J-1009	517.23	North Region	0.52	580.69	63.3
1690	J-1017	544.48	North Region	0.52	648.03	103.3
1691	J-1018	545.31	North Region	0.52	648.66	103.1
1702	J-1024	529.64	North Region	0.52	623.92	94.1
1703	J-1025	529.25	North Region	0.52	626.37	96.9
1762	J-1056	546.65	North Region	0.52	609.29	62.5
1766	J-1058	546.36	North Region	0.52	609.26	62.8
1771	J-1061	528.49	North Region	0.52	591.63	63
1781	J-1067	538.82	North Region	0.52	606.41	67.5
1786	J-1070	528.8	North Region	0.52	591.6	62.7
1813	J-1084	537.94	North Region	0.52	607.64	69.6
1825	J-1091	525.45	North Region	0.52	591.68	66.1
1826	J-1092	526.37	North Region	0.52	591.68	65.2
1834	J-1095	571.68	North Region	0.52	614.3	42.5
1835	J-1096	570.75	North Region	0.52	614.3	43.5
1853	J-1107	524.45	North Region	0.52	591.68	67.1
1859	J-1110	530.82	North Region	0.52	591.55	60.6
1867	J-1114	527.39	North Region	0.52	591.68	64.2
1883	J-1121	545.45	North Region	0.52	608.85	63.3
1888	J-1123	529.86	North Region	0.52	620.76	90.7
1898	J-1128	529.33	North Region	0.52	591.57	62.1
1910	J-1133	522.29	North Region	0.52	591.71	69.3
1911	J-1134	523.29	North Region	0.52	591.69	68.3
1926	J-1143	539.39	North Region	0.52	604.78	65.3
1927	J-1144	538.42	North Region	0.52	604.77	66.2
1964	J-1159	572.94	North Region	0.52	614.3	41.3
1981	J-1167	544.65	North Region	0.52	595.6	50.9
2037	J-1195	529.58	North Region	0.52	616.77	87
2046	J-1198	544.96	North Region	0.52	598.55	53.5
2047	J-1199	544.92	North Region	0.52	598.09	53.1
2070	J-1210	516.11	North Region	0.52	597.19	80.9
2077	J-1214	532.52	North Region	0.52	606.73	74.1
2078	J-1215	532.57	North Region	0.52	606.82	74.1
2082	J-1217	515.89	North Region	0.52	580.71	64.7
2091	J-1222	544.87	North Region	0.52	608.98	64
2092	J-1223	544.99	North Region	0.52	608.94	63.8
2124	J-1241	547.48	North Region	0.52	604.86	57.3
2136	J-1247	544.24	North Region	0.52	609.04	64.7
2153	J-1256	557.93	North Region	0.52	609.21	51.2
2205	J-1282	541.93	North Region	0.52	594.81	52.8
2221	J-1290	557.81	North Region	0.52	609.33	51.4
2223	J-1291	553.71	North Region	0.52	607.77	53.9
2252	J-1304	544.86	North Region	0.52	597.52	52.6

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2254	J-1305	542.07	North Region	0.52	604.83	62.6
2269	J-1313	543.58	North Region	0.52	608.85	65.1
2270	J-1314	543.81	North Region	0.52	608.85	64.9
2306	J-1332	536.83	North Region	0.52	604.77	67.8
2341	J-1348	548.73	North Region	0.52	604.85	56
2370	J-1360	541.7	North Region	0.52	605.41	63.6
2371	J-1361	543.4	North Region	0.52	605.08	61.6
2387	J-1368	544.79	North Region	0.52	596.8	51.9
2390	J-1370	544.61	North Region	0.52	652.87	108
2399	J-1374	591.61	North Region	0.52	610.59	18.9
2415	J-1382	532.19	North Region	0.52	591.53	59.2
2416	J-1383	532.04	North Region	0.52	591.52	59.4
2437	J-1394	548.82	North Region	0.52	608.48	59.5
2438	J-1395	546.87	North Region	0.52	608.45	61.5
2442	J-1397	520.27	North Region	0.52	593.74	73.3
2443	J-1398	524.59	North Region	0.52	593.47	68.7
2452	J-1401	545.35	North Region	0.52	609.19	63.7
2453	J-1402	544.9	North Region	0.52	609.16	64.1
2476	J-1410	548.73	North Region	0.52	609.24	60.4
2490	J-1415	532.5	North Region	0.52	593.02	60.4
2491	J-1416	531.93	North Region	0.52	593.43	61.4
2493	J-1417	527.6	North Region	0.52	593.45	65.7
2504	J-1421	534.69	North Region	0.52	604.76	69.9
2509	J-1424	573.57	North Region	0.52	609.24	35.6
2522	J-1430	536.06	North Region	0.52	607.1	70.9
2601	J-1463	550.35	North Region	0.52	608.53	58.1
2608	J-1466	528.48	North Region	0.52	565.83	37.3
2651	J-1487	544.35	North Region	0.52	608.85	64.4
2662	J-1490	544.57	North Region	0.52	608.85	64.2
2710	J-1511	559.48	North Region	0.52	611.2	51.6
2719	J-1515	556.51	North Region	0.52	609.16	52.5
2720	J-1516	555.85	North Region	0.52	609.17	53.2
2752	J-1530	531.76	North Region	0.52	593.43	61.6
2760	J-1533	562.56	North Region	0.52	609.17	46.5
2783	J-1541	550.09	North Region	0.52	604.86	54.7
2792	J-1545	522.16	North Region	0.52	597.67	75.4
2820	J-1555	530.38	North Region	0.52	599.14	68.6
2897	J-1581	548.47	North Region	0.52	608.87	60.3
2945	J-1601	564.62	North Region	0.52	610.45	45.7
2946	J-1602	556.95	North Region	0.52	610.43	53.4
2972	J-1612	566.96	North Region	0.52	520.62	-46.2
2973	J-1613	570.97	North Region	0.52	520.56	-50.3
2986	J-1615	549.65	North Region	0.52	609.14	59.4
3022	J-1625	555.04	North Region	0.52	608.66	53.5
3027	J-1626	532.4	North Region	0.52	593.01	60.5
3029	J-1627	520.7	North Region	0.52	594.44	73.6
3043	J-1630	556.32	North Region	0.52	521.72	-34.5
3044	J-1631	558.51	North Region	0.52	521.2	-37.2
3060	J-1635	528	North Region	0.52	593.01	64.9
3065	J-1638	572.68	North Region	0.52	609.16	36.4
3083	J-1647	590.65	North Region	0.52	610.7	20
3084	J-1648	591.58	North Region	0.52	611.36	19.7
3103	J-1656	571.69	North Region	0.52	614.3	42.5

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3104	J-1657	569.26	North Region	0.52	612.65	43.3
3108	J-1658	565.34	North Region	0.52	609.16	43.7
3137	J-1667	576.31	North Region	0.52	610.5	34.1
3158	J-1675	580.09	North Region	0.52	520.5	-59.5
3193	J-1689	591.37	North Region	0.52	622.73	31.3
3194	J-1690	589.5	North Region	0.52	622.73	33.2
3268	J-1716	513.1	North Region	0.52	581.49	68.3
3295	J-1729	539.97	North Region	0.52	604.71	64.6
3336	J-1744	583.94	North Region	0.52	605.01	21
3337	J-1745	589.83	North Region	0.52	605.06	15.2
3357	J-1751	565.45	North Region	0.52	521.19	-44.2
3448	J-1783	571.98	North Region	0.52	614.35	42.3
3518	J-1807	590.91	North Region	0.52	610.74	19.8
3519	J-1808	575.32	North Region	0.52	609.82	34.4
3535	J-1815	550.97	North Region	0.52	583.75	32.7
3544	J-1819	578.42	North Region	0.52	605.06	26.6
3549	J-1821	573.29	North Region	0.52	615.89	42.5
3575	J-1829	575.96	North Region	0.52	610.5	34.5
3576	J-1830	564.88	North Region	0.52	610.49	45.5
3579	J-1831	517.29	North Region	0.52	596.7	79.2
3588	J-1834	538	North Region	0.52	709.66	171.3
3589	J-1835	543.98	North Region	0.52	653.09	108.9
3595	J-1836	538	North Region	0.52	600.06	61.9
3596	J-1837	543.76	North Region	0.52	609.12	65.2
3620	J-1846	558.38	North Region	0.52	525.63	-32.7
3621	J-1847	549.32	North Region	0.52	527.66	-21.6
3646	J-1855	539.8	North Region	0.52	592.99	53.1
3648	J-1856	575.1	North Region	0.52	608.92	33.8
3649	J-1857	537.94	North Region	0.52	608.92	70.8
3688	J-1872	507.04	North Region	0.52	581.48	74.3
3705	J-1876	582.53	North Region	0.52	676.69	94
3706	J-1877	581.08	North Region	0.52	674.35	93.1
3724	J-1882	551.16	North Region	0.52	587.93	36.7
3744	J-1890	543.98	North Region	0.52	654.54	110.3
3745	J-1891	571.15	North Region	0.52	654.54	83.2
3750	J-1893	553.1	North Region	0.52	524.75	-28.3
3779	J-1902	569.91	North Region	0.52	646.73	76.7
3780	J-1903	571.48	North Region	0.52	633.83	62.2
3786	J-1905	576.16	North Region	0.52	580.54	4.4
3791	J-1907	517.43	North Region	0.52	580.51	63
3792	J-1908	576.23	North Region	0.52	580.53	4.3
3811	J-1916	546.68	North Region	0.52	645.92	99
3872	J-1936	533.47	North Region	0.52	537.28	3.8
3881	J-1940	523.19	North Region	0.52	565.78	42.5
3901	J-1950	546.77	North Region	0.52	704.22	157.1
3902	J-1951	595.6	<None>	0.52	704.12	108.3
3905	J-1952	596	North Region	0.52	962.36	365.6
3914	J-1955	582.65	North Region	0.52	676.45	93.6
3916	J-1956	582.85	North Region	0.52	676.72	93.7
3920	J-1958	555.04	North Region	0.52	619.97	64.8
3929	J-1962	584.38	North Region	0.52	605.17	20.7
3931	J-1963	584.6	North Region	0.52	605.31	20.7
3964	J-1966	557.43	North Region	0.52	525.61	-31.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3966	J-1967	555.75	North Region	0.52	525.57	-30.1
3969	J-1968	559.64	North Region	0.52	521.17	-38.4
3971	J-1969	563.43	North Region	0.52	521.09	-42.3
3973	J-1970	566	North Region	0.52	521.02	-44.9
3975	J-1971	568.67	North Region	0.52	520.97	-47.6
3977	J-1972	565.25	North Region	0.52	520.9	-44.3
4289	J-2004	571.89	North Region	0.52	614.3	42.3
4295	J-2006	543.76	North Region	0.52	610.77	66.9
4344	J-2009	575	North Region	0.52	609.8	34.7
4354	J-2010	576	North Region	0.52	615.71	39.6
4357	J-2011	576	North Region	0.52	615.89	39.8
4526	J-2018	545	<None>	0.52	647.04	101.8
88	J-40	609.87	Tatweer	0.58	654.96	45
89	J-41	609.92	Tatweer	0.58	654.96	44.9
164	J-89	613.58	Tatweer	0.58	655.11	41.5
165	J-90	613.62	Tatweer	0.58	655.12	41.4
188	J-105	612.5	Tatweer	0.58	655.5	42.9
189	J-106	612.47	Tatweer	0.58	655.51	43
253	J-147	613.68	Tatweer	0.58	655.13	41.4
258	J-150	610.03	Tatweer	0.58	654.94	44.8
259	J-151	610.01	Tatweer	0.58	654.94	44.8
348	J-208	610.08	Tatweer	0.58	654.94	44.8
349	J-209	610.06	Tatweer	0.58	654.94	44.8
377	J-226	610.09	Tatweer	0.58	654.94	44.8
446	J-269	616.72	Tatweer	0.58	657.09	40.3
447	J-270	616.72	Tatweer	0.58	657.13	40.3
460	J-278	616.72	Tatweer	0.58	657.04	40.2
755	J-460	616.7	Tatweer	0.58	656.66	39.9
756	J-461	616.72	Tatweer	0.58	656.71	39.9
912	J-555	609.7	Tatweer	0.58	654.94	45.2
913	J-556	609.69	Tatweer	0.58	654.94	45.2
947	J-577	629.28	Tatweer	0.58	657.69	28.3
948	J-578	629.53	Tatweer	0.58	657.69	28.1
955	J-582	652.53	<None>	0.58	858.51	205.6
956	J-583	652.98	<None>	0.58	858.5	205.1
960	J-585	616.71	Tatweer	0.58	657.26	40.5
993	J-604	616.73	Tatweer	0.58	656.97	40.2
1003	J-610	629.79	Tatweer	0.58	657.69	27.8
1069	J-650	653.5	<None>	0.58	858.5	204.6
1108	J-673	628.97	Tatweer	0.58	657.68	28.7
1361	J-824	610.69	Tatweer	0.58	654.98	44.2
1362	J-825	611.15	Tatweer	0.58	654.99	43.8
1490	J-902	609.89	Tatweer	0.58	654.94	45
1491	J-903	609.79	Tatweer	0.58	654.94	45.1
1587	J-956	613.94	Tatweer	0.58	655.17	41.1
1820	J-1088	616.7	Tatweer	0.58	657.71	40.9
1861	J-1111	615.53	Tatweer	0.58	656.19	40.6
1862	J-1112	613.98	Tatweer	0.58	656.02	42
1938	J-1149	612.83	Tatweer	0.58	655.85	42.9
1970	J-1162	612.9	Tatweer	0.58	655.39	42.4
1991	J-1171	612.55	Tatweer	0.58	655.66	43
2150	J-1255	616.58	Tatweer	0.58	657.99	41.3
2174	J-1267	630.89	<None>	0.58	861.29	229.9

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2175	J-1268	629.55	<None>	0.58	861.52	231.5
2272	J-1315	613.66	Tatweer	0.58	656.18	42.4
2324	J-1341	627.09	Tatweer	0.58	657.68	30.5
2539	J-1436	627.39	<None>	0.58	860.05	232.2
2540	J-1437	625.59	<None>	0.58	860.24	234.2
2621	J-1472	620.7	Tatweer	0.58	657.7	36.9
3003	J-1620	625.27	<None>	0.58	862.33	236.6
3017	J-1624	631.43	<None>	0.58	860.72	228.8
3173	J-1683	595.27	Tatweer	0.58	668.07	72.7
3271	J-1717	628.54	<None>	0.58	859.65	230.6
3313	J-1736	650	<None>	0.58	859.33	208.9
3368	J-1755	646.86	<None>	0.58	858.48	211.2
3486	J-1796	609.67	Tatweer	0.58	659.65	49.9
4318	J-2008	626.77	<None>	0.58	862.93	235.7
3467	J-1790	938.08	West Region	1.2	1143.95	205.5
566	J-342	573.04	East - Dulail	1.28	642.35	69.2
567	J-343	573.2	East - Dulail	1.28	642.36	69
1423	J-862	590.47	East - Dulail	1.28	600.67	10.2
1424	J-863	590.51	East - Dulail	1.28	600.7	10.2
1497	J-906	555	East - Dulail	1.28	315.72	-238.8
1498	J-907	555	East - Dulail	1.28	315.71	-238.8
1528	J-922	588.34	East - Dulail	1.28	602.01	13.6
1529	J-923	588.22	East - Dulail	1.28	602.07	13.8
1554	J-936	555	East - Dulail	1.28	343.58	-211
1555	J-937	555	East - Dulail	1.28	343.57	-211
1585	J-955	555	East - Dulail	1.28	343.56	-211
1617	J-973	555	East - Dulail	1.28	315.71	-238.8
1638	J-985	555	East - Dulail	1.28	311.99	-242.5
1639	J-986	555	East - Dulail	1.28	311.94	-242.6
1660	J-999	579.58	East - Dulail	1.28	431.47	-147.8
1661	J-1000	579.22	East - Dulail	1.28	431.47	-147.5
1720	J-1034	579.98	East - Dulail	1.28	431.49	-148.2
1757	J-1053	590.57	East - Dulail	1.28	600.87	10.3
1758	J-1054	590.54	East - Dulail	1.28	600.92	10.4
1832	J-1094	555	East - Dulail	1.28	316.07	-238.4
1840	J-1099	555	East - Dulail	1.28	315.54	-239
1845	J-1102	555	East - Dulail	1.28	323.22	-231.3
1846	J-1103	555	East - Dulail	1.28	323.22	-231.3
1857	J-1109	555	East - Dulail	1.28	311.92	-242.6
1976	J-1165	555	East - Dulail	1.28	324.15	-230.4
2020	J-1187	555	East - Dulail	1.28	311.91	-242.6
2042	J-1197	555	East - Dulail	1.28	311.93	-242.6
2072	J-1211	577.83	East - Dulail	1.28	433.78	-143.8
2202	J-1280	576.2	East - Dulail	1.28	679.55	103.1
2203	J-1281	575.62	East - Dulail	1.28	677.36	101.5
2242	J-1299	590.39	East - Dulail	1.28	601.05	10.6
2433	J-1392	555	East - Dulail	1.28	321.16	-233.4
2434	J-1393	555	East - Dulail	1.28	319.98	-234.5
2488	J-1414	555	East - Dulail	1.28	315.19	-239.3
2687	J-1502	586.55	East - Dulail	1.28	602.94	16.4
2688	J-1503	586.12	East - Dulail	1.28	603.41	17.3
2746	J-1529	587.43	East - Dulail	1.28	602.45	15
2829	J-1558	596.83	East - Dulail	1.28	846.53	249.2

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2830	J-1559	594.85	East - Dulail	1.28	840.66	245.3
2889	J-1578	574.93	East - Dulail	1.28	672.07	97
2909	J-1586	585.8	East - Dulail	1.28	604.09	18.3
2927	J-1594	602.94	East - Dulail	1.28	600.07	-2.9
2928	J-1595	597.67	East - Dulail	1.28	600.15	2.5
2959	J-1607	593.78	East - Dulail	1.28	701.57	107.6
2960	J-1608	593.73	East - Dulail	1.28	701.57	107.6
2982	J-1614	592.52	East - Dulail	1.28	833.49	240.5
2995	J-1619	585.38	East - Dulail	1.28	604.97	19.6
3286	J-1724	591.86	East - Dulail	1.28	600.33	8.4
3494	J-1799	596	East - Dulail	1.28	598.98	3
3495	J-1800	594.68	East - Dulail	1.28	598.93	4.2
3505	J-1804	579.27	East - Dulail	1.28	695.79	116.3
3525	J-1810	596	East - Dulail	1.28	751.82	155.5
3526	J-1811	594.82	East - Dulail	1.28	700.26	105.2
3530	J-1813	582.52	East - Dulail	1.28	642.19	59.5
3582	J-1832	615.87	East - Dulail	1.28	599.41	-16.4
3644	J-1854	592.46	East - Dulail	1.28	701.56	108.9
3655	J-1859	584.84	East - Dulail	1.28	642.12	57.2
3660	J-1861	585.63	East - Dulail	1.28	608.55	22.9
3712	J-1879	590.36	East - Dulail	1.28	801.92	211.1
3727	J-1883	596	East - Dulail	1.28	599	3
3728	J-1884	594.4	East - Dulail	1.28	599	4.6
3742	J-1889	609.23	East - Dulail	1.28	885.18	275.4
3767	J-1900	570.53	East - Dulail	1.28	480.87	-89.5
3784	J-1904	585.73	East - Dulail	1.28	611.58	25.8
3801	J-1911	636.34	East - Dulail	1.28	598.38	-37.9
3802	J-1912	616.28	East - Dulail	1.28	597.97	-18.3
3848	J-1930	617.57	East - Dulail	1.28	772.18	154.3
3874	J-1937	585.72	East - Dulail	1.28	610.41	24.6
3894	J-1947	596	East - Dulail	1.28	1015.16	418.3
4183	J-2002	598	East - Dulail	1.28	597.9	-0.1
4186	J-2003	598	East - Dulail	1.28	772.27	173.9
4367	J-2012	592	East - Dulail	1.28	701.57	109.4
35	J-6	611.34	Zarqa	1.33	669.54	58.1
36	J-7	611.38	Zarqa	1.33	669.54	58
46	J-13	599.43	Zarqa	1.33	661.89	62.3
47	J-14	599.48	Zarqa	1.33	661.89	62.3
54	J-18	620.83	Zarqa	1.33	667.98	47.1
55	J-19	620.86	Zarqa	1.33	667.98	47
71	J-29	594.84	Zarqa	1.33	663.4	68.4
72	J-30	594.88	Zarqa	1.33	663.41	68.4
77	J-33	599.36	Zarqa	1.33	661.88	62.4
79	J-34	622.16	Zarqa	1.33	668.01	45.8
80	J-35	622.13	Zarqa	1.33	667.99	45.8
85	J-38	598.28	Zarqa	1.33	665.35	66.9
86	J-39	598.18	Zarqa	1.33	665.35	67
91	J-42	594.96	Zarqa	1.33	662.34	67.2
92	J-43	595.03	Zarqa	1.33	662.33	67.2
94	J-44	607.06	Zarqa	1.33	667.6	60.4
95	J-45	607.13	Zarqa	1.33	667.6	60.3
103	J-50	590.71	Zarqa	1.33	666.21	75.3
104	J-51	590.78	Zarqa	1.33	666.22	75.3

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
129	J-67	577.04	Zarqa	1.33	667	89.8
130	J-68	577.01	Zarqa	1.33	667	89.8
135	J-71	618.89	Zarqa	1.33	667.97	49
136	J-72	618.8	Zarqa	1.33	667.97	49.1
140	J-74	601.48	Zarqa	1.33	666.54	64.9
141	J-75	601.58	Zarqa	1.33	666.55	64.8
146	J-78	591.1	Zarqa	1.33	666.23	75
148	J-79	611.42	Zarqa	1.33	669.68	58.1
150	J-80	602.69	Zarqa	1.33	670.16	67.3
151	J-81	602.78	Zarqa	1.33	670.13	67.2
153	J-82	618.7	Zarqa	1.33	667.97	49.2
158	J-85	570	Zarqa	1.33	734.49	164.2
159	J-86	570	Zarqa	1.33	734.49	164.2
161	J-87	562.89	Zarqa	1.33	625.16	62.1
162	J-88	562.63	Zarqa	1.33	625.13	62.4
173	J-95	584.28	Zarqa	1.33	667.03	82.6
174	J-96	584.1	Zarqa	1.33	667.03	82.8
179	J-99	607.65	Zarqa	1.33	668.25	60.5
180	J-100	607.58	Zarqa	1.33	668.24	60.5
191	J-107	623.78	Zarqa	1.33	667.43	43.6
192	J-108	623.78	Zarqa	1.33	667.43	43.6
196	J-110	598.54	Zarqa	1.33	666.21	67.5
197	J-111	598.64	Zarqa	1.33	666.21	67.4
202	J-114	584.28	Zarqa	1.33	695.32	110.8
203	J-115	584.07	Zarqa	1.33	695.14	110.8
213	J-121	622.12	Zarqa	1.33	667.12	44.9
214	J-122	622.17	Zarqa	1.33	667.12	44.9
216	J-123	553.15	Zarqa	1.33	624.24	71
217	J-124	553.06	Zarqa	1.33	624.23	71
219	J-125	601.19	Zarqa	1.33	666.53	65.2
224	J-128	622.06	Zarqa	1.33	667.12	45
241	J-139	635.17	Zarqa	1.33	664.32	29.1
242	J-140	635	Zarqa	1.33	664.43	29.4
250	J-145	600.92	Zarqa	1.33	667.65	66.6
251	J-146	601.05	Zarqa	1.33	667.69	66.5
255	J-148	592.01	Zarqa	1.33	695.32	103.1
256	J-149	591.88	Zarqa	1.33	695.32	103.2
273	J-160	586.3	Zarqa	1.33	662.63	76.2
274	J-161	586.3	Zarqa	1.33	662.63	76.2
278	J-163	601.26	Zarqa	1.33	666.61	65.2
279	J-164	601.31	Zarqa	1.33	666.63	65.2
287	J-168	595.54	Zarqa	1.33	666.43	70.8
288	J-169	595.92	Zarqa	1.33	666.43	70.4
295	J-173	563.99	Zarqa	1.33	625.07	61
296	J-174	563.8	Zarqa	1.33	625.08	61.2
298	J-175	605.81	Zarqa	1.33	668.81	62.9
299	J-176	605.68	Zarqa	1.33	668.81	63
301	J-177	599.27	Zarqa	1.33	667.67	68.3
302	J-178	598.98	Zarqa	1.33	667.67	68.5
304	J-179	599.53	Zarqa	1.33	666.21	66.6
305	J-180	599.52	Zarqa	1.33	666.21	66.6
307	J-181	617.46	Zarqa	1.33	655.74	38.2
308	J-182	617.69	Zarqa	1.33	655.56	37.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
316	J-187	602.91	Zarqa	1.33	666.3	63.3
317	J-188	603.21	Zarqa	1.33	666.27	62.9
319	J-189	612.04	Zarqa	1.33	666.22	54.1
320	J-190	611.93	Zarqa	1.33	666.29	54.2
324	J-192	597.67	Zarqa	1.33	667.66	69.8
325	J-193	597.42	Zarqa	1.33	667.66	70.1
327	J-194	620.28	Zarqa	1.33	666.05	45.7
328	J-195	620.35	Zarqa	1.33	666.06	45.6
330	J-196	610.2	Zarqa	1.33	674.82	64.5
331	J-197	610.31	Zarqa	1.33	674.93	64.5
333	J-198	621.25	Zarqa	1.33	663.99	42.7
334	J-199	621.09	Zarqa	1.33	664	42.8
336	J-200	570	Zarqa	1.33	680.41	110.2
337	J-201	570	Zarqa	1.33	680.47	110.3
356	J-213	589.73	Zarqa	1.33	662.18	72.3
357	J-214	589.81	Zarqa	1.33	662.17	72.2
359	J-215	588.18	Zarqa	1.33	642.47	54.2
360	J-216	587.98	Zarqa	1.33	642.42	54.3
362	J-217	613.5	Zarqa	1.33	669.29	55.7
363	J-218	613.64	Zarqa	1.33	669.32	55.6
365	J-219	599.21	Zarqa	1.33	667.64	68.3
366	J-220	599.48	Zarqa	1.33	667.71	68.1
368	J-221	563.78	Zarqa	1.33	625.07	61.2
372	J-223	570	Zarqa	1.33	677.14	106.9
373	J-224	570	Zarqa	1.33	677.19	107
375	J-225	613.78	Zarqa	1.33	669.36	55.5
381	J-228	588.96	Zarqa	1.33	665.94	76.8
382	J-229	589.47	Zarqa	1.33	665.94	76.3
395	J-237	619.02	Zarqa	1.33	668.24	49.1
396	J-238	619.09	Zarqa	1.33	668.24	49.1
404	J-243	634.79	Zarqa	1.33	664.58	29.7
406	J-244	619.04	Zarqa	1.33	667.95	48.8
408	J-245	575.98	Zarqa	1.33	667.22	91.1
409	J-246	576.08	Zarqa	1.33	667.22	91
411	J-247	611.89	Zarqa	1.33	675.61	63.6
412	J-248	611.74	Zarqa	1.33	675.48	63.6
414	J-249	585.76	Zarqa	1.33	663.66	77.7
415	J-250	585.81	Zarqa	1.33	663.66	77.7
417	J-251	617.03	Zarqa	1.33	663.38	46.3
418	J-252	616.83	Zarqa	1.33	663.37	46.4
425	J-256	622.58	Zarqa	1.33	667.7	45
426	J-257	622.68	Zarqa	1.33	667.68	44.9
428	J-258	603.64	Zarqa	1.33	668.26	64.5
429	J-259	603.88	Zarqa	1.33	668.03	64
436	J-263	622.24	Zarqa	1.33	668.01	45.7
438	J-264	624.85	Zarqa	1.33	668.34	43.4
439	J-265	624.87	Zarqa	1.33	668.34	43.4
441	J-266	619.23	Zarqa	1.33	666.26	46.9
442	J-267	619.05	Zarqa	1.33	666.26	47.1
449	J-271	600.74	Zarqa	1.33	666.14	65.3
450	J-272	600.57	Zarqa	1.33	666.14	65.4
455	J-275	607.1	Zarqa	1.33	668.15	60.9
456	J-276	607.32	Zarqa	1.33	668.19	60.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
458	J-277	635.18	Zarqa	1.33	664.2	29
465	J-281	622.05	Zarqa	1.33	667.96	45.8
467	J-282	611.2	Zarqa	1.33	669.52	58.2
469	J-283	601.23	Zarqa	1.33	666.85	65.5
470	J-284	601.27	Zarqa	1.33	666.85	65.4
472	J-285	637.2	Zarqa	1.33	669.7	32.4
473	J-286	637.1	Zarqa	1.33	669.7	32.5
493	J-298	570	Zarqa	1.33	677.05	106.8
494	J-299	570	Zarqa	1.33	677.05	106.8
496	J-300	620.2	Zarqa	1.33	666.04	45.7
501	J-303	646	Zarqa	1.33	654.02	8
502	J-304	646	Zarqa	1.33	654.11	8.1
506	J-306	599.64	Zarqa	1.33	661.92	62.2
508	J-307	646	Zarqa	1.33	654.5	8.5
509	J-308	646	Zarqa	1.33	654.02	8
513	J-310	584.92	Zarqa	1.33	694.87	109.7
514	J-311	584.94	Zarqa	1.33	694.87	109.7
519	J-314	622.33	Zarqa	1.33	667.97	45.6
524	J-317	624.76	Zarqa	1.33	668.41	43.6
526	J-318	610.12	Zarqa	1.33	668.04	57.8
527	J-319	610.13	Zarqa	1.33	668.03	57.8
529	J-320	620.65	Zarqa	1.33	668.01	47.3
530	J-321	620.74	Zarqa	1.33	667.99	47.2
539	J-326	609.32	Zarqa	1.33	685.71	76.2
540	J-327	609.11	Zarqa	1.33	685.91	76.6
543	J-328	646	Zarqa	1.33	654.03	8
544	J-329	646	Zarqa	1.33	654.07	8.1
557	J-337	577.57	Zarqa	1.33	666.88	89.1
559	J-338	572.94	Zarqa	1.33	666.02	92.9
560	J-339	573.12	Zarqa	1.33	666.02	92.7
572	J-346	595.26	Zarqa	1.33	699.37	103.9
573	J-347	595.15	Zarqa	1.33	699.18	103.8
584	J-354	623.67	Zarqa	1.33	667.86	44.1
585	J-355	623.59	Zarqa	1.33	667.86	44.2
587	J-356	595.31	Zarqa	1.33	666.43	71
589	J-357	623.78	Zarqa	1.33	667.4	43.5
594	J-360	583.03	Zarqa	1.33	663.54	80.3
595	J-361	583.21	Zarqa	1.33	663.47	80.1
597	J-362	600.89	Zarqa	1.33	667.63	66.6
598	J-363	601.07	Zarqa	1.33	667.63	66.4
600	J-364	612.18	Zarqa	1.33	666.14	53.9
605	J-367	620.16	Zarqa	1.33	666.03	45.8
606	J-368	620.11	Zarqa	1.33	666.03	45.8
608	J-369	588.31	Zarqa	1.33	643.83	55.4
609	J-370	588.44	Zarqa	1.33	643.92	55.4
611	J-371	601.27	Zarqa	1.33	667.75	66.3
616	J-374	588.96	Zarqa	1.33	664.22	75.1
617	J-375	588.32	Zarqa	1.33	664.21	75.7
622	J-378	587.71	Zarqa	1.33	667.37	79.5
623	J-379	587.43	Zarqa	1.33	667.43	79.8
628	J-382	622.08	Zarqa	1.33	668.37	46.2
629	J-383	622.17	Zarqa	1.33	668.37	46.1
631	J-384	613.83	Zarqa	1.33	669.32	55.4

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
633	J-385	582.85	Zarqa	1.33	663.62	80.6
640	J-389	601.18	Zarqa	1.33	666.85	65.5
642	J-390	601.38	Zarqa	1.33	666.58	65.1
643	J-391	601.46	Zarqa	1.33	666.59	65
645	J-392	592.49	Zarqa	1.33	695.13	102.4
647	J-393	610.15	Zarqa	1.33	668.03	57.8
649	J-394	601.28	Zarqa	1.33	666.54	65.1
657	J-399	608.29	Zarqa	1.33	667.99	59.6
658	J-400	608.17	Zarqa	1.33	667.99	59.7
660	J-401	637.26	Zarqa	1.33	669.7	32.4
665	J-404	582.92	Zarqa	1.33	663.62	80.5
671	J-407	607.87	Zarqa	1.33	670.11	62.1
672	J-408	608.07	Zarqa	1.33	670.07	61.9
674	J-409	618.83	Zarqa	1.33	666.26	47.3
689	J-418	589.87	Zarqa	1.33	662.18	72.2
691	J-419	617.02	Zarqa	1.33	667.97	50.9
692	J-420	617.21	Zarqa	1.33	667.96	50.6
700	J-425	550.83	Zarqa	1.33	624.72	73.7
701	J-426	550.39	Zarqa	1.33	624.72	74.2
705	J-428	603.42	Zarqa	1.33	667.27	63.7
706	J-429	603.48	Zarqa	1.33	667.27	63.7
720	J-438	607.97	Zarqa	1.33	667.96	59.9
724	J-440	617.89	Zarqa	1.33	734.27	116.1
725	J-441	617.6	Zarqa	1.33	733.97	116.1
727	J-442	592.08	Zarqa	1.33	667.31	75.1
728	J-443	591.64	Zarqa	1.33	667.39	75.6
730	J-444	575.45	Zarqa	1.33	677.01	101.4
731	J-445	575.42	Zarqa	1.33	677	101.4
736	J-448	620.85	Zarqa	1.33	664.03	43.1
738	J-449	557.81	Zarqa	1.33	624.73	66.8
739	J-450	557.22	Zarqa	1.33	624.7	67.3
741	J-451	599.98	Zarqa	1.33	667.24	67.1
742	J-452	600.18	Zarqa	1.33	667.24	66.9
744	J-453	599.15	Zarqa	1.33	661.89	62.6
758	J-462	611.76	Zarqa	1.33	666.43	54.6
766	J-467	587.44	Zarqa	1.33	666.11	78.5
767	J-468	587.18	Zarqa	1.33	666.11	78.8
774	J-472	589.72	Zarqa	1.33	664.23	74.4
776	J-473	612.38	Zarqa	1.33	666.14	53.7
783	J-477	620.97	Zarqa	1.33	667.97	46.9
785	J-478	599.38	Zarqa	1.33	666.21	66.7
797	J-485	622.36	Zarqa	1.33	667.71	45.3
807	J-490	623.66	Zarqa	1.33	667.44	43.7
815	J-495	614.17	Zarqa	1.33	664.89	50.6
816	J-496	614.08	Zarqa	1.33	664.89	50.7
821	J-499	594.3	Zarqa	1.33	661.92	67.5
822	J-500	594.76	Zarqa	1.33	661.92	67
828	J-503	595.72	Zarqa	1.33	666.43	70.6
845	J-513	594.72	Zarqa	1.33	662.31	67.5
847	J-514	607.96	Zarqa	1.33	667.58	59.5
848	J-515	608.2	Zarqa	1.33	667.58	59.3
850	J-516	608.41	Zarqa	1.33	668.05	59.5
855	J-519	552.47	Zarqa	1.33	624.18	71.6

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
856	J-520	552.37	Zarqa	1.33	624.17	71.6
864	J-525	577.25	Zarqa	1.33	666.98	89.6
866	J-526	600.1	Zarqa	1.33	632.24	32.1
867	J-527	600.53	Zarqa	1.33	632.32	31.7
873	J-530	640.8	Zarqa	1.33	757.53	116.5
874	J-531	640.91	Zarqa	1.33	757.46	116.3
882	J-536	595.32	Zarqa	1.33	663.64	68.2
883	J-537	595.48	Zarqa	1.33	663.73	68.1
888	J-540	588.53	Zarqa	1.33	667.15	78.5
889	J-541	588.91	Zarqa	1.33	667.16	78.1
901	J-548	591.86	Zarqa	1.33	665.44	73.4
902	J-549	591.22	Zarqa	1.33	665.44	74.1
904	J-550	595.87	Zarqa	1.33	699.1	103
938	J-572	576.81	Zarqa	1.33	636.37	59.4
940	J-573	610.32	Zarqa	1.33	666.29	55.8
941	J-574	610.04	Zarqa	1.33	666.26	56.1
945	J-576	599.5	Zarqa	1.33	665.78	66.1
953	J-581	588.12	Zarqa	1.33	643.71	55.5
958	J-584	614.12	Zarqa	1.33	669.32	55.1
962	J-586	617.28	Zarqa	1.33	663.4	46
988	J-601	570	Zarqa	1.33	680.51	110.3
990	J-602	605.98	Zarqa	1.33	667.9	61.8
991	J-603	605.6	Zarqa	1.33	667.89	62.2
995	J-605	559.35	Zarqa	1.33	676.88	117.3
996	J-606	559.68	Zarqa	1.33	676.88	117
998	J-607	587.91	Zarqa	1.33	667.44	79.4
1011	J-615	616.45	Zarqa	1.33	635.44	18.9
1012	J-616	615.99	Zarqa	1.33	635.27	19.2
1016	J-618	637.46	Zarqa	1.33	669.69	32.2
1021	J-621	588.13	Zarqa	1.33	643.58	55.3
1040	J-632	624.43	Zarqa	1.33	668.54	44
1041	J-633	624.59	Zarqa	1.33	668.56	43.9
1046	J-635	610.17	Zarqa	1.33	668.31	58
1047	J-636	609.96	Zarqa	1.33	668.29	58.2
1052	J-639	584.91	Zarqa	1.33	665.5	80.4
1053	J-640	584.82	Zarqa	1.33	665.52	80.5
1055	J-641	584.02	Zarqa	1.33	695.13	110.9
1057	J-642	595.72	Zarqa	1.33	663.89	68
1058	J-643	595.92	Zarqa	1.33	663.93	67.9
1060	J-644	614.48	Zarqa	1.33	663.31	48.7
1061	J-645	614.03	Zarqa	1.33	663.3	49.2
1066	J-648	586.21	Zarqa	1.33	630.32	44
1067	J-649	586.37	Zarqa	1.33	630.36	43.9
1071	J-651	616.73	Zarqa	1.33	667.97	51.1
1073	J-652	620.27	Zarqa	1.33	666.04	45.7
1075	J-653	602.44	Zarqa	1.33	666.55	64
1077	J-654	605.03	Zarqa	1.33	668.05	62.9
1078	J-655	604.69	Zarqa	1.33	668.06	63.2
1083	J-658	570	Zarqa	1.33	581.07	11
1084	J-659	570	Zarqa	1.33	581.12	11.1
1101	J-669	562.86	Zarqa	1.33	625.01	62
1106	J-672	623.62	Zarqa	1.33	667.87	44.2
1121	J-681	570	Zarqa	1.33	734.78	164.4

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1125	J-683	641.7	Zarqa	1.33	756.81	114.9
1126	J-684	641.89	Zarqa	1.33	756.83	114.7
1136	J-690	564.96	Zarqa	1.33	625.07	60
1140	J-692	592.3	Zarqa	1.33	666.24	73.8
1145	J-695	570	Zarqa	1.33	658.27	88.1
1146	J-696	570	Zarqa	1.33	658.27	88.1
1168	J-708	612.7	Zarqa	1.33	666.14	53.3
1170	J-709	622.93	Zarqa	1.33	666.71	43.7
1171	J-710	623.12	Zarqa	1.33	666.76	43.6
1194	J-724	599.75	Zarqa	1.33	666.59	66.7
1195	J-725	600.2	Zarqa	1.33	666.6	66.3
1205	J-731	570	Zarqa	1.33	573.4	3.4
1206	J-732	570	Zarqa	1.33	573.47	3.5
1210	J-734	606.96	Zarqa	1.33	665.75	58.7
1211	J-735	606.7	Zarqa	1.33	665.8	59
1216	J-738	575.81	Zarqa	1.33	667.21	91.2
1218	J-739	581.5	Zarqa	1.33	677.36	95.7
1219	J-740	581.24	Zarqa	1.33	677.44	96
1221	J-741	605.08	Zarqa	1.33	667.56	62.4
1223	J-742	636.34	Zarqa	1.33	656.69	20.3
1224	J-743	636.88	Zarqa	1.33	756.84	119.7
1229	J-746	570	Zarqa	1.33	658.27	88.1
1234	J-749	593.55	Zarqa	1.33	662.24	68.6
1235	J-750	593.94	Zarqa	1.33	662.26	68.2
1258	J-764	575.75	Zarqa	1.33	667.19	91.3
1260	J-765	618.85	Zarqa	1.33	664.23	45.3
1261	J-766	619.15	Zarqa	1.33	664.19	44.9
1265	J-768	607.9	Zarqa	1.33	668.38	60.4
1267	J-769	599.73	Zarqa	1.33	662.11	62.3
1268	J-770	600.08	Zarqa	1.33	662.11	61.9
1270	J-771	577.11	Zarqa	1.33	666.74	89.5
1271	J-772	576.69	Zarqa	1.33	666.75	89.9
1276	J-775	603.28	Zarqa	1.33	667.21	63.8
1281	J-777	612.29	Zarqa	1.33	675.81	63.4
1285	J-779	577.05	Zarqa	1.33	666.69	89.5
1286	J-780	576.46	Zarqa	1.33	666.67	90
1288	J-781	570	Zarqa	1.33	575.13	5.1
1289	J-782	570	Zarqa	1.33	575.04	5
1296	J-786	614.76	Zarqa	1.33	731.06	116.1
1297	J-787	614.19	Zarqa	1.33	730.47	116
1308	J-794	598.71	Zarqa	1.33	661.93	63.1
1329	J-806	606.49	Zarqa	1.33	665.67	59.1
1331	J-807	595.97	Zarqa	1.33	666.43	70.3
1333	J-808	570	Zarqa	1.33	733.87	163.5
1334	J-809	570	Zarqa	1.33	733.87	163.5
1340	J-812	570	Zarqa	1.33	735.12	164.8
1342	J-813	637.43	Zarqa	1.33	758.16	120.5
1343	J-814	636.76	Zarqa	1.33	752.22	115.2
1347	J-816	623.19	Zarqa	1.33	666.79	43.5
1349	J-817	623.4	Zarqa	1.33	667.47	44
1351	J-818	600.56	Zarqa	1.33	662.11	61.4
1353	J-819	584.66	Zarqa	1.33	667.04	82.2
1372	J-831	621.45	Zarqa	1.33	666.5	45

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1373	J-832	621.36	Zarqa	1.33	666.5	45
1391	J-843	611.91	Zarqa	1.33	670.45	58.4
1397	J-846	629.18	Zarqa	1.33	646.87	17.7
1398	J-847	629.93	Zarqa	1.33	756.82	126.6
1400	J-848	581.35	Zarqa	1.33	664.15	82.6
1401	J-849	579.54	Zarqa	1.33	664.14	84.4
1405	J-851	565.62	Zarqa	1.33	627.91	62.2
1406	J-852	565.22	Zarqa	1.33	627.56	62.2
1420	J-860	570	Zarqa	1.33	575.48	5.5
1421	J-861	570	Zarqa	1.33	575.58	5.6
1431	J-867	611.04	Zarqa	1.33	663.28	52.1
1432	J-868	610.25	Zarqa	1.33	663.28	52.9
1437	J-871	603.5	Zarqa	1.33	666.77	63.1
1438	J-872	603.2	Zarqa	1.33	666.89	63.6
1450	J-878	607.3	Zarqa	1.33	665.89	58.5
1452	J-879	609.5	Zarqa	1.33	667.99	58.4
1453	J-880	609.17	Zarqa	1.33	667.99	58.7
1458	J-883	570	Zarqa	1.33	574.61	4.6
1471	J-891	622.44	Zarqa	1.33	668.39	45.9
1481	J-897	623.42	Zarqa	1.33	666.86	43.4
1485	J-899	570	Zarqa	1.33	677.18	107
1486	J-900	570	Zarqa	1.33	677.18	107
1525	J-920	646	Zarqa	1.33	758.76	112.5
1526	J-921	646	Zarqa	1.33	758.52	112.3
1534	J-926	617.36	Zarqa	1.33	667.97	50.5
1557	J-938	580.04	Zarqa	1.33	678.8	98.6
1558	J-939	580.02	Zarqa	1.33	678.68	98.5
1560	J-940	619.94	Zarqa	1.33	663.94	43.9
1561	J-941	619.5	Zarqa	1.33	663.72	44.1
1563	J-942	621.27	Zarqa	1.33	668.29	46.9
1564	J-943	621.55	Zarqa	1.33	668.3	46.7
1571	J-947	637.77	Zarqa	1.33	756.84	118.8
1573	J-948	597.39	Zarqa	1.33	698.42	100.8
1583	J-954	589.31	Zarqa	1.33	662.23	72.8
1598	J-962	570	Zarqa	1.33	732.81	162.5
1599	J-963	570	Zarqa	1.33	732.81	162.5
1604	J-966	614.41	Zarqa	1.33	664.89	50.4
1622	J-976	581.17	Zarqa	1.33	679.77	98.4
1623	J-977	581.91	Zarqa	1.33	680.02	97.9
1625	J-978	624.54	Zarqa	1.33	669.04	44.4
1630	J-981	583.22	Zarqa	1.33	667.03	83.6
1634	J-983	570	Zarqa	1.33	733.87	163.5
1647	J-991	564.87	Zarqa	1.33	625.06	60.1
1652	J-994	639.85	Zarqa	1.33	757.7	117.6
1666	J-1003	598.3	Zarqa	1.33	666.47	68
1667	J-1004	598.88	Zarqa	1.33	666.48	67.5
1683	J-1013	610.71	Zarqa	1.33	640.75	30
1684	J-1014	611.85	Zarqa	1.33	639.92	28
1686	J-1015	583.96	Zarqa	1.33	663.22	79.1
1705	J-1026	584.73	Zarqa	1.33	663	78.1
1711	J-1029	599.08	Zarqa	1.33	762.39	163
1712	J-1030	600.84	Zarqa	1.33	762.27	161.1
1722	J-1035	570	Zarqa	1.33	679.97	109.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1724	J-1036	570	Zarqa	1.33	658.2	88
1726	J-1037	611.09	Zarqa	1.33	666.26	55.1
1728	J-1038	596.92	Zarqa	1.33	666.21	69.2
1729	J-1039	596.94	Zarqa	1.33	666.21	69.1
1738	J-1044	598.38	Zarqa	1.33	762.53	163.8
1744	J-1047	570	Zarqa	1.33	572.52	2.5
1746	J-1048	641.85	Zarqa	1.33	757.46	115.4
1748	J-1049	592.45	Zarqa	1.33	664.32	71.7
1752	J-1051	617.86	Zarqa	1.33	667.97	50
1754	J-1052	604.83	Zarqa	1.33	668.31	63.4
1760	J-1055	575.82	Zarqa	1.33	667.21	91.2
1768	J-1059	581.21	Zarqa	1.33	665.95	84.6
1769	J-1060	584.31	Zarqa	1.33	665.94	81.5
1773	J-1062	616.94	Zarqa	1.33	644.43	27.4
1774	J-1063	614.66	Zarqa	1.33	643.6	28.9
1789	J-1071	575.39	Zarqa	1.33	667.23	91.7
1795	J-1074	578.5	Zarqa	1.33	716.75	138
1796	J-1075	579.47	Zarqa	1.33	716.75	137
1800	J-1077	597.84	Zarqa	1.33	667.07	69.1
1801	J-1078	598.89	Zarqa	1.33	667.24	68.2
1803	J-1079	570	Zarqa	1.33	678.7	108.5
1811	J-1083	598.44	Zarqa	1.33	666.45	67.9
1815	J-1085	570.77	Zarqa	1.33	633.19	62.3
1816	J-1086	572.6	Zarqa	1.33	633.16	60.4
1818	J-1087	608.5	Zarqa	1.33	670.84	62.2
1830	J-1093	608.93	Zarqa	1.33	663.28	54.2
1872	J-1116	575.33	Zarqa	1.33	666.59	91.1
1877	J-1119	581.1	Zarqa	1.33	667.05	85.8
1885	J-1122	570	Zarqa	1.33	737.81	167.5
1894	J-1126	589.1	Zarqa	1.33	630.81	41.6
1908	J-1132	640.91	Zarqa	1.33	756.78	115.6
1913	J-1135	635.18	Zarqa	1.33	752.22	116.8
1914	J-1136	633.64	Zarqa	1.33	750.6	116.7
1921	J-1140	579.99	Zarqa	1.33	678.5	98.3
1922	J-1141	578.84	Zarqa	1.33	678.36	99.3
1924	J-1142	594.61	Zarqa	1.33	667.06	72.3
1934	J-1147	625.39	Zarqa	1.33	668.08	42.6
1940	J-1150	617.92	Zarqa	1.33	653.74	35.7
1951	J-1154	559.33	Zarqa	1.33	624.83	65.4
1955	J-1156	585.58	Zarqa	1.33	667.41	81.7
1960	J-1158	595.52	Zarqa	1.33	666.32	70.7
1966	J-1160	597.56	Zarqa	1.33	662.06	64.4
1968	J-1161	580.76	Zarqa	1.33	629.19	48.3
1972	J-1163	601.71	Zarqa	1.33	668.26	66.4
1978	J-1166	592.38	Zarqa	1.33	662.21	69.7
1984	J-1168	600.16	Zarqa	1.33	667.56	67.3
1987	J-1169	603.26	Zarqa	1.33	666.78	63.4
1993	J-1172	606.51	Zarqa	1.33	669.29	62.6
2008	J-1180	568.26	Zarqa	1.33	666.06	97.6
2009	J-1181	572.91	Zarqa	1.33	666.01	92.9
2016	J-1185	602.8	Zarqa	1.33	632.8	29.9
2018	J-1186	588.03	Zarqa	1.33	662.37	74.2
2023	J-1188	582.58	Zarqa	1.33	641.31	58.6

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2024	J-1189	579.76	Zarqa	1.33	640.9	61
2026	J-1190	619.47	Zarqa	1.33	668.19	48.6
2028	J-1191	599.41	Zarqa	1.33	663.81	64.3
2039	J-1196	587.04	Zarqa	1.33	665.45	78.3
2049	J-1200	590.84	Zarqa	1.33	662.18	71.2
2053	J-1202	636.33	Zarqa	1.33	669.8	33.4
2100	J-1227	641.06	Zarqa	1.33	757.15	115.9
2102	J-1228	597.62	Zarqa	1.33	631.85	34.2
2104	J-1229	609	Zarqa	1.33	674.66	65.5
2105	J-1230	607.99	Zarqa	1.33	674.46	66.3
2117	J-1237	580.71	Zarqa	1.33	692.7	111.8
2122	J-1240	597.35	Zarqa	1.33	666.45	69
2129	J-1244	585.07	Zarqa	1.33	695.32	110
2131	J-1245	570	Zarqa	1.33	734.78	164.4
2141	J-1250	623.8	Zarqa	1.33	667.19	43.3
2143	J-1251	582.58	Zarqa	1.33	667.38	84.6
2148	J-1254	598.17	Zarqa	1.33	662.18	63.9
2157	J-1258	638.93	Zarqa	1.33	756.83	117.7
2159	J-1259	612.65	Zarqa	1.33	667.98	55.2
2160	J-1260	611.65	Zarqa	1.33	667.98	56.2
2162	J-1261	619.86	Zarqa	1.33	667.98	48
2166	J-1263	578.71	Zarqa	1.33	666.72	87.8
2179	J-1270	551.67	Zarqa	1.33	624.08	72.3
2180	J-1271	550.06	Zarqa	1.33	623.91	73.7
2191	J-1277	603.15	Zarqa	1.33	668	64.7
2197	J-1279	580.09	Zarqa	1.33	677.55	97.3
2207	J-1283	609.15	Zarqa	1.33	666.23	57
2212	J-1285	636.96	Zarqa	1.33	668.42	31.4
2215	J-1286	622.57	Zarqa	1.33	682.33	59.6
2216	J-1287	622.35	Zarqa	1.33	681.06	58.6
2218	J-1288	547.69	Zarqa	1.33	623.03	75.2
2219	J-1289	549.81	Zarqa	1.33	623.02	73.1
2234	J-1296	598.86	Zarqa	1.33	666.65	67.7
2236	J-1297	593.61	Zarqa	1.33	662.94	69.2
2256	J-1306	554.47	Zarqa	1.33	624.38	69.8
2260	J-1308	599.21	Zarqa	1.33	667.45	68.1
2261	J-1309	599.25	Zarqa	1.33	667.38	68
2263	J-1310	615.12	Zarqa	1.33	638.62	23.5
2277	J-1318	617.13	Zarqa	1.33	668.24	51
2280	J-1319	587.3	Zarqa	1.33	665.75	78.3
2282	J-1320	621.35	Zarqa	1.33	679.74	58.3
2283	J-1321	620.9	Zarqa	1.33	678.53	57.5
2288	J-1323	593.36	Zarqa	1.33	668.07	74.6
2295	J-1326	618.08	Zarqa	1.33	663.58	45.4
2296	J-1327	616.13	Zarqa	1.33	663.49	47.3
2302	J-1330	602.03	Zarqa	1.33	667.87	65.7
2304	J-1331	595.73	Zarqa	1.33	662.33	66.5
2315	J-1336	595.95	Zarqa	1.33	668.63	72.5
2329	J-1343	574.1	Zarqa	1.33	666.46	92.2
2330	J-1344	573.09	Zarqa	1.33	666.36	93.1
2335	J-1346	609.19	Zarqa	1.33	669.21	59.9
2336	J-1347	608.34	Zarqa	1.33	668.95	60.5
2345	J-1350	597.2	Zarqa	1.33	666.22	68.9

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2346	J-1351	596.9	Zarqa	1.33	666.21	69.2
2351	J-1354	606.36	Zarqa	1.33	633.67	27.2
2353	J-1355	623.34	Zarqa	1.33	668.07	44.6
2357	J-1356	646	Zarqa	1.33	758.79	112.6
2361	J-1358	606.65	Zarqa	1.33	674.2	67.4
2364	J-1359	614.84	Zarqa	1.33	668.24	53.3
2376	J-1363	645.4	Zarqa	1.33	756.88	111.3
2384	J-1367	623.1	Zarqa	1.33	667.7	44.5
2424	J-1387	596.79	Zarqa	1.33	649.59	52.7
2425	J-1388	598	Zarqa	1.33	650.88	52.8
2427	J-1389	619.42	Zarqa	1.33	678.86	59.3
2428	J-1390	616.85	Zarqa	1.33	677.78	60.8
2431	J-1391	619.39	Zarqa	1.33	649.88	30.4
2448	J-1400	608.61	Zarqa	1.33	665.88	57.2
2455	J-1403	648.82	Zarqa	1.33	757.01	108
2458	J-1404	591.33	Zarqa	1.33	630.78	39.4
2466	J-1406	605.55	Zarqa	1.33	666.54	60.9
2471	J-1408	593.49	Zarqa	1.33	666.5	72.9
2474	J-1409	623.51	Zarqa	1.33	666.96	43.4
2498	J-1419	582.02	Zarqa	1.33	663.61	81.4
2502	J-1420	570.95	Zarqa	1.33	666.03	94.9
2518	J-1428	593.03	Zarqa	1.33	667.66	74.5
2536	J-1435	605.31	Zarqa	1.33	669.29	63.8
2552	J-1441	568.18	Zarqa	1.33	631	62.7
2554	J-1442	604.23	Zarqa	1.33	667.36	63
2563	J-1446	606.92	Zarqa	1.33	663.29	56.3
2564	J-1447	601.55	Zarqa	1.33	663.28	61.6
2574	J-1451	599.44	Zarqa	1.33	669.5	69.9
2577	J-1452	570	Zarqa	1.33	658.52	88.3
2579	J-1453	575.45	Zarqa	1.33	666.71	91.1
2580	J-1454	574.35	Zarqa	1.33	666.68	92.1
2595	J-1460	609.68	Zarqa	1.33	668.77	59
2596	J-1461	609.43	Zarqa	1.33	670.82	61.3
2599	J-1462	584.77	Zarqa	1.33	663.63	78.7
2603	J-1464	548.57	Zarqa	1.33	623.07	74.3
2610	J-1467	604.71	Zarqa	1.33	673.87	69
2624	J-1473	647.39	Zarqa	1.33	756.87	109.3
2630	J-1476	582.55	Zarqa	1.33	684.43	101.7
2640	J-1482	630.51	Zarqa	1.33	667.78	37.2
2646	J-1485	601.07	Zarqa	1.33	664.73	63.5
2648	J-1486	573.42	Zarqa	1.33	664.13	90.5
2660	J-1489	610.6	Zarqa	1.33	663.35	52.6
2670	J-1494	612.98	Zarqa	1.33	665.14	52.1
2671	J-1495	614.66	Zarqa	1.33	664.7	49.9
2673	J-1496	605.33	Zarqa	1.33	667.79	62.3
2677	J-1498	549.82	Zarqa	1.33	623.32	73.4
2678	J-1499	548.47	Zarqa	1.33	623.17	74.6
2683	J-1501	589.77	Zarqa	1.33	664.11	74.2
2694	J-1505	599.57	Zarqa	1.33	671.56	71.9
2703	J-1508	606.7	Zarqa	1.33	669.51	62.7
2706	J-1509	599.7	Zarqa	1.33	666.45	66.6
2712	J-1512	590.96	Zarqa	1.33	645.6	54.5
2714	J-1513	618.77	Zarqa	1.33	667.26	48.4

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2715	J-1514	615.35	Zarqa	1.33	666.8	51.3
2725	J-1518	610.18	Zarqa	1.33	670.07	59.8
2726	J-1519	612.22	Zarqa	1.33	669.9	57.6
2736	J-1524	570	Zarqa	1.33	575.26	5.3
2740	J-1526	587.71	Zarqa	1.33	695.32	107.4
2776	J-1537	555.29	Zarqa	1.33	676.88	121.3
2781	J-1540	577.93	Zarqa	1.33	677.91	99.8
2788	J-1543	617.05	Zarqa	1.33	734.23	116.9
2789	J-1544	620.42	Zarqa	1.33	727.4	106.8
2811	J-1551	615.16	Zarqa	1.33	672.88	57.6
2818	J-1554	603.82	Zarqa	1.33	690.68	86.7
2841	J-1563	600.63	Zarqa	1.33	673.36	72.6
2847	J-1566	583.76	Zarqa	1.33	691.59	107.6
2848	J-1567	583.59	Zarqa	1.33	689.72	105.9
2893	J-1579	580.03	Zarqa	1.33	633.11	53
2907	J-1585	620.5	Zarqa	1.33	666.48	45.9
2911	J-1587	582.26	Zarqa	1.33	666.7	84.3
2919	J-1591	622.48	Zarqa	1.33	666.62	44
2923	J-1592	589.46	Zarqa	1.33	661.98	72.4
2948	J-1603	637.57	Zarqa	1.33	756.72	118.9
3036	J-1628	605.36	Zarqa	1.33	663.34	57.9
3062	J-1636	618.89	Zarqa	1.33	665.95	47
3063	J-1637	618.88	Zarqa	1.33	665.94	47
3072	J-1642	611.39	Zarqa	1.33	667.97	56.5
3078	J-1645	582.22	Zarqa	1.33	677.36	94.9
3080	J-1646	605.5	Zarqa	1.33	667.16	61.5
3090	J-1651	576.39	Zarqa	1.33	667.4	90.8
3099	J-1655	585.59	Zarqa	1.33	694.96	109.2
3131	J-1665	574.38	Zarqa	1.33	676.79	102.2
3132	J-1666	577.04	Zarqa	1.33	676.76	99.5
3143	J-1670	635.79	Zarqa	1.33	663.9	28.1
3144	J-1671	633.88	Zarqa	1.33	667.38	33.4
3146	J-1672	578.76	Zarqa	1.33	677.92	99
3162	J-1677	602.36	Zarqa	1.33	666.23	63.7
3174	J-1684	590.23	Zarqa	1.33	667.7	77.3
3210	J-1697	570	Zarqa	1.33	695.16	124.9
3216	J-1698	570	Zarqa	1.33	767.32	196.9
3217	J-1699	583.76	Zarqa	1.33	765.53	181.4
3219	J-1700	602.92	Zarqa	1.33	668.26	65.2
3233	J-1704	636.5	Zarqa	1.33	658.04	21.5
3234	J-1705	639.11	Zarqa	1.33	653.18	14
3266	J-1715	618.95	Zarqa	1.33	677.03	58
3311	J-1735	579.73	Zarqa	1.33	666.98	87.1
3321	J-1738	597.31	Zarqa	1.33	685.86	88.4
3343	J-1746	590.22	Zarqa	1.33	633.08	42.8
3385	J-1760	584.88	Zarqa	1.33	674.21	89.2
3408	J-1772	627.82	Zarqa	1.33	669.6	41.7
3435	J-1780	624.56	Zarqa	1.33	700.73	76
3470	J-1792	616.87	Zarqa	1.33	668.78	51.8
3539	J-1817	664.29	Zarqa	1.33	756.67	92.2
3567	J-1827	620.85	Zarqa	1.33	667.56	46.6
3657	J-1860	567.43	Zarqa	1.33	676.81	109.2
3691	J-1873	570	Zarqa	1.33	766.43	196

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3723	J-1881	570.66	Zarqa	1.33	587.94	17.2
3842	J-1927	646	Zarqa	1.33	753.6	107.4
3843	J-1928	700	Zarqa	1.33	718.41	18.4
3855	J-1934	646	Zarqa	1.33	654.02	8
3899	J-1949	545.36	Zarqa	1.33	600.29	54.8
4056	J-1990	646	Zarqa	1.33	654.01	8
4060	J-1991	646	Zarqa	1.33	654.01	8
4756	J-2046	592	KABA City	1.33	733.72	141.4
38	J-8	746.61	Russaifah	1.48	762.84	16.2
39	J-9	746.73	Russaifah	1.48	762.84	16.1
43	J-11	702.41	Russaifah	1.48	659.92	-42.4
44	J-12	702.53	Russaifah	1.48	659.92	-42.5
97	J-46	610.71	Russaifah	1.48	708.9	98
98	J-47	610.46	Russaifah	1.48	708.9	98.2
106	J-52	633.38	Russaifah	1.48	892.27	258.4
107	J-53	633.47	Russaifah	1.48	892.62	258.6
126	J-65	631	Russaifah	1.48	632.67	1.7
127	J-66	631	Russaifah	1.48	632.81	1.8
132	J-69	656	Russaifah	1.48	719.28	63.2
133	J-70	655.92	Russaifah	1.48	719.31	63.3
143	J-76	684.9	Russaifah	1.48	666.84	-18
144	J-77	684.88	Russaifah	1.48	666.84	-18
155	J-83	667.28	Russaifah	1.48	711.41	44
156	J-84	667.34	Russaifah	1.48	711.4	44
170	J-93	774.01	Russaifah	1.48	878.69	104.5
171	J-94	773.75	Russaifah	1.48	878.66	104.7
226	J-129	749.71	Russaifah	1.48	763.75	14
227	J-130	749.85	Russaifah	1.48	763.75	13.9
232	J-133	706.83	Russaifah	1.48	646.02	-60.7
233	J-134	706.75	Russaifah	1.48	645.8	-60.8
238	J-137	668.46	Russaifah	1.48	752.58	83.9
239	J-138	668.34	Russaifah	1.48	666.81	-1.5
244	J-141	667.5	Russaifah	1.48	718.87	51.3
245	J-142	667.41	Russaifah	1.48	718.87	51.3
247	J-143	679.4	Russaifah	1.48	666.82	-12.6
248	J-144	679.43	Russaifah	1.48	666.82	-12.6
264	J-154	658.31	Russaifah	1.48	764.77	106.2
265	J-155	659.02	Russaifah	1.48	764.77	105.5
267	J-156	698.11	Russaifah	1.48	639.52	-58.5
268	J-157	697.93	Russaifah	1.48	639.42	-58.4
270	J-158	729.96	Russaifah	1.48	762.71	32.7
271	J-159	730.18	Russaifah	1.48	762.71	32.5
276	J-162	684.86	Russaifah	1.48	666.84	-18
313	J-185	721.5	Russaifah	1.48	762.95	41.4
314	J-186	721.63	Russaifah	1.48	762.94	41.2
353	J-211	716.23	Russaifah	1.48	855.59	139.1
354	J-212	715.76	Russaifah	1.48	855.54	139.5
384	J-230	684.92	Russaifah	1.48	666.84	-18
389	J-233	705.93	Russaifah	1.48	662.18	-43.7
390	J-234	705.86	Russaifah	1.48	662.18	-43.6
420	J-253	715.26	Russaifah	1.48	855.5	140
422	J-254	737.31	Russaifah	1.48	762.46	25.1
423	J-255	737.61	Russaifah	1.48	762.47	24.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
433	J-261	716.08	Russaifah	1.48	713.83	-2.2
434	J-262	715.76	Russaifah	1.48	713.83	-1.9
452	J-273	662.09	Russaifah	1.48	765.73	103.4
453	J-274	661.28	Russaifah	1.48	765.97	104.5
462	J-279	622.93	Russaifah	1.48	764.65	141.4
463	J-280	622.7	Russaifah	1.48	764.64	141.7
475	J-287	656.15	Russaifah	1.48	719.27	63
480	J-290	685.12	Russaifah	1.48	672.4	-12.7
485	J-293	679.35	Russaifah	1.48	710.98	31.6
486	J-294	678.95	Russaifah	1.48	710.98	32
498	J-301	717.8	Russaifah	1.48	763.15	45.3
499	J-302	717.66	Russaifah	1.48	763.13	45.4
511	J-309	706.64	Russaifah	1.48	645.51	-61
516	J-312	621.68	Russaifah	1.48	667.09	45.3
517	J-313	621.08	Russaifah	1.48	667.04	45.9
521	J-315	659.42	Russaifah	1.48	695.06	35.6
522	J-316	659.24	Russaifah	1.48	695.06	35.7
537	J-325	697.68	Russaifah	1.48	639.33	-58.2
546	J-330	727.37	Russaifah	1.48	859.94	132.3
547	J-331	727.14	Russaifah	1.48	859.94	132.5
549	J-332	691.13	Russaifah	1.48	741.99	50.8
550	J-333	690.58	Russaifah	1.48	742	51.3
564	J-341	698.36	Russaifah	1.48	639.66	-58.6
569	J-344	759.6	Russaifah	1.48	785.15	25.5
570	J-345	759.87	Russaifah	1.48	785.14	25.2
575	J-348	699.92	Russaifah	1.48	761.52	61.5
576	J-349	698.77	Russaifah	1.48	761.65	62.8
581	J-352	643.03	Russaifah	1.48	845.12	201.7
582	J-353	643.2	Russaifah	1.48	845.73	202.1
591	J-358	669.54	Russaifah	1.48	752.24	82.5
592	J-359	669.36	Russaifah	1.48	752.57	83
619	J-376	729.99	Russaifah	1.48	763.05	33
620	J-377	729.86	Russaifah	1.48	763.05	33.1
635	J-386	746.12	Russaifah	1.48	762.83	16.7
637	J-387	773.12	Russaifah	1.48	878.59	105.3
638	J-388	772.41	Russaifah	1.48	878.53	105.9
651	J-395	659.29	Russaifah	1.48	710.64	51.2
652	J-396	659.08	Russaifah	1.48	710.61	51.4
662	J-402	709.83	Russaifah	1.48	761.94	52
663	J-403	709.6	Russaifah	1.48	761.94	52.2
676	J-410	670.28	Russaifah	1.48	711.28	40.9
677	J-411	670.29	Russaifah	1.48	711.29	40.9
686	J-416	696.22	Russaifah	1.48	637.03	-59.1
687	J-417	696.35	Russaifah	1.48	637.03	-59.2
694	J-421	656.69	Russaifah	1.48	710.91	54.1
695	J-422	656.56	Russaifah	1.48	710.91	54.2
703	J-427	730.23	Russaifah	1.48	763.04	32.7
708	J-430	716.78	Russaifah	1.48	855.59	138.5
709	J-431	716.57	Russaifah	1.48	855.59	138.7
714	J-434	701.17	Russaifah	1.48	761.88	60.6
715	J-435	700.85	Russaifah	1.48	761.88	60.9
722	J-439	697.9	Russaifah	1.48	639.42	-58.4
752	J-458	688.66	Russaifah	1.48	717.41	28.7

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
753	J-459	689.24	Russaifah	1.48	717.42	28.1
760	J-463	624.34	Russaifah	1.48	743.1	118.5
761	J-464	623.82	Russaifah	1.48	743.09	119
763	J-465	732.1	Russaifah	1.48	762.63	30.5
764	J-466	732.14	Russaifah	1.48	762.62	30.4
772	J-471	732.5	Russaifah	1.48	762.61	30
778	J-474	717.96	Russaifah	1.48	763.13	45.1
787	J-479	705.74	Russaifah	1.48	662.18	-43.5
791	J-481	649.44	Russaifah	1.48	742.39	92.8
792	J-482	649.96	Russaifah	1.48	742.52	92.4
809	J-491	646.24	Russaifah	1.48	710.74	64.4
810	J-492	646.32	Russaifah	1.48	710.74	64.3
818	J-497	666.66	Russaifah	1.48	711.26	44.5
819	J-498	667.56	Russaifah	1.48	711.37	43.7
833	J-506	760.33	Russaifah	1.48	785.16	24.8
835	J-507	665.97	Russaifah	1.48	759.55	93.4
836	J-508	665.82	Russaifah	1.48	759.55	93.5
839	J-509	684.58	Russaifah	1.48	723.93	39.3
840	J-510	684.92	Russaifah	1.48	724.13	39.1
852	J-517	674.59	Russaifah	1.48	718.8	44.1
853	J-518	675.59	Russaifah	1.48	718.8	43.1
861	J-523	651.67	Russaifah	1.48	743.09	91.2
862	J-524	652.28	Russaifah	1.48	743.09	90.6
869	J-528	656.37	Russaifah	1.48	710.91	54.4
894	J-544	715.19	Russaifah	1.48	688.13	-27
895	J-545	715.1	Russaifah	1.48	688.7	-26.3
906	J-551	641.49	Russaifah	1.48	739.75	98.1
907	J-552	641.76	Russaifah	1.48	739.83	97.9
926	J-564	706.27	Russaifah	1.48	644.89	-61.3
927	J-565	706.07	Russaifah	1.48	644.89	-61.1
929	J-566	702.68	Russaifah	1.48	752.53	49.8
930	J-567	702.32	Russaifah	1.48	844.87	142.3
932	J-568	776.81	Russaifah	1.48	880.08	103.1
933	J-569	776.89	Russaifah	1.48	879.97	102.9
943	J-575	690.38	Russaifah	1.48	742.43	51.9
950	J-579	668.05	Russaifah	1.48	695.13	27
951	J-580	668.34	Russaifah	1.48	695.13	26.7
968	J-589	747.38	Russaifah	1.48	859.94	112.3
978	J-595	619.57	Russaifah	1.48	742.98	123.2
979	J-596	618.68	Russaifah	1.48	742.97	124
981	J-597	749.74	Russaifah	1.48	763.75	14
985	J-599	742.68	Russaifah	1.48	783.83	41.1
986	J-600	743.07	Russaifah	1.48	783.83	40.7
1008	J-613	616.89	Russaifah	1.48	733.7	116.6
1009	J-614	617.34	Russaifah	1.48	733.7	116.1
1030	J-626	712.55	Russaifah	1.48	762.78	50.1
1031	J-627	712.12	Russaifah	1.48	762.77	50.5
1035	J-629	623.21	Russaifah	1.48	785.02	161.5
1036	J-630	623.04	Russaifah	1.48	717.58	94.3
1043	J-634	690.3	Russaifah	1.48	717.42	27.1
1049	J-637	757.3	Russaifah	1.48	819.28	61.9
1050	J-638	757.27	Russaifah	1.48	819.28	61.9
1086	J-660	737.5	Russaifah	1.48	763.94	26.4

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1087	J-661	738.46	Russaifah	1.48	764.02	25.5
1094	J-665	660.26	Russaifah	1.48	688.75	28.4
1095	J-666	660.03	Russaifah	1.48	688.85	28.8
1103	J-670	630.94	Russaifah	1.48	847.79	216.4
1104	J-671	631.22	Russaifah	1.48	847.77	216.1
1112	J-675	750.6	Russaifah	1.48	804.99	54.3
1113	J-676	749.86	Russaifah	1.48	804.99	55
1115	J-677	686.56	Russaifah	1.48	711.01	24.4
1116	J-678	686.83	Russaifah	1.48	711.01	24.1
1123	J-682	633.85	Russaifah	1.48	894.28	259.9
1128	J-685	720.59	Russaifah	1.48	717.63	-3
1129	J-686	721.28	Russaifah	1.48	717.94	-3.3
1133	J-688	714.46	Russaifah	1.48	703.4	-11
1134	J-689	714.34	Russaifah	1.48	703.59	-10.7
1138	J-691	743.53	Russaifah	1.48	784.37	40.8
1151	J-699	746.29	Russaifah	1.48	762.85	16.5
1155	J-700	720.18	Russaifah	1.48	717.31	-2.9
1166	J-707	667.13	Russaifah	1.48	718.87	51.6
1173	J-711	701.57	Russaifah	1.48	824.79	123
1174	J-712	702	Russaifah	1.48	824.81	122.6
1180	J-715	712.46	Russaifah	1.48	704.77	-7.7
1181	J-716	712.17	Russaifah	1.48	705.01	-7.1
1189	J-721	767.6	Russaifah	1.48	804.97	37.3
1190	J-722	768.21	Russaifah	1.48	884.81	116.4
1197	J-726	685.87	Russaifah	1.48	717.43	31.5
1198	J-727	687.06	Russaifah	1.48	717.45	30.3
1213	J-736	668.45	Russaifah	1.48	717.32	48.8
1214	J-737	668.84	Russaifah	1.48	717.33	48.4
1231	J-747	620.79	Russaifah	1.48	708.94	88
1232	J-748	619.61	Russaifah	1.48	708.93	89.1
1242	J-754	610.99	Russaifah	1.48	733.68	122.4
1243	J-755	610.14	Russaifah	1.48	733.68	123.3
1245	J-756	685.14	Russaifah	1.48	634.62	-50.4
1246	J-757	685.93	Russaifah	1.48	634.62	-51.2
1248	J-758	665.56	Russaifah	1.48	759.54	93.8
1253	J-761	688.11	Russaifah	1.48	751.7	63.5
1254	J-762	686.94	Russaifah	1.48	751.7	64.6
1256	J-763	665.29	Russaifah	1.48	759.54	94.1
1279	J-776	659.86	Russaifah	1.48	695.28	35.4
1291	J-783	661.79	Russaifah	1.48	764.32	102.3
1299	J-788	730.94	Russaifah	1.48	780.2	49.2
1300	J-789	731.8	Russaifah	1.48	780.22	48.3
1316	J-798	745	Russaifah	1.48	747.09	2.1
1317	J-799	745	Russaifah	1.48	747.09	2.1
1319	J-800	679.51	Russaifah	1.48	666.82	-12.7
1338	J-811	745	Russaifah	1.48	747.02	2
1345	J-815	687.38	Russaifah	1.48	717.42	30
1355	J-820	704.85	Russaifah	1.48	762.14	57.2
1356	J-821	705.07	Russaifah	1.48	762.1	56.9
1358	J-822	638.98	Russaifah	1.48	717.66	78.5
1359	J-823	639.38	Russaifah	1.48	717.71	78.2
1364	J-826	705.16	Russaifah	1.48	645.5	-59.5
1365	J-827	705.77	Russaifah	1.48	645.5	-60.1

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1367	J-828	667.98	Russaifah	1.48	666.81	-1.2
1410	J-854	705.29	Russaifah	1.48	644.27	-60.9
1426	J-864	706.67	Russaifah	1.48	644.88	-61.7
1428	J-865	700.62	Russaifah	1.48	809.66	108.8
1429	J-866	701.46	Russaifah	1.48	809.66	108
1455	J-881	683.63	Russaifah	1.48	766.54	82.7
1456	J-882	682.73	Russaifah	1.48	766.54	83.6
1469	J-890	600.05	Russaifah	1.48	844.13	243.6
1475	J-893	714.88	Russaifah	1.48	673.54	-41.3
1476	J-894	715.32	Russaifah	1.48	674.58	-40.7
1478	J-895	622.57	Russaifah	1.48	733.79	111
1479	J-896	624.68	Russaifah	1.48	733.85	108.9
1483	J-898	658.3	Russaifah	1.48	766.92	108.4
1488	J-901	686.66	Russaifah	1.48	711.03	24.3
1495	J-905	698.39	Russaifah	1.48	639.32	-59
1504	J-910	617.75	Russaifah	1.48	708.92	91
1516	J-916	621.08	Russaifah	1.48	733.75	112.4
1520	J-918	699.24	Russaifah	1.48	640.2	-58.9
1541	J-930	692.03	Russaifah	1.48	666.85	-25.1
1542	J-931	691.51	Russaifah	1.48	666.85	-24.6
1566	J-944	710.85	Russaifah	1.48	762.67	51.7
1592	J-959	711.83	Russaifah	1.48	704.77	-7
1594	J-960	683.8	Russaifah	1.48	634.61	-49.1
1619	J-974	646.68	Russaifah	1.48	709.54	62.7
1620	J-975	645.01	Russaifah	1.48	709.49	64.4
1627	J-979	771.47	Russaifah	1.48	883.77	112.1
1628	J-980	773.06	Russaifah	1.48	883.29	110
1663	J-1001	634.73	Russaifah	1.48	724.56	89.7
1664	J-1002	633.84	Russaifah	1.48	724.77	90.8
1672	J-1007	668.76	Russaifah	1.48	751.48	82.6
1693	J-1019	611.75	Russaifah	1.48	708.9	97
1695	J-1020	655.95	Russaifah	1.48	744.56	88.4
1696	J-1021	658.04	Russaifah	1.48	745.11	86.9
1698	J-1022	777.39	Russaifah	1.48	880.41	102.8
1700	J-1023	702.15	Russaifah	1.48	752.53	50.3
1714	J-1031	668.44	Russaifah	1.48	711.34	42.8
1740	J-1045	669.69	Russaifah	1.48	717.34	47.6
1750	J-1050	722.37	Russaifah	1.48	718.84	-3.5
1764	J-1057	655.2	Russaifah	1.48	764.79	109.4
1783	J-1068	684.09	Russaifah	1.48	715.84	31.7
1784	J-1069	685.2	Russaifah	1.48	666.85	-18.3
1798	J-1076	663.41	Russaifah	1.48	710.87	47.4
1807	J-1081	700.29	Russaifah	1.48	639.32	-60.8
1822	J-1089	682.21	Russaifah	1.48	666.9	-15.3
1823	J-1090	681.77	Russaifah	1.48	666.9	-14.8
1848	J-1104	661.65	Russaifah	1.48	764.32	102.5
1874	J-1117	732.11	Russaifah	1.48	762.7	30.5
1875	J-1118	730.78	Russaifah	1.48	762.71	31.9
1881	J-1120	693.9	Russaifah	1.48	762.77	68.7
1890	J-1124	701.46	Russaifah	1.48	718.88	17.4
1891	J-1125	702.53	Russaifah	1.48	719.02	16.5
1896	J-1127	662.97	Russaifah	1.48	764.32	101.1
1903	J-1129	703.95	Russaifah	1.48	804.53	100.4

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
1904	J-1130	702.04	Russaifah	1.48	804.52	102.3
1906	J-1131	703.68	Russaifah	1.48	643.12	-60.4
1916	J-1137	595.79	Russaifah	1.48	721.53	125.5
1917	J-1138	596.68	Russaifah	1.48	721.53	124.6
1919	J-1139	697.79	Russaifah	1.48	639.42	-58.3
1929	J-1145	660.8	Russaifah	1.48	763.57	102.6
1931	J-1146	610.32	Russaifah	1.48	733.38	122.8
1936	J-1148	731.36	Russaifah	1.48	763.11	31.7
1947	J-1152	678.36	Russaifah	1.48	666.81	-11.5
1948	J-1153	678.25	Russaifah	1.48	666.82	-11.4
1953	J-1155	682.73	Russaifah	1.48	766.53	83.6
1958	J-1157	621.38	Russaifah	1.48	743.09	121.5
1974	J-1164	724.83	Russaifah	1.48	762.86	37.9
1989	J-1170	714.87	Russaifah	1.48	701.65	-13.2
1995	J-1173	763.01	Russaifah	1.48	785.1	22
1996	J-1174	764.5	Russaifah	1.48	785.08	20.5
2006	J-1179	668.12	Russaifah	1.48	763.79	95.5
2011	J-1182	629.14	Russaifah	1.48	734.02	104.7
2051	J-1201	636.35	Russaifah	1.48	724.2	87.7
2055	J-1203	646.04	Russaifah	1.48	704.72	58.6
2056	J-1204	644.47	Russaifah	1.48	704.65	60.1
2058	J-1205	626.13	Russaifah	1.48	729.47	103.1
2059	J-1206	627.72	Russaifah	1.48	729.46	101.5
2063	J-1207	678.62	Russaifah	1.48	711.1	32.4
2064	J-1208	680.99	Russaifah	1.48	711.08	30
2074	J-1212	616.74	Russaifah	1.48	743.09	126.1
2075	J-1213	618.08	Russaifah	1.48	743.09	124.8
2080	J-1216	690.22	Russaifah	1.48	751.61	61.3
2088	J-1220	765.4	Russaifah	1.48	876.59	111
2089	J-1221	759.82	Russaifah	1.48	875.19	115.1
2094	J-1224	642.25	Russaifah	1.48	704.61	62.2
2098	J-1226	683.11	Russaifah	1.48	633.81	-49.2
2107	J-1231	618.42	Russaifah	1.48	742.95	124.3
2108	J-1232	616.92	Russaifah	1.48	742.94	125.8
2110	J-1233	716.5	Russaifah	1.48	677.55	-38.9
2112	J-1234	711.32	Russaifah	1.48	676.68	-34.6
2113	J-1235	711.68	Russaifah	1.48	677.24	-34.4
2115	J-1236	709.15	Russaifah	1.48	762.49	53.2
2138	J-1248	730.21	Russaifah	1.48	762.43	32.2
2139	J-1249	733.57	Russaifah	1.48	762.44	28.8
2155	J-1257	666.49	Russaifah	1.48	761.68	95
2168	J-1264	713.44	Russaifah	1.48	754.62	41.1
2169	J-1265	715.09	Russaifah	1.48	752.71	37.5
2172	J-1266	647.53	Russaifah	1.48	765.56	117.8
2182	J-1272	777.52	Russaifah	1.48	879.36	101.6
2188	J-1275	673.15	Russaifah	1.48	666.81	-6.3
2189	J-1276	675.58	Russaifah	1.48	666.81	-8.7
2195	J-1278	744.62	Russaifah	1.48	787.16	42.4
2225	J-1292	720.79	Russaifah	1.48	720.56	-0.2
2240	J-1298	692.51	Russaifah	1.48	633.77	-58.6
2247	J-1301	659.03	Russaifah	1.48	710.9	51.8
2266	J-1311	759.35	Russaifah	1.48	781.98	22.6
2267	J-1312	761.93	Russaifah	1.48	782.14	20.2

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2274	J-1316	698.94	Russaifah	1.48	752.54	53.5
2275	J-1317	700.48	Russaifah	1.48	752.54	51.9
2286	J-1322	615.43	Russaifah	1.48	733.38	117.7
2317	J-1337	733.3	Russaifah	1.48	762.7	29.3
2322	J-1340	643.91	Russaifah	1.48	740.6	96.5
2327	J-1342	719.84	Russaifah	1.48	722.53	2.7
2332	J-1345	712.89	Russaifah	1.48	706.31	-6.6
2343	J-1349	714.2	Russaifah	1.48	762.9	48.6
2373	J-1362	651.26	Russaifah	1.48	709.7	58.3
2378	J-1364	708.34	Russaifah	1.48	665.53	-42.7
2392	J-1371	656.58	Russaifah	1.48	710.28	53.6
2393	J-1372	654.95	Russaifah	1.48	710.04	55
2395	J-1373	714.85	Russaifah	1.48	750.09	35.2
2401	J-1375	626.99	Russaifah	1.48	724.2	97
2403	J-1376	760.32	Russaifah	1.48	785.08	24.7
2410	J-1379	636.55	Russaifah	1.48	709.23	72.5
2411	J-1380	633.24	Russaifah	1.48	709.14	75.7
2421	J-1386	711.56	Russaifah	1.48	676.67	-34.8
2440	J-1396	779.32	Russaifah	1.48	881.45	101.9
2480	J-1412	730.57	Russaifah	1.48	861.69	130.9
2515	J-1427	626.68	Russaifah	1.48	725.82	98.9
2525	J-1431	709.91	Russaifah	1.48	768.43	58.4
2526	J-1432	706.48	Russaifah	1.48	768.42	61.8
2532	J-1433	728.89	Russaifah	1.48	763.3	34.3
2533	J-1434	723.26	Russaifah	1.48	763.24	39.9
2543	J-1438	750.68	Russaifah	1.48	763.58	12.9
2572	J-1450	652.94	Russaifah	1.48	704.94	51.9
2582	J-1455	716.01	Russaifah	1.48	717.54	1.5
2592	J-1459	739.83	Russaifah	1.48	762.76	22.9
2627	J-1474	666.31	Russaifah	1.48	705.84	39.5
2628	J-1475	661.65	Russaifah	1.48	705.39	43.6
2632	J-1477	699.92	Russaifah	1.48	751	51
2633	J-1478	702.02	Russaifah	1.48	750.96	48.8
2635	J-1479	692.03	Russaifah	1.48	824.66	132.4
2636	J-1480	697.3	Russaifah	1.48	824.69	127.1
2642	J-1483	764.06	Russaifah	1.48	785.87	21.8
2654	J-1488	666.19	Russaifah	1.48	711.97	45.7
2664	J-1491	711.76	Russaifah	1.48	761.99	50.1
2668	J-1493	695.58	Russaifah	1.48	636.95	-58.5
2680	J-1500	699.19	Russaifah	1.48	718.52	19.3
2708	J-1510	725.69	Russaifah	1.48	780.04	54.2
2728	J-1520	702.9	Russaifah	1.48	653.3	-49.5
2731	J-1521	681.65	Russaifah	1.48	666.83	-14.8
2733	J-1522	698.13	Russaifah	1.48	764.62	66.4
2734	J-1523	699.93	Russaifah	1.48	764.62	64.6
2743	J-1527	661.99	Russaifah	1.48	710.96	48.9
2744	J-1528	658	Russaifah	1.48	710.84	52.7
2769	J-1535	658.92	Russaifah	1.48	719.04	60
2773	J-1536	697.9	Russaifah	1.48	752.53	54.5
2798	J-1546	679.1	Russaifah	1.48	711.03	31.9
2809	J-1550	689.76	Russaifah	1.48	824.65	134.6
2825	J-1556	684.39	Russaifah	1.48	717.35	32.9
2826	J-1557	670.81	Russaifah	1.48	717.66	46.7

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2833	J-1560	697.64	Russaifah	1.48	844.89	147
2844	J-1564	777.52	Russaifah	1.48	835.6	58
2845	J-1565	777.26	Russaifah	1.48	835.56	58.2
2850	J-1568	688.18	Russaifah	1.48	764.63	76.3
2851	J-1569	694.34	Russaifah	1.48	764.62	70.1
2868	J-1572	660.55	Russaifah	1.48	718.78	58.1
2876	J-1574	765.6	Russaifah	1.48	819.28	53.6
2879	J-1575	752.86	Russaifah	1.48	794.28	41.3
2881	J-1576	712.89	Russaifah	1.48	710.77	-2.1
2913	J-1588	614.84	Russaifah	1.48	735.92	120.8
2916	J-1589	745.77	Russaifah	1.48	782.77	36.9
2917	J-1590	738.59	Russaifah	1.48	782.76	44.1
2925	J-1593	699.95	Russaifah	1.48	804.51	104.3
2930	J-1596	734.86	Russaifah	1.48	867.41	132.3
2932	J-1597	759.34	Russaifah	1.48	782.78	23.4
2937	J-1599	742.53	Russaifah	1.48	763.36	20.8
2940	J-1600	620.89	Russaifah	1.48	742.95	121.8
2953	J-1605	669.36	Russaifah	1.48	706.74	37.3
2962	J-1609	637.82	Russaifah	1.48	734.83	96.8
2990	J-1616	651.83	Russaifah	1.48	710.74	58.8
2991	J-1617	656.31	Russaifah	1.48	710.76	54.3
2993	J-1618	699.48	Russaifah	1.48	672.59	-26.8
3007	J-1621	750.29	Russaifah	1.48	804.25	53.8
3050	J-1632	753.59	Russaifah	1.48	804.9	51.2
3058	J-1634	686.67	Russaifah	1.48	666.89	-19.7
3067	J-1639	676.42	Russaifah	1.48	717.39	40.9
3069	J-1640	755.05	Russaifah	1.48	804.98	49.8
3070	J-1641	750.17	Russaifah	1.48	805	54.7
3123	J-1661	677.2	Russaifah	1.48	752.53	75.2
3125	J-1662	675.21	Russaifah	1.48	749.03	73.7
3140	J-1668	717.81	Russaifah	1.48	753	35.1
3155	J-1674	661.07	Russaifah	1.48	710.92	49.7
3185	J-1686	606.18	Russaifah	1.48	718.11	111.7
3187	J-1687	643.18	Russaifah	1.48	710.9	67.6
3188	J-1688	618.38	Russaifah	1.48	710.9	92.3
3200	J-1692	610.46	Russaifah	1.48	733.64	122.9
3206	J-1695	631	Russaifah	1.48	764.64	133.4
3208	J-1696	631	Russaifah	1.48	764.62	133.3
3225	J-1702	631	Russaifah	1.48	870.19	238.7
3229	J-1703	743.36	Russaifah	1.48	763.53	20.1
3237	J-1706	659.81	Russaifah	1.48	892.59	232.3
3243	J-1707	649.77	Russaifah	1.48	736.89	86.9
3249	J-1708	746.8	Russaifah	1.48	785.07	38.2
3250	J-1709	743.42	Russaifah	1.48	785.11	41.6
3252	J-1710	643.85	Russaifah	1.48	721.39	77.4
3258	J-1711	685.01	Russaifah	1.48	748.86	63.7
3259	J-1712	679.51	Russaifah	1.48	748.89	69.2
3261	J-1713	759.31	Russaifah	1.48	783.35	24
3278	J-1719	712.99	Russaifah	1.48	674.76	-38.2
3280	J-1720	607.68	Russaifah	1.48	725.28	117.4
3281	J-1721	608.81	Russaifah	1.48	727.15	118.1
3283	J-1722	749.65	Russaifah	1.48	805	55.2
3284	J-1723	735.97	Russaifah	1.48	804.98	68.9

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3291	J-1727	690.33	Russaifah	1.48	845.08	154.4
3305	J-1733	698.83	Russaifah	1.48	766.88	67.9
3308	J-1734	676.68	Russaifah	1.48	710.98	34.2
3324	J-1739	675.13	Russaifah	1.48	764.69	89.4
3325	J-1740	675.41	Russaifah	1.48	764.65	89.1
3329	J-1742	675.56	Russaifah	1.48	733.47	57.8
3333	J-1743	749.91	Russaifah	1.48	891.6	141.4
3373	J-1756	663.55	Russaifah	1.48	681.08	17.5
3374	J-1757	676.98	Russaifah	1.48	681.04	4.1
3378	J-1758	681.87	Russaifah	1.48	810.71	128.6
3390	J-1763	760.26	Russaifah	1.48	766.68	6.4
3396	J-1766	730.8	Russaifah	1.48	766.69	35.8
3400	J-1768	725.9	Russaifah	1.48	771.62	45.6
3401	J-1769	739.5	Russaifah	1.48	775.92	36.3
3406	J-1771	760	Russaifah	1.48	764.99	5
3416	J-1773	688.52	Russaifah	1.48	775.36	86.7
3417	J-1774	673.82	Russaifah	1.48	786.15	112.1
3426	J-1777	711.04	Russaifah	1.48	771.53	60.4
3428	J-1778	645.22	Russaifah	1.48	805.56	160
3446	J-1782	686.75	Russaifah	1.48	671.21	-15.5
3452	J-1784	612.65	Russaifah	1.48	846.86	233.7
3453	J-1785	599.53	Russaifah	1.48	846.38	246.4
3473	J-1793	702.86	Russaifah	1.48	720.7	17.8
3480	J-1794	652.84	Russaifah	1.48	710.86	57.9
3483	J-1795	723.74	Russaifah	1.48	735.2	11.4
3489	J-1797	663.38	Russaifah	1.48	667.69	4.3
3490	J-1798	659.65	Russaifah	1.48	667.07	7.4
3502	J-1803	642.83	Russaifah	1.48	714.27	71.3
3556	J-1823	694.41	Russaifah	1.48	827.37	132.7
3565	J-1826	618.16	Russaifah	1.48	717.58	99.2
3570	J-1828	602.19	Russaifah	1.48	667.01	64.7
3599	J-1838	695.8	Russaifah	1.48	750.88	55
3612	J-1843	686.41	Russaifah	1.48	666.95	-19.4
3618	J-1845	618.06	Russaifah	1.48	764.64	146.3
3627	J-1848	810	Russaifah	1.48	829.84	19.8
3628	J-1849	828.75	Russaifah	1.48	829.13	0.4
3633	J-1851	699.65	Russaifah	1.48	780.02	80.2
3673	J-1864	669.83	Russaifah	1.48	666.98	-2.8
3678	J-1867	715.43	Russaifah	1.48	752.81	37.3
3679	J-1868	717.47	Russaifah	1.48	753	35.5
3686	J-1871	726.61	Russaifah	1.48	802.11	75.3
3739	J-1888	631	Russaifah	1.48	666.81	35.7
3754	J-1894	631	Russaifah	1.48	932.26	300.7
3757	J-1895	717.41	Russaifah	1.48	752.53	35.1
3764	J-1899	736.47	Russaifah	1.48	804.48	67.9
3770	J-1901	838.17	Russaifah	1.48	828.78	-9.4
3819	J-1920	749.33	Russaifah	1.48	804.91	55.5
3820	J-1921	717.89	Russaifah	1.48	797.59	79.5
3823	J-1922	750.25	Russaifah	1.48	805.04	54.7
3837	J-1926	794.45	Russaifah	1.48	838.03	43.5
3859	J-1935	760	Russaifah	1.48	764.61	4.6
3897	J-1948	662.55	Russaifah	1.48	743.09	80.4
4601	J-2020	755	<None>	1.48	785.19	30.1

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
4604	J-2021	755	<None>	1.48	785.26	30.2
4613	J-2023	686	<None>	1.48	666.95	-19
4690	J-2032	700	<None>	1.48	658.73	-41.2
120	J-61	516.61	Azraq	1.51	566.85	50.1
121	J-62	516.55	Azraq	1.51	566.85	50.2
345	J-206	510.3	Azraq	1.51	572.03	61.6
346	J-207	510.27	Azraq	1.51	572.03	61.6
667	J-405	516.77	Azraq	1.51	566.85	50
697	J-423	512.06	Azraq	1.51	567	54.8
698	J-424	512.07	Azraq	1.51	566.99	54.8
749	J-456	510.49	Azraq	1.51	572.05	61.4
750	J-457	510.47	Azraq	1.51	572.06	61.5
1014	J-617	510.41	Azraq	1.51	572.06	61.5
1063	J-646	510.16	Azraq	1.51	572.06	61.8
1064	J-647	510.14	Azraq	1.51	572.05	61.8
1389	J-842	512.09	Azraq	1.51	566.99	54.8
1395	J-845	510.18	Azraq	1.51	572.03	61.7
1466	J-888	510.4	Azraq	1.51	572.03	61.5
2313	J-1335	513.6	Azraq	1.51	566.96	53.3
2462	J-1405	513.82	Azraq	1.51	566.85	52.9
2837	J-1561	511.19	Azraq	1.51	572.06	60.7
2887	J-1577	515.11	Azraq	1.51	566.96	51.7
3012	J-1623	514.54	Azraq	1.51	567.11	52.5
3160	J-1676	510.16	Azraq	1.51	571.81	61.5
3708	J-1878	511.33	Azraq	1.51	567.79	56.3
3761	J-1897	511.93	Azraq	1.51	570.16	58.1
3762	J-1898	510.49	Azraq	1.51	569.11	58.5
915	J-557	711.84	West Region	1.81	877.58	165.4
916	J-558	712.02	West Region	1.81	877.57	165.2
923	J-562	657.28	West Region	1.81	762.06	104.6
924	J-563	657.24	West Region	1.81	762.05	104.6
935	J-570	631	West Region	1.81	635.94	4.9
936	J-571	631	West Region	1.81	635.95	4.9
1038	J-631	712.3	West Region	1.81	877.53	164.9
1148	J-697	692.5	West Region	1.81	876.27	183.4
1149	J-698	693.01	West Region	1.81	876.26	182.9
1200	J-728	899.7	West Region	1.81	1144.04	243.8
1201	J-729	900.81	West Region	1.81	1144.03	242.7
1434	J-869	631	West Region	1.81	875.13	243.6
1435	J-870	632	West Region	1.81	875.11	242.6
1442	J-874	632	West Region	1.81	875.11	242.6
3468	J-1791	969.55	West Region	1.81	1143.94	174
3606	J-1840	799.7	West Region	1.81	1145.35	345
3607	J-1841	816.39	West Region	1.81	1144.9	327.9
3651	J-1858	760	West Region	1.81	1146.08	385.3
3665	J-1863	631	West Region	1.81	692.25	61.1
3759	J-1896	669.97	West Region	1.81	876.08	205.7
3834	J-1924	762.96	West Region	1.81	870.21	107
3835	J-1925	818.68	West Region	1.81	869.01	50.2
3850	J-1931	819.09	West Region	1.81	869.03	49.8
3852	J-1932	710.31	West Region	1.81	860.54	149.9
3853	J-1933	819.4	West Region	1.81	868.95	49.5
3876	J-1938	760	West Region	1.81	765.52	5.5

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3878	J-1939	760	West Region	1.81	1058.89	298.3
3883	J-1941	616.81	West Region	1.81	797.48	180.3
3884	J-1942	699.76	West Region	1.81	797.33	97.4
3911	J-1954	500.11	North Region	1.81	521.69	21.5
4158	J-1999	520	North Region	1.81	564.16	44.1
4160	J-2000	500	North Region	1.81	577.8	77.6
4713	J-2034	604	<None>	1.81	797.86	193.5
4716	J-2036	604	<None>	1.81	797.66	193.3
74	J-31	596.48	Awajan	2.46	666.96	70.3
75	J-32	596.62	Awajan	2.46	666.96	70.2
100	J-48	577.57	Awajan	2.46	666.98	89.2
101	J-49	577.57	Awajan	2.46	666.97	89.2
112	J-56	602.07	Awajan	2.46	843.36	240.8
113	J-57	602.13	Awajan	2.46	843.36	240.7
182	J-101	687.93	Awajan	2.46	699.89	11.9
183	J-102	687.89	Awajan	2.46	699.88	12
185	J-103	575.03	Awajan	2.46	637.84	62.7
186	J-104	574.96	Awajan	2.46	637.82	62.7
207	J-117	688	Awajan	2.46	699.99	12
208	J-118	688.09	Awajan	2.46	699.96	11.9
229	J-131	577.75	Awajan	2.46	666.92	89
230	J-132	577.64	Awajan	2.46	666.97	89.2
235	J-135	573.94	Awajan	2.46	634.87	60.8
236	J-136	573.92	Awajan	2.46	634.59	60.5
283	J-166	577.68	Awajan	2.46	666.98	89.1
310	J-183	605.07	Awajan	2.46	617.08	12
311	J-184	604.77	Awajan	2.46	617.15	12.4
322	J-191	687.84	Awajan	2.46	699.87	12
379	J-227	687.99	Awajan	2.46	699.92	11.9
488	J-295	596.15	Awajan	2.46	666.96	70.7
534	J-323	607.98	Awajan	2.46	693.83	85.7
535	J-324	607.88	Awajan	2.46	693.15	85.1
553	J-334	601.7	Awajan	2.46	634.86	33.1
554	J-335	601.83	Awajan	2.46	843.36	241
556	J-336	577.4	Awajan	2.46	666.99	89.4
562	J-340	605.47	Awajan	2.46	617.01	11.5
602	J-365	611.52	Awajan	2.46	691.81	80.1
603	J-366	611.28	Awajan	2.46	691.78	80.3
669	J-406	607.7	Awajan	2.46	693.14	85.3
679	J-412	584.58	Awajan	2.46	844.24	259.1
680	J-413	584.44	Awajan	2.46	666.34	81.7
746	J-454	641.94	Awajan	2.46	839.22	196.9
747	J-455	641.36	Awajan	2.46	839.24	197.5
769	J-469	621.99	Awajan	2.46	695.03	72.9
770	J-470	621.99	Awajan	2.46	695.03	72.9
803	J-488	608.17	Awajan	2.46	694.87	86.5
812	J-493	603.13	Awajan	2.46	676.74	73.5
813	J-494	602.82	Awajan	2.46	676.06	73.1
830	J-504	687.12	Awajan	2.46	633.82	-53.2
831	J-505	687.62	Awajan	2.46	633.79	-53.7
871	J-529	602.87	Awajan	2.46	843.25	239.9
879	J-534	573.8	Awajan	2.46	633.21	59.3
880	J-535	573.91	Awajan	2.46	633.11	59.1

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
965	J-587	579.4	Awajan	2.46	666.96	87.4
966	J-588	579.43	Awajan	2.46	666.96	87.4
1005	J-611	627.46	Awajan	2.46	625.71	-1.8
1006	J-612	627.28	Awajan	2.46	625.71	-1.6
1080	J-656	563.94	Awajan	2.46	635.78	71.7
1081	J-657	563.53	Awajan	2.46	635.76	72.1
1089	J-662	559.25	Awajan	2.46	634.03	74.6
1090	J-663	558.74	Awajan	2.46	634.42	75.5
1098	J-667	605.8	Awajan	2.46	616.83	11
1099	J-668	606.55	Awajan	2.46	616.86	10.3
1110	J-674	605.07	Awajan	2.46	616.81	11.7
1177	J-713	600.16	Awajan	2.46	666.96	66.7
1178	J-714	600.22	Awajan	2.46	719.46	119
1192	J-723	688.38	Awajan	2.46	633.78	-54.5
1237	J-751	687.59	Awajan	2.46	633.77	-53.7
1239	J-752	621.76	Awajan	2.46	695.03	73.1
1240	J-753	621.35	Awajan	2.46	695.03	73.5
1273	J-773	582.08	Awajan	2.46	666.97	84.7
1274	J-774	582.24	Awajan	2.46	666.97	84.6
1314	J-797	686.16	Awajan	2.46	633.81	-52.2
1324	J-803	576.63	Awajan	2.46	636.37	59.6
1412	J-855	578.26	Awajan	2.46	666.72	88.3
1448	J-877	687.55	Awajan	2.46	633.77	-53.7
1468	J-889	600.45	Awajan	2.46	843.8	242.9
1509	J-913	573.69	Awajan	2.46	632.79	59
1518	J-917	603.76	Awajan	2.46	616.81	13
1545	J-933	583.48	Awajan	2.46	666.98	83.3
1568	J-945	562.65	Awajan	2.46	577.7	15
1569	J-946	566.02	Awajan	2.46	577.69	11.6
1596	J-961	600.33	Awajan	2.46	719.6	119
1632	J-982	620.63	Awajan	2.46	695.03	74.3
1641	J-987	641.11	Awajan	2.46	685.43	44.2
1642	J-988	641.76	Awajan	2.46	685.44	43.6
1644	J-989	575.89	Awajan	2.46	636.37	60.4
1645	J-990	575.46	Awajan	2.46	636.47	60.9
1657	J-997	598.19	Awajan	2.46	666.96	68.6
1658	J-998	599.21	Awajan	2.46	666.96	67.6
1681	J-1012	606.92	Awajan	2.46	693.13	86
1688	J-1016	605.12	Awajan	2.46	842.93	237.3
1842	J-1100	585.26	Awajan	2.46	627.91	42.6
1843	J-1101	581.3	Awajan	2.46	628.31	46.9
1851	J-1106	583.15	Awajan	2.46	666.98	83.7
2001	J-1177	604.64	Awajan	2.46	692.36	87.5
2002	J-1178	603.42	Awajan	2.46	692.35	88.7
2034	J-1194	576.18	Awajan	2.46	636.37	60.1
2066	J-1209	582.95	Awajan	2.46	666.97	83.8
2084	J-1218	620.08	Awajan	2.46	625.8	5.7
2085	J-1219	617.66	Awajan	2.46	625.89	8.2
2096	J-1225	604.46	Awajan	2.46	843.71	238.8
2134	J-1246	577.65	Awajan	2.46	666.95	89.1
2145	J-1252	588.3	Awajan	2.46	626.9	38.5
2146	J-1253	585.6	Awajan	2.46	627.21	41.5
2209	J-1284	629.92	Awajan	2.46	625.71	-4.2

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
2244	J-1300	604.3	Awajan	2.46	843.59	238.8
2258	J-1307	579.37	Awajan	2.46	667.05	87.5
2290	J-1324	589.15	Awajan	2.46	664.38	75.1
2291	J-1325	587.4	Awajan	2.46	664.6	77
2348	J-1352	567.42	Awajan	2.46	638.42	70.9
2349	J-1353	571.66	Awajan	2.46	638.73	66.9
2380	J-1365	644.51	Awajan	2.46	686.76	42.2
2381	J-1366	643.84	Awajan	2.46	687.63	43.7
2547	J-1439	560.39	Awajan	2.46	634.58	74
2556	J-1443	601.41	Awajan	2.46	692.33	90.7
2570	J-1449	642.52	Awajan	2.46	689.13	46.5
2585	J-1456	582.66	Awajan	2.46	666.34	83.5
2588	J-1457	590.31	Awajan	2.46	666.97	76.5
2589	J-1458	583.78	Awajan	2.46	666.97	83
2612	J-1468	632.45	Awajan	2.46	626.16	-6.3
2613	J-1469	635.66	Awajan	2.46	625.94	-9.7
2615	J-1470	565.31	Awajan	2.46	631.15	65.7
2618	J-1471	560.73	Awajan	2.46	635.54	74.7
2638	J-1481	566.56	Awajan	2.46	636.06	69.4
2644	J-1484	581.1	Awajan	2.46	665.88	84.6
2722	J-1517	584.79	Awajan	2.46	665.76	80.8
2763	J-1534	596.8	Awajan	2.46	619.63	22.8
2778	J-1538	602.44	Awajan	2.46	672.19	69.6
2779	J-1539	605.28	Awajan	2.46	670.91	65.5
2785	J-1542	627.79	Awajan	2.46	626.66	-1.1
2800	J-1547	582.04	Awajan	2.46	698.92	116.6
2813	J-1552	584.28	Awajan	2.46	698.93	114.4
2862	J-1570	605.22	Awajan	2.46	691.37	86
2863	J-1571	601.82	Awajan	2.46	691.2	89.2
2895	J-1580	567.06	Awajan	2.46	634.83	67.6
2900	J-1582	633.92	Awajan	2.46	625.75	-8.2
2934	J-1598	623.28	Awajan	2.46	695.59	72.2
2950	J-1604	643.3	Awajan	2.46	684.77	41.4
2956	J-1606	650.56	Awajan	2.46	699.82	49.2
2964	J-1610	628.28	Awajan	2.46	839.54	210.8
3009	J-1622	582.07	Awajan	2.46	666.96	84.7
3040	J-1629	605.02	Awajan	2.46	666.97	61.8
3052	J-1633	570.75	Awajan	2.46	637.23	66.3
3096	J-1654	579.82	Awajan	2.46	666.96	87
3128	J-1663	606.72	Awajan	2.46	692.29	85.4
3129	J-1664	616.24	Awajan	2.46	692.27	75.9
3141	J-1669	715.46	Awajan	2.46	753	37.5
3166	J-1679	619.18	Awajan	2.46	692.85	73.5
3167	J-1680	626.34	Awajan	2.46	692.69	66.2
3179	J-1685	617.13	Awajan	2.46	732.34	115
3222	J-1701	591.9	Awajan	2.46	691.11	99
3288	J-1725	610.52	Awajan	2.46	615.66	5.1
3289	J-1726	602.84	Awajan	2.46	615.57	12.7
3293	J-1728	621.53	Awajan	2.46	694.55	72.9
3362	J-1752	601.07	Awajan	2.46	628.59	27.5
3364	J-1753	598.02	Awajan	2.46	675.35	77.2
3365	J-1754	602.61	Awajan	2.46	675.55	72.8
3387	J-1761	607.09	Awajan	2.46	694.06	86.8

Existing Model Node Information - PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
3388	J-1762	595.03	Awajan	2.46	693.77	98.5
3398	J-1767	596.3	Awajan	2.46	675.29	78.8
3403	J-1770	652.69	Awajan	2.46	838.79	185.7
3423	J-1776	560.45	Awajan	2.46	634.41	73.8
3432	J-1779	643.26	Awajan	2.46	697.8	54.4
3464	J-1789	602.9	Awajan	2.46	699.05	96
3497	J-1801	610.47	Awajan	2.46	704.47	93.8
3500	J-1802	635.72	Awajan	2.46	697.19	61.3
3533	J-1814	579.59	Awajan	2.46	666.76	87
3584	J-1833	610.88	Awajan	2.46	693.3	82.2
3616	J-1844	602.17	Awajan	2.46	845.64	243
3631	J-1850	632.72	Awajan	2.46	692.25	59.4
3662	J-1862	628.72	Awajan	2.46	685.13	56.3
3693	J-1874	587.42	Awajan	2.46	666.5	78.9
3696	J-1875	640	Awajan	2.46	643.37	3.4
3732	J-1885	572.79	Awajan	2.46	675.24	102.2
3830	J-1923	640	Awajan	2.46	642.98	3
4020	J-1988	639.08	Awajan	2.46	643.87	4.8
4546	J-2019	690	<None>	2.46	696.83	6.8
4623	J-2026	582.46	<None>	2.46	698.92	116.2
4674	J-2030	660	<None>	2.46	647.43	-12.5
3150	J-1673	719.28	<None>	222	820.15	100.7

Existing Model Pipe Information - PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
29	pipe-2301	2.26	J-3	J-4	125	120	1	10.4	0.85	8.011
34	pipe-21605	1.63	J-6	J-7	400	100	7	85.02	0.68	1.877
37	pipe-15829	1.66	J-8	J-9	150	120	1	-7.47	0.42	1.789
40	pipe-14379	2.74	J-2	J-10	200	120	1	8.05	0.26	0.503
42	pipe-24210	1.98	J-11	J-12	150	120	1	1.94	0.11	0.113
45	pipe-13489	2	J-13	J-14	150	100	7	-9.27	0.52	3.72
48	pipe-7460	2.06	J-15	J-2	200	120	1	8.57	0.27	0.577
50	pipe-1448	2.04	J-16	J-17	125	120	1	35.12	2.86	76.349
53	pipe-17360	2.05	J-18	J-19	150	120	1	6.64	0.38	1.453
56	pipe-2683	2.05	J-20	J-21	150	120	1	14.37	0.81	6.007
59	pipe-7305	2.11	J-15	J-22	150	100	9	10.52	0.6	4.72
61	pipe-7007	2.13	J-23	J-24	125	120	1	7.77	0.63	4.674
64	pipe-7461	2.25	J-25	J-26	150	100	9	10.21	0.58	4.462
67	pipe-3119	2.39	J-27	J-28	125	120	1	-1.54	0.13	0.218
70	pipe-16864	2.44	J-29	J-30	150	100	7	-13.57	0.77	7.565
73	pipe-24449	2.45	J-31	J-32	400	100	7	2.46	0.02	0.03
76	pipe-13467	2.47	J-33	J-13	150	100	7	-7.95	0.45	2.806
78	pipe-18437	2.54	J-34	J-35	150	120	1	15.2	0.86	6.632
81	pipe-2939	2.58	J-36	J-37	125	120	1	-5.17	0.42	2.191
84	pipe-19457	2.64	J-38	J-39	150	100	7	-1.33	0.08	0.113
87	pipe-3723	2.68	J-40	J-41	150	100	7	-2.9	0.16	0.444
90	pipe-19459	2.71	J-42	J-43	150	100	7	6.64	0.38	2.002
93	pipe-16577	2.75	J-44	J-45	150	100	7	-6.8	0.38	2.113
96	pipe-24133	2.76	J-46	J-47	200	100	7	1.48	0.05	0.027
99	pipe-8872	3.33	J-48	J-49	400	120	1	13.24	0.11	0.045
102	pipe-9681	2.84	J-50	J-51	150	100	7	-10.97	0.62	5.118
105	pipe-3682	2.89	J-52	J-53	150	100	7	-60.49	3.42	120.493
108	pipe-2204	2.89	J-54	J-55	125	130	8	4.65	0.38	1.556
111	pipe-9511	3.01	J-56	J-57	600	120	1	-185.91	0.66	0.79
114	pipe-14428	3.02	J-58	J-15	200	120	1	19.61	0.62	2.626
116	pipe-7360	3.04	J-59	J-60	125	130	8	2.67	0.22	0.551
119	pipe-15793	3.04	J-61	J-62	400	100	7	-3.02	0.02	0.012
122	pipe-160	3.06	J-63	J-64	125	130	8	2.07	0.17	0.34
125	pipe-8693	3.12	J-65	J-66	300	100	7	-220.69	3.12	45.25
128	pipe-8599	3.14	J-67	J-68	400	100	7	-37.23	0.3	0.427
131	pipe-24501	3.16	J-69	J-70	200	100	7	-27.66	0.88	6.986
134	pipe-18396	3.2	J-71	J-72	150	120	1	3.98	0.23	0.557
137	pipe-14140	3.27	J-60	J-73	125	130	8	2.15	0.18	0.376
139	pipe-10235	3.27	J-74	J-75	200	100	7	-19.47	0.62	3.645
142	pipe-8055	3.27	J-76	J-77	400	120	1	-19.3	0.15	0.068
145	pipe-9978	3.27	J-51	J-78	150	100	7	-3.73	0.21	0.682
147	pipe-21787	3.3	J-79	J-6	300	100	7	208.46	2.95	40.716
149	pipe-16389	3.35	J-80	J-81	300	100	7	92.39	1.31	9.021
152	pipe-9546	3.35	J-72	J-82	150	120	1	2.66	0.15	0.266
154	pipe-24140	3.37	J-83	J-84	300	120	1	74.64	1.06	4.334
157	pipe-15931	3.76	J-85	J-86	300	120	1	-7.33	0.1	0.059
160	pipe-23878	3.38	J-87	J-88	150	100	7	14.58	0.83	8.62
163	pipe-3736	3.4	J-89	J-90	150	100	7	-5.2	0.29	1.292
166	pipe-7304	3.46	J-91	J-92	125	130	8	3.87	0.32	1.107
169	pipe-25004	3.47	J-93	J-94	200	120	1	37.71	1.2	8.81
172	pipe-56	3.49	J-95	J-96	200	120	1	-10.78	0.34	0.875
175	pipe-7457	3.49	J-97	J-98	150	100	9	0.52	0.03	0.011
178	pipe-9571	3.52	J-99	J-100	300	100	7	59.65	0.84	4.019
181	pipe-19461	3.54	J-101	J-102	400	100	7	102.33	0.81	2.666
184	pipe-14792	3.64	J-103	J-104	300	100	7	54.06	0.76	3.335
187	pipe-10861	3.77	J-105	J-106	150	100	7	-8.08	0.46	2.901
190	pipe-9505	3.77	J-107	J-108	150	120	1	6.83	0.39	1.519
193	pipe-2944	3.83	J-36	J-109	125	120	1	4.65	0.38	1.808
195	pipe-17116	3.83	J-110	J-111	300	100	7	-0.91	0.01	0
198	pipe-7189	3.84	J-112	J-113	125	130	8	2.58	0.21	0.533
201	pipe-8444	3.87	J-114	J-115	200	100	7	76.71	2.44	46.084
204	pipe-13648	3.89	J-25	J-116	200	120	1	17.66	0.56	2.163
206	pipe-23755	3.89	J-117	J-118	400	100	7	170.53	1.36	6.902
209	pipe-6819	3.91	J-119	J-120	125	130	8	-3.77	0.31	1.055
212	pipe-19576	3.92	J-121	J-122	150	120	1	-2.66	0.15	0.266
215	pipe-15051	3.94	J-123	J-124	200	100	7	13.28	0.42	1.777
218	pipe-10013	3.94	J-125	J-74	150	100	7	-9.05	0.51	3.568
223	pipe-19577	4.08	J-128	J-121	150	120	1	-1.33	0.08	0.073
225	pipe-8817	4.09	J-129	J-130	250	120	1	27.03	0.55	1.619
228	pipe-9067	4.11	J-131	J-132	150	100	7	-18.49	1.05	13.413
231	pipe-24745	4.19	J-133	J-134	150	120	1	45.83	2.59	51.416
234	pipe-6237	4.2	J-135	J-136	150	100	7	44.23	2.5	67.479
237	pipe-8561	4.21	J-137	J-138	400	120	1	0	0	0
240	pipe-12571	4.21	J-139	J-140	200	100	7	-57.29	1.82	26.832
243	pipe-7966	4.23	J-141	J-142	200	100	7	2.97	0.09	0.123
246	pipe-9040	4.27	J-143	J-144	400	120	1	-11.87	0.09	0.035
249	pipe-21172	4.31	J-145	J-146	150	100	7	-13.88	0.79	7.886
252	pipe-3690	4.32	J-90	J-147	150	100	7	-5.78	0.33	1.551
254	pipe-11345	4.36	J-148	J-149	200	120	1	1.84	0.06	0.034
257	pipe-4061	4.37	J-150	J-151	150	100	7	0.55	0.03	0.017
260	pipe-7289	4.38	J-152	J-153	125	130	8	5.42	0.44	2.066

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ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
263	pipe-23379	4.39	J-154	J-155	300	100	7	25.57	0.36	0.832
266	pipe-24852	4.45	J-156	J-157	150	120	1	28.02	1.59	20.672
269	pipe-15825	4.48	J-158	J-159	200	120	1	11.87	0.38	1.029
272	pipe-8781	4.51	J-160	J-161	150	100	7	1.33	0.08	0.116
275	pipe-12923	4.51	J-77	J-162	400	120	1	-20.78	0.17	0.116
277	pipe-11857	4.53	J-163	J-164	150	100	7	-10.83	0.61	4.978
280	pipe-7458	4.55	J-22	J-165	150	100	9	10.01	0.57	4.304
282	pipe-8657	4.59	J-166	J-48	400	100	7	24.91	0.2	0.195
284	pipe-7290	4.58	J-153	J-167	125	130	8	4.9	0.4	1.713
286	pipe-7923	4.59	J-168	J-169	150	100	7	-1.53	0.09	0.13
289	pipe-14386	4.64	J-92	J-170	150	100	9	12.84	0.73	6.837
291	pipe-4540	4.64	J-171	J-172	150	120	1	2.07	0.12	0.16
294	pipe-8138	4.69	J-173	J-174	150	100	7	-7.46	0.42	2.509
297	pipe-9601	4.7	J-175	J-176	150	120	1	-2.66	0.15	0.269
300	pipe-17316	4.71	J-177	J-178	150	100	7	3.23	0.18	0.538
303	pipe-8893	4.71	J-179	J-180	300	100	7	36.09	0.51	1.581
306	pipe-19834	4.72	J-181	J-182	150	100	7	31.84	1.8	36.72
309	pipe-19651	4.74	J-183	J-184	150	100	7	-19.66	1.11	15.029
312	pipe-8710	4.78	J-185	J-186	200	120	1	17.76	0.57	2.178
315	pipe-12278	4.79	J-187	J-188	200	120	1	27.89	0.89	5.046
318	pipe-12853	4.82	J-189	J-190	200	120	1	-46.12	1.47	12.811
321	pipe-19470	4.82	J-101	J-191	300	100	7	60.83	0.86	4.153
323	pipe-9093	4.84	J-192	J-193	150	100	7	0.57	0.03	0.015
326	pipe-20565	4.9	J-194	J-195	150	120	1	-9.3	0.53	2.689
329	pipe-9475	4.92	J-196	J-197	200	120	1	-60.72	1.93	21.323
332	pipe-8131	4.95	J-198	J-199	250	100	7	-34.16	0.7	3.476
335	pipe-15734	4.95	J-200	J-201	150	100	7	-18.2	1.03	13.04
338	pipe-2252	4.98	J-202	J-203	150	120	1	-0.52	0.03	0.015
341	pipe-5092	4.99	J-204	J-205	125	120	1	-3.1	0.25	0.851
344	pipe-9176	5	J-206	J-207	200	100	7	-3.02	0.1	0.119
347	pipe-4062	5.09	J-208	J-209	150	100	7	1.7	0.1	0.161
350	pipe-13848	5.1	J-210	J-97	150	100	9	1.03	0.06	0.066
352	pipe-24704	5.11	J-211	J-212	150	120	1	18.41	1.04	9.496
355	pipe-15806	5.11	J-213	J-214	150	100	7	5.31	0.3	1.326
358	pipe-14583	5.13	J-215	J-216	200	100	7	33.7	1.07	10.044
361	pipe-21398	5.16	J-217	J-218	300	100	7	-78.38	1.11	6.663
364	pipe-17301	5.17	J-219	J-220	150	100	7	-19.64	1.11	15.017
367	pipe-8899	5.18	J-221	J-173	150	100	7	-3.48	0.2	0.604
369	pipe-7251	2.65	J-26	J-222	150	100	9	9.7	0.55	4.056
371	pipe-8447	5.27	J-223	J-224	200	100	7	-31.85	1.01	9.041
374	pipe-8757	5.27	J-218	J-225	300	100	7	-82.36	1.17	7.287
376	pipe-4058	5.28	J-226	J-208	150	100	7	2.27	0.13	0.268
378	pipe-19469	5.29	J-227	J-101	400	100	7	165.62	1.32	6.552
380	pipe-9622	5.29	J-228	J-229	150	100	7	-0.35	0.02	0.014
383	pipe-8056	5.31	J-230	J-76	400	120	1	-17.81	0.14	0.084
388	pipe-8399	5.32	J-233	J-234	150	120	1	-1.48	0.08	0.098
391	pipe-6077	7.41	J-235	J-236	200	120	1	29.42	0.94	5.57
394	pipe-19019	5.36	J-237	J-238	200	120	1	-3.98	0.13	0.139
397	pipe-4571	5.37	J-239	J-240	125	120	1	-0.52	0.04	0.028
403	pipe-8156	5.38	J-140	J-243	200	100	7	-58.62	1.87	27.99
405	pipe-9603	5.41	J-244	J-71	150	120	1	-10.63	0.6	3.437
407	pipe-8880	5.45	J-245	J-246	400	100	7	-29.51	0.23	0.273
410	pipe-9474	5.49	J-247	J-248	200	100	7	53.79	1.71	23.875
413	pipe-20741	5.5	J-249	J-250	150	100	7	-3.54	0.2	0.636
416	pipe-18819	5.53	J-251	J-252	150	120	1	6.88	0.39	1.535
419	pipe-9015	5.53	J-212	J-253	150	120	1	16.93	0.96	8.123
421	pipe-15839	5.54	J-254	J-255	150	120	1	-4.45	0.25	0.685
424	pipe-8146	5.55	J-256	J-257	150	120	1	9.49	0.54	2.787
427	pipe-15867	5.55	J-258	J-259	150	100	7	34.5	1.95	42.575
430	pipe-1462	5.59	J-260	J-17	150	120	1	-10.9	0.62	3.603
432	pipe-24146	5.6	J-261	J-262	200	100	7	1.48	0.05	0.027
435	pipe-9468	5.61	J-34	J-263	400	100	7	-36.94	0.29	0.411
437	pipe-16180	5.62	J-264	J-265	400	100	7	56.13	0.45	0.874
440	pipe-9589	5.63	J-266	J-267	400	100	7	2.48	0.02	0
443	pipe-2685	5.63	J-21	J-268	150	120	1	1.03	0.06	0.046
445	pipe-3649	5.67	J-269	J-270	150	100	7	-14.41	0.82	8.45
448	pipe-24065	5.68	J-271	J-272	200	100	7	3.98	0.13	0.196
451	pipe-14524	5.69	J-273	J-274	150	100	7	-34.31	1.94	42.157
454	pipe-21186	5.7	J-275	J-276	200	100	7	-26.11	0.83	6.257
457	pipe-16504	5.7	J-277	J-139	400	120	1	-373.21	2.97	21.042
459	pipe-3648	5.71	J-278	J-269	150	100	7	-13.83	0.78	7.848
461	pipe-23372	5.71	J-279	J-280	150	100	7	4.45	0.25	0.964
464	pipe-8147	5.72	J-35	J-281	150	120	1	13.87	0.79	5.629
466	pipe-16388	5.73	J-6	J-282	400	100	7	122.11	0.97	3.725
468	pipe-2132	5.74	J-283	J-284	150	100	7	-1.48	0.08	0.13
471	pipe-8125	5.75	J-285	J-286	200	120	1	7.18	0.23	0.401
474	pipe-9214	5.78	J-287	J-69	200	100	7	-13.35	0.43	1.803
476	pipe-2136	5.78	J-288	J-289	150	120	1	0	0	0
479	pipe-9042	5.8	J-290	J-77	200	100	7	0	0	0
481	pipe-6822	5.84	J-291	J-292	125	130	8	-9.3	0.76	5.616
484	pipe-8428	5.86	J-293	J-294	300	100	7	10.39	0.15	0.165

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487	pipe-11582	5.87	J-295	J-31	400	100	7	4.91	0.04	0
492	pipe-8448	5.87	J-298	J-299	200	120	1	-7.45	0.24	0.444
495	pipe-8143	5.88	J-300	J-194	150	120	1	-7.97	0.45	2.014
497	pipe-8963	5.88	J-301	J-302	200	120	1	17.81	0.57	2.2
500	pipe-645	5.95	J-303	J-304	400	100	7	-256.23	2.04	14.703
503	pipe-6079	5.95	J-236	J-305	200	120	1	28.91	0.92	5.394
505	pipe-6233	5.96	J-14	J-306	150	100	7	-10.6	0.6	4.794
510	pipe-24858	5.99	J-134	J-309	150	120	1	44.35	2.51	48.378
512	pipe-8088	5.99	J-310	J-311	150	100	7	1.33	0.08	0.099
515	pipe-9291	6	J-312	J-313	200	100	7	29.35	0.93	7.776
518	pipe-9467	6.04	J-314	J-263	150	120	1	-15.21	0.86	6.666
520	pipe-19472	6.05	J-315	J-316	150	100	7	1.48	0.08	0.123
523	pipe-9584	6.05	J-317	J-264	400	100	7	222.37	1.77	11.313
525	pipe-9620	6.1	J-318	J-319	300	100	7	30.73	0.43	1.172
528	pipe-9593	6.11	J-320	J-321	150	120	1	9.81	0.56	2.96
531	pipe-1192	6.11	J-268	J-322	150	120	1	0.52	0.03	0.012
533	pipe-22160	6.12	J-323	J-324	150	100	7	57.86	3.27	110.979
536	pipe-9283	6.13	J-157	J-325	150	120	1	23.57	1.33	15.008
538	pipe-12221	6.19	J-326	J-327	200	100	7	-63.93	2.03	32.869
541	pipe-9550	6.22	J-321	J-18	150	120	1	7.97	0.45	2.01
542	pipe-644	6.23	J-328	J-329	400	100	7	-167.88	1.34	6.717
545	pipe-8254	6.24	J-330	J-331	150	100	7	2.97	0.17	0.454
548	pipe-3679	6.24	J-332	J-333	150	100	7	-1.48	0.08	0.119
551	pipe-19450	6.24	J-118	J-227	400	100	7	168.07	1.34	6.736
552	pipe-8315	6.24	J-334	J-335	300	120	1	0	0	0
555	pipe-8775	6.29	J-336	J-337	150	100	7	21.96	1.24	18.448
558	pipe-8604	6.36	J-338	J-339	200	100	7	1.33	0.04	0.023
561	pipe-19649	6.39	J-340	J-183	150	100	7	-17.2	0.97	11.733
563	pipe-24749	6.4	J-341	J-156	150	120	1	29.51	1.67	22.746
565	pipe-7998	6.62	J-342	J-343	150	100	7	-3.83	0.22	0.73
568	pipe-14500	6.43	J-344	J-345	150	120	1	5.94	0.34	1.169
571	pipe-12249	6.46	J-346	J-347	200	120	1	72.41	2.3	29.545
574	pipe-3675	6.47	J-348	J-349	150	100	7	-23.26	1.32	20.52
577	pipe-4135	6.47	J-350	J-351	150	120	1	-5.17	0.29	0.903
580	pipe-15802	6.48	J-352	J-353	150	100	7	-53.07	3	94.564
583	pipe-8656	6.48	J-354	J-355	150	120	1	1.33	0.08	0.069
586	pipe-9875	6.49	J-356	J-168	200	100	7	-1.33	0.04	0.023
588	pipe-96	6.5	J-108	J-357	150	120	1	12.15	0.69	4.398
590	pipe-23039	6.52	J-358	J-359	150	100	7	-37.88	2.14	50.628
593	pipe-23308	6.53	J-360	J-361	150	100	7	16.21	0.92	10.512
596	pipe-13580	6.54	J-362	J-363	200	100	7	5.31	0.17	0.33
599	pipe-8134	6.54	J-364	J-189	200	120	1	-44.79	1.43	12.133
601	pipe-19273	6.56	J-365	J-366	150	100	7	9.83	0.56	4.164
604	pipe-22705	6.59	J-367	J-368	150	120	1	3.98	0.23	0.565
607	pipe-15471	6.62	J-369	J-370	200	100	7	-39.01	1.24	13.177
610	pipe-9096	6.65	J-146	J-371	150	100	7	-15.2	0.86	9.345
612	pipe-13922	6.67	J-372	J-373	125	130	8	8.33	0.68	4.588
615	pipe-135	6.72	J-374	J-375	150	100	7	5.31	0.3	1.34
618	pipe-8973	6.72	J-376	J-377	200	120	1	7.68	0.24	0.465
621	pipe-9580	6.77	J-378	J-379	150	100	7	-15.71	0.89	9.931
627	pipe-8153	6.85	J-382	J-383	200	120	1	-1.33	0.04	0.022
630	pipe-21400	6.86	J-218	J-384	150	100	7	2.66	0.15	0.369
632	pipe-9200	6.87	J-385	J-360	150	100	7	17.54	0.99	12.161
634	pipe-15828	6.87	J-386	J-8	150	120	1	-5.99	0.34	1.18
636	pipe-15778	6.88	J-387	J-388	200	120	1	34.74	1.11	7.587
639	pipe-8774	6.9	J-389	J-283	150	100	7	-0.15	0.01	0
641	pipe-2177	6.9	J-390	J-391	150	100	7	-5.51	0.31	1.424
644	pipe-12178	6.94	J-392	J-148	200	120	1	-67.91	2.16	26.233
646	pipe-8840	6.97	J-319	J-393	300	100	7	15.4	0.22	0.331
648	pipe-10012	7	J-394	J-74	200	100	7	-9.09	0.29	0.883
650	pipe-24443	7	J-395	J-396	200	100	7	20.78	0.66	4.105
653	pipe-3069	7	J-397	J-398	200	120	1	-1.55	0.05	0.027
656	pipe-8141	7.02	J-399	J-400	400	100	7	-16.11	0.13	0.085
659	pipe-8127	7.02	J-285	J-401	200	120	1	-8.51	0.27	0.561
661	pipe-8943	7.03	J-402	J-403	150	120	1	4.45	0.25	0.678
664	pipe-8782	7.03	J-385	J-404	150	100	7	0.44	0.02	0.011
666	pipe-8049	7.07	J-405	J-61	400	100	7	-1.51	0.01	0
668	pipe-7933	7.08	J-324	J-406	150	100	7	4.91	0.28	1.146
670	pipe-8137	7.09	J-407	J-408	150	120	1	13.79	0.78	5.564
673	pipe-16181	7.15	J-267	J-409	300	100	7	1.15	0.02	0.01
675	pipe-7963	7.16	J-410	J-411	150	100	7	-3.1	0.18	0.488
678	pipe-8771	7.23	J-412	J-413	400	120	1	0	0	0
681	pipe-1463	7.32	J-414	J-415	150	120	1	-8.32	0.47	2.182
684	pipe-9465	7.33	J-300	J-367	150	120	1	5.31	0.3	0.944
685	pipe-24752	7.34	J-416	J-417	150	120	1	1.48	0.08	0.091
688	pipe-8780	7.36	J-213	J-418	150	100	7	0.28	0.02	0
690	pipe-9545	7.38	J-419	J-420	200	120	1	14.8	0.47	1.562
693	pipe-8207	7.5	J-421	J-422	300	100	7	2.97	0.04	0.01
696	pipe-8328	7.53	J-423	J-424	250	100	7	6.05	0.12	0.138
699	pipe-8903	7.55	J-425	J-426	200	100	7	1.33	0.04	0.03
702	pipe-15831	7.59	J-427	J-376	200	120	1	-11.93	0.38	1.049

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704	pipe-15225	7.59	J-428	J-429	150	100	7	-2.82	0.16	0.402
707	pipe-8296	7.63	J-430	J-431	150	120	1	-1.48	0.08	0.088
710	pipe-7866	7.64	J-432	J-433	200	120	1	16.11	0.51	1.826
713	pipe-8941	7.65	J-434	J-435	150	120	1	1.48	0.08	0.088
716	pipe-156	7.65	J-436	J-437	150	100	7	9.81	0.56	4.153
719	pipe-17476	7.65	J-400	J-438	300	100	7	58.28	0.82	3.85
721	pipe-7171	7.65	J-157	J-439	150	100	7	2.97	0.17	0.457
723	pipe-12720	7.66	J-440	J-441	200	120	1	84.16	2.68	39.025
726	pipe-12474	7.71	J-442	J-443	200	100	7	-33.2	1.06	9.772
729	pipe-8097	7.74	J-444	J-445	150	100	7	3.98	0.23	0.779
732	pipe-11669	7.76	J-446	J-447	125	120	1	4.11	0.33	1.434
735	pipe-12812	7.76	J-199	J-448	250	100	7	-35.49	0.72	3.73
737	pipe-15047	7.79	J-449	J-450	200	100	7	17.26	0.55	2.914
740	pipe-13444	7.83	J-451	J-452	200	100	7	7.11	0.23	0.561
743	pipe-8759	7.88	J-33	J-453	150	100	7	-5.6	0.32	1.474
745	pipe-9539	7.89	J-454	J-455	250	120	1	-26.35	0.54	1.538
748	pipe-9173	7.9	J-456	J-457	200	100	7	-7.56	0.24	0.631
751	pipe-8224	7.97	J-458	J-459	150	100	7	-1.48	0.08	0.131
754	pipe-3645	7.98	J-460	J-461	150	100	7	-12.11	0.69	6.119
757	pipe-9480	8	J-190	J-462	200	120	1	-55.41	1.76	18
759	pipe-8196	9.04	J-463	J-464	300	120	1	17.81	0.25	0.305
762	pipe-15823	8.02	J-465	J-466	200	120	1	8.91	0.28	0.612
765	pipe-23365	8.09	J-467	J-468	200	100	7	1.33	0.04	0.018
768	pipe-8830	8.12	J-469	J-470	300	100	7	-5.94	0.08	0.055
771	pipe-8038	8.18	J-466	J-471	150	120	1	7.42	0.42	1.766
773	pipe-9631	8.23	J-472	J-374	150	100	7	6.64	0.38	2.006
775	pipe-9479	8.18	J-473	J-364	200	100	7	-2.66	0.08	0.091
777	pipe-8964	8.22	J-474	J-301	200	120	1	-14.53	0.46	1.512
779	pipe-8002	8.22	J-475	J-476	600	100	7	-234.91	0.83	1.738
782	pipe-122	8.22	J-19	J-477	150	120	1	5.31	0.3	0.95
784	pipe-7984	12.42	J-478	J-179	300	100	7	-3.56	0.05	0.018
786	pipe-12921	8.35	J-234	J-479	150	120	1	-2.97	0.17	0.321
788	pipe-5534	8.37	J-480	J-397	200	120	1	-1.03	0.03	0.009
790	pipe-24550	8.42	J-481	J-482	150	100	7	-19.47	1.1	14.76
796	pipe-9507	8.46	J-485	J-256	200	120	1	12.14	0.39	1.082
798	pipe-8805	8.61	J-486	J-487	150	120	1	1.08	0.06	0.052
801	pipe-15779	8.62	J-94	J-387	200	120	1	36.22	1.15	8.188
802	pipe-22418	8.68	J-488	J-323	150	100	7	60.32	3.41	119.858
804	pipe-4567	8.59	J-240	J-489	125	120	1	-5.65	0.46	2.596
806	pipe-8149	8.59	J-108	J-490	150	120	1	-6.65	0.38	1.439
808	pipe-23337	8.65	J-491	J-492	150	100	7	1.49	0.08	0.129
811	pipe-8707	8.7	J-493	J-494	150	100	7	48.03	2.72	78.613
814	pipe-9478	8.72	J-495	J-496	250	100	7	-2.66	0.05	0.026
817	pipe-15878	8.74	J-497	J-498	200	100	7	-38.08	1.21	12.595
820	pipe-15808	8.78	J-499	J-500	150	100	7	1.33	0.08	0.102
823	pipe-15886	8.83	J-84	J-498	300	120	1	66.91	0.95	3.541
824	pipe-9565	8.79	J-501	J-502	200	120	1	-0.22	0.01	0
827	pipe-9998	8.86	J-168	J-503	200	100	7	-1.13	0.04	0.017
829	pipe-8572	8.86	J-504	J-505	150	120	1	11.31	0.64	3.853
832	pipe-7559	8.86	J-506	J-344	200	120	1	7.42	0.24	0.437
834	pipe-6203	8.88	J-507	J-508	150	100	7	4.45	0.25	0.955
837	pipe-9087	8.96	J-276	J-99	200	100	7	-27.43	0.87	6.862
838	pipe-24773	8.97	J-509	J-510	150	100	7	-23.86	1.35	21.51
841	pipe-9605	8.98	J-511	J-512	150	120	1	-0.92	0.05	0.041
844	pipe-15815	8.99	J-513	J-42	150	100	7	-7.69	0.44	2.641
846	pipe-13582	9.07	J-514	J-515	200	100	7	2.66	0.08	0.09
849	pipe-17477	9.11	J-400	J-516	300	100	7	-75.72	1.07	6.24
851	pipe-9218	9.12	J-517	J-518	200	100	7	-4.45	0.14	0.237
854	pipe-21311	9.14	J-519	J-520	200	100	7	10.62	0.34	1.185
857	pipe-3362	9.18	J-521	J-522	125	120	1	-0.89	0.07	0.085
860	pipe-740	10.06	J-523	J-524	200	100	7	1.48	0.05	0.03
863	pipe-8663	9.24	J-68	J-525	200	100	7	12.31	0.39	1.562
865	pipe-19993	9.25	J-526	J-527	150	100	7	-14.58	0.82	8.644
868	pipe-8519	9.32	J-422	J-528	300	100	7	1.48	0.02	0.008
870	pipe-9531	9.28	J-529	J-57	250	120	1	-79.97	1.63	11.976
872	pipe-8090	9.3	J-530	J-531	150	100	7	13.04	0.74	7.033
875	pipe-2142	9.3	J-532	J-533	150	120	1	0	0	0
878	pipe-21148	9.33	J-534	J-535	150	100	7	16.72	0.95	11.132
881	pipe-14825	9.34	J-536	J-537	150	100	7	-16.23	0.92	10.53
884	pipe-2214	9.35	J-538	J-539	150	100	9	-0.52	0.03	0.016
887	pipe-9578	9.38	J-540	J-541	200	100	7	-10.25	0.33	1.103
890	pipe-8108	9.39	J-542	J-543	125	100	7	1.03	0.08	0.154
893	pipe-14487	9.4	J-544	J-545	150	120	1	-49.95	2.83	60.313
896	pipe-9564	9.4	J-546	J-547	200	120	1	1.84	0.06	0.032
899	pipe-4060	9.42	J-209	J-150	150	100	7	1.12	0.06	0.079
900	pipe-8164	12.27	J-548	J-549	150	100	7	-1.33	0.08	0.103
903	pipe-12250	9.45	J-346	J-550	400	100	7	370.87	2.95	29.148
905	pipe-24519	9.53	J-551	J-552	150	100	7	-15.01	0.85	9.125
911	pipe-3730	9.6	J-555	J-556	150	100	7	-1.75	0.1	0.171
914	pipe-8412	9.62	J-557	J-558	250	100	7	7.25	0.15	0.201
917	pipe-5090	9.62	J-559	J-489	150	120	1	-16.53	0.94	7.779

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ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
922	pipe-15848	9.72	J-562	J-563	150	100	7	1.81	0.1	0.176
925	pipe-8651	9.75	J-564	J-565	150	100	7	-2.97	0.17	0.45
928	pipe-8272	9.78	J-566	J-567	150	100	7	0	0	0
931	pipe-25001	9.79	J-568	J-569	200	120	1	42.16	1.34	10.849
934	pipe-8692	9.79	J-570	J-571	300	100	7	-33.82	0.48	1.406
937	pipe-24130	9.83	J-67	J-572	300	120	1	0	0	0
939	pipe-9472	9.83	J-573	J-574	150	120	1	8.56	0.48	2.294
942	pipe-24814	13.44	J-575	J-333	150	100	7	29.8	1.69	32.47
944	pipe-8772	9.96	J-180	J-576	150	100	7	34.76	1.97	43.188
946	pipe-20144	9.99	J-577	J-578	200	120	1	-1.73	0.05	0.03
949	pipe-24461	10	J-579	J-580	150	100	7	1.48	0.08	0.126
952	pipe-14908	10.01	J-581	J-369	200	100	7	-37.68	1.2	12.351
954	pipe-707	10.05	J-582	J-583	125	100	7	1.15	0.09	0.192
957	pipe-21399	10.1	J-384	J-584	150	100	7	1.33	0.08	0.103
959	pipe-3651	10.11	J-270	J-585	150	100	7	-17.83	1.01	12.537
961	pipe-18830	10.13	J-586	J-251	150	120	1	8.21	0.46	2.124
963	pipe-13872	10.15	J-119	J-292	150	100	9	11.36	0.64	5.446
964	pipe-11799	10.17	J-587	J-588	400	100	7	4.3	0.03	0.007
967	pipe-15774	10.2	J-331	J-589	150	100	7	1.48	0.08	0.124
969	pipe-1457	10.34	J-590	J-414	150	120	1	-7.8	0.44	1.935
977	pipe-6209	10.45	J-595	J-596	150	100	7	2.97	0.17	0.448
980	pipe-8970	10.47	J-129	J-597	350	100	7	39.77	0.41	0.895
982	pipe-9563	10.48	J-598	J-546	200	120	1	2.58	0.08	0.057
984	pipe-19822	10.55	J-599	J-600	150	120	1	-1.48	0.08	0.092
987	pipe-25083	10.57	J-201	J-601	200	100	7	-19.53	0.62	3.652
989	pipe-9521	10.61	J-602	J-603	300	100	7	12.74	0.18	0.224
992	pipe-3647	10.61	J-604	J-278	150	100	7	-13.26	0.75	7.242
994	pipe-8096	10.62	J-605	J-606	150	120	1	2.66	0.15	0.266
997	pipe-8883	10.62	J-607	J-379	400	100	7	60.36	0.48	1.009
1002	pipe-20143	10.62	J-578	J-610	200	120	1	-2.3	0.07	0.049
1004	pipe-23818	10.66	J-611	J-612	150	100	7	-2.94	0.17	0.447
1007	pipe-20959	10.74	J-613	J-614	150	100	7	-3.14	0.18	0.506
1010	pipe-15865	10.77	J-615	J-616	150	100	7	19.89	1.13	15.355
1013	pipe-9172	10.8	J-457	J-617	600	100	7	1.51	0.01	0
1015	pipe-15870	10.81	J-618	J-401	300	120	1	-38.48	0.54	1.273
1017	pipe-2679	10.87	J-619	J-620	150	120	1	2.58	0.15	0.25
1020	pipe-15389	11.02	J-581	J-621	200	100	7	36.36	1.16	11.558
1022	pipe-8100	11.03	J-298	J-223	200	100	7	-30.52	0.97	8.36
1023	pipe-7221	11.09	J-622	J-623	125	130	8	2.31	0.19	0.43
1026	pipe-23525	11.36	J-624	J-625	125	120	1	-8.87	0.72	5.972
1029	pipe-8960	11.18	J-626	J-627	200	120	1	13.36	0.43	1.292
1032	pipe-1464	11.19	J-628	J-415	150	120	1	-1.03	0.06	0.043
1034	pipe-3687	11.19	J-629	J-630	300	100	7	0	0	0
1037	pipe-14470	11.2	J-557	J-631	250	100	7	34.98	0.71	3.634
1039	pipe-8478	13.81	J-632	J-633	200	120	1	-13.28	0.42	1.277
1042	pipe-8223	11.1	J-634	J-459	150	100	7	1.54	0.09	0.134
1044	pipe-9085	11.28	J-391	J-163	150	100	7	-6.84	0.39	2.131
1045	pipe-8594	11.31	J-635	J-636	300	100	7	33.39	0.47	1.369
1048	pipe-8310	11.36	J-637	J-638	200	120	1	-2.97	0.09	0.085
1051	pipe-8010	11.37	J-639	J-640	150	100	7	-5.31	0.3	1.335
1054	pipe-8157	11.52	J-115	J-641	150	100	7	5.31	0.3	1.331
1056	pipe-8769	11.42	J-642	J-643	200	100	7	-18.88	0.6	3.439
1059	pipe-23355	11.46	J-644	J-645	150	120	1	4.23	0.24	0.617
1062	pipe-8042	11.51	J-646	J-647	250	120	1	22.69	0.46	1.164
1065	pipe-23456	11.55	J-648	J-649	150	100	7	-9.27	0.52	3.735
1068	pipe-706	11.62	J-583	J-650	125	100	7	0.58	0.05	0.051
1070	pipe-8150	11.65	J-419	J-651	300	120	1	-1.25	0.02	0
1072	pipe-8191	11.73	J-652	J-300	150	120	1	-1.33	0.08	0.07
1074	pipe-10237	11.87	J-75	J-653	150	100	7	2.66	0.15	0.37
1076	pipe-9610	11.92	J-654	J-655	300	120	1	-19.77	0.28	0.375
1079	pipe-24045	11.94	J-656	J-657	300	100	7	44.23	0.63	2.306
1082	pipe-23561	12.02	J-658	J-659	400	120	1	-144.76	1.15	3.64
1085	pipe-24876	12.09	J-660	J-661	150	100	7	-12.47	0.71	6.473
1088	pipe-7987	12.1	J-662	J-663	150	100	7	-29.48	1.67	31.839
1091	pipe-2253	12.1	J-664	J-203	150	120	1	-0.52	0.03	0.015
1093	pipe-8425	12.1	J-665	J-666	150	100	7	-14.66	0.83	8.73
1096	pipe-9016	12.2	J-431	J-211	150	120	1	-2.97	0.17	0.323
1097	pipe-7990	12.28	J-667	J-668	150	100	7	-7.37	0.42	2.442
1100	pipe-8111	12.32	J-221	J-669	200	100	7	22.57	0.72	4.783
1102	pipe-15889	12.33	J-670	J-671	600	120	1	241.58	0.85	1.304
1105	pipe-118	12.37	J-672	J-354	150	120	1	2.66	0.15	0.265
1107	pipe-8791	12.39	J-673	J-577	200	120	1	-1.15	0.04	0.018
1109	pipe-7989	12.39	J-674	J-667	150	100	7	-4.91	0.28	1.153
1111	pipe-19451	12.44	J-675	J-676	400	120	1	-8.91	0.07	0.024
1114	pipe-19478	12.53	J-677	J-678	150	100	7	-0.77	0.04	0.036
1117	pipe-2284	12.53	J-679	J-680	200	100	7	1.03	0.03	0.015
1120	pipe-9652	13.21	J-681	J-86	400	100	7	315.32	2.51	21.582
1122	pipe-3681	12.61	J-53	J-682	150	100	7	-63.46	3.59	131.689
1124	pipe-8467	12.64	J-683	J-684	150	100	7	-5.31	0.3	1.33
1127	pipe-8553	12.67	J-685	J-686	200	120	1	-65.96	2.1	24.853
1130	pipe-1459	12.68	J-687	J-628	150	120	1	-0.52	0.03	0.015

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1132	pipe-9077	12.7	J-688	J-689	200	100	7	-40.85	1.3	14.342
1135	pipe-8116	14.98	J-173	J-690	150	100	7	2.66	0.15	0.368
1137	pipe-25024	12.73	J-600	J-691	150	120	1	-41.31	2.34	42.422
1139	pipe-8023	12.9	J-78	J-692	150	100	7	-5.06	0.29	1.218
1141	pipe-8695	12.99	J-693	J-694	300	100	7	-0.52	0.01	0
1144	pipe-8092	12.95	J-695	J-696	400	100	7	-1.33	0.01	0
1147	pipe-8411	12.97	J-697	J-698	150	100	7	3.62	0.21	0.654
1150	pipe-8816	13.05	J-9	J-699	200	120	1	-8.96	0.29	0.616
1152	pipe-8477	13.12	J-633	J-317	400	100	7	223.7	1.78	11.426
1153	pipe-9083	13.12	J-537	J-642	150	100	7	-17.55	0.99	12.185
1154	pipe-8591	13.14	J-700	J-685	200	100	7	-54.21	1.73	24.226
1159	pipe-1887	13.18	J-703	J-704	125	120	1	-6.25	0.51	3.123
1162	pipe-7482	13.23	J-705	J-706	125	130	8	1.12	0.09	0.11
1165	pipe-8518	13.24	J-142	J-707	200	100	7	1.48	0.05	0.028
1167	pipe-8132	13.23	J-708	J-473	200	100	7	-1.33	0.04	0.028
1169	pipe-19072	13.27	J-709	J-710	150	120	1	-11.95	0.68	4.267
1172	pipe-24090	13.32	J-711	J-712	150	120	1	-5.94	0.34	1.167
1175	pipe-8173	13.33	J-335	J-56	600	120	1	-2.46	0.01	0
1176	pipe-8177	13.37	J-713	J-714	300	120	1	0	0	0
1179	pipe-7980	13.38	J-715	J-716	200	100	7	-45.31	1.44	17.377
1182	pipe-8248	13.38	J-717	J-718	500	100	7	136.27	0.69	1.54
1185	pipe-10665	13.39	J-719	J-720	200	120	1	1.53	0.05	0.022
1188	pipe-24147	13.45	J-721	J-722	200	120	1	0	0	0
1191	pipe-8573	13.48	J-505	J-723	150	120	1	3.94	0.22	0.547
1193	pipe-9874	13.5	J-724	J-725	150	100	7	-1.33	0.08	0.105
1196	pipe-8582	13.63	J-726	J-727	200	100	7	-11.93	0.38	1.469
1199	pipe-8376	13.66	J-728	J-729	200	100	7	4.82	0.15	0.272
1202	pipe-8277	13.72	J-117	Awajan High Squa	600	120	1	-172.99	0.61	0.705
1204	pipe-8833	13.75	J-731	J-732	600	100	7	-414.84	1.47	4.978
1207	pipe-7220	13.84	J-622	J-733	125	130	8	1.76	0.14	0.258
1209	pipe-9615	13.98	J-734	J-735	150	100	7	-9.65	0.55	4.02
1212	pipe-8218	14	J-736	J-737	200	100	7	-4.56	0.15	0.25
1215	pipe-8785	14.03	J-246	J-738	200	100	7	9.82	0.31	1.024
1217	pipe-11957	14.03	J-739	J-740	150	100	7	-11.67	0.66	5.716
1220	pipe-21176	14.04	J-603	J-741	150	100	7	25.21	1.43	23.821
1222	pipe-7918	14.08	J-742	J-743	200	120	1	0	0	0
1225	pipe-10659	14.1	J-744	J-745	150	120	1	-0.71	0.04	0.021
1228	pipe-8476	14.22	J-696	J-746	400	100	7	-2.66	0.02	0.005
1230	pipe-22824	15.37	J-747	J-748	200	100	7	7.42	0.24	0.61
1233	pipe-15816	14.39	J-749	J-750	150	100	7	-5.04	0.28	1.205
1236	pipe-8403	14.44	J-505	J-751	150	120	1	4.91	0.28	0.824
1238	pipe-8831	14.46	J-752	J-753	300	100	7	13.32	0.19	0.247
1241	pipe-24175	14.48	J-754	J-755	150	100	7	1.31	0.07	0.098
1244	pipe-8569	14.5	J-756	J-757	150	100	7	-2.97	0.17	0.452
1247	pipe-24417	14.85	J-508	J-758	150	100	7	2.97	0.17	0.456
1252	pipe-8222	15.26	J-761	J-762	150	100	7	-1.48	0.08	0.127
1255	pipe-8607	15.27	J-758	J-763	150	100	7	1.48	0.08	0.127
1257	pipe-1997	15.36	J-738	J-764	200	100	7	8.49	0.27	0.785
1259	pipe-23595	15.37	J-765	J-766	200	120	1	21.25	0.68	3.051
1264	pipe-21380	15.47	J-768	J-99	300	100	7	88.41	1.25	8.312
1266	pipe-9202	20.84	J-769	J-770	150	100	7	2.66	0.15	0.371
1269	pipe-8662	15.51	J-771	J-772	150	100	7	-3.98	0.23	0.782
1272	pipe-6242	15.51	J-773	J-774	400	100	7	-2.46	0.02	0
1275	pipe-8890	15.6	J-428	J-775	300	100	7	58.44	0.83	3.864
1277	pipe-8650	15.62	J-309	J-565	150	120	1	39.9	2.26	39.769
1278	pipe-19474	15.62	J-315	J-776	150	100	7	-19.12	1.08	14.269
1280	pipe-8136	15.7	J-777	J-247	400	100	7	238.6	1.9	12.88
1282	pipe-2285	17.81	J-680	J-778	200	100	7	0.52	0.02	0.004
1284	pipe-9489	15.77	J-779	J-780	200	100	7	12.57	0.4	1.618
1287	pipe-8449	20.25	J-781	J-782	400	100	7	138.02	1.1	4.673
1290	pipe-23378	15.97	J-155	J-783	300	100	7	169.52	2.4	27.766
1292	pipe-6730	16.05	J-784	J-785	125	130	8	-6.78	0.55	3.134
1295	pipe-21924	16.16	J-786	J-787	200	120	1	81.51	2.59	36.782
1298	pipe-8622	16.34	J-788	J-789	200	100	7	-12.7	0.4	1.649
1304	pipe-7706	16.45	J-792	J-793	150	100	9	1.55	0.09	0.136
1307	pipe-14183	16.7	J-453	J-794	150	100	7	-6.93	0.39	2.179
1312	pipe-8172	16.91	J-668	J-340	150	100	7	-14.74	0.83	8.821
1313	pipe-8571	16.93	J-797	J-504	150	120	1	-3.94	0.22	0.545
1315	pipe-8801	16.94	J-798	J-799	300	100	7	20.52	0.29	0.554
1318	pipe-9039	16.99	J-144	J-800	400	120	1	-13.36	0.11	0.044
1320	pipe-10669	17	J-801	J-802	200	120	1	1.32	0.04	0.018
1323	pipe-6230	18.53	J-572	J-803	300	120	1	-1.33	0.02	0.004
1328	pipe-9079	17.17	J-806	J-734	200	100	7	-21.54	0.69	4.385
1330	pipe-9999	17.31	J-503	J-807	200	100	7	-2.45	0.08	0.077
1332	pipe-23541	21.87	J-808	J-809	300	120	1	1.33	0.02	0
1335	pipe-7906	17.46	J-489	J-810	125	120	1	-22.7	1.85	34.016
1337	pipe-8037	24.75	J-811	J-799	200	120	1	-19.03	0.61	2.487
1339	pipe-9443	15.49	J-812	J-681	400	100	7	317.98	2.53	21.92
1344	pipe-8996	17.82	J-815	J-726	150	100	7	-2.92	0.16	0.438
1346	pipe-19069	17.91	J-816	J-710	150	120	1	6.04	0.34	1.205
1348	pipe-17870	18.01	J-490	J-817	150	120	1	-7.98	0.45	2.017

5.2 Hydraulic Model Data and Results for the Future 2030 Model at Average Demand and Peak Demand

Future 2030 Model Tank Information

ID	Label	Elevation (Base) (m)	Elevation (Minimum) (m)	Elevation (Initial) (m)	Elevation (Maximum) (m)	Diameter (m)	Flow (Out net) (L/s)
4023	Zarqa Reservoir	572	573	575	576	37.85	-58.75
4051	Batrawi Reservoir	651	652	654	654.5	104	-68.07
4066	Khaw Reservoir	599.6	601	606	607.4	77.41	1474.27
4090	Hitten Reservoir	765	765	769	770	95	40.78
4091	Hitten Tower	764	780	782	783	20.6	-29.28
4108	Russaifah High	803	803	805	806.2	26.76	0.4
4112	Russaifah Low	751	751	753	754.2	49.67	36.3
4128	Merhib Reservoir	633.5	634	636	636.5	20.6	36.68
4140	Beirein Reservoir	867	867	869	870.5	19.07	25.25
4144	Um Rummaneh Reservoir	762.9	763	765	766.2	13.89	-28.55
4153	Sarout Reservoir	769	769	770.5	771.5	14.27	54.92
4154	Awajan High Square	697.5	699	700	702	35.68	-184.98
4155	Awajan High Circular	695.5	697	700	701	38.19	56.87
4156	Awajan Low	640	641	643	643.5	55	105.87
4157	Qunaya Reservoir	577	578	579	580	14.57	-10.81
4167	Hashmeya Reservoir	621	622	622.5	624.2	34.55	-12.57
4171	Hallabat Reservoir	597	598	599	600	41.2	23.27
4265	Zarqa High Reservoir	716	717	718	719	32.57	-31.54
4279	Sukhna Reservoir	572	573	575	576	25.2	7.36
4590	Tamween Reservoir	611.5	613	615	615.5	17.84	18.57
4597	Basateen Reservoir	630.5	631	633	634	30	4.4
4797	New Dulail Reservoir	656	656	660	661	35.68	-44.84
4798	New Tatweer Reservoir	666	666	670	671	19.54	-13.18
4799	New Tafeh Reservoir	728	728	731	733	19.5	-18.63
4800	King Abdullah Reservoir	643	643	647	648	59.7	-767
4802	Awajan Hub	587	587	591	592	22.57	-24.13
4803	Awajan West Reservoir	724	724	728	729	27.64	-7.47
4804	Awajan North Reservoir	705	705	709	710	29.85	3.71
4858	Azraq Water Tower	510.89	530	538	540	7.98	3.32
5043	Russaifah Hub Reservoir	724	724	728	729	33.1	14
5056	Russaifah North West Reservoir	905	905	909	910	19	40.87
5108	Merhib High Reservoir	747	747	751	752	15.96	-36.01
5109	Berein High Reservoir	972	972	975	977	15.96	-14.33
5121	Um Rummaneh High Reservoir	985	985	989	990	11.2	-10.02
5134	Alouk High Reservoir	694	694	698	699	11.28	-80.71
5883	Hallabat Water Tower	594	614	620	624	11.28	-17.16
6015	Khaw Water Tower	599.6	619.6	627	629.6	15.96	-48.49

Future 2030 Model Pump Information

ID	Label	Elevation (m)	Pump Definition	Status (Initial)	Hydraulic Grade (Suction) (m)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)
4720	Alouk Pump	600	Alouk PS	On	606.94	965.38	14.25	358.45
5002	Awajan Hub PS	585.86	Awajan Hub PS	On	590.09	761.56	417.05	171.47
5036	Awajan North PS	640	Awajan North PS	On	642.92	747.52	97.67	104.59
5023	Awajan West PS	695	Awajan West PS	On	699.98	795.89	79.88	95.91
4376	Azraq to Khaw PS	560.62	New Azraq	On	571.25	799.62	268.4	228.37
4406	Azraq to Khaw2	560.62	New Azraq	On	571.24	799.61	268.4	228.37
4867	Azraq WT Booster	510	Azraq WT Booster	On	537.68	584.75	10.85	47.08
4252	Basteen to Russaifah Low	630	Basteen to Russaifah Low	On	632.98	823.57	134	190.59
4268	Batrawi PS	646	Batrawi PS	On	653.86	732.21	97.79	78.35
6104	Corridor PS	668	Corridor PS	On	669.92	783.09	361.1	113.16
4225	Hallabat to Khaw	596	Hallabat to Khaw	On	598.99	784.73	99	185.74
6101	Hallabat to Khaw2	596	Hallabat to Khaw	On	598.99	784.73	99	185.74
4906	Hallabat WT PS	596	Hallabat WT PS	On	598.13	620.69	22.64	22.56
5088	Hashmeya HL PS	559.08	Hashmeya HL PS	On	649.28	821.57	2.96	172.29
4524	Hashmeya PS	538	Hashimeya PS	On	610.23	658.59	126.75	48.36
6074	Hashmeya Well PS	538	Hashimeya well PS	On	539.98	631.57	66.92	91.59
4101	Hitten Tower Pump	760	Hitten Tower PS	On	768.5	782.04	113.13	13.55
4441	Khaw to Awajan	596	Khaw to Awajan	On	605.96	808.88	402.75	202.92
4471	Khaw to Batrawi	590	Khaw to Batrawi	On	605.96	690.67	602.96	84.71
4468	Khaw to Hashmeya	590	Khaw to Hashmeya	On	605.96	629.06	132.68	23.1
5837	Khaw to KABA	596	Khaw to KABA City	On	605.98	659.37	669.78	53.38
6017	Khaw to Khaw WT	599	Khaw to Khaw WT	On	605.99	627.06	48.49	21.07
4452	Khaw to Russaifah	596	Khaw to Russaifah	On	605.97	841.64	520.17	235.67
4465	Khaw to Zarqa	590	Khaw to Zarqa	On	605.96	644.94	131.04	38.98
5117	Merhib HL to Berein PS	733.75	Merhib HL to Berein PS	On	750.85	881.51	23.46	130.66
4522	Merhib to Berein	633	Merhib to Merhib High	On	635.87	761.64	60.92	125.77
4877	New Tafeh PS	592	Tafeh to Dulail	On	612.72	699.54	94.13	86.82
4633	Russaifah Booster	803	Russaifah Booster	On	804.94	1157.21	29	352.27
5046	Russaifah Hub PS	724	Russaifah Hub PS	On	727.97	849.68	503.62	121.71
5103	Sukhna HL PS	519.11	Sukhna HL PS	On	607.46	636.17	17.79	28.72
4641	Sukhna Pumps	534.09	Sukhna Pumps	On	574.29	612.58	53.36	38.29
4882	Tafeh PS to Tafeh Res	592	Tafeh PS	On	612.5	802.15	32.32	189.65
4087	Tamwn 2	610	Tamween PS	On	614.99	667.53	97.22	52.54
6054	Tatweer PS	624	Tatweer PS	On	782.72	797.48	34.61	14.76
4147	Um Rummaneh PS	760	Rummaneh to Rummaneh	On	764.95	978.79	14.33	213.84
5130	Um Rummaneh to Um Rummaneh High	760	Rummaneh to Rummaneh High	On	764.88	1001.14	21.62	236.26
4045	Zarqa to Batrawi	570	Zarqa to Batrawi	On	574.94	688.39	162.08	113.45

Future 2030 Model Node Information AVERAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5172	J-2103	560.34	<None>	0	571.29	10.9
5177	J-2104	510.13	Azraq	2.99	537.64	27.5
5179	J-2105	510.15	Azraq	2.99	537.82	27.6
5182	J-2106	511.89	Azraq	2.99	537.83	25.9
5188	J-2107	510.04	Azraq	2.99	537.96	27.9
5190	J-2108	520.69	Azraq	2.99	537.8	17.1
5192	J-2109	515	Azraq	2.99	537.51	22.5
5194	J-2110	600	East - Dulail	2.74	656.51	56.4
5197	J-2111	638	<None>	0	674.89	36.8
5207	J-2112	594.71	East - Dulail	2.74	701.67	106.7
5231	J-2121	602.09	East - Dulail	2.74	619.12	17
5236	J-2122	592	East - Dulail	2.74	658.02	65.9
5239	J-2123	592	East - Dulail	2.74	612.85	20.8
5243	J-2124	592	East - Dulail	2.74	612.8	20.8
5252	J-2125	629.08	East - Dulail	2.74	658.06	28.9
5254	J-2126	599.72	East - Dulail	2.74	655.43	55.6
5256	J-2127	592.37	East - Dulail	2.74	653.96	61.5
5258	J-2128	587.99	East - Dulail	2.74	652.91	64.8
5260	J-2129	586.82	East - Dulail	2.74	651.99	65
5262	J-2130	575.64	East - Dulail	2.74	651.84	76
5264	J-2131	574.01	East - Dulail	2.74	651.68	77.5
5266	J-2132	570	East - Dulail	2.74	648.41	78.3
5268	J-2133	590	East - Dulail	2.74	650.75	60.6
5270	J-2134	581.97	East - Dulail	2.74	650.57	68.5
5273	J-2135	633.73	East - Dulail	2.74	730.47	96.6
5275	J-2136	640	East - Dulail	2.74	730.38	90.2
5277	J-2137	635	East - Dulail	2.74	730.35	95.2
5280	J-2138	635.11	KABA City	0	800.2	164.8
5284	J-2139	611	KABA City	0	789.01	177.6
5296	J-2141	631.34	Russaifah	13.97	766.26	134.6
5311	J-2142	639	Awajan	14.48	756.67	117.4
5319	J-2143	610.23	Tatweer	10.72	669.24	58.9
5321	J-2144	621.28	Tatweer	10.72	669.13	47.8
5323	J-2145	624.57	Tatweer	10.72	776.81	151.9
5329	J-2147	590	North Region	2.96	628.98	38.9
5330	J-2148	590	North Region	2.96	628.97	38.9
5345	J-2149	702.78	Awajan	14.48	781.03	78.1
5355	J-2150	757.84	Russaifah	13.97	845.67	87.7
5372	J-2155	827.35	Russaifah	13.97	902.18	74.7
5374	J-2156	808.88	Russaifah	13.97	898.33	89.3
5376	J-2157	782.28	Russaifah	13.97	897.41	114.9
5378	J-2158	746.1	Russaifah	13.97	897.04	150.6
5380	J-2159	807.58	Russaifah	13.97	896.8	89
5382	J-2160	783.77	Russaifah	13.97	798.86	15.1
5384	J-2161	749.66	Russaifah	13.97	797.48	47.7
5386	J-2162	712.91	Russaifah	13.97	796.95	83.9
5388	J-2163	733.67	Russaifah	13.97	792.24	58.5
5390	J-2164	761.58	Russaifah	13.97	791.38	29.7
5392	J-2165	667.96	Russaifah	13.97	745.17	77.1
5394	J-2166	676.89	Russaifah	13.97	745.74	68.7
5396	J-2167	680.87	Russaifah	13.97	747.41	66.4
5398	J-2168	694.41	Russaifah	13.97	748.15	53.6
5400	J-2169	698.1	Russaifah	13.97	747.8	49.6
5402	J-2170	673.1	Russaifah	13.97	747.66	74.4
5404	J-2171	699.87	Russaifah	13.97	747.62	47.7
5406	J-2172	729.27	Russaifah	13.97	751.95	22.6

Future 2030 Model Node Information AVERAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5408	J-2173	685.84	Russaifah	13.97	749.27	63.3
5410	J-2174	707.57	Russaifah	13.97	747.92	40.3
5412	J-2175	701.11	Russaifah	13.97	747.48	46.3
5415	J-2176	726	Russaifah	13.97	747.32	21.3
5417	J-2177	660.84	Russaifah	13.97	745.11	84.1
5419	J-2178	685.34	Russaifah	13.97	745.38	59.9
5422	J-2179	668.72	Russaifah	13.97	748.54	79.7
5426	J-2180	597.66	Russaifah	13.97	744.89	146.9
5427	J-2181	613.96	Russaifah	13.97	744.41	130.2
5429	J-2182	620.92	Russaifah	13.97	746.87	125.7
5431	J-2183	656.26	Russaifah	13.97	745.78	89.3
5434	J-2184	634.75	Russaifah	13.97	742.06	107.1
5436	J-2185	649.79	Russaifah	13.97	741.02	91
5438	J-2186	673.82	Russaifah	13.97	740.41	66.5
5440	J-2187	674.75	Russaifah	13.97	740.35	65.5
5442	J-2188	750.86	Russaifah	13.97	781.43	30.5
5444	J-2189	726.28	Russaifah	13.97	778.66	52.3
5446	J-2190	736.31	Russaifah	13.97	778.14	41.7
5448	J-2191	709.06	Russaifah	13.97	777.69	68.5
5450	J-2192	696.7	Russaifah	13.97	777.61	80.7
5452	J-2193	698.99	Russaifah	13.97	778.47	79.3
5454	J-2194	759.88	Russaifah	13.97	768.43	8.5
5456	J-2195	757	Russaifah	13.97	766.25	9.2
5458	J-2196	745.42	Russaifah	13.97	764.53	19.1
5460	J-2197	705.22	Russaifah	13.97	761.82	56.5
5462	J-2198	675.6	Russaifah	13.97	756.69	80.9
5464	J-2199	674.96	Russaifah	13.97	755.58	80.5
5466	J-2200	658.53	Russaifah	13.97	754.47	95.7
5468	J-2201	623.42	Russaifah	13.97	751.67	128
5471	J-2202	724.59	Russaifah	13.97	803.34	78.6
5473	J-2203	729.7	Russaifah	13.97	803.41	73.6
5475	J-2204	730.35	Russaifah	13.97	803.63	73.1
5477	J-2205	585.06	Awajan	14.48	635.14	50
5479	J-2206	579.35	Awajan	14.48	635.16	55.7
5481	J-2207	603.59	Awajan	14.48	635.23	31.6
5483	J-2208	582.38	Awajan	14.48	635.51	53
5485	J-2209	577.96	Awajan	14.48	635.87	57.8
5487	J-2210	665.56	Russaifah	13.97	739.18	73.5
5489	J-2211	591.64	Awajan	14.48	696.85	105
5491	J-2212	624.87	Awajan	14.48	694.99	70
5493	J-2213	615.39	Awajan	14.48	694.39	78.8
5495	J-2214	622.62	Awajan	14.48	694.18	71.4
5497	J-2215	564.32	Awajan	14.48	693.55	129
5499	J-2216	561.49	Awajan	14.48	693.38	131.6
5501	J-2217	616.58	Awajan	14.48	694.18	77.4
5505	J-2218	623.5	Awajan	14.48	640.18	16.6
5507	J-2219	614.9	Awajan	14.48	638.32	23.4
5509	J-2220	571.37	Awajan	14.48	636.91	65.4
5511	J-2221	573.04	Awajan	14.48	636.92	63.8
5513	J-2222	584.91	Awajan	14.48	637.25	52.2
5515	J-2223	581.24	Awajan	14.48	636.12	54.8
5517	J-2224	595.79	Awajan	14.48	635.91	40
5519	J-2225	694.02	Awajan	14.48	722.81	28.7
5521	J-2226	683.32	Awajan	14.48	721.8	38.4
5523	J-2227	644.06	Awajan	14.48	721.4	77.2

Future 2030 Model Node Information AVERAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5525	J-2228	658.36	Awajan	14.48	721.21	62.7
5528	J-2229	586.47	<None>	0	630.33	43.8
5533	J-2230	570	Zarqa	22.08	574.97	5
5537	J-2232	570	Zarqa	22.08	574.96	5
5548	J-2233	570	Zarqa	22.08	688.37	118.1
5556	J-2235	597.27	Zarqa	22.08	651.67	54.3
5558	J-2236	609.88	Zarqa	22.08	651.71	41.7
5560	J-2237	620.26	Zarqa	22.08	651.71	31.4
5562	J-2238	612.09	Zarqa	22.08	651.71	39.5
5564	J-2239	604.09	Zarqa	22.08	651.61	47.4
5566	J-2240	635.43	Zarqa	22.08	653.07	17.6
5568	J-2241	636.38	Zarqa	22.08	652.53	16.1
5570	J-2242	620.97	Zarqa	22.08	652	31
5572	J-2243	618.24	Zarqa	22.08	651.78	33.5
5582	J-2246	586.98	Zarqa	22.08	651.4	64.3
5584	J-2247	622.69	Zarqa	22.08	651.46	28.7
5587	J-2248	613.81	Zarqa	22.08	651.45	37.6
5590	J-2249	609.2	Zarqa	22.08	651.78	42.5
5592	J-2250	629.35	Zarqa	22.08	652.06	22.7
5594	J-2251	558.2	Zarqa	22.08	651.61	93.2
5597	J-2252	642.22	Zarqa	22.08	652.78	10.5
5599	J-2253	634.86	Zarqa	22.08	651.32	16.4
5601	J-2254	606.44	Zarqa	22.08	650.37	43.8
5603	J-2255	579.48	Zarqa	22.08	649.81	70.2
5605	J-2256	576.01	Zarqa	22.08	648.68	72.5
5607	J-2257	579.99	Zarqa	22.08	650.03	69.9
5609	J-2258	582.28	Zarqa	22.08	650.18	67.8
5612	J-2259	605.65	Zarqa	22.08	652.16	46.4
5614	J-2260	618.81	Zarqa	22.08	652.45	33.6
5617	J-2261	635.47	Zarqa	22.08	713.82	78.2
5619	J-2262	654.64	Zarqa	22.08	712.64	57.9
5621	J-2263	607.49	Zarqa	22.08	712.11	104.4
5623	J-2264	557.28	Zarqa	22.08	648.38	90.9
5630	J-2265	528.03	North Region	2.96	612.24	84
5632	J-2266	529.36	North Region	2.96	611.09	81.6
5634	J-2267	540.38	North Region	2.96	610.46	69.9
5636	J-2268	533.32	North Region	2.96	609.76	76.3
5638	J-2269	517.2	North Region	2.96	609.52	92.1
5640	J-2270	520.36	North Region	2.96	609.5	89
5642	J-2271	544.49	North Region	2.96	609.63	65
5644	J-2272	540.33	North Region	2.96	610.13	69.7
5648	J-2273	519.61	North Region	2.96	609.52	89.7
5651	J-2274	530.76	North Region	2.96	609.62	78.7
5655	J-2275	532.08	North Region	2.96	609.53	77.3
5659	J-2276	505.79	North Region	2.96	609.8	103.8
5662	J-2277	557.48	North Region	2.96	630.65	73
5664	J-2278	564.9	North Region	2.96	628.45	63.4
5666	J-2279	530.72	North Region	2.96	624.54	93.6
5668	J-2280	532.43	North Region	2.96	622.28	89.7
5670	J-2281	506.99	North Region	2.96	621.87	114.6
5672	J-2282	482.41	North Region	2.96	624.24	141.5
5686	J-2286	560	West - North -West	1.45	578.8	18.8
5688	J-2287	550	West - North -West	1.45	578.63	28.6
5690	J-2288	540	West - North -West	1.45	578.52	38.4
5692	J-2289	545	West - North -West	1.45	578.5	33.4
5695	J-2290	495.77	West - North -West	1.45	770.4	274.1

Future 2030 Model Node Information AVERAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5703	J-2291	685.76	West - North -West	1.45	697.58	11.8
5705	J-2292	660.22	West - North -West	1.45	695.47	35.2
5707	J-2293	609.21	West - North -West	1.45	694.44	85.1
5709	J-2294	628.06	West - North -West	1.45	693.92	65.7
5711	J-2295	654.58	West - North -West	1.45	693.65	39
5713	J-2296	628.2	West - North -West	1.45	693.56	65.2
5715	J-2297	650	West - North -West	1.45	693.41	43.3
5717	J-2298	697.86	West - North -West	1.45	769.98	72
5726	J-2299	900	West - North -West	1.45	988.76	88.6
5728	J-2300	835.68	West - North -West	1.45	988.21	152.2
5730	J-2301	798.39	West - North -West	1.45	988.01	189.2
5732	J-2302	845.63	West - North -West	1.45	988.08	142.2
5734	J-2303	926.37	West - North -West	1.45	988.87	62.4
5736	J-2304	854.34	West - North -West	1.45	988.8	134.2
5738	J-2305	803.33	West - North -West	1.45	988.78	185.1
5746	J-2307	643.19	West - North -West	1.45	761.53	118.1
5749	J-2308	806.2	West - North -West	1.45	868.98	62.7
5751	J-2309	762.98	West - North -West	1.45	868.91	105.7
5753	J-2310	756.86	West - North -West	1.45	868.89	111.8
5755	J-2311	734.19	West - North -West	1.45	868.87	134.4
5757	J-2312	712.78	West - North -West	1.45	868.85	155.8
5759	J-2313	641.53	West - North -West	1.45	868.85	226.9
5772	J-2316	591.89	North Region	2.96	621.51	29.6
5774	J-2317	563.15	North Region	2.96	621.35	58.1
5777	J-2319	556.74	North Region	2.96	620.85	64
5779	J-2320	552.42	North Region	2.96	620.62	68.1
5781	J-2321	541.44	North Region	2.96	620.08	78.5
5783	J-2322	533.86	North Region	2.96	619.88	85.8
5785	J-2323	591.65	North Region	2.96	621.41	29.7
5789	J-2324	577.17	North Region	2.96	620.86	43.6
5793	J-2325	564.29	North Region	2.96	620.19	55.8
5796	J-2326	539.31	North Region	2.96	619.03	79.6
5798	J-2327	536.08	North Region	2.96	614.83	78.6
5800	J-2328	537.4	North Region	2.96	612.2	74.6
5802	J-2329	543.84	North Region	2.96	611.06	67.1
5804	J-2330	550.26	North Region	2.96	610.86	60.5
5806	J-2331	543.72	North Region	2.96	610.84	67
5808	J-2332	540.6	North Region	2.96	610.85	70.1
5811	J-2333	543.97	North Region	2.96	654.01	109.8
5813	J-2334	555.24	North Region	2.96	651.68	96.2
5815	J-2335	539.93	North Region	2.96	651.85	111.7
5816	J-2336	532.66	North Region	2.96	651.55	118.7
5818	J-2337	555.52	North Region	2.96	649.66	93.9
5821	J-2338	635.06	North Region	2.96	820.9	185.5
5825	J-2339	540	North Region	2.96	657.56	117.3
5829	J-2340	611	KABA City	0	659.51	48.4
5832	J-2341	635	KABA City	0	653.87	18.8
5840	J-2342	585	Awajan	14.48	761.23	175.9
5843	J-2343	585	Awajan	14.48	760.96	175.6
5880	J-2344	850	West - North -West	1.45	987.91	137.6
5889	J-2346	594.77	<None>	2.74	619.4	24.6
5899	J-2347	610	<None>	22.08	651.58	41.5
5916	J-2348	638	<None>	0	674.89	36.8
5924	J-2350	638	<None>	0	674.89	36.8
5927	J-2351	592	<None>	2.74	658.09	66
5932	J-2353	592	<None>	2.74	612.79	20.8

Future 2030 Model Node Information AVERAGE DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5947	J-2356	638	East - Dulail	2.74	730.36	92.2
5948	J-2357	630	East - Dulail	2.74	730.46	100.3
5950	J-2358	573	East - Dulail	2.74	650.7	77.5
5953	J-2359	575	East - Dulail	2.74	647.93	72.8
5955	J-2360	575	East - Dulail	2.74	647.88	72.7
5957	J-2361	580	East - Dulail	2.74	651.89	71.8
5960	J-2362	588	East - Dulail	2.74	651.87	63.7
5962	J-2363	580	East - Dulail	2.74	651.86	71.7
5964	J-2364	585	East - Dulail	2.74	652.1	67
5966	J-2365	600	East - Dulail	2.74	651.81	51.7
5973	J-2366	590	<None>	2.96	690.57	100.4
5980	J-2367	590	<None>	2.96	644.84	54.7
6003	J-2368	620	<None>	0	753.5	133.2
6038	J-2370	765	<None>	1.45	770.08	5.1
6047	J-2371	624	<None>	0	783.11	158.8
6058	J-2372	631.34	<None>	0	767.2	135.6
6062	J-2373	543	<None>	0	611.95	68.8
6065	J-2374	570	<None>	0	626.91	56.8
6069	J-2375	543	<None>	0	631.06	87.9
6081	J-2377	530	<None>	0	579	48.9
6087	J-2378	765	<None>	0	770.49	5.5

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5167	P-764	18.15	Azraq to Khaw PS	FCV-38	600	120	Ductile Iron	268.4	0.95	1.587
5173	P-768	194.2	Azraq Res.	J-2103	600	120	Ductile Iron	536.8	1.9	5.723
5174	P-769	26.68	J-2103	Azraq to Khaw PS	600	120	Ductile Iron	268.4	0.95	1.585
5175	P-770	32.81	J-2103	Azraq to Khaw2	600	120	Ductile Iron	268.4	0.95	1.584
5176	P-771	14.58	Azraq to Khaw2	FCV-43	600	120	Ductile Iron	268.4	0.95	1.582
5181	P-774	607.75	J-2105	J-2104	152.4	120	Ductile Iron	2.99	0.16	0.303
5183	P-775	6040.89	Azraq Res.	J-2106	152.4	120	Ductile Iron	14.6	0.8	5.723
5184	P-776	138.25	J-2106	J-2105	152.4	120	Ductile Iron	0.77	0.04	0.024
5185	P-777	46.14	J-2106	Azraq WT Booster	152.4	120	Ductile Iron	10.85	0.59	3.302
5186	P-778	18.37	Azraq WT Booster	FCV-44	152.4	120	Ductile Iron	10.85	0.59	3.301
5187	P-779	19.83	FCV-44	Azraq Water Tower	152.4	120	Ductile Iron	10.85	0.59	3.302
5189	P-780	76.89	Azraq Water Tower	J-2107	250	120	Ductile Iron	14.17	0.29	0.485
5191	P-781	6077.81	J-2107	J-2108	250	120	Ductile Iron	2.99	0.06	0.027
5198	P-785	48107.13	FCV-38	J-2111	600	120	Ductile Iron	268.4	0.95	1.585
5203	P-790	12.56	Hallabat Wellfield	FCV-26	600	120	Ductile Iron	197.37	0.7	0.897
5204	P-791	13.15	FCV-26	Hallabat Reservoir	600	120	Ductile Iron	197.37	0.7	0.897
5205	P-792	47.88	Hallabat Reservoir	Hallabat to Khaw	600	120	Ductile Iron	99	0.35	0.25
5206	P-793	48.36	Hallabat to Khaw	FCV-19	600	120	Ductile Iron	99	0.35	0.249
5210	P-796	515.68	FCV-19	J-2112	600	120	Ductile Iron	99	0.35	0.25
5212	P-798	67.63	Hallabat Reservoir	Hallabat WT PS	152.4	120	Ductile Iron	22.64	1.24	12.891
5219	P-802	229.78	J-2346	H-2	150	120	Ductile Iron	2.74	0.15	0.279
5230	P-808	417.93	H-2	H-3	150	120	Ductile Iron	2.74	0.15	0.279
5232	P-809	1345.21	H-3	J-2121	200	120	Ductile Iron	2.74	0.09	0.069
5234	P-811	36.08	Za'atari Wells	FCV-37	600	120	Ductile Iron	83.33	0.29	0.182
5237	P-813	10291.13	J-2111	J-2122	600	120	Ductile Iron	273.31	0.97	1.639
5238	P-814	933.7	J-2122	J-2110	600	120	Ductile Iron	270.57	0.96	1.609
5241	P-816	4978.9	J-2123	Khaw Reservoir	600	120	Ductile Iron	248.56	0.88	1.375
5242	P-817	38.28	J-2122	J-2123	600	120	Ductile Iron	0	0	0
5244	P-818	8608.75	FCV-37	J-2124	600	120	Ductile Iron	83.33	0.29	0.182
5245	P-819	4980.93	J-2124	Khaw Reservoir	600	120	Ductile Iron	247.66	0.88	1.366
5246	P-820	22.77	J-2123	J-2124	600	120	Ductile Iron	296.25	1.05	1.902
5248	P-822	32.98	New Tafeh PS	FCV-46	400	120	Ductile Iron	94.13	0.75	1.64
5249	P-823	45.19	J-2124	Tafeh PS to Tafeh Res	200	120	Ductile Iron	32.32	1.03	6.632
5250	P-824	35.11	Tafeh PS to Tafeh Res	FCV-45	200	120	Ductile Iron	32.32	1.03	6.631
5251	P-825	3141.25	FCV-46	New Dulail Reservoir	400	120	Ductile Iron	94.13	0.75	1.641
5253	P-826	964.89	New Dulail Reservoir	J-2125	300	120	Ductile Iron	49.29	0.7	2.011
5255	P-827	1452.96	J-2125	J-2126	300	120	Ductile Iron	46.55	0.66	1.809
5257	P-828	912.33	J-2126	J-2127	300	120	Ductile Iron	43.82	0.62	1.617
5259	P-829	732.09	J-2127	J-2128	300	120	Ductile Iron	41.08	0.58	1.435
5261	P-830	1258.76	J-2128	J-2129	300	120	Ductile Iron	28.53	0.4	0.73
5272	P-836	5774.97	FCV-45	New Tafeh Reservoir	300	120	Ductile Iron	32.32	0.46	0.92
5274	P-837	2823.56	New Tafeh Reservoir	J-2135	300	120	Ductile Iron	13.69	0.19	0.188
5276	P-838	1263.48	J-2135	J-2136	300	120	Ductile Iron	8.22	0.12	0.073
5281	P-841	2581.71	Khaw to Awajan	J-2138	600	120	Ductile Iron	402.75	1.42	3.362
5283	P-843	46.38	FCV-48	King Abdullah Reservoir	800	120	Ductile Iron	767	1.53	2.729
5285	P-844	3330.75	J-2138	J-2139	600	120	Ductile Iron	402.75	1.42	3.362
5289	P-847	5.34	Russaifah Hub Reservoir	Russaifah Hub PS	600	120	Ductile Iron	503.62	1.78	5.09
5290	P-848	3.34	Russaifah Hub PS	H-7	600	120	Ductile Iron	503.62	1.78	5.086
5291	P-849	23.75	Tamween Wells	FCV-28	600	120	Ductile Iron	78.68	0.28	0.163
5292	P-850	22.38	FCV-28	Tamween Reservoir	600	120	Ductile Iron	78.68	0.28	0.163
5293	P-851	53.54	Tamween Reservoir	Tamwn 2	600	120	Ductile Iron	97.22	0.34	0.242
5294	P-852	21.47	Tamwn 2	FCV-47	600	120	Ductile Iron	97.22	0.34	0.243
5298	P-855	6946.33	J-2141	FCV-73	600	120	Ductile Iron	489.62	1.73	4.827
5300	P-857	12.12	Well 21	Well 21 Awajan	152.4	120	Ductile Iron	13.89	0.76	5.214
5301	P-858	157.19	Well 21 Awajan	Awajan Hub	152.4	120	Ductile Iron	13.89	0.76	5.216
5302	P-859	12.6	Well 22	FCV-30	152.4	120	Ductile Iron	8.3	0.46	2.008
5303	P-860	124.4	FCV-30	Awajan Hub	152.4	120	Ductile Iron	8.3	0.46	2.01
5304	P-861	56.8	Well 23	FCV-7	152.4	120	Ductile Iron	44.99	2.47	45.988
5305	P-862	619.77	FCV-7	Awajan Hub	152.4	120	Ductile Iron	44.99	2.47	45.988
5306	P-863	252.92	Awajan Hub	Awajan Hub PS	600	120	Ductile Iron	417.05	1.48	3.586
5307	P-864	16.64	Awajan Hub PS	H-1	600	120	Ductile Iron	417.05	1.48	3.586
5309	P-866	5.38	FCV-15	Awajan High Square	600	120	Ductile Iron	208	0.74	0.983
5310	P-867	45.95	Awajan High Square	Awajan High Circular	400	120	Ductile Iron	23.02	0.18	0.006
5313	P-869	4.26	J-2142	FCV-59	500	120	Ductile Iron	165.6	0.84	1.572
5314	P-870	4.19	FCV-59	Awajan Low	500	120	Ductile Iron	165.6	0.84	1.582
5315	P-871	10.68	Awajan Low	Awajan North PS	300	120	Ductile Iron	97.67	1.38	7.138
5316	P-872	5398.13	Awajan North PS	Awajan North Reservoir	300	120	Ductile Iron	97.67	1.38	7.135
5318	P-874	117.87	FCV-51	New Tatweer Reservoir	152.4	120	Ductile Iron	34.61	1.9	28.293
5322	P-876	898.61	J-2143	J-2144	300	120	Ductile Iron	10.72	0.15	0.119
5325	P-878	3914.94	J-2145	J-2141	600	120	Ductile Iron	357.42	1.26	2.695
5331	P-881	26.76	Khaw to Hashmeya	J-2147	400	120	Ductile Iron	132.68	1.06	3.101
5335	P-885	18.45	J-2147	J-2148	600	120	Ductile Iron	129.72	0.46	0.411
5336	P-886	12.75	Khaw Reservoir	Khaw to Hashmeya	400	120	Ductile Iron	132.68	1.06	3.1
5338	P-888	11.95	Khaw Reservoir	Khaw to Zarqa	400	120	Ductile Iron	131.04	1.04	3.03
5339	P-889	11.5	Khaw Reservoir	Khaw to Batrawi	700	120	Ductile Iron	602.96	1.57	3.349
5341	P-891	11.11	Khaw Reservoir	Khaw to Russaifah	700	120	Ductile Iron	520.17	1.35	2.549
5343	P-893	3.97	Awajan High Circular	Awajan West PS	300	120	Ductile Iron	79.88	1.13	4.909
5344	P-894	4.46	Awajan West PS	H-6	300	120	Ductile Iron	79.88	1.13	4.922
5346	P-895	3018.36	H-6	J-2149	300	120	Ductile Iron	79.88	1.13	4.917
5348	P-897	16.03	Rusaifah Wells	FCV-29	400	120	Ductile Iron	129.6	1.03	2.967
5349	P-898	26.57	FCV-29	Basateen Reservoir	400	120	Ductile Iron	129.6	1.03	2.966
5350	P-899	7.46	Basateen Reservoir	Basteen to Russaifah Low	400	120	Ductile Iron	134	1.07	3.154
5351	P-900	3.67	Basteen to Russaifah Low	FCV-64	400	120	Ductile Iron	134	1.07	3.163
5352	P-901	3083.54	FCV-64	Russaifah Low	400	120	Ductile Iron	134	1.07	3.156
5353	P-902	1437.86	Russaifah High	FCV-32	300	120	Ductile Iron	80	1.13	4.93
5354	P-903	6.66	FCV-32	Russaifah Low	300	120	Ductile Iron	80	1.13	4.926
5356	P-904	784.99	H-7	J-2150	600	120	Ductile Iron	503.62	1.78	5.085
5358	P-906	4.42	Hitten Reservoir	H-11	300	120	Ductile Iron	113.13	1.6	9.371
5359	P-907	49.09	H-11	Hitten Tower Pump	300	120	Ductile Iron	113.13	1.6	9.365
5360	P-908	4.69	Hitten Tower Pump	Hitten Tower	300	120	Ductile Iron	113.13	1.6	9.365
5364	P-911	10.3	Russaifah High	Russaifah Booster	200	120	Ductile Iron	29	0.92	5.427
5373	P-916	1777.15	Russaifah North West Reserv	J-2155	300	120	Ductile Iron	69.87	0.99	3.837
5375	P-917	1515.99	J-2155	J-2156	300	120	Ductile Iron	55.9	0.79	2.538
5377	P-918	619.42	J-2156	J-2157	300	120	Ductile Iron	41.92	0.59	1.49
5379	P-919	531.95	J-2157	J-2158	300	120	Ductile Iron	27.95	0.4	0.703
5381	P-920	1229.03	J-2158	J-2159	300	120	Ductile Iron	13.97	0.2	0.195
5383	P-921	1601.03	Russaifah High	J-2160	300	120	Ductile Iron	69.87	0.99	3.837
5385	P-922	544.22	J-2160	J-2161	300	120	Ductile Iron	55.9	0.79	2.538
5387	P-923	351.46	J-2161	J-2162	300	120	Ductile Iron	41.92	0.59	1.49
5389	P-924	929.13	J-2162	J-2163	200	120	Ductile Iron	27.95	0.89	5.067

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5391	P-925	615.27	J-2163	J-2164	200	120	Ductile Iron	13.97	0.44	1.404
5393	P-926	1486.39	J-2180	J-2165	400	120	Ductile Iron	-29.28	0.23	0.189

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5395	P-927	1047.73	J-2165	J-2166	400	120	Ductile Iron	-52.15	0.41	0.55
5397	P-928	969.65	J-2166	J-2167	400	120	Ductile Iron	-96.58	0.77	1.721
5401	P-930	946.65	J-2168	J-2169	400	120	Ductile Iron	41.92	0.33	0.367
5403	P-931	787.73	J-2169	J-2170	400	120	Ductile Iron	27.95	0.22	0.173
5405	P-932	846.25	J-2170	J-2171	400	120	Ductile Iron	13.97	0.11	0.048
5407	P-933	309.5	Russaifah Low	J-2172	500	120	Ductile Iron	250.3	1.27	3.386
5409	P-934	881.22	J-2172	J-2173	500	120	Ductile Iron	236.33	1.2	3.044
5411	P-935	517.49	J-2173	J-2174	300	120	Ductile Iron	56.78	0.8	2.613
5413	P-936	284.39	J-2174	J-2175	300	120	Ductile Iron	42.8	0.61	1.548
5414	P-937	294.92	J-2175	J-2167	300	120	Ductile Iron	14.85	0.21	0.218
5416	P-938	832.12	J-2175	J-2176	300	120	Ductile Iron	13.97	0.2	0.195
5418	P-939	651.85	J-2165	J-2177	300	120	Ductile Iron	8.89	0.13	0.084
5420	P-940	765.04	J-2177	J-2178	300	120	Ductile Iron	-19.06	0.27	0.346
5421	P-941	381.8	J-2178	J-2166	300	120	Ductile Iron	-33.04	0.47	0.958
5423	P-942	665.26	J-2167	J-2179	400	120	Ductile Iron	-95.7	0.76	1.692
5424	P-943	624.41	J-2179	J-2168	400	120	Ductile Iron	55.9	0.44	0.625
5425	P-944	464.19	J-2173	J-2179	500	120	Ductile Iron	165.57	0.84	1.575
5428	P-945	2073.4	J-2180	J-2181	300	120	Ductile Iron	15.31	0.22	0.231
5430	P-946	1012.66	J-2181	J-2182	300	120	Ductile Iron	-54.57	0.77	2.427
5432	P-947	567.67	J-2182	J-2183	200	120	Ductile Iron	16.56	0.53	1.921
5433	P-948	530.71	J-2183	J-2166	200	120	Ductile Iron	2.58	0.08	0.061
5435	P-949	924.21	J-2181	J-2184	300	120	Ductile Iron	55.9	0.79	2.538
5437	P-950	701.79	J-2184	J-2185	300	120	Ductile Iron	41.92	0.59	1.49
5439	P-951	869.05	J-2185	J-2186	300	120	Ductile Iron	27.95	0.4	0.703
5441	P-952	308.89	J-2186	J-2187	300	120	Ductile Iron	13.97	0.2	0.195
5443	P-953	430.89	Hitten Tower	J-2188	400	120	Ductile Iron	83.85	0.67	1.325
5445	P-954	722.7	J-2188	J-2189	300	120	Ductile Iron	69.87	0.99	3.837
5447	P-955	349.46	J-2189	J-2190	300	120	Ductile Iron	41.92	0.59	1.49
5449	P-956	626.77	J-2190	J-2191	300	120	Ductile Iron	27.95	0.4	0.703
5451	P-957	432.71	J-2191	J-2192	300	120	Ductile Iron	13.97	0.2	0.195
5453	P-958	931.71	J-2189	J-2193	300	120	Ductile Iron	13.97	0.2	0.195
5455	P-959	261.55	Hitten Reservoir	J-2194	500	120	Ductile Iron	196.9	1	2.171
5457	P-960	388.66	J-2194	J-2195	400	120	Ductile Iron	182.92	1.46	5.617
5459	P-961	354.26	J-2195	J-2196	400	120	Ductile Iron	168.95	1.34	4.848
5461	P-962	655.96	J-2196	J-2197	400	120	Ductile Iron	154.97	1.23	4.131
5463	P-963	1480.77	J-2197	J-2198	400	120	Ductile Iron	141	1.12	3.468
5465	P-964	386.87	J-2198	J-2199	400	120	Ductile Iron	127.02	1.01	2.859
5467	P-965	483.72	J-2199	J-2200	400	120	Ductile Iron	113.05	0.9	2.303
5469	P-966	382.06	J-2200	J-2201	300	120	Ductile Iron	99.07	1.4	7.325
5470	P-967	868.34	J-2201	J-2182	300	120	Ductile Iron	85.1	1.2	5.528
5474	P-969	346.09	J-2202	J-2203	300	120	Ductile Iron	-13.97	0.2	0.195
5476	P-970	324.75	J-2203	J-2204	300	120	Ductile Iron	-27.95	0.4	0.703
5480	P-972	375.52	J-2205	J-2206	400	120	Ductile Iron	-14.48	0.12	0.051
5482	P-973	351.24	J-2206	J-2207	400	120	Ductile Iron	-28.97	0.23	0.185
5484	P-974	720.84	J-2207	J-2208	400	120	Ductile Iron	-43.45	0.35	0.392
5486	P-975	544.34	J-2208	J-2209	400	120	Ductile Iron	-57.93	0.46	0.668
5488	P-976	1124.32	J-2177	J-2210	152.4	120	Ductile Iron	13.97	0.77	5.275
5492	P-978	1242.41	J-2211	J-2212	300	120	Ductile Iron	41.98	0.59	1.493
5494	P-979	883.42	J-2212	J-2213	300	120	Ductile Iron	27.5	0.39	0.682
5496	P-980	1217.69	J-2213	J-2214	300	120	Ductile Iron	13.01	0.18	0.171
5500	P-982	827.26	J-2215	J-2216	300	120	Ductile Iron	14.48	0.2	0.208
5502	P-983	559.54	J-2214	J-2217	300	120	Ductile Iron	-1.47	0.02	0.003
5503	P-984	839.02	J-2217	J-2215	300	120	Ductile Iron	28.97	0.41	0.751
5504	P-985	1573.75	J-2211	J-2217	300	120	Ductile Iron	44.92	0.64	1.693
5506	P-986	552.45	Awajan Low	J-2218	400	120	Ductile Iron	173.8	1.38	5.109
5508	P-987	427.26	J-2218	J-2219	400	120	Ductile Iron	159.31	1.27	4.348
5512	P-989	939.46	J-2220	J-2221	300	120	Ductile Iron	-3.23	0.05	0.013
5516	P-991	1046.93	J-2220	J-2223	300	120	Ductile Iron	28.97	0.41	0.751
5518	P-992	1034.6	J-2223	J-2224	300	120	Ductile Iron	14.48	0.2	0.208
5520	P-993	1915.64	Awajan West Reservoir	J-2225	300	120	Ductile Iron	57.93	0.82	2.712
5522	P-994	632.87	J-2225	J-2226	300	120	Ductile Iron	43.45	0.61	1.592
5524	P-995	536.07	J-2226	J-2227	300	120	Ductile Iron	28.97	0.41	0.751
5526	P-996	903.27	J-2227	J-2228	300	120	Ductile Iron	14.48	0.2	0.208
5534	P-1002	30.38	Zarqa Reservoir	J-2230	600	120	Ductile Iron	206.25	0.73	0.974
5538	P-1004	10.61	J-2230	J-2232	600	120	Ductile Iron	184.16	0.65	0.789
5540	P-1006	4.94	J-2232	Zarqa to Batrawi	400	120	Ductile Iron	162.08	1.29	4.489
5551	P-1015	3.77	Zarqa to Batrawi	J-2233	400	120	Ductile Iron	162.08	1.29	4.482
5554	P-1018	1956.93	J-2233	FCV-53	400	120	Ductile Iron	140	1.11	3.423
5555	P-1019	6.4	FCV-53	Batrawi Reservoir	400	120	Ductile Iron	140	1.11	3.418
5559	P-1021	370.31	J-2235	J-2236	400	120	Ductile Iron	-22.08	0.18	0.112
5561	P-1022	604.23	J-2236	J-2237	400	120	Ductile Iron	3.92	0.03	0.005
5565	P-1024	446.57	J-2238	J-2239	600	120	Ductile Iron	93.61	0.33	0.225
5567	P-1025	352.35	Batrawi Reservoir	J-2240	600	120	Ductile Iron	353.32	1.25	2.638
5569	P-1026	232.49	J-2240	J-2241	600	120	Ductile Iron	331.24	1.17	2.341
5571	P-1027	716	J-2241	J-2242	600	120	Ductile Iron	178.02	0.63	0.741
5573	P-1028	370.19	J-2242	J-2243	600	120	Ductile Iron	155.94	0.55	0.58
5574	P-1029	19.98	Batrawi Reservoir	Batrawi PS	300	120	Ductile Iron	97.79	1.38	7.153
5575	P-1030	1986.86	Batrawi PS	Zarqa High Reservoir	300	120	Steel	97.79	1.38	7.151
5588	P-1038	544.12	J-2247	J-2248	400	120	Ductile Iron	6.8	0.05	0.013
5589	P-1039	1023.64	J-2248	J-2246	400	120	Ductile Iron	13.67	0.11	0.046
5595	P-1042	1394.04	J-2250	J-2251	400	120	Ductile Iron	38.89	0.31	0.319
5600	P-1045	664.9	J-2252	J-2253	400	120	Ductile Iron	110.41	0.88	2.205
5604	P-1047	655.26	J-2254	J-2255	400	120	Ductile Iron	66.25	0.53	0.856
5606	P-1048	691.72	J-2255	J-2256	300	120	Ductile Iron	44.16	0.62	1.641
5611	P-1051	328.17	J-2258	J-2257	300	120	Ductile Iron	22.08	0.31	0.454
5613	P-1052	1208.88	J-2258	J-2259	300	120	Ductile Iron	-44.16	0.62	1.641
5615	P-1053	342.15	J-2259	J-2260	400	120	Ductile Iron	-66.25	0.53	0.856
5618	P-1055	1201.86	Zarqa High Reservoir	J-2261	300	120	Ductile Iron	66.25	0.94	3.477
5620	P-1056	719.17	J-2261	J-2262	300	120	Ductile Iron	44.16	0.62	1.641
5622	P-1057	1163.84	J-2262	J-2263	300	120	Ductile Iron	22.08	0.31	0.454
5627	P-1061	7427.82	Hashmeya Reservoir	FCV-35	300	120	Ductile Iron	46	0.65	1.769
5628	P-1062	11.23	FCV-35	Sukhna Reservoir	300	120	Ductile Iron	46	0.65	1.77
5629	P-1063	303.69	Sukhna Reservoir	Sukhna Pumps	300	120	Ductile Iron	53.36	0.75	2.329
5631	P-1064	145.03	Sukhna Pumps	J-2265	300	120	Ductile Iron	53.36	0.75	2.329
5633	P-1065	204.26	J-2265	J-2266	200	120	Ductile Iron	29.65	0.94	5.652
5635	P-1066	134.25	J-2266	J-2267	200	120	Ductile Iron	26.68	0.85	4.65
5645	P-1071	90	J-2267	J-2272	200	120	Ductile Iron	23.72	0.75	3.739
5646	P-1072	227.35	J-2272	J-2268	200	120	Ductile Iron	15.09	0.48	1.619
5647	P-1073	505.7	J-2271	J-2272	152.4	120	Ductile Iron	-5.66	0.31	0.989
5649	P-1074	392.2	J-2269	J-2273	152.4	120	Ductile Iron	-0.5	0.03	0.011

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5650	P-1075	360.06	J-2273	J-2270	152.4	120	Ductile Iron	1.25	0.07	0.061
5652	P-1076	132.96	J-2268	J-2274	200	120	Ductile Iron	12.13	0.39	1.08

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5653	P-1077	470.94	J-2274	J-2269	152.4	120	Ductile Iron	2.46	0.14	0.212
5654	P-1078	508.25	J-2273	J-2274	200	120	Ductile Iron	-4.72	0.15	0.188
5656	P-1079	311.78	J-2270	J-2275	152.4	120	Ductile Iron	-1.71	0.09	0.108
5657	P-1080	381.99	J-2275	J-2271	152.4	120	Ductile Iron	-2.69	0.15	0.25
5658	P-1081	591.13	J-2274	J-2275	152.4	120	Ductile Iron	1.98	0.11	0.142
5660	P-1082	836.35	J-2265	J-2276	200	120	Ductile Iron	20.75	0.66	2.919
5661	P-1083	1068.41	J-2276	Sukhna HL PS	200	120	Ductile Iron	17.79	0.57	2.194
5663	P-1084	668.91	Sukhna HL PS	J-2277	152.4	120	Ductile Iron	17.79	0.98	8.247
5665	P-1085	1405.14	J-2277	J-2278	200	120	Ductile Iron	14.82	0.47	1.566
5667	P-1086	1005.78	J-2278	J-2279	152.4	120	Ductile Iron	11.86	0.65	3.892
5669	P-1087	2096.91	J-2279	J-2280	152.4	120	Ductile Iron	5.93	0.33	1.078
5671	P-1088	1382.25	J-2280	J-2281	152.4	120	Ductile Iron	2.96	0.16	0.299
5673	P-1089	995.66	J-2279	J-2282	152.4	120	Ductile Iron	2.96	0.16	0.299
5683	P-1096	8954.39	Qunaya Reservoir	J-2377	152.4	120	Ductile Iron	0	0	0
5687	P-1099	197.83	Qunaya Reservoir	J-2286	152.4	120	Ductile Iron	5.8	0.32	1.036
5689	P-1100	274.55	J-2286	J-2287	152.4	120	Ductile Iron	4.35	0.24	0.608
5691	P-1101	389.51	J-2287	J-2288	152.4	120	Ductile Iron	2.9	0.16	0.287
5693	P-1102	201.37	J-2288	J-2289	152.4	120	Ductile Iron	1.45	0.08	0.079
5698	P-1106	1764.98	Sarrout Source	Sarout Reservoir	152.4	120	Ductile Iron	26.05	1.43	16.714
5701	P-1109	11.59	Alouk Spring	Alouk Pump	152.4	120	Ductile Iron	14.25	0.78	5.471
5704	P-1111	134.68	Alouk High Reservoir	J-2291	150	120	Ductile Iron	10.15	0.57	3.154
5706	P-1112	889.35	J-2291	J-2292	150	120	Ductile Iron	8.7	0.49	2.37
5708	P-1113	608.34	J-2292	J-2293	150	120	Ductile Iron	7.25	0.41	1.691
5710	P-1114	466.73	J-2293	J-2294	150	120	Ductile Iron	5.8	0.33	1.119
5712	P-1115	402.25	J-2294	J-2295	150	120	Ductile Iron	4.35	0.25	0.657
5714	P-1116	310.26	J-2295	J-2296	150	120	Ductile Iron	2.9	0.16	0.31
5716	P-1117	1738.98	J-2296	J-2297	150	120	Ductile Iron	1.45	0.08	0.086
5720	P-1120	9.54	Um Rummaneh (Berein) Well	FCV-40	152.4	120	Ductile Iron	24.5	1.34	14.922
5721	P-1121	8.53	FCV-40	Um Rummaneh Reservoir	152.4	120	Ductile Iron	24.5	1.34	14.922
5722	P-1122	8.54	Um Rummaneh Reservoir	Um Rummaneh PS	152.4	120	Ductile Iron	14.33	0.79	5.527
5723	P-1123	2580.62	Um Rummaneh PS	Berein High Reservoir	200	120	Ductile Iron	14.33	0.46	1.47
5724	P-1124	10.25	Um Rummaneh Reservoir	Um Rummaneh to Um Rumma	152.4	120	Ductile Iron	21.62	1.19	11.837
5725	P-1125	3855.69	Um Rummaneh to Um Rumm	Um Rummaneh High Reservoi	200	120	Ductile Iron	21.62	0.69	3.149
5727	P-1126	587.47	Um Rummaneh High Reserv	J-2299	200	120	Ductile Iron	7.25	0.23	0.416
5731	P-1128	2571.75	J-2300	J-2301	152.4	120	Ductile Iron	1.45	0.08	0.079
5733	P-1129	1619	J-2300	J-2302	152.4	120	Ductile Iron	1.45	0.08	0.079
5735	P-1130	793.82	Um Rummaneh High Reserv	J-2303	200	120	Ductile Iron	4.35	0.14	0.162
5737	P-1131	910.61	J-2303	J-2304	200	120	Ductile Iron	2.9	0.09	0.076
5739	P-1132	1203.33	J-2304	J-2305	200	120	Ductile Iron	1.45	0.05	0.021
5743	P-1135	5.13	Merhib Wells	FCV-27	300	120	Ductile Iron	24.24	0.34	0.536
5744	P-1136	4.37	FCV-27	Merhib Reservoir	300	120	Ductile Iron	24.24	0.34	0.545
5745	P-1137	42.85	Merhib Reservoir	Merhib to Berein	300	120	Ductile Iron	60.92	0.86	2.976
5747	P-1138	38.12	Merhib to Berein	J-2307	300	120	Ductile Iron	60.92	0.86	2.975
5750	P-1140	225.16	Beirein Reservoir	J-2308	300	120	Ductile Iron	8.7	0.12	0.081
5754	P-1142	604.93	J-2309	J-2310	300	120	Ductile Iron	5.8	0.08	0.038
5756	P-1143	783.19	J-2310	J-2311	300	120	Ductile Iron	4.35	0.06	0.022
5758	P-1144	1215.5	J-2311	J-2312	300	120	Ductile Iron	2.9	0.04	0.011
5760	P-1145	2802.9	J-2312	J-2313	300	120	Ductile Iron	1.45	0.02	0.003
5761	P-1146	40.62	Merhib High Reservoir	Merhib HL to Berein PS	200	120	Ductile Iron	23.46	0.75	3.662
5764	P-1148	3416.87	Merhib HL to Berein PS	Beirein Reservoir	200	120	Ductile Iron	23.46	0.75	3.662
5765	P-1149	1777.92	New Tatweer Reservoir	J-2143	300	120	Ductile Iron	21.43	0.3	0.43
5766	P-1150	1175.52	J-2219	J-2222	300	120	Ductile Iron	32.2	0.46	0.914
5769	P-1151	16.31	Sarout Reservoir	J-2378	152.4	120	Ductile Iron	2.9	0.16	0.287
5773	P-1154	527.68	Hashmeya Reservoir	J-2316	300	120	Ductile Iron	47.43	0.67	1.873
5778	P-1156	589.05	J-2317	J-2319	152.4	120	Ductile Iron	5.17	0.28	0.836
5780	P-1157	1014.01	J-2319	J-2320	152.4	120	Ductile Iron	2.61	0.14	0.235
5782	P-1158	500.31	J-2320	J-2321	152.4	120	Ductile Iron	5.93	0.33	1.078
5784	P-1159	667.11	J-2321	J-2322	152.4	120	Ductile Iron	2.96	0.16	0.299
5786	P-1160	170.62	J-2316	J-2323	300	120	Ductile Iron	25.7	0.36	0.602
5787	P-1161	866.35	J-2323	J-2317	300	120	Ductile Iron	8.13	0.12	0.071
5790	P-1163	761.44	J-2320	J-2324	200	120	Ductile Iron	-6.29	0.2	0.32
5791	P-1164	360.93	J-2324	J-2323	200	120	Ductile Iron	-14.6	0.46	1.523
5792	P-1165	665.53	J-2319	J-2324	152.4	120	Ductile Iron	-0.4	0.02	0.007
5794	P-1166	862.57	J-2324	J-2325	152.4	120	Ductile Iron	4.95	0.27	0.771
5795	P-1167	543.49	J-2325	J-2316	200	120	Ductile Iron	-18.77	0.6	2.424
5797	P-1168	400.58	J-2325	J-2326	200	120	Ductile Iron	20.75	0.66	2.919
5799	P-1169	508.31	J-2326	J-2327	152.4	120	Ductile Iron	17.79	0.98	8.247
5801	P-1170	448.3	J-2327	J-2328	152.4	120	Ductile Iron	14.82	0.81	5.884
5803	P-1171	291.21	J-2328	J-2329	152.4	120	Ductile Iron	11.86	0.65	3.892
5805	P-1172	336.33	J-2329	J-2330	152.4	120	Ductile Iron	4.33	0.24	0.603
5807	P-1173	308.16	J-2330	J-2331	152.4	120	Ductile Iron	1.37	0.07	0.071
5809	P-1174	141.57	J-2331	J-2332	152.4	120	Ductile Iron	-1.6	0.09	0.095
5810	P-1175	318.46	J-2332	J-2329	152.4	120	Ductile Iron	-4.56	0.25	0.663
5817	P-1178	3559.28	J-2335	J-2336	300	120	Ductile Iron	8.89	0.13	0.084
5819	P-1179	1758.94	J-2336	J-2337	152.4	120	Ductile Iron	5.93	0.33	1.078
5820	P-1180	1255.43	J-2337	Hashmeya HL PS	152.4	120	Ductile Iron	2.96	0.16	0.299
5822	P-1181	2272.86	Hashmeya HL PS	J-2338	152.4	120	Ductile Iron	2.96	0.16	0.299
5823	P-1182	365.98	J-2333	J-2335	152.4	120	Ductile Iron	14.82	0.81	5.884
5824	P-1183	575.97	J-2335	J-2334	152.4	120	Ductile Iron	2.96	0.16	0.299
5826	P-1184	89.65	Hashmeya PS	J-2339	300	120	Ductile Iron	126.75	1.79	11.562
5828	P-1186	430.16	J-2339	J-2333	152.4	120	Ductile Iron	17.79	0.98	8.247
5830	P-1187	22.52	FCV-47	J-2340	600	120	Ductile Iron	97.22	0.34	0.241
5831	P-1188	20.93	J-2340	J-2139	600	120	Ductile Iron	0	0	0
5834	P-1190	50.25	J-2341	FCV-48	800	120	Ductile Iron	767	1.53	2.729
5835	P-1191	3239.39	J-2340	J-2341	400	120	Ductile Iron	97.22	0.77	1.742
5838	P-1193	7.87	Khaw Reservoir	Khaw to KABA	800	120	Ductile Iron	669.78	1.33	2.123
5839	P-1194	2588.67	Khaw to KABA	J-2341	800	120	Ductile Iron	669.78	1.33	2.124
5841	P-1195	76.87	H-1	J-2342	600	120	Ductile Iron	417.05	1.48	3.586
5842	P-1196	1702.62	J-2342	FCV-15	600	120	Ductile Iron	208	0.74	0.989
5845	P-1198	2332.17	J-2343	J-2142	500	120	Ductile Iron	180.08	0.92	1.84
5846	P-1199	302.9	J-2342	J-2343	600	120	Ductile Iron	194.57	0.69	0.874
5848	P-1200	3031.46	J-2141	FCV-70	600	120	Ductile Iron	374	1.32	2.931
5849	P-1201	57.67	FCV-70	Awajan Hub	600	120	Ductile Iron	374	1.32	2.931
5850	P-1202	1060.64	Batrawi Reservoir	J-2260	400	120	Ductile Iron	88.33	0.7	1.459
5852	P-1204	656.51	J-2264	J-2256	300	120	Ductile Iron	-22.08	0.31	0.455
5853	P-1205	647.88	J-2253	J-2254	400	120	Ductile Iron	88.33	0.7	1.459
5855	P-1207	916.71	Russaifah High	J-2204	300	120	Ductile Iron	41.92	0.59	1.49
5856	P-1208	787.79	J-2249	J-2241	400	120	Ductile Iron	-70.17	0.56	0.952
5857	P-1209	635.83	J-2241	J-2250	400	120	Ductile Iron	60.97	0.49	0.734
5858	P-1210	140.44	J-2249	J-2236	400	120	Ductile Iron	48.09	0.38	0.473

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5866	P-1215	1235.8	J-2308	H-9	300	120	Ductile Iron	7.25	0.1	0.058
5867	P-1216	36.21	H-9	J-2309	300	120	Ductile Iron	7.25	0.1	0.058

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5869	P-1217	1679.68	J-2299	H-8	200	120	Ductile Iron	5.8	0.18	0.276
5870	P-1218	298.3	H-8	J-2300	200	120	Ductile Iron	5.8	0.18	0.275
5872	P-1219	1450.45	Awajan North Reservoir	H-10	300	120	Ductile Iron	101.38	1.43	7.645
5873	P-1220	139.31	H-10	J-2211	300	120	Ductile Iron	101.38	1.43	7.645
5874	P-1221	1065.26	J-2222	J-2221	300	120	Ductile Iron	17.72	0.25	0.302
5876	P-1223	1029.16	J-2209	J-2220	400	120	Ductile Iron	-72.41	0.58	1.01
5877	P-1224	615.62	J-2219	J-2220	400	120	Ductile Iron	112.63	0.9	2.288
5878	P-1225	70.41	J-2107	J-2105	152.4	120	Ductile Iron	8.19	0.45	1.963
5879	P-1226	1049.35	J-2105	J-2109	152.4	120	Ductile Iron	2.99	0.16	0.303
5881	P-1227	3750.69	J-2300	J-2344	152.4	120	Ductile Iron	1.45	0.08	0.079
5886	P-1229	524.66	H-5	J-2346	150	120	Ductile Iron	5.48	0.31	1.006
5887	P-1230	74.73	Hallabat Water Tower	H-5	150	120	Ductile Iron	5.48	0.31	1.006
5888	P-1231	53.48	Hallabat WT PS	Hallabat Water Tower	152.4	120	Ductile Iron	22.64	1.24	12.891
5890	P-1232	1660.2	J-2129	J-2131	300	120	Ductile Iron	13.69	0.19	0.188
5894	P-1236	4396.88	J-2130	J-2133	200	120	Ductile Iron	5.48	0.17	0.248
5895	P-1237	2563.28	J-2133	J-2134	200	120	Ductile Iron	2.74	0.09	0.069
5896	P-1238	951.72	J-2237	J-2243	400	120	Ductile Iron	-18.16	0.14	0.078
5897	P-1239	215.96	J-2243	J-2238	600	120	Ductile Iron	115.69	0.41	0.334
5898	P-1240	832.61	J-2239	J-2247	400	120	Ductile Iron	28.88	0.23	0.184
5900	P-1241	1861.97	J-2251	J-2347	400	120	Ductile Iron	8.39	0.07	0.019
5901	P-1242	712.09	J-2347	J-2248	400	120	Ductile Iron	28.95	0.23	0.185
5902	P-1243	540.66	J-2239	J-2347	600	120	Ductile Iron	42.65	0.15	0.053
5903	P-1244	2803.48	J-2251	J-2246	300	120	Ductile Iron	8.42	0.12	0.076
5904	P-1245	11.71	Khaw Reservoir	Khaw to Awajan	600	120	Ductile Iron	402.75	1.42	3.362
5905	P-1246	10.09	FCV-73	Russaifah Hub Reservoir	600	120	Ductile Iron	489.62	1.73	4.829
5908	P-1247	750.47	Qunaya Well	FCV-74	152.4	120	Ductile Iron	16.61	0.91	7.264
5909	P-1248	27.78	FCV-74	Qunaya Reservoir	152.4	120	Ductile Iron	16.61	0.91	7.264
5912	P-1249	131.31	Zarqa Wells	FCV-75	400	120	Steel	70	0.56	0.948
5913	P-1250	4.02	FCV-75	Zarqa Reservoir	400	120	Steel	70	0.56	0.944
5917	P-1251	6296.21	J-2112	J-2348	600	120	Ductile Iron	457.36	1.62	4.254
5918	P-1252	10449.44	J-2348	J-2123	600	120	Ductile Iron	547.56	1.94	5.937
5919	P-1253	110.87	J-2111	J-2348	600	120	Ductile Iron	-8.81	0.03	0.003
5925	P-1257	48132.41	FCV-43	J-2350	600	120	Ductile Iron	268.4	0.95	1.585
5926	P-1258	148.77	J-2350	J-2111	600	120	Ductile Iron	-3.9	0.01	0.001
5928	P-1259	10313.59	J-2350	J-2351	600	120	Ductile Iron	272.3	0.96	1.628
5929	P-1260	73.53	J-2351	J-2122	600	120	Ductile Iron	0	0	0
5933	P-1262	39.9	J-2124	J-2353	600	120	Ductile Iron	96.87	0.34	0.241
5934	P-1263	44.65	J-2353	New Tafeh PS	400	120	Ductile Iron	94.13	0.75	1.641
5945	P-1268	594.84	J-2136	J-2356	300	120	Ductile Iron	5.48	0.08	0.034
5946	P-1269	509.67	J-2356	J-2137	300	120	Ductile Iron	2.74	0.04	0.009
5949	P-1270	858.93	J-2135	J-2357	300	120	Ductile Iron	2.74	0.04	0.01
5951	P-1271	1096.28	J-2131	J-2358	200	120	Ductile Iron	10.95	0.35	0.894
5952	P-1272	4354.29	J-2358	J-2132	200	120	Ductile Iron	8.22	0.26	0.525
5954	P-1273	1956.49	J-2132	J-2359	200	120	Ductile Iron	5.48	0.17	0.248
5956	P-1274	640.29	J-2359	J-2360	200	120	Ductile Iron	2.74	0.09	0.069
5958	P-1275	996	J-2129	J-2361	300	120	Ductile Iron	9.36	0.13	0.093
5959	P-1276	1191.15	J-2361	J-2130	300	120	Ductile Iron	6.62	0.09	0.049
5961	P-1277	445.91	J-2129	J-2362	152.4	120	Ductile Iron	2.74	0.15	0.258
5963	P-1278	1068.35	J-2130	J-2363	200	120	Ductile Iron	-1.6	0.05	0.025
5965	P-1279	1489.47	J-2363	J-2364	200	120	Ductile Iron	-4.33	0.14	0.161
5967	P-1280	1125.18	J-2364	J-2365	152.4	120	Ductile Iron	2.74	0.15	0.258
5968	P-1281	1102.41	J-2364	J-2128	200	120	Ductile Iron	-9.81	0.31	0.729
5969	P-1282	394.03	Batrawi Reservoir	J-2252	400	120	Ductile Iron	132.49	1.05	3.091
5972	P-1284	3.34	FCV-76	Batrawi Reservoir	700	120	Ductile Iron	600	1.56	3.322
5975	P-1286	9168.13	J-2366	FCV-76	700	120	Ductile Iron	600	1.56	3.319
5976	P-1287	29.89	Khaw to Batrawi	J-2366	700	120	Ductile Iron	602.96	1.57	3.351
5978	P-1288	2159.76	J-2339	FCV-77	300	120	Ductile Iron	106	1.5	8.302
5979	P-1289	2.22	FCV-77	Hashmeya Reservoir	300	120	Ductile Iron	106	1.5	8.304
5982	P-1291	4997.73	J-2367	J-2229	400	120	Steel	128.08	1.02	2.903
5983	P-1292	35.37	Khaw to Zarqa	J-2367	400	120	Ductile Iron	131.04	1.04	3.028
5987	P-1293	1435.13	J-2149	FCV-78	300	120	Ductile Iron	65.4	0.93	3.395
5988	P-1294	59.92	FCV-78	Awajan West Reservoir	300	120	Ductile Iron	65.4	0.93	3.394
5991	P-1295	5869.97	Russaifah Booster	FCV-79	200	120	Ductile Iron	29	0.92	5.425
5992	P-1296	150.88	FCV-79	Russaifah North West Reservo	200	120	Ductile Iron	29	0.92	5.426
5994	P-1297	4663.47	J-2150	FCV-80	600	120	Ductile Iron	220.4	0.78	1.101
5995	P-1298	7.06	FCV-80	Russaifah High	600	120	Ductile Iron	220.4	0.78	1.096
5998	P-1299	182.31	J-2150	FCV-81	500	120	Ductile Iron	269.25	1.37	3.876
5999	P-1300	5	FCV-81	Hitten Reservoir	500	120	Ductile Iron	269.25	1.37	3.873
6005	P-1302	18870.9	J-2368	J-2112	600	120	Ductile Iron	361.1	1.28	2.746
6007	P-1303	8436.53	FCV-82	J-2368	600	120	Ductile Iron	361.1	1.28	2.746
6018	P-1309	2.66	Khaw Reservoir	Khaw to Khaw WT	300	120	Ductile Iron	48.49	0.69	1.947
6019	P-1310	31.06	Khaw to Khaw WT	Khaw Water Tower	300	120	Ductile Iron	48.49	0.69	1.95
6021	P-1311	3699.25	J-2307	Merhib High Reservoir	300	120	Ductile Iron	59.47	0.84	2.847
6026	P-1314	3.81	FCV-83	Zarqa Reservoir	400	120	Steel	195	1.55	6.321
6028	P-1315	5260.79	Beirein Reservoir	FCV-84	250	120	Ductile Iron	40	0.81	3.319
6029	P-1316	6.22	FCV-84	Um Rummaneh Reservoir	250	120	Ductile Iron	40	0.81	3.316
6031	P-1317	2843.33	Alouk Pump	FCV-85	150	120	Ductile Iron	14.25	0.81	5.909
6032	P-1318	116.4	FCV-85	Alouk High Reservoir	150	120	Ductile Iron	14.25	0.81	5.909
6034	P-1319	4497.85	J-2290	FCV-86	200	120	Ductile Iron	-1.45	0.05	0.021
6035	P-1320	13.59	FCV-86	Sarout Reservoir	200	120	Ductile Iron	-1.45	0.05	0.022
6036	P-1321	2563.93	Sarout Reservoir	Alouk High Reservoir	200	130	Ductile Iron	76.61	2.44	28.276
6040	P-1324	4643.88	J-2370	J-2298	200	120	Ductile Iron	1.45	0.05	0.021
6048	P-1326	1752.64	J-2139	J-2371	600	120	Ductile Iron	402.75	1.42	3.362
6049	P-1327	2215.88	J-2371	J-2145	600	120	Ductile Iron	368.14	1.3	2.846
6055	P-1331	52.56	J-2371	Tatweer PS	200	120	Ductile Iron	34.61	1.1	7.527
6056	P-1332	487.45	Tatweer PS	FCV-51	200	120	Ductile Iron	34.61	1.1	7.528
6059	P-1334	13788.58	Khaw to Russaifah	J-2372	600	120	Ductile Iron	520.17	1.84	5.399
6061	P-1336	201.75	J-2372	J-2141	600	130	Ductile Iron	520.17	1.84	4.655
6063	P-1337	5975.18	J-2148	J-2373	400	120	Ductile Iron	126.75	1.01	2.847
6064	P-1338	604.31	J-2373	Hashmeya PS	400	120	Ductile Iron	126.75	1.01	2.847
6066	P-1339	1177.39	J-2229	J-2374	400	120	Steel	128.08	1.02	2.903
6067	P-1340	175.17	J-2374	FCV-83	400	120	Steel	195	1.55	6.323
6070	P-1342	30.76	J-2373	J-2375	400	120	Steel	0	0	0
6071	P-1343	4749.68	J-2375	J-2374	400	120	Steel	66.92	0.53	0.872
6075	P-1345	24.64	Hashmeya Wells	Hashmeya Well PS	400	120	Steel	66.92	0.53	0.873
6076	P-1346	584.21	Hashmeya Well PS	J-2375	400	120	Steel	66.92	0.53	0.872
6082	P-1348	961.39	J-2377	J-2290	152.4	130	Ductile Iron	0	0	0
6083	P-1349	1223.76	J-2377	J-2281	152.4	130	Ductile Iron	0	0	0
6085	P-1350	3326.93	J-2298	FCV-88	152.4	120	Ductile Iron	0	0	0
6086	P-1351	5.72	FCV-88	Um Rummaneh Reservoir	152.4	120	Ductile Iron	0	0	0

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
6088	P-1352	1680.37	J-2378	J-2370	152.4	130	Ductile Iron	2.9	0.16	0.247
6090	P-1353	4990.53	J-2351	PSV-1	600	120	Ductile Iron	269.56	0.95	1.598

Future 2030 Model Pipe Information AVERAGE DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
6091	P-1354	14.36	PSV-1	Khaw Reservoir	600	120	Ductile Iron	269.56	0.95	1.599
6093	P-1355	4049.38	J-2110	PSV-2	600	120	Ductile Iron	267.83	0.95	1.579
6094	P-1356	13.81	PSV-2	Khaw Reservoir	600	120	Ductile Iron	267.83	0.95	1.579
6099	P-1360	6763.88	FCV-89	J-2348	600	120	Ductile Iron	99	0.35	0.25
6102	P-1362	51	Hallabat Reservoir	Hallabat to Khaw2	600	120	Ductile Iron	99	0.35	0.25
6103	P-1363	48.09	Hallabat to Khaw2	FCV-89	600	120	Ductile Iron	99	0.35	0.251
6105	P-1364	28.1	Corridor Reservoir	Corridor PS	600	120	Ductile Iron	361.1	1.28	2.746
6106	P-1365	30.71	Corridor PS	FCV-82	600	120	Ductile Iron	361.1	1.28	2.748

Future 2030 Model Node Information PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5172	J-2103	560.34	<None>	0	571.29	10.9
5197	J-2111	638	<None>	0	674.7	36.6
5280	J-2138	635.11	KABA City	0	796.74	161.3
5284	J-2139	611	KABA City	0	785.21	173.9
5528	J-2229	586.47	<None>	0	630	43.4
5829	J-2340	611	KABA City	0	659.51	48.4
5832	J-2341	635	KABA City	0	653.87	18.8
5916	J-2348	638	<None>	0	674.7	36.6
5924	J-2350	638	<None>	0	674.7	36.6
6003	J-2368	620	<None>	0	753.16	132.9
6047	J-2371	624	<None>	0	779.15	154.8
6058	J-2372	631.34	<None>	0	762.98	131.4
6062	J-2373	543	<None>	0	607.15	64
6065	J-2374	570	<None>	0	626.59	56.5
6069	J-2375	543	<None>	0	630.76	87.6
6081	J-2377	530	<None>	0	579	48.9
6087	J-2378	765	<None>	0	770.49	5.5
5686	J-2286	560	West - North -West	2.18	578.57	18.5
5688	J-2287	550	West - North -West	2.18	578.21	28.2
5690	J-2288	540	West - North -West	2.18	577.98	37.9
5692	J-2289	545	West - North -West	2.18	577.94	32.9
5695	J-2290	495.77	West - North -West	2.18	770.3	274
5703	J-2291	685.76	West - North -West	2.18	697.1	11.3
5705	J-2292	660.22	West - North -West	2.18	692.63	32.3
5707	J-2293	609.21	West - North -West	2.18	690.45	81.1
5709	J-2294	628.06	West - North -West	2.18	689.35	61.2
5711	J-2295	654.58	West - North -West	2.18	688.79	34.1
5713	J-2296	628.2	West - North -West	2.18	688.58	60.3
5715	J-2297	650	West - North -West	2.18	688.27	38.2
5717	J-2298	697.86	West - North -West	2.18	769.4	71.4
5726	J-2299	900	West - North -West	2.18	988.48	88.3
5728	J-2300	835.68	West - North -West	2.18	987.33	151.3
5730	J-2301	798.39	West - North -West	2.18	986.89	188.1
5732	J-2302	845.63	West - North -West	2.18	987.05	141.1
5734	J-2303	926.37	West - North -West	2.18	988.73	62.2
5736	J-2304	854.34	West - North -West	2.18	988.58	134
5738	J-2305	803.33	West - North -West	2.18	988.53	184.8
5746	J-2307	643.19	West - North -West	2.18	761.33	117.9
5749	J-2308	806.2	West - North -West	2.18	868.96	62.6
5751	J-2309	762.98	West - North -West	2.18	868.81	105.6
5753	J-2310	756.86	West - North -West	2.18	868.76	111.7
5755	J-2311	734.19	West - North -West	2.18	868.72	134.3
5757	J-2312	712.78	West - North -West	2.18	868.69	155.6
5759	J-2313	641.53	West - North -West	2.18	868.67	226.7
5880	J-2344	850	West - North -West	2.18	986.7	136.4
6038	J-2370	765	<None>	2.18	769.61	4.6
5194	J-2110	600	East - Dulail	4.11	656.38	56.3
5207	J-2112	594.71	East - Dulail	4.11	701.34	106.4
5231	J-2121	602.09	East - Dulail	4.11	618.15	16
5236	J-2122	592	East - Dulail	4.11	657.86	65.7
5239	J-2123	592	East - Dulail	4.11	612.73	20.7
5243	J-2124	592	East - Dulail	4.11	612.69	20.6
5252	J-2125	629.08	East - Dulail	4.11	655.89	26.8
5254	J-2126	599.72	East - Dulail	4.11	650.32	50.5
5256	J-2127	592.37	East - Dulail	4.11	647.19	54.7
5258	J-2128	587.99	East - Dulail	4.11	644.97	56.9

Future 2030 Model Node Information PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5260	J-2129	586.82	East - Dulail	4.11	643.02	56.1
5262	J-2130	575.64	East - Dulail	4.11	642.7	66.9
5264	J-2131	574.01	East - Dulail	4.11	642.36	68.2
5266	J-2132	570	East - Dulail	4.11	635.44	65.3
5268	J-2133	590	East - Dulail	4.11	640.4	50.3
5270	J-2134	581.97	East - Dulail	4.11	640.02	57.9
5273	J-2135	633.73	East - Dulail	4.11	729.88	96
5275	J-2136	640	East - Dulail	4.11	729.68	89.5
5277	J-2137	635	East - Dulail	4.11	729.63	94.4
5889	J-2346	594.77	<None>	4.11	618.72	23.9
5927	J-2351	592	<None>	4.11	657.98	65.8
5932	J-2353	592	<None>	4.11	612.68	20.6
5947	J-2356	638	East - Dulail	4.11	729.64	91.5
5948	J-2357	630	East - Dulail	4.11	729.86	99.7
5950	J-2358	573	East - Dulail	4.11	640.28	67.1
5953	J-2359	575	East - Dulail	4.11	634.42	59.3
5955	J-2360	575	East - Dulail	4.11	634.32	59.2
5957	J-2361	580	East - Dulail	4.11	642.83	62.7
5960	J-2362	588	East - Dulail	4.11	642.78	54.7
5962	J-2363	580	East - Dulail	4.11	642.76	62.6
5964	J-2364	585	East - Dulail	4.11	643.27	58.1
5966	J-2365	600	East - Dulail	4.11	642.65	42.6
5329	J-2147	590	North Region	4.45	626.84	36.8
5330	J-2148	590	North Region	4.45	626.83	36.8
5630	J-2265	528.03	North Region	4.45	598.31	70.1
5632	J-2266	529.36	North Region	4.45	595.86	66.4
5634	J-2267	540.38	North Region	4.45	594.54	54
5636	J-2268	533.32	North Region	4.45	593.05	59.6
5638	J-2269	517.2	North Region	4.45	592.53	75.2
5640	J-2270	520.36	North Region	4.45	592.5	72
5642	J-2271	544.49	North Region	4.45	592.77	48.2
5644	J-2272	540.33	North Region	4.45	593.83	53.4
5648	J-2273	519.61	North Region	4.45	592.54	72.8
5651	J-2274	530.76	North Region	4.45	592.74	61.9
5655	J-2275	532.08	North Region	4.45	592.57	60.4
5659	J-2276	505.79	North Region	4.45	593.14	87.2
5662	J-2277	557.48	North Region	4.45	595.62	38.1
5664	J-2278	564.9	North Region	4.45	590.96	26
5666	J-2279	530.72	North Region	4.45	582.67	51.8
5668	J-2280	532.43	North Region	4.45	577.88	45.4
5670	J-2281	506.99	North Region	4.45	577	69.9
5672	J-2282	482.41	North Region	4.45	582.04	99.4
5772	J-2316	591.89	North Region	4.45	620.41	28.5
5774	J-2317	563.15	North Region	4.45	620.06	56.8
5777	J-2319	556.74	North Region	4.45	619.01	62.1
5779	J-2320	552.42	North Region	4.45	618.51	66
5781	J-2321	541.44	North Region	4.45	617.37	75.8
5783	J-2322	533.86	North Region	4.45	616.94	82.9
5785	J-2323	591.65	North Region	4.45	620.19	28.5
5789	J-2324	577.17	North Region	4.45	619.02	41.8
5793	J-2325	564.29	North Region	4.45	617.61	53.2
5796	J-2326	539.31	North Region	4.45	615.14	75.7
5798	J-2327	536.08	North Region	4.45	606.25	70
5800	J-2328	537.4	North Region	4.45	600.66	63.1
5802	J-2329	543.84	North Region	4.45	598.26	54.3

Future 2030 Model Node Information PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5804	J-2330	550.26	North Region	4.45	597.83	47.5
5806	J-2331	543.72	North Region	4.45	597.79	54
5808	J-2332	540.6	North Region	4.45	597.81	57.1
5811	J-2333	543.97	North Region	4.45	641.14	97
5813	J-2334	555.24	North Region	4.45	636.21	80.8
5815	J-2335	539.93	North Region	4.45	636.58	96.5
5816	J-2336	532.66	North Region	4.45	635.94	103.1
5818	J-2337	555.52	North Region	4.45	631.92	76.2
5821	J-2338	635.06	North Region	4.45	744.55	109.3
5825	J-2339	540	North Region	4.45	648.66	108.4
5973	J-2366	590	<None>	4.45	690.37	100.2
5980	J-2367	590	<None>	4.45	644.46	54.3
5177	J-2104	510.13	Azraq	4.48	537.14	27
5179	J-2105	510.15	Azraq	4.48	537.53	27.3
5182	J-2106	511.89	Azraq	4.48	537.53	25.6
5188	J-2107	510.04	Azraq	4.48	537.91	27.8
5190	J-2108	520.69	Azraq	4.48	537.56	16.8
5192	J-2109	515	Azraq	4.48	536.86	21.8
5319	J-2143	610.23	Tatweer	16.08	668.38	58
5321	J-2144	621.28	Tatweer	16.08	668.15	46.8
5323	J-2145	624.57	Tatweer	16.08	772.63	147.8
5296	J-2141	631.34	Russaifah	20.96	762.02	130.4
5355	J-2150	757.84	Russaifah	20.96	843.9	85.9
5372	J-2155	827.35	Russaifah	20.96	894.55	67.1
5374	J-2156	808.88	Russaifah	20.96	886.4	77.4
5376	J-2157	782.28	Russaifah	20.96	884.44	102
5378	J-2158	746.1	Russaifah	20.96	883.65	137.3
5380	J-2159	807.58	Russaifah	20.96	883.14	75.4
5382	J-2160	783.77	Russaifah	20.96	791.98	8.2
5384	J-2161	749.66	Russaifah	20.96	789.06	39.3
5386	J-2162	712.91	Russaifah	20.96	787.95	74.9
5388	J-2163	733.67	Russaifah	20.96	777.97	44.2
5390	J-2164	761.58	Russaifah	20.96	776.14	14.5
5392	J-2165	667.96	Russaifah	20.96	732.9	64.8
5394	J-2166	676.89	Russaifah	20.96	734.35	57.3
5396	J-2167	680.87	Russaifah	20.96	739.19	58.2
5398	J-2168	694.41	Russaifah	20.96	741.37	46.9
5400	J-2169	698.1	Russaifah	20.96	740.63	42.4
5402	J-2170	673.1	Russaifah	20.96	740.34	67.1
5404	J-2171	699.87	Russaifah	20.96	740.25	40.3
5406	J-2172	729.27	Russaifah	20.96	750.48	21.2
5408	J-2173	685.84	Russaifah	20.96	743.97	58
5410	J-2174	707.57	Russaifah	20.96	740.59	33
5412	J-2175	701.11	Russaifah	20.96	739.43	38.2
5415	J-2176	726	Russaifah	20.96	739.09	13.1
5417	J-2177	660.84	Russaifah	20.96	732.82	71.8
5419	J-2178	685.34	Russaifah	20.96	733.49	48
5422	J-2179	668.72	Russaifah	20.96	742.19	73.3
5426	J-2180	597.66	Russaifah	20.96	732.01	134.1
5427	J-2181	613.96	Russaifah	20.96	729.99	115.8
5429	J-2182	620.92	Russaifah	20.96	734.04	112.9
5431	J-2183	656.26	Russaifah	20.96	733.73	77.3
5434	J-2184	634.75	Russaifah	20.96	725.02	90.1
5436	J-2185	649.79	Russaifah	20.96	722.8	72.9
5438	J-2186	673.82	Russaifah	20.96	721.51	47.6
5440	J-2187	674.75	Russaifah	20.96	721.38	46.5

Future 2030 Model Node Information PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5442	J-2188	750.86	Russaifah	20.96	780.79	29.9
5444	J-2189	726.28	Russaifah	20.96	774.91	48.5
5446	J-2190	736.31	Russaifah	20.96	773.81	37.4
5448	J-2191	709.06	Russaifah	20.96	772.88	63.7
5450	J-2192	696.7	Russaifah	20.96	772.7	75.8
5452	J-2193	698.99	Russaifah	20.96	774.53	75.4
5454	J-2194	759.88	Russaifah	20.96	767.99	8.1
5456	J-2195	757	Russaifah	20.96	764.17	7.2
5458	J-2196	745.42	Russaifah	20.96	761.21	15.8
5460	J-2197	705.22	Russaifah	20.96	756.64	51.3
5462	J-2198	675.6	Russaifah	20.96	748.18	72.4
5464	J-2199	674.96	Russaifah	20.96	746.41	71.3
5466	J-2200	658.53	Russaifah	20.96	744.7	86
5468	J-2201	623.42	Russaifah	20.96	740.6	116.9
5471	J-2202	724.59	Russaifah	20.96	801.48	76.7
5473	J-2203	729.7	Russaifah	20.96	801.62	71.8
5475	J-2204	730.35	Russaifah	20.96	802.11	71.6
5487	J-2210	665.56	Russaifah	20.96	720.25	54.6
5311	J-2142	639	Awajan	21.72	747.69	108.5
5345	J-2149	702.78	Awajan	21.72	770.46	67.5
5477	J-2205	585.06	Awajan	21.72	626.35	41.2
5479	J-2206	579.35	Awajan	21.72	626.39	46.9
5481	J-2207	603.59	Awajan	21.72	626.53	22.9
5483	J-2208	582.38	Awajan	21.72	627.13	44.7
5485	J-2209	577.96	Awajan	21.72	627.9	49.8
5489	J-2211	591.64	Awajan	21.72	683.25	91.4
5491	J-2212	624.87	Awajan	21.72	679.32	54.3
5493	J-2213	615.39	Awajan	21.72	678.04	62.5
5495	J-2214	622.62	Awajan	21.72	677.6	54.9
5497	J-2215	564.32	Awajan	21.72	676.27	111.7
5499	J-2216	561.49	Awajan	21.72	675.9	114.2
5501	J-2217	616.58	Awajan	21.72	677.6	60.9
5505	J-2218	623.5	Awajan	21.72	637.02	13.5
5507	J-2219	614.9	Awajan	21.72	633.08	18.2
5509	J-2220	571.37	Awajan	21.72	630.1	58.6
5511	J-2221	573.04	Awajan	21.72	630.12	57
5513	J-2222	584.91	Awajan	21.72	630.81	45.8
5515	J-2223	581.24	Awajan	21.72	628.43	47.1
5517	J-2224	595.79	Awajan	21.72	627.98	32.1
5519	J-2225	694.02	Awajan	21.72	716.99	22.9
5521	J-2226	683.32	Awajan	21.72	714.86	31.5
5523	J-2227	644.06	Awajan	21.72	714	69.8
5525	J-2228	658.36	Awajan	21.72	713.61	55.1
5840	J-2342	585	Awajan	21.72	752.61	167.3
5843	J-2343	585	Awajan	21.72	752.31	167
5533	J-2230	570	Zarqa	33.12	574.96	5
5537	J-2232	570	Zarqa	33.12	574.95	4.9
5548	J-2233	570	Zarqa	33.12	681.12	110.9
5556	J-2235	597.27	Zarqa	33.12	649.06	51.7
5558	J-2236	609.88	Zarqa	33.12	649.15	39.2
5560	J-2237	620.26	Zarqa	33.12	649.14	28.8
5562	J-2238	612.09	Zarqa	33.12	649.15	37
5564	J-2239	604.09	Zarqa	33.12	648.93	44.8
5566	J-2240	635.43	Zarqa	33.12	652.03	16.6
5568	J-2241	636.38	Zarqa	33.12	650.88	14.5
5570	J-2242	620.97	Zarqa	33.12	649.75	28.7

Future 2030 Model Node Information PEAK DEMAND

ID	Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (m H2O)
5572	J-2243	618.24	Zarqa	33.12	649.3	31
5582	J-2246	586.98	Zarqa	33.12	648.49	61.4
5584	J-2247	622.69	Zarqa	33.12	648.61	25.9
5587	J-2248	613.81	Zarqa	33.12	648.59	34.7
5590	J-2249	609.2	Zarqa	33.12	649.29	40
5592	J-2250	629.35	Zarqa	33.12	649.89	20.5
5594	J-2251	558.2	Zarqa	33.12	648.95	90.6
5597	J-2252	642.22	Zarqa	33.12	651.42	9.2
5599	J-2253	634.86	Zarqa	33.12	648.31	13.4
5601	J-2254	606.44	Zarqa	33.12	646.31	39.8
5603	J-2255	579.48	Zarqa	33.12	645.12	65.5
5605	J-2256	576.01	Zarqa	33.12	642.72	66.6
5607	J-2257	579.99	Zarqa	33.12	645.58	65.5
5609	J-2258	582.28	Zarqa	33.12	645.9	63.5
5612	J-2259	605.65	Zarqa	33.12	650.1	44.4
5614	J-2260	618.81	Zarqa	33.12	650.72	31.8
5617	J-2261	635.47	Zarqa	33.12	709.15	73.5
5619	J-2262	654.64	Zarqa	33.12	706.65	51.9
5621	J-2263	607.49	Zarqa	33.12	705.53	97.8
5623	J-2264	557.28	Zarqa	33.12	642.08	84.6
5899	J-2347	610	<None>	33.12	648.87	38.8

Future 2030 Model Pipe Information PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5167	P-764	18.15	Azraq to Khaw PS	FCV-38	600	120	Ductile Iron	268.4	0.95	1.587
5173	P-768	194.2	Azraq Res.	J-2103	600	120	Ductile Iron	536.8	1.9	5.723
5174	P-769	26.68	J-2103	Azraq to Khaw PS	600	120	Ductile Iron	268.4	0.95	1.585
5175	P-770	32.81	J-2103	Azraq to Khaw2	600	120	Ductile Iron	268.4	0.95	1.584
5176	P-771	14.58	Azraq to Khaw2	FCV-43	600	120	Ductile Iron	268.4	0.95	1.582
5181	P-774	607.75	J-2105	J-2104	152.4	120	Ductile Iron	4.48	0.25	0.642
5183	P-775	6040.89	Azraq Res.	J-2106	152.4	120	Ductile Iron	14.67	0.8	5.773
5184	P-776	138.25	J-2106	J-2105	152.4	120	Ductile Iron	-0.66	0.04	0.019
5185	P-777	46.14	J-2106	Azraq WT Booster	152.4	120	Ductile Iron	10.85	0.59	3.301
5186	P-778	18.37	Azraq WT Booster	FCV-44	152.4	120	Ductile Iron	10.85	0.59	3.301
5187	P-779	19.83	FCV-44	Azraq Water Tower	152.4	120	Ductile Iron	10.85	0.59	3.302
5189	P-780	76.89	Azraq Water Tower	J-2107	250	120	Ductile Iron	23.06	0.47	1.197
5191	P-781	6077.81	J-2107	J-2108	250	120	Ductile Iron	4.48	0.09	0.058
5198	P-785	48107.13	FCV-38	J-2111	600	120	Ductile Iron	268.4	0.95	1.585
5203	P-790	12.56	Hallabat Wellfield	FCV-26	600	120	Ductile Iron	197.37	0.7	0.897
5204	P-791	13.15	FCV-26	Hallabat Reservoir	600	120	Ductile Iron	197.37	0.7	0.897
5205	P-792	47.88	Hallabat Reservoir	Hallabat to Khaw	600	120	Ductile Iron	99	0.35	0.25
5206	P-793	48.36	Hallabat to Khaw	FCV-19	600	120	Ductile Iron	99	0.35	0.249
5210	P-796	515.68	FCV-19	J-2112	600	120	Ductile Iron	99	0.35	0.25
5212	P-798	67.63	Hallabat Reservoir	Hallabat WT PS	152.4	120	Ductile Iron	22.64	1.24	12.891
5219	P-802	229.78	J-2346	H-2	150	120	Ductile Iron	4.11	0.23	0.59
5230	P-808	417.93	H-2	H-3	150	120	Ductile Iron	4.11	0.23	0.59
5232	P-809	1345.21	H-3	J-2121	200	120	Ductile Iron	4.11	0.13	0.145
5234	P-811	36.08	Za'atari Wells	FCV-37	600	120	Ductile Iron	83.33	0.29	0.182
5237	P-813	10291.13	J-2111	J-2122	600	120	Ductile Iron	272.98	0.97	1.636
5238	P-814	933.7	J-2122	J-2110	600	120	Ductile Iron	268.87	0.95	1.59
5241	P-816	4978.9	J-2123	Khaw Reservoir	600	120	Ductile Iron	246.33	0.87	1.352
5242	P-817	38.28	J-2122	J-2123	600	120	Ductile Iron	0	0	0
5244	P-818	8608.75	FCV-37	J-2124	600	120	Ductile Iron	83.33	0.29	0.182
5245	P-819	4980.93	J-2124	Khaw Reservoir	600	120	Ductile Iron	245.42	0.87	1.343
5246	P-820	22.77	J-2123	J-2124	600	120	Ductile Iron	296.75	1.05	1.91
5248	P-822	32.98	New Tafeh PS	FCV-46	400	120	Ductile Iron	94.13	0.75	1.64
5249	P-823	45.19	J-2124	Tafeh PS to Tafeh Res	200	120	Ductile Iron	32.32	1.03	6.631
5250	P-824	35.11	Tafeh PS to Tafeh Res	FCV-45	200	120	Ductile Iron	32.32	1.03	6.631
5251	P-825	3141.25	FCV-46	New Dulail Reservoir	400	120	Ductile Iron	94.13	0.75	1.641
5253	P-826	964.89	New Dulail Reservoir	J-2125	300	120	Ductile Iron	73.94	1.05	4.261
5255	P-827	1452.96	J-2125	J-2126	300	120	Ductile Iron	69.83	0.99	3.833
5257	P-828	912.33	J-2126	J-2127	300	120	Ductile Iron	65.72	0.93	3.426
5259	P-829	732.09	J-2127	J-2128	300	120	Ductile Iron	61.62	0.87	3.04
5261	P-830	1258.76	J-2128	J-2129	300	120	Ductile Iron	42.79	0.61	1.547
5272	P-836	5774.97	FCV-45	New Tafeh Reservoir	300	120	Ductile Iron	32.32	0.46	0.92
5274	P-837	2823.56	New Tafeh Reservoir	J-2135	300	120	Ductile Iron	20.54	0.29	0.397
5276	P-838	1263.48	J-2135	J-2136	300	120	Ductile Iron	12.32	0.17	0.154
5281	P-841	2581.71	Khaw to Awajan	J-2138	600	120	Ductile Iron	409.2	1.45	3.462
5283	P-843	46.38	FCV-48	King Abdullah Reservoir	800	120	Ductile Iron	767	1.53	2.729
5285	P-844	3330.75	J-2138	J-2139	600	120	Ductile Iron	409.2	1.45	3.462
5289	P-847	5.34	Russaifah Hub Reservoir	Russaifah Hub PS	600	120	Ductile Iron	510.61	1.81	5.215
5290	P-848	3.34	Russaifah Hub PS	H-7	600	120	Ductile Iron	510.61	1.81	5.22
5291	P-849	23.75	Tamween Wells	FCV-28	600	120	Ductile Iron	78.68	0.28	0.163
5292	P-850	22.38	FCV-28	Tamween Reservoir	600	120	Ductile Iron	78.68	0.28	0.163
5293	P-851	53.54	Tamween Reservoir	Tamwn 2	600	120	Ductile Iron	97.22	0.34	0.242
5294	P-852	21.47	Tamwn 2	FCV-47	600	120	Ductile Iron	97.22	0.34	0.243
5298	P-855	6946.33	J-2141	FCV-73	600	120	Ductile Iron	489.62	1.73	4.827
5300	P-857	12.12	Well 21	Well 21 Awajan	152.4	120	Ductile Iron	13.89	0.76	5.214
5301	P-858	157.19	Well 21 Awajan	Awajan Hub	152.4	120	Ductile Iron	13.89	0.76	5.216
5302	P-859	12.6	Well 22	FCV-30	152.4	120	Ductile Iron	8.3	0.46	2.008
5303	P-860	124.4	FCV-30	Awajan Hub	152.4	120	Ductile Iron	8.3	0.46	2.01
5304	P-861	56.8	Well 23	FCV-7	152.4	120	Ductile Iron	44.99	2.47	45.988
5305	P-862	619.77	FCV-7	Awajan Hub	152.4	120	Ductile Iron	44.99	2.47	45.988
5306	P-863	252.92	Awajan Hub	Awajan Hub PS	600	120	Ductile Iron	438.77	1.55	3.94
5307	P-864	16.64	Awajan Hub PS	H-1	600	120	Ductile Iron	438.77	1.55	3.939
5309	P-866	5.38	FCV-15	Awajan High Square	600	120	Ductile Iron	208	0.74	0.983
5310	P-867	45.95	Awajan High Square	Awajan High Circular	400	120	Ductile Iron	6.94	0.06	0.013
5313	P-869	4.26	J-2142	FCV-59	500	120	Ductile Iron	165.6	0.84	1.572
5314	P-870	4.19	FCV-59	Awajan Low	500	120	Ductile Iron	165.6	0.84	1.582
5315	P-871	10.68	Awajan Low	Awajan North PS	300	120	Ductile Iron	97.67	1.38	7.138
5316	P-872	5398.13	Awajan North PS	Awajan North Reservoir	300	120	Ductile Iron	97.67	1.38	7.135
5318	P-874	117.87	FCV-51	New Tatweer Reservoir	152.4	120	Ductile Iron	34.61	1.9	28.293
5322	P-876	898.61	J-2143	J-2144	300	120	Ductile Iron	16.08	0.23	0.252
5325	P-878	3914.94	J-2145	J-2141	600	120	Ductile Iron	358.51	1.27	2.71
5331	P-881	26.76	Khaw to Hashmeya	J-2147	400	120	Ductile Iron	146.02	1.16	3.699
5335	P-885	18.45	J-2147	J-2148	600	120	Ductile Iron	141.58	0.5	0.488
5336	P-886	12.75	Khaw Reservoir	Khaw to Hashmeya	400	120	Ductile Iron	146.02	1.16	3.702
5338	P-888	11.95	Khaw Reservoir	Khaw to Zarqa	400	120	Ductile Iron	132.31	1.05	3.083
5339	P-889	11.5	Khaw Reservoir	Khaw to Batrawi	700	120	Ductile Iron	604.45	1.57	3.366
5341	P-891	11.11	Khaw Reservoir	Khaw to Russaifah	700	120	Ductile Iron	526.07	1.37	2.603
5343	P-893	3.97	Awajan High Circular	Awajan West PS	300	120	Ductile Iron	87.12	1.23	5.771
5344	P-894	4.46	Awajan West PS	H-6	300	120	Ductile Iron	87.12	1.23	5.773
5346	P-895	3018.36	H-6	J-2149	300	120	Ductile Iron	87.12	1.23	5.774
5348	P-897	16.03	Rusaifah Wells	FCV-29	400	120	Ductile Iron	129.6	1.03	2.967
5349	P-898	26.57	FCV-29	Basateen Reservoir	400	120	Ductile Iron	129.6	1.03	2.966
5350	P-899	7.46	Basateen Reservoir	Basteen to Russaifah Low	400	120	Ductile Iron	134	1.07	3.154
5351	P-900	3.67	Basteen to Russaifah Low	FCV-64	400	120	Ductile Iron	134	1.07	3.163
5352	P-901	3083.54	FCV-64	Russaifah Low	400	120	Ductile Iron	134	1.07	3.156
5353	P-902	1437.86	Russaifah High	FCV-32	300	120	Ductile Iron	80	1.13	4.93
5354	P-903	6.66	FCV-32	Russaifah Low	300	120	Ductile Iron	80	1.13	4.926
5356	P-904	784.99	H-7	J-2150	600	120	Ductile Iron	510.61	1.81	5.217
5358	P-906	4.42	Hitten Reservoir	H-11	300	120	Ductile Iron	113.13	1.6	9.371
5359	P-907	49.09	H-11	Hitten Tower Pump	300	120	Ductile Iron	113.13	1.6	9.365
5360	P-908	4.69	Hitten Tower Pump	Hitten Tower	300	120	Ductile Iron	113.13	1.6	9.365
5364	P-911	10.3	Russaifah High	Russaifah Booster	200	120	Ductile Iron	29	0.92	5.427
5373	P-916	1777.15	Russaifah North West Res	J-2155	300	120	Ductile Iron	104.81	1.48	8.131
5375	P-917	1515.99	J-2155	J-2156	300	120	Ductile Iron	83.85	1.19	5.378
5377	P-918	619.42	J-2156	J-2157	300	120	Ductile Iron	62.89	0.89	3.157
5379	P-919	531.95	J-2157	J-2158	300	120	Ductile Iron	41.92	0.59	1.49
5381	P-920	1229.03	J-2158	J-2159	300	120	Ductile Iron	20.96	0.3	0.413
5383	P-921	1601.03	Russaifah High	J-2160	300	120	Ductile Iron	104.81	1.48	8.131
5385	P-922	544.22	J-2160	J-2161	300	120	Ductile Iron	83.85	1.19	5.378
5387	P-923	351.46	J-2161	J-2162	300	120	Ductile Iron	62.89	0.89	3.157
5389	P-924	929.13	J-2162	J-2163	200	120	Ductile Iron	41.92	1.33	10.737

Future 2030 Model Pipe Information PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5391	P-925	615.27	J-2163	J-2164	200	120	Ductile Iron	20.96	0.67	2.974
5393	P-926	1486.39	J-2180	J-2165	400	120	Ductile Iron	-54.34	0.43	0.593

Appendix 8

- Unit Costs 1-19
- Quantities 1-14
- Overall Costs 1-12

Unit Costs 1

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate Rates for Pipeline Construction

Diameter	Material	Construction Cost Per Meter off-road	Construction Cost Per Meter in Road
mm		JoD/m length - excluding taxes	
20	MDPE	10.00	13.00
32	MDPE	10.00	13.00
50	MDPE	17.00	22.00
63	MDPE	17.00	22.00
110	HPPE	37.00	45.00
160	HPPE	45.00	55.00
200	HPPE	65.00	75.00
200	Ductile Iron (DI)	55.00	65.00
300	DI	90.00	100.00
400	DI	125.00	150.00
500	DI	200.00	250.00
600	DI	260.00	300.00
700	DI	270.00	310.00

Additional Construction Costs per linear metre of construction	
Permanent road surface reinstatement	30
Traffic management during construction	1
Temporary diversion of electricity cables	20
Temporary diversion of telecomms cables	20
Temporary diversion of drainage pipes	30
Temporary diversion of water service pipes	20
Permanent diversion of pipes, cables and ducts	50
Contractor's Overheads as % of overall construction cost	15
Construction contingencies as % of overall construction cost	5
Other costs	

Rates High-lighted to be inserted by ACEPO

Unit Costs 2

GROUP RABIEH

شركة رابية عمان للتوريدات الفنية ذ.م.م
Amman Rabieh for Tech. Supplies Co.

انتباه المهندسه نادية المحترمه
5857639

TO : TO WHOM IT MAY CONCERN

DUCTILE IRON PIPES PRICE LIST FOR APRIL 2010

Please find below our commercial offer which we hope to meet your requirements

NO.	DESCRIPTION	QTY	U.Price	Total
		m		
	Ductile Iron Pipes as per ISO2531,EN545 K9 with Cement Lining as per ISO4179 ,Zinc & coatings Quoting as per ISO8179 6/5.5 meter long,With EPDM rubber caskets			
1	DN 100	6	JOD 18.00	JOD 108.00
2	DN 150	6	JOD 23.00	JOD 138.00
3	DN 200	6	JOD 30.00	JOD 180.00
	DN 250	6	JOD 38.00	JOD 228.00
	DN 300	6	JOD 45.00	JOD 270.00
	DN 400	6	JOD 74.00	JOD 444.00
	DN 500	6	JOD 98.00	JOD 588.00
	DN 600	6	JOD 132.00	JOD 792.00
	DN 700	6	JOD 175.00	JOD 1,050.00
	DN 800	6	JOD 229.00	JOD 1,374.00
	DN 900	6	JOD 298.00	JOD 1,788.00
	DN 1000	6	JOD 348.00	JOD 2,088.00
	DN 1200	6	JOD 535.00	JOD 3,210.00

** Total CPT SITE IN JOD
** Delivery:90-120 days
** Validity: 15 days
** Country of Origin:CHINA
** A/M prices Don't include unloading on Site

Thank you and best Regards
Mohammad Abdel-Al

P.O Box 2883 Amman 11821, Jordan Tel :(19626) 5526802,Fax: (19626) 5536802)
E-mail:sales@rabiehgroup.com

Unit Costs 3

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate Rates for Land Acquisition and Wayleaves

Unit Land Costs	Unit	Rate paid to Landowner / Occupier JoD - excluding taxes
Land Purchase costs		
Rural fertile land	ha	80,000
Rural barren land	ha	30,000
Urban city site	ha	1,000,000
Urban town/village site	ha	400,000
Wayleave costs on private lands		
Rural fertile land	m length	N/A
Rural barren land	m length	N/A
Urban city area	m length	N/A
Urban town/village area	m length	N/A
Wayleave costs on public lands		
On major road	m length	N/A
On minor road	m length	N/A
Off-road	m length	N/A

Additional Purchase Costs as % of payment to landowner	%
Advisors fees - legal, valuers, surveyors, etc	2
Statutory costs - stamp duty, levies, etc	N/A
Local taxes	10
Other costs	

Rates High-lighted to be inserted by ACEPO

Unit Costs 4: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	500	m3				
Water Depth	4.5	m				
Avg. Floor Thickness	0.5	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	15	m				
Outside Breadth	9	m				
Wall Height	5.625	m				
Avg. Wall Thickness	0.47	m				
No. of Columns (at 4m c/c)	6	no.				
Area of Site	675	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	250	m3	2.5	JoD/m3	625	
Excavate Rock	125	m3	5	JoD/m3	625	
Place, level and compact crushed stone and granular fill	94	m3	15	JoD/m3	1,406	
Fill leanmix	23	m3	50	JoD/m3	1,172	
Remove spoil material from site and dispose to licensed facility	23	m3	5	JoD/m3	117	
Excavate, Store, Replace Topsoil	169	m2	5	JoD/m2	844	
Sum Earthworks						***4,789***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	144	m	20	JoD/m	2,880	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Concrete Road Kerb within site	36	m	15	JoD/m	540	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	1	no.	500	JoD/Item	500	
Site Storm Drainage Pipework 300mm diameter	30	m	50	JoD/m	1,500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	90	m	50	JoD/m	4,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	48	no.	50	JoD/Item	2,400	
Site Soft Landscaping: Soil grading and Seeding	169	m2	5	JoD/m2	844	
Sum Other Siteworks						***26,564***
					Siteworks Sub-Total	**31,353**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	135	m2	10	JoD/m2	1,350	
150mm depth of no-fines concrete	135	m2	15	JoD/m2	2,025	
100mm diameter Under-Drain Pipes at 4m c/c	76	m	50	JoD/m	3,800	
Sum Preparatory Work						***7,175***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	62.7	m2	10	JoD/m2	627	
Concrete Supply and Placement	68	m3	60	JoD/m3	4,050	
Steel Supply and Fixing	20.25	Tonne	250	JoD/Tonne	5,063	
Sum Floor						***9,740***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	62.7	m				
Wall Area one face	352.6875	m2				
Formwork Supply, erect, strike	705.375	m2	10	JoD/m2	7,054	
Concrete Supply and Placement	165.32227	m3	60	JoD/m3	9,919	
Steel Supply and Fixing	49.59668	Tonne	250	JoD/Tonne	12,399	
Sum Walls						***29,372***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	196.3125	m	8	JoD/m	1,571	
Waterproof lining of internal floor and walls	588.9375	m2	8	JoD/m2	4,712	
Sum Internal Sealing and Lining						***6,282***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.5	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	5.625	m				
Formwork Supply, erect, strike	151	m2	10	JoD/m2	1,509	
Concrete Supply and Placement	24	m3	60	JoD/m3	1,449	
Steel Supply and Fixing	7.245	Tonne	250	JoD/Tonne	1,811	
Sum Columns						***4,770***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	135	m2	50	JoD/m2	6,750	
Lift and Place Pre-cast Roof slabs	135	m2	10	JoD/m2	1,350	
Concrete Screed In-situ 150mm	135	m2	15	JoD/m2	2,025	
Supply and fit external Waterproofing Membrane	135	m2	15	JoD/m2	2,025	
Supply and place protective gravel/aggregate 150mm depth	135	m2	15	JoD/m2	2,025	
Supply and fit Roof Drainage Pipework 100mm diameter	84	m	20	JoD/m	1,680	
Sum Roof						***15,855***
					Reservoir Structure Sub-Total	**73,193**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	15	m	97.5	JoD/m	1,463	
150mm diameter DI watermain	15	m	71.5	JoD/m	1,073	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	7.5	m	97.5	JoD/m	731	
150mm diameter DI watermain	7.5	m	71.5	JoD/m	536	
Sum Water Supply Pipes						***3,803***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	2		600	JoD/item	1,200	
Sluice Valves 150mm diameter supplied and fitted	2		500	JoD/item	1,000	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	2		2,500	JoD/item	5,000	
Ultrasonic Level Monitor and display panel	1		2,000	JoD/item	2,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	0		8,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	1		5,000	JoD/item	5,000	
Miscellaneous Bends, Tees and Special Fittings	16		300	JoD/item	4,800	
Sum Pipefittings and Instrumentation						***19,000***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	48	m	50	JoD/item	2,400	
Sum Metalwork						***7,280***
					Pipes, fittings, instrumentation and metal work Sub-Total	**30,083**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	15,000	JoD/item	15,000	
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***25,000***
					Control Building and Monitoring and Treatment Sub-Total	**33,500**
Total Cost						**168,129**
Rounded Cost						**168,000**
Unit cost / m3 of storage volume:					**cost/m3**	**336.00**

Unit Costs 5: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	2,500	m3				
Water Depth	4.6	m				
Avg. Floor Thickness	0.5	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	33	m				
Outside Breadth	18	m				
Wall Height	5.75	m				
Avg. Wall Thickness	0.48	m				
No. of Columns (at 4m c/c)	32	no.				
Area of Site	2,970	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	1,250	m3	2.5	JoD/m3	3,125	
Excavate Rock	625	m3	5	JoD/m3	3,125	
Place, level and compact crushed stone and granular fill	469	m3	15	JoD/m3	7,031	
Fill leanmix	117	m3	50	JoD/m3	5,859	
Remove spoil material from site and dispose to licensed facility	117	m3	5	JoD/m3	586	
Excavate, Store, Replace Topsoil	743	m2	5	JoD/m2	3,713	
Sum Earthworks						***23,439***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	306	m	20	JoD/m	6,120	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	255	m2	20	JoD/m2	5,100	
Concrete Road Kerb within site	76.5	m	15	JoD/m	1,148	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	3	no.	500	JoD/Item	1,500	
Site Storm Drainage Pipework 300mm diameter	66	m	50	JoD/m	3,300	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	3	no.	50	JoD/Item	150	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	198	m	50	JoD/m	9,900	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	102	no.	50	JoD/Item	5,100	
Site Soft Landscaping: Soil grading and Seeding	743	m2	5	JoD/m2	3,713	
Sum Other Siteworks						***46,930***
					Siteworks Sub-Total	**70,369**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	594	m2	10	JoD/m2	5,940	
150mm depth of no-fines concrete	594	m2	15	JoD/m2	8,910	
100mm diameter Under-Drain Pipes at 4m c/c	224	m	50	JoD/m	11,200	
Sum Preparatory Work						***26,050***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	132	m2	10	JoD/m2	1,320	
Concrete Supply and Placement	297	m3	60	JoD/m3	17,820	
Steel Supply and Fixing	89.1	Tonne	250	JoD/Tonne	22,275	
Sum Floor						***41,415***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	132	m				
Wall Area one face	759	m2				
Formwork Supply, erect, strike	1518	m2	10	JoD/m2	15,180	
Concrete Supply and Placement	363.6875	m3	60	JoD/m3	21,821	
Steel Supply and Fixing	109.10625	Tonne	250	JoD/Tonne	27,277	
Sum Walls						***64,278***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	520	m	8	JoD/m	4,160	
Waterproof lining of internal floor and walls	1560	m2	8	JoD/m2	12,480	
Sum Internal Sealing and Lining						***16,640***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.5	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	5.75	m				
Formwork Supply, erect, strike	809	m2	10	JoD/m2	8,090	
Concrete Supply and Placement	129	m3	60	JoD/m3	7,766	
Steel Supply and Fixing	38.832	Tonne	250	JoD/Tonne	9,708	
Sum Columns						***25,564***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	594	m2	50	JoD/m2	29,700	
Lift and Place Pre-cast Roof slabs	594	m2	10	JoD/m2	5,940	
Concrete Screed In-situ 150mm	594	m2	15	JoD/m2	8,910	
Supply and fit external Waterproofing Membrane	594	m2	15	JoD/m2	8,910	
Supply and place protective gravel/aggregate 150mm depth	594	m2	15	JoD/m2	8,910	
Supply and fit Roof Drainage Pipework 100mm diameter	174	m	20	JoD/m	3,480	
Sum Roof						***65,850***
					Reservoir Structure Sub-Total	**239,797**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***6,825***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	2		800	JoD/item	1,600	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	3	No.	3,000	JoD/item	9,000	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	2		8,000	JoD/item	16,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	1		6,000	JoD/item	6,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	28		300	JoD/item	8,400	
Sum Pipefittings and Instrumentation						***47,400***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	102	m	50	JoD/item	5,100	
Sum Metalwork						***9,980***
					Pipes, fittings, instrumentation and metal work Sub-Total	**64,205**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	30,000	JoD/item	30,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	15,000	JoD/item	15,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***45,000***
					Control Building and Monitoring and Treatment Sub-Total	**53,500**
Total Cost						**427,871**
Rounded Cost						**428,000**
Unit cost / m3 of storage volume:					**cost/m3**	**171.20**

Unit Costs 6: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	5,000	m3				
Water Depth	6.1	m				
Avg. Floor Thickness	0.61	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	40	m				
Outside Breadth	22	m				
Wall Height	7.625	m				
Avg. Wall Thickness	0.64	m				
No. of Columns (at 4m c/c)	45	no.				
Area of Site	4,400	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	2,500	m3	2.5	JoD/m3	6,250	
Excavate Rock	1,250	m3	5	JoD/m3	6,250	
Place, level and compact crushed stone and granular fill	938	m3	15	JoD/m3	14,063	
Fill leanmix	234	m3	50	JoD/m3	11,719	
Remove spoil material from site and dispose to licensed facility	234	m3	5	JoD/m3	1,172	
Excavate, Store, Replace Topsoil	1,100	m2	5	JoD/m2	5,500	
Sum Earthworks						***44,953***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	372	m	20	JoD/m	7,440	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	310	m2	20	JoD/m2	6,200	
Concrete Road Kerb within site	93	m	15	JoD/m	1,395	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Pipework 300mm diameter	80	m	50	JoD/m	4,000	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	4	no.	50	JoD/Item	200	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	240	m	50	JoD/m	12,000	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	124	no.	50	JoD/Item	6,200	
Site Soft Landscaping: Soil grading and Seeding	1,100	m2	5	JoD/m2	5,500	
Sum Other Siteworks						***55,835***
					Siteworks Sub-Total	**100,788**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	880	m2	10	JoD/m2	8,800	
150mm depth of no-fines concrete	880	m2	15	JoD/m2	13,200	
100mm diameter Under-Drain Pipes at 4m c/c	320	m	50	JoD/m	16,000	
Sum Preparatory Work						***38,000***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	195.932	m2	10	JoD/m2	1,959	
Concrete Supply and Placement	537	m3	60	JoD/m3	32,208	
Steel Supply and Fixing	161.04	Tonne	250	JoD/Tonne	40,260	
Sum Floor						***74,427***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	160.6	m				
Wall Area one face	1224.575	m2				
Formwork Supply, erect, strike	2449.15	m2	10	JoD/m2	24,492	
Concrete Supply and Placement	778.11536	m3	60	JoD/m3	46,687	
Steel Supply and Fixing	233.43461	Tonne	250	JoD/Tonne	58,359	
Sum Walls						***129,537***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	813.35833	m	8	JoD/m	6,507	
Waterproof lining of internal floor and walls	2440.075	m2	8	JoD/m2	19,521	
Sum Internal Sealing and Lining						***26,027***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.61	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	7.625	m				
Formwork Supply, erect, strike	1415	m2	10	JoD/m2	14,154	
Concrete Supply and Placement	226	m3	60	JoD/m3	13,588	
Steel Supply and Fixing	67.93875	Tonne	250	JoD/Tonne	16,985	
Sum Columns						***44,726***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	880	m2	50	JoD/m2	44,000	
Lift and Place Pre-cast Roof slabs	880	m2	10	JoD/m2	8,800	
Concrete Screed In-situ 150mm	880	m2	15	JoD/m2	13,200	
Supply and fit external Waterproofing Membrane	880	m2	15	JoD/m2	13,200	
Supply and place protective gravel/aggregate 150mm depth	880	m2	15	JoD/m2	13,200	
Supply and fit Roof Drainage Pipework 100mm diameter	212	m	20	JoD/m	4,240	
Sum Roof						***96,640***
					Reservoir Structure Sub-Total	**409,358**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	40	m	130.0	JoD/m	5,200	
200mm diameter DI watermain	30	m	97.5	JoD/m	2,925	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	15	m	97.5	JoD/m	1,463	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***18,038***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	4		800	JoD/item	3,200	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	3		4,000	JoD/item	12,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	2		8,000	JoD/item	16,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	1		6,000	JoD/item	6,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	36		300	JoD/item	10,800	
Sum Pipefittings and Instrumentation						***55,600***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	124	m	50	JoD/item	6,200	
Sum Metalwork						***11,080***
					Pipes, fittings, instrumentation and metal work Sub-Total	**84,718**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	40,000	JoD/item	40,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	20,000	JoD/item	20,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***60,000***
					Control Building and Monitoring and Treatment Sub-Total	**68,500**
Total Cost						**663,364**
Rounded Cost						**663,000**
Unit cost / m3 of storage volume:					**cost/m3**	**132.60**

Unit Costs 7: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	12,000	m3				
Water Depth	7.0	m				
Avg. Floor Thickness	0.7	m				
Pre-cast Roof Thickness	0.35	m				
Outside Length	59	m				
Outside Breadth	31	m				
Wall Height	8.75	m				
Avg. Wall Thickness	0.73	m				
No. of Columns (at 4m c/c)	98	no.				
Area of Site	9,145	m2				
Distance of Site from existing public road	100	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	6,000	m3	2.5	JoD/m3	15,000	
Excavate Rock	3,000	m3	5	JoD/m3	15,000	
Place, level and compact crushed stone and granular fill	2,250	m3	15	JoD/m3	33,750	
Fill leanmix	563	m3	50	JoD/m3	28,125	
Remove spoil material from site and dispose to licensed facility	563	m3	5	JoD/m3	2,813	
Excavate, Store, Replace Topsoil	2,286	m2	5	JoD/m2	11,431	
Sum Earthworks						***106,119***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	540	m	20	JoD/m	10,800	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	450	m2	20	JoD/m2	9,000	
Concrete Road Kerb within site	135	m	15	JoD/m	2,025	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	600	m2	20	JoD/m2	12,000	
Site Lighting Standard inclusive of power cables and ducting	9	no.	500	JoD/Item	4,500	
Site Storm Drainage Pipework 300mm diameter	118	m	50	JoD/m	5,900	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	5	no.	50	JoD/Item	250	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	354	m	50	JoD/m	17,700	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	180	no.	50	JoD/Item	9,000	
Site Soft Landscaping: Soil grading and Seeding	2,286	m2	5	JoD/m2	11,431	
Sum Other Siteworks						***91,106***
					Siteworks Sub-Total	**197,225**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	1829	m2	10	JoD/m2	18,290	
150mm depth of no-fines concrete	1829	m2	15	JoD/m2	27,435	
100mm diameter Under-Drain Pipes at 4m c/c	615	m	50	JoD/m	30,750	
Sum Preparatory Work						***76,475***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	324.94	m2	10	JoD/m2	3,249	
Concrete Supply and Placement	1280	m3	60	JoD/m3	76,818	
Steel Supply and Fixing	384.09	Tonne	250	JoD/Tonne	96,023	
Sum Floor						***176,090***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	232.1	m				
Wall Area one face	2030.875	m2				
Formwork Supply, erect, strike	4061.75	m2	10	JoD/m2	40,618	
Concrete Supply and Placement	1480.8464	m3	60	JoD/m3	88,851	
Steel Supply and Fixing	444.25391	Tonne	250	JoD/Tonne	111,063	
Sum Walls						***240,532***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	1467.4583	m	8	JoD/m	11,740	
Waterproof lining of internal floor and walls	4402.375	m2	8	JoD/m2	35,219	
Sum Internal Sealing and Lining						***46,959***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.7	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	8.75	m				
Formwork Supply, erect, strike	3537	m2	10	JoD/m2	35,372	
Concrete Supply and Placement	566	m3	60	JoD/m3	33,957	
Steel Supply and Fixing	169.785	Tonne	250	JoD/Tonne	42,446	
Sum Columns						***111,775***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	1,829	m2	50	JoD/m2	91,450	
Lift and Place Pre-cast Roof slabs	1829	m2	10	JoD/m2	18,290	
Concrete Screed In-situ 150mm	1,829	m2	15	JoD/m2	27,435	
Supply and fit external Waterproofing Membrane	1,829	m2	15	JoD/m2	27,435	
Supply and place protective gravel/aggregate 150mm depth	1,829	m2	15	JoD/m2	27,435	
Supply and fit Roof Drainage Pipework 100mm diameter	304	m	20	JoD/m	6,080	
Sum Roof						***198,125***
					Reservoir Structure Sub-Total	**849,955**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	200	m	195.0	JoD/m	39,000	
300mm diameter DI watermain	100	m	130.0	JoD/m	13,000	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	100	m	195.0	JoD/m	19,500	
300mm diameter DI watermain	50	m	130.0	JoD/m	6,500	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***78,000***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	16		800	JoD/item	12,800	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	3		8,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	58		300	JoD/item	17,400	
Sum Pipefittings and Instrumentation						***76,600***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	180	m	50	JoD/item	9,000	
Sum Metalwork						***13,880***
					Pipes, fittings, instrumentation and metal work Sub-Total	**168,480**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	30	m2	400	JoD/m2	12,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***12,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	80,000	JoD/item	80,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	60,000	JoD/item	60,000	
Other Treatment Process Installation	1	no.	60,000	JoD/item	-	
Sum Monitoring and Treatment						***140,000***
					Control Building and Monitoring and Treatment Sub-Total	**152,500**
Total Cost						**1,368,160**
Rounded Cost						**1,368,000**

Unit cost / m3 of storage volume:	**cost/m3**	**114.00**

Unit Costs 8: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	20,000	m3				
Water Depth	7.0	m				
Avg. Floor Thickness	0.7	m				
Pre-cast Roof Thickness	0.35	m				
Outside Length	76	m				
Outside Breadth	40	m				
Wall Height	8.75	m				
Avg. Wall Thickness	0.73	m				
No. of Columns (at 4m c/c)	162	no.				
Area of Site	15,200	m2				
Distance of Site from existing public road	200	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	10,000	m3	2.5	JoD/m3	25,000	
Excavate Rock	5,000	m3	5	JoD/m3	25,000	
Place, level and compact crushed stone and granular fill	3,750	m3	15	JoD/m3	56,250	
Fill leanmix	938	m3	50	JoD/m3	46,875	
Remove spoil material from site and dispose to licensed facility	938	m3	5	JoD/m3	4,688	
Excavate, Store, Replace Topsoil	3,800	m2	5	JoD/m2	19,000	
Sum Earthworks						***176,813***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	696	m	20	JoD/m	13,920	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	580	m2	20	JoD/m2	11,600	
Concrete Road Kerb within site	174	m	15	JoD/m	2,610	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	1200	m2	20	JoD/m2	24,000	
Site Lighting Standard inclusive of power cables and ducting	15	no.	500	JoD/Item	7,500	
Site Storm Drainage Pipework 300mm diameter	152	m	50	JoD/m	7,600	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	6	no.	50	JoD/Item	300	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	456	m	50	JoD/m	22,800	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	232	no.	50	JoD/Item	11,600	
Site Soft Landscaping: Soil grading and Seeding	3,800	m2	5	JoD/m2	19,000	
Sum Other Siteworks						***129,430***
					Siteworks Sub-Total	**306,243**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	3040	m2	10	JoD/m2	30,400	
150mm depth of no-fines concrete	3040	m2	15	JoD/m2	45,600	
100mm diameter Under-Drain Pipes at 4m c/c	950	m	50	JoD/m	47,500	
Sum Preparatory Work						***123,500***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	418.88	m2	10	JoD/m2	4,189	
Concrete Supply and Placement	2128	m3	60	JoD/m3	127,680	
Steel Supply and Fixing	638.4	Tonne	250	JoD/Tonne	159,600	
Sum Floor						***291,469***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	299.2	m				
Wall Area one face	2618	m2				
Formwork Supply, erect, strike	5236	m2	10	JoD/m2	52,360	
Concrete Supply and Placement	1908.9583	m3	60	JoD/m3	114,538	
Steel Supply and Fixing	572.6875	Tonne	250	JoD/Tonne	143,172	
Sum Walls						***310,069***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	2119.3333	m	8	JoD/m	16,955	
Waterproof lining of internal floor and walls	6358	m2	8	JoD/m2	50,864	
Sum Internal Sealing and Lining						***67,819***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.7	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	8.75	m				
Formwork Supply, erect, strike	5847	m2	10	JoD/m2	58,472	
Concrete Supply and Placement	936	m3	60	JoD/m3	56,133	
Steel Supply and Fixing	280.665	Tonne	250	JoD/Tonne	70,166	
Sum Columns						***184,771***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	3,040	m2	50	JoD/m2	152,000	
Lift and Place Pre-cast Roof slabs	3040	m2	10	JoD/m2	30,400	
Concrete Screed In-situ 150mm	3,040	m2	15	JoD/m2	45,600	
Supply and fit external Waterproofing Membrane	3,040	m2	15	JoD/m2	45,600	
Supply and place protective gravel/aggregate 150mm depth	3,040	m2	15	JoD/m2	45,600	
Supply and fit Roof Drainage Pipework 100mm diameter	392	m	20	JoD/m	7,840	
Sum Roof						***327,040***
					Reservoir Structure Sub-Total	**1,304,668**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	500	m	195.0	JoD/m	97,500	
300mm diameter DI watermain	100	m	130.0	JoD/m	13,000	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	250	m	195.0	JoD/m	48,750	
300mm diameter DI watermain	50	m	130.0	JoD/m	6,500	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***165,750***
Special Pipe Fittings and Instrumentation						
Sluice Valves 400mm diameter supplied and fitted	20		1,200	JoD/item	24,000	
Sluice Valves 300mm diameter supplied and fitted	8		800	JoD/item	6,400	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 400mm diameter	4		14,000	JoD/item	56,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	0		8,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	44		300	JoD/item	13,200	
Sum Pipefittings and Instrumentation						***122,000***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	232	m	50	JoD/item	11,600	
Sum Metalwork						***16,480***
					Pipes, fittings, instrumentation and metal work Sub-Total	**304,230**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	30	m2	400	JoD/m2	12,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***12,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	100,000	JoD/item	100,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	80,000	JoD/item	80,000	
Other Treatment Process Installation	1	no.	80,000	JoD/item	-	
Sum Monitoring and Treatment						***180,000***
					Control Building and Monitoring and Treatment Sub-Total	**192,500**
Total Cost						**2,107,640**
Rounded Cost						**2,108,000**

Unit cost / m3 of storage volume:	**cost/m3**	**105.40**

Unit Costs 9: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.15	Static Head, m	120	Flow, m3/hr	20
Length, m	8000	Friction Loss, m	8.246	Velocity, m/s	0.314
C Value	120	Total Head, m	128.246	**REQUIRED PUMP POWER**	
C.S.A	0.018			Efficiency, %	60
				Power, kW	12

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	20	m3/hr				
No. of Pumps (one Duty / one Standby)	2	No.				
Motor Power	12	kW			1,000	***2,000***
Head Lift	128	m				
Pumping Station Key Dimensions						
Length	4	m				
Breadth	6	m				
Height	3	m				
Area of Site	120	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**2,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	60	m	20	JoD/m	1,200	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	50	m2	20	JoD/m2	1,000	
Concrete Road Kerb within site	15	m	15	JoD/m	225	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	0	no.	500	JoD/Item	-	
Site Storm Drainage Pipework 300mm diameter	8	m	50	JoD/m	400	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	1	no.	50	JoD/Item	50	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	24	m	50	JoD/m	1,200	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	20	no.	50	JoD/Item	1,000	
Site Soft Landscaping: Soil grading and Seeding	30	m2	5	JoD/m2	150	
Sum Other Siteworks						***16,125***
					Siteworks Sub-Total	**16,125**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	8	m	71.5	JoD/m	572	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	8	m	71.5	JoD/m	572	
Sum Water Supply Pipes						***1,144***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	0		600	JoD/item	-	
Sluice Valves 150mm diameter supplied and fitted	6		500	JoD/item	3,000	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	2		2,500	JoD/item	5,000	
Display panel. Control system and Telemetry Link	1		28,000	JoD/item	28,000	
Commissioning and Testing	1		2,000	JoD/item	2,000	
Pressure Transducers	4		250	JoD/item	1,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	2		5,000	JoD/item	10,000	
Miscellaneous Bends, Tees and Special Fittings	8		300	JoD/item	2,400	
Variable Speed Drive Unit	2		5,000	JoD/item	10,000	
Air Vessel - Surge Protection	1		5,000	JoD/item	5,000	
Sum Pipefittings and Instrumentation						***66,400***
Metalwork						
Pump house gantry lifting unit	1	no.	7,000	JoD/item	7,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***7,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**75,044**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	24	m2	600	JoD/m2	14,400	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***14,900***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**24,900**
Total Cost						**118,069**
Rounded Cost						**118,000**

Unit Costs 10: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.2	Static Head, m	120	Flow, m3/hr	50
Length, m	8000	Friction Loss, m	11.084	Velocity, m/s	0.442
C Value	120	Total Head, m	131.084	**REQUIRED PUMP POWER**	
C.S.A	0.031			Efficiency, %	60
				Power, kW	30

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	50	m3/hr				
No. of Pumps (one Duty / one Standby)	2	No.				
Motor Power	30	kW			10,000	***20,000***
Head Lift	131	m				
Pumping Station Key Dimensions						
Length	5	m				
Breadth	7	m				
Height	3	m				
Area of Site	175	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**20,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	72	m	20	JoD/m	1,440	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	60	m2	20	JoD/m2	1,200	
Concrete Road Kerb within site	18	m	15	JoD/m	270	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	0	no.	500	JoD/Item	-	
Site Storm Drainage Pipework 300mm diameter	10	m	50	JoD/m	500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	1	no.	50	JoD/Item	50	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	30	m	50	JoD/m	1,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	24	no.	50	JoD/Item	1,200	
Site Soft Landscaping: Soil grading and Seeding	44	m2	5	JoD/m2	219	
Sum Other Siteworks						***17,279***
					Siteworks Sub-Total	**17,279**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	10	m	71.5	JoD/m	715	
Sum Water Supply Pipes						***6,240***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	2	No.	3,000	JoD/item	6,000	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		40,000	JoD/item	40,000	
Commissioning and Testing	1		4,000	JoD/item	4,000	
Pressure Transducers	4		250	JoD/item	1,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	2		6,000	JoD/item	12,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	2		5,000	JoD/item	10,000	
Air Vessel - Surge Protection	1		30,000	JoD/item	30,000	
Sum Pipefittings and Instrumentation						***112,600***
Metalwork						
Pump house gantry lifting unit	1	no.	10,000	JoD/item	10,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***10,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**129,340**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	35	m2	600	JoD/m2	21,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***21,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**31,500**
Total Cost						**198,119**
						198,000
Rounded Cost						

Unit Costs 11: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.3	Static Head, m	120	Flow, m3/hr	200
Length, m	8000	Friction Loss, m	20.044	Velocity, m/s	0.786
C Value	120	Total Head, m	140.044	**REQUIRED PUMP POWER**	
C.S.A	0.071			Efficiency, %	60
				Power, kW	127

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	200	m3/hr				
No. of Pumps (two Duty / two Standby)	4	No.				
Motor Power	64	kW			35,000	***140,000***
Head Lift	140	m				
Pumping Station Key Dimensions						
Length	10	m				
Breadth	14	m				
Height	3	m				
Area of Site	700	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**140,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	144	m	20	JoD/m	2,880	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Concrete Road Kerb within site	36	m	15	JoD/m	540	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	1	no.	500	JoD/Item	500	
Site Storm Drainage Pipework 300mm diameter	20	m	50	JoD/m	1,000	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	60	m	50	JoD/m	3,000	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	48	no.	50	JoD/Item	2,400	
Site Soft Landscaping: Soil grading and Seeding	175	m2	5	JoD/m2	875	
Sum Other Siteworks						***24,595***
					Siteworks Sub-Total	**24,595**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	5	m	97.5	JoD/m	488	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***6,338***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	10		800	JoD/item	8,000	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	2		4,000	JoD/item	8,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		40,000	JoD/item	40,000	
Commissioning and Testing	1		8,000	JoD/item	8,000	
Pressure Transducers	8		250	JoD/item	2,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	4		6,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	4		5,000	JoD/item	20,000	
Air Vessel - Surge Protection	1		40,000	JoD/item	40,000	
Sum Pipefittings and Instrumentation						***158,400***
Metalwork						
Pump house gantry lifting unit	1	no.	14,000	JoD/item	14,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***14,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**179,238**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	140	m2	600	JoD/m2	84,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***84,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**94,500**
Total Cost						**438,333**
						438,000
Rounded Cost						

Unit Costs 12: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.5	Static Head, m	120	Flow, m3/hr	500
Length, m	8000	Friction Loss, m	9.087	Velocity, m/s	0.707
C Value	120	Total Head, m	129.087	**REQUIRED PUMP POWER**	
C.S.A	0.196			Efficiency, %	70
				Power, kW	251

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	500	m3/hr				
No. of Pumps (two Duty / two Standby)	4	No.				
Motor Power	126	kW			40,000	***160,000***
Head Lift	129	m				
Pumping Station Key Dimensions						
Length	15	m				
Breadth	20	m				
Height	3	m				
Area of Site	1,500	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**160,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	210	m	20	JoD/m	4,200	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	175	m2	20	JoD/m2	3,500	
Concrete Road Kerb within site	52.5	m	15	JoD/m	788	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	2	no.	500	JoD/Item	1,000	
Site Storm Drainage Pipework 300mm diameter	30	m	50	JoD/m	1,500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	90	m	50	JoD/m	4,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	70	no.	50	JoD/Item	3,500	
Site Soft Landscaping: Soil grading and Seeding	375	m2	5	JoD/m2	1,875	
Sum Other Siteworks						***31,863***
					Siteworks Sub-Total	**31,863**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***10,725***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	10		800	JoD/item	8,000	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	2		4,000	JoD/item	8,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		50,000	JoD/item	50,000	
Commissioning and Testing	1		7,000	JoD/item	7,000	
Pressure Transducers	8		250	JoD/item	2,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	4		6,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	4		5,000	JoD/item	20,000	
Air Vessel - Surge Protection	1		45,000	JoD/item	45,000	
Sum Pipefittings and Instrumentation						***172,400***
Metalwork						
Pump house gantry lifting unit	1	no.	20,000	JoD/item	20,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***20,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**203,625**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	300	m2	600	JoD/m2	180,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***180,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**190,500**
Total Cost						**585,988**
						586,000
Rounded Cost						

Unit Costs 13: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

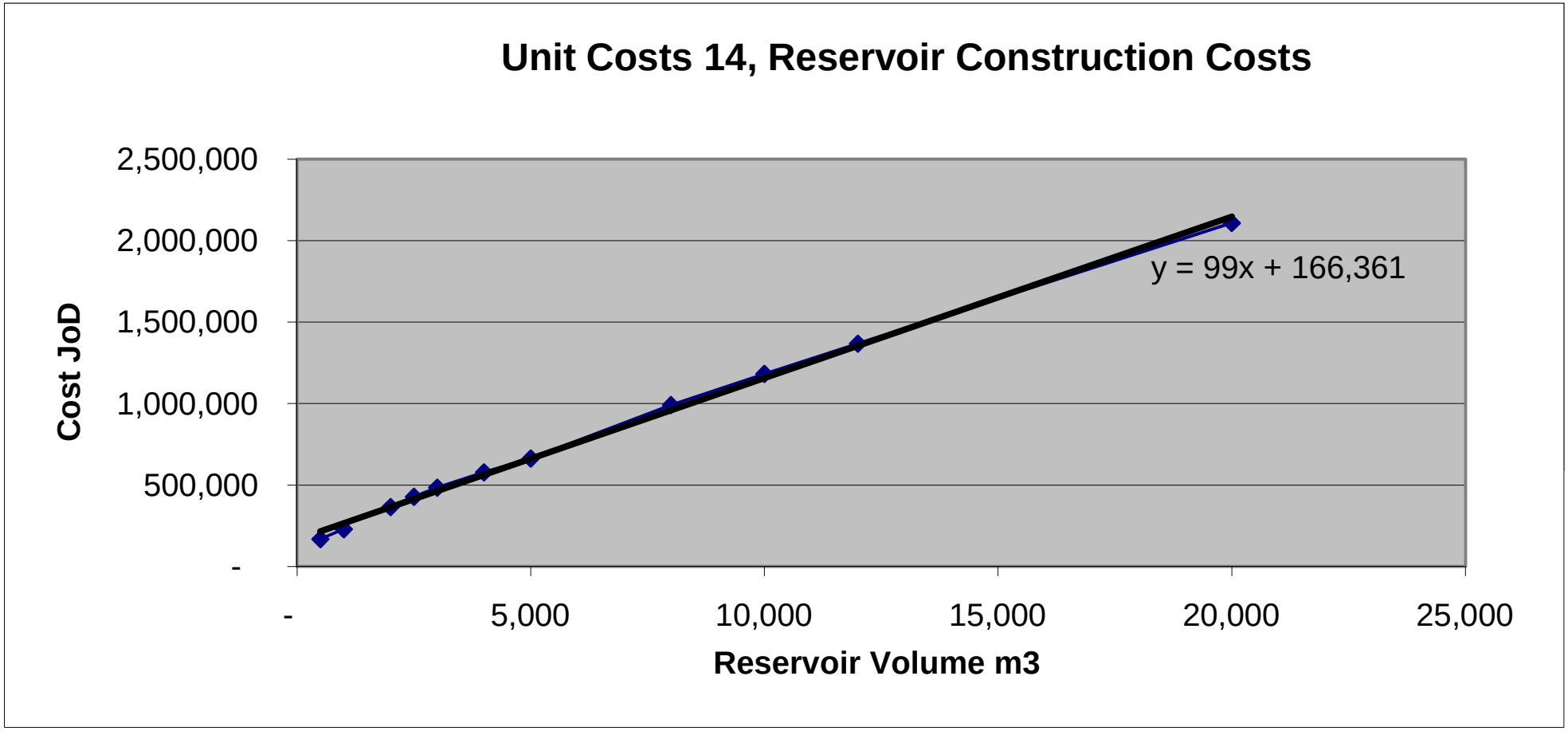
Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

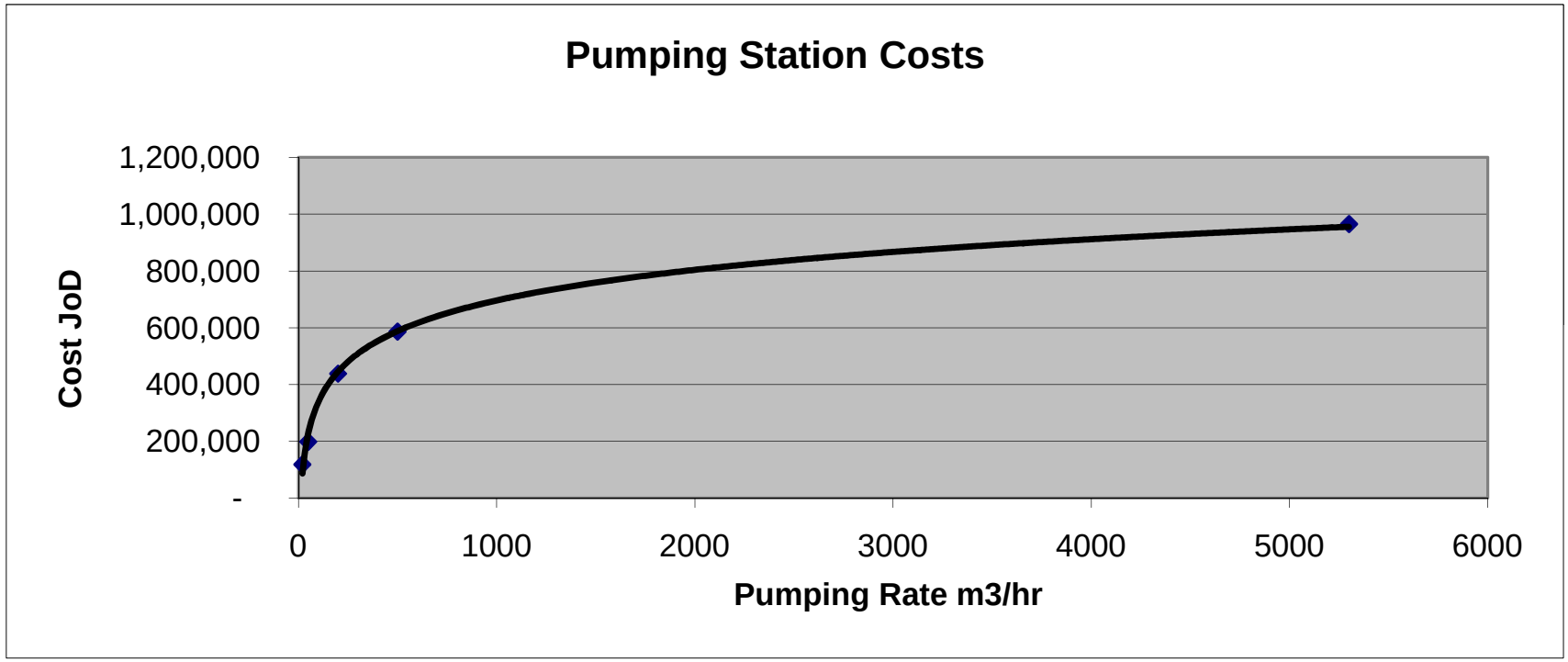
RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	1.2	Static Head, m	120	Flow, m3/hr	5300
Length, m	10000	Friction Loss, m	12.655	Velocity, m/s	1.302
C Value	120	Total Head, m	132.655	**REQUIRED PUMP POWER**	
C.S.A	1.131			Efficiency, %	70
				Power, kW	2737

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	5,300	m3/hr				
No. of Pumps (four Duty / two Standby)	6	No.				
Motor Power	684	kW			60,000	***360,000***
Head Lift	133	m				
Pumping Station Key Dimensions						
Length	18	m				
Breadth	24	m				
Height	3	m				
Area of Site	2,160	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**360,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	252	m	20	JoD/m	5,040	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	210	m2	20	JoD/m2	4,200	
Concrete Road Kerb within site	63	m	15	JoD/m	945	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	2	no.	500	JoD/Item	1,000	
Site Storm Drainage Pipework 300mm diameter	36	m	50	JoD/m	1,800	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	108	m	50	JoD/m	5,400	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	84	no.	50	JoD/Item	4,200	
Site Soft Landscaping: Soil grading and Seeding	540	m2	5	JoD/m2	2,700	
Sum Other Siteworks						***36,285***
					Siteworks Sub-Total	**36,285**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***8,450***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	12		800	JoD/item	9,600	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		60,000	JoD/item	60,000	
Commissioning and Testing	1		10,000	JoD/item	10,000	
Pressure Transducers	12		250	JoD/item	3,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	6		6,000	JoD/item	36,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	30		300	JoD/item	9,000	
Variable Speed Drive Unit	6		5,000	JoD/item	30,000	
Air Vessel - Surge Protection	1		85,000	JoD/item	85,000	
Sum Pipefittings and Instrumentation						***262,200***
Metalwork						
Pump house gantry lifting unit	1	no.	28,000	JoD/item	28,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***28,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**299,150**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	432	m2	600	JoD/m2	259,200	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***259,700***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**269,700**
Total Cost						**965,135**
						965,000
Rounded Cost						


Unit Costs 14, Reservoir Construction Costs
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
Cost JoD
y = 99x + 166,361
-
5,000
10,000
15,000
20,000
25,000
Reservoir Volume m3

Unit Costs 15

pumping rate m3/hr	Cost JoD
20	118,000
50	198,000
200	438,000
500	586,000
5300	965,000



Unit Costs 16

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points, Site Investigations, Information Systems

Strategic Infrastructure

1. Strategic Metering Infrastructure

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Electromagnetic Flow Meter 300mm-600mm	No.	5,000	65	325,000
Telemetry Outstation - 6 channel	No.	4,000	12	48,000
Telemetry Outstation - 2 channel	No.	2,500	20	50,000
Site works, civil and instrumentation inc pressure tappings, chambers, pipework	No.	10,000	32	320,000
Central Telemetry server and software	No.	60,000	1	60,000
Total Construction Cost				**803,000**

2. Mapping / GIS

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Aerial Photography Maps	km2	100	1,000	100,000
Up-dated Digital Land Maps	km2	20	1,000	20,000
Mapping co-ordinate systems reconciliation upgrade	Item	50,000	1	50,000
GPS Survey of network pipelines and features	km	50	3,515	175,750
GIS Record Update Nodes, Links, Customer Points	No.	0.50	200,000	100,000
Total Construction Cost				**445,750**

3. Condition Assessments / Site Investigations of Strategic Pipelines (c. 130 km)

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Pipe Tracing, Marking, location of other services, GPS Survey, mapping at specific locations 30m length	No.	100	260	26,000
Standard locations: Slit trench, trench and pipe measurements, pipe condition assessment, soil samples, strap-on meter flow-test	No.	400	130	52,000
Special locations: Pipe cut-out tapping, pressure-monitoring and water sampling point installation	No.	2,000	40	80,000
Air valve and wash-out valve condition check, service and refurbishment	No.	1,500	60	90,000
Sluice valve / butterfly valve / reservoir inlet/outlet valve condition check, service and refurbishment	No.	2,000	40	80,000
Laboratory tests and report	No.	50,000	1	50,000
Total Construction Cost				**378,000**

Unit Costs 17

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points, Site Investigations, Information Systems

Strategic Infrastructure

4. SCADA System

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Central System hardware, software, installation, overall system design and configuration, incorporating monitoring, control and alarm and call-out systems, commissioning, training	No.	900,000	1	900,000
Major Hub facilities sites - e.g. Large reservoir with multi-stage pumping station and several inlets and / or outlets: 2x24-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	50,000	5	250,000
Large facilities sites - e.g. Local reservoir with pumping station and more than 1 inlet and / or outlet: 24-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	40,000	14	560,000
Small facilities sites - e.g. Local reservoir with only gravity supply or pumping station with only 1 inlet and 1 outlet: 12-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	20,000	40	800,000
Total Construction Cost				**2,510,000**

5. Asset Management

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Pumps and controls refurbishment and spare parts provision existing strategic pumping stations	No.	50,000	5	250,000
Pumps and controls refurbishment and spare parts provision existing local large pumping stations	No.	20,000	7	140,000
Pumps and controls refurbishment and spare parts provision existing local small/medium pumping stations	No.	10,000	12	120,000
Refurbishment of chlorine dosing, injection, lifting, handling and storage equipment at large chlorination facilities - sources and strategic hubs	No.	20,000	5	100,000
Refurbishment of chlorine dosing, injection, lifting, handling and storage equipment at local chlorination facilities - reservoirs and pumping stations	No.	10,000	10	100,000
Provision of stock of Network monitoring, measurement, data-logging and leakage detection equipment for mobile monitoring and inspection of network	Item	100,000	1	100,000
Total Construction Cost				**810,000**

Unit Costs 18

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points

DMA Connection Points

Works Item Description	**Unit Cost Rate (JD)**
Electromagnetic Flow Meter typical 200mm	3,000
Pressure-Reducing Valve typical 200mm	3,000
Telemetry Outstation - 2 channel	2,500
Site works: pressure tapping, pipework, sluice valves, hydrant/washout, power and communications	1,500
Total Construction Cost	**10,000**

Unit Costs 19

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points

Customer Connections

1. Customer Connection Control Points - Underground

Works Item Description	Unit Cost Rate (JD)
Unsuitable pipe replacement typical 3m lengt	26
Construct underground connection control point chamber and stop-valve	70
check-meter / new meter installed in 10%	4
Total Construction Cost	**100**

2. Customer Meter Replacements

Works Item Description	Unit Cost Rate (JD)
Meters, connections, customers, properties survey, database update and condition appraisal (2 meter surveys for 1 replacement)	10
Meter replacement	40
Total Construction Cost	**50**

Quantities 1

Zarqa Governorate Feasability Study

Secondary & Tertiary Network Field Study

Location : **Date of Survey:**

Area Type :

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	General Condition	No of photos taken
1	G	2"	2	OK	
1	PE	2"	1.5	OK	
2	PE	25mm	3.5	OK	
3	PE	25mm	2.5	OK	
4	PE	25mm	20	OK	
5	PE	2"	50	OK	
5	G	2"	50	OK	
6	PE	25mm	3	OK	
7	G	25mm	3	OK	
8	PE	25mm	2	OK	
10	G	2"	6	OK	
11	G	2"	25	OK	
11	PE	25mm	8	OK	
11	G	2"	30	OK	
12	PE	2"	2	OK	
12	G	2"	2	OK	
13	PE	25mm	1.5	OK	
14A	G	2"		OK	
14B	G	2"	400	OK	
15	PE	2"	20	OK	
16	PE	2"	40	OK	
17	PE	2"	15	OK	
18	G	2"	25	OK	
19	G	2"	8	OK	
20A					
20B	G	2"	205	OK	
21A					
21B	PE	2"	280	OK	
22A					
22B	G	2"	130	OK	
23A					
23B	PE	2"	60	OK	
24A					
24B	G	2"	75	OK	
25	PE	2"	5	OK	
26A					
26B	G	2"	660	OK	
27	G	2"	10	OK	
28	G	2"	12	OK	
29	PE	2"	10	OK	

Total	2167 OUT OF	11706	2"
		480	4"

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 1 **Date of Survey:** 22nd February 2010 **Survey By:** MRC & AG

Area Type : Recently (2 Years) Rehabilitated

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	Underground Length (m)	General Condition	No of Valves	No of Hydrants	No of marker posts	Other fittings	No of photos taken
1	Steel	2"	275	N/A	Good	1	0	0		1
2	Black MDPE / HDPE	2"	80	N/A	Good	0	0	0		0
3	Black MDPE / HDPE	2"	N/A	2470	Unknown	13	0	0		0
4	Steel	2"	N/A	240	Unknown	0	0	0		0
5	Steel	1"	40	N/A	Good	2	0	0		0
6	Steel	1"	N/A	70	Unknown	0	0	0		0
7	MDPE	125mm	N/A	1820	Unknown	2	0	0		0
8	DI	200mm	N/A	50	Fair	0	0	0		
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Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 1 **Date of Survey:** 24th February 2010 **Survey By:** MRC & AG

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply cover material	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?
1	Residential	1	Yes	Unmade / Tarmac	20mm Iron	11m	1	Private	Good	468281	Spannor Powx	1
2	Residential	1	Yes	Unmade / Tarmac	25mm Plastic	10m	1	Private	Good	473578	SPX	1
3	Residential	1	Yes	Unmade / Tarmac	20mm Iron	11m	1	Private	Good	99750200	SMC	1
4	Residential	2	Yes	Tarmac	25mm Plastic	1m	N/A	Private	N/A	N/A	N/A	1
5	Residential	1	No	Tarmac	25mm Plastic	2m	1	Private	Good	126897	SPX	1
6	Residential	2	No	Tarmac	20mm Iron	3m	N/A	Private	Good	25226963	SPX	1
7	Residential	4	No	Tarmac / Concrete	20mm Iron	7m	1	Private	Good	94085892	BDK	1
8	Residential	1	No	Tarmac / Concrete	20mm Iron	4m	N/A	Private	N/A	N/A	N/A	1
9	Residential	2	No	Tarmac	20mm Iron	3m	2	Private	Good	164481, 540870	SPX, SPX	2
10	Residential	1	No	Tarmac	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
11	Residential	1	Yes	Tarmac / Concrete	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
12	Residential	1	Yes	Tarmac / Concrete	25mm Plastic	3m	1	Private	Good	21052934	ABB	1
13	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	1	Private	Good	254338	SPX	1
14	Residential	2	No	Tarmac	25mm Plastic	1m	1	Private	Good	22118263	MTF	1
15	Residential	1	No	Tarmac	25mm Plastic	2m	N/A	Private	N/A	N/A	N/A	1
16	Residential	1	No	Tarmac / Concrete	25mm Plastic	7m	1	Private	Good	88184845	BAYLAN	1
17	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	1	Private	Good	22101900	MTF	1
18	Residential	1	No	Tarmac / Concrete	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
19	Residential	1	Yes	Tarmac	25mm Plastic	9m	N/A	Private	N/A	N/A	N/A	1
20	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	N/A	Private	N/A	N/A	N/A	1
21	Residential	1	No	Tarmac	25mm Plastic	11m	N/A	Private	N/A	N/A	N/A	1
22	Mixed	5commercial, 2 Residential	No	Tarmac / Flags	25mm Plastic	4m	1	Private	Good	361843	SPX	1
23	Mixed	5commercial, 2 Residential	No	Tarmac / Flags	25mm Plastic	14m	1	Private	Good	21035332	ABB	2
24	Commercial	1 commercial, 0 Residential	No	Tarmac	20mm Iron	6m	1	Private	Good	230943	SPX	1
25												
26												
27												
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50												

Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 2 **Date of Survey:** 25th February 2010 **Survey By:** MRC & AG

Area Type : Mature network

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	Underground Length (m)	General Condition	No of Valves	No of Hydrants	No of marker posts	Other fittings	No of photos taken
1	Steel	2"	690m	N/A	Good	0	0	0		0
2	Plastic	2"	55m	N/A	Good	0	0	0		0
3	Ductile iron	6"	N/A	440m	Very Poor	2	0	0		0
4	Steel	2"	65m	N/A	Poor	0	0	0		0
5	Steel	1"	340m	N/A	Good	0	0	0		0
6	Plastic	2"	N/A	240m	Good	0	0	0		0
7	Plastic	1"	155m	N/A	Good	1	0	0		0
8	Steel	1"	N/A	180m	Unknown	0	0	0		
9	Ductile iron	4"	N/A	1260m	Unknown	0	0	0		
10	Steel	1"	N/A	415m	Unknown	0	0	0		
11	Plastic	1"	N/A	80m	Unknown	0	0	0		
12	Steel	1"	30m	N/A	Poor	0	0	0		
13	Unknown	Unknown	N/A	595m	Unknown	0	0	0		
14										
15										
16										
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21										
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24										
25										
26										
27										
28										
29										
30										

Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 2 **Date of Survey:** 25th February 2010 **Survey By:** MRC & AG

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply cover material	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?
1	Residential	1	Yes	N/A	20mm Iron	1m	Unknown	Private	N/A	N/A	N/A	1
2	Residential	4	Yes	N/A	20mm Plastic	3m	1	Private	Good	542707	SPX	2
3	Residential	1	Yes	N/A	20mm Iron	1m	1	Private	Good	Unknown	SPX	2
4	Residential	3	Yes	N/A	20mm Plastic	1m	1	Private	Poor	332002	Not recognised	2
5	Residential	2	No	Tarmac	20mm Iron	4m	1	Private	Average	248281	SPX	1
6	Residential	4	Yes	N/A	20mm Plastic	3m	4	Private	Average	94096990, 271799, 175482, 25196458	Mados, SPX, SPX, MTF	1
7	Residential	1	Yes	N/A	20mm Plastic	6m	1	Private	Good	594321	SPX	1
8	Residential	2	Yes	Unmade	20mm Plastic	3m	1	Private	Good	94012607	SOCAM	1
9	Residential	1	No	Tarmac	20mm Plastic	5m	1	Private	Good	94111910	SOCAM	1
10	Mixed	1 commercial, 1 residential	Yes	N/A	20mm Iron	1m	1	Private	Good	25208834	MTF	1
11	Residential	1	Yes	Tarmac & Unmade	20mm Iron	12m	1	Private	Good	270443	SPX	2
12	Residential	2	Yes	N/A	20mm Plastic	10m	2	Private	Good	99742313, 273634	SMC, SPX	1
13	Residential	2	Yes	N/A	20mm Iron	2m	2	Private	Good	996100, 152342	SOCAM, SPX	1
14	Residential	3	Yes	Concrete	25mm Iron	4m	1	Private	Good	249706	SPX	1
15	Residential	6	Yes	Tarmac	20mm Iron	7m	2	Private	Good	21004290, 555686	ABB, SPX	1
16	Residential	3	Yes	Tarmac	20mm Plastic	6m	3	Private	Good	94109605, 22102043, 570130	SOCAM, MTF, SPX	1
17	Residential	8	Yes	Tarmac	20mm Iron	12m	1	Private	Good	537895	SPX	2
18	Residential	3	Yes	Concrete	20mm Plastic	1m	2	Private	Good	297574, 94051428	SPX, SOCAM	1
19	Residential	2	Yes	Tarmac	20mm Plastic	5m	2	Private	Good	152649, 581616	SPX, SPX	1
20	Residential	2	Yes	N/A	20mm Iron	7m	1	Private	Good	152341	SPX	1
21	Residential	4	Yes	N/A	25mm Plastic	4m	4	Private	Average	94092232, 94027222, 349439, 94060535	SOCAM, SOCAM, SPX, SOCAM	2
22	Residential	2	Yes	Concrete	20mm Iron	5m	1	Private	Poor	94013993	SOCAM	1
23	Residential	2	No	Tarmac	20mm Iron	8m	1	Private	Poor	94111906	SOCAM	1
24	Residential	1	Yes	Concrete	20mm Iron	6m	UNK	Private	UNK	Unknown	Unknown	1
25	Commercial	0	Yes	Concrete	20mm Iron	5m	1	Private	Poor	Unknown - not accessible	SMC	2
26	Mixed	2	Yes	Tarmac	20mm Iron	15m	2	Private	Poor	22147021, 94112724	MTF, SOCAM	2
27	Mixed	4	Yes	Concrete	20mm Plastic	12m	4	Public	Good	555415, 320408, 94025907, Sub mtr (private)	SPX, SPX, SOCAM	2
28	Residential	4	Yes	N/A	25mm Plastic	4m	4	Public	Average	90741840, 218643, 94000875, 186296	SMC, SPX, SOCAM, SPX	1
29	Mixed	1 commercial, 2 residential	Yes	N/A	25mm Plastic	6m	1	Private	Poor	159089	SPX	2
30												
31												
32												
33												
34												
35												
36												
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48												
49												
50												

Total

Quantities 6

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Zarqa **Date of Survey:** **Survey By:**

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?		
								GOOD	25211801	MTF			
								GOOD	25205185	MTF			
								GOOD	25208905	MTF			
								GOOD	261099	SPX			
1	Residential	9	N	--	--	9	Private	GOOD	25205854	MTF			
								GOOD	25210123	MTF			
								GOOD	110921	SPX			
								GOOD	252030534	MTF			
								BAD	22085749	MTF			
								GOOD	186851	SPX			
								GOOD	942005507				SOCAM
								GOOD	584330	SPX			
								GOOD	25188988	MTF			
2	Residential	9	N	--	--	9	Private	GOOD	214102	SPX			
								GOOD	577492	SPX			
								GOOD	524594	SPX			
								GOOD	23188528	MTF			
								GOOD	141975	SPX			
3	Residential	10	N	--	--	1	Private	GOOD	129516	SPX			
								GOOD	553711	SPX			
4								GOOD	507133	SPX			
	Residential	4	N	--	--	3	Private	GOOD	133673	SPX			
5	Residential	1	N	--	--	1		GOOD	225089	SPX			
								GOOD	88129419	SPX			
								GOOD	262052	SPX			
								GOOD	22094805	MTF			
6								GOOD	324385	SPX			
								GOOD	145402	SPX			
								GOOD	88155157	SPX			
								GOOD	288392	SPX			
	Residential	8	Y	PE	4	8		GOOD	8818281	SPX			
7	Residential	8	N	----	----	----	Private	UN RECHABLE					
8	Residential	1	N	--	--	1		GOOD	43710	SPX			
9													
	Residential	6	N	--	--	2	Private	UN RECHABLE					
10								BAD	4850309	SPX			
	Residential	2	N	--	--	2	Private	GOOD	95566				SOCAM
11	Residential	2	N	--	--	1	Private	GOOD	600455	SPX			
12	MIXED	4	N	--	--	1	Private	GOOD	88126018	SPX			
13	Residential	1	N	--	--	1	Private	GOOD	115273				SOCAM
14	Residential	1	N	--	--	1	Private	GOOD	26307458	MTF			
15	MIXED	1	N	--	--	1	Private	GOOD	606016	SPX			
16	Residential	1	UN RECHABLE										
17	Residential	1	UN RECHABLE										
18	Residential	1	N	--	--	1	Private	GOOD	24150134	MTF			
19	Residential	2	N	--	--	1	Private	GOOD	21080031	ABB			
20	Residential	1	N	--	--	1	Private	UN RECHABLE					
21	Residential	1	N	--	--	1	Private	UN RECHABLE					
							Private	GOOD	9501	SPX			
22	Residential	2				2	Private	GOOD	97181				SOCAM
23	Residential	1	N	--	--	1	Private	GOOD	21043313	ABB			
								GOOD	25247306	MTF			
								GOOD	95486				SOCAM
								GOOD	21079789	ABB			
24	Residential	4	N	--	--	4	Private	GOOD	21079233	ABB			
25	Residential	4	N	--	--	1	Private	GOOD	24159653	MTF			
26	Residential	1	N	--	--	1	Private	GOOD	58092				SOCAM
	Residential							GOOD	116742	SPX			
								GOOD	537465	SPX			
								GOOD	6012				SOCAM
27		4	N	--	--	4	Private	GOOD	181504	SPX			
								GOOD	116742	SPX			
28								GOOD	537465	SPX			
								GOOD	606012	SOCAM			
	Residential	4	N	..	..	4	Private	GOOD	181504	SPX			
								GOOD	168281	SPX			
29	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	**GOOD**	184847	SPX			
								GOOD	N.A	SPX			
30	Residential	2	N	..	..	1	Private	GOOD	21057673	ABB			
31	Residential	1	Y	PLASTIC	5M	1	Private	GOOD	9839	SPX			
32	Residential	1	Y	Glvanized	7m	1	Private	GOOD	91772	socam			
33	Residential	1	n	..	..	1	Private	GOOD	20843123	MTF			
34	Residential	1	N	..	..	1	Private	GOOD	153000	SPX			
35	Residential	..	N	..	..	..	Private	..	..	..			
36	Residential	1	N	..	..	1	Private	GOOD	881165899	SPX			
37	Residential	1	N	..	..	1	Private	GOOD	318917	SPX			
								GOOD	186657	SPX			
38	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	GOOD	39765	SPX			
								GOOD	531570	SPX			
39	Residential	1	N	..	..	1	Private	GOOD	18745	SPX			
40	Residential	1	N	..	..	1	Private	..	..	..			
								GOOD	2596475	MTF			
								GOOD	2519103	MTF			
41	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	**GOOD**	26302813	RAYLAN			
								GOOD	24169856	MTF			
42	**Residential**	**2**	**N**	**..**	**..**	**2**	**Private**	GOOD	24169996	MTF			
43	Residential	1	N	..	..	1	Private	GOOD	77724	MTF			
								GOOD	505094	SPX			
								GOOD	492964	SPX			
								GOOD	209703	SPX			
								GOOD	25189119	MTF			
								GOOD	368063	SPX			
								GOOD	750344	SPX			
								GOOD	25188345	MTF			
44	**Residential**	**8**	**N**	**..**	**..**	**8**	**Private**	**GOOD**	135776	SPX			
45	Residential	1	N	..	..	1	Private	GOOD	256398	SPX			
								GOOD	25211852	MTF			
46	**Residential**	**2**	**N**	**..**	**..**	**2**	**Private**	GOOD	25205772	MTF			

Quantities 7

Zarqa WSS

Meters Stopped Calculation

No. Of Meters stopped in any quarter from sample of meters that were working at beginning and end of sample period

Areas 1 to 6

All meters that were working at Q12003 with readings >= 10m3 (equivalent to c. 15 lcd)	12,907	
All of those meters that were still working at Q12008 with readings >= 10m3	11,461	Selected Sample

Of the Selected Sample, no. of meters that recorded <= 5m3 (c. 8 lcd) in any quarter from Q22003 to Q42007 inclusive

Quarter	No. Of Meters			
Q22003	116			
Q32003	106			
Q42003	213			
Q12004	296			
Q22004	224			
Q32004	144			
Q42004	281			
Q12005	296			
Q22005	351			
Q32005	276			
Q42005	318			
Q12006	291			
Q22006	134			
Q32006	123			
Q42006	106			
Q12007	130			
Q22007	88			
Q32007	417			
Q42007	404			
Average	227	out of	11,461	total

2.0%

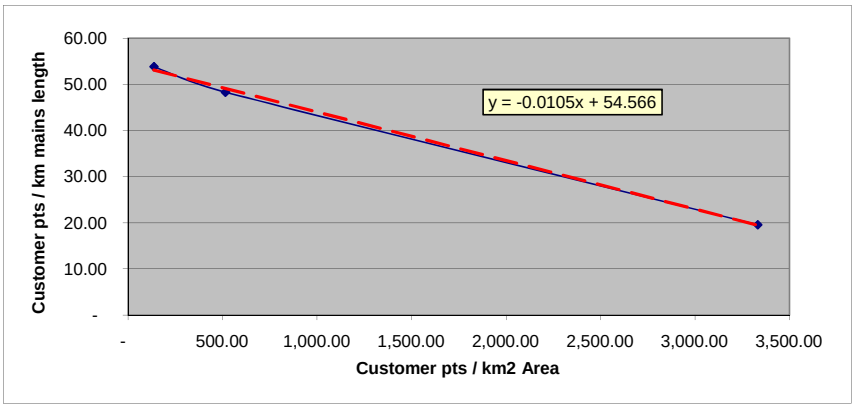
Quantities 8
Zarqa WSS
Density Statistics

Mains Length Shown on GIS

WSA		Mains
Density	NAME	Length
		(km)
High	Zarqa City	65.08
Medium	Hashmeya	96.53
Low	Berein	5.12

Mains Length Not Shown on GIS

WSA		Mains
Density	NAME	Length
		(km)
High	Zarqa City	-
Medium	Hashmeya	2.53
Low	Berein	6.30



Non-GIS Direct Measured Mains Length

Total Mains Length

WSA		Mains	Land Area	Customer points	Mains/Land Area	Customer points/ Land Area	Customer points/ Mains Length	Average Mains Length/ Customer Points (m)
Density	NAME	Length	km2	no.	(km/km2)	(No./km2)	(No./km)	
		(km)						
High	Zarqa City	65.08	1.00	3,333.00	65.08	3,333.00	51.22	19.52
Medium	Hashmeya	99.06	3.98	2,050.00	24.86	514.56	20.69	48.32
Low	Berein	12.44	1.70	231.00	7.34	136.28	18.57	53.85

Quantities 9
Zarqa WSS
Water Supply Area Statistics

WSA Distribution Area		Land Area			Customer points 2008		Development Density	Mains Length
		2008	2008	Total	Total	Density per serviced land area (No./km2)	mains length / customer pt (m)	Calculated
ID	NAME	Serviced	Unserviced					Total
		km2	km2	km2	no.			(m)
Az1	Azraq	5.56	13.95	19.51	923	166	52.8	48,756
AzTot		**5.56**	**13.95**	**19.51**	**923**			**48,756**
Du1	Hallabat	1.32	6.45	7.77	261	198	52.5	13,700
Du2	Dulail	7.17	44.32	51.49	2,739	382	50.6	138,467
Du3	Tafeh	1.51	25.08	26.59	82	54	54.0	4,428
DuTot		**9.99**	**75.86**	**85.85**	**3,082**			**156,595**
Ka1	King Abdullah City High	-	9.08	9.08	1	-	54.6	55
Ka2	King Abdullah City Low	0.19	15.57	15.76	153	801	46.2	7,061
KaTot		**0.19**	**24.65**	**24.84**	**154**			**7,116**
Ta1	Tatweer	1.97	13.12	15.09	1,822	923	44.9	81,755
TaTot		**1.97**	**13.12**	**15.09**	**1,822**			**81,755**
Za1	Zarqa High	3.93	-	3.93	2,133	542	48.9	104,246
Za2	Zarqa Mid - Batrawi	11.63	0.98	12.61	20,572	1,769	36.0	740,444
Za3	Zarqa North	0.81	5.87	6.68	283	349	50.9	14,405
ZaTot		**16.37**	**6.85**	**23.22**	**22,988**			**859,095**
Aw1	Awajan High	4.91	-	4.91	5,585	1,138	42.6	238,006
Aw2	Awajan Mid	3.97	0.19	4.16	3,379	851	45.6	154,168
Aw4	Awajan West	3.35	6.15	9.49	2,092	625	48.0	100,430
Aw5	Awajan North	4.55	7.06	11.61	2,558	562	48.7	124,475
AwTot		**16.77**	**13.40**	**30.17**	**13,614**			**617,079**
Ru1	Russaifah North West	1.66	11.26	12.92	392	236	52.1	20,420
Ru3	Russaifah High	4.15	4.99	9.14	7,965	1,917	34.4	274,294
Ru4	Russaifah Low	3.63	-	3.63	5,743	1,582	38.0	217,970
Ru5	Hitteen Tower	0.44	0.18	0.62	1,008	2,271	30.7	30,963
Ru6	Hitteen Reservoir	6.19	5.53	11.72	10,054	1,624	37.5	377,169
RuTot		**16.08**	**21.95**	**38.03**	**25,162**			**920,815**
No1	Khaw	0.30	18.50	18.80	162	539	48.9	7,922
No2	Hashmeya South	0.10	3.62	3.72	78	768	46.5	3,627
No3	Hashmeya Town	4.11	3.01	7.12	3,110	757	46.6	144,974
No4	Hashmeya Rural	0.83	12.04	12.87	413	500	49.3	20,367
No5	Sukhna	3.94	19.84	23.78	2,474	628	48.0	118,673
NoTot		**9.27**	**57.02**	**66.29**	**6,237**			**295,564**
We1	Merhib	1.53	10.09	11.62	303	198	52.5	15,905
We2	Berein	3.58	15.01	18.59	548	153	53.0	29,021
We3	Um Rumanneh	3.90	21.09	24.99	725	186	52.6	38,147
We4	Sarout	2.08	10.66	12.74	208	100	53.5	11,131
We5	Alouk	3.83	19.12	22.95	691	180	52.7	36,396
No7	Qunaya	0.65	12.11	12.76	112	172	52.8	5,910
WNWTot		**15.57**	**88.08**	**103.65**	**2,587**			**136,509**
TOTAL for WSAs		**91.80**	**314.87**	**406.67**	**76,569**			**3,123,285**

Additional Areas outside WSAs			**4,555**	**20**		
Total of Zarqa Governorate			**4,962**	**76,589**		**3,123,285**

Quantities 10 Zarqa WSS

Water Supply Area Pipe Details from GIS

WSA		Steel						Galvanised Steel						Ductile Iron					
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total
Az1	Azraq			7,808	5,096	738	13,643						-				246		246
AzTot		**-**	**-**	**7,808**	**5,096**	**738**	**13,643**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**246**	**-**	**246**
Du1	Hallabat			2,301	2,229		4,530	11,052					11,052					1,859	1,859
Du2	Dulail			16,024	12,614	13,195	41,834	95,742					95,742						-
Du3	Tafeh			9,030		22,214	31,244	12,181					12,181						-
DuTot		**-**	**-**	**27,355**	**14,843**	**35,409**	**77,608**	**118,975**	**-**	**-**	**-**	**-**	**118,975**	**-**	**-**	**-**	**-**	**1,859**	**1,859**
Ka1	King Abdullah City High						-						-			4,590	1,985	7,333	13,908
Ka2	King Abdullah City Low			1,584	497	5,886	7,966						-			11,940	5,682		17,622
KaTot		**-**	**-**	**1,584**	**497**	**5,886**	**7,966**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**16,531**	**7,666**	**7,333**	**31,530**
Ta1	Tatweer			10,356	165	7,887	18,408	396					396		2,553	1,958	3,567		8,078
TaTot		**-**	**-**	**10,356**	**165**	**7,887**	**18,408**	**396**	**-**	**-**	**-**	**-**	**396**	**-**	**2,553**	**1,958**	**3,567**	**-**	**8,078**
Za1	Zarqa High			8,357	2,273	192	10,823						-		2,568	589	4,681		7,837
Za2	Zarqa Mid - Batrawi		89	49,222	14,918	23,117	87,345	13,855					13,855		22,770	5,755	10,519	5,880	44,924
Za3	Zarqa North			6,372			6,372						-						-
ZaTot		**-**	**89**	**63,951**	**17,191**	**23,309**	**104,539**	**13,855**	**-**	**-**	**-**	**-**	**13,855**	**-**	**25,338**	**6,344**	**15,200**	**5,880**	**52,761**
Aw1	Awajan High			9,780	5,203	1,153	16,136	47	216				264		5,174	6,679	2,231	3,087	17,171
Aw2	Awajan Low			5,490	2,688	4,157	12,336	810					810		5,089	7,271	4,617	3,842	20,819
Aw3	Awajan West			12,166	699	297	13,161	5,266					5,266			1,533	1,873	1,750	5,156
Aw4	Awajan North			12,254	3,509		15,764	8,424	452				8,876		2,136	4,899			7,035
AwTot		**-**	**-**	**39,690**	**12,100**	**5,607**	**57,396**	**14,547**	**669**	**-**	**-**	**-**	**15,216**	**-**	**12,399**	**20,381**	**8,721**	**8,680**	**50,180**
Ru1	Russaifah North West			7,758			7,758	6,701					6,701				4,104	817	4,920
Ru2	Russaifah High A			31,198			31,198	84,491					84,491			73	8,733	5,228	14,034
Ru3	Russaifah Low		478	17,584	6	533	18,602	22,421					22,421			325	10,018	2,795	13,138
Ru4	Hitteen Tower			2,217			2,217	5,714					5,714				155		155
Ru5	Hitteen Reservoir			28,852		10,657	39,508	81,304					81,304				18,151	4,856	23,007
RuTot		**-**	**478**	**87,609**	**6**	**11,190**	**99,284**	**200,631**	**-**	**-**	**-**	**-**	**200,631**	**-**	**-**	**398**	**41,161**	**13,695**	**55,254**
No1	Khaw			707	2,266	1,124	4,097	1,060					1,060				4,561		4,561
No2	Hashmeya South			4,110		3,158	7,268	1,453					1,453			909	304		1,213
No3	Hashmeya Town			10,438			10,438	13,205					13,205				15,649		15,649
No4	Hashmeya Rural			7,315			7,315	345					345						-
No5	Sukhna			8,990			8,990	14,144					14,144						-
NoTot		**-**	**-**	**31,559**	**2,266**	**4,282**	**38,107**	**30,206**	**-**	**-**	**-**	**-**	**30,206**	**-**	**-**	**909**	**20,513**	**-**	**21,422**
We1	Merhib			5,923	6,009		11,932	7,058					7,058						-
We2	Berein			19,649			19,649	16,898					16,898				1,522		1,522
We3	Um Rumanneh		1,957	20,195	6,147		28,299	31,056					31,056						-
We4	Berein North			1,148			1,148	14,608					14,608						-
We5	Sarout/Alouk			5,640			5,640	44,866					44,866						-
We6	Qunaya			17,214		83	25,836	1,408					1,408						-
WeTot		**-**	**1,957**	**69,769**	**12,156**	**83**	**92,504**	**115,893**	**-**	**-**	**-**	**-**	**115,893**	**-**	**-**	**-**	**1,522**	**-**	**1,522**
TOTAL for WSAs		**-**	**2,525**	**339,681**	**64,321**	**94,390**	**509,456**	**494,504**	**-494,504**	**-**	**-**	**-**	**495,172**	**-**	**40,290**	**46,520**	**98,597**	**37,445**	**222,852**
							500,917												222,852
Additional Areas outside WSAs																			
Total of Zarqa Governorate		**-**	**2,525**	**339,681**	**64,321**	**94,390**	**509,456**	**494,504**	**-494,504**	**-**	**-**	**-**	**495,172**	**-**	**40,290**	**46,520**	**98,597**	**37,445**	**222,852**

WSA		PE / PVC						Other / Unknown						GIS Total						Density Total
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	
Az1	Azraq						-						-	-	-	7,808	5,343	738	13,889	48,756
AzTot		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7,808**	**5,343**	**738**	**13,889**	**48,756**
Du1	Hallabat						-						-	11,052	-	2,301	2,229	1,859	17,440	13,700
Du2	Dulail		22,801	9,996			32,796						-	95,742	22,801	26,020	12,614	13,195	170,373	138,467
Du3	Tafeh						-						-	12,181	-	9,030	-	22,214	43,425	4,428
DuTot		**-**	**22,801**	**9,996**	**-**	**-**	**32,796**	**-**	**-**	**-**	**-**	**-**	**-**	**118,975**	**22,801**	**37,351**	**14,843**	**37,268**	**231,237**	**156,595**
Ka1	King Abdullah City High	1,989	8,013				10,003						-	1,989	8,013	4,590	1,985	7,333	23,910	55
Ka2	King Abdullah City Low	3,977	10,093				14,070						-	3,977	10,093	13,524	6,178	5,886	39,658	7,061
KaTot		**5,966**	**18,106**	**-**	**-**	**-**	**24,072**	**-**	**-**	**-**	**-**	**-**	**-**	**5,966**	**18,106**	**18,115**	**8,163**	**13,219**	**63,568**	**7,116**
Ta1	Tatweer	2,737	27,893	3,090			33,720						-	3,133	30,446	15,405	3,732	7,887	60,603	81,755
TaTot		**2,737**	**27,893**	**3,090**	**-**	**-**	**33,720**	**-**	**-**	**-**	**-**	**-**	**-**	**3,133**	**30,446**	**15,405**	**3,732**	**7,887**	**60,603**	**81,755**
Za1	Zarqa High	4,471	45,345	129			49,945						-	4,471	47,913	9,075	6,954	192	68,605	104,246
Za2	Zarqa Mid - Batrawi	41,916	246,948	29			288,894						-	55,771	269,807	55,006	25,437	28,996	435,018	740,444
Za3	Zarqa North	15	14,355				14,370						-	15	14,355	6,372	-	-	20,742	14,405
ZaTot		**46,403**	**306,648**	**159**	**-**	**-**	**353,209**	**-**	**-**	**-**	**-**	**-**	**-**	**60,258**	**332,075**	**70,453**	**32,391**	**29,188**	**524,365**	**859,095**
Aw1	Awajan High	8,289	73,859				82,148			450			450	8,336	79,249	16,909	7,434	4,240	116,168	238,006
Aw2	Awajan Low	7,872	49,864				57,736						-	8,682	54,953	12,761	7,305	8,000	91,701	154,168
Aw3	Awajan West	644	42,417				43,062						-	5,910	42,417	13,698	2,572	2,047	66,644	100,430
Aw4	Awajan North	1,850	51,434	23			53,308						-	10,274	54,023	17,176	3,509	-	84,982	124,475
AwTot		**18,655**	**217,575**	**23**	**-**	**-**	**236,253**	**-**	**-**	**450**	**-**	**-**	**450**	**33,202**	**230,642**	**60,544**	**20,821**	**14,286**	**359,496**	**617,079**
Ru1	Russaifah North West			4,141			4,141	44	5,397	1,602			7,044	6,746	5,397	13,502	4,104	817	30,565	20,420
Ru2	Russaifah High		749				749	2,373	2,562	17,538		1,698	24,171	86,864	3,311	48,809	8,733	6,926	154,643	274,294
Ru3	Russaifah Low		828				828		9,577	3,475			13,052	22,421	10,883	21,384	10,024	3,328	68,041	217,970
Ru4	Hitteen Tower						-			272		157	428	5,714	-	2,489	155	157	8,514	30,963
Ru5	Hitteen Reservoir						-	8,882	19,508	15,705	542	1,920	46,557	90,186	19,508	44,557	18,693	17,432	190,376	377,169
RuTot		**-**	**1,577**	**4,141**	**-**	**-**	**5,719**	**11,299**	**37,044**	**38,592**	**542**	**3,775**	**91,252**	**211,930**	**39,100**	**130,741**	**41,709**	**28,660**	**452,139**	**920,815**
No1	Khaw			3,795			3,795	427		570			997	1,487	-	5,072	6,827	1,124	14,509	7,922
No2	Hashmeya South	912	1,587				2,499	105	243				348	2,470	1,830	5,019	304	3,158	12,781	3,627
No3	Hashmeya Town	5,093		9,670			14,763	23,091	48,067	4,566			75,724	41,389	48,067	24,674	15,649	-	129,778	144,974
No4	Hashmeya Rural	106		2,260			2,365		17,893	5,998			23,891	450	17,893	15,572	-	-	33,916	20,367
No5	Sukhna	1,619	2,453	4,392			8,465	8,557	31,800	15,106			55,463	24,321	34,254	28,488	-	-	87,062	118,673
NoTot		**7,729**	**4,040**	**20,117**	**-**	**-**	**31,886**	**32,181**	**98,004**	**26,240**	**-**	**-**	**156,425**	**70,117**	**102,045**	**78,824**	**22,780**	**4,282**	**278,047**	**295,564**
We1	Merhib	440	9,997				10,437						-	7,498	9,997	5,923	6,009	-	29,426	15,905
We2	Berein						-			6,366	5,213		11,578	16,898	-	26,014	6,735	-	49,647	29,021
We3	Um Rumanneh						-			2,709			2,709	31,056	1,957	22,904	6,147	-	62,065	38,147
We4	Berein North						-	301		5,658			5,959	14,909	-	6,806	-	-	21,715	11,131
We5	Sarout/Alouk						-		671	5,861			6,532	44,866	671	11,501	-	-	57,038	36,396
We6	Qunaya	230					859		1,603		2,017		3,620	1,637	1,603	17,214	2,017	83	22,554	5,910
WeTot		**670**	**9,997**	**-**	**-**	**-**	**11,296**	**301**	**2,274**	**20,594**	**7,229**	**-**	**30,398**	**116,864**	**14,228**	**90,363**	**20,907**	**83**	**242,445**	**136,509**
TOTAL for WSAs		**82,159**	**608,636**	**37,526**	**-**	**-**	**728,951**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**620,443**	**789,442**	**509,604**	**170,689**	**135,611**	**2,225,788**	**3,123,285**
Additional Areas outside WSAs																			154,529	
Total of Zarqa Governorate		**82,159**	**608,636**	**37,526**	**-**	**-**	**728,951**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**620,443**	**789,442**	**509,604**	**170,689**	**135,611**	**2,380,317**	**3,123,285**

Quantities 11 Zarqa WSS

Calculation of Secondary and Tertiary Rehabilitation and Restructuring Requirements

Prior to making allowance for recently completed works

WSA	GIS Total						Non-GIS Total (All Extra to <50mm Except Russaifah)						Density Total	Max of GIS and Density	GIS + Non-GIS Total								
	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total			up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	Tertiary %	Secondary %	Primary %
	Tertiary	Secondary	Secondary	Primary	Primary		Tertiary	Secondary	Secondary	Primary	Primary				Tertiary	Secondary	Secondary	Primary	Primary		length	length	length
Azraq	-	-	7,808	5,343	738	13,889	34,867	-	-	-	-	34,867	48,756	48,756	34,867	-	7,808	5,343	738	48,756	72%	16%	12%
Dulail	118,975	22,801	37,351	14,843	37,268	231,237	-	-	-	-	-	-	156,595	231,237	118,975	22,801	37,351	14,843	37,268	231,237	51%	26%	23%
KABA	5,966	18,106	18,115	8,163	13,219	63,568	-	-	-	-	-	-	7,116	63,568	5,966	18,106	18,115	8,163	13,219	63,568	9%	57%	34%
Tatweer	3,133	30,446	15,405	3,732	7,887	60,603	21,153	-	-	-	-	21,153	81,755	81,755	24,286	30,446	15,405	3,732	7,887	81,755	30%	56%	14%
Zarqa	60,258	332,075	70,453	32,391	29,188	524,365	334,730	-	-	-	-	334,730	859,095	859,095	394,988	332,075	70,453	32,391	29,188	859,095	46%	47%	7%
Awajan	33,202	230,642	60,544	20,821	14,286	359,496	257,584	-	-	-	-	257,584	617,079	617,079	290,786	230,642	60,544	20,821	14,286	617,079	47%	47%	6%
Russaifah	211,930	39,100	130,741	41,709	28,660	452,139	215,845	252,831	-	-	-	468,676	920,815	920,815	427,775	291,931	130,741	41,709	28,660	920,815	46%	46%	8%
North	70,117	102,045	78,824	22,780	4,282	278,047	17,517	-	-	-	-	17,517	295,564	295,564	87,634	102,045	78,824	22,780	4,282	295,564	30%	61%	9%
West NorthWest	116,864	14,228	90,363	20,907	83	242,445	-	-	-	-	-	-	136,509	242,445	116,864	14,228	90,363	20,907	83	242,445	48%	43%	9%
All WSA's	620,443	789,442	509,604	170,689	135,611	2,225,788	881,696	252,831	-	-	-	1,134,527	3,123,285	3,360,316	1,502,140	1,042,273	509,604	170,689	135,611	3,360,316	45%	46%	9%
Non WSA						154,529							-	154,529					154,529	154,529			
Total						2,380,317							3,123,285	3,514,844	1,502,140	1,042,273	509,604	170,689	290,139	3,514,844			

Rehabilitation Ratios	Rehab	Restructure
Steel	50%	100%
Galvanised Metal	100%	100%
Ductile Iron	20%	100%
PE/PVC	50%	100%
Other/Unknown	80%	100%
Non-GIS	80%	100%

Russaifah Adjustment to match aggregate tertiary ratio of Zarqa and Awajan WSAs 46.456%

427,775.32

215,845.36

Tertiary m length	Secondary m length	Primary m length
34,867	7,808	6,081
118,975	60,151	52,111
5,966	36,221	21,382
24,286	45,851	11,619
394,988	402,528	61,580
290,786	291,187	35,107
427,775	422,671	70,369
87,634	180,869	27,062
116,864	104,591	20,990
1,502,140	1,551,877	306,300
-	-	154,529
1,502,140	1,551,877	460,828

Tert+Sec m length	Primary m length	All m length
42,675	6,081	48,756
179,126	52,111	231,237
42,187	21,382	63,568
70,137	11,619	81,755
797,516	61,580	859,095
581,972	35,107	617,079
850,446	70,369	920,815
268,502	27,062	295,564
221,455	20,990	242,445
3,054,016	306,300	3,360,316
-	154,529	154,529
3,054,016	460,828	3,514,844

WSA	Rehab up to 300mm diam Total						Restructure up to 300mm diam Total					
	up to 50mm	60 - 90mm	100-150mm	200-300mm			up to 50mm	60 - 90mm	100-150mm	200-300mm		
	Tertiary	Secondary	Secondary	Primary			Tertiary	Secondary	Secondary	Primary		
Azraq	27,894	-	3,904	2,597			34,867	-	7,808	5,343		
Dulail	118,975	11,400	18,675	7,422			118,975	22,801	37,351	14,843		
KABA	2,983	9,053	4,098	1,782			5,966	18,106	18,115	8,163		
Tatweer	18,687	14,457	7,115	796			24,286	30,446	15,405	3,732		
Zarqa	304,841	158,436	33,323	11,636			394,988	332,075	70,453	32,391		
Awajan	229,942	111,936	24,293	7,794			290,786	230,642	60,544	20,821		
Russaifah	382,346	232,928	76,829	8,669			427,775	291,931	130,741	41,709		
North	73,829	80,424	47,011	5,236			87,634	102,045	78,824	22,780		
West NorthWest	116,469	7,796	51,360	12,166			116,864	14,228	90,363	20,907		
All WSA's	1,275,965	626,430	266,609	58,097	-	-	1,502,140	1,042,273	509,604	170,689		

WSA	Total Customer Connections	Total Customer Meters
Azraq	602	991
Dulail	3,689	3,309
KABA		-
Tatweer	891	1,613
Zarqa	35,157	47,474
Awajan	15,952	21,885
Russaifah	29,023	35,921
North	4,729	7,293
West NorthWest	1,247	2,355
All WSA's	91,290	120,841

Quantities 12 Zarqa WSS

Water Supply Area Pipe Details from GIS

WSA		Steel						Galvanised Steel						Ductile Iron					
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total
	Al Gwaireyeh			22,975	10,240	2,793	36,008	13,504					13,504	9,116		3,502	797	1,482	14,897
AzTot		**-**	**-**	**22,975**	**10,240**	**2,793**	**36,008**	**13,504**	**-**	**-**	**-**	**-**	**13,504**	**9,116**	**-**	**3,502**	**797**	**1,482**	**14,897**
Du1	Hallabat			2,301	2,229		4,530	11,052					11,052					1,859	1,859
Du2	Dulail			16,024	12,614	13,195	41,834	95,742					95,742						-
Du3	Tafeh			9,030		22,214	31,244	12,181					12,181						-
DuTot		**-**	**-**	**27,355**	**14,843**	**35,409**	**77,608**	**118,975**	**-**	**-**	**-**	**-**	**118,975**	**-**	**-**	**-**	**-**	**1,859**	**1,859**
Ka1	King Abdullah City High						-						-			4,590	1,985	7,333	13,908
Ka2	King Abdullah City Low			1,584	497	5,886	7,966						-			11,940	5,682		17,622
KaTot		**-**	**-**	**1,584**	**497**	**5,886**	**7,966**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**16,531**	**7,666**	**7,333**	**31,530**
Ta1	Tatweer			10,356	165	7,887	18,408	396					396		2,553	1,958	3,567		8,078
TaTot		**-**	**-**	**10,356**	**165**	**7,887**	**18,408**	**396**	**-**	**-**	**-**	**-**	**396**	**-**	**2,553**	**1,958**	**3,567**	**-**	**8,078**
Za1	Zarqa High			8,357	2,273	192	10,823						-		2,568	589	4,681		7,837
Za2	Zarqa Mid - Batrawi		89	49,222	14,918	23,117	87,345	13,855					13,855		22,770	5,755	10,519	5,880	44,924
Za3	Zarqa North			6,372			6,372						-						-
ZaTot		**-**	**89**	**63,951**	**17,191**	**23,309**	**104,539**	**13,855**	**-**	**-**	**-**	**-**	**13,855**	**-**	**25,338**	**6,344**	**15,200**	**5,880**	**52,761**
Aw1	Awajan High			9,780	5,203	1,153	16,136	47	216				264		5,174	6,679	2,231	3,087	17,171
Aw2	Awajan Mid			5,490	2,688	4,157	12,336	810					810		5,089	7,271	4,617	3,842	20,819
Aw3	Awajan West			12,166	699	297	13,161	5,266					5,266			1,533	1,873	1,750	5,156
Aw4	Awajan North			12,254	3,509		15,764	8,424	452				8,876		2,136	4,899			7,035
AwTot		**-**	**-**	**39,690**	**12,100**	**5,607**	**57,396**	**14,547**	**669**	**-**	**-**	**-**	**15,216**	**-**	**12,399**	**20,381**	**8,721**	**8,680**	**50,180**
Ru1	Russaifah North West			7,758			7,758	6,701					6,701				4,104	817	4,920
Ru2	Russaifah High A			31,198			31,198	84,491					84,491			73	8,733	5,228	14,034
Ru3	Russaifah Low		478	17,584	6	533	18,602	22,421					22,421			325	10,018	2,795	13,138
Ru4	Hitteen Tower			2,217			2,217	5,714					5,714				155		155
Ru5	Hitteen Reservoir			28,852		10,657	39,508	81,304					81,304				18,151	4,856	23,007
RuTot		**-**	**478**	**87,609**	**6**	**11,190**	**99,284**	**200,631**	**-**	**-**	**-**	**-**	**200,631**	**-**	**-**	**398**	**41,161**	**13,695**	**55,254**
No1	Khaw			707	2,266	1,124	4,097	1,060					1,060				4,561		4,561
No2	Hashmeya South			4,110		3,158	7,268	1,453					1,453			909	304		1,213
No3	Hashmeya Town			10,438			10,438	13,205					13,205				15,649		15,649
No4	Hashmeya Rural			7,315			7,315	345					345						-
No5	Sukhna			8,990			8,990	14,144					14,144						-
NoTot		**-**	**-**	**31,559**	**2,266**	**4,282**	**38,107**	**30,206**	**-**	**-**	**-**	**-**	**30,206**	**-**	**-**	**909**	**20,513**	**-**	**21,422**
We1	Merhib			5,923	6,009		11,932	7,058					7,058						-
We2	Berein			19,649			19,649	16,898					16,898				1,522		1,522
We3	Um Rumanneh		1,957	20,195	6,147		28,299	31,056					31,056						-
We4	Berein North			1,148			1,148	14,608					14,608						-
We5	Sarout/Alouk			5,640			5,640	44,866					44,866						-
We6	Qunaya			17,214		83	25,836	1,408					1,408						-
WeTot		**-**	**1,957**	**69,769**	**12,156**	**83**	**92,504**	**115,893**	**-**	**-**	**-**	**-**	**115,893**	**-**	**-**	**-**	**1,522**	**-**	**1,522**
TOTAL for WSAs		**-**	**2,525**	**354,848**	**69,464**	**96,445**	**531,821**	**508,008**	**-**	**508,008**	**-**	**-**	**-**	**508,676**	**9,116**	**40,290**	**50,022**	**99,148**	**38,927**	**237,503**
							523,282												237,503
Additional Areas outside WSAs																			
Total of Zarqa Governorate		**-**	**2,525**	**354,848**	**69,464**	**96,445**	**531,821**	**508,008**	**-**	**508,008**	**-**	**-**	**-**	**508,676**	**9,116**	**40,290**	**50,022**	**99,148**	**38,927**	**237,503**

WSA		PE / PVC						Other / Unknown						GIS Total						Density Total
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	
Az1	Azraq	23,560	114,129				137,689						-	46,180	114,129	26,477	11,037	4,275	202,098	48,756
AzTot		**23,560**	**114,129**	**-**	**-**	**-**	**137,689**	**-**	**-**	**-**	**-**	**-**	**-**	**46,180**	**114,129**	**26,477**	**11,037**	**4,275**	**202,098**	**48,756**
Du1	Hallabat						-						-	11,052	-	2,301	2,229	1,859	17,440	13,700
Du2	Dulail		22,801	9,996			32,796						-	95,742	22,801	26,020	12,614	13,195	170,373	138,467
Du3	Tafeh						-						-	12,181	-	9,030	-	22,214	43,425	4,428
DuTot		**-**	**22,801**	**9,996**	**-**	**-**	**32,796**	**-**	**-**	**-**	**-**	**-**	**-**	**118,975**	**22,801**	**37,351**	**14,843**	**37,268**	**231,237**	**156,595**
Ka1	King Abdullah City High	1,989	8,013				10,003						-	1,989	8,013	4,590	1,985	7,333	23,910	55
Ka2	King Abdullah City Low	3,977	10,093				14,070						-	3,977	10,093	13,524	6,178	5,886	39,658	7,061
KaTot		**5,966**	**18,106**	**-**	**-**	**-**	**24,072**	**-**	**-**	**-**	**-**	**-**	**-**	**5,966**	**18,106**	**18,115**	**8,163**	**13,219**	**63,568**	**7,116**
Ta1	Tatweer	2,737	27,893	3,090			33,720						-	3,133	30,446	15,405	3,732	7,887	60,603	81,755
TaTot		**2,737**	**27,893**	**3,090**	**-**	**-**	**33,720**	**-**	**-**	**-**	**-**	**-**	**-**	**3,133**	**30,446**	**15,405**	**3,732**	**7,887**	**60,603**	**81,755**
Za1	Zarqa High	4,471	45,345	129			49,945						-	4,471	47,913	9,075	6,954	192	68,605	104,246
Za2	Zarqa Mid - Batrawi	41,916	246,948	29			288,894						-	55,771	269,807	55,006	25,437	28,996	435,018	740,444
Za3	Zarqa North	15	14,355				14,370						-	15	14,355	6,372	-	-	20,742	14,405
ZaTot		**46,403**	**306,648**	**159**	**-**	**-**	**353,209**	**-**	**-**	**-**	**-**	**-**	**-**	**60,258**	**332,075**	**70,453**	**32,391**	**29,188**	**524,365**	**859,095**
Aw1	Awajan High	8,289	73,859				82,148			450			450	8,336	79,249	16,909	7,434	4,240	116,168	238,006
Aw2	Awajan Mid	7,872	49,864				57,736						-	8,682	54,953	12,761	7,305	8,000	91,701	154,168
Aw3	Awajan West	644	42,417				43,062						-	5,910	42,417	13,698	2,572	2,047	66,644	100,430
Aw4	Awajan North	1,850	51,434	23			53,308						-	10,274	54,023	17,176	3,509	-	84,982	124,475
AwTot		**18,655**	**217,575**	**23**	**-**	**-**	**236,253**	**-**	**-**	**450**	**-**	**-**	**450**	**33,202**	**230,642**	**60,544**	**20,821**	**14,286**	**359,496**	**617,079**
Ru1	Russaifah North West			4,141			4,141	44	5,397	1,602			7,044	6,746	5,397	13,502	4,104	817	30,565	20,420
Ru2	Russaifah High		749				749	2,373	2,562	17,538		1,698	24,171	86,864	3,311	48,809	8,733	6,926	154,643	274,294
Ru3	Russaifah Low		828				828		9,577	3,475			13,052	22,421	10,883	21,384	10,024	3,328	68,041	217,970
Ru4	Hitteen Tower						-			272		157	428	5,714	-	2,489	155	157	8,514	30,963
Ru5	Hitteen Reservoir						-	8,882	19,508	15,705	542	1,920	46,557	90,186	19,508	44,557	18,693	17,432	190,376	377,169
RuTot		**-**	**1,577**	**4,141**	**-**	**-**	**5,719**	**11,299**	**37,044**	**38,592**	**542**	**3,775**	**91,252**	**211,930**	**39,100**	**130,741**	**41,709**	**28,660**	**452,139**	**920,815**
No1	Khaw			3,795			3,795	427		570			997	1,487	-	5,072	6,827	1,124	14,509	7,922
No2	Hashmeya South	912	1,587				2,499	105	243				348	2,470	1,830	5,019	304	3,158	12,781	3,627
No3	Hashmeya Town	5,093		9,670			14,763	23,091	48,067	4,566			75,724	41,389	48,067	24,674	15,649	-	129,778	144,974
No4	Hashmeya Rural	106		2,260			2,365		17,893	5,998			23,891	450	17,893	15,572	-	-	33,916	20,367
No5	Sukhna	1,619	2,453	4,392			8,465	8,557	31,800	15,106			55,463	24,321	34,254	28,488	-	-	87,062	118,673
NoTot		**7,729**	**4,040**	**20,117**	**-**	**-**	**31,886**	**32,181**	**98,004**	**26,240**	**-**	**-**	**156,425**	**70,117**	**102,045**	**78,824**	**22,780**	**4,282**	**278,047**	**295,564**
We1	Merhib	440	9,997				10,437						-	7,498	9,997	5,923	6,009	-	29,426	15,905
We2	Berein						-			6,366	5,213		11,578	16,898	-	26,014	6,735	-	49,647	29,021
We3	Um Rumanneh						-			2,709			2,709	31,056	1,957	22,904	6,147	-	62,065	38,147
We4	Berein North						-	301		5,658			5,959	14,909	-	6,806	-	-	21,715	11,131
We5	Sarout/Alouk						-		671	5,861			6,532	44,866	671	11,501	-	-	57,038	36,396
We6	Qunaya	230					859		1,603		2,017		3,620	1,637	1,603	17,214	2,017	83	22,554	5,910
WeTot		**670**	**9,997**	**-**	**-**	**-**	**11,296**	**301**	**2,274**	**20,594**	**7,229**	**-**	**30,398**	**116,864**	**14,228**	**90,363**	**20,907**	**83**	**242,445**	**136,509**
TOTAL for WSAs		**105,719**	**722,765**	**37,526**	**-**	**-**	**866,640**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**666,623**	**903,571**	**528,272**	**176,383**	**139,147**	**2,413,997**	**3,123,285**
Additional Areas outside WSAs																			- 33,680	
Total of Zarqa Governorate		**105,719**	**722,765**	**37,526**	**-**	**-**	**866,640**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**666,623**	**903,571**	**528,272**	**176,383**	**139,147**	**2,380,317**	**3,123,285**

Quantities 13

Population 7.
Zarqa WSS Pipe Lengths, Customer Points and System Inputs

2008

Current Arrangement	hrs/wk	ILI	Admin
	43	15.8	7.1%

Nodal Demands 2008

2008 Current Arrangement

WSA	Population	connections	Pipe Length					Water usage lcd		Physical Lo	Admin Los	Metered	Unmetered	Total SI	avg SI	GIS pts	Demand per GIS pt 2008 l/d				Total SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd	no.	dom	non-dom	UFW	Total	m3/d
Azraq	7,396	991	42,675	6,081	48,756	20.3	152	138.1	19.5	598	136	1,166		1,899	257	923	1,107	156	794	2,058	1,899
Dulail	37,790	3,309	179,126	52,111	231,237	14.3	163	48.4	9.8	2,273	343	2,197		4,813	127	3070	595	120	852	1,568	4,813
King Abdullah	-	-	42,187	21,382	63,568	0.0	0	-	-	257	20	-		277		154	-	-	1,797	1,797	277
Tatweer	8,501	1,613	70,137	11,619	81,755	19.7	104	64.0	1.4	983	118	556		1,656	195	1799	302	7	612	921	1,656
Zarqa	283,526	47,474	797,516	61,580	859,095	55.3	330	55.5	3.4	22,665	3,027	16,723		42,415	150	22988	685	42	1,118	1,845	42,415
Awajan	149,171	21,885	581,972	35,107	617,079	35.5	242	59.7	2.0	11,342	1,579	9,208		22,130	148	13614	654	22	949	1,626	22,130
Russaifah	303,448	35,921	850,446	70,369	920,815	39.0	330	50.6	1.5	18,244	2,618	15,823		36,685	121	25160	611	18	829	1,458	36,685
North	51,629	7,293	268,502	27,062	295,564	24.7	175	62.4	2.8	4,143	577	3,367		8,087	157	6127	526	23	770	1,320	8,087
West-NorthWest	12,864	2,355	221,455	20,990	242,445	9.7	53	78.7	4.0	1,932	230	1,063		3,225	251	2665	380	19	811	1,210	3,225
Non-WSA				154,529	154,529					625	276		2,961	3,861		89					3,861
TOTAL for WSAs	854,325	120,841	3,054,016	460,828	3,514,844	34.4	243	55.8	2.9	63,062	8,923	50,103	2,961	125,049	146	76,589					125,049

2030 Full Network Performance Standard

Notes on calculation of future pipe lengths and customer connection points
New primary pipes will increase at 50% of sec/tert rate
For new sec/tert pipe density 2008-2030, allow that 10% of pop increase on ex pipes
Remainder of increase on pipes at length ratio 2.14:3.34 to existing length in each separate WSA except KABA

If pop 2008	5,000	pipe l 2008	20.00 km	primary	2	sec/tert	18.00
If pop 2030	10,000	pipe l 2030	30.96	primary	2.58	sec/tert	28.38

KABA pipe length calculated: KABA pipe length 2030 = Zarqa pipe length 2030
Connections for present pop increasing by 10% to allow for additional separation of combined and inclusion of currently unknown.
Connections for future additional pop at ratio of 2.14:3.34 to existing per pop (+10%).
Connections for future KABA at 10 persons per connection
For intermediate years between 2008-2030, linear interpolation of pipe length and customer points for each WSA, except KABA
For KABA, linear interpolation of pipe length from 2008-2020

Full Network Performance Standard	hrs/wk	ILI	Admin
	168	2.00	6.2%

2030 Full Network Performance Standard

WSA	Population	connections	Pipe Length					Water usage lcd		Physical Lo	Admin Los	Metered	Unmetered	Total SI	avg SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd
Azraq	10,154	1,351	50,136	6,613	56,749	23.8	179	100.0	5.2	384	96	1,068		1,548	152
Dulail	55,329	4,722	220,915	58,190	279,104	16.9	198	100.0	5.2	1,503	484	5,821		7,808	141
King Abdullah	436,008	43,601	955,586	67,682	1,023,268	42.6	426	100.0	5.2	10,767	3,746	45,868		60,381	138
Tatweer	16,888	2,896	109,980	14,919	124,899	23.2	135	100.0	5.2	829	172	1,777		2,778	164
Zarqa	399,586	65,918	955,586	67,682	1,023,268	64.4	390	100.0	5.2	15,230	3,788	42,036		61,054	153
Awajan	225,680	31,985	735,934	39,751	775,685	41.2	291	100.0	5.2	7,948	2,096	23,742		33,786	150
Russaifah	450,472	51,779	1,059,966	79,037	1,139,003	45.5	395	100.0	5.2	12,634	3,970	47,390		63,994	142
North	76,008	10,449	332,533	30,288	362,821	28.8	209	100.0	5.2	2,816	715	7,996		11,527	152
West-NorthWest	19,874	3,495	284,585	23,981	308,566	11.3	64	100.0	5.2	1,316	225	2,091		3,632	183
Non-WSA					250,000					500	225		2,909	3,634	
TOTAL for WSAs	1,690,000	216,196	4,705,220	388,144	5,343,364	40.5	316	100.0	5.2	53,926	15,518	177,788	2,909	250,141	148

Quantities 14 Zarqa WSS **Population, Average System Input, UFW and Infrastructure Statistics by Distribution Area 2008 and 2030**

WSA / Distribution Area		Population		AD System Input		UFW			Infrastructure 2008		Infrastructure 2030	
		2008	2030	2008	2030	2008	2030	2030	Pipe Length	Connections	Pipe Length	Connections
ID	NAME						Without project	With project				
				m3/d	m3/d	m3/d	m3/d	m3/d	m	no	m	no
Az1	Azraq	7,396	10,154	1,937	1,147	746	563	222	48,756	991	56,749	1,351
AzTot		**7,396**	**10,154**	**1,937**	**1,147**	**746**	**563**	**222**	**48,756**	**991**	**56,749**	**1,351**
Du1	Hallabat	3,213	4,704	414	532	216	261	103	17,440	281	21,050	402
Du2	Dulail	33,568	46,481	4,271	5,252	2,203	2,578	1,016	170,373	2,939	205,640	3,967
Du3	Tafeh	1,009	4,144	296	468	234	230	91	43,425	88	52,414	354
DuTot		**37,790**	**55,329**	**4,981**	**6,252**	**2,653**	**3,069**	**1,209**	**231,237**	**3,309**	**279,104**	**4,722**
Ka1	King Abdullah City High	-	276,589	105	31,255	105	15,341	6,046	23,910	-	384,889	27,659
Ka2	King Abdullah City Low	-	159,419	174	18,015	174	8,842	3,485	39,658	-	638,380	15,942
KaTot		**-**	**436,008**	**278**	**49,270**	**278**	**24,183**	**9,531**	**63,568**	**-**	**1,023,268**	**43,601**
Ta1	Tatweer	8,501	16,888	1,697	1,908	1,112	937	369	81,755	1,613	124,899	2,896
TaTot		**8,501**	**16,888**	**1,697**	**1,908**	**1,112**	**937**	**369**	**81,755**	**1,613**	**124,899**	**2,896**
Za1	Zarqa High	26,308	31,677	4,163	3,580	2,520	1,757	692	104,246	4,405	124,167	5,226
Za2	Zarqa Mid - Batrawi	253,728	313,932	38,991	35,475	23,146	17,412	6,863	740,444	42,485	881,943	51,788
Za3	Zarqa North	3,490	53,977	555	6,100	337	2,994	1,180	14,405	584	17,158	8,904
ZaTot		**283,526**	**399,586**	**43,708**	**45,154**	**26,003**	**22,163**	**8,735**	**859,095**	**47,474**	**1,023,268**	**65,918**
Aw1	Awajan High	61,196	76,882	9,291	8,688	5,301	4,264	1,681	238,006	8,978	299,180	10,896
Aw2	Awajan Low	37,024	47,069	5,666	5,319	3,252	2,611	1,029	154,168	5,432	193,793	6,671
Aw4	Awajan West	22,922	46,344	3,530	5,237	2,035	2,570	1,013	100,430	3,363	126,243	6,568
Aw5	Awajan North	28,028	55,386	4,323	6,259	2,496	3,072	1,211	124,475	4,112	156,469	7,850
AwTot		**149,171**	**225,680**	**22,809**	**25,502**	**13,084**	**12,517**	**4,933**	**617,079**	**21,885**	**775,685**	**31,985**
Ru1	Russaifah North West	4,704	47,676	616	5,387	355	2,644	1,042	20,420	557	25,258	5,480
Ru2	Russaifah High	96,064	129,853	11,961	14,674	6,619	7,202	2,839	274,294	11,372	339,288	14,926
Ru3	Russaifah Low	69,265	86,039	8,713	9,723	4,861	4,772	1,881	217,970	8,199	269,618	9,890
Ru4	Hitteen Tower	12,157	15,753	1,497	1,780	821	874	344	30,963	1,439	38,300	1,811
Ru5	Hitteen Reservoir	121,259	171,153	15,234	19,341	8,491	9,493	3,741	377,169	14,354	466,539	19,673
RuTot		**303,448**	**450,472**	**38,022**	**50,904**	**21,147**	**24,985**	**9,847**	**920,815**	**35,921**	**1,139,003**	**51,779**
No1	Khaw	1,356	5,752	219	650	126	319	126	7,922	192	9,725	791
No2	Hashmeya South	623	1,568	101	177	58	87	34	3,627	88	4,453	216
No3	Hashmeya Town	26,139	32,974	4,194	3,726	2,399	1,829	721	144,974	3,692	177,964	4,533
No4	Hashmeya Rural	3,471	6,942	562	784	323	385	152	20,367	490	25,002	954
No5	Sukhna	20,040	28,772	3,249	3,251	1,872	1,596	629	118,673	2,831	145,677	3,956
NoTot		**51,629**	**76,008**	**8,325**	**8,589**	**4,779**	**4,216**	**1,662**	**295,564**	**7,293**	**362,821**	**10,449**
We1	Merhib	1,454	2,258	381	255	256	125	49	29,426	266	37,452	397
We2	Berein	2,647	3,976	676	449	448	221	87	49,647	485	63,187	699
We3	Um Rumanneh	3,449	5,242	870	592	573	291	115	62,065	631	78,992	922
We4	Berein North	1,043	1,759	276	199	186	98	38	21,715	191	27,637	309
We5	Sarout/Alouk	3,304	4,978	822	562	538	276	109	57,038	605	72,594	875
We6	Qunaya	966	1,661	266	188	183	92	36	22,554	177	28,705	292
WeTot		**12,864**	**19,874**	**3,291**	**2,246**	**2,184**	**1,102**	**434**	**242,445**	**2,355**	**308,566**	**3,495**
TOTAL for WSAs		**854,325**	**1,690,000**	**125,049**	**190,973**	**71,985**	**93,736**	**36,944**	**3,360,316**	**120,841**	**5,093,364**	**216,196**

In addition to UFW effects, there are other significant level of service issues incorporated into the above statistics:

At 2008 => 37 hours per week average supply, 55.8 lcd average domestic use
With Project at 2030 => 70 hours per week average supply, 85 lcd average domestic use
Without Project at 2030 => 18 hours per week average supply, 53 lcd average domestic use

Alternative scenarios to the above can be generated, depending on constraints - quantity of water available, required minimum duration of supply, required minimum unit quantity of supply, etc.

Overall Costs 1 Zarqa WSS
All WSA Projects Summary Cost Estimate, inclusive of Construction Costs and Ancillary Costs

Updated on: 07/05/2010 dm

	Strategic Infra.	Water Supply Area (WSA)									Total Cost
		Azraq	Dulail	King Abdullah City	Tatweer	Zarqa	Awajan	Russaifah	North	West-NW	
Phase 1a. MCC								30%			
Primary Network	1,984,000	-	-	-	1,664,031	3,616,787	8,182,192	1,614,147	-	-	**17,061,156**
Secondary Network	-	-	-	-	1,412,292	7,152,275	8,026,195	5,197,827	-	-	**21,788,589**
Tertiary Network	-	-	-	-	1,038,827	16,268,506	12,983,065	6,340,053	-	-	**36,630,451**
Sum	**1,984,000**	**-**	**-**	**-**	**4,115,150**	**27,037,567**	**29,191,452**	**13,152,026**	**-**	**-**	**75,480,195**
Phase 1b. Others								70%			
Primary Network	5,120,729	-	86,800	-	-	813,676	-	3,766,342	-	-	**9,787,546**
Secondary Network	-	-	2,326,919	-	-	-	-	12,128,262	7,843,329	5,085,722	**27,384,232**
Tertiary Network	-	125,121	5,481,260	-	-	-	-	14,793,456	4,161,569	4,442,093	**29,003,500**
Sum	**5,120,729**	**125,121**	**7,894,980**	**-**	**-**	**813,676**	**-**	**30,688,060**	**12,004,898**	**9,527,815**	**66,175,279**
Phase 2.											
Primary Network	29,811,513	876,516	6,862,552	3,145,012	-	5,319,600	8,622,030	11,926,148	3,028,248	4,427,274	**74,018,893**
Secondary Network	-	-	-	-	80,476	-	-	-	-	-	**80,476**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**29,811,513**	**876,516**	**6,862,552**	**3,145,012**	**80,476**	**5,319,600**	**8,622,030**	**11,926,148**	**3,028,248**	**4,427,274**	**74,099,369**
Phase 3.											
Primary Network	32,725,932	-	334,476	-	-	740,652	-	-	1,337,972	1,844,364	**36,983,397**
Secondary Network	-	-	-	-	-	-	-	-	-	-	**-**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**32,725,932**	**-**	**334,476**	**-**	**-**	**740,652**	**-**	**-**	**1,337,972**	**1,844,364**	**36,983,397**
Total											
Primary Network	69,642,174	876,516	7,283,829	3,145,012	1,664,031	10,490,714	16,804,222	17,306,636	4,366,220	6,271,638	**137,850,992**
Secondary Network	-	-	2,326,919	-	1,492,768	7,152,275	8,026,195	17,326,089	7,843,329	5,085,722	**49,253,297**
Tertiary Network	-	125,121	5,481,260	-	1,038,827	16,268,506	12,983,065	21,133,509	4,161,569	4,442,093	**65,633,951**
Sum	**69,642,174**	**1,001,637**	**15,092,008**	**3,145,012**	**4,195,626**	**33,911,495**	**37,813,482**	**55,766,234**	**16,371,118**	**15,799,454**	**252,738,240**

Overall Costs 2

All WSA Projects Summary Cost Estimate, inclusive of Construction Costs and Ancillary Costs

Updated on: 13/05/2010 tc

	Strategic Infra.	Water Supply Area (WSA)									Total Cost
		Azraq	Dulail	King Abdullah City	Tatweer	Zarqa	Awajan	Russaifah	North	West-NW	
Phase 1 (MCC)											
Primary Network	1,984,000	-	-	-	1,664,031	3,616,787	8,182,192	1,614,147	-	-	**17,061,156**
Secondary Network	-	-	-	-	1,412,292	7,152,275	8,026,195	5,197,827	-	-	**21,788,589**
Tertiary Network	-	-	-	-	1,038,827	16,268,506	12,983,065	6,340,053	-	-	**36,630,451**
Sum	**1,984,000**	**-**	**-**	**-**	**4,115,150**	**27,037,567**	**29,191,452**	**13,152,026**	**-**	**-**	**75,480,195**
Phase 1 (TBD)											
Primary Network	5,120,729	-	86,800	-	-	813,676	-	3,766,342	-	-	**9,787,546**
Secondary Network	-	-	2,326,919	-	-	-	-	12,128,262	7,843,329	5,085,722	**27,384,232**
Tertiary Network	-	125,121	5,481,260	-	-	-	-	14,793,456	4,161,569	4,442,093	**29,003,500**
Sum	**5,120,729**	**125,121**	**7,894,980**	**-**	**-**	**813,676**	**-**	**30,688,060**	**12,004,898**	**9,527,815**	**66,175,279**
Phase 2.											
Primary Network	29,811,513	876,516	6,862,552	3,145,012	-	5,319,600	8,622,030	11,926,148	3,028,248	4,427,274	**74,018,893**
Secondary Network	-	-	-	-	80,476	-	-	-	-	-	**80,476**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**29,811,513**	**876,516**	**6,862,552**	**3,145,012**	**80,476**	**5,319,600**	**8,622,030**	**11,926,148**	**3,028,248**	**4,427,274**	**74,099,369**
Phase 3.											
Primary Network	32,725,932	-	334,476	-	-	740,652	-	-	1,337,972	1,844,364	**36,983,397**
Secondary Network	-	-	-	-	-	-	-	-	-	-	**-**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**32,725,932**	**-**	**334,476**	**-**	**-**	**740,652**	**-**	**-**	**1,337,972**	**1,844,364**	**36,983,397**
Total											
Primary Network	69,642,174	876,516	7,283,829	3,145,012	1,664,031	10,490,714	16,804,222	17,306,636	4,366,220	6,271,638	**137,850,992**
Secondary Network	-	-	2,326,919	-	1,492,768	7,152,275	8,026,195	17,326,089	7,843,329	5,085,722	**49,253,297**
Tertiary Network	-	125,121	5,481,260	-	1,038,827	16,268,506	12,983,065	21,133,509	4,161,569	4,442,093	**65,633,951**
Sum	**69,642,174**	**1,001,637**	**15,092,008**	**3,145,012**	**4,195,626**	**33,911,495**	**37,813,482**	**55,766,234**	**16,371,118**	**15,799,454**	**252,738,240**

Beneficiaries Phase 1 MCC (100% beneficiaries	854,325	-	-	-	8,501	226,821	149,171	91,034	-	-	475,527
Unit cost per Beneficiary for Phase 1 MCC	2	-	-	-	484	119	196	144	-	-	159
Beneficiaries of Full IMP	854,325	7,396	37,790	-	8,501	283,526	149,171	303,448	51,629	12,864	854,325
Unit cost per Beneficiary for Full IMP	82	135	399	-	494	120	253	184	317	1,228	296

Relative VFM in Priority Areas v other areas for Full IMP

	Beneficiaries	Full IMP Cost	Unit Cost per beneficiary	Unit cost as %
Priority Areas	475,527	85,868,174	180.57	41%
Other Areas	378,798	166,870,066	440.53	100%

Overall Costs 3: 20445 Zarqa WSS — Project Works Schedule 1 Strategic Infrastructure. 23/04/10.

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
1	Strategic Infrastructure		**Strategic Metering Infrastructure**		**1a**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
1	Strategic Infrastructure		**Mapping / GIS / Condition Assessments**		**1a**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
1	Strategic Infrastructure		Construct new trunk main pipeline	Hallabat-Hallabat junction (600mm diameter, 6.9km length), possible	2	Primary			PIP.N	3			600	6.9		JOD 390	JOD 2,691,000	JOD 53,820	JOD 53,820	JOD 134,550	JOD 134,550	JOD 269,100	JOD 3,336,840
1	Strategic Infrastructure		Construct new trunk main pipeline	Khaw-Awajan (700mm diameter, 16.3 km length)	2	Primary			PIP.N	4			600	16.3		JOD 390	JOD 6,361,626	JOD 127,233	JOD 127,233	JOD 318,081	JOD 318,081	JOD 636,163	JOD 7,888,416
1	Strategic Infrastructure		Upgrade primary network pipeline	Azraq-Khaw-Russaifah (600mm diameter, 83.0 km length)	2	Primary			PIP.RH	1			600	83.0		JOD 78	JOD 6,474,000	JOD 129,480	JOD 129,480	JOD 323,700	JOD 323,700	JOD 647,400	JOD 8,027,760
1	Strategic Infrastructure		Upgrade primary network pipeline	Corridor-Khaw (600mm diameter, 46.2 km length)	2	Primary			PIP.RH	2			600	46.2		JOD 78	JOD 3,603,600	JOD 72,072	JOD 72,072	JOD 180,180	JOD 180,180	JOD 360,360	JOD 4,468,464
1	Strategic Infrastructure		Upgrade primary network pipeline	Zatari-Khaw (600mm diameter, 11.8 km length) (Governorate Boundary)	2	Primary			PIP.RH	3			600	11.8		JOD 78	JOD 920,400	JOD 18,408	JOD 18,408	JOD 46,020	JOD 46,020	JOD 92,040	JOD 1,141,296
1	Strategic Infrastructure		Rehabilitate existing primary network pipeline	Vulnerable sections of Azraq/ Corridor/ Zatari-Khaw-Russaifah	2	Primary			PIP.RH	1			600	6.0		JOD 78.00	JOD 468,000	JOD 9,360	JOD 9,360	JOD 23,400	JOD 23,400	JOD 46,800	JOD 580,320
1	Strategic Infrastructure		Rehabilitate existing primary network pipeline	Vulnerable sections of Azraq/ Corridor/ Zatari-Khaw-Russaifah	2	Primary			PIP.RH	2			600	20.0		JOD 78.00	JOD 1,560,000	JOD 31,200	JOD 31,200	JOD 78,000	JOD 78,000	JOD 156,000	JOD 1,934,400
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Hallabat (Pumping Rate 900 m3/hr)	2	Primary			PS.U	3		900				JOD 748.00	JOD 673,200	JOD 13,464	JOD 13,464	JOD 33,660	JOD 33,660	JOD 67,320	JOD 834,768
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Khaw (Pumping Rate 4,400 m3/hr)	2	Primary			PS.U	5		4,400				JOD 207.00	JOD 910,800	JOD 18,216	JOD 18,216	JOD 45,540	JOD 45,540	JOD 91,080	JOD 1,129,392
1	Strategic Infrastructure		Upgrade existing reservoir	Azraq (Pump Flow-balancing Reservoir 12,000 m3)	2	Primary			RES.U	1	12,000					JOD 13.79	JOD 165,528	JOD 3,311	JOD 3,311	JOD 8,276	JOD 8,276	JOD 16,553	JOD 205,255
1	Strategic Infrastructure		Upgrade existing reservoir	Hallabat (Pump Flow-balancing Reservoir 1,000 m3)	2	Primary			RES.U	3	1,000					JOD 47.86	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
1	Strategic Infrastructure		Upgrade existing reservoir	Khaw (Pump Flow-balancing Reservoir 12,000 m3)	2	Primary			RES.U	5	12,000					JOD 13.79	JOD 165,528	JOD 3,311	JOD 3,311	JOD 8,276	JOD 8,276	JOD 16,553	JOD 205,255
1	Strategic Infrastructure		Construct new trunk main pipeline	Azraq-Khaw (600mm diameter, 64.0 km length), possible	3	Primary			PIP.N	1			600	64.0		JOD 390	JOD 24,960,000	JOD 499,200	JOD 499,200	JOD 1,248,000	JOD 1,248,000	JOD 2,496,000	JOD 30,950,400
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Corridor (Pumping Rate 1,300 m3/hr)	3	Primary	A & B		PS.U	2		1,300				JOD 562.78	JOD 731,610	JOD 14,632	JOD 14,632	JOD 36,581	JOD 36,581	JOD 73,161	JOD 907,196
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Zatari (Pumping Rate 300 m3/hr)	3	Primary	A & B		PS.U	4		300				JOD 1,933.80	JOD 580,140	JOD 11,603	JOD 11,603	JOD 29,007	JOD 29,007	JOD 58,014	JOD 719,374
1	Strategic Infrastructure		Upgrade existing reservoir	Corridor (Pump Flow-balancing Reservoir 1,000 m3)	3	Primary	A & B		RES.U	2	1,000					JOD 47.86	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
1	Strategic Infrastructure		Upgrade existing reservoir	Zatari (Pump Flow-balancing Reservoir 2,000 m3)	3	Primary	A & B		RES.U	4	2,000					JOD 36.14	JOD 72,270	JOD 1,445	JOD 1,445	JOD 3,614	JOD 3,614	JOD 7,227	JOD 89,615
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Azraq (Pumping Rate 2,400 m3/hr)	1b	Primary			PS.U	1		2,400				JOD 345.68	JOD 829,620	JOD 16,592	JOD 16,592	JOD 41,481	JOD 41,481	JOD 82,962	JOD 1,028,729
1	Strategic Infrastructure		**SCADA System**		**1b**	Primary											JOD 2,500,000	JOD 50,000	JOD 50,000	JOD 125,000	JOD 125,000	JOD 250,000	JOD 3,100,000
1	Strategic Infrastructure		**Asset Management - Spares, Contingencies**		**1b**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
													Phase 1a		Primary		JOD 1,600,000	JOD 32,000	JOD 32,000	JOD 80,000	JOD 80,000	JOD 160,000	JOD 1,984,000
													Phase 1b		Primary		JOD 4,129,620	JOD 82,592	JOD 82,592	JOD 206,481	JOD 206,481	JOD 412,962	JOD 5,120,729
													Phase 2		Primary		JOD 24,041,543	JOD 480,831	JOD 480,831	JOD 1,202,077	JOD 1,202,077	JOD 2,404,154	JOD 29,811,513
													Phase 3		Primary		JOD 26,391,881	JOD 527,838	JOD 527,838	JOD 1,319,594	JOD 1,319,594	JOD 2,639,188	JOD 32,725,932
													Total				JOD 56,163,044	JOD 1,123,261	JOD 1,123,261	JOD 2,808,152	JOD 2,808,152	JOD 5,616,304	JOD 69,642,174

Overall Costs 4:20445 Zarqa WSS

Project Works Schedule 2 Azraq
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
2	Azraq		Construct new pumping station	At Azraq Water Tower	2	Primary			PS.N	1		60				JOD 4,056	JOD 243,348	JOD 4,867	JOD 4,867	JOD 12,167	JOD 12,167	JOD 24,335	JOD 301,752
2	Azraq		Construct new water tower	Azraq Water Tower	2	Primary			RESW.N	2	600					JOD 739	JOD 443,520	JOD 8,870	JOD 8,870	JOD 22,176	JOD 22,176	JOD 44,352	JOD 549,965
2	Azraq		Install new DMA connection point	Install new DMA connection points	2	Primary			DMA.N	3					2	JOD 10,000	JOD 20,000	JOD 400	JOD 400	JOD 1,000	JOD 1,000	JOD 2,000	JOD 24,800
		Az1				Tertiary		No.	CM.N				50% Replac	495		50	JOD 24,750	JOD 495	JOD 495	JOD 1,238	JOD 1,238	JOD 2,475	JOD 30,690
		Az1				Tertiary		No.	CP.RS				100% Restr	762		100	JOD 76,154	JOD 1,523	JOD 1,523	JOD 3,808	JOD 3,808	JOD 7,615	JOD 94,431
														Phase 1b		Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD 100,904	JOD 2,018	JOD 2,018	JOD 5,045	JOD 5,045	JOD 10,090	JOD 125,121
																Total	JOD 100,904	JOD 2,018	JOD 2,018	JOD 5,045	JOD 5,045	JOD 10,090	JOD 125,121

Overall Costs 5: 20445 Zarqa WSS

Project Works Schedule 3 Dulail
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
3	Dulail		Construct new water tower	Hallabat Water Tower (Distribution Storage Reservoir 300 m3)	2	Primary			RESW.N	1	300					JOD 739.20	JOD 221,760	JOD 4,435	JOD 4,435	JOD 11,088	JOD 11,088	JOD 22,176	JOD 274,982
3	Dulail		Construct new pumping station	Dulail Highest Levels Boosters (Target Pumping Rate 35 m3/hr)	3	Primary			PS.N	1		35				JOD 5,421	JOD 189,735	JOD 3,795	JOD 3,795	JOD 9,487	JOD 9,487	JOD 18,974	JOD 235,271
3	Dulail		Construct new reservoir	Dulail (Distribution Storage Reservoir 3,000 m3)	2	Primary			RES.N	2	3,000					JOD 177.47	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
3	Dulail		Construct new pumping station	Tafeh Highest Levels Boosters (Target Pumping Rate 12 m3/hr)	3	Primary			PS.N	2		12				JOD 6,667	JOD 80,004	JOD 1,600	JOD 1,600	JOD 4,000	JOD 4,000	JOD 8,000	JOD 99,205
3	Dulail		Construct new reservoir	Tafeh (Distribution Storage Reservoir 500 m3)	2	Primary			RES.N	3	500					JOD 369.60	JOD 184,800	JOD 3,696	JOD 3,696	JOD 9,240	JOD 9,240	JOD 18,480	JOD 229,152
3	Dulail		Rehabilitate existing Primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200 - 300	7.422		JOD 55.25	JOD 410,066	JOD 8,201	JOD 8,201	JOD 20,503	JOD 20,503	JOD 41,007	JOD 508,481
3	Dulail		Construct new pumping station	Tafeh (to Dulail and Tafeh Distribution Storage Reservoirs - Target Pumping Rate 300 m3/hr)	2	Primary			PS.N	5		300				JOD 1,844	JOD 553,300	JOD 11,066	JOD 11,066	JOD 27,665	JOD 27,665	JOD 55,330	JOD 686,092
3	Dulail		Construct new primary network pipeline	Tafeh PS to Dulail Reservoir (400mm diameter, 2.9 km length)	2	Primary			PIP.N	7			400	2.9		JOD 195	JOD 565,500	JOD 11,310	JOD 11,310	JOD 28,275	JOD 28,275	JOD 56,550	JOD 701,220
3	Dulail		Construct new primary network pipeline	Dulail Reservoir to Dulail Distribution Area (400mm diameter, 2.0 km length)	2	Primary			PIP.N	8			400	2.0		JOD 195	JOD 390,000	JOD 7,800	JOD 7,800	JOD 19,500	JOD 19,500	JOD 39,000	JOD 483,600
3	Dulail		Restructure primary network pipeline	Restructure existing and rehabilitated Primary network pipelines	2	Primary			PIP.RS	8			200-300	14.843		JOD 12.16	JOD 180,491	JOD 3,610	JOD 3,610	JOD 9,025	JOD 9,025	JOD 18,049	JOD 223,809
3	Dulail		Construct new primary network pipeline	Dulail Reservoir to Dulail Distribution Area (300mm diameter 9.0 km length)	2	Primary			PIP.N	9			300	9.0		JOD 130	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
3	Dulail		Construct new primary network pipeline	Tafeh PS to Tafeh Reservoir (200mm diameter, 5.6 km length)	2	Primary			PIP.N	10			200	5.6		JOD 97.50	JOD 546,000	JOD 10,920	JOD 10,920	JOD 27,300	JOD 27,300	JOD 54,600	JOD 677,040
3	Dulail		Construct new primary network pipeline	Tafeh Reservoir to Tafeh Distribution Area (300mm diameter, 6.0 km length)	2	Primary			PIP.N	11			300	6.0		JOD 130	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
3	Dulail		Install new DMA connection point	DMA connection points	1b	Primary			DMA.N	12					7	JOD 10,000	JOD 70,000	JOD 1,400	JOD 1,400	JOD 3,500	JOD 3,500	JOD 7,000	JOD 86,800
		Du1				Secondary		m	PIP.RH				100 - 150mr	1,150		58.5	JOD 67,295	JOD 1,346	JOD 1,346	JOD 3,365	JOD 3,365	JOD 6,730	JOD 83,446
		Du1				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du1				Secondary		m	PIP.RS				100 - 150mr	2,301		8.77	JOD 20,177	JOD 404	JOD 404	JOD 1,009	JOD 1,009	JOD 2,018	JOD 25,020
		Du1				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du1				Tertiary		No.	CM.N				50% Replac	141		50	JOD 7,025	JOD 141	JOD 141	JOD 351	JOD 351	JOD 703	JOD 8,711
		Du1				Tertiary		No.	CP.RS				100% Restr	216		100	JOD 21,615	JOD 432	JOD 432	JOD 1,081	JOD 1,081	JOD 2,162	JOD 26,803
		Du1				Tertiary		m	PIP.RH				≤ 50mm	11,052		28.6	JOD 316,077	JOD 6,322	JOD 6,322	JOD 15,804	JOD 15,804	JOD 31,608	JOD 391,936
		Du1				Tertiary		m	PIP.RS				≤ 50mm	11,052		5.72	JOD 63,215	JOD 1,264	JOD 1,264	JOD 3,161	JOD 3,161	JOD 6,322	JOD 78,387
		Du2				Secondary		m	PIP.RH				100 - 150mr	13,010		58.5	JOD 761,086	JOD 15,222	JOD 15,222	JOD 38,054	JOD 38,054	JOD 76,109	JOD 943,747
		Du2				Secondary		m	PIP.RH				60 - 90mm	11,400		28.6	JOD 326,048	JOD 6,521	JOD 6,521	JOD 16,302	JOD 16,302	JOD 32,605	JOD 404,299
		Du2				Secondary		m	PIP.RS				100 - 150mr	26,020		8.77	JOD 228,196	JOD 4,564	JOD 4,564	JOD 11,410	JOD 11,410	JOD 22,820	JOD 282,963
		Du2				Secondary		m	PIP.RS				60 - 90mm	22,801		5.72	JOD 130,419	JOD 2,608	JOD 2,608	JOD 6,521	JOD 6,521	JOD 13,042	JOD 161,720
		Du2				Tertiary		No.	CM.N				50% Replac	1,470		50	JOD 73,475	JOD 1,470	JOD 1,470	JOD 3,674	JOD 3,674	JOD 7,348	JOD 91,109
		Du2				Tertiary		No.	CP.RS				100% Restr	2,261		100	JOD 226,077	JOD 4,522	JOD 4,522	JOD 11,304	JOD 11,304	JOD 22,608	JOD 280,335
		Du2				Tertiary		m	PIP.RH				≤ 50mm	95,742		28.6	JOD 2,738,229	JOD 54,765	JOD 54,765	JOD 136,911	JOD 136,911	JOD 273,823	JOD 3,395,404
		Du2				Tertiary		m	PIP.RS				≤ 50mm	95,742		5.72	JOD 547,646	JOD 10,953	JOD 10,953	JOD 27,382	JOD 27,382	JOD 54,765	JOD 679,081
		Du3				Secondary		m	PIP.RH				100 - 150mr	4,515		58.5	JOD 264,132	JOD 5,283	JOD 5,283	JOD 13,207	JOD 13,207	JOD 26,413	JOD 327,524
		Du3				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du3				Secondary		m	PIP.RS				100 - 150mr	9,030		8.77	JOD 79,195	JOD 1,584	JOD 1,584	JOD 3,960	JOD 3,960	JOD 7,919	JOD 98,201
		Du3				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du3				Tertiary		No.	CM.N				50% Replac	44		50	JOD 2,200	JOD 44	JOD 44	JOD 110	JOD 110	JOD 220	JOD 2,728
		Du3				Tertiary		No.	CP.RS				100% Restr	68		100	JOD 6,769	JOD 135	JOD 135	JOD 338	JOD 338	JOD 677	JOD 8,394
		Du3				Tertiary		m	PIP.RH				≤ 50mm	12,181		28.6	JOD 348,369	JOD 6,967	JOD 6,967	JOD 17,418	JOD 17,418	JOD 34,837	JOD 431,977
		Du3				Tertiary		m	PIP.RS				≤ 50mm	12,181		5.72	JOD 69,674	JOD 1,393	JOD 1,393	JOD 3,484	JOD 3,484	JOD 6,967	JOD 86,395

	Restructure customer connection points	**Phase 1b**	Primary Network	JOD 70,000	JOD 1,400	JOD 1,400	JOD 3,500	JOD 3,500	JOD 7,000	JOD 86,800
	Replace customer meters		Secondary Network	JOD 1,876,548	JOD 37,531	JOD 37,531	JOD 93,827	JOD 93,827	JOD 187,655	JOD 2,326,919
			Tertiary Network	JOD 4,420,371	JOD 88,407	JOD 88,407	JOD 221,019	JOD 221,019	JOD 442,037	JOD 5,481,260
			Total	JOD 6,366,919	JOD 127,338	JOD 127,338	JOD 318,346	JOD 318,346	JOD 636,692	JOD 7,894,980
		Phase 2	Primary Network	JOD 5,534,316	JOD 110,686	JOD 110,686	JOD 276,716	JOD 276,716	JOD 553,432	JOD 6,862,552
			Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
			Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
			Total	JOD 5,534,316	JOD 110,686	JOD 110,686	JOD 276,716	JOD 276,716	JOD 553,432	JOD 6,862,552

Overall Costs 6: 20445 Zarqa WSS

Project Works Schedule 4 King Abdullah WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
4	King Abdullah City		Construct new reservoir	King Abdullah Bin Aziz City Strategic Reservoir (Distribution Storage Reservoir 5,000 m3)	2	Primary			RES.N	1	5,000					JOD 145.86	JOD 729,300	JOD 14,586	JOD 14,586	JOD 36,465	JOD 36,465	JOD 72,930	JOD 904,332
4	King Abdullah City		Construct new trunk main pipeline	Khaw to New King Abdullah Reservoir	2	Primary			PIP.N	4			800	2.2		JOD 520	JOD 1,144,000	JOD 22,880	JOD 22,880	JOD 57,200	JOD 57,200	JOD 114,400	JOD 1,418,560
4	King Abdullah City		Construct new trunk main pipeline	Tamween to New King Abdullah Reservoir (400mm diameter, 3.4 km length)	2	Primary			PIP.N	5			400	3.4		JOD 195	JOD 663,000	JOD 13,260	JOD 13,260	JOD 33,150	JOD 33,150	JOD 66,300	JOD 822,120
															Phase 2	Primary Network	JOD 2,536,300	JOD 50,726	JOD 50,726	JOD 126,815	JOD 126,815	JOD 253,630	JOD 3,145,012
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 2,536,300	JOD 50,726	JOD 50,726	JOD 126,815	JOD 126,815	JOD 253,630	JOD 3,145,012

Overall Costs 7: 20445 Zarga WSS

Project Works Schedule 5 Tatweer WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
5	Tatweer		Construct new reservoir	Tatweer (Distribution Storage Reservoir 1,000 m3)	1a	Primary			RES.N	1	1,000					JOD 252	JOD 251,900	JOD 5,038	JOD 5,038	JOD 12,595	JOD 12,595	JOD 25,190	JOD 312,356
5	Tatweer		Construct new pumping station	Tatweer (to Tatweer Distribution Storage Reservoir - Target Pumping Rate 100 m3/hr)	1a	Primary			PS.N	2		100				JOD 3,597	JOD 359,700	JOD 7,194	JOD 7,194	JOD 17,985	JOD 17,985	JOD 35,970	JOD 446,028
5	Tatweer		Construct new primary network pipeline	Tatweer PS to Tatweer Reservoir (200mm diameter, 3.6 km length)	1a	Primary			PIP.N	3			200	3.6		JOD 97.50	JOD 351,000	JOD 7,020	JOD 7,020	JOD 17,550	JOD 17,550	JOD 35,100	JOD 435,240
5	Tatweer		Construct new pumping station	Tatweer (High level booster PS - Target Pumping Rate 10 m3/hr)	2	Secondary			PS.N	3		10				JOD 6,490	JOD 64,900	JOD 1,298	JOD 1,298	JOD 3,245	JOD 3,245	JOD 6,490	JOD 80,476
5	Tatweer		Construct new primary network pipeline	Tatweer Reservoir to Tatweer Distribution Area (300mm diameter, 2.0 km length)	1a	Primary			PIP.N	4			300	2.0		JOD 130	JOD 260,000	JOD 5,200	JOD 5,200	JOD 13,000	JOD 13,000	JOD 26,000	JOD 322,400
5	Tatweer		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	0.796		JOD 55.25	JOD 43,979	JOD 880	JOD 880	JOD 2,199	JOD 2,199	JOD 4,398	JOD 54,534
5	Tatweer		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	5					3	JOD 10,000	JOD 30,000	JOD 600	JOD 600	JOD 1,500	JOD 1,500	JOD 3,000	JOD 37,200
5	Tatweer		Restructure existing primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	3.732		JOD 12.16	JOD 45,381	JOD 908	JOD 908	JOD 2,269	JOD 2,269	JOD 4,538	JOD 56,273
		Ta1			1a	Secondary		m	PIP.RH				100 - 150mm	7,115		58.5	JOD 416,228	JOD 8,325	JOD 8,325	JOD 20,811	JOD 20,811	JOD 41,623	JOD 516,123
		Ta1			1a	Secondary		m	PIP.RH				60 - 90mm	14,457		28.6	JOD 413,467	JOD 8,269	JOD 8,269	JOD 20,673	JOD 20,673	JOD 41,347	JOD 512,699
		Ta1			1a	Secondary		m	PIP.RS				100 - 150mm	15,405		8.77	JOD 135,102	JOD 2,702	JOD 2,702	JOD 6,755	JOD 6,755	JOD 13,510	JOD 167,526
		Ta1			1a	Secondary		m	PIP.RS				60 - 90mm	30,446		5.72	JOD 174,148	JOD 3,483	JOD 3,483	JOD 8,707	JOD 8,707	JOD 17,415	JOD 215,944
		Ta1			1a	Tertiary		No.	CM.N				50% Replace	807		50	JOD 40,325	JOD 807	JOD 807	JOD 2,016	JOD 2,016	JOD 4,033	JOD 50,003
		Ta1			1a	Tertiary		No.	CP.RS				100% Restru	1,241		100	JOD 124,077	JOD 2,482	JOD 2,482	JOD 6,204	JOD 6,204	JOD 12,408	JOD 153,855
		Ta1			1a	Tertiary		m	PIP.RH				≤ 50mm	18,687		28.6	JOD 534,446	JOD 10,689	JOD 10,689	JOD 26,722	JOD 26,722	JOD 53,445	JOD 662,713
		Ta1			1a	Tertiary		m	PIP.RS				≤ 50mm	24,286		5.72	JOD 138,916	JOD 2,778	JOD 2,778	JOD 6,946	JOD 6,946	JOD 13,892	JOD 172,256
															Phase 1a	Primary Network	JOD 1,341,960	JOD 26,839	JOD 26,839	JOD 67,098	JOD 67,098	JOD 134,196	JOD 1,664,031
																Secondary Network	JOD 1,138,946	JOD 22,779	JOD 22,779	JOD 56,947	JOD 56,947	JOD 113,895	JOD 1,412,292
																Tertiary Network	JOD 837,764	JOD 16,755	JOD 16,755	JOD 41,888	JOD 41,888	JOD 83,776	JOD 1,038,827
																Total	JOD 3,318,669	JOD 66,373	JOD 66,373	JOD 165,933	JOD 165,933	JOD 331,867	JOD 4,115,150

Overall Costs 8: 20445 Zarqa WSS

Project Works Schedule 6 Zarqa WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
6	Zarqa		Construct new primary network pipeline	Batrawi and Zarqa High Reservoirs to Distribution Areas (300mm diameter, 9.0 km length)	1a	Primary			PIP.N	7			300	9.0		JOD 130	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
6	Zarqa		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	9					63	JOD 10,000	JOD 630,000	JOD 12,600	JOD 12,600	JOD 31,500	JOD 31,500	JOD 63,000	JOD 781,200
6	Zarqa		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	11.636		JOD 55.25	JOD 642,889	JOD 12,858	JOD 12,858	JOD 32,144	JOD 32,144	JOD 64,289	JOD 797,182
6	Zarqa		Restructure secondary and tertiary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	32.391		JOD 12.16	JOD 393,875	JOD 7,877	JOD 7,877	JOD 19,694	JOD 19,694	JOD 39,387	JOD 488,404
6	Zarqa		Upgrade existing reservoir	Zarqa PS Reservoir (Pump Flow-balancing Reservoir 4,500 m3)	1a	Primary			RES.U	1	4,500					JOD 17.78	JOD 80,000	JOD 1,600	JOD 1,600	JOD 4,000	JOD 4,000	JOD 8,000	JOD 99,200
		Za1			1a	Secondary			PIP.RH				100 - 150mm	4,361		58.5	JOD 255,113	JOD 5,102	JOD 5,102	JOD 12,756	JOD 12,756	JOD 25,511	JOD 316,340
		Za1			1a	Secondary			PIP.RH				60 - 90mm	23,186		28.6	JOD 663,122	JOD 13,262	JOD 13,262	JOD 33,156	JOD 33,156	JOD 66,312	JOD 822,271
		Za1			1a	Secondary			PIP.RS				100 - 150mm	9,075		8.77	JOD 79,587	JOD 1,592	JOD 1,592	JOD 3,979	JOD 3,979	JOD 7,959	JOD 98,688
		Za1			1a	Secondary			PIP.RS				60 - 90mm	47,913		5.72	JOD 274,062	JOD 5,481	JOD 5,481	JOD 13,703	JOD 13,703	JOD 27,406	JOD 339,837
		Za1			1a	Tertiary			CM.N				50% Replac	2,203		50	JOD 110,125	JOD 2,203	JOD 2,203	JOD 5,506	JOD 5,506	JOD 11,013	JOD 136,555
		Za1			1a	Tertiary			CP.RS				100% Restru	3,388		100	JOD 338,846	JOD 6,777	JOD 6,777	JOD 16,942	JOD 16,942	JOD 33,885	JOD 420,169
		Za1			1a	Tertiary			PIP.RH				≤ 50mm	30,218		28.6	JOD 864,246	JOD 17,285	JOD 17,285	JOD 43,212	JOD 43,212	JOD 86,425	JOD 1,071,665
		Za1			1a	Tertiary			PIP.RS				≤ 50mm	39,450		5.72	JOD 225,652	JOD 4,513	JOD 4,513	JOD 11,283	JOD 11,283	JOD 22,565	JOD 279,809
		Za2			1a	Secondary			PIP.RH				100 - 150mm	13,589		58.5	JOD 794,934	JOD 15,899	JOD 15,899	JOD 39,747	JOD 39,747	JOD 79,493	JOD 985,718
		Za2			1a	Secondary			PIP.RH				60 - 90mm	71,008		28.6	JOD 2,030,827	JOD 40,617	JOD 40,617	JOD 101,541	JOD 101,541	JOD 203,083	JOD 2,518,225
		Za2			1a	Secondary			PIP.RS				100 - 150mm	28,529		8.77	JOD 250,200	JOD 5,004	JOD 5,004	JOD 12,510	JOD 12,510	JOD 25,020	JOD 310,248
		Za2			1a	Secondary			PIP.RS				60 - 90mm	155,678		5.72	JOD 890,478	JOD 17,810	JOD 17,810	JOD 44,524	JOD 44,524	JOD 89,048	JOD 1,104,193
		Za2			1a	Tertiary			CM.N				50% Replac	13,113		50	JOD 655,625	JOD 13,113	JOD 13,113	JOD 32,781	JOD 32,781	JOD 65,563	JOD 812,975
		Za2			1a	Tertiary			CP.RS				100% Restru	20,173		100	JOD 2,017,300	JOD 40,346	JOD 40,346	JOD 100,865	JOD 100,865	JOD 201,730	JOD 2,501,452
		Za2			1a	Tertiary			PIP.RH				≤ 50mm	247,507		28.6	JOD 7,078,703	JOD 141,574	JOD 141,574	JOD 353,935	JOD 353,935	JOD 707,870	JOD 8,777,592
		Za2			1a	Tertiary			PIP.RS				≤ 50mm	309,343		5.72	JOD 1,769,440	JOD 35,389	JOD 35,389	JOD 88,472	JOD 88,472	JOD 176,944	JOD 2,194,106
		Za3			1a	Secondary			PIP.RH				100 - 150mm	3,186		58.5	JOD 186,373	JOD 3,727	JOD 3,727	JOD 9,319	JOD 9,319	JOD 18,637	JOD 231,102
		Za3			1a	Secondary			PIP.RH				60 - 90mm	7,178		28.6	JOD 205,277	JOD 4,106	JOD 4,106	JOD 10,264	JOD 10,264	JOD 20,528	JOD 254,544
		Za3			1a	Secondary			PIP.RS				100 - 150mm	6,372		8.77	JOD 55,880	JOD 1,118	JOD 1,118	JOD 2,794	JOD 2,794	JOD 5,588	JOD 69,291
		Za3			1a	Secondary			PIP.RS				60 - 90mm	14,355		5.72	JOD 82,111	JOD 1,642	JOD 1,642	JOD 4,106	JOD 4,106	JOD 8,211	JOD 101,817
		Za3			1a	Tertiary			CM.N				50% Replac	292		50	JOD 14,600	JOD 292	JOD 292	JOD 730	JOD 730	JOD 1,460	JOD 18,104
		Za3			1a	Tertiary			CP.RS				100% Restru	449		100	JOD 44,923	JOD 898	JOD 898	JOD 2,246	JOD 2,246	JOD 4,492	JOD 55,705
		Za3			1a	Tertiary			PIP.RH				≤ 50mm	8		28.6	JOD 216	JOD 4	JOD 4	JOD 11	JOD 11	JOD 22	JOD 268
		Za3			1a	Tertiary			PIP.RS				≤ 50mm	15		5.72	JOD 86	JOD 2	JOD 2	JOD 4	JOD 4	JOD 9	JOD 107
6	Zarqa		Construct new primary network pipeline	Batrawi Reservoir to Distribution Areas	2	Primary			PIP.N	3			600	8.0		JOD 390	JOD 3,120,000	JOD 62,400	JOD 62,400	JOD 156,000	JOD 156,000	JOD 312,000	JOD 3,868,800
6	Zarqa		Upgrade primary network pipeline	Khaw PS to Batrawi Reservoir	2	Primary			PIP.U	4			400	9.0		JOD 39.00	JOD 351,000	JOD 7,020	JOD 7,020	JOD 17,550	JOD 17,550	JOD 35,100	JOD 435,240
6	Zarqa		Upgrade primary network pipeline	Khaw PS to Batrawi Reservoir (700mm diameter, 9.0 km length)	2	Primary			PIP.U	3			700	9.0		JOD 91.00	JOD 819,000	JOD 16,380	JOD 16,380	JOD 40,950	JOD 40,950	JOD 81,900	JOD 1,015,560
6	Zarqa		Construct new reservoir	Additional Batrawi-level reservoir (Distribution Storage Reservoir 3,000 m3)	3	Primary			RES.N	1	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
6	Zarqa		Construct new pumping station	Zarqa High - Highest Levels Boosters (Target Pumping Rate 10 m3/hr)	3	Primary			PS.N	2		10				JOD 6,490	JOD 64,900	JOD 1,298	JOD 1,298	JOD 3,245	JOD 3,245	JOD 6,490	JOD 80,476
6	Zarqa		Upgrade existing pumping station	Zarqa PS (to Batrawi Distribution Storage Reservoir - Target Pumping Rate 500 m3/hr)	1b	Primary			PS.U	2		500				JOD 1,160	JOD 580,140	JOD 11,603	JOD 11,603	JOD 29,007	JOD 29,007	JOD 58,014	JOD 719,374
6	Zarqa		Upgrade primary network pipeline	Zarqa PS to Batrawi Reservoir (400mm diameter, 2.0 km length)	1b	Primary			PIP.U	5			400	2.0		JOD 39.00	JOD 76,050	JOD 1,521	JOD 1,521	JOD 3,803	JOD 3,803	JOD 7,605	JOD 94,302
															Phase 1a	Primary Network	JOD 2,916,764	JOD 58,335	JOD 58,335	JOD 145,838	JOD 145,838	JOD 291,676	JOD 3,616,787
																Secondary Network	JOD 5,767,963	JOD 115,359	JOD 115,359	JOD 288,398	JOD 288,398	JOD 576,796	JOD 7,152,275
																Tertiary Network	JOD 13,119,763	JOD 262,395	JOD 262,395	JOD 655,988	JOD 655,988	JOD 1,311,976	JOD 16,268,506
																Total	JOD 21,804,490	JOD 436,090	JOD 436,090	JOD 1,090,224	JOD 1,090,224	JOD 2,180,449	JOD 27,037,567
															Phase 2	Primary Network	JOD 4,290,000	JOD 85,800	JOD 85,800	JOD 214,500	JOD 214,500	JOD 429,000	JOD 5,319,600
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 4,290,000	JOD 85,800	JOD 85,800	JOD 214,500	JOD 214,500	JOD 429,000	JOD 5,319,600

Overall Costs 9: 20445 Zarqa WSS

Project Works Schedule 7 Awajan WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
7	Awajan		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	23					13	JOD 10,000	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
7	Awajan		Construct new primary network pipeline	Awajan West Reservoir to Distribution (300mm diameter, 6.4 km length)	1a	Primary			PIP.N	4			300	6.4		JOD 130	JOD 832,000	JOD 16,640	JOD 16,640	JOD 41,600	JOD 41,600	JOD 83,200	JOD 1,031,680
7	Awajan		Construct new primary network pipeline	Awajan High Reservoir to new Awajan West Reservoir (300mm diameter, 4.5 km length)	1a	Primary			PIP.N	12			300	4.5		JOD 130	JOD 585,000	JOD 11,700	JOD 11,700	JOD 29,250	JOD 29,250	JOD 58,500	JOD 725,400
7	Awajan		Construct new primary network pipeline	Awajan West Reservoir to Distribution (300mm diameter, 6.1 km length)	1a	Primary			PIP.N	19			300	6.1		JOD 130	JOD 793,000	JOD 15,860	JOD 15,860	JOD 39,650	JOD 39,650	JOD 79,300	JOD 983,320
7	Awajan		Construct new primary network pipeline	Awajan North Reservoir to Distribution (300mm diameter, 6.0 km length)	1a	Primary			PIP.N	22			300	6.0		JOD 130	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
7	Awajan		Construct new primary network pipeline	Awajan Low Reservoir to new Awajan North Reservoir (300mm diameter, 2.4 km length) Part	1a	Primary			PIP.N	15 B			300	2.4		JOD 130	JOD 312,000	JOD 6,240	JOD 6,240	JOD 15,600	JOD 15,600	JOD 31,200	JOD 386,880
7	Awajan		Upgrade primary network pipeline	Awajan High Reservoir to Distribution (250mm diameter, 0.4 km length)	1a	Primary			PIP.U	16			250	0.4		JOD 22.10	JOD 8,840	JOD 177	JOD 177	JOD 442	JOD 442	JOD 884	JOD 10,962
7	Awajan		Upgrade primary network pipeline	Awajan High Reservoir to Distribution (300mm diameter, 3.0 km length)	1a	Primary			PIP.U	17			300	3.0		JOD 26	JOD 78,000	JOD 1,560	JOD 1,560	JOD 3,900	JOD 3,900	JOD 7,800	JOD 96,720
7	Awajan		Upgrade primary network pipeline	Awajan Low Reservoir to new Awajan North Reservoir (300mm diameter, 3.2 km length) Part	1a	Primary			PIP.U	15 A			300	3.2		JOD 26	JOD 83,200	JOD 1,664	JOD 1,664	JOD 4,160	JOD 4,160	JOD 8,320	JOD 103,168
7	Awajan		Construct new pumping station	Awajan High Reservoir PS (to Awajan West Distribution Storage Reservoir - Target Pumping Rate 270 m3/hr)	1a	Primary			PS.N	6		270				JOD 1,980	JOD 534,600	JOD 10,692	JOD 10,692	JOD 26,730	JOD 26,730	JOD 53,460	JOD 662,904
7	Awajan		Construct new pumping station	Awajan Low Reservoir PS (to Awajan North Distribution Storage Reservoir - Target Pumping Rate 300 m3/hr)	1a	Primary			PS.N	7		300				JOD 1,844	JOD 553,300	JOD 11,066	JOD 11,066	JOD 27,665	JOD 27,665	JOD 55,330	JOD 686,092
7	Awajan		Construct new reservoir	Awajan West Reservoir (Distribution Storage Reservoir 3,000 m3)	1a	Primary			RES.N	3	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
7	Awajan		Construct new reservoir	Awajan North Reservoir (Distribution Storage Reservoir 3,000 m3)	1a	Primary			RES.N	4	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
		Aw1				Secondary		m	PIP.RH				100 - 150mm	6,586		58.5	JOD 385,269	JOD 7,705	JOD 7,705	JOD 19,263	JOD 19,263	JOD 38,527	JOD 477,734
		Aw1				Secondary		m	PIP.RH				60 - 90mm	38,181		28.6	JOD 1,091,967	JOD 21,839	JOD 21,839	JOD 54,598	JOD 54,598	JOD 109,197	JOD 1,354,039
		Aw1				Secondary		m	PIP.RS				100 - 150mm	16,909		8.77	JOD 148,291	JOD 2,966	JOD 2,966	JOD 7,415	JOD 7,415	JOD 14,829	JOD 183,881
		Aw1				Secondary		m	PIP.RS				60 - 90mm	79,249		5.72	JOD 453,306	JOD 9,066	JOD 9,066	JOD 22,665	JOD 22,665	JOD 45,331	JOD 562,100
		Aw1				Tertiary		No.	CM.N				50% Replac	4,489		50	JOD 224,450	JOD 4,489	JOD 4,489	JOD 11,223	JOD 11,223	JOD 22,445	JOD 278,318
		Aw1				Tertiary		No.	CP.RS				100% Restr	6,906		100	JOD 690,615	JOD 13,812	JOD 13,812	JOD 34,531	JOD 34,531	JOD 69,062	JOD 856,363
		Aw1				Tertiary		m	PIP.RH				≤ 50mm	101,662		28.6	JOD 2,907,534	JOD 58,151	JOD 58,151	JOD 145,377	JOD 145,377	JOD 290,753	JOD 3,605,342
		Aw1				Tertiary		m	PIP.RS				≤ 50mm	130,174		5.72	JOD 744,595	JOD 14,892	JOD 14,892	JOD 37,230	JOD 37,230	JOD 74,459	JOD 923,297
		Aw2				Secondary		m	PIP.RH				100 - 150mm	4,199		58.5	JOD 245,654	JOD 4,913	JOD 4,913	JOD 12,283	JOD 12,283	JOD 24,565	JOD 304,611
		Aw2				Secondary		m	PIP.RH				60 - 90mm	25,950		28.6	JOD 742,167	JOD 14,843	JOD 14,843	JOD 37,108	JOD 37,108	JOD 74,217	JOD 920,287
		Aw2				Secondary		m	PIP.RS				100 - 150mm	12,761		8.77	JOD 111,914	JOD 2,238	JOD 2,238	JOD 5,596	JOD 5,596	JOD 11,191	JOD 138,774
		Aw2				Secondary		m	PIP.RS				60 - 90mm	54,953		5.72	JOD 314,331	JOD 6,287	JOD 6,287	JOD 15,717	JOD 15,717	JOD 31,433	JOD 389,771
		Aw2				Tertiary		No.	CM.N				50% Replac	2,716		50	JOD 135,800	JOD 2,716	JOD 2,716	JOD 6,790	JOD 6,790	JOD 13,580	JOD 168,392
		Aw2				Tertiary		No.	CP.RS				100% Restr	4,178		100	JOD 417,846	JOD 8,357	JOD 8,357	JOD 20,892	JOD 20,892	JOD 41,785	JOD 518,129
		Aw2				Tertiary		m	PIP.RH				≤ 50mm	54,719		28.6	JOD 1,564,976	JOD 31,300	JOD 31,300	JOD 78,249	JOD 78,249	JOD 156,498	JOD 1,940,570
		Aw2				Tertiary		m	PIP.RS				≤ 50mm	71,149		5.72	JOD 406,970	JOD 8,139	JOD 8,139	JOD 20,349	JOD 20,349	JOD 40,697	JOD 504,643
		Aw3				Secondary		m	PIP.RH				100 - 150mm	6,389		58.5	JOD 373,776	JOD 7,476	JOD 7,476	JOD 18,689	JOD 18,689	JOD 37,378	JOD 463,482
		Aw3				Secondary		m	PIP.RH				60 - 90mm	21,209		28.6	JOD 606,567	JOD 12,131	JOD 12,131	JOD 30,328	JOD 30,328	JOD 60,657	JOD 752,143
		Aw3				Secondary		m	PIP.RS				100 - 150mm	13,698		8.77	JOD 120,133	JOD 2,403	JOD 2,403	JOD 6,007	JOD 6,007	JOD 12,013	JOD 148,965
		Aw3				Secondary		m	PIP.RS				60 - 90mm	42,417		5.72	JOD 242,627	JOD 4,853	JOD 4,853	JOD 12,131	JOD 12,131	JOD 24,263	JOD 300,857
		Aw3				Tertiary		No.	CM.N				50% Replac	1,682		50	JOD 84,075	JOD 1,682	JOD 1,682	JOD 4,204	JOD 4,204	JOD 8,408	JOD 104,253
		Aw3				Tertiary		No.	CP.RS				100% Restr	2,587		100	JOD 258,692	JOD 5,174	JOD 5,174	JOD 12,935	JOD 12,935	JOD 25,869	JOD 320,778
		Aw3				Tertiary		m	PIP.RH				≤ 50mm	32,617		28.6	JOD 932,836	JOD 18,657	JOD 18,657	JOD 46,642	JOD 46,642	JOD 93,284	JOD 1,156,716
		Aw3				Tertiary		m	PIP.RS				≤ 50mm	39,696		5.72	JOD 227,061	JOD 4,541	JOD 4,541	JOD 11,353	JOD 11,353	JOD 22,706	JOD 281,555
		Aw4				Secondary		m	PIP.RH				100 - 150mm	7,118		58.5	JOD 416,427	JOD 8,329	JOD 8,329	JOD 20,821	JOD 20,821	JOD 41,643	JOD 516,370
		Aw4				Secondary		m	PIP.RH				60 - 90mm	26,597		28.6	JOD 760,664	JOD 15,213	JOD 15,213	JOD 38,033	JOD 38,033	JOD 76,066	JOD 943,223
		Aw4				Secondary		m	PIP.RS				100 - 150mm	17,176		8.77	JOD 150,633	JOD 3,013	JOD 3,013	JOD 7,532	JOD 7,532	JOD 15,063	JOD 186,785
		Aw4				Secondary		m	PIP.RS				60 - 90mm	54,023		5.72	JOD 309,010	JOD 6,180	JOD 6,180	JOD 15,451	JOD 15,451	JOD 30,901	JOD 383,173
		Aw4				Tertiary		No.	CM.N				50% Replac	2,056		50	JOD 102,800	JOD 2,056	JOD 2,056	JOD 5,140	JOD 5,140	JOD 10,280	JOD 127,472
		Aw4				Tertiary		No.	CP.RS				100% Restr	3,163		100	JOD 316,308	JOD 6,326	JOD 6,326	JOD 15,815	JOD 15,815	JOD 31,631	JOD 392,222
		Aw4				Tertiary		m	PIP.RH				≤ 50mm	40,944		28.6	JOD 1,170,987	JOD 23,420	JOD 23,420	JOD 58,549	JOD 58,549	JOD 117,099	JOD 1,452,024
		Aw4				Tertiary		m	PIP.RS				≤ 50mm	49,767		5.72	JOD 284,669	JOD 5,693	JOD 5,693	JOD 14,233	JOD 14,233	JOD 28,467	JOD 352,990
7	Awajan		Construct new primary network pipeline	Awajan North Reservoir to Distribution (300mm diameter, 6.5 km length)	2	Primary			PIP.N	5			300	6.5		JOD 130	JOD 845,000	JOD 16,900	JOD 16,900	JOD 42,250	JOD 42,250	JOD 84,500	JOD 1,047,800
7	Awajan		Construct new primary network pipeline	Interim point to new Awajan Hub Reservoir / PS (600mm diameter, 0.3 km length)	2	Primary			PIP.N	9			600	0.3		JOD 390	JOD 117,000	JOD 2,340	JOD 2,340	JOD 5,850	JOD 5,850	JOD 11,700	JOD 145,080
7	Awajan		Construct new primary network pipeline	New Awajan Hub PS to interim point (600mm diameter, 0.3 km length)	2	Primary			PIP.N	10			600	0.3		JOD 390	JOD 117,000	JOD 2,340	JOD 2,340	JOD 5,850	JOD 5,850	JOD 11,700	JOD 145,080
7	Awajan		Construct new primary network pipeline	New Awajan Hub PS to interim point (500mm diameter, 0.3 km length)	2	Primary			PIP.N	13			500	0.3		JOD 325	JOD 97,500	JOD 1,950	JOD 1,950	JOD 4,875	JOD 4,875	JOD 9,750	JOD 120,900
7	Awajan		Construct new primary network pipeline	Interim point to Awajan Low Reservoir (500mm diameter, 3.7 km length)	2	Primary			PIP.N	14			500	3.7		JOD 325	JOD 1,202,500	JOD 24,050	JOD 24,050	JOD 60,125	JOD 60,125	JOD 120,250	JOD 1,491,100
7	Awajan		Construct new primary network pipeline	Awajan High Reservoir to Distribution (300mm diameter, 11.6 km length)	2	Primary			PIP.N	18			300	11.6		JOD 130	JOD 1,508,000	JOD 30,160	JOD 30,160	JOD 75,400	JOD 75,400	JOD 150,800	JOD 1,869,920
7	Awajan		Construct new primary network pipeline	Awajan Low Reservoir to Distribution (300mm diameter, 2.1 km length)	2	Primary			PIP.N	21			300	2.1		JOD 130	JOD 273,000	JOD 5,460	JOD 5,460	JOD 13,650	JOD 13,650	JOD 27,300	JOD 338,520
7	Awajan		Upgrade primary network pipeline	Strategic Ring Main connection point to interim point (600mm diameter, 3.6 km length)	2	Primary			PIP.U	8			600	3.6		JOD 78	JOD 280,800	JOD 5,616	JOD 5,616	JOD 14,040	JOD 14,040	JOD 28,080	JOD 348,192
7	Awajan		Upgrade primary network pipeline	Interim point to Awajan High Reservoir (600mm diameter, 2.1 km length)	2	Primary			PIP.U	11			600	2.1		JOD 78	JOD 163,800	JOD 3,276	JOD 3,276	JOD 8,190	JOD 8,190	JOD 16,380	JOD 203,112
7	Awajan		Upgrade primary network pipeline	Awajan Low Reservoir to Distribution (400mm diameter, 8.0 km length)	2	Primary			PIP.U	20			400	8.0		JOD 39	JOD 312,000	JOD 6,240	JOD 6,240	JOD 15,600	JOD 15,600	JOD 31,200	JOD 386,880
7	Awajan		Construct new pumping station	Awajan West Highest Levels Boosters (Target Pumping Rate 30 m3/hr)	2	Primary			PS.N	2		30				JOD 5,858	JOD 175,725	JOD 3,515	JOD 3,515	JOD 8,786	JOD 8,786	JOD 17,573	JOD 217,899
7	Awajan		Construct new pumping station	Awajan North Highest Levels Boosters (Target Pumping Rate 30 m3/hr)	2	Primary			PS.N	3		30				JOD 5,858	JOD 175,725	JOD 3,515	JOD 3,515	JOD 8,786	JOD 8,786	JOD 17,573	JOD 217,899
7	Awajan		Construct new pumping station	Awajan Hub PS (to Awajan High and Awajan Low Distribution Storage Reservoirs - Target Pumping Rate 1,300 m3/hr)	2	Primary			PS.N	5		1,300				JOD 625	JOD 812,900	JOD 16,258	JOD 16,258	JOD 40,645	JOD 40,645	JOD 81,290	JOD 1,007,996
7	Awajan		Construct new reservoir	Awajan Low Additional Reservoir (Distribution Storage Reservoir 2,000 m3)	2	Primary			RES.N	1	2,000					JOD 201	JOD 401,500	JOD 8,030	JOD 8,030	JOD 20,075	JOD 20,075	JOD 40,150	JOD 497,860
7	Awajan		Construct new reservoir	Awajan Hub Reservoir (Pump Flow-balancing Reservoir 2,500 m3)	2	Primary			RES.N	2	2,500					JOD 188	JOD 470,800	JOD 9,416	JOD 9,416	JOD 23,540	JOD 23,540	JOD 47,080	JOD 583,792
7	Awajan		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	23					16	JOD 10,000	JOD 160,000	JOD 3,200	JOD 3,200	JOD 8,000	JOD 8,000	JOD 16,000	JOD 198,400
7	Awajan		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable Primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	7.794		JOD 55.25	JOD 430,619	JOD 8,612	JOD 8,612	JOD 21,531	JOD 21,531	JOD 43,062	JOD 533,967
7	Awajan		Restructure primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	20.821		JOD 12.16	JOD 253,183	JOD 5,064	JOD 5,064	JOD 12,659	JOD 12,659	JOD 25,318	JOD 313,947
															Phase 1a	Primary Network	JOD 6,598,542	JOD 131,971	JOD 131,971	JOD 329,927	JOD 329,927	JOD 659,854	JOD 8,182,192
																Secondary Network	JOD 6,472,738	JOD 129,455	JOD 129,455	JOD 323,637	JOD 323,637	JOD 647,274	JOD 8,026,195
																Tertiary Network	JOD 10,470,214	JOD 209,404	JOD 209,404	JOD 523,511	JOD 523,511	JOD 1,047,021	JOD 12,983,065
																Total	JOD 23,541,494	JOD 470,830	JOD 470,830	JOD 1,177,075	JOD 1,177,075	JOD 2,354,149	JOD 29,191,452
															Phase 2	Primary Network	JOD 6,953,250	JOD 139,065	JOD 139,065	JOD 347,663	JOD 347,663	JOD 695,325	JOD 8,622,030
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 6,953,250	JOD 139,065	JOD 139,065	JOD 347,663	JOD 347,663	JOD 695,325	JOD 8,622,030

Overall Costs 10: 20445 Zarqa WSS

Project Works Schedule 8
Russaifah WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
8	Russaifah		Install new DMA connection point	DMA connection points	1a 30%, 1b 70%	Primary			DMA.N	25					26	JOD 10,000	JOD 260,000	JOD 5,200	JOD 5,200	JOD 13,000	JOD 13,000	JOD 26,000	JOD 322,400
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to Russaifah High Distribution part (600mm diameter, 2.0 km length)	1a 30%, 1b 70%	Primary			PIP.N	20			600	2.0		JOD 390	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
8	Russaifah		Construct new primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (400mm diameter, 4.0 km length)	1a 30%, 1b 70%	Primary			PIP.N	22			400	4.0		JOD 195	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
8	Russaifah		Upgrade primary network pipeline	Basateen PS to Russaifah Low Reservoir part distance (400mm diameter, 4.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	15			400	4.0		JOD 39.00	JOD 156,000	JOD 3,120	JOD 3,120	JOD 7,800	JOD 7,800	JOD 15,600	JOD 193,440
8	Russaifah		Upgrade primary network pipeline	Basateen PS to Russaifah Low Reservoir part distance (500mm diameter, 5.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	16			500	5.0		JOD 65.00	JOD 325,000	JOD 6,500	JOD 6,500	JOD 16,250	JOD 16,250	JOD 32,500	JOD 403,000
8	Russaifah		Upgrade primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (500mm diameter, 2.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	21			500	2.0		JOD 65.00	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
8	Russaifah		Construct new pumping station	Basateen PS (to Russaifah Low Storage Reservoir - Target Pumping Rate 560 m3/hr)	1a 30%, 1b 70%	Primary			PS.N	11		560				JOD 1,188	JOD 665,000	JOD 13,300	JOD 13,300	JOD 33,250	JOD 33,250	JOD 66,500	JOD 824,600
8	Russaifah		Upgrade existing reservoir	Basateen Reservoir (Flow-balancing Reservoir 500 m3)	1a 30%, 1b 70%	Primary			RES.U	6	500					JOD 74	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
		Ru1				Secondary		m	PIP.RH				100 - 150ø	7.232		58.5	JOD 423,044	JOD 8,461	JOD 8,461	JOD 21,152	JOD 21,152	JOD 42,304	JOD 524,575
		Ru1				Secondary		m	PIP.RH				60 - 90mm	4.318		28.6	JOD 123,491	JOD 2,470	JOD 2,470	JOD 6,175	JOD 6,175	JOD 12,349	JOD 153,129
		Ru1				Secondary		m	PIP.RS				100 - 150ø	13.502		8.77	JOD 118,411	JOD 2,368	JOD 2,368	JOD 5,921	JOD 5,921	JOD 11,841	JOD 146,829
		Ru1				Secondary		m	PIP.RS				60 - 90mm	5.397		5.72	JOD 30,873	JOD 617	JOD 617	JOD 1,544	JOD 1,544	JOD 3,087	JOD 38,282
		Ru1				Tertiary		No.	CM.N				50% Repla	279		50	JOD 13,925	JOD 279	JOD 279	JOD 696	JOD 696	JOD 1,393	JOD 17,267
		Ru1				Tertiary		No.	CP.RS				100% Res	428		100	JOD 42,846	JOD 857	JOD 857	JOD 2,142	JOD 2,142	JOD 4,285	JOD 53,129
		Ru1				Tertiary		m	PIP.RH				≤ 50mm	6.737		28.6	JOD 192,672	JOD 3,853	JOD 3,853	JOD 9,634	JOD 9,634	JOD 19,267	JOD 238,913
		Ru1				Tertiary		m	PIP.RS				≤ 50mm	6.746		5.72	JOD 38,585	JOD 772	JOD 772	JOD 1,929	JOD 1,929	JOD 3,859	JOD 47,845
		Ru2				Secondary		m	PIP.RH				100 - 150ø	29.644		58.5	JOD 1,734,180	JOD 34,684	JOD 34,684	JOD 86,709	JOD 86,709	JOD 173,418	JOD 2,150,383
		Ru2				Secondary		m	PIP.RH				60 - 90mm	52.967		28.6	JOD 1,514,860	JOD 30,297	JOD 30,297	JOD 75,743	JOD 75,743	JOD 151,486	JOD 1,878,426
		Ru2				Secondary		m	PIP.RS				100 - 150ø	48.809		8.77	JOD 428,055	JOD 8,561	JOD 8,561	JOD 21,403	JOD 21,403	JOD 42,805	JOD 530,788
		Ru2				Secondary		m	PIP.RS				60 - 90mm	66.400		5.72	JOD 380,321	JOD 7,606	JOD 7,606	JOD 19,016	JOD 19,016	JOD 38,032	JOD 471,598
		Ru2				Tertiary		No.	CM.N				50% Repla	5.686		50	JOD 284,300	JOD 5,686	JOD 5,686	JOD 14,215	JOD 14,215	JOD 28,430	JOD 352,532
		Ru2				Tertiary		No.	CP.RS				100% Res	8.748		100	JOD 874,769	JOD 17,495	JOD 17,495	JOD 43,738	JOD 43,738	JOD 87,477	JOD 1,084,714
		Ru2				Tertiary		m	PIP.RH				≤ 50mm	129.539		28.6	JOD 3,704,803	JOD 74,096	JOD 74,096	JOD 185,240	JOD 185,240	JOD 370,480	JOD 4,593,955
		Ru2				Tertiary		m	PIP.RS				≤ 50mm	140.800		5.72	JOD 805,379	JOD 16,108	JOD 16,108	JOD 40,269	JOD 40,269	JOD 80,538	JOD 998,670
		Ru3				Secondary		m	PIP.RH				100 - 150ø	11.637		58.5	JOD 680,773	JOD 13,615	JOD 13,615	JOD 34,039	JOD 34,039	JOD 68,077	JOD 844,159
		Ru3				Secondary		m	PIP.RH				60 - 90mm	71.648		28.6	JOD 2,049,137	JOD 40,983	JOD 40,983	JOD 102,457	JOD 102,457	JOD 204,914	JOD 2,540,930
		Ru3				Secondary		m	PIP.RS				100 - 150ø	21.384		8.77	JOD 187,540	JOD 3,751	JOD 3,751	JOD 9,377	JOD 9,377	JOD 18,754	JOD 232,550
		Ru3				Secondary		m	PIP.RS				60 - 90mm	90.050		5.72	JOD 515,087	JOD 10,302	JOD 10,302	JOD 25,754	JOD 25,754	JOD 51,509	JOD 638,708
		Ru3				Tertiary		No.	CM.N				50% Repla	4.100		50	JOD 204,975	JOD 4,100	JOD 4,100	JOD 10,249	JOD 10,249	JOD 20,498	JOD 254,169
		Ru3				Tertiary		No.	CP.RS				100% Res	6.307		100	JOD 630,692	JOD 12,614	JOD 12,614	JOD 31,535	JOD 31,535	JOD 63,069	JOD 782,058
		Ru3				Tertiary		m	PIP.RH				≤ 50mm	76.489		28.6	JOD 2,187,591	JOD 43,752	JOD 43,752	JOD 109,380	JOD 109,380	JOD 218,759	JOD 2,712,612
		Ru3				Tertiary		m	PIP.RS				≤ 50mm	90.006		5.72	JOD 514,836	JOD 10,297	JOD 10,297	JOD 25,742	JOD 25,742	JOD 51,484	JOD 638,397
		Ru4				Secondary		m	PIP.RH				100 - 150ø	1.326		58.5	JOD 77,555	JOD 1,551	JOD 1,551	JOD 3,878	JOD 3,878	JOD 7,756	JOD 96,168
		Ru4				Secondary		m	PIP.RH				60 - 90mm	9.483		28.6	JOD 271,209	JOD 5,424	JOD 5,424	JOD 13,560	JOD 13,560	JOD 27,121	JOD 336,299
		Ru4				Secondary		m	PIP.RS				100 - 150ø	2.489		8.77	JOD 21,824	JOD 436	JOD 436	JOD 1,091	JOD 1,091	JOD 2,182	JOD 27,062
		Ru4				Secondary		m	PIP.RS				60 - 90mm	11.854		5.72	JOD 67,802	JOD 1,356	JOD 1,356	JOD 3,390	JOD 3,390	JOD 6,780	JOD 84,075
		Ru4				Tertiary		No.	CM.N				50% Repla	720		50	JOD 35,975	JOD 720	JOD 720	JOD 1,799	JOD 1,799	JOD 3,598	JOD 44,609
		Ru4				Tertiary		No.	CP.RS				100% Res	1.107		100	JOD 110,692	JOD 2,214	JOD 2,214	JOD 5,535	JOD 5,535	JOD 11,069	JOD 137,258
		Ru4				Tertiary		m	PIP.RH				≤ 50mm	13.810		28.6	JOD 394,962	JOD 7,899	JOD 7,899	JOD 19,748	JOD 19,748	JOD 39,496	JOD 489,753
		Ru4				Tertiary		m	PIP.RS				≤ 50mm	15.834		5.72	JOD 90,569	JOD 1,811	JOD 1,811	JOD 4,528	JOD 4,528	JOD 9,057	JOD 112,306
		Ru5				Secondary		m	PIP.RH				100 - 150ø	26.990		58.5	JOD 1,578,926	JOD 31,579	JOD 31,579	JOD 78,946	JOD 78,946	JOD 157,893	JOD 1,957,868
		Ru5				Secondary		m	PIP.RH				60 - 90mm	94.512		28.6	JOD 2,703,039	JOD 54,061	JOD 54,061	JOD 135,152	JOD 135,152	JOD 270,304	JOD 3,351,768
		Ru5				Secondary		m	PIP.RS				100 - 150ø	44.557		8.77	JOD 390,766	JOD 7,815	JOD 7,815	JOD 19,538	JOD 19,538	JOD 39,077	JOD 484,550
		Ru5				Secondary		m	PIP.RS				60 - 90mm	118.140		5.72	JOD 675,760	JOD 13,515	JOD 13,515	JOD 33,788	JOD 33,788	JOD 67,576	JOD 837,942
		Ru5				Tertiary		No.	CM.N				50% Repla	7.177		50	JOD 358,850	JOD 7,177	JOD 7,177	JOD 17,943	JOD 17,943	JOD 35,885	JOD 444,974
		Ru5				Tertiary		No.	CP.RS				100% Res	11.042		100	JOD 1,104,154	JOD 22,083	JOD 22,083	JOD 55,208	JOD 55,208	JOD 110,415	JOD 1,369,151
		Ru5				Tertiary		m	PIP.RH				≤ 50mm	155.772		28.6	JOD 4,455,073	JOD 89,101	JOD 89,101	JOD 222,754	JOD 222,754	JOD 445,507	JOD 5,524,291
		Ru5				Tertiary		m	PIP.RS				≤ 50mm	174.389		5.72	JOD 997,504	JOD 19,950	JOD 19,950	JOD 49,875	JOD 49,875	JOD 99,750	JOD 1,236,905
8	Russaifah		Construct new primary network pipeline	Strategic Ring Main connection point to new Russaifah Hub Res/PS (800mm diameter, 1.0 km length)	2	Primary			PIP.N	5			800	1.0		JOD 520	JOD 520,000	JOD 10,400	JOD 10,400	JOD 26,000	JOD 26,000	JOD 52,000	JOD 644,800
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to Russaifah High Distribution part (400mm diameter, 6.0 km length)	2	Primary			PIP.N	6			400	6.0		JOD 195	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
8	Russaifah		Construct new primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (300mm diameter, 4.0 km length)	2	Primary			PIP.N	7			300	4.0		JOD 130	JOD 520,000	JOD 10,400	JOD 10,400	JOD 26,000	JOD 26,000	JOD 52,000	JOD 644,800
8	Russaifah		Construct new primary network pipeline	Hitteen Reservoir to Hitteen Res Distribution Area part (700mm diameter, 1.0 km length)	2	Primary			PIP.N	8			700	1.0		JOD 455	JOD 455,000	JOD 9,100	JOD 9,100	JOD 22,750	JOD 22,750	JOD 45,500	JOD 564,200
8	Russaifah		Construct new primary network pipeline	New Russaifah Hub PS to Russaifah High Reservoir additional pipe (400mm diameter, 5.8 km length)	2	Primary			PIP.N	13			400	5.8		JOD 195	JOD 1,131,000	JOD 22,620	JOD 22,620	JOD 56,550	JOD 56,550	JOD 113,100	JOD 1,402,440
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to New Russaifah NorthWest Reservoir (200mm diameter, 5.5 km length)	2	Primary			PIP.N	17			200	5.5		JOD 97.50	JOD 536,250	JOD 10,725	JOD 10,725	JOD 26,813	JOD 26,813	JOD 53,625	JOD 664,950
8	Russaifah		Construct new primary network pipeline	Russaifah Hub PS to Hitteen Reservoir (600mm diameter, 0.5 km length)	2	Primary			PIP.N	18			600	0.5		JOD 390	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
8	Russaifah		Construct new primary network pipeline	Hitteen Reservoir to Hitteen WT environs pipework (200mm diameter, 0.5 km length)	2	Primary			PIP.N	19			200	0.5		JOD 97.50	JOD 48,750	JOD 975	JOD 975	JOD 2,438	JOD 2,438	JOD 4,875	JOD 60,450
8	Russaifah		Construct new primary network pipeline	Hitteen Water Tower to Hitteen WT Distribution Area (200mm diameter, 0.1 km length)	2	Primary			PIP.N	24			200	0.1		JOD 97.50	JOD 9,750	JOD 195	JOD 195	JOD 488	JOD 488	JOD 975	JOD 12,090
8	Russaifah		Upgrade primary network pipeline	New Russaifah Hub PS to Russaifah High Reservoir (400mm diameter, 4.8 km length)	2	Primary			PIP.U	12			400	4.8		JOD 39.00	JOD 187,200	JOD 3,744	JOD 3,744	JOD 9,360	JOD 9,360	JOD 18,720	JOD 232,128
8	Russaifah		Upgrade primary network pipeline	Russaifah High Reservoir to Russaifah Low Reservoir (300mm diameter, 1.4 km length)	2	Primary			PIP.U	14			300	1.4		JOD 26	JOD 36,400	JOD 728	JOD 728	JOD 1,820	JOD 1,820	JOD 3,640	JOD 45,136
8	Russaifah		Upgrade primary network pipeline	Hitteen Reservoir to Hitteen Res Distribution Area part (300mm diameter, 7.0 km length)	2	Primary			PIP.U	23			300	7.0		JOD 26	JOD 182,000	JOD 3,640	JOD 3,640	JOD 9,100	JOD 9,100	JOD 18,200	JOD 225,680
8	Russaifah		Construct new pumping station	Russaifah North-West Highest Levels Boosters (Target Pumping Rate 15 m3/hr)	2	Primary			PS.N	4		15				JOD 6,453	JOD 96,795	JOD 1,936	JOD 1,936	JOD 4,840	JOD 4,840	JOD 9,680	JOD 120,026
8	Russaifah		Construct new pumping station	New Russaifah Hub PS (to Hitteen and Russaifah High Distribution Storage Reservoirs - Target Pumping Rate 2,000 m3/hr)	2	Primary			PS.N	8		2,000				JOD 445	JOD 889,900	JOD 17,798	JOD 17,798	JOD 44,495	JOD 44,495	JOD 88,990	JOD 1,103,476
8	Russaifah		Construct new pumping station	Russaifah High Reservoir PS (to Russaifah North-West Storage Reservoir - Target Pumping Rate 62 m3/hr)	2	Primary			PS.N	10		62				JOD 4,516	JOD 280,000	JOD 5,600	JOD 5,600	JOD 14,000	JOD 14,000	JOD 28,000	JOD 347,200
8	Russaifah		Upgrade existing pumping station	Hitteen Reservoir PS (to Hitteen Water Tower Storage Reservoir - Target Pumping Rate 52 m3/hr)	2	Primary			PS.U	9		52				JOD 4,240	JOD 220,500	JOD 4,410	JOD 4,410	JOD 11,025	JOD 11,025	JOD 22,050	JOD 273,420
8	Russaifah		Construct new reservoir	New Russaifah Hub Reservoir (Flow-Balancing Reservoir 4,000 m3)	2	Primary			RES.N	1	4,000					JOD 159	JOD 635,800	JOD 12,716	JOD 12,716	JOD 31,790	JOD 31,790	JOD 63,580	JOD 788,392
8	Russaifah		Construct new reservoir	Hitteen Reservoir Additional (Distribution Storage Reservoir 5,000 m3)	2	Primary			RES.N	1	5,000					JOD 146	JOD 729,300	JOD 14,586	JOD 14,586	JOD 36,465	JOD 36,465	JOD 72,930	JOD 904,332
8	Russaifah		Construct new reservoir	Hitteen Water Tower Additional (Distribution Storage Reservoir 600 m3)	2	Primary			RES.N	2	600					JOD 370	JOD 221,760	JOD 4,435	JOD 4,435	JOD 11,088	JOD 11,088	JOD 22,176	JOD 274,982
8	Russaifah		Construct new reservoir	Russaifah High Reservoir Additional (Distribution Storage Reservoir 6,000 m3)	2	Primary			RES.N	3	6,000					JOD 142	JOD 849,556	JOD 16,991	JOD 16,991	JOD 42,478	JOD 42,478	JOD 84,956	JOD 1,053,449
8	Russaifah		Construct new reservoir	Basateen Reservoir Additional (Distribution Storage Reservoir 700 m3)	2	Primary			RES.N	4	700					JOD 312	JOD 218,350	JOD 4,367	JOD 4,367	JOD 10,918	JOD 10,918	JOD 21,835	JOD 270,754
8	Russaifah		Construct new reservoir	Russaifah North-West (Distribution Storage Reservoir 1,500 m3)	2	Primary			RES.N	5	1,500					JOD 218	JOD 326,700	JOD 6,534	JOD 6,534	JOD 16,335	JOD 16,335	JOD 32,670	JOD 405,108
8	Russaifah		Upgrade existing reservoir	Hitteen Reservoir (Distribution Storage Reservoir 4,000 m3)	2	Primary			RES.U	2	4,000					JOD 24	JOD 95,370	JOD 1,907	JOD 1,907	JOD 4,769	JOD 4,769	JOD 9,537	JOD 118,259
8	Russaifah		Upgrade existing reservoir	Hitteen Water Tower (Distribution Storage Reservoir 300 m3)	2	Primary			RES.U	3	300					JOD 208	JOD 62,480	JOD 1,250	JOD 1,250	JOD 3,124	JOD 3,124	JOD 6,248	JOD 77,475
8	Russaifah		Install new DMA connection point	DMA connection points	1a 30%, 1b 70%	Primary			DMA.N	25					22	JOD 10,000	JOD 220,000	JOD 4,400	JOD 4,400	JOD 11,000	JOD 11,000	JOD 22,000	JOD 272,800
8	Russaifah		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a 30%, 1b 70%	Primary			PIP.RH	4			200-300	8.669		JOD 55.25	JOD 478,962	JOD 9,579	JOD 9,579	JOD 23,948	JOD 23,948	JOD 47,896	JOD 593,913
8	Russaifah		Restructure primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a 30%, 1b 70%	Primary			PIP.RS	8			200-300	41.709		JOD 12.16	JOD 507,181	JOD 10,144	JOD 10,144	JOD 25,359	JOD 25,359	JOD 50,718	JOD 628,905

Phase 1a	Primary Network	JOD 1,301,731	JOD 26,035	JOD 26,035	JOD 65,087	JOD 65,087	JOD 130,173	JOD 1,614,147
	Secondary Network	JOD 4,191,796	JOD 83,836	JOD 83,836	JOD 209,590	JOD 209,590	JOD 419,180	JOD 5,197,827
	Tertiary Network	JOD 5,112,946	JOD 102,259	JOD 102,259	JOD 255,647	JOD 255,647	JOD 511,295	JOD 6,340,053
	Total	JOD 10,606,472	JOD 212,129	JOD 212,129	JOD 530,324	JOD 530,324	JOD 1,060,647	JOD 13,152,026
Phase 2	Primary Network	JOD 9,617,861	JOD 192,357	JOD 192,357	JOD 480,893	JOD 480,893	JOD 961,786	JOD 11,926,148
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 9,617,861	JOD 192,357	JOD 192,357	JOD 480,893	JOD 480,893	JOD 961,786	JOD 11,926,148

Overall Costs 11: 20445 Zarqa WSS

Project Works Schedule 9 North
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
9	North		Install new DMA connection point	DMA connection points	2	Primary			DMA.N	6					15	JOD 10,000	JOD 150,000	JOD 3,000	JOD 3,000	JOD 7,500	JOD 7,500	JOD 15,000	JOD 186,000
9	North		Construct new primary network pipeline	Khaw North WT Khaw Distribution Area	2	Primary			PIP.N	4			400	1.0		JOD 195	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
9	North		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200-300	5.236		JOD 55.25	JOD 289,289	JOD 5,786	JOD 5,786	JOD 14,464	JOD 14,464	JOD 28,929	JOD 358,718
9	North		Restructure secondary and tertiary network pipeline	Restructure existing and rehabilitated secondary and tertiary network pipelines	2	Primary			PIP.RS	8			200-300	22.780		JOD 12.16	JOD 277,005	JOD 5,540	JOD 5,540	JOD 13,850	JOD 13,850	JOD 27,700	JOD 343,486
9	North		Upgrade existing primary network pipeline	Hashmeya PS to Zarqa PS (400mm diameter, 5.4 km length)	2	Primary			PIP.U	5			400	5.4		JOD 39	JOD 208,741	JOD 4,175	JOD 4,175	JOD 10,437	JOD 10,437	JOD 20,874	JOD 258,839
9	North		Upgrade existing pumping station	Hashmeya PS pumping to Zarqa - Target Pumping Rate 425 m3/hr)	2	Primary			PS.U	2		425				JOD 1,458	JOD 619,850	JOD 12,397	JOD 12,397	JOD 30,993	JOD 30,993	JOD 61,985	JOD 768,614
9	North		Construct new reservoir	Khaw North Water Tower (Distribution Storage Reservoir 2,000 m3)	2	Primary			RES.N	1	2,000					JOD 351	JOD 702,250	JOD 14,045	JOD 14,045	JOD 35,113	JOD 35,113	JOD 70,225	JOD 870,790
		No1				Secondary		m	PIP.RH				100 - 150mm	2,707		58.5	JOD 158,360	JOD 3,167	JOD 3,167	JOD 7,918	JOD 7,918	JOD 15,836	JOD 196,366
		No1				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD
		No1				Secondary		m	PIP.RS				100 - 150mm	5,072		8.77	JOD 44,481	JOD 890	JOD 890	JOD 2,224	JOD 2,224	JOD 4,448	JOD 55,157
		No1				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		No1				Tertiary		No.	CM.N				50% Replac	96		50	JOD 4,800	JOD 96	JOD 96	JOD 240	JOD 240	JOD 480	JOD 5,952
		No1				Tertiary		No.	CP.RS				100% Restr	148		100	JOD 14,769	JOD 295	JOD 295	JOD 738	JOD 738	JOD 1,477	JOD 18,314
		No1				Tertiary		m	PIP.RH				≤ 50mm	1,401		28.6	JOD 40,081	JOD 802	JOD 802	JOD 2,004	JOD 2,004	JOD 4,008	JOD 49,701
		No1				Tertiary		m	PIP.RS				≤ 50mm	1,487		5.72	JOD 8,505	JOD 170	JOD 170	JOD 425	JOD 425	JOD 851	JOD 10,546
		No2				Secondary		m	PIP.RH				100 - 150mm	2,237		58.5	JOD 130,844	JOD 2,617	JOD 2,617	JOD 6,542	JOD 6,542	JOD 13,084	JOD 162,246
		No2				Secondary		m	PIP.RH				60 - 90mm	988		28.6	JOD 28,257	JOD 565	JOD 565	JOD 1,413	JOD 1,413	JOD 2,826	JOD 35,039
		No2				Secondary		m	PIP.RS				100 - 150mm	5,019		8.77	JOD 44,014	JOD 880	JOD 880	JOD 2,201	JOD 2,201	JOD 4,401	JOD 54,577
		No2				Secondary		m	PIP.RS				60 - 90mm	1,830		5.72	JOD 10,468	JOD 209	JOD 209	JOD 523	JOD 523	JOD 1,047	JOD 12,980
		No2				Tertiary		No.	CM.N				50% Replac	44		50	JOD 2,200	JOD 44	JOD 44	JOD 110	JOD 110	JOD 220	JOD 2,728
		No2				Tertiary		No.	CP.RS				100% Restr	68		100	JOD 6,769	JOD 135	JOD 135	JOD 338	JOD 338	JOD 677	JOD 8,394
		No2				Tertiary		m	PIP.RH				≤ 50mm	1,993		28.6	JOD 56,994	JOD 1,140	JOD 1,140	JOD 2,850	JOD 2,850	JOD 5,699	JOD 70,673
		No2				Tertiary		m	PIP.RS				≤ 50mm	2,470		5.72	JOD 14,127	JOD 283	JOD 283	JOD 706	JOD 706	JOD 1,413	JOD 17,517
		No3				Secondary		m	PIP.RH				100 - 150mm	13,707		58.5	JOD 801,837	JOD 16,037	JOD 16,037	JOD 40,092	JOD 40,092	JOD 80,184	JOD 994,278
		No3				Secondary		m	PIP.RH				60 - 90mm	38,454		28.6	JOD 1,099,781	JOD 21,996	JOD 21,996	JOD 54,989	JOD 54,989	JOD 109,978	JOD 1,363,728
		No3				Secondary		m	PIP.RS				100 - 150mm	24,674		8.77	JOD 216,388	JOD 4,328	JOD 4,328	JOD 10,819	JOD 10,819	JOD 21,639	JOD 268,321
		No3				Secondary		m	PIP.RS				60 - 90mm	48,067		5.72	JOD 274,945	JOD 5,499	JOD 5,499	JOD 13,747	JOD 13,747	JOD 27,495	JOD 340,932
		No3				Tertiary		No.	CM.N				50% Replac	1,846		50	JOD 92,300	JOD 1,846	JOD 1,846	JOD 4,615	JOD 4,615	JOD 9,230	JOD 114,452
		No3				Tertiary		No.	CP.RS				100% Restr	2,840		100	JOD 284,000	JOD 5,680	JOD 5,680	JOD 14,200	JOD 14,200	JOD 28,400	JOD 352,160
		No3				Tertiary		m	PIP.RH				≤ 50mm	38,774		28.6	JOD 1,108,932	JOD 22,179	JOD 22,179	JOD 55,447	JOD 55,447	JOD 110,893	JOD 1,375,076
		No3				Tertiary		m	PIP.RS				≤ 50mm	47,076		5.72	JOD 269,274	JOD 5,385	JOD 5,385	JOD 13,464	JOD 13,464	JOD 26,927	JOD 333,900
		No4				Secondary		m	PIP.RH				100 - 150mm	9,585		58.5	JOD 560,747	JOD 11,215	JOD 11,215	JOD 28,037	JOD 28,037	JOD 56,075	JOD 695,326
		No4				Secondary		m	PIP.RH				60 - 90mm	14,315		28.6	JOD 409,401	JOD 8,188	JOD 8,188	JOD 20,470	JOD 20,470	JOD 40,940	JOD 507,657
		No4				Secondary		m	PIP.RS				100 - 150mm	15,572		8.77	JOD 136,567	JOD 2,731	JOD 2,731	JOD 6,828	JOD 6,828	JOD 13,657	JOD 169,343
		No4				Secondary		m	PIP.RS				60 - 90mm	17,893		5.72	JOD 102,350	JOD 2,047	JOD 2,047	JOD 5,118	JOD 5,118	JOD 10,235	JOD 126,914
		No4				Tertiary		No.	CM.N				50% Replac	245		50	JOD 12,250	JOD 245	JOD 245	JOD 613	JOD 613	JOD 1,225	JOD 15,190
		No4				Tertiary		No.	CP.RS				100% Restr	377		100	JOD 37,692	JOD 754	JOD 754	JOD 1,885	JOD 1,885	JOD 3,769	JOD 46,738
		No4				Tertiary		m	PIP.RH				≤ 50mm	397		28.6	JOD 11,367	JOD 227	JOD 227	JOD 568	JOD 568	JOD 1,137	JOD 14,095
		No4				Tertiary		m	PIP.RS				≤ 50mm	450		5.72	JOD 2,576	JOD 52	JOD 52	JOD 129	JOD 129	JOD 258	JOD 3,195
		No5				Secondary		m	PIP.RH				100 - 150mm	18,776		58.5	JOD 1,098,380	JOD 21,968	JOD 21,968	JOD 54,919	JOD 54,919	JOD 109,838	JOD 1,361,991
		No5				Secondary		m	PIP.RH				60 - 90mm	26,667		28.6	JOD 762,675	JOD 15,253	JOD 15,253	JOD 38,134	JOD 38,134	JOD 76,267	JOD 945,717
		No5				Secondary		m	PIP.RS				100 - 150mm	28,488		8.77	JOD 249,840	JOD 4,997	JOD 4,997	JOD 12,492	JOD 12,492	JOD 24,984	JOD 309,801
		No5				Secondary		m	PIP.RS				60 - 90mm	34,254		5.72	JOD 195,931	JOD 3,919	JOD 3,919	JOD 9,797	JOD 9,797	JOD 19,593	JOD 242,955
		No5				Tertiary		No.	CM.N				50% Replac	1,416		50	JOD 70,775	JOD 1,416	JOD 1,416	JOD 3,539	JOD 3,539	JOD 7,078	JOD 87,761
		No5				Tertiary		No.	CP.RS				100% Restr	2,178		100	JOD 217,769	JOD 4,355	JOD 4,355	JOD 10,888	JOD 10,888	JOD 21,777	JOD 270,034
		No5				Tertiary		m	PIP.RH				≤ 50mm	31,264		28.6	JOD 894,141	JOD 17,883	JOD 17,883	JOD 44,707	JOD 44,707	JOD 89,414	JOD 1,108,735
		No5				Tertiary		m	PIP.RS				≤ 50mm	36,151		5.72	JOD 206,782	JOD 4,136	JOD 4,136	JOD 10,339	JOD 10,339	JOD 20,678	JOD 256,409
9	North		Construct new primary network pipeline	Hashmeya Reservoir additional to Hashmeya Distribution Area (300mm diameter, 3.0 km length)	3	Primary			PIP.N	5			300	3.0		JOD 130	JOD 390,000	JOD 7,800	JOD 7,800	JOD 19,500	JOD 19,500	JOD 39,000	JOD 483,600
9	North		Construct new pumping station	Hashmeya Rural Highest Levels Boosters (Target Pumping Rate 7 m3/hr)	3	Primary			PS.N	3		7				JOD 7,886	JOD 55,205	JOD 1,104	JOD 1,104	JOD 2,760	JOD 2,760	JOD 5,521	JOD 68,454
9	North		Construct new pumping station	Sukhna Highest Levels Boosters (Target Pumping Rate 7 m3/hr)	3	Primary			PS.N	4		7				JOD 7,886	JOD 55,205	JOD 1,104	JOD 1,104	JOD 2,760	JOD 2,760	JOD 5,521	JOD 68,454
9	North		Construct new reservoir	Hashmeya Additional reservoir (Distribution Storage Reservoir 1,500 m3)	3	Primary			RES.N	1	1,500					JOD 218	JOD 326,700	JOD 6,534	JOD 6,534	JOD 16,335	JOD 16,335	JOD 32,670	JOD 405,108
9	North		Construct new reservoir	Sukhna Additional reservoir (Distribution Storage Reservoir 1,000 m3)	3	Primary			RES.N	2	1,000					JOD 252	JOD 251,900	JOD 5,038	JOD 5,038	JOD 12,595	JOD 12,595	JOD 25,190	JOD 312,356
															Phase 1b	Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Secondary Network	JOD 6,325,265	JOD 126,505	JOD 126,505	JOD 316,263	JOD 316,263	JOD 632,527	JOD 7,843,329
																Tertiary Network	JOD 3,356,104	JOD 67,122	JOD 67,122	JOD 167,805	JOD 167,805	JOD 335,610	JOD 4,161,569
																Total	JOD 9,681,370	JOD 193,627	JOD 193,627	JOD 484,068	JOD 484,068	JOD 968,137	JOD 12,004,898
															Phase 2	Primary Network	JOD 2,442,135	JOD 48,843	JOD 48,843	JOD 122,107	JOD 122,107	JOD 244,214	JOD 3,028,248
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 2,442,135	JOD 48,843	JOD 48,843	JOD 122,107	JOD 122,107	JOD 244,214	JOD 3,028,248
															Phase 3	Primary Network	JOD 1,079,010	JOD 21,580	JOD 21,580	JOD 53,951	JOD 53,951	JOD 107,901	JOD 1,337,972
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 1,079,010	JOD 21,580	JOD 21,580	JOD 53,951	JOD 53,951	JOD 107,901	JOD 1,337,972

Overall Costs 12: 20445 Zarga WSS

Project Works Schedule 10 West-NorthWest WSA, 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(units)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
10	West-Northwest		Install new DMA connection point	DMA connection points	2	Primary			DMA.N	29					2	JOD 10,000	JOD 20,000	JOD 400	JOD 400	JOD 1,000	JOD 1,000	JOD 2,000	JOD 24,800
10	West-Northwest		Construct new primary network pipeline	Berein Reservoir to Um Rumanneh Reservoir/PS (200mm diameter, 3.7 km length)	2	Primary			PIP.N	17			200	3.7		JOD 97.50	JOD 360,750	JOD 7,215	JOD 7,215	JOD 18,038	JOD 18,038	JOD 36,075	JOD 447,330
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh PS to new Berein High Reservoir (200mm diameter, 2.5 km length)	2	Primary			PIP.N	18			200	2.5		JOD 97.50	JOD 243,750	JOD 4,875	JOD 4,875	JOD 12,188	JOD 12,188	JOD 24,375	JOD 302,250
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh PS to new Um Rumanneh High Reservoir (200mm diameter, 2.1 km length)	2	Primary			PIP.N	19			200	2.1		JOD 97.50	JOD 204,750	JOD 4,095	JOD 4,095	JOD 10,238	JOD 10,238	JOD 20,475	JOD 253,890
10	West-Northwest		Construct new primary network pipeline	Berein High Reservoir to Berein South Distribution (200mm diameter, 2.0 km length)	2	Primary			PIP.N	20			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Berein High Reservoir to Berein North Distribution (150mm diameter, 2.0 km length)	2	Primary			PIP.N	21			150	2.0		JOD 71.50	JOD 143,000	JOD 2,860	JOD 2,860	JOD 7,150	JOD 7,150	JOD 14,300	JOD 177,320
10	West-Northwest		Construct new primary network pipeline	Alouk PS to Alouk High Reservoir (100mm diameter, 2.5 km length)	2	Primary			PIP.N	26			100	2.5		JOD 58.50	JOD 146,250	JOD 2,925	JOD 2,925	JOD 7,313	JOD 7,313	JOD 14,625	JOD 181,350
10	West-Northwest		Construct new primary network pipeline	Sarout Reservoir to Alouk High Reservoir (150mm diameter, 3.0 km length)	2	Primary			PIP.N	27			150	3.0		JOD 71.50	JOD 214,500	JOD 4,290	JOD 4,290	JOD 10,725	JOD 10,725	JOD 21,450	JOD 265,980
10	West-Northwest		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200-300	12.166		JOD 55.25	JOD 672,172	JOD 13,443	JOD 13,443	JOD 33,609	JOD 33,609	JOD 67,217	JOD 833,493
10	West-Northwest		Restructure Primary network pipeline	Restructure existing and rehabilitated primary network pipelines	2	Primary			PIP.RS	8			200-300	20.907		JOD 12.16	JOD 254,229	JOD 5,085	JOD 5,085	JOD 12,711	JOD 12,711	JOD 25,423	JOD 315,244
10	West-Northwest		Upgrade primary network pipeline	Merhib PS to new Merhib High Reservoir (300mm diameter, 3.7 km length)	2	Primary			PIP.U	14			300	3.7		JOD 26.00	JOD 96,200	JOD 1,924	JOD 1,924	JOD 4,810	JOD 4,810	JOD 9,620	JOD 119,288
10	West-Northwest		Upgrade primary network pipeline	Berein Reservoir to Berein East Distribution (150mm diameter, 2.0 km length)	2	Primary			PIP.U	22			150	2.0		JOD 14.30	JOD 28,600	JOD 572	JOD 572	JOD 1,430	JOD 1,430	JOD 2,860	JOD 35,464
10	West-Northwest		Construct new pumping station	Um Rumanneh PS (to new Berein High Reservoir and new Um Rumanneh High Reservoir - Target Pumping Rate 90 m3/hr)	2	Primary			PS.N	11		90				JOD 3,667	JOD 330,000	JOD 6,600	JOD 6,600	JOD 16,500	JOD 16,500	JOD 33,000	JOD 409,200
10	West-Northwest		Construct new pumping station	Alouk PS (to new Alouk High Reservoir - Target Pumping Rate 5 m3/hr)	2	Primary			PS.N	13		5				JOD 10,000	JOD 50,000	JOD 1,000	JOD 1,000	JOD 2,500	JOD 2,500	JOD 5,000	JOD 62,000
10	West-Northwest		Upgrade existing pumping station	Merhib PS (to new Merhib High Reservoir - Target Pumping Rate 105 m3/hr)	2	Primary			PS.U	9		105				JOD 3,149	JOD 330,660	JOD 6,613	JOD 6,613	JOD 16,533	JOD 16,533	JOD 33,066	JOD 410,018
10	West-Northwest		Construct new reservoir	Berein High Reservoir (Distribution Storage Reservoir 300 m3)	2	Primary			RES.N	5	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Upgrade existing reservoir	Merhib Reservoir (Flow-Balancing Storage Reservoir 1,000 m3)	2	Primary			RES.U	1	1,000					JOD 48	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
10	West-Northwest		Upgrade existing reservoir	Berein Reservoir (Distribution and Flow-Balancing Reservoir 1,000 m3)	2	Primary			RES.U	3	1,000					JOD 48	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
10	West-Northwest		Upgrade existing reservoir	Um Rumanneh Reservoir (Flow-Balancing Storage Reservoir 500 m3)	2	Primary			RES.U	4	500					JOD 74	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
10	West-Northwest		Upgrade existing reservoir	Sarout Reservoir (Distribution and Flow-Balancing Storage Reservoir 400 m3)	2	Primary			RES.U	7	400					JOD 92	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
		We1				Secondary		m	PIP.RH				100 - 150mm	2.961		58.5	JOD 173,244	JOD 3,465	JOD 3,465	JOD 8,662	JOD 8,662	JOD 17,324	JOD 214,822
		We1				Secondary		m	PIP.RH				60 - 90mm	4.998		28.6	JOD 142,953	JOD 2,859	JOD 2,859	JOD 7,148	JOD 7,148	JOD 14,295	JOD 177,261
		We1				Secondary		m	PIP.RS				100 - 150mm	5.923		8.77	JOD 51,944	JOD 1,039	JOD 1,039	JOD 2,597	JOD 2,597	JOD 5,194	JOD 64,410
		We1				Secondary		m	PIP.RS				60 - 90mm	9.997		5.72	JOD 57,181	JOD 1,144	JOD 1,144	JOD 2,859	JOD 2,859	JOD 5,718	JOD 70,905
		We1				Tertiary		No.	CM.N				50% Replac	133		50	JOD 6,650	JOD 133	JOD 133	JOD 333	JOD 333	JOD 665	JOD 8,246
		We1				Tertiary		No.	CP.RS				100% Restr	205		100	JOD 20,462	JOD 409	JOD 409	JOD 1,023	JOD 1,023	JOD 2,046	JOD 25,372
		We1				Tertiary		m	PIP.RH				≤ 50mm	5.998		28.6	JOD 171,553	JOD 3,431	JOD 3,431	JOD 8,578	JOD 8,578	JOD 17,155	JOD 212,726
		We1				Tertiary		m	PIP.RS				≤ 50mm	7.498		5.72	JOD 42,888	JOD 858	JOD 858	JOD 2,144	JOD 2,144	JOD 4,289	JOD 53,182
		We2				Secondary		m	PIP.RH				100 - 150mm	14.917		58.5	JOD 872,634	JOD 17,453	JOD 17,453	JOD 43,632	JOD 43,632	JOD 87,263	JOD 1,082,066
		We2				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We2				Secondary		m	PIP.RS				100 - 150mm	26.014		8.77	JOD 228,145	JOD 4,563	JOD 4,563	JOD 11,407	JOD 11,407	JOD 22,815	JOD 282,900
		We2				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We2				Tertiary		No.	CM.N				50% Replac	243		50	JOD 12,125	JOD 243	JOD 243	JOD 606	JOD 606	JOD 1,213	JOD 15,035
		We2				Tertiary		No.	CP.RS				100% Restr	373		100	JOD 37,308	JOD 746	JOD 746	JOD 1,865	JOD 1,865	JOD 3,731	JOD 46,262
		We2				Tertiary		m	PIP.RH				≤ 50mm	13.518		28.6	JOD 386,626	JOD 7,733	JOD 7,733	JOD 19,331	JOD 19,331	JOD 38,663	JOD 479,416
		We2				Tertiary		m	PIP.RS				≤ 50mm	16.898		5.72	JOD 96,657	JOD 1,933	JOD 1,933	JOD 4,833	JOD 4,833	JOD 9,666	JOD 119,854
		We3				Secondary		m	PIP.RH				100 - 150mm	12.265		58.5	JOD 717,490	JOD 14,350	JOD 14,350	JOD 35,874	JOD 35,874	JOD 71,749	JOD 889,687
		We3				Secondary		m	PIP.RH				60 - 90mm	979		28.6	JOD 27,990	JOD 560	JOD 560	JOD 1,400	JOD 1,400	JOD 2,799	JOD 34,708
		We3				Secondary		m	PIP.RS				100 - 150mm	22.904		8.77	JOD 200,869	JOD 4,017	JOD 4,017	JOD 10,043	JOD 10,043	JOD 20,087	JOD 249,077
		We3				Secondary		m	PIP.RS				60 - 90mm	1,957		5.72	JOD 11,196	JOD 224	JOD 224	JOD 560	JOD 560	JOD 1,120	JOD 13,883
		We3				Tertiary		No.	CM.N				50% Replac	316		50	JOD 15,775	JOD 316	JOD 316	JOD 789	JOD 789	JOD 1,578	JOD 19,561
		We3				Tertiary		No.	CP.RS				100% Restr	485		100	JOD 48,538	JOD 971	JOD 971	JOD 2,427	JOD 2,427	JOD 4,854	JOD 60,188
		We3				Tertiary		m	PIP.RH				≤ 50mm	24.845		28.6	JOD 710,566	JOD 14,211	JOD 14,211	JOD 35,528	JOD 35,528	JOD 71,057	JOD 881,102
		We3				Tertiary		m	PIP.RS				≤ 50mm	31.056		5.72	JOD 177,642	JOD 3,553	JOD 3,553	JOD 8,882	JOD 8,882	JOD 17,764	JOD 220,275
		We4				Secondary		m	PIP.RH				100 - 150mm	5.101		58.5	JOD 298,382	JOD 5,968	JOD 5,968	JOD 14,919	JOD 14,919	JOD 29,838	JOD 369,993
		We4				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We4				Secondary		m	PIP.RS				100 - 150mm	6.806		8.77	JOD 59,689	JOD 1,194	JOD 1,194	JOD 2,984	JOD 2,984	JOD 5,969	JOD 74,015
		We4				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We4				Tertiary		No.	CM.N				50% Replac	96		50	JOD 4,775	JOD 96	JOD 96	JOD 239	JOD 239	JOD 478	JOD 5,921
		We4				Tertiary		No.	CP.RS				100% Restr	147		100	JOD 14,692	JOD 294	JOD 294	JOD 735	JOD 735	JOD 1,469	JOD 18,218
		We4				Tertiary		m	PIP.RH				≤ 50mm	11.927		28.6	JOD 341,112	JOD 6,822	JOD 6,822	JOD 17,056	JOD 17,056	JOD 34,111	JOD 422,979
		We4				Tertiary		m	PIP.RS				≤ 50mm	14.909		5.72	JOD 85,278	JOD 1,706	JOD 1,706	JOD 4,264	JOD 4,264	JOD 8,528	JOD 105,745
		We5				Secondary		m	PIP.RH				100 - 150mm	7.509		58.5	JOD 439,278	JOD 8,786	JOD 8,786	JOD 21,964	JOD 21,964	JOD 43,928	JOD 544,705
		We5				Secondary		m	PIP.RH				60 - 90mm	537		28.6	JOD 15,349	JOD 307	JOD 307	JOD 767	JOD 767	JOD 1,535	JOD 19,033
		We5				Secondary		m	PIP.RS				100 - 150mm	11.501		8.77	JOD 100,868	JOD 2,017	JOD 2,017	JOD 5,043	JOD 5,043	JOD 10,087	JOD 125,076
		We5				Secondary		m	PIP.RS				60 - 90mm	671		5.72	JOD 3,837	JOD 77	JOD 77	JOD 192	JOD 192	JOD 384	JOD 4,758
		We5				Tertiary		No.	CM.N				50% Replac	303		50	JOD 15,125	JOD 303	JOD 303	JOD 756	JOD 756	JOD 1,513	JOD 18,755
		We5				Tertiary		No.	CP.RS				100% Restr	465		100	JOD 46,538	JOD 931	JOD 931	JOD 2,327	JOD 2,327	JOD 4,654	JOD 57,708
		We5				Tertiary		m	PIP.RH				≤ 50mm	35.892		28.6	JOD 1,026,523	JOD 20,530	JOD 20,530	JOD 51,326	JOD 51,326	JOD 102,652	JOD 1,272,888
		We5				Tertiary		m	PIP.RS				≤ 50mm	44.866		5.72	JOD 256,631	JOD 5,133	JOD 5,133	JOD 12,832	JOD 12,832	JOD 25,663	JOD 318,222
		We6				Secondary		m	PIP.RH				100 - 150mm	8.607		58.5	JOD 503,519	JOD 10,070	JOD 10,070	JOD 25,176	JOD 25,176	JOD 50,352	JOD 624,363
		We6				Secondary		m	PIP.RH				60 - 90mm	1.283		28.6	JOD 36,681	JOD 734	JOD 734	JOD 1,834	JOD 1,834	JOD 3,668	JOD 45,485
		We6				Secondary		m	PIP.RS				100 - 150mm	17.214		8.77	JOD 150,970	JOD 3,019	JOD 3,019	JOD 7,548	JOD 7,548	JOD 15,097	JOD 187,202
		We6				Secondary		m	PIP.RS				60 - 90mm	1.603		5.72	JOD 9,170	JOD 183	JOD 183	JOD 459	JOD 459	JOD 917	JOD 11,371
		We6				Tertiary		No.	CM.N				50% Replac	89		50	JOD 4,425	JOD 89	JOD 89	JOD 221	JOD 221	JOD 443	JOD 5,487
		We6				Tertiary		No.	CP.RS				100% Restr	136		100	JOD 13,615	JOD 272	JOD 272	JOD 681	JOD 681	JOD 1,362	JOD 16,883
		We6				Tertiary		m	PIP.RH				≤ 50mm	1.310		28.6	JOD 37,463	JOD 749	JOD 749	JOD 1,873	JOD 1,873	JOD 3,746	JOD 46,454
		We6				Tertiary		m	PIP.RS				≤ 50mm	1.637		5.72	JOD 9,366	JOD 187	JOD 187	JOD 468	JOD 468	JOD 937	JOD 11,614
10	West-Northwest		Construct new primary network pipeline	Inlet-Outlet branch pipework to new Merhib High Reservoir (300mm diameter, 1.0 km length)	3	Primary			PIP.N	15			300	1.0		JOD 130.00	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
10	West-Northwest		Construct new primary network pipeline	Merhib High Reservoir to Merhib Distribution (200mm diameter, 2.0 km length)	3	Primary			PIP.N	23			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh High Reservoir to Um Rumanneh Distribution (200mm diameter, 2.0 km length)	3	Primary			PIP.N	24			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Alouk High Reservoir Alouk Distribution (150mm diameter, 2.3 km length)	3	Primary			PIP.N	28			150	2.3		JOD 71.50	JOD 164,450	JOD 3,289	JOD 3,289	JOD 8,223	JOD 8,223	JOD 16,445	JOD 203,918
10	West-Northwest		Upgrade primary network pipeline	New Merhib High Reservoir/PS to Berein Reservoir (300mm diameter, 2.9 km length)	3	Primary			PIP.U	16			300	2.9		JOD 26.00	JOD 75,400	JOD 1,508	JOD 1,508	JOD 3,770	JOD 3,770	JOD 7,540	JOD 93,496
10	West-Northwest		Construct new pumping station	Berein Highest Levels Boosters (Target Pumping Rate 5 m3/hr)	3	Primary			PS.N	5		5				JOD 6,490	JOD 32,450	JOD 649	JOD 649	JOD 1,623	JOD 1,623	JOD 3,245	JOD 40,238
10	West-Northwest		Construct new pumping station	Um Rumanneh Highest Levels Boosters (Target Pumping Rate 5 m3/hr)	3	Primary			PS.N	6		5				JOD 6,490	JOD 32,450	JOD 649	JOD 649	JOD 1,623	JOD 1,623	JOD 3,245	JOD 40,238
10	West-Northwest		Construct new pumping station	Merhib High Reservoir PS (to existing Berein Reservoir - Target Pumping Rate 90 m3/hr)	3	Primary			PS.N	10		90				JOD 3,667	JOD 330,000	JOD 6,600	JOD 6,600	JOD 16,500	JOD 16,500	JOD 33,000	JOD 409,200
10	West-Northwest		Construct new reservoir	Merhib High Reservoir (Distribution and Flow-Balancing Storage Reservoir 300 m3)	3	Primary			RES.N	2	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Construct new reservoir	Um Rumanneh High Reservoir (Distribution Storage Reservoir 300 m3)	3	Primary			RES.N	6	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Construct new reservoir	Alouk High Reservoir (Distribution Storage Reservoir 300 m3)	3	Primary			RES.N	8	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491

		Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
Phase 1b	Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Secondary Network	JOD 4,101,389	JOD 82,028	JOD 82,028	JOD 205,069	JOD 205,069	JOD 410,139	JOD 5,085,722
	Tertiary Network	JOD 3,582,333	JOD 71,647	JOD 71,647	JOD 179,117	JOD 179,117	JOD 358,233	JOD 4,442,093
	Total	JOD 7,683,722	JOD 153,674	JOD 153,674	JOD 384,186	JOD 384,186	JOD 768,372	JOD 9,527,815
Phase 2	Primary Network	JOD 3,570,383	JOD 71,408	JOD 71,408	JOD 178,519	JOD 178,519	JOD 357,038	JOD 4,427,274
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 3,570,383	JOD 71,408	JOD 71,408	JOD 178,519	JOD 178,519	JOD 357,038	JOD 4,427,274
Phase 3	Primary Network	JOD 1,487,390	JOD 29,748	JOD 29,748	JOD 74,370	JOD 74,370	JOD 148,739	JOD 1,844,364
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 1,487,390	JOD 29,748	JOD 29,748	JOD 74,370	JOD 74,370	JOD 148,739	JOD 1,844,364

Future 2030 Model Pipe Information PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5395	P-927	1047.73	J-2165	J-2166	400	120	Ductile Iron	-85.84	0.68	1.383
5397	P-928	969.65	J-2166	J-2167	400	120	Ductile Iron	-171.75	1.37	4.998
5401	P-930	946.65	J-2168	J-2169	400	120	Ductile Iron	62.89	0.5	0.778
5403	P-931	787.73	J-2169	J-2170	400	120	Ductile Iron	41.92	0.33	0.367
5405	P-932	846.25	J-2170	J-2171	400	120	Ductile Iron	20.96	0.17	0.102
5407	P-933	309.5	Russaifah Low	J-2172	500	120	Ductile Iron	402.34	2.05	8.155
5409	P-934	881.22	J-2172	J-2173	500	120	Ductile Iron	381.38	1.94	7.385
5411	P-935	517.49	J-2173	J-2174	300	120	Ductile Iron	93.1	1.32	6.529
5413	P-936	284.39	J-2174	J-2175	300	120	Ductile Iron	72.14	1.02	4.071
5414	P-937	294.92	J-2175	J-2167	300	120	Ductile Iron	30.22	0.43	0.812
5416	P-938	832.12	J-2175	J-2176	300	120	Ductile Iron	20.96	0.3	0.413
5418	P-939	651.85	J-2165	J-2177	300	120	Ductile Iron	10.54	0.15	0.116
5420	P-940	765.04	J-2177	J-2178	300	120	Ductile Iron	-31.38	0.44	0.871
5421	P-941	381.8	J-2178	J-2166	300	120	Ductile Iron	-52.35	0.74	2.247
5423	P-942	665.26	J-2167	J-2179	400	120	Ductile Iron	-162.5	1.29	4.511
5424	P-943	624.41	J-2179	J-2168	400	120	Ductile Iron	83.85	0.67	1.325
5425	P-944	464.19	J-2173	J-2179	500	120	Ductile Iron	267.31	1.36	3.824
5428	P-945	2073.4	J-2180	J-2181	300	120	Ductile Iron	33.37	0.47	0.977
5430	P-946	1012.66	J-2181	J-2182	300	120	Ductile Iron	-71.44	1.01	3.998
5432	P-947	567.67	J-2182	J-2183	200	120	Ductile Iron	8.36	0.27	0.542
5433	P-948	530.71	J-2183	J-2166	200	120	Ductile Iron	-12.6	0.4	1.159
5435	P-949	924.21	J-2181	J-2184	300	120	Ductile Iron	83.85	1.19	5.378
5437	P-950	701.79	J-2184	J-2185	300	120	Ductile Iron	62.89	0.89	3.157
5439	P-951	869.05	J-2185	J-2186	300	120	Ductile Iron	41.92	0.59	1.49
5441	P-952	308.89	J-2186	J-2187	300	120	Ductile Iron	20.96	0.3	0.413
5443	P-953	430.89	Hitten Tower	J-2188	400	120	Ductile Iron	125.77	1	2.807
5445	P-954	722.7	J-2188	J-2189	300	120	Ductile Iron	104.81	1.48	8.131
5447	P-955	349.46	J-2189	J-2190	300	120	Ductile Iron	62.89	0.89	3.157
5449	P-956	626.77	J-2190	J-2191	300	120	Ductile Iron	41.92	0.59	1.49
5451	P-957	432.71	J-2191	J-2192	300	120	Ductile Iron	20.96	0.3	0.413
5453	P-958	931.71	J-2189	J-2193	300	120	Ductile Iron	20.96	0.3	0.413
5455	P-959	261.55	Hitten Reservoir	J-2194	500	120	Ductile Iron	268.46	1.37	3.855
5457	P-960	388.66	J-2194	J-2195	400	120	Ductile Iron	247.49	1.97	9.832
5459	P-961	354.26	J-2195	J-2196	400	120	Ductile Iron	226.53	1.8	8.346
5461	P-962	655.96	J-2196	J-2197	400	120	Ductile Iron	205.57	1.64	6.972
5463	P-963	1480.77	J-2197	J-2198	400	120	Ductile Iron	184.61	1.47	5.713
5465	P-964	386.87	J-2198	J-2199	400	120	Ductile Iron	163.64	1.3	4.57
5467	P-965	483.72	J-2199	J-2200	400	120	Ductile Iron	142.68	1.14	3.545
5469	P-966	382.06	J-2200	J-2201	300	120	Ductile Iron	121.72	1.72	10.726
5470	P-967	868.34	J-2201	J-2182	300	120	Ductile Iron	100.76	1.43	7.558
5474	P-969	346.09	J-2202	J-2203	300	120	Ductile Iron	-20.96	0.3	0.413
5476	P-970	324.75	J-2203	J-2204	300	120	Ductile Iron	-41.92	0.59	1.49
5480	P-972	375.52	J-2205	J-2206	400	120	Ductile Iron	-21.72	0.17	0.109
5482	P-973	351.24	J-2206	J-2207	400	120	Ductile Iron	-43.45	0.35	0.392
5484	P-974	720.84	J-2207	J-2208	400	120	Ductile Iron	-65.17	0.52	0.831
5486	P-975	544.34	J-2208	J-2209	400	120	Ductile Iron	-86.9	0.69	1.415
5488	P-976	1124.32	J-2177	J-2210	152.4	120	Ductile Iron	20.96	1.15	11.178
5492	P-978	1242.41	J-2211	J-2212	300	120	Ductile Iron	62.97	0.89	3.165
5494	P-979	883.42	J-2212	J-2213	300	120	Ductile Iron	41.24	0.58	1.445
5496	P-980	1217.69	J-2213	J-2214	300	120	Ductile Iron	19.52	0.28	0.362
5500	P-982	827.26	J-2215	J-2216	300	120	Ductile Iron	21.72	0.31	0.441
5502	P-983	559.54	J-2214	J-2217	300	120	Ductile Iron	-2.2	0.03	0.006
5503	P-984	839.02	J-2217	J-2215	300	120	Ductile Iron	43.45	0.61	1.592
5504	P-985	1573.75	J-2211	J-2217	300	120	Ductile Iron	67.38	0.95	3.587
5506	P-986	552.45	Awajan Low	J-2218	400	120	Ductile Iron	260.69	2.07	10.825
5508	P-987	427.26	J-2218	J-2219	400	120	Ductile Iron	238.97	1.9	9.214
5512	P-989	939.46	J-2220	J-2221	300	120	Ductile Iron	-4.85	0.07	0.027
5516	P-991	1046.93	J-2220	J-2223	300	120	Ductile Iron	43.45	0.61	1.592
5518	P-992	1034.6	J-2223	J-2224	300	120	Ductile Iron	21.72	0.31	0.441
5520	P-993	1915.64	Awajan West Reservoir	J-2225	300	120	Ductile Iron	86.9	1.23	5.746
5522	P-994	632.87	J-2225	J-2226	300	120	Ductile Iron	65.17	0.92	3.373
5524	P-995	536.07	J-2226	J-2227	300	120	Ductile Iron	43.45	0.61	1.592
5526	P-996	903.27	J-2227	J-2228	300	120	Ductile Iron	21.72	0.31	0.441
5534	P-1002	30.38	Zarqa Reservoir	J-2230	600	120	Ductile Iron	239.37	0.85	1.282
5538	P-1004	10.61	J-2230	J-2232	600	120	Ductile Iron	206.25	0.73	0.975
5540	P-1006	4.94	J-2232	Zarqa to Batrawi	400	120	Ductile Iron	173.12	1.38	5.069
5551	P-1015	3.77	Zarqa to Batrawi	J-2233	400	120	Ductile Iron	173.12	1.38	5.074
5554	P-1018	1956.93	J-2233	FCV-53	400	120	Ductile Iron	140	1.11	3.423
5555	P-1019	6.4	FCV-53	Batrawi Reservoir	400	120	Ductile Iron	140	1.11	3.418
5559	P-1021	370.31	J-2235	J-2236	400	120	Ductile Iron	-33.12	0.26	0.237
5561	P-1022	604.23	J-2236	J-2237	400	120	Ductile Iron	5.88	0.05	0.01
5565	P-1024	446.57	J-2238	J-2239	600	120	Ductile Iron	140.41	0.5	0.478
5567	P-1025	352.35	Batrawi Reservoir	J-2240	600	120	Ductile Iron	529.98	1.87	5.589
5569	P-1026	232.49	J-2240	J-2241	600	120	Ductile Iron	496.86	1.76	4.96
5571	P-1027	716	J-2241	J-2242	600	120	Ductile Iron	267.03	0.94	1.57
5573	P-1028	370.19	J-2242	J-2243	600	120	Ductile Iron	233.9	0.83	1.229
5574	P-1029	19.98	Batrawi Reservoir	Batrawi PS	300	120	Ductile Iron	97.79	1.38	7.153
5575	P-1030	1986.86	Batrawi PS	Zarqa High Reservoir	300	120	Steel	97.79	1.38	7.151
5588	P-1038	544.12	J-2247	J-2248	400	120	Ductile Iron	10.19	0.08	0.027
5589	P-1039	1023.64	J-2248	J-2246	400	120	Ductile Iron	20.5	0.16	0.098
5595	P-1042	1394.04	J-2250	J-2251	400	120	Ductile Iron	58.33	0.46	0.676
5600	P-1045	664.9	J-2252	J-2253	400	120	Ductile Iron	165.62	1.32	4.672
5604	P-1047	655.26	J-2254	J-2255	400	120	Ductile Iron	99.37	0.79	1.814
5606	P-1048	691.72	J-2255	J-2256	300	120	Ductile Iron	66.25	0.94	3.476
5611	P-1051	328.17	J-2258	J-2257	300	120	Ductile Iron	33.12	0.47	0.963
5613	P-1052	1208.88	J-2258	J-2259	300	120	Ductile Iron	-66.25	0.94	3.476
5615	P-1053	342.15	J-2259	J-2260	400	120	Ductile Iron	-99.37	0.79	1.814
5618	P-1055	1201.86	Zarqa High Reservoir	J-2261	300	120	Ductile Iron	99.37	1.41	7.366
5620	P-1056	719.17	J-2261	J-2262	300	120	Ductile Iron	66.25	0.94	3.476
5622	P-1057	1163.84	J-2262	J-2263	300	120	Ductile Iron	33.12	0.47	0.963
5627	P-1061	7427.82	Hashmeya Reservoir	FCV-35	300	120	Ductile Iron	46	0.65	1.769
5628	P-1062	11.23	FCV-35	Sukhna Reservoir	300	120	Ductile Iron	46	0.65	1.77
5629	P-1063	303.69	Sukhna Reservoir	Sukhna Pumps	300	120	Ductile Iron	80.05	1.13	4.935
5631	P-1064	145.03	Sukhna Pumps	J-2265	300	120	Ductile Iron	80.05	1.13	4.935
5633	P-1065	204.26	J-2265	J-2266	200	120	Ductile Iron	44.47	1.42	11.976
5635	P-1066	134.25	J-2266	J-2267	200	120	Ductile Iron	40.02	1.27	9.853
5645	P-1071	90	J-2267	J-2272	200	120	Ductile Iron	35.58	1.13	7.922
5646	P-1072	227.35	J-2272	J-2268	200	120	Ductile Iron	22.64	0.72	3.431
5647	P-1073	505.7	J-2271	J-2272	152.4	120	Ductile Iron	-8.49	0.47	2.095
5649	P-1074	392.2	J-2269	J-2273	152.4	120	Ductile Iron	-0.75	0.04	0.023

Future 2030 Model Pipe Information PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5650	P-1075	360.06	J-2273	J-2270	152.4	120	Ductile Iron	1.88	0.1	0.129
5652	P-1076	132.96	J-2268	J-2274	200	120	Ductile Iron	18.2	0.58	2.288

Future 2030 Model Pipe Information PEAK DEMAND

ID	Label	Length (Scaled) (m)	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Material	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
5653	P-1077	470.94	J-2274	J-2269	152.4	120	Ductile Iron	3.7	0.2	0.449
5654	P-1078	508.25	J-2273	J-2274	200	120	Ductile Iron	-7.08	0.23	0.398
5656	P-1079	311.78	J-2270	J-2275	152.4	120	Ductile Iron	-2.57	0.14	0.229
5657	P-1080	381.99	J-2275	J-2271	152.4	120	Ductile Iron	-4.04	0.22	0.53
5658	P-1081	591.13	J-2274	J-2275	152.4	120	Ductile Iron	2.97	0.16	0.3
5660	P-1082	836.35	J-2265	J-2276	200	120	Ductile Iron	31.13	0.99	6.186
5661	P-1083	1068.41	J-2276	Sukhna HL PS	200	120	Ductile Iron	26.68	0.85	4.65
5663	P-1084	668.91	Sukhna HL PS	J-2277	152.4	120	Ductile Iron	26.68	1.46	17.475
5665	P-1085	1405.14	J-2277	J-2278	200	120	Ductile Iron	22.23	0.71	3.317
5667	P-1086	1005.78	J-2278	J-2279	152.4	120	Ductile Iron	17.79	0.98	8.247
5669	P-1087	2096.91	J-2279	J-2280	152.4	120	Ductile Iron	8.89	0.49	2.285
5671	P-1088	1382.25	J-2280	J-2281	152.4	120	Ductile Iron	4.45	0.24	0.633
5673	P-1089	995.66	J-2279	J-2282	152.4	120	Ductile Iron	4.45	0.24	0.633
5683	P-1096	8954.39	Qunaya Reservoir	J-2377	152.4	120	Ductile Iron	0	0	0
5687	P-1099	197.83	Qunaya Reservoir	J-2286	152.4	120	Ductile Iron	8.7	0.48	2.194
5689	P-1100	274.55	J-2286	J-2287	152.4	120	Ductile Iron	6.53	0.36	1.288
5691	P-1101	389.51	J-2287	J-2288	152.4	120	Ductile Iron	4.35	0.24	0.608
5693	P-1102	201.37	J-2288	J-2289	152.4	120	Ductile Iron	2.18	0.12	0.168
5698	P-1106	1764.98	Sarrout Source	Sarout Reservoir	152.4	120	Ductile Iron	26.05	1.43	16.714
5701	P-1109	11.59	Alouk Spring	Alouk Pump	152.4	120	Ductile Iron	14.25	0.78	5.471
5704	P-1111	134.68	Alouk High Reservoir	J-2291	150	120	Ductile Iron	15.23	0.86	6.683
5706	P-1112	889.35	J-2291	J-2292	150	120	Ductile Iron	13.05	0.74	5.023
5708	P-1113	608.34	J-2292	J-2293	150	120	Ductile Iron	10.88	0.62	3.583
5710	P-1114	466.73	J-2293	J-2294	150	120	Ductile Iron	8.7	0.49	2.371
5712	P-1115	402.25	J-2294	J-2295	150	120	Ductile Iron	6.53	0.37	1.391
5714	P-1116	310.26	J-2295	J-2296	150	120	Ductile Iron	4.35	0.25	0.657
5716	P-1117	1738.98	J-2296	J-2297	150	120	Ductile Iron	2.18	0.12	0.182
5720	P-1120	9.54	Um Rummaneh (Berein) V	FCV-40	152.4	120	Ductile Iron	24.5	1.34	14.922
5721	P-1121	8.53	FCV-40	Um Rummaneh Reservoir	152.4	120	Ductile Iron	24.5	1.34	14.922
5722	P-1122	8.54	Um Rummaneh Reservoir	Um Rummaneh PS	152.4	120	Ductile Iron	14.33	0.79	5.527
5723	P-1123	2580.62	Um Rummaneh PS	Berein High Reservoir	200	120	Ductile Iron	14.33	0.46	1.471
5724	P-1124	10.25	Um Rummaneh Reservoir	Um Rummaneh to Um Rumm	152.4	120	Ductile Iron	21.62	1.19	11.837
5725	P-1125	3855.69	Um Rummaneh to Um Ru	Um Rummaneh High Reservo	200	120	Ductile Iron	21.62	0.69	3.149
5727	P-1126	587.47	Um Rummaneh High Res	J-2299	200	120	Ductile Iron	10.88	0.35	0.883
5731	P-1128	2571.75	J-2300	J-2301	152.4	120	Ductile Iron	2.18	0.12	0.168
5733	P-1129	1619	J-2300	J-2302	152.4	120	Ductile Iron	2.18	0.12	0.168
5735	P-1130	793.82	Um Rummaneh High Res	J-2303	200	120	Ductile Iron	6.53	0.21	0.343
5737	P-1131	910.61	J-2303	J-2304	200	120	Ductile Iron	4.35	0.14	0.162
5739	P-1132	1203.33	J-2304	J-2305	200	120	Ductile Iron	2.18	0.07	0.045
5743	P-1135	5.13	Merhib Wells	FCV-27	300	120	Ductile Iron	24.24	0.34	0.536
5744	P-1136	4.37	FCV-27	Merhib Reservoir	300	120	Ductile Iron	24.24	0.34	0.545
5745	P-1137	42.85	Merhib Reservoir	Merhib to Berein	300	120	Ductile Iron	61.02	0.86	2.985
5747	P-1138	38.12	Merhib to Berein	J-2307	300	120	Ductile Iron	61.02	0.86	2.987
5750	P-1140	225.16	Beirein Reservoir	J-2308	300	120	Ductile Iron	13.05	0.18	0.172
5754	P-1142	604.93	J-2309	J-2310	300	120	Ductile Iron	8.7	0.12	0.081
5756	P-1143	783.19	J-2310	J-2311	300	120	Ductile Iron	6.53	0.09	0.048
5758	P-1144	1215.5	J-2311	J-2312	300	120	Ductile Iron	4.35	0.06	0.022
5760	P-1145	2802.9	J-2312	J-2313	300	120	Ductile Iron	2.18	0.03	0.006
5761	P-1146	40.62	Merhib High Reservoir	Merhib HL to Berein PS	200	120	Ductile Iron	23.46	0.75	3.662
5764	P-1148	3416.87	Merhib HL to Berein PS	Beirein Reservoir	200	120	Ductile Iron	23.46	0.75	3.662
5765	P-1149	1777.92	New Tatweer Reservoir	J-2143	300	120	Ductile Iron	32.15	0.45	0.911
5766	P-1150	1175.52	J-2219	J-2222	300	120	Ductile Iron	48.3	0.68	1.936
5769	P-1151	16.31	Sarout Reservoir	J-2378	152.4	120	Ductile Iron	4.35	0.24	0.607
5773	P-1154	527.68	Hashmeya Reservoir	J-2316	300	120	Ductile Iron	71.15	1.01	3.968
5778	P-1156	589.05	J-2317	J-2319	152.4	120	Ductile Iron	7.75	0.43	1.772
5780	P-1157	1014.01	J-2319	J-2320	152.4	120	Ductile Iron	3.91	0.21	0.499
5782	P-1158	500.31	J-2320	J-2321	152.4	120	Ductile Iron	8.89	0.49	2.285
5784	P-1159	667.11	J-2321	J-2322	152.4	120	Ductile Iron	4.45	0.24	0.633
5786	P-1160	170.62	J-2316	J-2323	300	120	Ductile Iron	38.55	0.55	1.275
5787	P-1161	866.35	J-2323	J-2317	300	120	Ductile Iron	12.2	0.17	0.151
5790	P-1163	761.44	J-2320	J-2324	200	120	Ductile Iron	-9.43	0.3	0.678
5791	P-1164	360.93	J-2324	J-2323	200	120	Ductile Iron	-21.9	0.7	3.226
5792	P-1165	665.53	J-2319	J-2324	152.4	120	Ductile Iron	-0.6	0.03	0.016
5794	P-1166	862.57	J-2324	J-2325	152.4	120	Ductile Iron	7.42	0.41	1.634
5795	P-1167	543.49	J-2325	J-2316	200	120	Ductile Iron	-28.15	0.9	5.136
5797	P-1168	400.58	J-2325	J-2326	200	120	Ductile Iron	31.13	0.99	6.186
5799	P-1169	508.31	J-2326	J-2327	152.4	120	Ductile Iron	26.68	1.46	17.475
5801	P-1170	448.3	J-2327	J-2328	152.4	120	Ductile Iron	22.23	1.22	12.468
5803	P-1171	291.21	J-2328	J-2329	152.4	120	Ductile Iron	17.79	0.98	8.247
5805	P-1172	336.33	J-2329	J-2330	152.4	120	Ductile Iron	6.5	0.36	1.278
5807	P-1173	308.16	J-2330	J-2331	152.4	120	Ductile Iron	2.05	0.11	0.151
5809	P-1174	141.57	J-2331	J-2332	152.4	120	Ductile Iron	-2.4	0.13	0.201
5810	P-1175	318.46	J-2332	J-2329	152.4	120	Ductile Iron	-6.84	0.38	1.406
5817	P-1178	3559.28	J-2335	J-2336	300	120	Ductile Iron	13.34	0.19	0.179
5819	P-1179	1758.94	J-2336	J-2337	152.4	120	Ductile Iron	8.89	0.49	2.285
5820	P-1180	1255.43	J-2337	Hashmeya HL PS	152.4	120	Ductile Iron	4.45	0.24	0.633
5822	P-1181	2272.86	Hashmeya HL PS	J-2338	152.4	120	Ductile Iron	4.45	0.24	0.633
5823	P-1182	365.98	J-2333	J-2335	152.4	120	Ductile Iron	22.23	1.22	12.468
5824	P-1183	575.97	J-2335	J-2334	152.4	120	Ductile Iron	4.45	0.24	0.633
5826	P-1184	89.65	Hashmeya PS	J-2339	300	120	Ductile Iron	137.13	1.94	13.375
5828	P-1186	430.16	J-2339	J-2333	152.4	120	Ductile Iron	26.68	1.46	17.475
5830	P-1187	22.52	FCV-47	J-2340	600	120	Ductile Iron	97.22	0.34	0.241
5831	P-1188	20.93	J-2340	J-2139	600	120	Ductile Iron	0	0	0
5834	P-1190	50.25	J-2341	FCV-48	800	120	Ductile Iron	767	1.53	2.731
5835	P-1191	3239.39	J-2340	J-2341	400	120	Ductile Iron	97.22	0.77	1.742
5838	P-1193	7.87	Khaw Reservoir	Khaw to KABA	800	120	Ductile Iron	669.78	1.33	2.123
5839	P-1194	2588.67	Khaw to KABA	J-2341	800	120	Ductile Iron	669.78	1.33	2.124
5841	P-1195	76.87	H-1	J-2342	600	120	Ductile Iron	438.77	1.55	3.939
5842	P-1196	1702.62	J-2342	FCV-15	600	120	Ductile Iron	208	0.74	0.989
5845	P-1198	2332.17	J-2343	J-2142	500	120	Ductile Iron	187.32	0.95	1.979
5846	P-1199	302.9	J-2342	J-2343	600	120	Ductile Iron	209.05	0.74	0.998
5848	P-1200	3031.46	J-2141	FCV-70	600	120	Ductile Iron	374	1.32	2.931
5849	P-1201	57.67	FCV-70	Awajan Hub	600	120	Ductile Iron	374	1.32	2.931
5850	P-1202	1060.64	Batrawi Reservoir	J-2260	400	120	Ductile Iron	132.49	1.05	3.091
5852	P-1204	656.51	J-2264	J-2256	300	120	Ductile Iron	-33.12	0.47	0.963
5853	P-1205	647.88	J-2253	J-2254	400	120	Ductile Iron	132.49	1.05	3.091
5855	P-1207	916.71	Russaifah High	J-2204	300	120	Ductile Iron	62.89	0.89	3.157
5856	P-1208	787.79	J-2249	J-2241	400	120	Ductile Iron	-105.25	0.84	2.018
5857	P-1209	635.83	J-2241	J-2250	400	120	Ductile Iron	91.45	0.73	1.556
5858	P-1210	140.44	J-2249	J-2236	400	120	Ductile Iron	72.13	0.57	1.003

5.3 Hydraulic Profiles and Pump Design Calculations for Strategic Transmission Lines:

- Azraq to Khaw
- Khaw to Batrawi to Zarqa High
- Khaw to Russaifah
- Russaifah to Russaifah High
- Basateem to Russaifah Low
- Corridor Wells to Khaw
- Khaw to Awajan Hub
- Awajan Hub to Awajan Low
- Awajan High to Awajan West
- Awajan Hub to Awajan High
- Awajan Low to Awajan North
- Supply Profile: Azraq-Khaw-Russaifah
- Supply Profile: Khaw-Awajan-Awajan High-Awajan West / Awajan-Awajan Low-Awajan North

AZRAQ TO KHAW PUMPED RISING MAIN PROPOSED 2030 DELIVERY

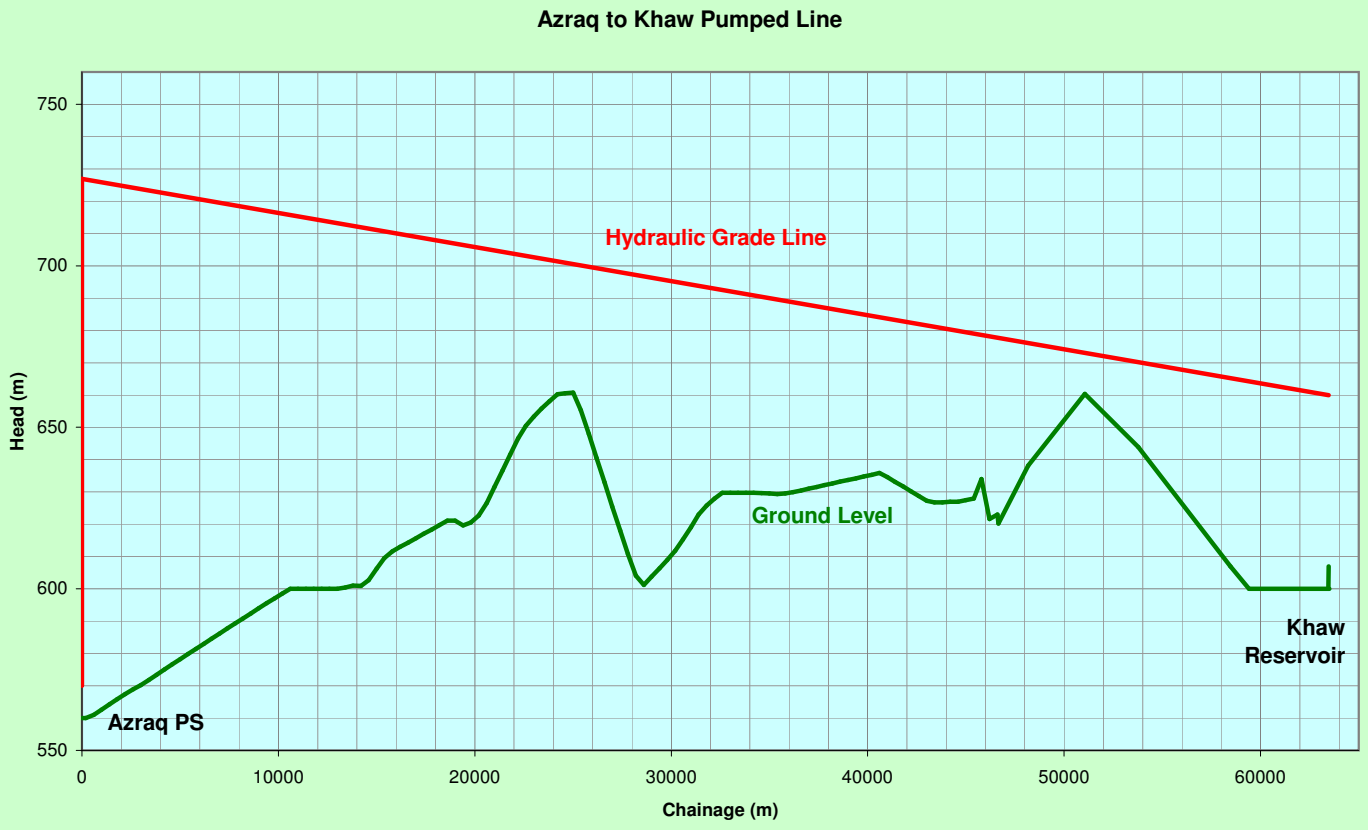
STATIC HEAD

Azraq Reservoir	570	*mOD*
Khaw Top Water Level	660	*mOD* (TWL = 607m, throttled to 660 m)

PIPE DETAILS			FLOW DETAILS			HEAD DETAILS		
Effective Diameter	0.849	*m*	Flow	0.5368	m^3/s	Static Head	90	*m*
Length	63468	*m*	Velocity	0.948	*m/s*	Friction Loss	66.882	*m*
C Value	120		**REQUIRED PUMP POWER**			Friction Loss	1.054	*m/km*
C.S.A	0.566	m^2	Efficiency	70	%			
			Req'd Pump Power	1180	*(kW)*	Total Head	156.882	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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KHAW -BATRAWI -ZARQA HIGH PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Khaw TWL	607	*mOD*
Batrawi TWL	654.5	*mOD*

PIPE DETAILS

Effective Diameter	0.7	*m*
Length	9,233	*m*
C Value	120	
C.S.A	0.385	m^2

FLOW DETAILS

Flow	0.6	m^3/s
Velocity	1.559	*m/s*

REQUIRED PUMP POWER

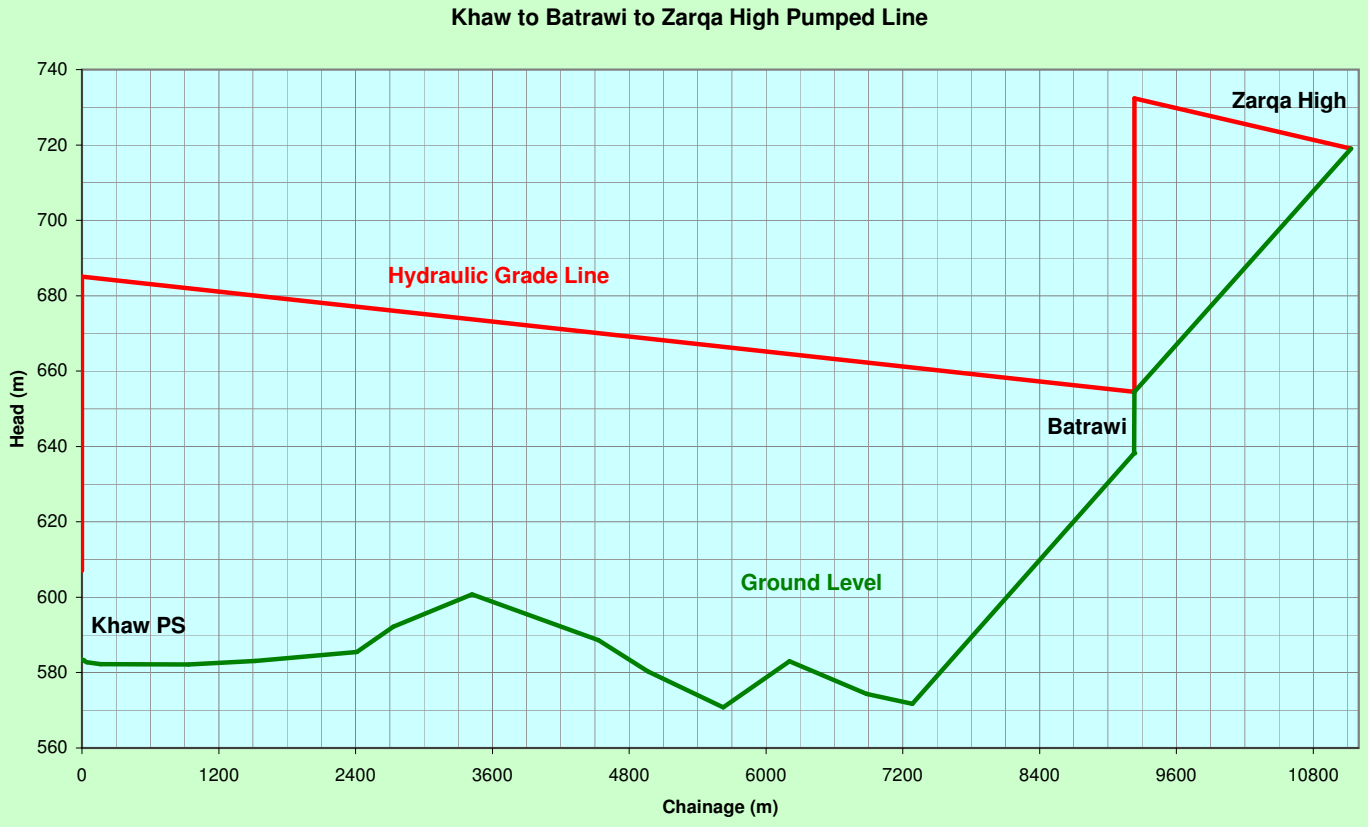
Efficiency	70	%
Req'd Pump Power	657	*(kW)*

HEAD DETAILS

Static Head	47.5	*m*
Friction Loss	30.604	*m*
Friction Loss	3.315	*m/km*
Total Head	78.104	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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KHAW TO RUSSAIFAH PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Khaw Top Water Level	607	*mOD*
Russaifah Hub TWL	729	*mOD*

PIPE DETAILS

Effective Diameter	0.6	*m*
Length	21,000	*m*
C Value	120	
C.S.A	0.283	m^2

FLOW DETAILS

Flow	0.489	m^3/s
Velocity	1.729	*m/s*

REQUIRED PUMP POWER

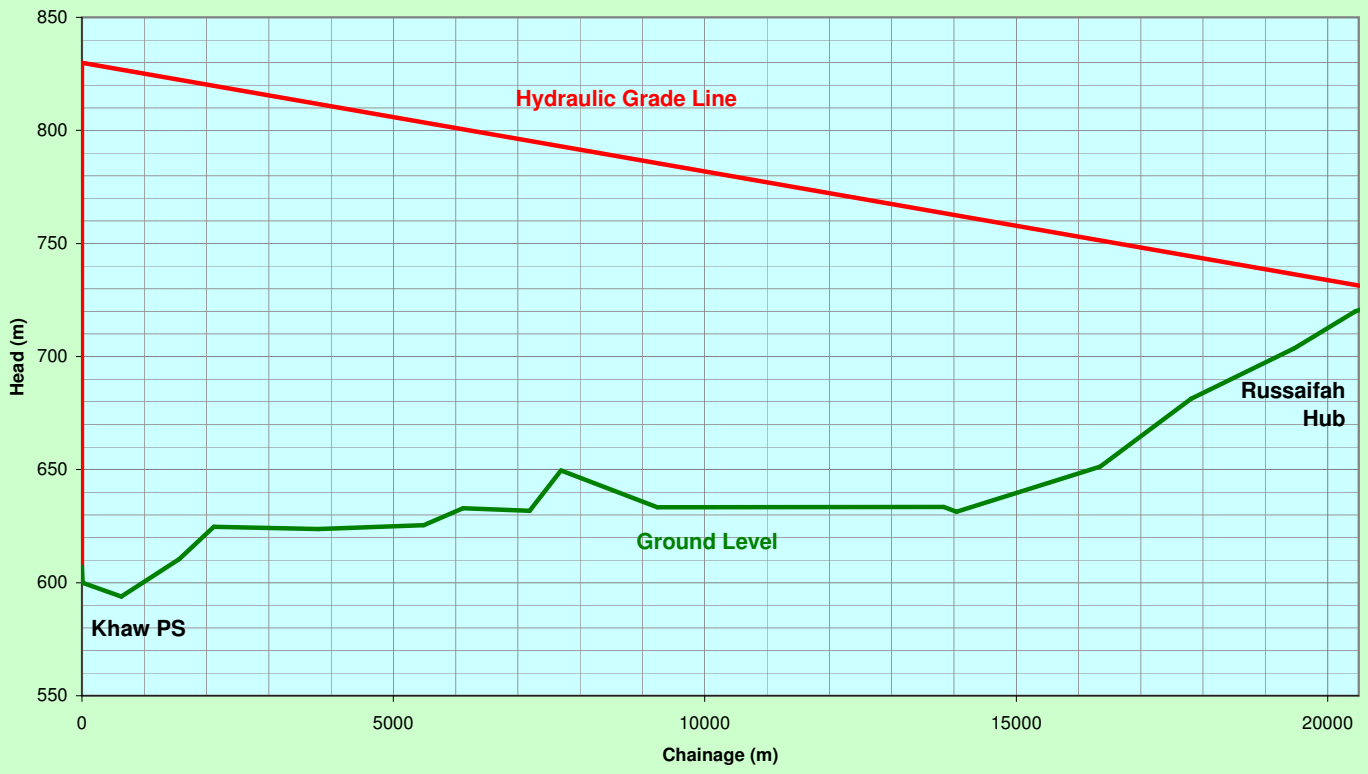
Efficiency	70	%
Req'd Pump Power	1528	*(kW)*

HEAD DETAILS

Static Head	122	*m*
Friction Loss	100.972	*m*
Friction Loss	4.808	*m/km*
Total Head	222.972	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



Nicholas O' Dwyer

RUSSAIFAH HUB TO RUSSAIFAH HIGH PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Russaifah Hub TWL	729	*mOD*
Russaifah High TWL	806.2	*mOD*

PIPE DETAILS

Effective Diameter	0.6	*m*
Length	5482.8357	*m*
C Value	120	
C.S.A	0.283	m^2

FLOW DETAILS

Flow	0.5	m^3/s
Velocity	1.768	*m/s*

REQUIRED PUMP POWER

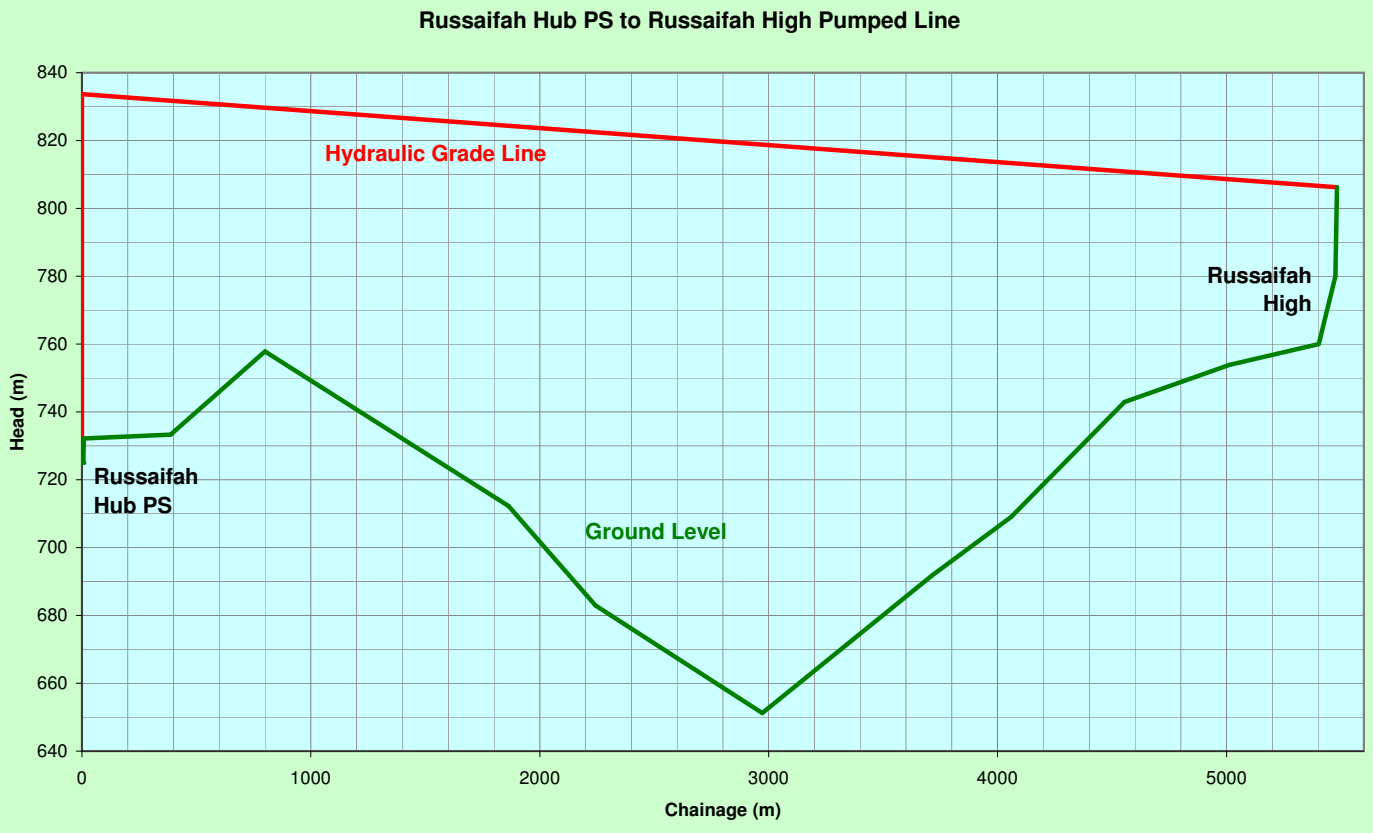
Efficiency	70	%
Req'd Pump Power	734	*(kW)*

HEAD DETAILS

Static Head	77.2	*m*
Friction Loss	27.471	*m*
Friction Loss	5.010	*m/km*
Total Head	104.671	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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BASATEEM PS TO RUSSAIFAH LOW PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Basateem PS TWL	643.5	*mOD*
Russaifah Low TWL	754.2	*mOD*

PIPE DETAILS

Effective Diameter	0.4	*m*
Length	3108.8274	*m*
C Value	120	
C.S.A	0.126	m^2

FLOW DETAILS

Flow	0.134	m^3/s
Velocity	1.066	*m/s*

REQUIRED PUMP POWER

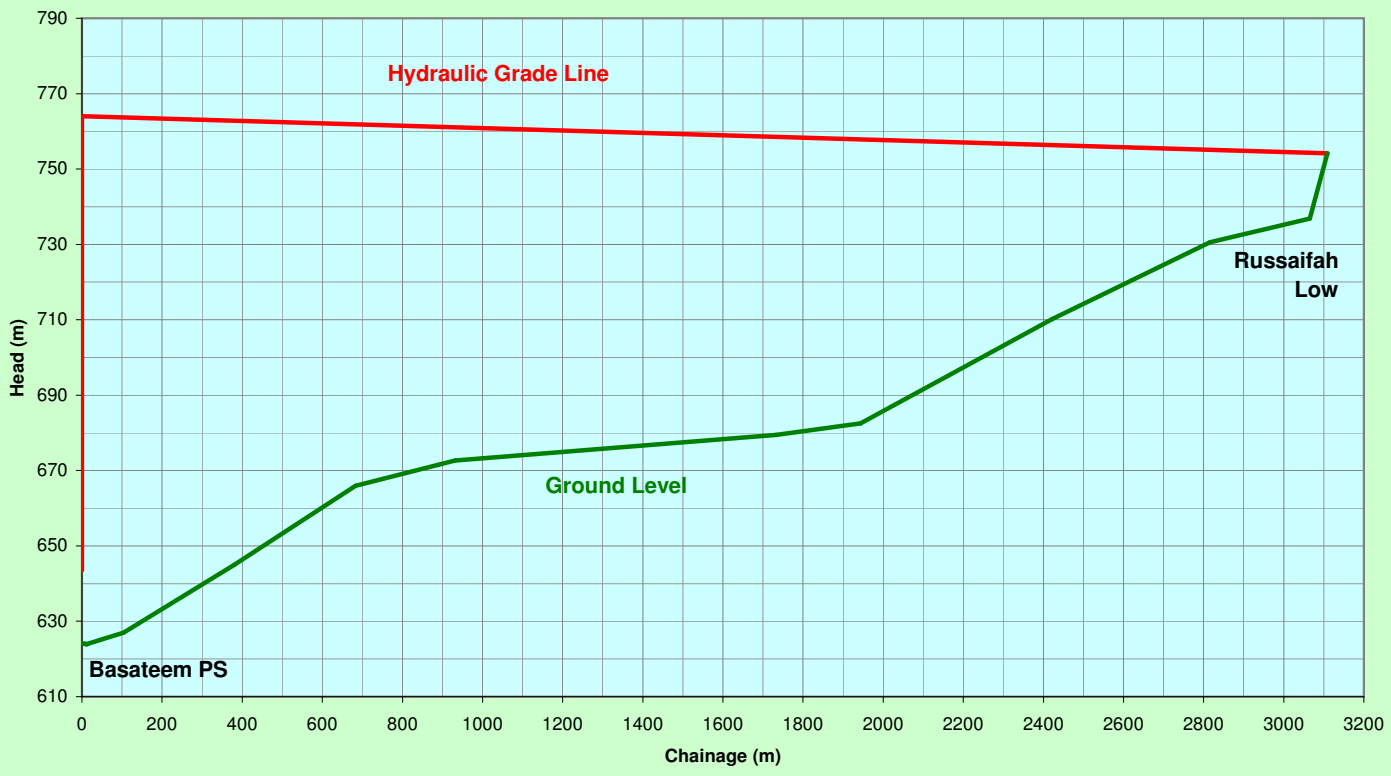
Efficiency	70	%
Req'd Pump Power	226	*(kW)*

HEAD DETAILS

Static Head	110.7	*m*
Friction Loss	9.797	*m*
Friction Loss	3.151	*m/km*
Total Head	120.497	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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CORRIDOR TO KHAW PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Corridor Wells	776.25	*mOD*
Khaw Top Water Level	620	*mOD* (TWL = 607m, throttled to 620 m)

PIPE DETAILS

Effective Diameter	0.6	*m*
Length	49,099	*m*
C Value	120	
C.S.A	0.283	m^2

FLOW DETAILS

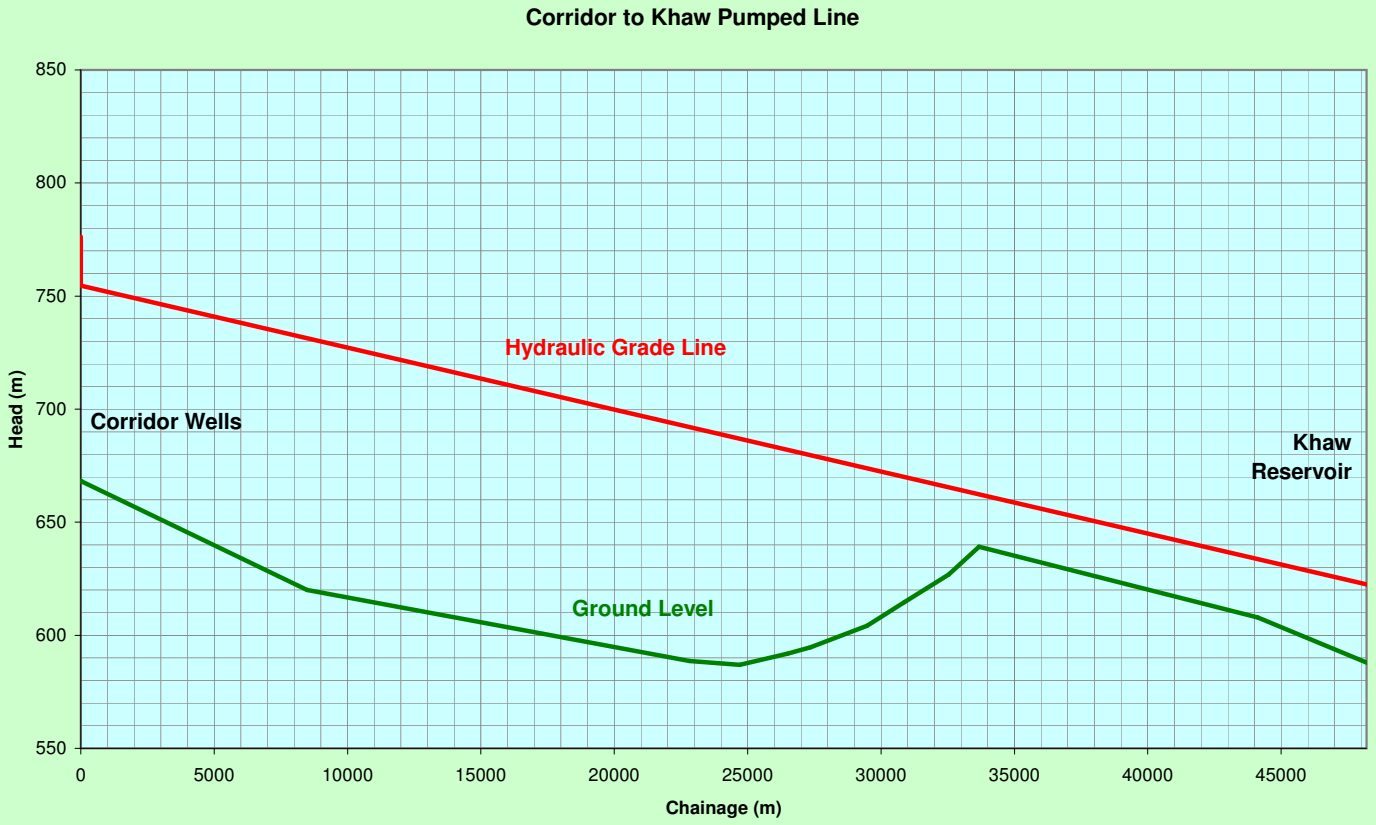
Flow	0.361	m^3/s
Velocity	1.277	*m/s*

REQUIRED PUMP POWER

Efficiency	70	%
Req'd Pump Power	-110	*(kW)*

HEAD DETAILS

Static Head	-156.25	*m*
Friction Loss	134.579	*m*
Friction Loss	2.741	*m/km*
Total Head	-21.671	*m*



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KHAW TO AWAJAN HUB PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Khaw Top Water Level	607	*mOD*
Awajan Hub TWL	630	*mOD* (TWL = 592m, throttled to 630 m)

PIPE DETAILS

Effective Diameter	0.6	*m*
Length	17,130	*m*
C Value	120	
C.S.A	0.283	m^2

FLOW DETAILS

Flow	0.374	m^3/s
Velocity	1.323	*m/s*

REQUIRED PUMP POWER

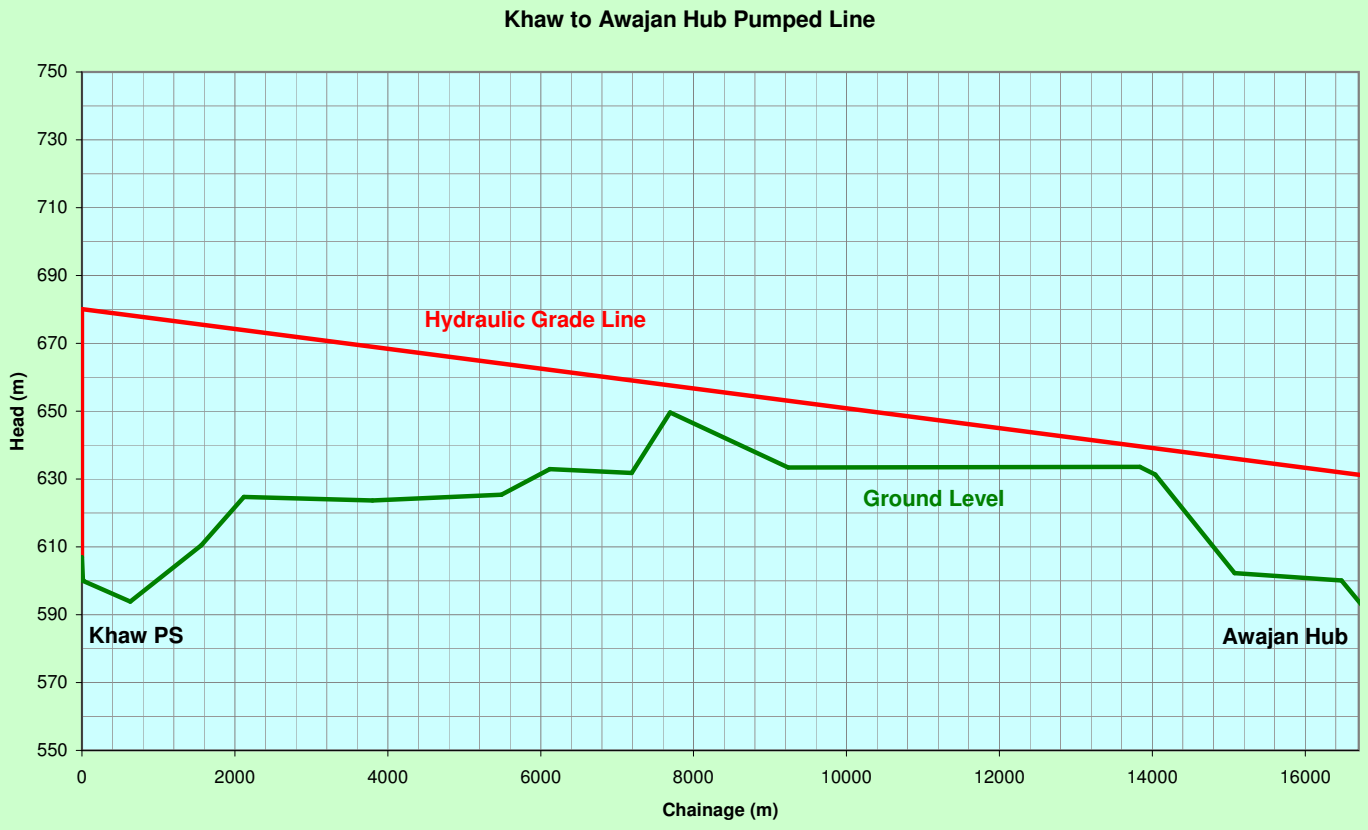
Efficiency	70	%
Req'd Pump Power	383	*(kW)*

HEAD DETAILS

Static Head	23	*m*
Friction Loss	50.133	*m*
Friction Loss	2.927	*m/km*
Total Head	73.133	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



Nicholas O' Dwyer

AWAJAN HUB TO AWAJAN LOW PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Awajan Hub TWL	592	*mOD*
Awajan Low TWL	643.5	*mOD*

PIPE DETAILS

Effective Diameter	0.5	*m*
Length	3100	*m*
C Value	120	
C.S.A	0.196	m^2

FLOW DETAILS

Flow	0.18	m^3/s
Velocity	0.917	*m/s*

REQUIRED PUMP POWER

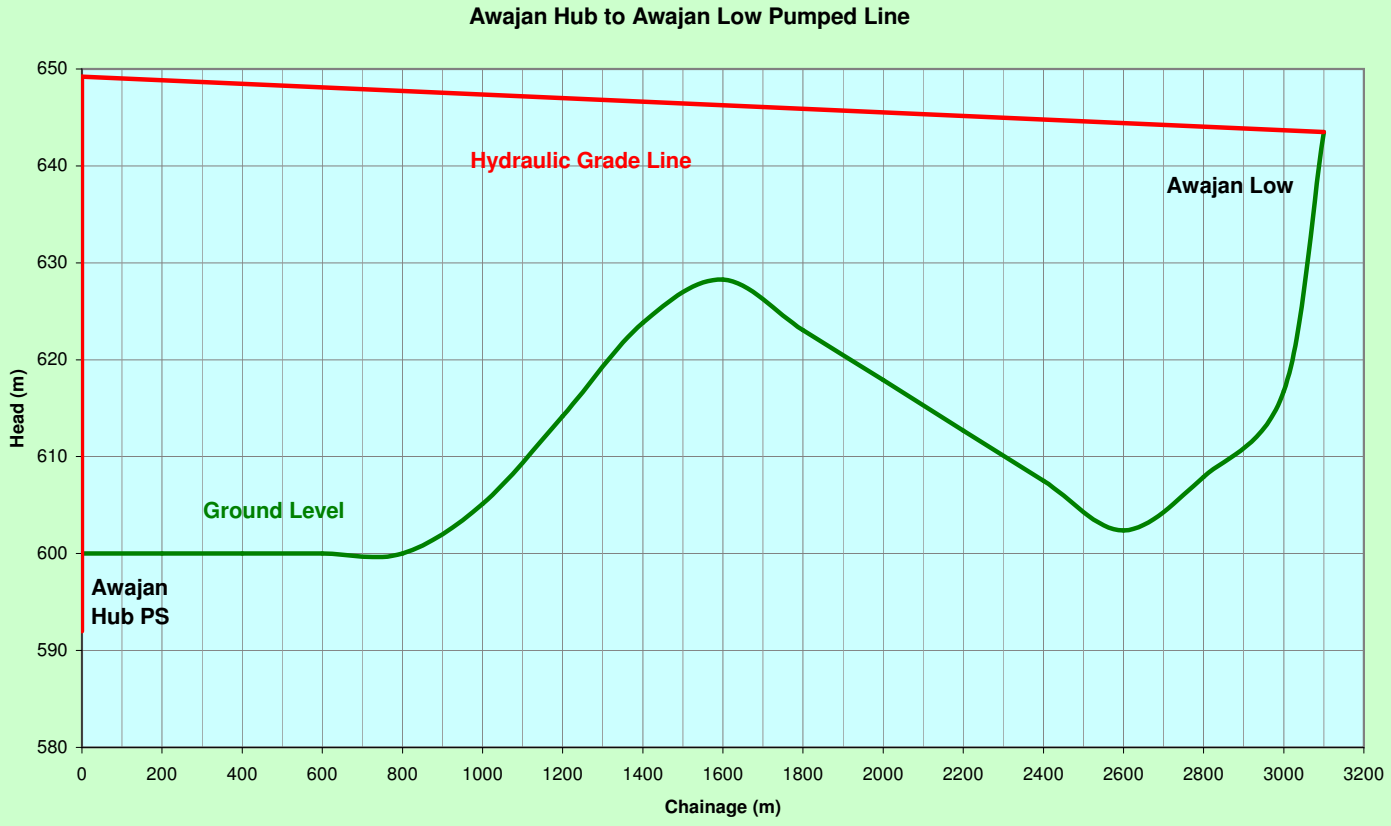
Efficiency	70	%
Req'd Pump Power	144	*(kW)*

HEAD DETAILS

Static Head	51.5	*m*
Friction Loss	5.691	*m*
Friction Loss	1.836	*m/km*
Total Head	57.191	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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AWAJAN HIGH PS TO AWAJAN WEST PUMPED RISING MAIN PROPOSED 2030 DELIVERY

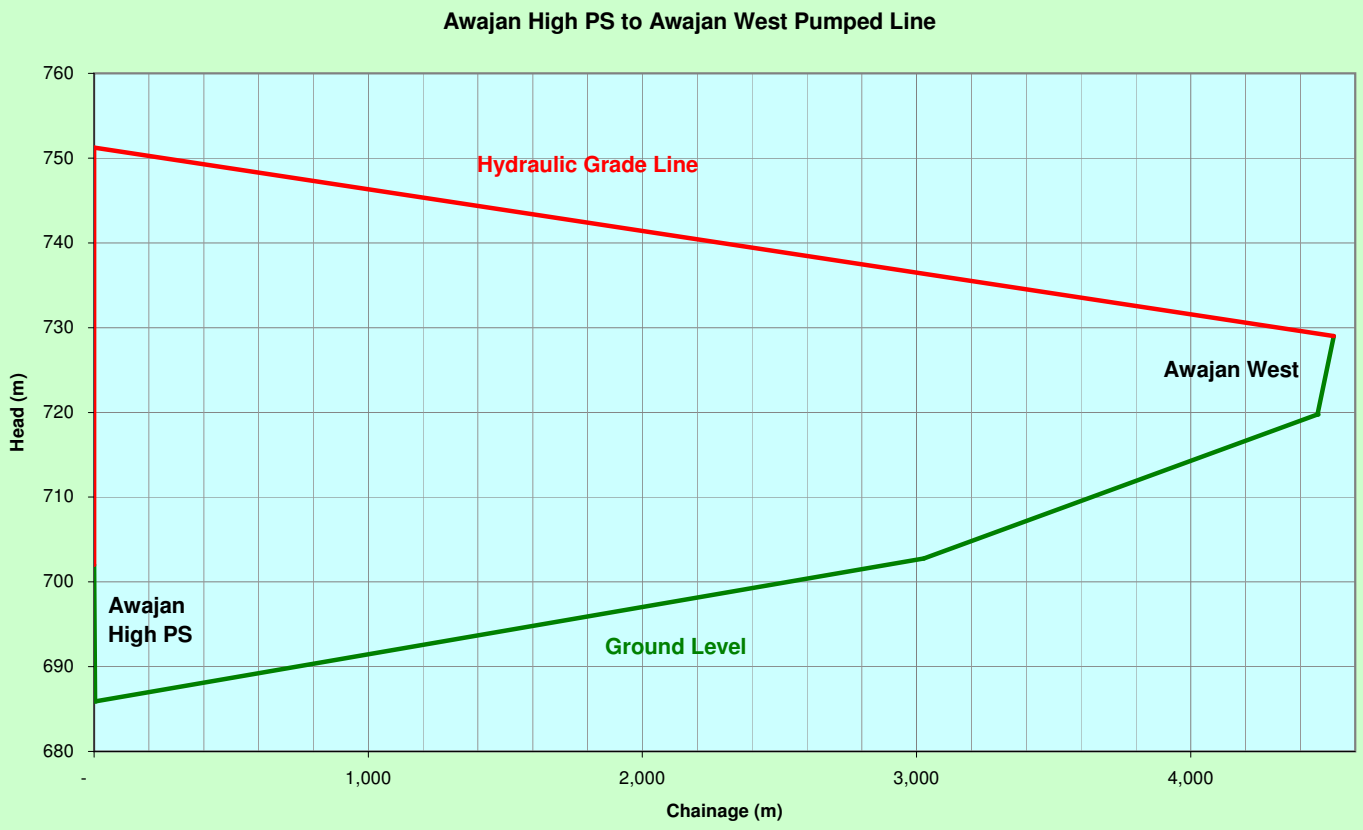
STATIC HEAD

Awajan High TWL	702	*mOD*
Awajan West TWL	729	*mOD*

PIPE DETAILS			FLOW DETAILS			HEAD DETAILS		
Effective Diameter	0.3	*m*	Flow	0.08	m^3/s	Static Head	27	*m*
Length	4,522	*m*	Velocity	1.132	*m/s*	Friction Loss	22.257	*m*
C Value	120		**REQUIRED PUMP POWER**			Friction Loss	4.922	*m/km*
C.S.A	0.071	m^2	Efficiency	70	%			
			Req'd Pump Power	55	*(kW)*	Total Head	49.257	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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AWAJAN HUB TO AWAJAN HIGH PUMPED RISING MAIN PROPOSED 2030 DELIVERY

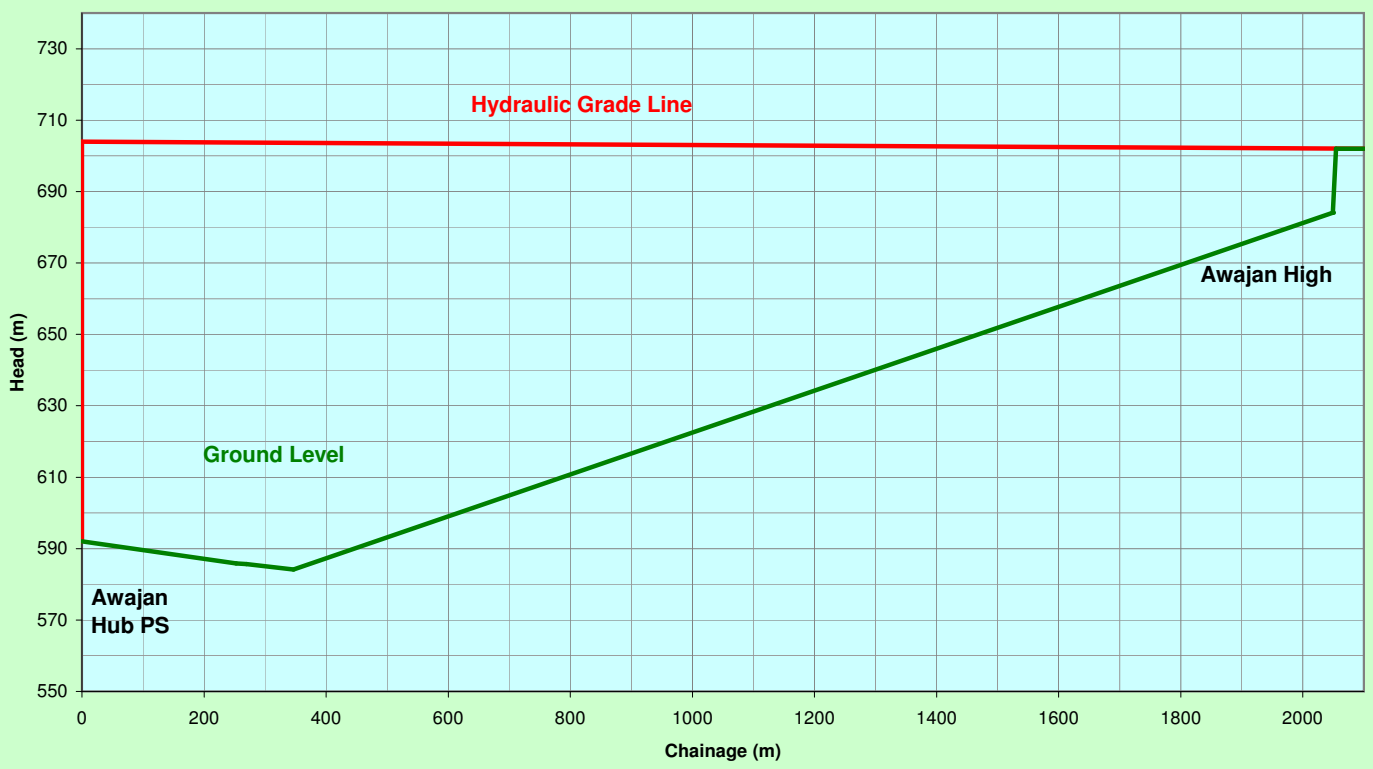
STATIC HEAD

Awajan Hub TWL	592	*mOD*
Awajan High TWL	702	*mOD*

PIPE DETAILS			FLOW DETAILS			HEAD DETAILS		
Effective Diameter	0.6	*m*	Flow	0.2	m^3/s	Static Head	110	*m*
Length	2,100	*m*	Velocity	0.707	*m/s*	Friction Loss	1.929	*m*
C Value	120		**REQUIRED PUMP POWER**			Friction Loss	0.918	*m/km*
C.S.A	0.283	m^2	Efficiency	70	%			
			Req'd Pump Power	314	*(kW)*	Total Head	111.929	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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AWAJAN LOW TO AWAJAN NORTH PUMPED RISING MAIN PROPOSED 2030 DELIVERY

STATIC HEAD

Awajan Low TWL	643.5	*mOD*
Awajan North TWL	710	*mOD*

PIPE DETAILS

Effective Diameter	0.3	*m*
Length	5435.7617	*m*
C Value	120	
C.S.A	0.071	m^2

FLOW DETAILS

Flow	0.097	m^3/s
Velocity	1.372	*m/s*

REQUIRED PUMP POWER

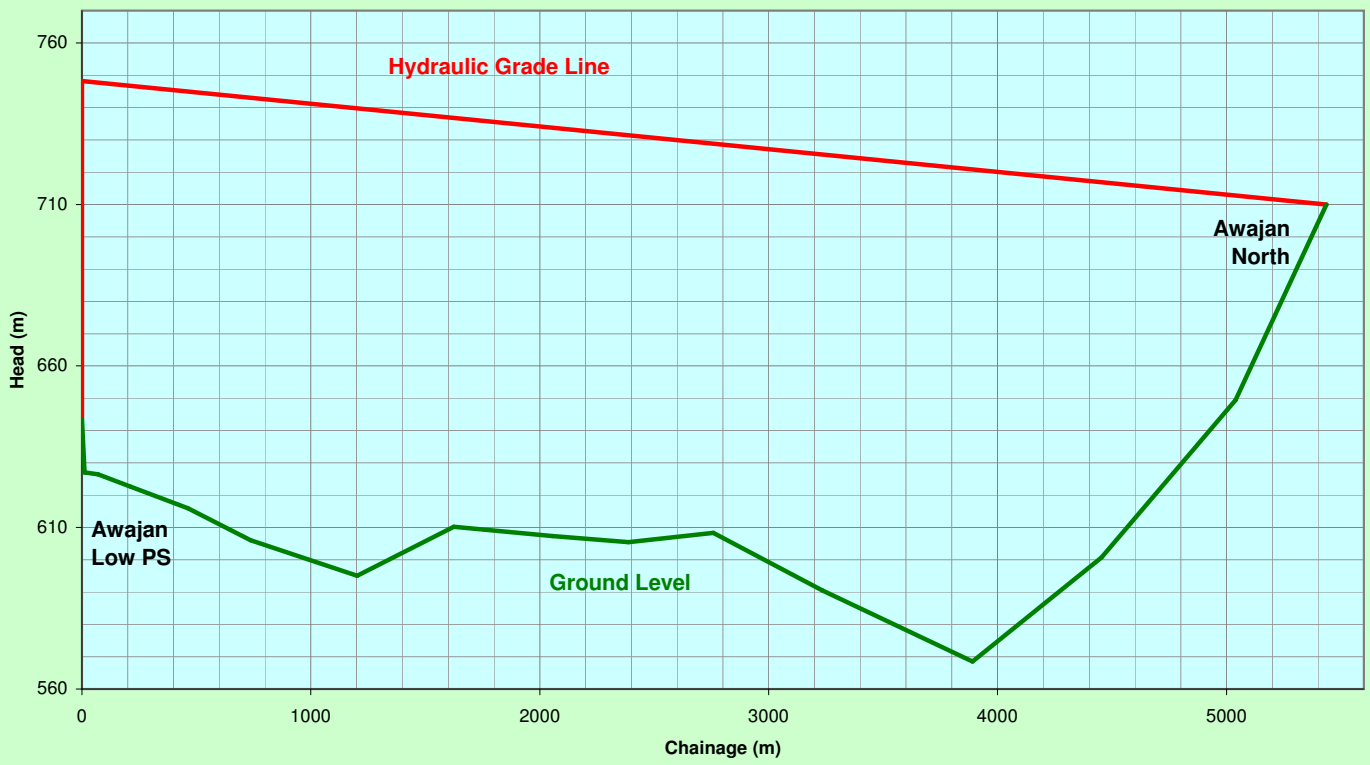
Efficiency	70	%
Req'd Pump Power	142	*(kW)*

HEAD DETAILS

Static Head	66.5	*m*
Friction Loss	38.228	*m*
Friction Loss	7.033	*m/km*
Total Head	104.728	*m*

NOTES :

1. Enter data in GREY cells
2. Valve % opening should be written in 10's from 0 to 100
3. Bends are Ductile Iron and cover the range of diameters from 50mm to 1200mm only
4. Fittings losses includes sharp edged entry and exit losses combined (K value = 1.5)



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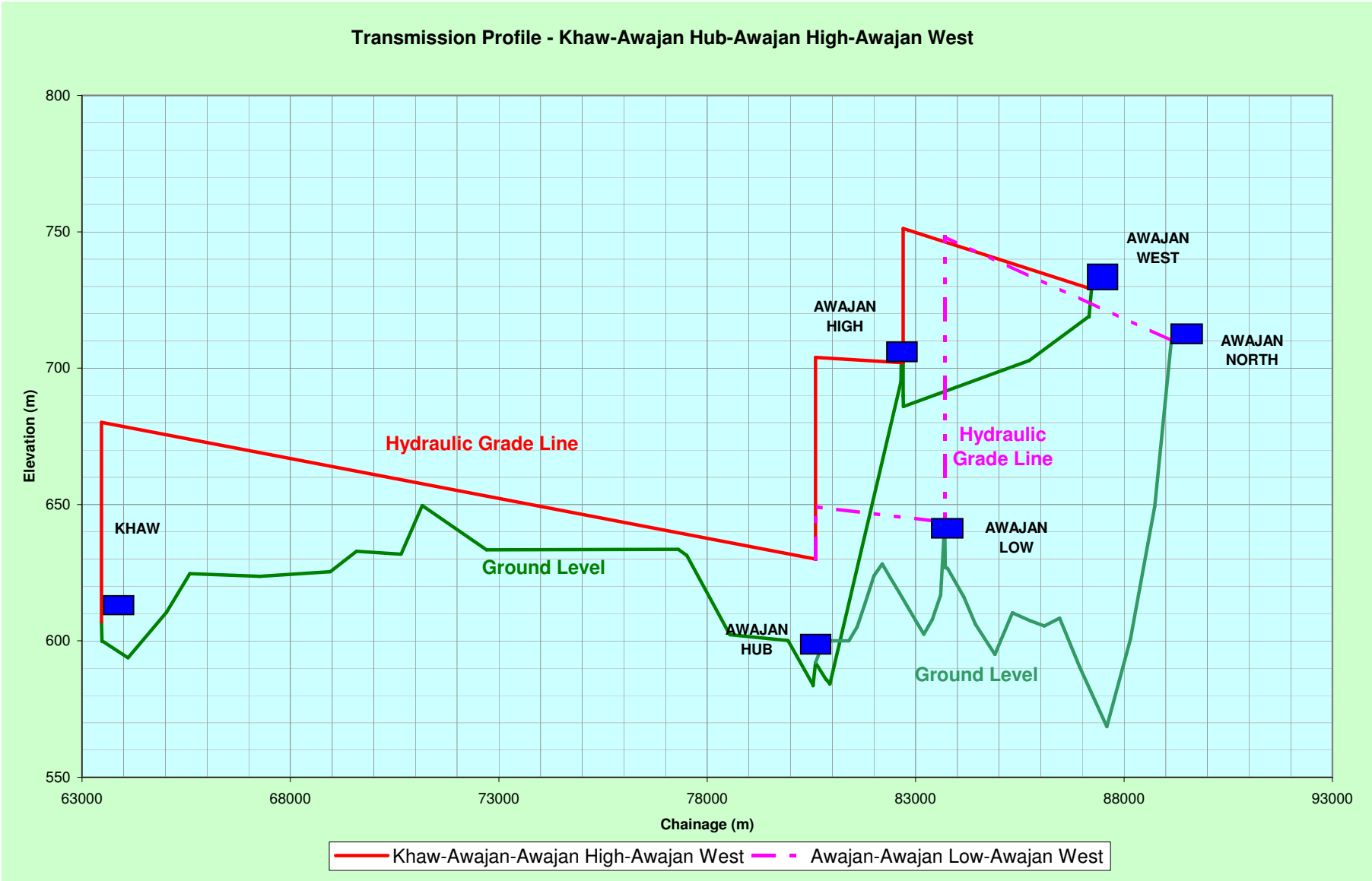
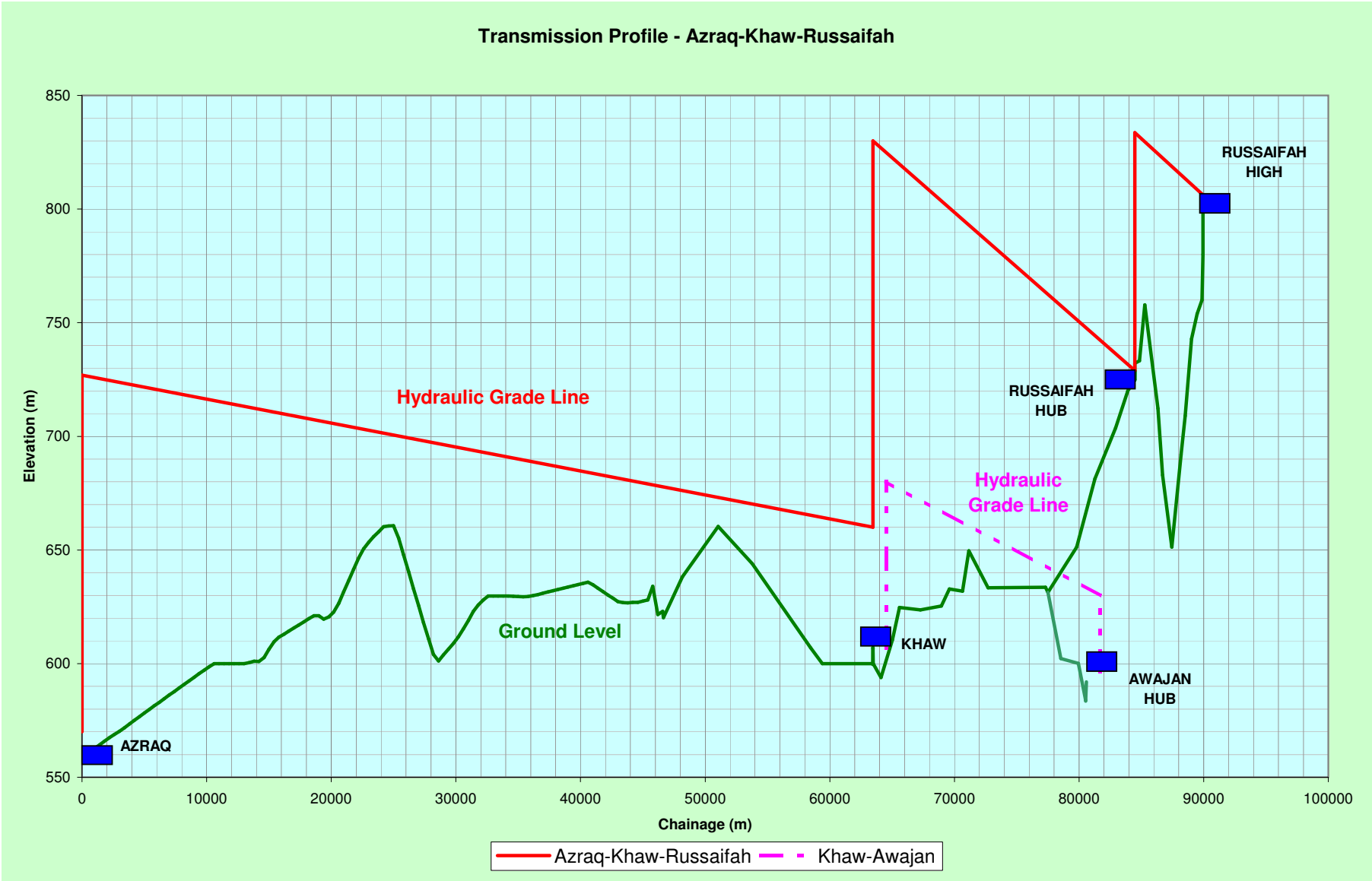
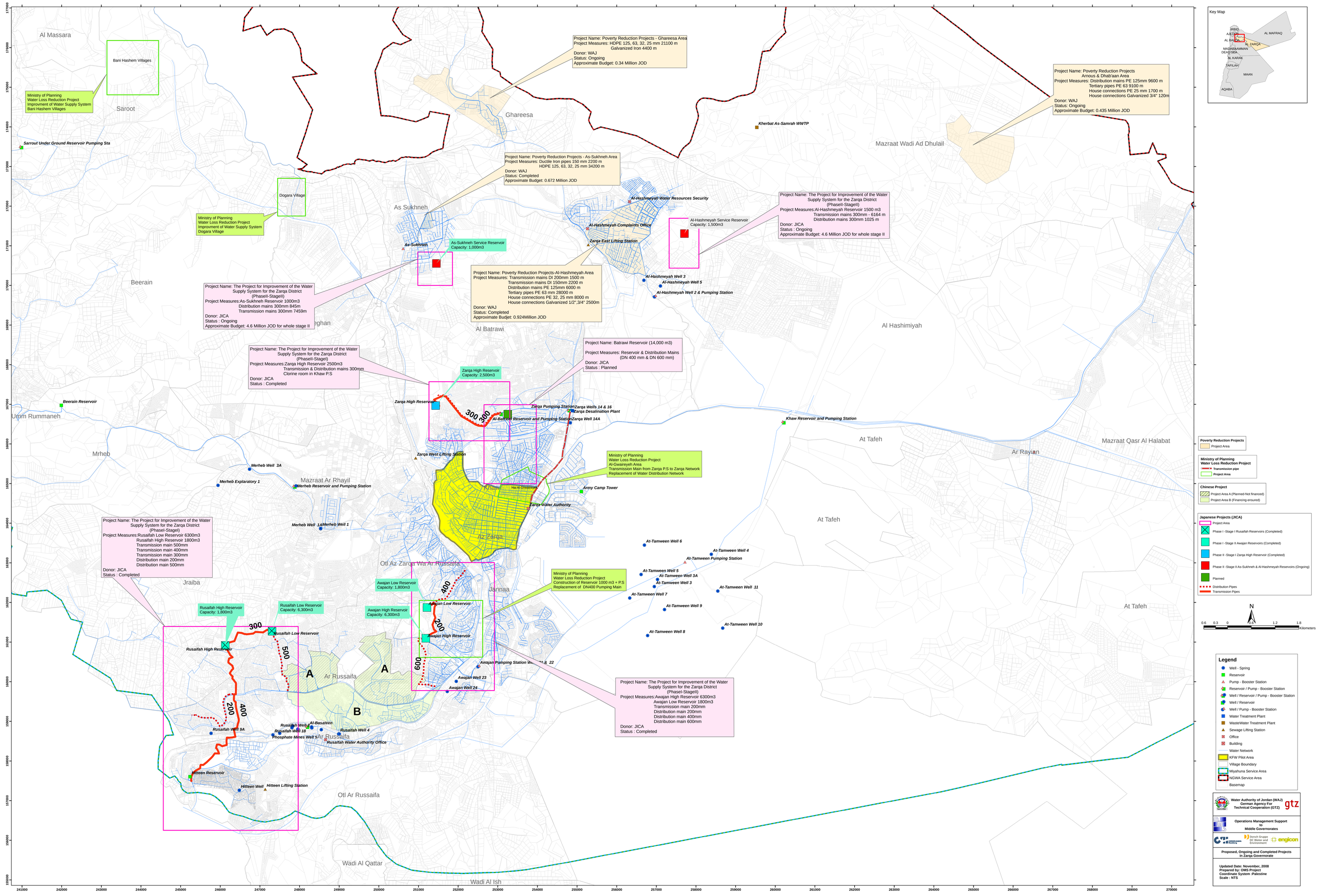

Transmission Profile - Khaw-Awajan Hub-Awajan High-Awajan West
Elevation (m)
800
750
700
650
600
550
63000
68000
73000
78000
83000
88000
93000
Chainage (m)
KHAW
AWAJAN HUB
AWAJAN HIGH
AWAJAN WEST
AWAJAN NORTH
AWAJAN LOW
Hydraulic Grade Line
Hydraulic Grade Line
Ground Level
Ground Level
Khaw-Awajan-Awajan High-Awajan West
Awajan-Awajan Low-Awajan West


Transmission Profile - Azraq-Khaw-Russaifah
Elevation (m)
850
800
750
700
650
600
550
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
Chainage (m)
Hydraulic Grade Line
Ground Level
Hydraulic
Grade Line
AZRAQ
KHAW
AWAJAN
HUB
RUSSAIFAH
HUB
RUSSAIFAH
HIGH
Azraq-Khaw-Russaifah
Khaw-Awajan

APPENDIX 6 – DETAILS OF RECENT AND CURRENT CAPITAL PROJECTS

ID	Project	ID	Project measures	Funding Agency	Value	Country	Reference	Status	Contractor	Info source
1	Ministry of Planning, Zarqa Water Loss Reduction Project - Managing Jordan scarce water resources in areas of large concentration of Iraqi refugees	A	Replacement of Ghweria water network	EU Commission Delegation to Jordan	$ 16,000,000	EU		Completed		Handout from WAJ Zarqa and OMS drawing, updated Nov. 2008
		B	Replacement of transmission pipeline from the Zarqa pump station to Zarqa network							
		C	Construction of 1,000m3 reservoir and pumping station in Awajan; 400mm pumping main							
		D	Replacement of old 16-inch pipeline for Awajan and Rusaifa							
		E	Improvement of the supply system of Bani Hashem and Dogara villages							
2	Pilot customer meter project in Ghweria	A	Meter replacement and maintenance and control of NRW for 22,000 customers	KfW Entwicklungsbank (KfW)	$ 4,000,000	Germany		Completed		Handout from WAJ Zarqa
3	Project for the upgrading of the water pipe network for the low reservoir distribution zone (zone B) in Russaifah city of Jordan	A	Replacement of water networks in areas within Russaifah low reservoir distribution zone (Jabal Al-Shamali, Um Maradjeh (Jaradeh?), Awajan)	People's Republic of China	$ 10,000,000	China		Financing ensured (Nov. 2008)		Handout from WAJ Zarqa and OMS drawing, updated Nov. 2008
4	Project for the upgrading of the water pipe network for the low reservoir distribution zone (zone A) in Russaifah city of Jordan	A	Replacement of water networks in areas within Russaifah low reservoir distribution zone	People's Republic of China		China		Planned, not financed (Nov 2008)		OMS drawing, updated Nov. 2008
5	JICA 2011 project	A	Supply of equipment and materials, including pumps, valves and pipes	Japan International Cooperation Agency (JICA) / Japan Overseas Development Agency (ODA)	$ 10,000,000	Japan		Start 2011		Handout from WAJ Zarqa
		B	Pilot area hydraulic study in Russaifah (Al-Naqab, Hashim housing) including 1,000 customers and 10km of network							
6	Project for Improvement of the Water Supply for the Zarqa District	A	Zarqa High reservoir (2,500m3)	Japan International Cooperation Agency (JICA) / Japan Overseas Development Agency (ODA)	$ 20,000,000	Japan		Completed, 2006-2008	Dai Nippon Construction	Basic design study report on the project for improvement of the water supply system for the Zarqa district (phase II) in the Hashemite Kingdom of Jordan, April 2006; website: http://www.jordan.emb-japan.go.jp/eng_page/oda/en_water.htm; website: http://www.dnc.co.jp/en/index.html
		B	Hashmeya reservoir (1,500m3)					Completed, 2008-2009. Some outstanding electrical work (Feb 2010)		
		C	Sukhna reservoir (1,000m3)					Completed, 2008-2009		
		D	Batrawi reservoir (14,000m3)					Completed, 2009-2010		Also: WAJ (Individual cost: JD7,400,000)
		E	Transmission main, Batrawi PS - Zarqa High res, 300mm x 2,072m					Completed, 2006-2008		
		F	Transmission main, Khaw PS - Hashmeya res, 300mm x 6,141m					Completed		
		G	Transmission main, Hashmeya res - Sukhna res, 300mm x 7,798m					Completed, 2008-2009		
		H	Distribution main, Zarqa High res - ex. Network, 300mm x 1,572m					Completed, 2006-2008		
		I	Distribution main, Hashmeya res - ex. Network, 300mm x 1,338m					Completed		
		J	Distribution main, Sukhna res - ex. network, 200mm x 7,322m					Completed		
		K	Distribution main, Batrawi res - ex. network, 600mm x 3,080m and 400mm x 480m					Completed		
		L	Renewal of pumping equipment at Batrawi PS					Completed		
		M	Chlorination facility and building at Khaw PS, 16kg/h x 2					Completed		
		N	Separation of distribution zones and conversion of mains from distribution to transmission					Completed		
		O	Awajan High reservoir (1800m3)					Completed, 2003-2004		
		P	Awajan Low reservoir (6,300m3)					Completed, 2003-2004		
		Q	Transmission main, Hashmeya res - Sukhna res, 500-200mm x 7,564m					Completed, 2003-2004		
		R	Distribution main, Zarqa High res - ex. Network, 500, 200mm x 5,088m					Completed, 2003-2004		
7	WAJ Amman-supervised project, 2009	A	Azraq water network rehabilitation	Unknown	$ 2,150,000	Unknown		Supervised by WAJ-Amman, 2009		WAJ
8	WAJ Zarqa-supervised projects, 2009	A	Linking water to Greiba area	WAJ	$ 476,000	Jordan	M/2008/51	Completed		WAJ
		B	Booster (11)		$ 300,000		M/2008/37	Completed		
		C	Renewing water pipe network and house connections in Hashmeya		$ 276,000		M/2009/9	Completed		
		D	Water network in areas of Zarqa		$ 629,000		M/2009/24	Completed		
		E	Water network in areas of Russaifah		$ 393,000		M/2009/6	Completed		
		F	Network water in Wadi Al Ish		$ 34,000			Completed		
		G	Excavate water pipeline in Zarqa		$ 83,000			Completed		
		H	Connect water to Greiba / Crusher area in Zarqa		$ 287,000			Completed		
		I	Connect water pipe to Zarqa detention		$ 83,000			Completed		
		J	Maintenance of well hole		$ 20,000			Completed		
		K	Water network to Soudani area		$ 136,000		M/2009/25	Completed		
		L	Development of Hijazi well / Hallabat		$ 127,000		M/2009/15	Completed		
		M	Water networks in Um Rumanneh area		$ 66,000			Completed		
9	WAJ operation of new water resources, 2008	A	Operate and service corridor wells nos. 17 and 18: Construction of 6" pipeline 1km from wells 17 and 18 to connect to main transmission line Ø600 mm. Two control rooms, fence, parking and well protection	WAJ	$ 210,000	Jordan		Completed, Aug 2008		WAJ
		B	Civil works for well no. 24, Awajan: Chlorination room, emergency cylinders, guard room, well protection, fence and parking		$ 56,000			Completed, Aug 2009		
10	Improvement of water networks and transmission lines (central tenders), 2008	A	Civil works for well no. 24, Awajan: Rehabilitation of water networks with polyethylene pipes for Hay Hussien, Shabib, Nozha	WAJ	$ 1,400,000	Jordan		Tender stage, 2008		WAJ
11	Improvement on water networks and transmission lines / local funded, 2008	A	Rehabilitation of water networks for Zarqa refugee camp, lots 5, 9 and 10: Replacement of old galvanized pipe with polyethylene pipe, 25, 32, 63 mm and 4km long	WAJ	$ 71,000	Jordan		Completed, Aug 2008		WAJ
		B	Construction of 125 mm water line for Bustan & Hashmeya areas: Replacement of old 2" dia pipeline with new 125 mm polyethylene line		$ 30,000			Completed, Aug 2008		
12	Improvement of water networks and emergency lines / local funded, 2008	A	Construction of pipelines at Dulail area: Construction of 4" pipe line 2.0km long and network 25, 32, 63 mm polyethylene pipes, 2.5km long	WAJ	$ 56,000	Jordan		Completed, Aug 2008		WAJ
		B	Construction of pipelines at Hashmeya area: Construction of 4" ductile pipe line for Ghariseh, Sukhneh, Majrousheh, Abu Zeiqan 2.5km long		$ 77,000			Completed, Aug 2008		
		C	Construction of 12" pipe at the Army road: Construction of 12" pipe line, 3.5km long, at Hay Hussien, Shabib with valve manhole		$ 23,000			Completed, June 2008		
		D	Construction of emergency pipe line at Prince Mohammed, Masoum and Dier Sharaf areas: Construction of 4" ductile pipe at Al Izz bin Abdul Salam, Mahdi Streets and Crusher areas		$ 81,000			Completed, Aug 2008		
		E	Construction of emergency pipeline at engineering housing, Merhib and Awajan: Construction of 4", 6", & 8" pipe, 3025m long, at Ahmadi, Nassar, Engineering Housing areas and valves 400 & 600 mm dia at Awajan intersection		$ 100,000			Completed, Aug 2008		
		F	Construction of emergency pipelines at Russaifah, Kadisieh, Rashid, Hitteen, Prince Faisel and Jabal Shamali areas:		$ 57,000			Completed, Sept 2008		
13	Poverty Reduction Projects (PRP)	A	Ghareesa area PRP: 21.1km of 125, 63, 32, 25mm HDPE; 4km of galvanized iron pipe	WAJ	$ 486,000	Jordan		Ongoing, 2008		WAJ OMS project, GIS drawing
		B	Arnous and Dhab'aan area (Dulail) PRP: 9.6km 125mm PE distribution main; 9.1km 63mm PE tertiary pipework; 1.7km 25mm PE house connections; 120m galvanized house connections		$ 621,000			Ongoing, 2008		
		C	Sukhna area PRP: 2.2km 150mm DI pipework; 34.2km 125, 63, 32, and 25mm HDPE pipe		$ 960,000			Completed		
		D	Hashmeya PRP: Transmission mains: 1.5km 200mm and 2.2km 150mm DI; Distribution main: 6km 125mm PE; Tertiary pipework: 28km 63mm PE; House connections: 8km 32 and 25mm PE, and 2.5km 1/2" and 3/4" galvanized		$ 1,320,000			Completed		

Proposed, Ongoing and Completed Projects in Zarqa Governorate



APPENDIX 7 – WATER PRODUCTION, WATER AUDITS, UFW / NRW ANALYSIS

Appendix 7

- Water Production Data/Calcs Sheets 1-18
- Population Data/Calcs Sheets 1-12
- Customer Water Use 1
- Water Audit 1-10
- UFW Assessment 1-8
- Water Balance 1-4

Water Production 1.
Water Production from Zarqa Wells in 2008

av. M3/hr	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name (English)	Ref	Name (Arabic)
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	Azraq 1	F 1028	بئر الازرق)1(
158	**1388174**	120269	114977	85909	122422	119678	116328	119697	115227	115047	119552	116556	122512	Azraq 1a	F 4141	بئر الازرق)1أ(
209	**1831039**	155176	149769	150013	150055	149717	149211	153180	154856	154591	165330	141261	157880	Azraq 2	F 1029	بئر الازرق)2(
121	**1057192**	90005	87869	92883	83723	87121	87074	79003	94077	87223	93364	77500	97350	Azraq 3	F 1030	بئر الازرق)3(
145	**1266843**	108191	108578	109980	96765	117352	73894	102199	118377	118324	119273	93433	100477	Azraq 4	F 1031	بئر الازرق)4(
54	**474150**	35042	33607	35995	33081	34927	33000	35823	43091	41798	40443	70449	36894	Azraq 5	F 1032	بئر الازرق)5(
151	**1326390**	109894	109899	115251	110385	118716	118427	105849	118357	103685	111978	93575	110374	Azraq 6	F 1033	بئر الازرق)6(
130	**1134658**	95140	91957	100111	95260	100167	100015	95134	100135	77022	98023	80798	100896	Azraq 7	F 1034	بئر الازرق)7(
78	**685551**	59971	56060	62862	56308	58769	36395	59467	54511	60462	63725	57397	59624	Azraq 9	F 1036	بئر الازرق)9(
168	**1469074**	120100	124939	132948	133153	102399	127478	120921	119999	124105	129338	119121	114573	Azraq 10	F 1037	بئر الازرق)10(
145	**1272470**	107837	106548	106108	100348	104878	107952	98798	111525	114677	111933	93606	108260	Azraq 11	F 1038	بئر الازرق)11(
97	**850539**	74746	61470	77732	62434	73887	74406	70479	74189	68705	68500	64898	79093	Azraq 12	F 1039	بئر الازرق)12(
113	**993022**	81014	81072	81935	83024	91876	80033	77686	89146	83639	83161	68056	92380	Azraq 13	F 1040	بئر الازرق)13(
48	**418292**	33127	33215	32946	33203	36443	36514	35217	36144	35838	35286	34438	35921	Azraq 15	F 1042	بئر الازرق)15(
101	**884212**	75217	79168	77259	74323	50378	81150	77227	80388	75546	59214	74536	79806	Azraq 16	F 4166	بئر الازرق)16(
136	**1189209**	98048	97943	97912	98397	99143	104183	98658	104219	103899	100626	85996	100185	Azraq 18	F 3222	بئر الازرق)18(
84	**732322**	69882	59878	64779	51289	64670	63072	63489	69427	35975	45770	68908	75183	Azraq 20	F 4205	بئر الازرق)20(
60	**523932**	66676	66511	59777	54551	56007	58679	54408	30200	17634	20464	19486	19539	Qunaya	AL0600	نبع القنية
6	**56301**	4611	4541	4771	4614	4793	4740	5499	5855	4217	4450	4251	3959	Sarout	AL0604	نبع صروت
4	**33617**	2451	2564	3236	2999	2752	3002	3174	4037	2199	2205	2498	2500	Alouk	AL0610	نبع العالوك
151	**1324423**	98526	79183	123606	123523	123320	123306	103368	124742	139266	92621	95452	97510	Zarqa 14a	AL1192	بئر الزرقاء 14أ
247	**2160981**	178255	153782	190642	190413	190506	189225	180080	191473	173408	176380	176249	170568	Zarqa 14	AL1898	بئر الزرقاء 14
115	**1003197**	132163	79430	120693	120589	120480	120399	96629	41792	19785	58910	28012	64315	Zarqa 16	AL1899	بئر الزرقاء16
48	**417179**	20558	24663	33622	33459	33472	33555	36602	42624	41344	36967	40994	39319	Hashmeya 2	AL2715	بئر الها شمية2
176	**1542433**	132236	132074	129241	128530	128979	128649	127672	137632	135160	119686	123643	118931	Hashmeya 3	AL1230	بئر الها شمية 3
168	**1472213**	125518	123500	126197	125419	125973	125533	118679	125350	126199	120440	119050	110355	Hashmeya 5	AL1254	بئر الها شمية 5
50	**440580**	57860	59321	26190	26295	26206	26257	32465	32231	39208	38040	37735	38772	Awajan 21	AL1319	بئر عو جان 21
30	**263247**	10078	12994	17797	17806	17765	17868	25230	23419	28808	29747	29989	31746	Awajan 22	AL1318	بئر عو جان 22
162	**1418883**	135650	112602	134103	131654	94966	92896	138528	125717	143167	117744	129373	62483	Awajan 23	AL2691	بئر عو جان 23
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	Awajan 24	AL3741	بئر عوجان 24
18	**159152**	218	13501	14280	40690	11284	11260	9357	9367	9895	14931	12191	12178	Merhib 2	AL2419	بئر مرحب 2
7	**58007**	3002	2807	4334	5298	5300	5284	4318	4322	4337	6010	6495	6500	Merhib 1	AL2420	بئر مرحب 1
14	**123555**	10949	9342	9016	10010	11130	10256	7197	7205	7649	12344	11432	17025	Merhib 1a	AL3431	بئر مرحب 1أ
26	**226308**	17404	41068	18956	18923	17973	19667	227	21105	18051	17489	17362	18083	Merhib 2a	AL3432	بئر مرحب 2أ
15	**133832**	11195	11755	11708	12008	12979	8053	13395	13410	13564	7423	9070	9272	Merhib 3a	AL3531	بئر مرحب 3أ
7	**65409**	0	0	47	3155	3163	3348	20805	3561	0	179	15588	15563	Merhib New Exploration Well	AL3654	بئر مرحب الاستكشافي
31	**270430**	18166	16928	32040	31895	31982	31829	19907	18600	18000	18600	17363	15120	Hallabat 10	AL3133	بئر الحلابات 10
10	**85164**	11035	9420	3809	9200	9431	6044	10504	13290	3698	0	93	8640	Hallabat 7	AL3284	بئر الحلابات 7
64	**561626**	36158	39653	40865	39634	39655	52081	57640	63120	50320	44800	55492	42208	Hallabat 8	AL3285	بئر الحلابات 8
9	**75375**	0	0	0	0	0	165	14875	14853	11987	11214	15004	7277	Hallabat 3x	AL3306	بئر الحلابات 3 ب
5	**46738**	18	1550	4782	3302	3443	3339	7104	18453	4747	0	0	0	Hallabat 11	AL3445	بئرالحلابات 11
13	**110322**	10042	9767	11128	12984	12107	12116	12178	22168	7832	0	0	0	Hallabat 12	AL3495	بئر الحلابات 12
6	**50492**	6077	5597	5496	5005	5594	5287	4236	11064	2136	0	0	0	Hallabat 14	AL3497	بئر الحلابات 14
93	**811818**	68378	73558	69118	68876	68997	69024	76261	67904	69752	85084	72476	22390	Hallabat 15	AL3688	بئر الحلابات15
92	**810227**	79264	69918	69151	73693	73861	73854	73958	63415	68924	67113	71139	25937	Hallabat 16	AL3704	بئر الحلابات16
94	**822243**	70526	69731	73251	74811	74939	74995	80036	72237	73301	84750	52221	21445	Hallabat 17	AL3726	بئر الحلابات17
100	**876096**	77436	69740	68318	74617	74547	74768	78135	69216	68550	84568	73601	62600	Hallabat 18	AL3727	بئر الحلابات18
105	**919805**	84538	71197	73331	77246	77279	77408	81686	73976	73217	91845	74982	63100	Hallabat 19	AL3728	بئر الحلابات19
91	**801231**	70537	71375	64523	60275	60621	60616	70392	62871	64628	81255	69495	64643	Hallabat 20	AL3729	بئر الحلابات20
27	**239867**	32421	33014	24985	24399	24962	24524	16696	15177	17170	17554	8788	177	Berein 2	AL3179	بئر بيرين 2
37	**320525**	19988	13597	20313	20299	20470	20462	33606	37082	30692	33701	27681	42634	Berein 3	AL3364	بئر بيرين 3
22	**195429**	15156	19996	18999	18397	17459	18010	20079	20140	13252	15669	12181	6091	Berein production	AL3703	بئر بيرين الانتاجي
2	**20393**	0	0	0	35	2429	2427	2399	2404	2710	3277	4659	53	Um Rumanneh 2	AL3576	بئر ام رمانة 2
29	**255466**	21009	20998	21502	20991	21000	20981	21492	21508	21492	21516	21484	21493	Tamween 3	AL3442	بئر التموين3
21	**184371**	11481	23694	14356	14348	14353	14324	13201	10776	9764	10754	7013	40307	Tamween 5	AL3490	بئر التموين5
29	**252726**	8364	222	18054	16977	15734	19381	28586	31040	29899	25782	28981	29706	Tamween 4	AL3506	بئر التموين4
9	**80387**	147	704	283	285	280	364	7717	8452	11318	8448	39665	2724	Tamween 6	AL3646	بئر التموين6
59	**514003**	44036	37133	42577	42977	42600	42619	39633	44259	43920	46068	42930	45251	Tamween 9	AL3664	بئر التموين9
9	**81392**	0	0	0	0	0	117	10570	13210	14636	12953	11477	18429	Tamween 8	AL3667	بئرالتموين8
38	**329629**	21695	15666	25616	25484	25794	25240	26001	34537	33993	31308	37603	26692	Tamween 11	AL3670	بئر التموين11
48	**418208**	38340	30784	36599	36582	36649	36602	36442	15926	37506	38761	35580	38437	Tamween 10	AL3672	بئر التموين10
17	**148949**	17481	14620	6195	6145	6149	6238	18496	18169	14806	15161	12338	13151	Tamween 7	AL3673	بئر التموين7
25	**222937**	19297	16413	18994	18694	18800	18847	20322	20138	18782	18196	15090	19364	Tamween 3a	AL3747	بئر التموين 3أ
65	**567706**	43935	46735	48359	46799	48359	48369	46783	46817	46800	48360	45270	51120	Corridor 6	AL3448	بئر الكريدور 6
96	**843219**	51050	54200	74195	54200	74398	74402	72052	79228	79200	81840	76454	72000	Corridor 7	AL3449	بئر الكريدور 7
48	**422652**	30236	32440	37158	32440	37198	37193	35987	36013	36000	37200	34787	36000	Corridor 8	AL3450	بئر الكريدور 8
70	**613606**	51006	50004	52121	53956	52079	52058	50382	50418	50400	52080	48702	50400	Corridor 1	AL3475	بئر الكريدور 1
77	**677416**	52877	57556	55841	57556	55800	55767	54019	57621	57600	59520	55659	57600	Corridor 2	AL3476	بئر الكريدور 2
68	**595316**	40210	40185	40408	43242	48360	48325	46938	61222	61200	63280	62346	39600	Corridor 3	AL3477	بئر الكريدور 3
64	**559221**	43854	46754	44683	46754	44638	44636	46783	46817	46800	48400	48702	50400	Corridor 4	AL3478	بئر الكريدور 4
64	**564598**	52046	53882	46235	53883	46119	46128	50305	43215	43200	44640	41745	43200	Corridor 5	AL3479	بئر الكريدور 5
78	**682918**	52586	57599	59519	57600	59518	59440	57618	61222	61200	62888	28928	64800	Corridor 9	AL3480	بئر الكريدور 9
63	**552958**	40156	43245	48313	43245	48358	48289	46783	46817	46800	48400	48632	43920	Corridor 10	AL3481	بئر الكريدور 10
96	**841512**	64380	68397	70678	68398	70679	70566	68414	72026	72000	74400	69574	72000	Corridor 12	AL3644	بئر الكريدور 12
101	**887545**	70596	75551	74445	75553	74395	74270	72013	75627	75600	78120	72975	68400	Corridor 13	AL3645	بئر الكريدور 13
52	**452950**	36429	30063	36023	36622	39599	39539	39586	39614	39600	40920	38235	36720	Corridor 15	AL3689	بئر الكريدور 15
19	**170328**	11540	11146	10354	9504	9327	10067	9320	14657	16800	27126	23881	16606	Phosphorous 2	AL1340	بئر الفو سفات 2
11	**98222**	11463	9580	8092	8902	8436	9675	10334	15496	16244	0	0	0	Phosphorous 5	AL1343	بئر الفو سفات 5
25	**215192**	55	5057	14206	22353	28035	36488	38452	42253	28029	0	0	264	Phosphorous Deep	AL3287	الفوسفات العميق
4	**34191**	0	25	2325	6312	8512	9247	7770	0	0	0	0	0	Basateen 1	AL1351	بئر البساتين1
10	**88239**	0	81	7514	8467	7582	7788	9195	13077	26252	4574	38	3671	Basateen 1a	AL3310	بئر البساتين 1أ
137	**1202224**	90149	99482	91246	111855	102350	108772	102037	99992	104910	104628	86237	100566	Maqtab 2	AL1352	بئر المكتب 2
131	**1148426**	82474	76989	58896	42362	26911	55824	130461	137857	120074	132909	125956	157713	No.4	AL1551	بئر 4
39	**342250**	26054	23800	23691	22143	22217	23745	25856	42901	41613	41827	5973	42430	No.8	AL1447	بئر 8
21	**185286**	0	251	23371	27185	27642	30505	28741	29756	15105	2681	0	49	Russaifah 18	AL1826	بئر الرصيفة 18
70	**614133**	46111	54600	66552	64732	77968	68638	42885	42915	42792	37491	20448	49001	Russaifah 9a	AL3656	بئر الرصيفة 9أ
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	Hitteen	AL1836	بئر مخيم حطين
1	**5295**	618	370	335	345	340	353	547	449	461	621	194	662	Omari	F1063	بئر العمري
0	**525**	0	0	0	0	0	0	0	361	0	2	134	28	Wadi Rutm	F1155	بئر وادي الرتم
2	**15519**	1217	1199	1186	1204	1190	1200	1233	1583	1381	1453	1295	1378	Desert Abu Toseh	F1175	بئر ابو طزة
3	**27643**	2775	498	2202	2283	2600	2604	2900	4768	1799	1795	1288	2131	Wadi Ghudf	F1242	بئر وادي الغدف
1	**4450**	217	436	440	442	435	435	20	609	242	387	340	447	Wadi Butm	F1274	بئر وادي البطم
2	**20431**	1185	1164	1170	1176	1176	1136	1172	941	10358	313	220	420	Army Retired	F1287	بئر المتقاعدين العسكريين
1	**9139**	825	815	800	805	815	814	956	1022	988	371	425	503	Tal Hassan	F1303	بئر تل حسان
3	**25106**	1382	1501	1628	2254	2735	3145	2603	4762	1198	1048	813	2037	Katafiat	J1000	بئر القطافيات
1	**4580**	326	411	435	445	435	431	536	117	2	10	234	1198	Hazeem Ghumr	J1008	بئر هزيم الغمر
1	**6720**	464	475	470	455	465	459	366	348	534	258	495	1931	Hazeem Dahek	J1009	بئر الهزيم الضاحك
3	**26627**	1978	20	1877	2018	3726	1584	4523	4503	2392	1761	439	1806	Haside	J3029	بئر الحصيدة
5754	**50408378**	**4130793**	**4006373**	**4221892**	**4216747**	**4208701**	**4234663**	**4360182**	**4466719**	**4289033**	**4289226**	**3967153**	**4016896**	**Total**		

Water Imports from Other Governerates and Private Wells

av. M3/hr	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name	
257	**2248230**	238100	201100	189400	187100	218200	121200	171600	177000	182330	205670	197200	159330	**Zatari to Mafraq**	**من خط الزعتري +كمية العاقب**
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	**Zatari to Hashmeya University**	**من خط الزعتري للجامعة الهاشمية**
69	**607388**	0	44543	124540	113976	110100	101494	112735	0	0	0	0	0	**Mari Zahran to Corridor**	**بئر مرعي زهران -خط الكوريدور**
58	**507400**	0	41274	108376	93091	72739	87832	104088	0	0	0	0	0	**Mohamad Hameidi to Corridor**	**بئر ابو هويدي -خط الكوريدور**
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	**Tahatal Well to Corridor**	**بئر طه التل -خط الكوريدور**
36	**314230**	0	14563	63757	57700	52320	60125	65765	0	0	0	0	0	**Harzallah to Hallabat**	**بئر حرزالله -خط الحلابات**
420	**3677248**	**238100**	**301480**	**486073**	**451867**	**453359**	**370651**	**454188**	**177000**	**182330**	**205670**	**197200**	**159330**	**Total**	

Water Exports

av. M3/hr	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name	
805	**7047988**	504382	504967	512178	481697	469296	586059	620256	732897	733398	678622	633854	590382	**Khaw to Amman + Tamween**	**العاصمه)من خو+كميه من التموين(**
24	**213000**	18000	18000	18000	18000	18000	18000	18000	18000	15000	18000	18000	18000	**Jerash from Um Rumanneh**	**جرش) من محطة ام رمانه (**
7	**59027**	2421	4551	2000	2000	3836	4273	6227	6669	3059	10155	7354	6482	**Balqa from Um Rumanneh**	**البلقاء) من محطة ام رمانه(**
14	**124350**	18450	13940	13920	14660	12300	11480	11120	6420	5670	5190	5490	5710	**Mafraq from Qunaya**	**المفرق)من محطة القنيه (**
83	**727207**	58179	62560	45590	26040	45760	54710	44200	62990	59040	87580	85308	95250	**Beraq Mahmeya Nature Reserve from Azraq pipeline**	**برك المحميه) من خط الازرقين(**
17	**146035**	10987	6889	10543	11427	13917	12161	14856	19463	19355	8019	5877	12541	**From Desert Wells to Animal Watering**	**سقاية المواشي من الابارالصحراويه**
106	**931513**	113464	49005	130061	108815	83818	80820	72947	63287	60709	64091	50533	53963	**Discharge from Desalination Plant**	**من محطة التحليه مياه غير صالحه**
0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	**Wash Out**	**مياه مضخوخه على الوش اوت**
1056	**9249120**	**725883**	**659912**	**732292**	**662639**	**646927**	**767503**	**787606**	**909726**	**896231**	**871657**	**806416**	**782328**	**Total**	

Nett System Input (Production + Imports - Exports)

av. M3/hr	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name
5118	**44836506**	**3643010**	**3647941**	**3975673**	**4005975**	**4015133**	**3837811**	**4026764**	**3733993**	**3575132**	**3623239**	**3357937**	**3393898**	**Total**

6 Wells feeding Merhib Pumping Station

av. M3/hr	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name	Ref	
20	**112960**					14998	14799	14201	14721	14222	14111	12518	13390	Merhib 2	AL2419	بئر مرحب 2
8	**44756**					10087	8948	11154	8086	1342	1020	1511	2608	Merhib 1	AL2420	بئر مرحب 1
19	**112242**					14025	5637	19604	19740	12940	13384	13002	13910	Merhib 1a	AL3431	بئر مرحب 1أ
26	**147903**					16482	18387	17181	19726	20232	19711	16627	19557	Merhib 2a	AL3432	بئر مرحب 2أ
30	**170445**					31044	28129	23448	11800	15152	20277	17421	23174	Merhib 3a	AL3531	بئر مرحب 3أ
31	**179000**					29760	29762	29043	33180	14776	14860	13486	14133	Merhib new Exploration well	AL3654	بئر مرحب الاستكشافي
133	**767306**					**116396**	**105662**	**114631**	**107253**	**78664**	**83363**	**74565**	**86772**	**Total**		

4 Wells feeding Um Rumanneh Reservoir

19	**108504**					14745	2601	12460	29915	15937	10908	12427	9511	Berein 2	AL3179	بئر بيرين 2
40	**228820**					30909	30397	26728	41811	34997	27468	20863	15647	Berein 3	AL3364	بئر بيرين 3
9	**51495**					16594	9809	12589	12394	0	0	0	109	Berein production Well	AL3703	بئر بيرين الانتاجي
4	**21451**					3771	4428	3342	1229	2935	2768	947	2031	Um Rumanneh 2	AL3576	بئر ام رمانة 2
71	**410270**					**66019**	**47235**	**55119**	**85349**	**53869**	**41144**	**34237**	**27298**	**Total**		

Water Production 2.

Count	MWI ID	STATION_NAME	Well Field Name	COORDINATES PALESTINE		ALTITUDE (m)	WELL_DEPTH (m)	AQUIFER_CODE	Well Information				Production in 2008 (m3/year)	OLD PUMPING TEST DATA							Latest Maintenance and Pump Setup										
				PALESTINE_NORTH	PALESTINE_EAST				Casing diameter (in)	Depth to Screen (m)	Screen Length (m)	Screen Diameter (in)		TEST_DATE	S_WATER_LEVEL (Depth_m)	P_WATER_LEVEL (Depth_m)	Drawdown (m)	YIELD (m3/hr)	DURATION	SALINITY (mg/l)	Suspension Line Length	Suspension Line Diameter	Cable measure mm^2	Pressure on Well Head	Flow (Q)	Head (H)	Pump Type	Engine Power (KW)	Well Productio (m^3)	Current (Ameper)	Maintenance Date
1	*AL0600	QUNAYYAH	Al-Qnayyah Wells	1182300	244300	500							523932																		
2	AL0604	EL HAWAYAH	El Hawayah Wells	1173400	241000	600							56301																		
3	*AL0610	ALUQ	Al-Alouk Wells	1174700	237200	590			14/9.625	359	66	9.625	33617																		
4	*AL1230	HASHIMIYA NO 3	Al- Hashmeyah Wells	1170130	256690	540	102	B2/A7	12.4	72.22	27.58	NA	1542433	14/01/1986	47.1	47.5	0.4	90	48	690	84	6	95	5	200	100	كبراري	92	200	162	16/02/2006
5	AL1254	HASHIMIYA NO 5		1170040	256910	540	106	BA	NA	NA	NA	NA	1472213	29/01/1986	51	51.1	0.1	80	48	662	72	6	70	7.5	150	150	كبراري	92	170	170	05/08/2007
6	AL2715	HASHIMIYA NO 2		1169744	257027	540	128	-	NA	NA	NA	NA	417179	07/08/1979	49.53	53.45	3.92	60	45		78	4	70	7	50-35	175-200	اوستنال	45	55	70	01/02/2009
7	AL1192	ZERQA MUNICIPILITY NEW(14A)	Zarqa Wells	1166535	254830	568	281	A4	9.84	NA	NA	NA	1324423	30/06/1971	74	75	1	155	24	384	92	8	95	5	200	100	اوستنال	92	122	130	28/10/2008
8	AL1899	ZERQA WELL NO 3 (S16)		1166920	254870	586	113	B2/A7	12.25	NA	NA	NA	1003197	17/01/1966	57.95	62.75	4.8	167	72	666	90	6	70	1.5	150	150	سير	92	185	161	22/11/2007
9	*AL1898	ZERQA WELL NO 2 (S14)		1166830	254870	587	246	A4	13.3	188	56	8	2160981	13/07/1966	69.1	69.46	0.36	35		1152	144	8	150-185	1	300	100	جت	132	240	213	20/04/2009
10	*AL3448	CORODOR 6	Corridour Wells	1176744	292808	692	267	BA	10.75	NA	NA	NA	567706	16/10/2000	178.9	180.2	1.3	210	48		220	6	70مجوز	10	100	300	اتوريا	132	130	260	31/07/2008
11	*AL3449	CORODOR 7		1176492	291709	690	321	BA	10.75	58	200	10.75	843219	10/05/1998	172.75	173.4	0.65	62	48	210	240	6	70مجوز	1	133	285	رتس	160			01/06/2001
12	*AL3450	CORODOR 8		1175518	291662	682	350	BA	10.75	106/166/146	20/80/104	10.75	422652	27/09/1997	166.65	167.05	0.4	71	40	217	228	6	70مجوز	1	133	280	رتس	160			01/06/2001
13	*AL3475	CORODOR 1		1183370	294165	785	395	BA	10.75	320	75	10.75	613606	02/08/1998	276.45	276.53	0.08	70	48	240	319	6	70مجوز	1	100	300	رتس	144			01/06/2001
14	AL3476	CORODOR 2		1179480	293660	735	350	BA	10.75	NA	NA	NA	677416	13/08/1998	219.43	219.85	0.42	80	48	206	252	6	70مجوز	1	112	290	رتس	144			01/06/2001
15	*AL3477	CORODOR 3		1178382	293631	715	350	BA	10.75	NA	NA	NA	595316	04/07/1998	201.7	201.85	0.15	40	24		240	6	70مجوز	1	112	290	رتس	144			01/06/2001
16	*AL3478	CORODOR 4		1181423	293672	749	350	BA	10.75	NA	NA	NA	559221	20/05/1998	238.25	238.4	0.15	43	23	205	254	6	70مجوز	1	100	300	رتس	132			16/04/2009
17	*AL3479	CORODOR 5		1177418	293606	700	350	BA	10.75	170	140	10.75	564598	28/04/1998	186.3	187.7	1.4	68	48	202	240	6	70مجوز	1	120	285	رتس	144			01/06/2001
18	*AL3480	CORODOR 9		1174767	291048	663	351	B2/A7	10.75	253	88	10.75	682918	17/02/1998	153	171.55	18.55	83	44	255	226	6	70مجوز	12	100	300	انافالوس	130		218	27/02/2008
19	*AL3481	CORODOR 10		1175079	292874	670	350	BA	10.75	250	100	12.25 (no screen)	552958	16/05/2000	155	174	19	73	36		224	6	70مجوز	1	100	300	رتس	144			31/08/2004
20	*AL3644	CORODOR 12		1176258	293341	683	350	A7	10.75	240	40/60	10.75/9.625	841512	27/05/2003	177.54	178	0.46	97	30		210	6	150	4	100	250	كبراري	110	113	201	23/01/2006
21	*AL3645	CORODOR 13		1177057	294239	700	351	B2/A7	10.75	220	60/60	10.75/9.625	887545	12/05/2003	188.13	195.45	7.32	88	45		240	6	150	0.5	100	300	جت	130	95	230	01/03/2005
22	*AL3689	CORODOR 15		1176881	294952	698	324	B2/A7	10.75/9.625	125	100	9.625	452950	27/12/2004	191.6	198.8	7.2	80	144		228	4	70	13	50	350	فانسان		81	140	12/04/2006
23	**F 1028	AWSA 1	Azraq Wells	1150502	321477	537	203	BA					0	08/03/1981	24.76	28.84	4.08	171	120	270											
24	**F 1029	AWSA 2		1150334	322143	527	212	BA					1831039	28/02/1981	14.43	19.68	5.25	313	96	272	48	8	120	7	300	100	جت	132	250	240	12/12/2007
25	**F 1030	AWSA 3		1149842	322157	521	210	BA					1057192	27/03/1981	8.48	12.44	3.96	240	96	281	32	8	70	7	100	200	امبو	92		146	26/10/2008
26	**F 1031	AWSA 4		1150959	321861	536	206	BA					1266843	13/04/1981	24.06	42.66	18.6	230	96	297	54	8	95	7	220	100	جت	110	160	176	23/08/2007
27	**F 1032	AWSA 5		1151204	321232	541	204	BA					474150	27/03/1981	28.45	61.04	32.59	122	28		60	6	95	7.5	100	100	جت	45	54		01/10/2005
28	**F 1033	AWSA 6		1151459	321828	548	206	BA					1326390	19/03/1981	29.34	32.33	2.99	170	96		60	8	95	6	200	100	كبراري	92	90	169	17/08/2005
29	**F 1034	AWSA 7		1149360	323259	516	204	BA					1134658	12/03/1981	4.58	5.59	1.01	240	36	384	37	8	95	7	200	100	كبراري	92		163	06/10/2007
30	**F 1036	AWSA 9		1150188	323217	525	204	BA					685551	27/04/1981	13	39.02	26.02	161	96	390	54	6	95	7	100	125	فانسان	55	90	100	31/05/2008
31	**F 1037	AWSA 10		1149872	322749	521	203	BA					1469074	08/05/1981	7.78	12.84	5.06	257	96	473	32	8	70	1	200	100	كبراري	90		147	09/11/2000
32	**F 1038	AWSA 11		1149139	322425	517	61	BA					1272470	03/06/1981	4.86	5.39	0.53	200	96	336	36	6	70	7	180	103	KSB	108		126	05/12/2007
33	**F 1039	AWSA 12		1147792	321723	528	209	BA					850539	02/06/1981	16.07	22.64	6.57	300	96	288	102	6	70	7	170	150	KSB	101	100	188	07/12/2006
34	**F 1040	AWSA 13		1148359	321195	532	205	BA					993022	18/07/1981	20.7	22.1	1.4	304	82	672	61	8	120	7	150	150	جت	100	180	176	20/07/2008
35	**F 1042	AWSA 15		1146909	321182	524	210	BA					418292	19/08/1981	12.94	39.33	26.39	203	96	281	92	4	35	6.5	150	150	سير	92		82	29/11/2008
36	**F 4205	AWSA 20 (AZRAQ 20)		1146760	320420	550	117	B4/B5	10.75	71	30	10.75	732322	13/12/2006	34.8		-	100	100		48	6	50	7	100	100	امبو	52		81	02/09/2007
37	**F 3222	AWSA 18 (AZRAQ)		1152200	322500	560	171	BA					1189209	16/11/1991	45.4	45.65	0.25	146	48	275	120	6	150	1	150	150	كبراري	92	156	168	29/06/2002
38	**F 4141	AWSA 1A		1150499	321474	550	220	B4					1388174	12/02/2004	39.26	43.65	4.39	88	53		96	6	50	1	150	150	جت	100	175	174	17/12/2007
39	**F 4166	AWSA 16		1149364	321013	550	160	B4	13.375	30	39	13.375	884212	27/06/2004	44	44.1	0.1	94	70		66	5	70	7.5	100	150	فانسان	67	110	109	11/04/2007
40	F 1303	TELL HASSAN	Desert Wells	1154354	330445	590	173	B4					9139	31/12/1988	69.23	81.72	12.49	106		420											
41	F 1155	RATTAM VALLEY 1 (NEW)		1147539	313308	539	236	B4					525	18/03/1981	19.6	26.98	7.38	54	45	320											
42	F 1175	PAB-8		1131525	314042	527	130	B4					15519	06/03/1958	0.25	72	71.75	203	72	1750											
43	F 1274	WADI BUTUM NO 1 (NEW)		1134830	300150	567	550	B4					4450	09/06/1985	39	111.55	72.55	45	48	1645											
44	F 1063	AZ 19 (PP 440)_Wadi El Omry		1107619	341329	543	301	B4					5295	12/02/1964	20.5	36.17	15.67	9	1	1510											
45	F 1287	S.ORG.FOR RET.SERV-MEN NO 2		1106324	342748	551	75	B4/B5					20431	22/07/1984	27.32	47.3	19.98	12	48	1267											
46	J 1008	WADI EL HAZEEM 1(INA)		1123350	361750	531	67	B4/B5					4580	07/08/1971	12.4	13.64	1.24	24	24	1472											
47	J 1009	WADI EL HAZEEM 2 (DH.)		1113881	361261	530	52	B5					6720	19/12/1982	16	22.25	6.25	67	24	806											
48	J 1000	QATTAFI-1		1144000	377600	610	207	B4					25106	09/11/1969	87	97	10	40	29	768	120	4	50	1	50	125	اوستنال	30			18/06/2008
49	F 1242	WADI EL GHADAF 1		1093729	312830	675	140	B4/B5					27643	23/02/1973	118.3	122.8	4.5	47	46	1152	122	4	35	1	50	125	امبو	35			07/10/2006
50	J 3029	HUSAYDEH POLICE STATION 2		1058000	364500	622	80	B4/B5					26627	12/09/1998	57.08		-	80			66	4	35	1	25	125	اوستنال	18.5			17/09/2007
51	**AL3704	HALLABAT 16	Al-Hallabat Wells	1164000	287203	590	170	B2/A7	10.75	100	165	10.75	810227	19/09/2004	78.54	78.8	0.26	91	51		114	6	70	11	100	150	اوستنال	75	53	137	22/08/2006
52	**AL3726	HALLABAT EAST 17		1165870	286718	590	257	B2/A7	10.75	95/205	50/40	10.75	822243	21/10/2004	78.6	79.2	0.6	93	53		114	6	70	1	100	150	اوستنال	75			11/09/2006
53	*AL3727	HALLABAT EAST 18		1165923	287930	600	245	B2/A7	10.75	110	50	10.75	876096	30/10/2004	87.8	88.25	0.45	63	48		114	6	70	8	100	150	اوستنال	22	90	132	25/06/2007
54	**AL3728	HALLABAT 19 (EAST HALLABAT)		1165100	288098	590	124	B2/A7	10.75	80	120	10.75	919805	04/11/2004	79.15	79.6	0.45	91	48		102	6	150	3	100	150	اوستنال	75		142	06/11/2006
55	**AL3729	HALLABAT 20 (EAST HALLABT)		1164178	288023	590	165	B2/A7	10.75	80	60	10.75	801231	03/12/2004	78.4	79.5	1.1	75	120		120	6	95	4	100	150	كبراري	59	100	123	08/11/2006
56	**AL3495	HALLABAT 12		1165847	281241	591	142	A7					110322	18/04/1999	82.35	83.03	0.68	69	48	313	126	6	70	1	50-30	100-130	كبراري	22	23	36	19/11/2006
57	**AL3497	HALLABAT 14		1165200	282100	600	283	A7	10.75	80/230	90/43	10.75	50492	02/06/1999	78.75	89.75	11	30	48		228	4	50	1	27	238	امبو	30	13	52	11/02/2009
58	**AL3284	HALLABAT 7		1165247	281179	595	135	B2/A7	16	75/84	12/51	16/13.375	85164	29/10/1991	75.86	87.36	11.5	91	48	682	126	4	70	7	20	200	جت	22		42	02/11/2003
58	**AL3284	HALLABAT 7		1165247	281179	595	135	B2/A7	16				85164	12/10/2003	89.57	115.2	25.63	15	45		126	4	70	7	20	200	جت	22		42	02/11/2003
59	**AL3285	HALLABAT 8		1165193	281891	593	136	B2/A7	16/13.2				561626	30/12/1991	75.7	76.31	0.61	132	48		108	6	120	2.5	200	100	سبكو	92	110	109	23/12/2006
60	**AL3306	HALLABAT 3B		1166309	278883	592	160						75375				-				132	4	70	3	25-30	130-150	اوستنال	22	15	44	14/06/2008
61	**AL3133	HALLABAT 10		1164420	281281	599	169	B2/A7	13.375	NA	83	NA	270430	11/06/1993	80.44	145	64.56	65	48	592	144	4	50	1	50	160	جت	37	36	63	28/09/2004
62	**AL3445	HALLABAT 11		1165405	280734	595	137	B2/A7	12.75/9.625	NA	NA	NA	46738	11/03/1997	83.37	84.59	1.22	106	48	530	126	4	35	1	50	150	اوستنال	45	60	61	26/06/2008
63	**AL3688	HALLABAT 15		1164656	285975	590	219	B2/A7	10.75	130	80	10.75	811818	15/03/2004	77.6	95.4	17.8	75	72		150	6	70	10	100	150	اوستنال	75	50	132	22/08/2006
64	**AL3664	SUPPLY NO 9	Al-Tamween Wells	1161823	257206	700	370	B2/A7	10.75/9.625	260/300/350	10/40/10	10.75/9.26/9.26	514003	22/10/2003	120	197.7	77.7	80	72		216	4	70	2.5	50-70	250-300	اوستنال	81	62	122	18/10/2007
65	**AL3667	SUPPLY NO 8		1161167	256780	660	315	B2/A7	10.75	275	30	10.75	81392	04/11/2003	122.45	175.75	53.3	90	72		216	4	70	2.5	50-70	200-250	اوستنال	75	52	118	17/08/2008
66	**AL3670	SUPPLY NO11		1162290	258551	650	312	A4	10.75	250	50	10.75	329629	18/01/2004	112.79	170.14	57.35	70	95		216	4	70	4.5	50	250	فانسان	67	50	110	06/04/2009
67	**AL3672	SUPPLY NO 10		1161354	258675	632	320	B2/A7	10.75	200/220/240/260	10/10/10/50	10.75	418208	13/11/2003	125.75	197.6	71.85	85	120		240	4	70	2.5	50-70	250-300	انافالوس	75	50	144	17/03/2007
68	*AL3673	SUPPLY NO 7		1162114	256330	590	297	B2/A7	10.75	197	90	10.75	148949	01/12/2003	91.2	247.5	156.3	48	48		270	4	70	2	30	300	جت	37	32	74	10/12/2007
69	**AL3747	SUPPLY 3A		1162580	257030	620	360	B2/A7	10.75	160/240	40/110	10.75	222937	26/07/2005	125.2	225.8	100.6	75	48		262	4	50	0.5	50	200	كبراري	55	40	81	11/01/2007
70	**AL3646	SUPPLY NO 6		1163450	256700	680	285	B2/A7	10.75/9.625	NA	55	NA	80387	24/05/2003	99.2	108.5	9.3	55	48		150	4	70	3.5	50	125	جراندفوس	30	40	55	09/06/2007
71	**AL3506	SUPPLY NO 5		1163030	258470	607	348	B2/A7	10.75	NA	NA	NA	184371	09/12/1997	76.08	68.43	-	74	48	512	186	4	35	1	50	200	انافالوس	45	40	78	19/06/2007
72	**AL3490	SUPPLY NO 4		1162750	256900	615	332		10.75/8.75	NA	NA	NA	252726				0				246	4	70	4	50	200	جت	52	42	89	20/12/2008
73	**AL3442	SUPPLY NO 3		1162580	257030	620	341	B2/A7	10.75	NA	NA	NA	255466	14/09/1997	74.8	77.16	2.36	70	48	570	192	4	70-95	2	50	200	انافالوس	52	50	97	14/03/2009
74	**AL2691	AWAJAN 23	Awajan Wells	1160000	251980	600	151	B2/A7	18/13.375	NA	NA	NA	1418883	01/01/1987	25.62	34.75	9.13	185	72		60	6	95	12	150	300	جت	185	205	330	03/04/2008
75	**Al1318	AWAJAN 22 ZERQA MUNICIPALITY A		1160340	252468	587		B2/A7					263247				-				124	4	70	13	50	250	اوفل	60	48	120	28/01/2009
76	*AL1319	AWAJAN 21 ZERQA MANICIPILITY B		1160410	252494	585	148	B2/A7	13.375	29.6	111	13.375	440580	18/04/1987	28.47	31.68	3.21	190	54		72	6	50	13	100	200	جت	92	170	133	17/12/2008
77	**AL3741	AWAJAN 24		1159590	251905	600	175	B2/A7	10.75	100	70	10.75	0	24/10/2005	40.4	116.1	75.7	40	96		150	4	35	1	50	200	امبو	55			20/04/2009
78	**AL3431	WADI MIRHIB 1A	Merheb Wells	1163862	248533	604	403	A4	9.625	290	113	6.625	123555	08/03/1995	0	147.7	147.7	58	38	480	216	4	95	3.5	25	250	لوارا	30	25	67	16/12/2008
79	**AL3432	WADI MIRHIB 2A		1165000	248000	650	370	A4	13.375/9.625	145	58	9.625	226308	02/05/1995	0	26.6	26.6	80	48	495	84	4	35	1	50	70	لوارا	15	30	29	04/09/2004
80	**AL3531	WADI MIRHIB 3A		1165280	246711	665	375	A4					133832	12/04/1999	33.95	122.6	88.65	72	68		180	6	35	1	50	175	كبراري	37	22	63	06/12/2008
81	*AL2419	WADI MIRHIB 2		1164942	247971	634	217	A4	11.75/8.625	0	146/77	11.75/8.625	159152	29/03/1996	6.6	25.45	18.85	95	24	536	120	4	50	1	25	100	لوارا	13	21	23	07/11/2005
82	**AL2420	WADI MIRHIB 1		1163872	248533	604	255	A4					58007	21/08/1989		76.7	76.7	27	24	432	122	4	50-35	3.25	50	125	انافالوس	26	28	44	19/04/2007
83	**AL3654	BEERAIN EXPLARATORY 1		1167338	240456	700	654	K	14/10.75/9.625	474/560/607	46/17/17	9.625	65409	21/07/2003	330.4	347.2	16.8	25	72	650	340	4	120	2	50-70	250-300	فانسان	75	30	121	22/04/2009
84	**AL3656	RUSEIFA 9A	Rusaifah Wells	1158700	245770	640	188	B2/A7	13.375/9.625	No Screen'	No Screen'	No Screen'	614133	23/06/2003	17.8	23.1	5.3	140	48	855	72	6	50	3	100	50	سير	22	95	47	04/04/2009
85	AL1352	RUSEIFA MUNICIPALITY 2		1158792	248848	622	80	B2/A7					1202224	20/05/1973	24	28	4	126	48	608	65	6	95	1	150	100	اوستنال	67	130	107	21/12/2008
86	**AL1447	RUSEIFA 8 (MUNICIPALITY)		1158806	247958	622	119	B2/A7	13.375	NA	NA	NA	342250	24/12/1989	27.45	28.45	1	105	24		100	4	35	1	50	125	اوستنال	30	42	51	25/09/2007
87	**AL1551	RUSEIFA MUNICIPALITY 4		1158683	248987	620	98	A7					1148426	02/10/1983	20.09	20.93	0.84	120	72		78	6	95	6.5	100	100	فانسان	45	98	88	20/100/2008
88	AL1826	RUSEIFA 18/AMMAN MUN. 25		1158704	247266	622	310	A4					185286	08/05/1971	0	85.6	85.6	250	72	422	210	6	50	1	50	175	كبراري	37		53	03/09/2003
89	AL1836	AWSA 26 (SHNELLER CAMP NO 1)		1157250	246450	710	315	A4					0	08/09/1973	57	105	48	71	72	409	186	4	70	11	20	200	E-TECH	22	13	40	09/08/2005
90	**AL1351	RUSEIFA MUNICIPALITY 1	Al-Basateen Wells	1158837	248309	620	31	ALL					34191	01/03/1960	21.2		-	186		840	114	4	70-120	7.5	25	125	اوستنال	18.5	13	30	22/05/2008
91	**AL3310	RUSEIFA 1A (BASATEEN/1B)		1158861	248304	620	217	-	10.75/13.17	NA	NA	NA	88239	12/09/1998	33.4		-			620	162	6	95	1	50	52	جراندفوس	22	62	30	10/05/2003
92	*AL3287	RUSEIFA 1 DEEP (PHOSPHATE)	Phosphate Wells	1158879	247829	624	452	B2/A7	13.375/9.625	312	140	9.625 (no screen)	215192	17/05/1992	96.3	197.3	101	87	48	384	258	6	120	1	50-70	200-250	انافالوس	67	62	111	02/04/2008
93	AL1340	PHOSPHATE MINES 2		1158840	247808	626		B2/A7					170328	07/05/1998			0			250	60	4	16	1	50	50	انافالوس	11	48	22	29/09/2003
94	**AL1343	PHOSPHATE MINES 5		1158700	247500	650	121	B2	13/9.625	77	40	9.625	98222	03/05/1971	32	57	25	90		531	72	6	70	1	100	50	فانسان	26			28/11/2007
94	**AL1343	PHOSPHATE MINES 5		1158700	247500	650	121	B2	13/9.625	77	40	9.625	98222	13/07/2002	31.75	33.11	1.36	110	50		72	6	70	1	100	50	فانسان	26			28/11/2007
94	**AL1343	PHOSPHATE MINES 5		1158700	247500	650	121	B2	13/9.625	77	40	9.625	98222	04/01/2006	33.8		-	65	96		72	6	70	1	100	50	فانسان	26			28/11/2007
95	*AL3576	BEERAIN 2A / UM RUMMANEH	Beerain Wells	1166718	238325	800	398	A2/A1	14/9.625	NA	NA	NA	20393	20/11/2000	85	207.3	122.3	60			240	4	35	1	30	300	جت	45		66	24/03/2009
95	*AL3576	BEERAIN 2A / UM RUMMANEH		1166718	238325	800	398	A2/A1	14/9.625	NA	NA	NA	20393	17/03/2001	86.7	125.08	38.38	38	71		240	4	35	1	30	300	جت	45		66	24/03/2009
96	**AL3179	BEERAIN 2(SHAFA BADRAN 2)		1166818	239442	731	122	A4	20/12.75	NA	NA	NA	239867	07/06/1988	21.1	126.1	105	36		538	110	4	35	9	30-50	100-130	انافالوس	26.5	18	46	01/11/2005
96	**AL3179	BEERAIN 2(SHAFA BADRAN 2)		1166818	239442	731	122	A4	20/12.75	NA	NA	NA	239867	20/07/1996	20.5	24	3.5	69	72	616	110	4	35	9	30-50	100-130	انافالوس	26.5	18	46	01/11/2005
97	**AL3364	BEERAIN 3(SHAFA BADRAN 3)		1166816	239992	719	165	A2/A1	10.75	42.27/136.52	50.93/18.05	10.75	320525	20/06/1988	17.55	151.55	134	46	72	672	138	4	25-35	7.5	21-30	247-311	امبو	37		58	14/12/2008
97	**AL3364	BEERAIN 3(SHAFA BADRAN 3)		1166816	239992	719	165	A2/A1	10.75	42.27/136.52	50.93/18.05	10.75	320525	30/06/1996	16.45	90.5	74.05	45	50	720	138	4	25-35	7.5	21-30	247-311	امبو	37		58	14/12/2008
98	AL3703	BEERAIN PRODUCTION WELL(SHALLOW		1167340	240460	700	105	A4	10.75	45	50	10.75	195429	17/05/2004	3.6	41.55	37.95	105	214		84	4	25	10	30-50	100-130	انافالوس	22	36	43	04/05/2008

Selected Wells

Water Production 3.
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Water Production, Imports, Exports and SIV 2008-2009 by Water Supply Area (WSA)

Summary Water Production from Zarqa Wells in 2008 - 2009

WSA	2009 Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	2008 Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name (English)	Ref
Azraq	**1369690**	**1400709**	**1413705**	**1442298**	**1425315**	**1431052**	**1492325**	**1394231**	**1434812**	**1349502**	**1454568**	**1433659**	**1396949**	**1424623**	**1384170**	**1410121**	**1389132**	**1392827**	**1483668**	**1400536**	**1445516**	**1340528**	**1471408**	Azraq Sum	
Dulail	**672553**	**692389**	**670717**	**674970**	**673942**	**648502**	**672127**	**663768**	**599652**	**600398**	**684516**	**629361**	**656611**	**687978**	**670248**	**699500**	**698982**	**687663**	**716657**	**716400**	**740048**	**672009**	**686160**	Corridor Sum	
Dulail	**448996**	**507200**	**510792**	**425295**	**452253**	**469962**	**473695**	**485937**	**504763**	**440005**	**511676**	**532175**	**508434**	**515812**	**531538**	**532456**	**541526**	**586912**	**571167**	**517092**	**569229**	**501866**	**333360**	Hallabat Sum	
Zarqa	**358094**	**370276**	**366641**	**375602**	**337377**	**292085**	**300425**	**308428**	**353490**	**333769**	**339262**	**408944**	**312395**	**434941**	**434525**	**434306**	**432930**	**380077**	**358007**	**332459**	**327911**	**299713**	**332393**	Zarqa Sum	
KABA City	**202022**	**209651**	**198739**	**231031**	**218826**	**227790**	**192836**	**211549**	**203195**	**184545**	**186987**	**181850**	**160234**	**184176**	**182483**	**181359**	**184713**	**222460**	**218015**	**236116**	**228947**	**252161**	**255554**	**Tamween Sum**	
Awajan	**44082**	**59699**	**132597**	**147552**	**173841**	**207786**	**226205**	**209762**	**196731**	**184003**	**198085**	**203588**	**184917**	**178090**	**175755**	**138937**	**137021**	**196223**	**181367**	**211183**	**185531**	**197097**	**133001**	Awajan Sum	
	44302	78511	68807	71910	93336	89853	108060	81243	84161	81543	65788	82474	76989	58896	42362	26911	55824	130461	137857	120074	132909	125956	157713	No.4	AL1551
	33344	21281	22963	24322	25178	36191	49010	49982	51543	27423	23432	26054	23800	23691	22143	22217	23745	25856	42901	41613	41827	5973	42430	No.8	AL1447
	15503	14884	16106	14559	20909	29307	24438	0	0	0	0	0	106	9839	14779	16094	17035	16965	13077	26252	4574	38	3671	Basateen Sum	
	47203	46324	59943	63969	68807	73211	73162	86245	80905	29264	19291	23058	25783	32652	40759	45798	56230	58106	72406	61073	27126	23881	16870	Phosphorous Sum	
	33288	**47753**	**51242**	**58669**	**66231**	**63350**	**52781**	**33493**	**33539**	**48929**	**54260**	**46111**	**54851**	**89923**	**91917**	**105610**	**99143**	**71626**	**72671**	**57897**	**40172**	**20448**	**49050**	**Russaifah Sum**	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Hitteen	AL1836
	93797	96160	92116	97183	96006	94910	98544	99938	95012	99774	77616	90149	99482	91246	111855	102350	108772	102037	99992	104910	104628	86237	100566	Maqtab 2	AL1352
Russaifah	**267437**	**304913**	**311177**	**330612**	**370467**	**386822**	**405995**	**350901**	**345160**	**286933**	**240387**	**267846**	**281011**	**306247**	**323815**	**318980**	**360749**	**405051**	**438904**	**411819**	**351236**	**262533**	**370300**		
	195804	244611	304973	321906	321399	308156	305427	294106	282422	267659	273824	278312	280237	289060	287408	288424	287737	282953	305606	302703	277093	283687	268605	Hashmeya Sum	
	69448	71630	67893	75239	69149	70380	76865	71390	52350	50794	64180	66676	66511	59777	54551	56007	58679	54408	30200	17634	20464	19486	19539	Qunaya	AL0600
North	**265252**	**316241**	**372866**	**397145**	**390548**	**378536**	**382292**	**365496**	**334772**	**318453**	**338004**	**344988**	**346748**	**348837**	**341959**	**344431**	**346416**	**337361**	**335806**	**320337**	**297557**	**303173**	**288144**		
	77854	66981	78025	77639	79630	75234	79866	68569	79564	72955	62975	42768	78473	58341	90084	61829	57868	55299	58970	53496	58376	72138	78621	Merhib Sum	
	46265	38496	40659	44198	35514	43294	40917	51523	52671	34588	39222	67565	66607	64297	63095	62891	62996	70381	72399	61114	66924	48650	48902	Berein Sum	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	2429	2427	2399	2404	2710	3277	4659	53	Um Rumanneh 2	AL3576
	4594	5144	5192	5584	5513	5249	4965	5012	3037	706	935	4611	4541	4771	4614	4793	4740	5499	5855	4217	4450	4251	3959	Sarout	AL0604
	2524	2245	2793	2657	2686	2847	3178	3861	3162	2219	2221	2451	2564	3236	2999	2752	3002	3174	4037	2199	2205	2498	2500	Alouk	AL0610
West North West	**131237**	**112866**	**126669**	**130078**	**123343**	**126624**	**128926**	**128965**	**138434**	**110468**	**105353**	**117395**	**152185**	**130645**	**160827**	**134694**	**131033**	**136752**	**143665**	**123736**	**135232**	**132196**	**134035**		
	0	0	0	0	0	0	0	1	99	48	33	618	370	335	345	340	353	547	449	461	621	194	662	Omari	F1063
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	361	0	2	134	28	Wadi Rutm	F1155
	5131	501	493	125	3235	902	997	880	2271	3146	730	1217	1199	1186	1204	1190	1200	1233	1583	1381	1453	1295	1378	Desert Abu Toseh	F1175
	1329	2005	1993	2027	1676	1121	1118	1141	2486	2402	3952	2775	498	2202	2283	2600	2604	2900	4768	1799	1795	1288	2131	Wadi Ghudf	F1242
	188	0	0	1	139	801	828	529	127	159	383	217	436	440	442	435	435	20	609	242	387	340	447	Wadi Butm	F1274
	910	501	503	818	792	903	1076	824	994	397	752	1185	1164	1170	1176	1176	1136	1172	941	10358	313	220	420	Army Retired	F1287
	1254	200	197	56	2508	601	614	1267	914	200	298	825	815	800	805	815	814	956	1022	988	371	425	503	Tal Hassan	F1303
	746	501	500	627	609	1514	2617	556	1660	1936	1738	1382	1501	1628	2254	2735	3145	2603	4762	1198	1048	813	2037	Katafiat	J1000
	3	201	198	200	200	200	200	251	251	244	399	326	411	435	445	435	431	536	117	2	10	234	1198	Hazeem Ghumr	J1008
	293	200	202	392	735	200	200	209	617	460	441	464	475	470	455	465	459	366	348	534	258	495	1931	Hazeem Dahek	J1009
	367	1503	1502	1979	748	501	550	693	1910	3609	1878	1978	20	1877	2018	3726	1584	4523	4503	2392	1761	439	1806	Haside	J3029
Desert	**10221**	**5612**	**5588**	**6225**	**10642**	**6743**	**8200**	**6351**	**11329**	**12601**	**10604**	**10987**	**6889**	**10543**	**11427**	**13917**	**12161**	**14856**	**19463**	**19355**	**8019**	**5877**	**12541**		
	3769584	**3979556**	**4109491**	**4160808**	**4176554**	**4175902**	**4283026**	**4125388**	**4122338**	**3820677**	**4069442**	**4130793**	**4006373**	**4221892**	**4216747**	**4208701**	**4234663**	**4360182**	**4466719**	**4289033**	**4289226**	**3967153**	**4016896**		**Total m3/month**
	30	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**28**	**31**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
	125,653	**128,373**	**136,983**	**134,220**	**134,728**	**139,197**	**138,162**	**137,513**	**132,979**	**136,453**	**131,272**	**133,251**	**133,546**	**136,190**	**140,558**	**135,765**	**136,602**	**145,339**	**144,088**	**142,968**	**138,362**	**136,798**	**129,577**		**m3/d Total**

Water Imports from Other Governerates and Private Wells

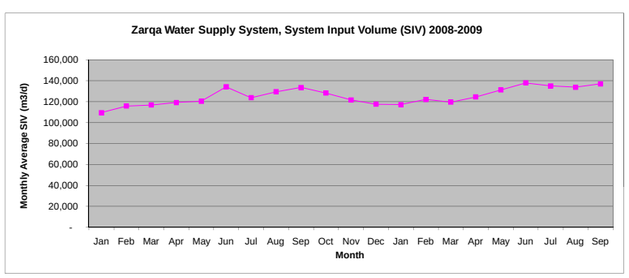
	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name
	119070	119985	114520	114411	114389	94670	75716	0	0	0	0	0	44543	124540	113976	110100	101494	112735	0	0	0	0	0	**Mari Zahran to Corridor**
	81500	73870	79740	92586	102436	85968	47673	0	0	0	0	0	41274	108376	93091	72739	87832	104088	0	0	0	0	0	**Mohamad Hameidi to Corridor**
	90205	85260	84220	80592	50000	53258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**Tahatal Well to Corridor**
	63243	63153	64485	64445	61556	49613	47174	0	0	0	0	0	14563	63757	57700	52320	60125	65765	0	0	0	0	0	**Harzallah to Hallabat**
	170000	160000	127970	127970	175030	176000	192000	200000	236000	197200	180100	238100	201100	189400	187100	218200	121200	171600	177000	182330	205670	197200	159330	**Zatari to Mafraq**
	89290	88980	90860	91000	90700	94850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**Zatari to Hashmeya University**
Dulail	**613308**	**591248**	**561795**	**571004**	**594111**	**554359**	**362563**	**200000**	**236000**	**197200**	**180100**	**238100**	**301480**	**486073**	**451867**	**453359**	**370651**	**454188**	**177000**	**182330**	**205670**	**197200**	**159330**		**Total**
	30	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**28**	**31**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
	20,444	**19,073**	**18,727**	**18,419**	**19,165**	**18,479**	**11,696**	**6,667**	**7,613**	**7,043**	**5,810**	**7,681**	**10,049**	**15,680**	**15,062**	**14,624**	**11,956**	**15,140**	**5,710**	**6,078**	**6,635**	**6,800**	**5,140**		**m3/d Total**

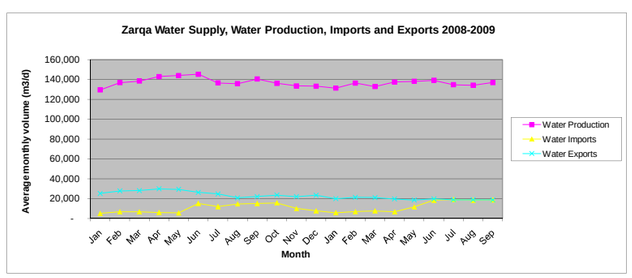
Water Exports

	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name
Azraq		26540	29400	42030	60447	35173	35720	37848	38582	47151	58179	62560	45590	26040	45760	54710	44200	62990	59040	87580	85308	95250	**ahmeya Nature Reserve from Azraq pipeline**
		83501	60152	54347	51585	56975	84968	103800	83879	60482	113464	49005	130061	108815	83818	80820	72947	63287	60709	64091	50533	53963	**Discharge from Desalination Plant**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**Wash Out**
Zarqa		**83501**	**60152**	**54347**	**51585**	**56975**	**84968**	**103800**	**83879**	**60482**	**113464**	**49005**	**130061**	**108815**	**83818**	**80820**	**72947**	**63287**	**60709**	**64091**	**50533**	**53963**	
KABA City	431258	406972	451315	439604	430994	441086	425046	465366	429326	465054	504382	504967	512178	481697	469296	586059	620256	732897	733398	678622	633854	590382	**Khaw to Amman + Tamween**
North		18370	18760	16010	19360	16180	16970	13560	12560	11530	18450	13940	13920	14660	12300	11480	11120	6420	5670	5190	5490	5710	**Mafraq from Qunaya**
	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	15000	18000	18000	18000	**Jerash from Um Rumanneh**
	2776	3212	1984	2424	4947	1096	1750	2952	2417	3860	2421	4551	2000	2000	3836	4273	6227	6669	3059	10155	7354	6482	**Balqa from Um Rumanneh**
West North West	**20776**	**21212**	**19984**	**20424**	**22947**	**19096**	**19750**	**20952**	**20417**	**21860**	**20421**	**22551**	**20000**	**20000**	**21836**	**22273**	**24227**	**24669**	**18059**	**28155**	**25354**	**24482**	
Desert		5588	6225	10642	6743	8200	6351	11329	12601	10604	10987	6889	10543	11427	13917	12161	14856	19463	19355	8019	5877	12541	**From Desert Wells to Animal Watering**
	452034	**562183**	**585836**	**583057**	**592076**	**576710**	**588805**	**652855**	**597365**	**616681**	**725883**	**659912**	**732292**	**662639**	**646927**	**767503**	**787606**	**909726**	**896231**	**871657**	**806416**	**782328**		**Total**
	31	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**28**	**31**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
	14,582	**18,739**	**18,898**	**18,808**	**19,736**	**18,604**	**19,627**	**21,060**	**21,334**	**19,893**	**23,416**	**21,997**	**23,622**	**22,088**	**20,869**	**24,758**	**26,254**	**29,346**	**29,874**	**28,118**	**27,807**	**25,236**		**m3/d Total**

Nett System Input (Production + Imports - Exports)

Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name
4118770	**4109103**	**4145976**	**4187608**	**4138185**	**4068879**	**3736583**	**3705483**	**3420512**	**3632861**	**3643010**	**3647941**	**3975673**	**4005975**	**4015133**	**3837811**	**4026764**	**3733993**	**3575132**	**3623239**	**3357937**	**3393898**	**Total**
31	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**28**	**31**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**	**Days**
132,864	**136,970**	**133,741**	**135,084**	**137,940**	**131,254**	**124,553**	**119,532**	**122,161**	**117,189**	**117,516**	**121,598**	**128,248**	**133,533**	**129,520**	**123,800**	**134,225**	**120,451**	**119,171**	**116,879**	**115,791**	**109,481**	**m3/d Total**





Water Production 4.
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Water Production, Imports, Exports and SIV 2008 by Water Supply Area (WSA)

Water Production from Zarqa Wells in 2008

Nearest WSA to Source	Av 2008 m3/day	Total 2008 m3pa	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan
Azraq	46,375	16,973,137	1,433,659	1,396,949	1,424,623	1,384,170	1,410,121	1,389,132	1,392,827	1,483,668	1,400,536	1,445,516	1,340,528	1,471,408
Dulail	39,626	14,503,184	1,161,536	1,165,045	1,203,790	1,201,786	1,231,956	1,240,508	1,274,575	1,287,824	1,233,492	1,309,277	1,173,875	1,019,520
KABA City	6,798	2,488,068	181,850	160,234	184,176	182,483	181,359	184,713	222,460	218,015	236,116	228,947	252,161	255,554
Tatweer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zarqa	12,264	4,488,601	408,944	312,395	434,941	434,525	434,306	432,930	380,077	358,007	332,459	327,911	299,713	332,393
Awajan	5,800	2,122,710	203,588	184,917	178,090	175,755	138,937	137,021	196,223	181,367	211,183	185,531	197,097	133,001
Russaifah	11,198	4,098,491	267,846	281,011	306,247	323,815	318,980	360,749	405,051	438,904	411,819	351,236	262,533	370,300
North	10,808	3,955,757	344,988	346,748	348,837	341,959	344,431	346,416	337,361	335,806	320,337	297,557	303,173	288,144
West - NorthWest	4,460	1,632,395	117,395	152,185	130,645	160,827	134,694	131,033	136,752	143,665	123,736	135,232	132,196	134,035
Desert	399	146,035	10,987	6,889	10,543	11,427	13,917	12,161	14,856	19,463	19,355	8,019	5,877	12,541
Total	**137,728**	**50,408,378**	**4,130,793**	**4,006,373**	**4,221,892**	**4,216,747**	**4,208,701**	**4,234,663**	**4,360,182**	**4,466,719**	**4,289,033**	**4,289,226**	**3,967,153**	**4,016,896**
Days	**1**	**366**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**
Mean/day	**4,517**	**1,653,045**	**133,251**	**133,546**	**136,190**	**140,558**	**135,765**	**136,602**	**145,339**	**144,088**	**142,968**	**138,362**	**136,798**	**129,577**

Water Imports from Other Governerates and Private Wells 2008

Azraq	-	-												
Dulail	10,047	3,677,248	238,100	301,480	486,073	451,867	453,359	370,651	454,188	177,000	182,330	205,670	197,200	159,330
KABA City	-	-												
Tatweer	-	-												
Zarqa	-	-												
Awajan	-	-												
Russaifah	-	-												
North	-	-												
West - NorthWest	-	-												
Desert	-	-												
Total	**10,047**	**3,677,248**	**238,100**	**301,480**	**486,073**	**451,867**	**453,359**	**370,651**	**454,188**	**177,000**	**182,330**	**205,670**	**197,200**	**159,330**
Days	**1**	**366**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**
Mean/day	**329**	**120,554**	**7,681**	**10,049**	**15,680**	**15,062**	**14,624**	**11,956**	**15,140**	**5,710**	**6,078**	**6,635**	**6,800**	**5,140**

Water Exports

Azraq	1,987	727,207	58,179	62,560	45,590	26,040	45,760	54,710	44,200	62,990	59,040	87,580	85,308	95,250
Dulail	-	-												
Export to Amman: **KABA City**	2,545	931,513	113,464	49,005	130,061	108,815	83,818	80,820	72,947	63,287	60,709	64,091	50,533	53,963
Export to Amman: **Tatweer**	19,257	7,047,988	504,382	504,967	512,178	481,697	469,296	586,059	620,256	732,897	733,398	678,622	633,854	590,382
7,979,501 m3/d **Zarqa**	-	-												
Awajan	-	-												
Russaifah	-	-												
North	340	124,350	18,450	13,940	13,920	14,660	12,300	11,480	11,120	6,420	5,670	5,190	5,490	5,710
West - NorthWest	743	272,027	20,421	22,551	20,000	20,000	21,836	22,273	24,227	24,669	18,059	28,155	25,354	24,482
Desert	399	146,035	10,987	6,889	10,543	11,427	13,917	12,161	14,856	19,463	19,355	8,019	5,877	12,541
Total	**25,271**	**9,249,120**	**725,883**	**659,912**	**732,292**	**662,639**	**646,927**	**767,503**	**787,606**	**909,726**	**896,231**	**871,657**	**806,416**	**782,328**
Days	**1**	**366**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**
Mean/day	**829**	**303,385**	**23,416**	**21,997**	**23,622**	**22,088**	**20,869**	**24,758**	**26,254**	**29,346**	**29,874**	**28,118**	**27,807**	**25,236**

Nett System Input Volume - SIV (Production + Imports - Exports) - but excepting transfers between WS Sub-Regions

Azraq	44,388	16,245,930	1,375,480	1,334,389	1,379,033	1,358,130	1,364,361	1,334,422	1,348,627	1,420,678	1,341,496	1,357,936	1,255,220	1,376,158
Dulail	49,673	18,180,432	1,399,636	1,466,525	1,689,863	1,653,653	1,685,315	1,611,159	1,728,763	1,464,824	1,415,822	1,514,947	1,371,075	1,178,850
KABA City	4,253	1,556,555	68,386	111,229	54,115	73,668	97,541	103,893	149,513	154,728	175,407	164,856	201,628	201,591
Tatweer	- 19,257	- 7,047,988	- 504,382	- 504,967	- 512,178	- 481,697	- 469,296	- 586,059	- 620,256	- 732,897	- 733,398	- 678,622	- 633,854	- 590,382
Zarqa	12,264	4,488,601	408,944	312,395	434,941	434,525	434,306	432,930	380,077	358,007	332,459	327,911	299,713	332,393
Awajan	5,800	2,122,710	203,588	184,917	178,090	175,755	138,937	137,021	196,223	181,367	211,183	185,531	197,097	133,001
Russaifah	11,198	4,098,491	267,846	281,011	306,247	323,815	318,980	360,749	405,051	438,904	411,819	351,236	262,533	370,300
North	10,468	3,831,407	326,538	332,808	334,917	327,299	332,131	334,936	326,241	329,386	314,667	292,367	297,683	282,434
West - NorthWest	3,717	1,360,368	96,974	129,634	110,645	140,827	112,858	108,760	112,525	118,996	105,677	107,077	106,842	109,553
Desert	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**122,504**	**44,836,506**	**3,643,010**	**3,647,941**	**3,975,673**	**4,005,975**	**4,015,133**	**3,837,811**	**4,026,764**	**3,733,993**	**3,575,132**	**3,623,239**	**3,357,937**	**3,393,898**
Days	**1**	**366**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**
Mean/day	**4,017**	**1,470,213**	**117,516**	**121,598**	**128,248**	**133,533**	**129,520**	**123,800**	**134,225**	**120,451**	**119,171**	**116,879**	**115,791**	**109,481**

Water Production 5.

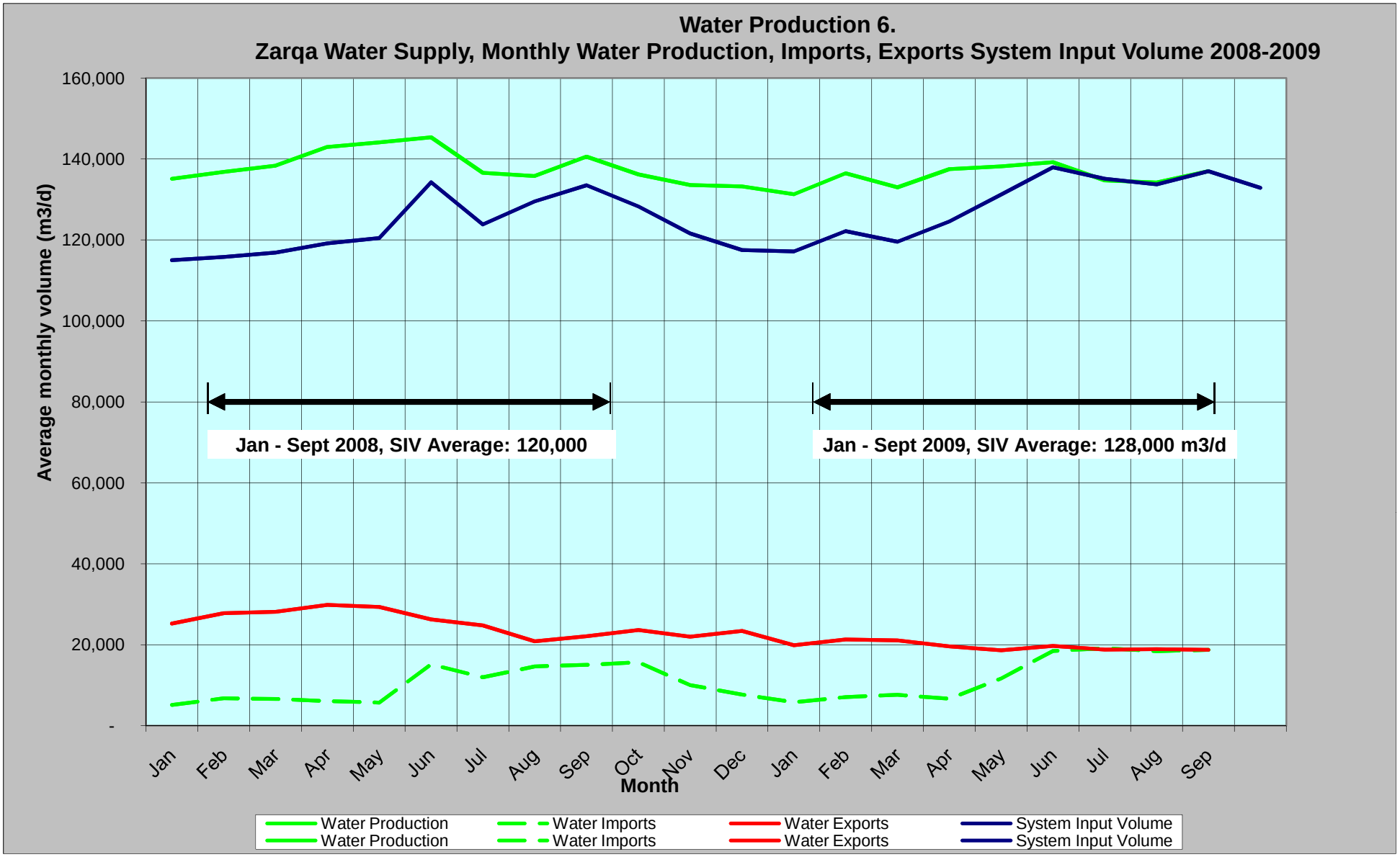
20445. Zarqa Water Supply Re-structuring and Rehabilitation

Water transfers to/from Russaifah WSA 2008

		2008											
Nett of Russaifah		**Dec**	**Nov**	**Oct**	**Sep**	**Aug**	**Jul**	**Jun**	**May**	**Apr**	**Mar**	**Feb**	**Jan**
Prod/mth m3	**46,307,501**	3,862,947	3,725,362	3,915,645	3,892,932	3,889,721	3,873,914	3,952,745	4,027,815	3,877,214	3,937,990	3,704,620	3,646,596
prod/hr av	**5,286**	5,192	5,174	5,263	5,407	5,228	5,207	5,490	5,414	5,385	5,293	5,513	4,901
SIV nett m3/mth	**35,178,864**	2,844,799	2,882,213	3,131,179	3,109,196	3,248,453	3,033,326	3,190,141	2,877,907	2,783,973	2,836,373	2,680,224	2,561,080
SIV nett m3/hr	**4,016**	3,824	4,003	4,209	4,318	4,366	4,077	4,431	3,868	3,867	3,812	3,851	3,442
from other gov	**3,677,248**	238,100	301,480	486,073	451,867	453,359	370,651	454,188	177,000	182,330	205,670	197,200	159,330
to Awj from Russ	**60,000**	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
from Awj to Russ	**4,998,640**	474,550	444,060	494,300	510,830	404,700	404,210	380,340	380,490	360,010	390,630	368,180	386,340
From KABA to Russ	**587,647**	60,815	45,657	48,947	67,134	48,000	44,526	52,546	41,692	24,330	50,000	52,000	52,000
to other gov	**9,279,598**	725,883	659,912	732,292	662,639	646,927	767,503	788,906	909,726	896,231	871,657	806,416	811,506
Russaifah													
Prod/mth m3	**4,098,491**	267,846	281,011	306,247	323,815	318,980	360,749	405,051	438,904	411,819	351,236	262,533	370,300
prod/hr av	**468**	360	390	412	450	429	485	563	590	572	472	391	498
SIV nett m3/mth	**9,624,778**	798,211	765,728	844,494	896,779	766,680	804,485	832,937	856,086	791,159	786,866	677,713	803,640
SIV nett m3/hr	**1,099**	1,073	1,064	1,135	1,246	1,030	1,081	1,157	1,151	1,099	1,058	974	1,080
from Awj to Russ	**4,998,640**	474,550	444,060	494,300	510,830	404,700	404,210	380,340	380,490	360,010	390,630	368,180	386,340
From KABA to Russ	**587,647**	60,815	45,657	48,947	67,134	48,000	44,526	52,546	41,692	24,330	50,000	52,000	52,000
to Awj from Russ	**60,000**	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Sum													
Prod/mth m3	**50,405,992**	4,130,793	4,006,373	4,221,892	4,216,747	4,208,701	4,234,663	4,357,796	4,466,719	4,289,033	4,289,226	3,967,153	4,016,896
prod/hr av	**5,754**	5,552	5,564	5,675	5,857	5,657	5,692	6,052	6,004	5,957	5,765	5,904	5,399
SIV nett m3/mth	**44,803,642**	3,643,010	3,647,941	3,975,673	4,005,975	4,015,133	3,837,811	4,023,078	3,733,993	3,575,132	3,623,239	3,357,937	3,364,720
SIV nett m3/hr	**5,115**	4,897	5,067	5,344	5,564	5,397	5,158	5,588	5,019	4,965	4,870	4,825	4,522
imports from other gov	**3,677,248**	238,100	301,480	486,073	451,867	453,359	370,651	454,188	177,000	182,330	205,670	197,200	159,330
exports to other gov	**9,279,598**	725,883	659,912	732,292	662,639	646,927	767,503	788,906	909,726	896,231	871,657	806,416	811,506

Nett Transfers between Russaifah and other WSA's - Positive number for inflow to Russaifah

530,365	484,717	538,247	572,964	447,700	443,736	427,886	417,182	379,340	435,630	415,180	433,340


Water Production 6.
Zarqa Water Supply, Monthly Water Production, Imports, Exports System Input Volume 2008-2009
Average monthly volume (m3/d)
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
-
Jan - Sept 2008, SIV Average: 120,000
Jan - Sept 2009, SIV Average: 128,000 m3/d
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Month
Water Production
Water Imports
Water Exports
System Input Volume
Water Production
Water Imports
Water Exports
System Input Volume

Water Production 7.

Water Production from Zarqa Wells in 2008 - 2009

Ref	Name (English)	2008 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2009 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
	Azraq Sum	1471408	1340528	1445516	1400536	1483668	1392827	1389132	1410121	1384170	1424623	1396949	1433659	1454568	1349502	1434812	1394231	1492325	1431052	1425315	1442298	1413705	1400709	1369690
	Corridor Sum	686160	672009	740048	716400	716657	687663	698982	699500	670248	687978	656611	629361	684516	600398	599652	663768	672127	648502	673942	674970	670717	692389	672553
	Hallabat Sum	333360	501866	569229	517092	571167	586912	541526	532456	531538	515812	508434	532175	511676	440005	504763	485937	473695	469962	452253	425295	510792	507200	448996
	Zarqa Sum	332393	299713	327911	332459	358007	380077	432930	434306	434525	434941	312395	408944	339262	333769	353490	308428	300425	292085	337377	375602	366641	370276	358094
	Tamween Sum	255554	252161	228947	236116	218015	222460	184713	181359	182483	184176	160234	181850	186987	184545	203195	211549	192836	227790	218826	231031	198739	209651	202022
	Awajan Sum	133001	197097	185531	211183	181367	196223	137021	138937	175755	178090	184917	203588	198085	184003	196731	209762	226205	207786	173841	147552	132597	59699	44082
AL1551	No.4	157713	125956	132909	120074	137857	130461	55824	26911	42362	58896	76989	82474	65788	81543	84161	81243	108060	89853	93336	71910	68807	78511	44302
AL1447	No.8	42430	5973	41827	41613	42901	25856	23745	22217	22143	23691	23800	26054	23432	27423	51543	49982	49010	36191	25178	24322	22963	21281	33344
	Basateen Sum	3671	38	4574	26252	13077	16965	17035	16094	14779	9839	106	0	0	0	0	0	24438	29307	20909	14559	16106	14884	15503
	Phosphorous Sum	16870	23881	27126	61073	72406	58106	56230	45798	40759	32652	25783	23058	19291	29264	80905	86245	73162	73211	68807	63969	59943	46324	47203
	Russaifah Sum	220684	20448	40172	57897	72671	71626	99143	105610	91917	89923	54851	46111	54260	48929	33539	33493	52781	63350	66231	58669	51242	47753	33288
AL1836	Hitteen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AL1352	Maqtab 2	100566	86237	104628	104910	99992	102037	108772	102350	111855	91246	99482	90149	77616	99774	95012	99938	98544	94910	96006	97183	92116	96160	93797
		541934	262533	351236	411819	438904	405051	360749	318980	323815	306247	281011	267846	240387	286933	345160	350901	405995	386822	370467	330612	311177	304913	267437
	Hashmeya Sum	268605	283687	277093	302703	305606	282953	287737	288424	287408	289060	280237	278312	273824	267659	282422	294106	305427	308156	321399	321906	304973	244611	195804
AL0600	Qunaya	19539	19486	20464	17634	30200	54408	58679	56007	54551	59777	66511	66676	64180	50794	52350	71390	76865	70380	69149	75239	67893	71630	69448
		288144	303173	297557	320337	335806	337361	346416	344431	341959	348837	346748	344988	338004	318453	334772	365496	382292	378536	390548	397145	372866	316241	265252
	Merhib Sum	78621	72138	58376	53496	58970	55299	57868	61829	90084	58341	78473	42768	62975	72955	79564	68569	79866	75234	79630	77639	78025	66981	77854
	Berein Sum	48902	48650	66924	61114	72399	70381	62996	62891	63095	64297	66607	67565	39222	34588	52671	51523	40917	43294	35514	44198	40659	38496	46265
AL3576	Um Rumanneh 2	53	4659	3277	2710	2404	2399	2427	2429	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AL0604	Sarout	3959	4251	4450	4217	5855	5499	4740	4793	4614	4771	4541	4611	935	706	3037	5012	4965	5249	5513	5584	5192	5144	4594
AL0610	Alouk	2500	2498	2205	2199	4037	3174	3002	2752	2999	3236	2564	2451	2221	2219	3162	3861	3178	2847	2686	2657	2793	2245	2524
		134035	132196	135232	123736	143665	136752	131033	134694	160827	130645	152185	117395	105353	110468	138434	128965	128926	126624	123343	130078	126669	112866	131237
F1063	Omari	662	194	621	461	449	547	353	340	345	335	370	618	33	48	99	1	0	0	0	0	0	0	0
F1155	Wadi Rutm	28	134	2	0	361	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F1175	Desert Abu Toseh	1378	1295	1453	1381	1583	1233	1200	1190	1204	1186	1199	1217	730	3146	2271	880	997	902	3235	125	493	501	5131
F1242	Wadi Ghudf	2131	1288	1795	1799	4768	2900	2604	2600	2283	2202	498	2775	3952	2402	2486	1141	1118	1121	1676	2027	1993	2005	1329
F1274	Wadi Butm	447	340	387	242	609	20	435	435	442	440	436	217	383	159	127	529	828	801	139	1	0	0	188
F1287	Army Retired	420	220	313	10358	941	1172	1136	1176	1176	1170	1164	1185	752	397	994	824	1076	903	792	818	503	501	910
F1303	Tal Hassan	503	425	371	988	1022	956	814	815	805	800	815	825	298	200	914	1267	614	601	2508	56	197	200	1254
J1000	Katafiat	2037	813	1048	1198	4762	2603	3145	2735	2254	1628	1501	1382	1738	1936	1660	556	2617	1514	609	627	500	501	746
J1008	Hazeem Ghumr	1198	234	10	2	117	536	431	435	445	435	411	326	399	244	251	251	200	200	200	200	198	201	3
J1009	Hazeem Dahek	1931	495	258	534	348	366	459	465	455	470	475	464	441	460	617	209	200	200	735	392	202	200	293
J3029	Haside	1806	439	1761	2392	4503	4523	1584	3726	2018	1877	20	1978	1878	3609	1910	693	550	501	748	1979	1502	1503	367
		12541	5877	8019	19355	19463	14856	12161	13917	11427	10543	6889	10987	10604	12601	11329	6351	8200	6743	10642	6225	5588	5612	10221
	Total m3/month	4188530	3967153	4289226	4289033	4466719	4360182	4234663	4208701	4216747	4221892	4006373	4130793	4069442	3820677	4122338	4125388	4283026	4175902	4176554	4160808	4109491	3979556	3769584
Days		31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30
Total	**m3/d**	135,114	136,798	138,362	142,968	144,088	145,339	136,602	135,765	140,558	136,190	133,546	133,251	131,272	136,453	132,979	137,513	138,162	139,197	134,728	134,220	136,983	128,373	125,653

Water Imports from Other Governerates and Private Wells

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Mari Zahran to Corridor	0	0	0	0	0	112735	101494	110100	113976	124540	44543	0	0	0	0	0	75716	94670	114389	114411	114520	119985	119070
Mohamad Hameidi to Corridor	0	0	0	0	0	104088	87832	72739	93091	108376	41274	0	0	0	0	0	47673	85968	102436	92586	79740	73870	81500
Tahatal Well to Corridor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53258	50000	80592	84220	85260	90205
Harzallah to Hallabat	0	0	0	0	0	65765	60125	52320	57700	63757	14563	0	0	0	0	0	47174	49613	61556	64445	64485	63153	63243
Zatari to Mafraq	159330	197200	205670	182330	177000	171600	121200	218200	187100	189400	201100	238100	180100	197200	236000	200000	192000	176000	175030	127970	127970	160000	170000
Zatari to Hashmeya University	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94850	90700	91000	90860	88980	89290
Total	159330	197200	205670	182330	177000	454188	370651	453359	451867	486073	301480	238100	180100	197200	236000	200000	362563	554359	594111	571004	561795	591248	613308
Days	31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30
Total m3/d	5,140	6,800	6,635	6,078	5,710	15,140	11,956	14,624	15,062	15,680	10,049	7,681	5,810	7,043	7,613	6,667	11,696	18,479	19,165	18,419	18,727	19,073	20,444

Water Exports

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
hmeya Nature Reserve from Azraq pipeline	95250	85308	87580	59040	62990	44200	54710	45760	26040	45590	62560	58179	47151	38582	37848	35720	35173	60447	42030	29400	26540	
Discharge from Desalination Plant	53963	50533	64091	60709	63287	72947	80820	83818	108815	130061	49005	113464	60482	83879	103800	84968	56975	51585	54347	60152	83501	
Wash Out	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	53963	**50533**	**64091**	**60709**	**63287**	**72947**	**80820**	**83818**	**108815**	**130061**	**49005**	**113464**	**60482**	**83879**	**103800**	**84968**	**56975**	**51585**	**54347**	**60152**	**83501**	
Khaw to Amman + Tamween	590382	633854	678622	733398	732897	620256	586059	469296	481697	512178	504967	504382	465054	429326	465366	425046	441086	430994	439604	451315	406972	431258
Mafraq from Qunaya	5710	5490	5190	5670	6420	11120	11480	12300	14660	13920	13940	18450	11530	12560	13560	16970	16180	19360	16010	18760	18370	
Jerash from Um Rumanneh	18000	18000	18000	15000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000	18000
Balqa from Um Rumanneh	6482	7354	10155	3059	6669	6227	4273	3836	2000	2000	4551	2421	3860	2417	2952	1750	1096	4947	2424	1984	3212	2776
	24482	**25354**	**28155**	**18059**	**24669**	**24227**	**22273**	**21836**	**20000**	**20000**	**22551**	**20421**	**21860**	**20417**	**20952**	**19750**	**19096**	**22947**	**20424**	**19984**	**21212**	**20776**
From Desert Wells to Animal Watering	12541	5877	8019	19355	19463	14856	12161	13917	11427	10543	6889	10987	10604	12601	11329	6351	8200	6743	10642	6225	5588	
Total	782328	806416	871657	896231	909726	787606	767503	646927	662639	732292	659912	725883	616681	597365	652855	588805	576710	592076	583057	585836	562183	452034
Days	31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31
Total m3/d	25,236	27,807	28,118	29,874	29,346	26,254	24,758	20,869	22,088	23,622	21,997	23,416	19,893	21,334	21,060	19,627	18,604	19,736	18,808	18,898	18,739	14,582

Nett System Input (Production + Imports - Exports)

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Total	3565532	3357937	3623239	3575132	3733993	4026764	3837811	4015133	4005975	3975673	3647941	3643010	3632861	3420512	3705483	3736583	4068879	4138185	4187608	4145976	4109103	4118770
Days	31	29	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31
Total m3/d	115,017	115,791	116,879	119,171	120,451	134,225	123,800	129,520	133,533	128,248	121,598	117,516	117,189	122,161	119,532	124,553	131,254	137,940	135,084	133,741	136,970	132,864

Water Production 8.

Water Production from Zarqa Wells in 2008

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total 2008 m3pa	Av 2008 m3/day	Nearest WSA to Source
1,471,408	1,340,528	1,445,516	1,400,536	1,483,668	1,392,827	1,389,132	1,410,121	1,384,170	1,424,623	1,396,949	1,433,659	16,973,137	46,375	**Azraq**
1,019,520	1,173,875	1,309,277	1,233,492	1,287,824	1,274,575	1,240,508	1,231,956	1,201,786	1,203,790	1,165,045	1,161,536	14,503,184	39,626	**Dulail**
255,554	252,161	228,947	236,116	218,015	222,460	184,713	181,359	182,483	184,176	160,234	181,850	2,488,068	6,798	**KABA City**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Tatweer**
332,393	299,713	327,911	332,459	358,007	380,077	432,930	434,306	434,525	434,941	312,395	408,944	4,488,601	12,264	**Zarqa**
133,001	197,097	185,531	211,183	181,367	196,223	137,021	138,937	175,755	178,090	184,917	203,588	2,122,710	5,800	**Awajan**
370,300	262,533	351,236	411,819	438,904	405,051	360,749	318,980	323,815	306,247	281,011	267,846	4,098,491	11,198	**Russaifah**
288,144	303,173	297,557	320,337	335,806	337,361	346,416	344,431	341,959	348,837	346,748	344,988	3,955,757	10,808	**North**
134,035	132,196	135,232	123,736	143,665	136,752	131,033	134,694	160,827	130,645	152,185	117,395	1,632,395	4,460	**West - NorthWest**
12,541	5,877	8,019	19,355	19,463	14,856	12,161	13,917	11,427	10,543	6,889	10,987	146,035	399	**Desert**
4,016,896	**3,967,153**	**4,289,226**	**4,289,033**	**4,466,719**	**4,360,182**	**4,234,663**	**4,208,701**	**4,216,747**	**4,221,892**	**4,006,373**	**4,130,793**	**50,408,378**	**137,728**	**Total**
31	**29**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**366**	**1**	**Days**
129,577	**136,798**	**138,362**	**142,968**	**144,088**	**145,339**	**136,602**	**135,765**	**140,558**	**136,190**	**133,546**	**133,251**	**137,728**	**137,728**	**Mean/day**

Water Imports from Other Governerates and Private Wells 2008

												-	-	**Azraq**
159,330	197,200	205,670	182,330	177,000	454,188	370,651	453,359	451,867	486,073	301,480	238,100	3,677,248	10,047	**Dulail**
												-	-	**KABA City**
												-	-	**Tatweer**
												-	-	**Zarqa**
												-	-	**Awajan**
												-	-	**Russaifah**
												-	-	**North**
												-	-	**West - NorthWest**
												-	-	**Desert**
159,330	**197,200**	**205,670**	**182,330**	**177,000**	**454,188**	**370,651**	**453,359**	**451,867**	**486,073**	**301,480**	**238,100**	**3,677,248**	**10,047**	**Total**
31	**29**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**366**	**1**	**Days**
5,140	**6,800**	**6,635**	**6,078**	**5,710**	**15,140**	**11,956**	**14,624**	**15,062**	**15,680**	**10,049**	**7,681**	**10,047**	**10,047**	**Mean/day**

Imports 2008 m3/d

3045.86885	Corridor	to
858.551913	Hallabat	to
6142.70492	Zatari	from
10047.1257		sum (Dulail

Additional Major New I
from Zatari
New University m3/d 2
2946.60131

Water Exports

95,250	85,308	87,580	59,040	62,990	44,200	54,710	45,760	26,040	45,590	62,560	58,179	727,207	1,987	**Azraq**
												-	-	**Dulail**
53,963	50,533	64,091	60,709	63,287	72,947	80,820	83,818	108,815	130,061	49,005	113,464	931,513	2,545	**Wash-out at Zarqa**
590,382	633,854	678,622	733,398	732,897	620,256	586,059	469,296	481,697	512,178	504,967	504,382	7,047,988	19,257	**Tatweer**
												-	-	**Zarqa**
												-	-	**Awajan**
												-	-	**Russaifah**
5,710	5,490	5,190	5,670	6,420	11,120	11,480	12,300	14,660	13,920	13,940	18,450	124,350	340	**North to Mafraq from Qunaya**
24,482	25,354	28,155	18,059	24,669	24,227	22,273	21,836	20,000	20,000	22,551	20,421	272,027	743	**West - Jerash and Balqa from Um Rumanneh**
12,541	5,877	8,019	19,355	19,463	14,856	12,161	13,917	11,427	10,543	6,889	10,987	146,035	399	**Desert**
782,328	**806,416**	**871,657**	**896,231**	**909,726**	**787,606**	**767,503**	**646,927**	**662,639**	**732,292**	**659,912**	**725,883**	**9,249,120**	**25,271**	**Total**
31	**29**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**366**	**1**	**Days**
25,236	**27,807**	**28,118**	**29,874**	**29,346**	**26,254**	**24,758**	**20,869**	**22,088**	**23,622**	**21,997**	**23,416**	**25,271**	**25,271**	**Mean/day**

Export to Amman:

Jerash	581.967213
Balqa	161.275956
West sum	743.243169

Nett System Input Volume - SIV (Production + Imports - Exports) - but excepting transfers between WS Sub-Regions

1,376,158	1,255,220	1,357,936	1,341,496	1,420,678	1,348,627	1,334,422	1,364,361	1,358,130	1,379,033	1,334,389	1,375,480	16,245,930	44,388	**Azraq**
1,178,850	1,371,075	1,514,947	1,415,822	1,464,824	1,728,763	1,611,159	1,685,315	1,653,653	1,689,863	1,466,525	1,399,636	18,180,432	49,673	**Dulail**
201,591	201,628	164,856	175,407	154,728	149,513	103,893	97,541	73,668	54,115	111,229	68,386	1,556,555	4,253	**KABA City**
- 590,382	- 633,854	- 678,622	- 733,398	- 732,897	- 620,256	- 586,059	- 469,296	- 481,697	- 512,178	- 504,967	- 504,382	- 7,047,988	- 19,257	**Tatweer**
332,393	299,713	327,911	332,459	358,007	380,077	432,930	434,306	434,525	434,941	312,395	408,944	4,488,601	12,264	**Zarqa**
133,001	197,097	185,531	211,183	181,367	196,223	137,021	138,937	175,755	178,090	184,917	203,588	2,122,710	5,800	**Awajan**
370,300	262,533	351,236	411,819	438,904	405,051	360,749	318,980	323,815	306,247	281,011	267,846	4,098,491	11,198	**Russaifah**
282,434	297,683	292,367	314,667	329,386	326,241	334,936	332,131	327,299	334,917	332,808	326,538	3,831,407	10,468	**North**
109,553	106,842	107,077	105,677	118,996	112,525	108,760	112,858	140,827	110,645	129,634	96,974	1,360,368	3,717	**West - NorthWest**
-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Desert**
3,393,898	**3,357,937**	**3,623,239**	**3,575,132**	**3,733,993**	**4,026,764**	**3,837,811**	**4,015,133**	**4,005,975**	**3,975,673**	**3,647,941**	**3,643,010**	**44,836,506**	**122,504**	**Total**
31	**29**	**31**	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**366**	**1**	**Days**
109,481	**115,791**	**116,879**	**119,171**	**120,451**	**134,225**	**123,800**	**129,520**	**133,533**	**128,248**	**121,598**	**117,516**	**122,504**	**122,504**	**Mean/day**

Water Production 9

20445. Zarqa Water Supply Re-structuring and
Water transfers to/from Russaifah WSA 2008

2008													
Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		**Nett of Russaifah**
3,646,596	3,704,620	3,937,990	3,877,214	4,027,815	3,952,745	3,873,914	3,889,721	3,892,932	3,915,645	3,725,362	3,862,947	**46,307,501**	Prod/mth m3
4,901	5,513	5,293	5,385	5,414	5,490	5,207	5,228	5,407	5,263	5,174	5,192	**5,286**	prod/hr av
2,561,080	2,680,224	2,836,373	2,783,973	2,877,907	3,190,141	3,033,326	3,248,453	3,109,196	3,131,179	2,882,213	2,844,799	**35,178,864**	SIV nett m3/mth
3,442	3,851	3,812	3,867	3,868	4,431	4,077	4,366	4,318	4,209	4,003	3,824	**4,016**	SIV nett m3/hr
159,330	197,200	205,670	182,330	177,000	454,188	370,651	453,359	451,867	486,073	301,480	238,100	**3,677,248**	from other gov
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	**60,000**	to Awj from Russ
386,340	368,180	390,630	360,010	380,490	380,340	404,210	404,700	510,830	494,300	444,060	474,550	**4,998,640**	from Awj to Russ
52,000	52,000	50,000	24,330	41,692	52,546	44,526	48,000	67,134	48,947	45,657	60,815	**587,647**	From KABA to Russ
811,506	806,416	871,657	896,231	909,726	788,906	767,503	646,927	662,639	732,292	659,912	725,883	**9,279,598**	to other gov
													Russaifah
370,300	262,533	351,236	411,819	438,904	405,051	360,749	318,980	323,815	306,247	281,011	267,846	**4,098,491**	Prod/mth m3
498	391	472	572	590	563	485	429	450	412	390	360	**468**	prod/hr av
803,640	677,713	786,866	791,159	856,086	832,937	804,485	766,680	896,779	844,494	765,728	798,211	**9,624,778**	SIV nett m3/mth
1,080	974	1,058	1,099	1,151	1,157	1,081	1,030	1,246	1,135	1,064	1,073	**1,099**	SIV nett m3/hr
386,340	368,180	390,630	360,010	380,490	380,340	404,210	404,700	510,830	494,300	444,060	474,550	**4,998,640**	from Awj to Russ
52,000	52,000	50,000	24,330	41,692	52,546	44,526	48,000	67,134	48,947	45,657	60,815	**587,647**	From KABA to Russ
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	**60,000**	to Awj from Russ
													Sum
4,016,896	3,967,153	4,289,226	4,289,033	4,466,719	4,357,796	4,234,663	4,208,701	4,216,747	4,221,892	4,006,373	4,130,793	**50,405,992**	Prod/mth m3
5,399	5,904	5,765	5,957	6,004	6,052	5,692	5,657	5,857	5,675	5,564	5,552	**5,754**	prod/hr av
3,364,720	3,357,937	3,623,239	3,575,132	3,733,993	4,023,078	3,837,811	4,015,133	4,005,975	3,975,673	3,647,941	3,643,010	**44,803,642**	SIV nett m3/mth
4,522	4,825	4,870	4,965	5,019	5,588	5,158	5,397	5,564	5,344	5,067	4,897	**5,115**	SIV nett m3/hr
159,330	197,200	205,670	182,330	177,000	454,188	370,651	453,359	451,867	486,073	301,480	238,100	**3,677,248**	imports from other gov
811,506	806,416	871,657	896,231	909,726	788,906	767,503	646,927	662,639	732,292	659,912	725,883	**9,279,598**	exports to other gov

Nett Transfers between Russaifah and other W

433,340	415,180	435,630	379,340	417,182	427,886	443,736	447,700	572,964	538,247	484,717	530,365

Positive number for inflow to Russaifah-

Zarqa Nett production =	
Production - Plant Discharge/Washout	
m3/d	m3pa
9,719	3,557,088

Water Production 10.
Water Production from Zarqa Wells in 2008 - 2009

2008

ad m3/d	Total m3	Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name (English)	Ref
46,375	16,973,137	**1433659**	**1396949**	**1424623**	**1384170**	**1410121**	**1389132**	**1392827**	**1483668**	**1400536**	**1445516**	**1340528**	**1471408**	Azraq Sum	
22,573	8,261,617	**629361**	**656611**	**687978**	**670248**	**699500**	**698982**	**687663**	**716657**	**716400**	**740048**	**672009**	**686160**	Corridor Sum	
17,053	6,241,567	**532175**	**508434**	**515812**	**531538**	**532456**	**541526**	**586912**	**571167**	**517092**	**569229**	**501866**	**333360**	Hallabat Sum	
12,264	4,488,601	**408944**	**312395**	**434941**	**434525**	**434306**	**432930**	**380077**	**358007**	**332459**	**327911**	**299713**	**332393**	Zarqa Sum	
6,798	2,488,068	**181850**	**160234**	**184176**	**182483**	**181359**	**184713**	**222460**	**218015**	**236116**	**228947**	**252161**	**255554**	**Tamween Sum**	
5,800	2,122,710	**203588**	**184917**	**178090**	**175755**	**138937**	**137021**	**196223**	**181367**	**211183**	**185531**	**197097**	**133001**	Awajan Sum	
-	-														
3,138	1,148,426	82474	76989	58896	42362	26911	55824	130461	137857	120074	132909	125956	157713	No.4	AL1551
935	342,250	26054	23800	23691	22143	22217	23745	25856	42901	41613	41827	5973	42430	No.8	AL1447
335	122,430	0	106	9839	14779	16094	17035	16965	13077	26252	4574	38	3671	Basateen Sum	
1,322	483,742	23058	25783	32652	40759	45798	56230	58106	72406	61073	27126	23881	16870	Phosphorous Sum	
2,184	799,419	**46111**	**54851**	**89923**	**91917**	**105610**	**99143**	**71626**	**72671**	**57897**	**40172**	**20448**	**49050**	**Russaifah Sum**	
-	-	0	0	0	0	0	0	0	0	0	0	0	0	Hitteen	AL1836
3,285	1,202,224	90149	99482	91246	111855	102350	108772	102037	99992	104910	104628	86237	100566	Maqtab 2	AL1352
11,198	4,098,491	**267846**	**281011**	**306247**	**323815**	**318980**	**360749**	**405051**	**438904**	**411819**	**351236**	**262533**	**370300**		
-	-														
9,377	3,431,825	278312	280237	289060	287408	288424	287737	282953	305606	302703	277093	283687	268605	Hashmeya Sum	
1,432	523,932	66676	66511	59777	54551	56007	58679	54408	30200	17634	20464	19486	19539	Qunaya	AL0600
10,808	3,955,757	**344988**	**346748**	**348837**	**341959**	**344431**	**346416**	**337361**	**335806**	**320337**	**297557**	**303173**	**288144**		
-	-														
2,094	766,263	42768	78473	58341	90084	61829	57868	55299	58970	53496	58376	72138	78621	Merhib Sum	
2,065	755,821	67565	66607	64297	63095	62891	62996	70381	72399	61114	66924	48650	48902	Berein Sum	
56	20,393	0	0	0	35	2429	2427	2399	2404	2710	3277	4659	53	Um Rumanneh 2	AL3576
154	56,301	4611	4541	4771	4614	4793	4740	5499	5855	4217	4450	4251	3959	Sarout	AL0604
92	33,617	2451	2564	3236	2999	2752	3002	3174	4037	2199	2205	2498	2500	Alouk	AL0610
4,460	1,632,395	**117395**	**152185**	**130645**	**160827**	**134694**	**131033**	**136752**	**143665**	**123736**	**135232**	**132196**	**134035**		
-	-														
14	5,295	618	370	335	345	340	353	547	449	461	621	194	662	Omari	F1063
1	525	0	0	0	0	0	0	0	361	0	2	134	28	Wadi Rutm	F1155
42	15,519	1217	1199	1186	1204	1190	1200	1233	1583	1381	1453	1295	1378	Desert Abu Toseh	F1175
76	27,643	2775	498	2202	2283	2600	2604	2900	4768	1799	1795	1288	2131	Wadi Ghudf	F1242
12	4,450	217	436	440	442	435	435	20	609	242	387	340	447	Wadi Butm	F1274
56	20,431	1185	1164	1170	1176	1176	1136	1172	941	10358	313	220	420	Army Retired	F1287
25	9,139	825	815	800	805	815	814	956	1022	988	371	425	503	Tal Hassan	F1303
69	25,106	1382	1501	1628	2254	2735	3145	2603	4762	1198	1048	813	2037	Katafiat	J1000
13	4,580	326	411	435	445	435	431	536	117	2	10	234	1198	Hazeem Ghumr	J1008
18	6,720	464	475	470	455	465	459	366	348	534	258	495	1931	Hazeem Dahek	J1009
73	26,627	1978	20	1877	2018	3726	1584	4523	4503	2392	1761	439	1806	Haside	J3029
399	146,035	**10987**	**6889**	**10543**	**11427**	**13917**	**12161**	**14856**	**19463**	**19355**	**8019**	**5877**	**12541**		
		4130793	**4006373**	**4221892**	**4216747**	**4208701**	**4234663**	**4360182**	**4466719**	**4289033**	**4289226**	**3967153**	**4016896**		**Total m3/month**
		31	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
		133,251	**133,546**	**136,190**	**140,558**	**135,765**	**136,602**	**145,339**	**144,088**	**142,968**	**138,362**	**136,798**	**129,577**	**m3/d**	**Total**

Water Imports from Other Governerates and Private Wells

		Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name	
1,660	607,388	0	44543	124540	113976	110100	101494	112735	0	0	0	0	0	**Mari Zahran to Corridor**	
1,386	507,400	0	41274	108376	93091	72739	87832	104088	0	0	0	0	0	**Mohamad Hameidi to Corridor**	
-	-	0	0	0	0	0	0	0	0	0	0	0	0	**Tahatal Well to Corridor**	
859	314,230	0	14563	63757	57700	52320	60125	65765	0	0	0	0	0	**Harzallah to Hallabat**	
6,143	2,248,230	238100	201100	189400	187100	218200	121200	171600	177000	182330	205670	197200	159330	**Zatari to Mafraq**	
-	-	0	0	0	0	0	0	0	0	0	0	0	0	**Zatari to Hashmeya University**	
		238100	**301480**	**486073**	**451867**	**453359**	**370651**	**454188**	**177000**	**182330**	**205670**	**197200**	**159330**		**Total**
		31	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
		7,681	**10,049**	**15,680**	**15,062**	**14,624**	**11,956**	**15,140**	**5,710**	**6,078**	**6,635**	**6,800**	**5,140**	**m3/d**	**Total**

Water Exports

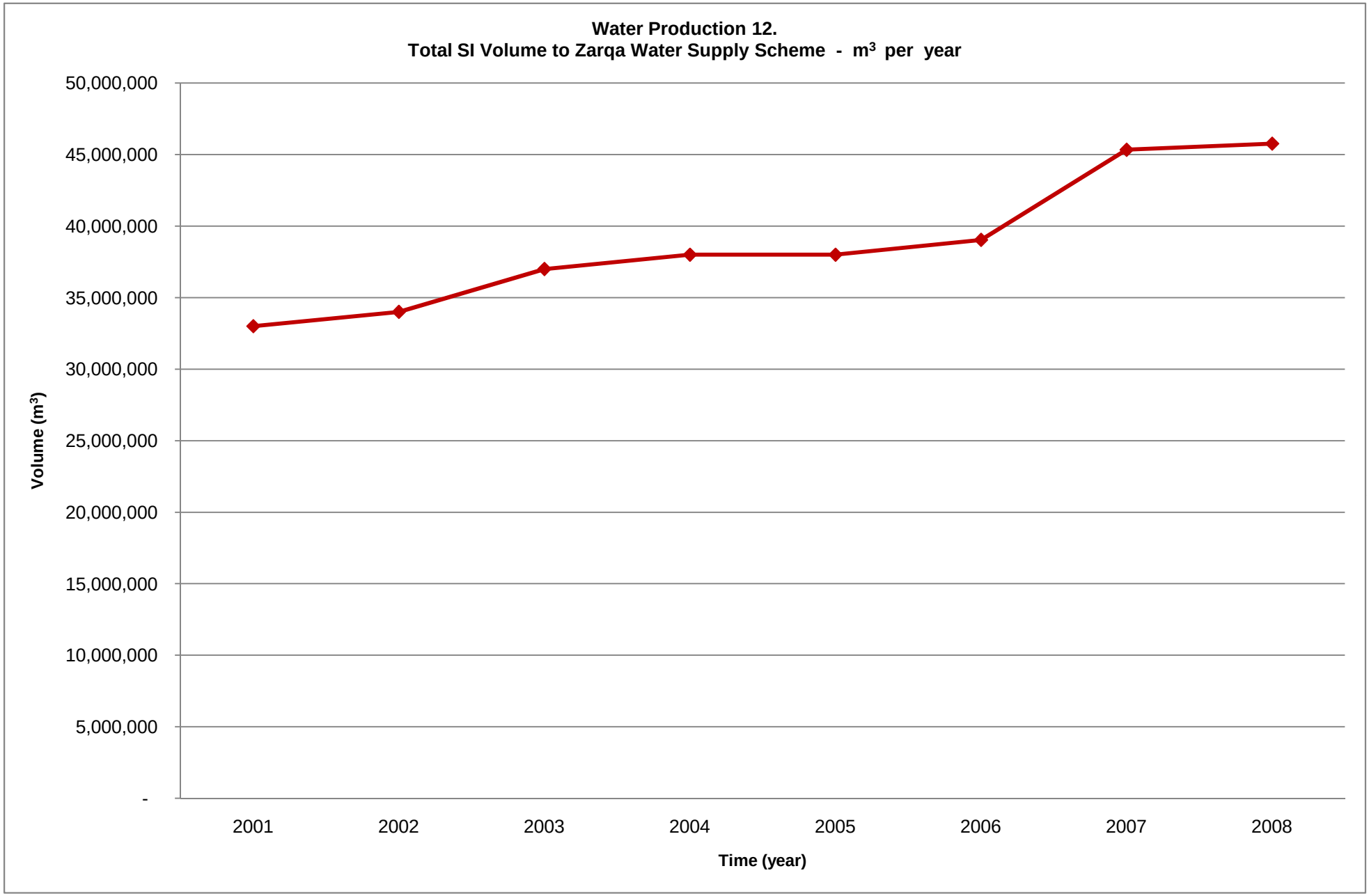
		Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name
1,987	727,207	58179	62560	45590	26040	45760	54710	44200	62990	59040	87580	85308	95250	**ahmeya Nature Reserve from Azraq pipeline**
-	-													
2,545	931,513	113464	49005	130061	108815	83818	80820	72947	63287	60709	64091	50533	53963	**Discharge from Desalination Plant**
-	-	0	0	0	0	0	0	0	0	0	0	0	0	**Wash Out**
2,545	931,513	**113464**	**49005**	**130061**	**108815**	**83818**	**80820**	**72947**	**63287**	**60709**	**64091**	**50533**	**53963**	
-	-													
19,257	7,047,988	504382	504967	512178	481697	469296	586059	620256	732897	733398	678622	633854	590382	**Khaw to Amman + Tamween**
-	-													
-	-													
340	124,350	18450	13940	13920	14660	12300	11480	11120	6420	5670	5190	5490	5710	**Mafraq from Qunaya**
-	-													
582	213,000	18000	18000	18000	18000	18000	18000	18000	18000	15000	18000	18000	18000	**Jerash from Um Rumanneh**
161	59,027	2421	4551	2000	2000	3836	4273	6227	6669	3059	10155	7354	6482	**Balqa from Um Rumanneh**
743	272,027	**20421**	**22551**	**20000**	**20000**	**21836**	**22273**	**24227**	**24669**	**18059**	**28155**	**25354**	**24482**	
-	-													
399	146,035	10987	6889	10543	11427	13917	12161	14856	19463	19355	8019	5877	12541	**From Desert Wells to Animal Watering**
		725883	**659912**	**732292**	**662639**	**646927**	**767503**	**787606**	**909726**	**896231**	**871657**	**806416**	**782328**	**Total**
		31	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**	**Days**
		23,416	**21,997**	**23,622**	**22,088**	**20,869**	**24,758**	**26,254**	**29,346**	**29,874**	**28,118**	**27,807**	**25,236**	**m3/d**	**Total**

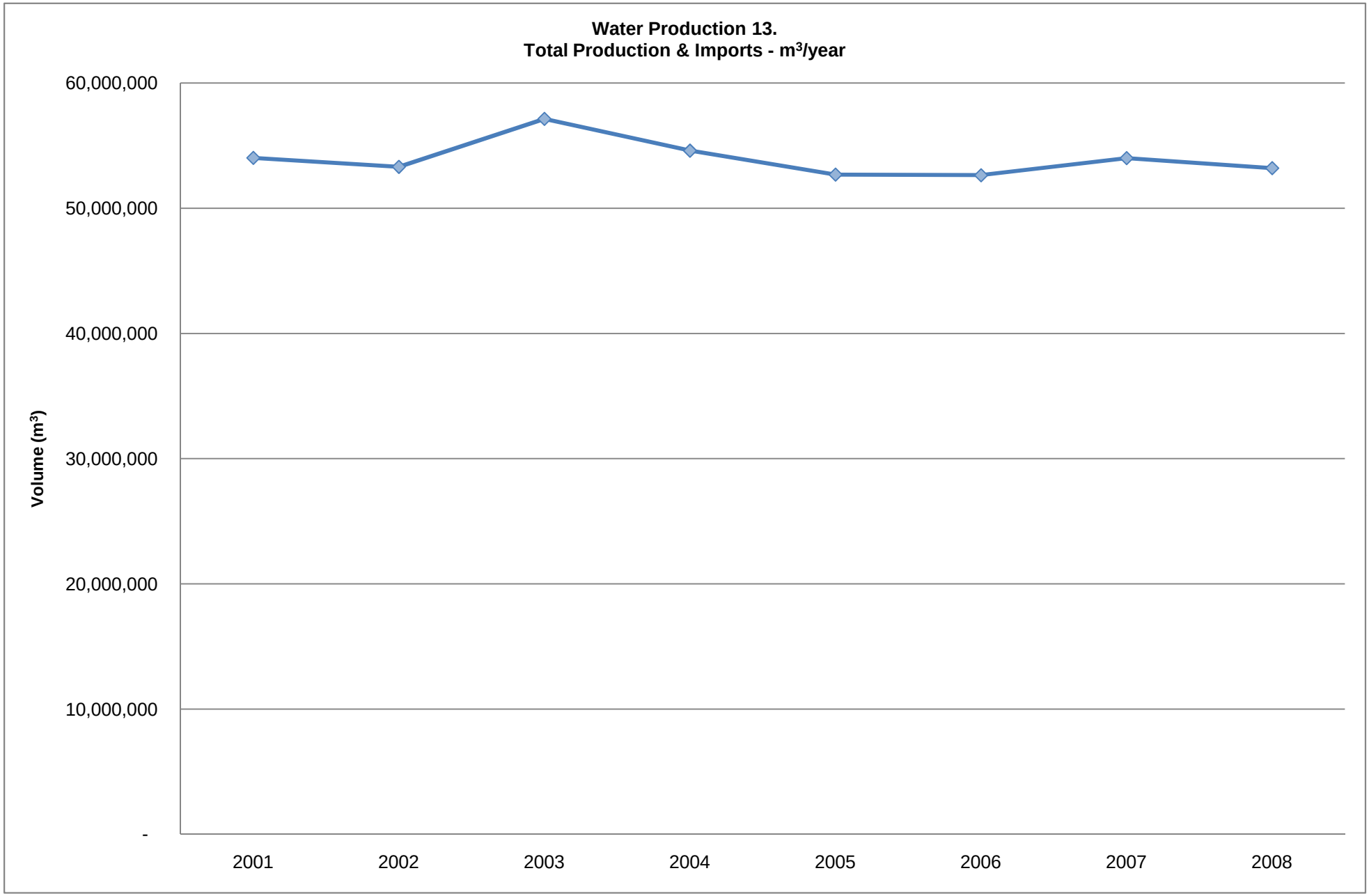
Nett System Input (Production + Imports - Exports)

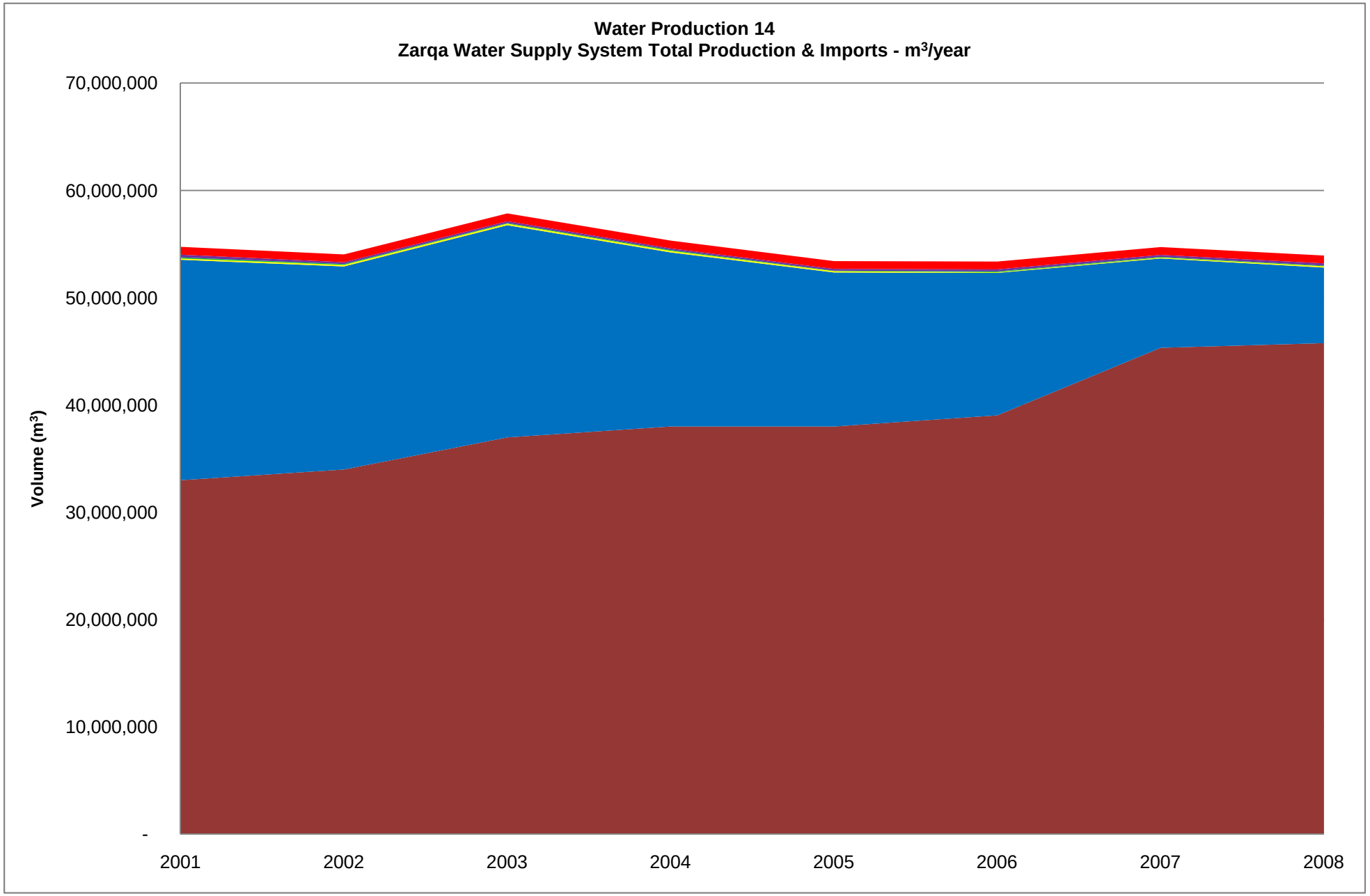
Dec	Nov	Oct	Sep	Aug	Jul	Jun	May	Apr	Mar	Feb	Jan	Name	
3643010	**3647941**	**3975673**	**4005975**	**4015133**	**3837811**	**4026764**	**3733993**	**3575132**	**3623239**	**3357937**	**3393898**		**Total**
31	**30**	**31**	**30**	**31**	**31**	**30**	**31**	**30**	**31**	**29**	**31**		**Days**
117,516	**121,598**	**128,248**	**133,533**	**129,520**	**123,800**	**134,225**	**120,451**	**119,171**	**116,879**	**115,791**	**109,481**	**m3/d**	**Total**

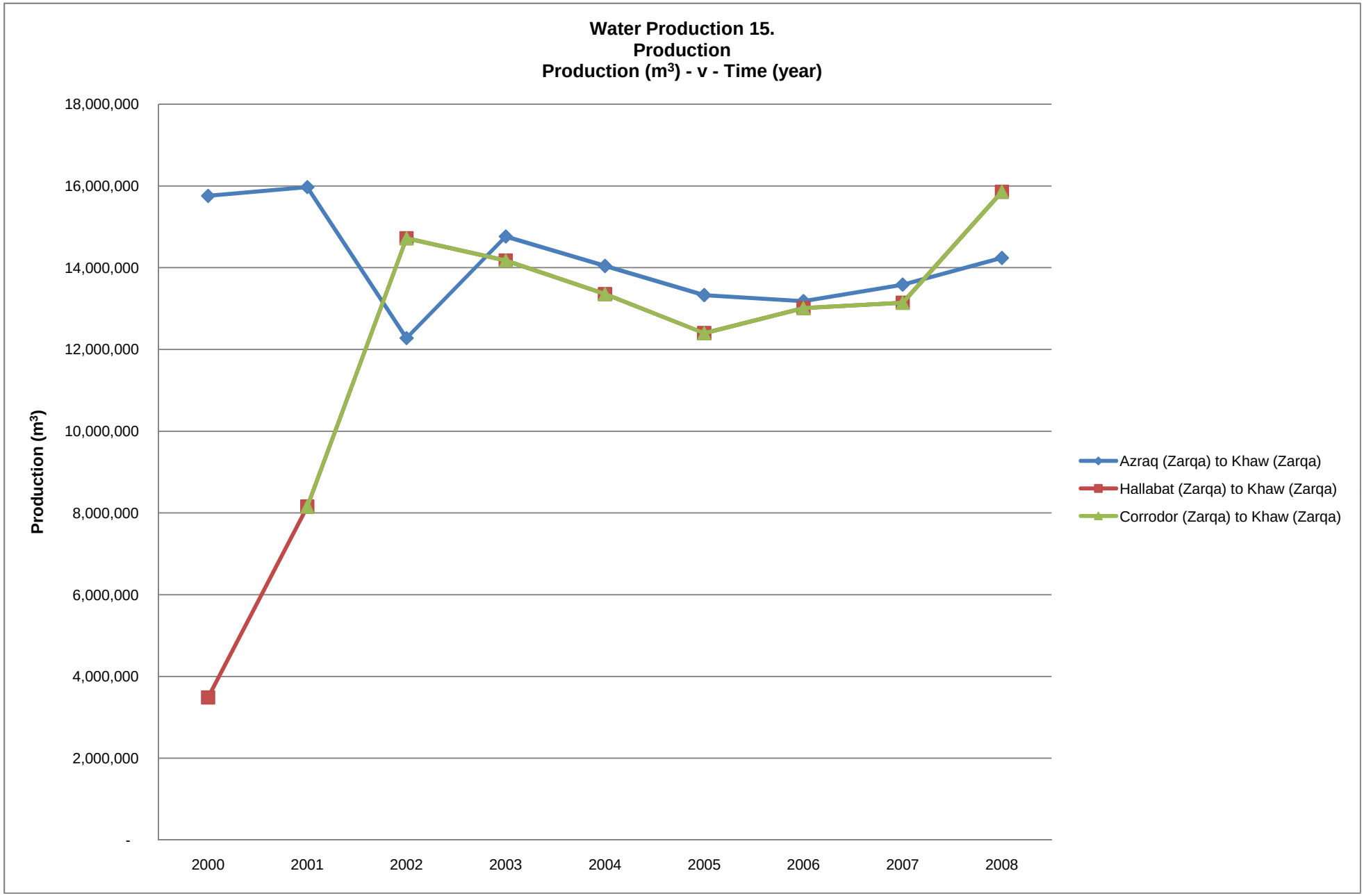
Water Production 11.
20445 - Bulk water transfer amoung Jordans governorates over 2001 - 2008

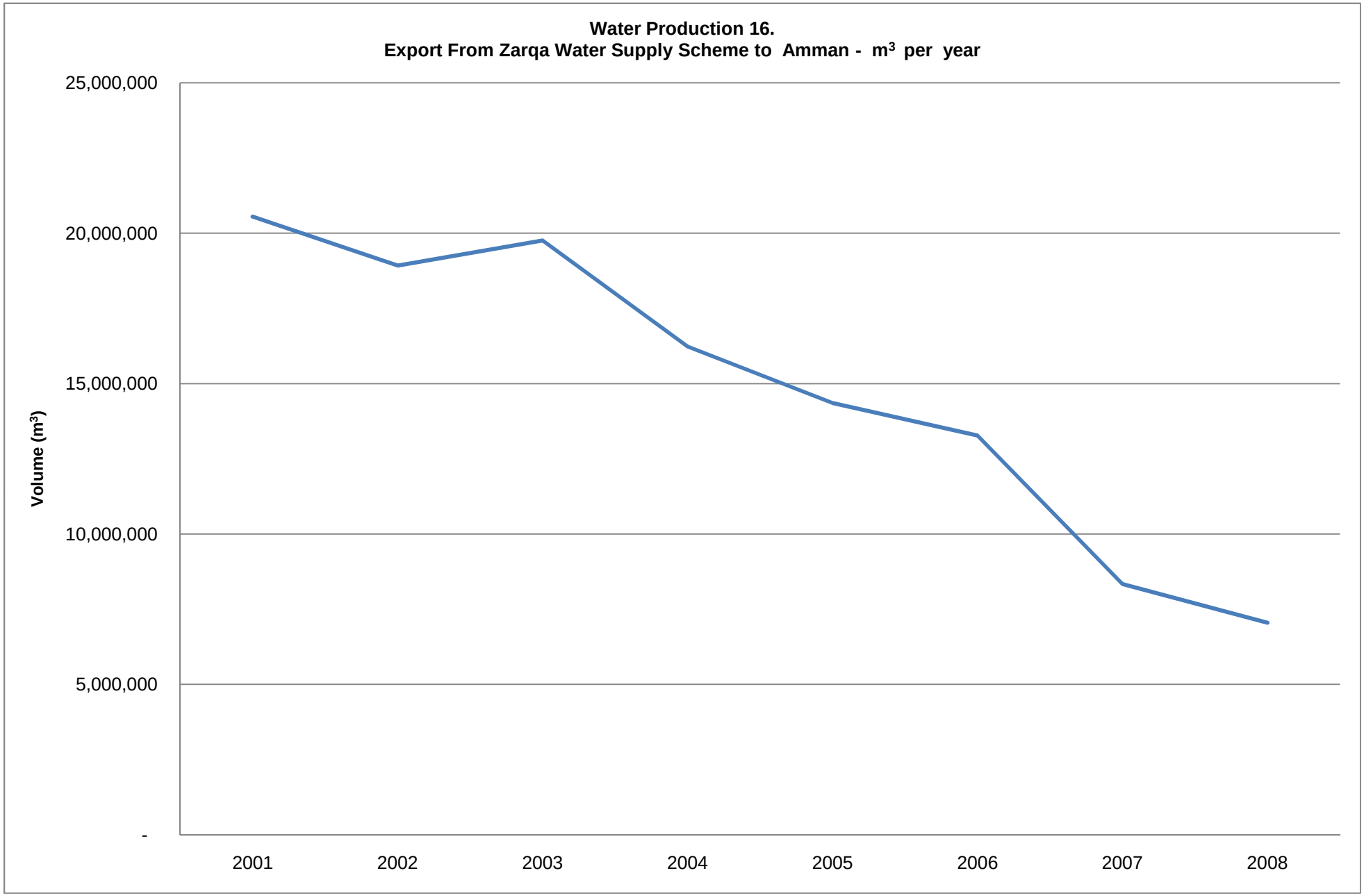
	Description from	2000	2001	2002	2003	2004	2005	2006	2007	2008
Import	Za'atari (Mafraq) to Khaw (Zarqa)	15,319,579	13,923,955	12,297,186	11,200,830	9,864,861	8,621,172	7,096,568	4,217,057	2,248,230
Production	Azraq (Zarqa) to Khaw (Zarqa)	15,759,260	15,972,985	12,277,270	14,765,880	14,043,990	13,328,758	13,183,030	13,585,716	14,240,022
Production	Hallabat (Zarqa) to Khaw (Zarqa)	3,487,750	8,157,568	14,719,246	14,175,870	13,356,440	12,400,070	13,012,550	13,142,318	15,856,496
Production	Corrodor (Zarqa) to Khaw (Zarqa)		8,157,568	14,719,246	14,175,870	13,356,440	12,400,070	13,012,550	13,142,318	15,856,496
Export	Khaw (Zarqa) to Amman	18,704,217	20,547,296	18,924,275	19,761,615	16,231,750	14,356,079	13,274,663	8,331,868	7,047,988
Circulation	Khaw (Zarqa) to Zarqa	15,624,002	17,384,366	17,857,404	17,158,149	17,769,860	17,214,770	17,720,782	20,154,444	23,531,779
Export	Zarqa to Mafraq	219,340	118,180	139,430	140,870	135,200	120,820	78,150	77,900	124,350
Export	Zarqa to Balqa	117,720	117,720	80,357	77,327	98,571	48,751	75,897	65,823	59,027
Export	Zarqa to Jerash	274,680	245,480	169,643	162,673	141,429	167,978	178,646	195,194	213,000
Water supply	Zarqa		33,000,000	34,000,000	37,000,000	38,000,000	38,000,000	39,037,492	45,339,344	45,768,019
Water Production & Imports		0	54,028,676	53,313,705	57,142,485	54,606,950	52,693,628	52,644,848	54,010,129	53,212,384
Zarqa to Conservation Area			727,207	727,207	727,207	727,207	727,207	727,207	727,207	727,207

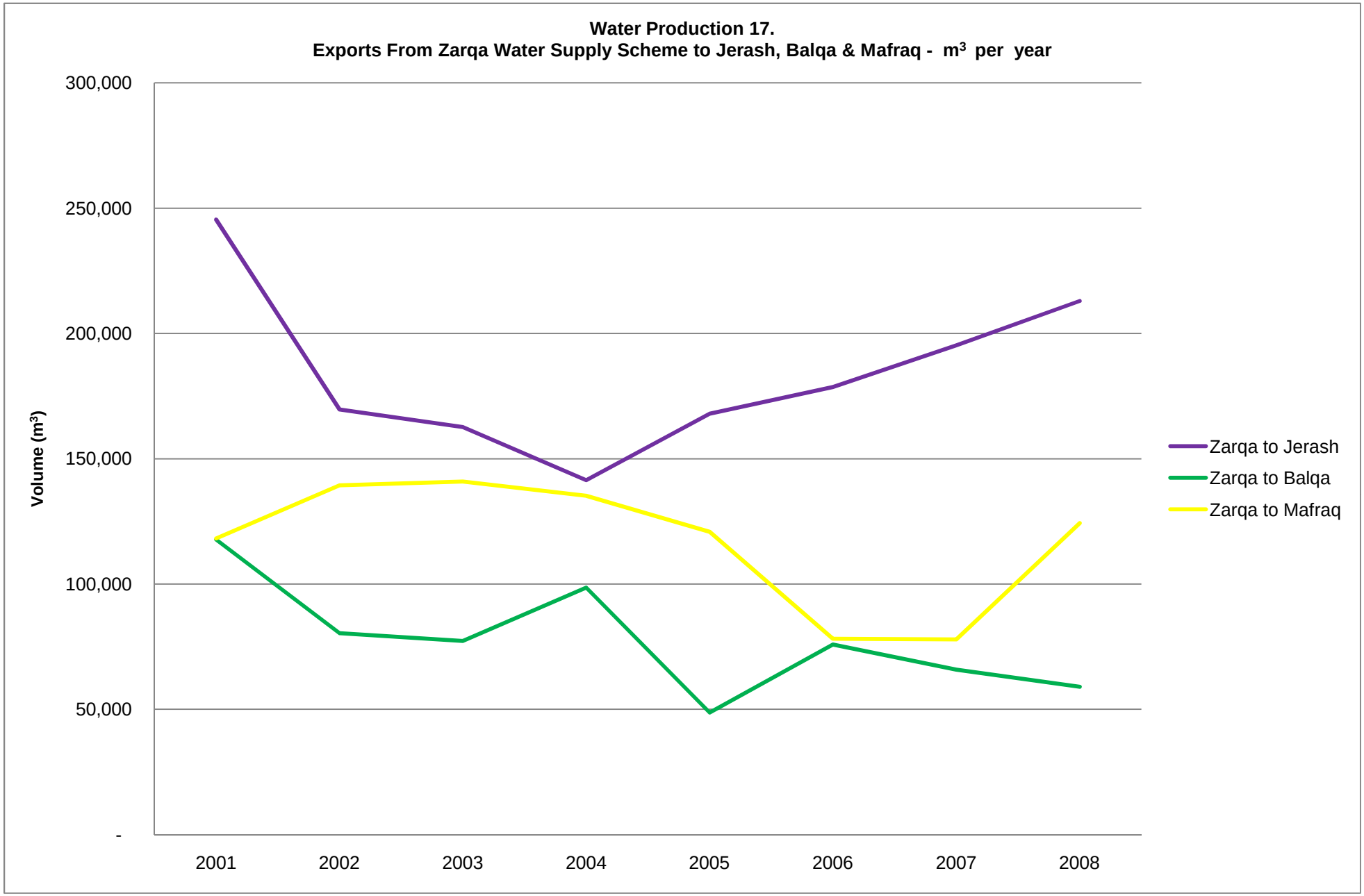

Water Production 12.
Total SI Volume to Zarqa Water Supply Scheme - m³ per year
50,000,000
45,000,000
40,000,000
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
-
Volume (m³)
2001
2002
2003
2004
2005
2006
2007
2008
Time (year)

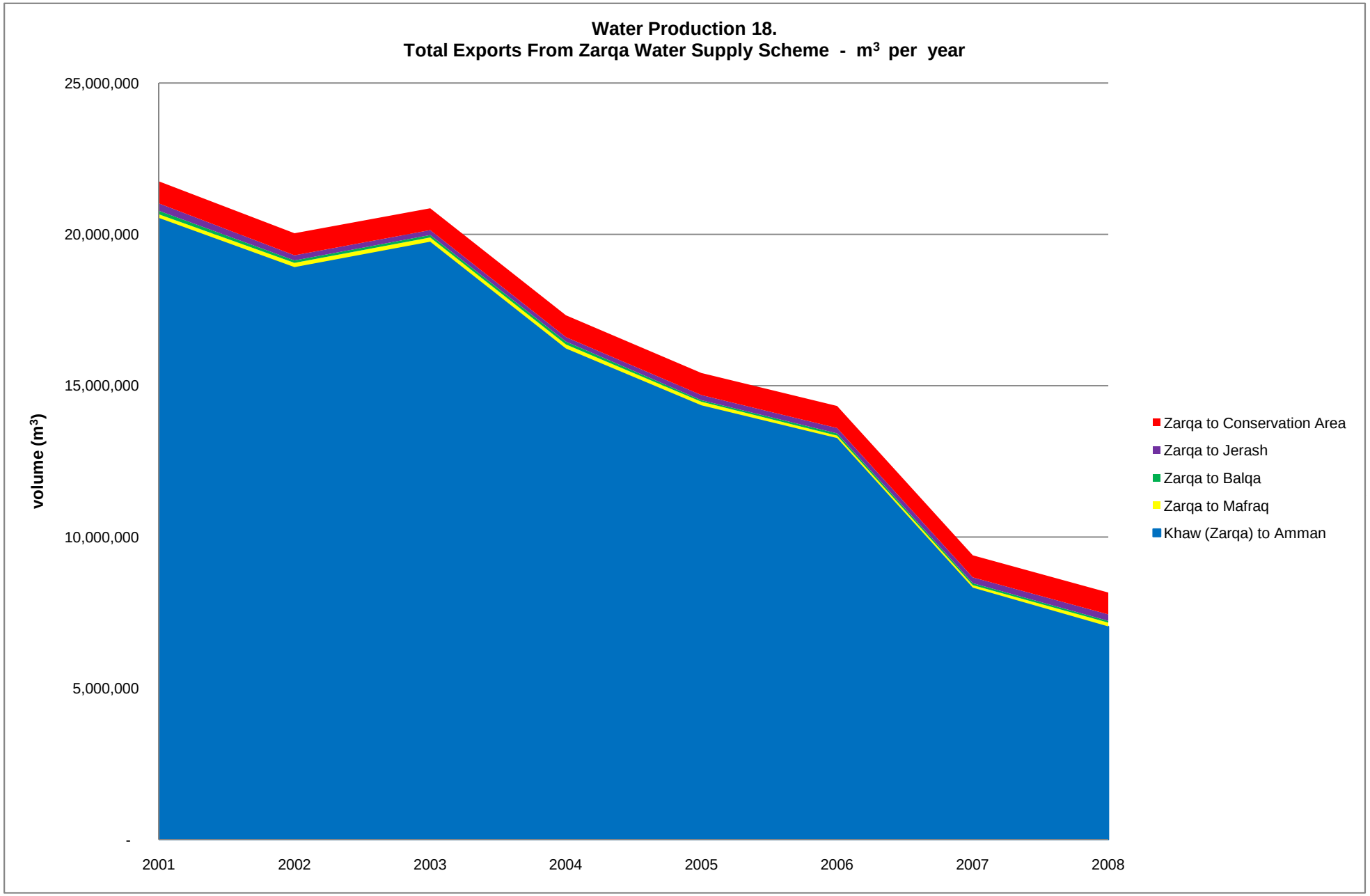

Water Production 13.
Total Production & Imports - m³/year
Volume (m³)
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
-
2001
2002
2003
2004
2005
2006
2007
2008


Water Production 14
Zarqa Water Supply System Total Production & Imports - m³/year
Volume (m³)
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
-
2001
2002
2003
2004
2005
2006
2007
2008


Water Production 15.
Production
Production (m³) - v - Time (year)
Production (m³)
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
-
2000
2001
2002
2003
2004
2005
2006
2007
2008
Azraq (Zarqa) to Khaw (Zarqa)
Hallabat (Zarqa) to Khaw (Zarqa)
Corrodor (Zarqa) to Khaw (Zarqa)


Water Production 16.
Export From Zarqa Water Supply Scheme to Amman - m3 per year
Volume (m3)
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
-
2001
2002
2003
2004
2005
2006
2007
2008


Water Production 17.
Exports From Zarqa Water Supply Scheme to Jerash, Balqa & Mafraq - m3 per year
Volume (m3)
300,000
250,000
200,000
150,000
100,000
50,000
-
2001
2002
2003
2004
2005
2006
2007
2008
Zarqa to Jerash
Zarqa to Balqa
Zarqa to Mafraq


Water Production 18.
Total Exports From Zarqa Water Supply Scheme - m³ per year
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
-
volume (m³)
2001
2002
2003
2004
2005
2006
2007
2008
Zarqa to Conservation Area
Zarqa to Jerash
Zarqa to Balqa
Zarqa to Mafraq
Khaw (Zarqa) to Amman

Population 1
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Population Zarqa Governerate Statistics 1979 - 2008

	Part of existing Zarqa Governorate	Full existing Zarqa Governorate			
	1979	**1979**	**1994**	**2004**	**2008**
Persons	309,405	381,962	639,469	774,569	871,600
Households	44,427	54,845	101,847	143,421	164,453
Housing Units (HU)	52,646	64,992	122,021	177,853	192,687
Residential Buildings (Bldg)	41,784	51,583	68,901	85,689	90,132
Av HU/Bldg all Res. Buildings	1.26	1.26	1.77	2.08	2.14
Vacant HUs	8,219	10,146	20,174	34,432	28,234
Vacant HUs (% of all HUs)	15.6%	15.6%	16.5%	19.4%	17.2%
New HUs since last Census			57,029	55,832	14,834
New Res. Buildings since last Census			17,318	16,788	4,443
Av HU/Bldg new Res. Buildings			3.29	3.33	3.34
Av Persons per Household	6.96	6.96	6.28	5.40	5.30

Households on municipal water supply %	98.0%
Households on municipal water supply no.	161,164
Households not on municipal water supply	3,289
Population on municipal water supply	854,168
Population not on municipal water supply	17,432
HUs on municipal water supply	189,115
HUs not on municipal water supply (Households not on muws + 50% of Governerate HU vacancy	3,571

Data Sources

DOS Census 1979 data		DOS Census 1994	DOS Census 2004	
	Calculated using Census 1979 ratios			Calculated using historical trends and ratios applied to 2008 data

Composite Growth rate % per annum

1979-2008	1994-2008	2004-2008
2.89%	2.24%	2.99%

new primary pipes will increase at 50% of sec/tert rate
For new sec/tert pipe density 2008-2030, allow that 10% of pop increase on ex pipes
Remainder of increase on pipes at length ratio 2.14:3.34 to existing length

If pop 2008	5,000	pipe l 2008	20.00	km	primary	2 sec/tert	18.00
If pop 2030	10,000	pipe l 2030	30.96		primary	2.58 sec/tert	28.38

Population 2.
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Zarqa Governorate Population and Households Summary Statistics 2008

	2008
Persons	871,600
Households	164,453
Housing Units (HU)	192,687
Residential Buildings (Bldg)	90,132
Av HU/Bldg all Res. Buildings	2.14
Vacant HUs	28,234
Vacant HUs (% of all HUs)	17.2%
New HUs since last Census	14,834
New Res. Buildings since last Census	4,443
Av HU/Bldg new Res. Buildings	3.34
Av Persons per Household	5.30
Households on municipal water supply %	98%
Households on municipal water supply no.	161,164
Households not on municipal water supply	3,289
Population on municipal water supply	854,168
Population not on municipal water supply	17,432
HUs on municipal water supply	189,115
HUs not on municipal water supply (Households not on muws + 50% of Governerate HU vacancy rate)	3,571

Population 3
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Zarqa Governorate Population Projections 2008-2030

A. Calculation using steady ratio to population of Jordan

	2008	2010	2015	2020	2025	2030	
Zarqa Governorate Population Persons	871,600	907,419	990,997	1,065,621	1,135,766	1,206,410	
Jordan population projections	5,840,000	6,080,000	6,640,000	7,140,000	7,610,000	8,083,333	DOS figures
Zarqa Population as % of Jordan	14.92%	14.92%	14.92%	14.92%	14.92%	14.92%	

B. Calculation using recent population trend

Population Growth Rate 2004-2008 for Zarqa Governorate: 2.99% composite per annum

	2008	2010	2015	2020	2025	2030	
Zarqa Governorate Population Persons	871,600	924,583	1,071,562	1,241,906	1,439,329	1,668,136	Calculated using 2004-2008 pop. growth rate
Jordan population projections	5,840,000	6,080,000	6,640,000	7,140,000	7,610,000	8,083,333	
Zarqa Population as % of Jordan	14.92%	15.21%	16.14%	17.39%	18.91%	20.64%	

C. Calculation using 50% of recent population trend + addition of King Abdullah Bin Aziz City design population

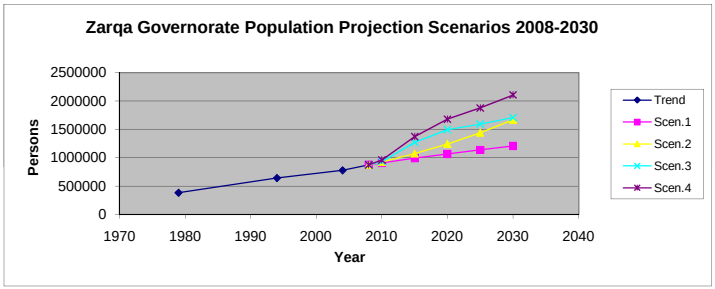
	2008	2010	2015	2020	2025	2030
Zarqa Governorate Population Persons	871,600	932,063	1,270,493	1,492,761	1,591,472	1,705,876
Jordan population projections	5,840,000	6,080,000	6,640,000	7,140,000	7,610,000	8,083,333
Zarqa Population as % of Jordan	14.92%	15.33%	19.13%	20.91%	20.91%	21.10%

D. Calculation using recent population trend + addition of King Abdullah Bin Aziz City design population

	2008	2010	2015	2020	2025	2030	
King Abdullah Bin Aziz City additional persons	-	33,972	298,912	436,008	436,008	436,008	Designed for all population in period 2010 - 2017
Zarqa Governorate Population Persons	871,600	958,555	1,370,474	1,677,914	1,875,337	2,104,144	
Jordan population projections	5,840,000	6,080,000	6,640,000	7,140,000	7,610,000	8,083,333	
Zarqa Population as % of Jordan	14.92%	15.77%	20.64%	23.50%	24.64%	26.03%	

E. Population Trend Scenarios

		1979	1994	2004	2008	2010	2015	2020	2025	2030
Trend 1979-2008	Trend	381962	639469	774569	871600					
Scenario 1. Same % of Jordan pop.	Scen.1				871,600	907,419	990,997	1,065,621	1,135,766	1,206,410
Scenario 2. Continuing recent Zarqa growth rate	Scen.2				871,600	924,583	1,071,562	1,241,906	1,439,329	1,668,136
Scenario 3. 50% of recent growth + KABA City	Scen.3				871,600	932,063	1,270,493	1,492,761	1,591,472	1,705,876
Scenario 3. 100% of recent growth + KABA City	Scen.4				871,600	958,555	1,370,474	1,677,914	1,875,337	2,104,144



F. Selected Design Scenario: Scenario 3, Calculation using 50% of recent population trend + addition of King Abdullah Bin Aziz City design population

	2008	2010	2015	2020	2025	2030
Zarqa Governorate Population Persons	871,600	932,063	1,270,493	1,492,761	1,591,472	1,705,876
Persons on Municipal Water Supply System	854,325	914,916	1,253,663	1,476,249	1,575,279	1,690,000
	98.02%	98.16%	98.68%	98.89%	98.98%	99.07%
Persons not on Municipal Water Supply System	17,275	17,148	16,830	16,512	16,194	15,876

	2008	2010	2015	2020	2025	2030
Zarqa Governorate Population Persons	871,600	932,063	1,270,493	1,492,761	1,591,472	1,705,876
Persons on Municipal Water Supply System	854,325	914,916	1,253,663	1,476,249	1,575,279	1,690,000
	98.02%	98.16%	98.68%	98.89%	98.98%	99.07%
Persons not on Municipal Water Supply System	17,275	17,148	16,830	16,512	16,194	15,876

Projected Population (Scenario 3, at even growth rate

	2008	2010	2015	2020	2025	2030
Zarqa Governorate Population Persons	871,600	871,600	871,600	871,600	871,600	871,600
Population without water supply	17,275	17,148	16,830	16,512	16,194	15,876
Population % with water supply	98.02%	98.16%	98.68%	98.89%	98.98%	99.07%
Population with water supply	854,325	914,916	1,253,663	1,476,249	1,575,279	1,690,000

Table 4.5

Population 4.
20445. Zarqa Water Supply Re-structuring and Rehabilitation
Water Model Demands 2008

WSA	GIS Customer points 2008	
	Total	Ratio
ID		
	no.	
AzTot	923	1.21%
DuTot	3,070	4.01%
KaTot	154	0.20%
TaTot	1,799	2.35%
ZaTot	22,988	30.01%
AwTot	13,614	17.78%
RuTot	25,160	32.85%
NoTot	6,329	8.26%
WeTot	2,463	3.22%
Additional Areas outside WSAs	89	0.12%
Total of Zarqa Governorate	**76,589**	

Population 5.
Zarqa WSS
WSA & Distribution Area Land Areas

WSA / Distribution Area		Land Area			GIS Customer points 2008
		2008	2030	Total	Total
ID	NAME	Serviced	Unserviced		
		km2	km2	km2	no.
Az1	Azraq	5.56	13.95	19.51	923
AzTot		**5.56**	**13.95**	**19.51**	**923**
Du1	Hallabat	1.32	6.45	7.77	261
Du2	Dulail	7.17	44.29	51.46	2,727
Du3	Tafeh	1.51	25.07	26.58	82
DuTot		**9.99**	**75.81**	**85.81**	**3,070**
Ka1	King Abdullah City High	-	15.75	15.75	1
Ka2	King Abdullah City Low	0.19	8.89	9.08	153
KaTot		**0.19**	**24.64**	**24.83**	**154**
Ta1	Tatweer	1.97	13.11	15.08	1,799
TaTot		**1.97**	**13.11**	**15.08**	**1,799**
Za1	Zarqa High	3.93	- 0.00	3.93	2,133
Za2	Zarqa Mid - Batrawi	11.63	0.97	12.60	20,572
Za3	Zarqa North	0.81	5.86	6.67	283
ZaTot		**16.37**	**6.84**	**23.21**	**22,988**
Aw1	Awajan High	4.91	- 0.00	4.90	5,585
Aw2	Awajan Low	3.97	0.19	4.16	3,379
Aw4	Awajan West	3.35	6.14	9.49	2,092
Aw5	Awajan North	4.55	7.06	11.61	2,558
AwTot		**16.77**	**13.39**	**30.16**	**13,614**
Ru1	Russaifah North West	1.66	11.27	12.93	390
Ru2	Russaifah High	6.31	2.83	9.14	7,965
Ru3	Russaifah Low	3.63	- 0.00	3.63	5,743
Ru4	Hitteen Tower	0.44	0.18	0.62	1,008
Ru5	Hitteen Reservoir	6.19	5.53	11.72	10,054
RuTot		**18.24**	**19.80**	**38.04**	**25,160**
No1	Khaw	0.30	18.49	18.79	161
No2	Hashmeya South	0.10	3.62	3.72	74
No3	Hashmeya Town	4.11	3.01	7.12	3,103
No4	Hashmeya Rural	0.83	12.03	12.86	412
No5	Sukhna	5.39	18.15	23.54	2,379
NoTot		**10.73**	**55.30**	**66.03**	**6,129**
We1	Merhib	1.53	10.08	11.62	301
We2	Berein	3.58	15.00	18.58	548
We3	Um Rumanneh	3.90	21.07	24.97	714
We4	Berein North	2.08	10.66	12.74	216
We5	Sarout/Alouk	3.83	19.10	22.93	684
We6	Qunaya	2.09	10.66	12.75	200
WeTot		**17.01**	**86.58**	**103.60**	**2,663**
TOTAL for WSAs		**96.84**	**309.42**	**406.26**	**76,500**

Additional Areas outside WSAs			4,556	89
Total of Zarqa Governorate			**4,962**	**76,589**

Population 6.
Zarqa WSS
WSAs Population 2008 - 2030

Ecoconsult data April 2010

WSA		Land Area			GIS Customer points 2008	Population 2008	Pop density	Pop density	Potential density	Potential Saturation Pop Density	Potential pop	population growth factors				Add pop	Pop	Increase	Density	Saturation
		2008	2030	Total	Total		serviced land	most dense zone in WSA	most dense zone in equivalent WSA	v. Most dense	total land	Additional pop ex pop	add land	proximity to	special	2008-2030	2030	%	persons/km2	% of mod
ID	NAME	Serviced	Unserviced							50%		34.5%	34.5%	34.5%	100%					
		km2	km2	km2	no.		Pop/km2			Pop/km2		1	1		1.0034					
AzTot	Azraq	5.56	13.95	19.51	923	7,396	1,329	1,329	5,000	2,500	48,775	100%	100%	5%	0%	2,758	10,154	37%	520	21%
DuTot	Dulail	9.99	75.81	85.81	3,070	37,790	3,781	3,781	10,000	5,000	429,043	100%	100%	10%	0%	17,539	55,329	46%	645	13%
KaTot	King Abdullah	-	24.83	24.83	154	-	-	-	35,000	17,500	434,532	0%	0%	0%	100%	436,008	436,008		17,559	100%
TaTot	Tatweer	1.97	13.11	15.08	1,799	8,501	4,308	14,568	35,000	17,500	263,954	100%	100%	20%	0%	8,387	16,888	99%	1,120	6%
ZaTot	Zarqa	16.37	6.84	23.21	22,988	283,526	17,315	42,827	45,000	22,500	522,260	100%	100%	100%	0%	116,060	399,586	41%	17,215	77%
AwTot	Awajan	16.77	13.39	30.16	13,614	149,171	8,894	22,753	35,000	17,500	527,792	100%	100%	90%	0%	76,509	225,680	51%	7,483	43%
RuTot	Russaifah	18.24	19.80	38.04	25,160	303,448	16,640	44,371	45,000	20,000	760,788	100%	100%	90%	0%	147,024	450,472	48%	11,842	59%
NoTot	North	10.73	55.30	66.03	6,129	51,629	4,814	4,814	10,000	5,000	330,127	100%	100%	20%	0%	24,379	76,008	47%	1,151	23%
WeTot	West-NorthWest	17.01	86.58	103.60	2,663	12,864	756	756	5,000	2,500	258,990	100%	100%	10%	0%	7,010	19,874	54%	192	8%
TOTAL for WSAs		96.65	309.61	406.26	76,500	854,325					3,576,261					835,675	1,690,000	98%		

Additional Areas outside WSAs			4,556	89
Total of Zarqa Governorate			**4,962**	**76,589**

1690000

WSA	2008 Population persons	Serviced Land km2	Pop Density Average persons/km2	Pop Density Most Dense Zone persons/km2
Azraq	7,396	5.56	1,329	1,329
Dulail	37,790	9.99	3,781	3,781
King Abdullah	-	-	-	-
Tatweer	8,501	1.97	4,308	14,568
Zarqa	283,526	16.37	17,315	42,827
Awajan	149,171	16.77	8,894	22,753
Russaifah	303,448	18.24	16,640	44,371
North	51,629	10.73	4,814	4,814
West-NorthWest	12,864	17.01	756	756
TOTAL for WSAs	854,325	96.65	8,839	44,371

WSA	2030 Additional Servicable Land (km2)	Total Servicable Land (km2)	Proximity to Existing Urban Areas (km)	Proximity Factor (%)	Exceptional Factors
Azraq	13.95	19.51	73	5%	
Dulail	75.81	85.81	15	10%	
King Abdullah	24.83	24.83	0		KABA City Project
Tatweer	13.11	15.08	5	20%	
Zarqa	6.84	23.21	0	100%	
Awajan	13.39	30.16	2	90%	
Russaifah	19.80	38.04	2	90%	
North	55.30	66.03	5	20%	
West-NorthWest	86.58	103.60	15	10%	
TOTAL for WSAs	309.61	406.26			

WSA	2030 Additional Population (persons)	Total Population (persons)	Pop Increase 2008-2030 (%)	Pop Density Average (persons/km2)	Pop Density Saturation % v 2008 highest
Azraq	2,758	10,154	37%	520	39%
Dulail	17,539	55,329	46%	645	17%
King Abdullah	436,008	436,008	0%	17,559	
Tatweer	8,387	16,888	99%	1,120	8%
Zarqa	116,060	399,586	41%	17,215	40%
Awajan	76,509	225,680	51%	7,483	33%
Russaifah	147,024	450,472	48%	11,842	27%
North	24,379	76,008	47%	1,151	24%
West-NorthWest	7,010	19,874	54%	192	25%
TOTAL for WSAs	835,675	1,690,000	98%	4,160	9%

WSA	2008-2030 2008	2010	2015	2020	2025	2030	Average Annual % growth rate
Azraq	7,396	7,612	8,181	8,792	9,448	10,154	1.45
Dulail	37,790	39,123	42,664	46,525	50,736	55,329	1.75
King Abdullah	-	30,326	288,575	423,238	426,221	436,008	
Tatweer	8,501	9,048	10,576	12,362	14,449	16,888	3.17
Zarqa	283,526	292,509	316,233	341,881	369,609	399,586	1.57
Awajan	149,171	154,893	170,175	186,966	205,413	225,680	1.90
Russaifah	303,448	314,545	344,096	376,422	411,786	450,472	1.81
North	51,629	53,477	58,390	63,755	69,612	76,008	1.77
West-NorthWest	12,864	13,383	14,773	16,309	18,003	19,874	2.00
TOTAL for WSAs	854,325	914,916	1,253,663	1,476,249	1,575,278	1,690,000	3.15

Population 7.
Zarqa WSS Pipe Lengths, Customer Points and System Inputs

2008

Current Arrangement	hrs/wk	ILI	Admin
	43	15.8	7.1%

Nodal Demands 2008

2008 Current Arrangement

WSA	Population	connections	Pipe Length					Water usage lcd		Physical L	Admin Los	Metered	Unmetere	Total SI	avg SI	GIS pts	Demand per GIS pt 2008 l/d				Total SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd	no.	dom	non-dom	UFW	Total	m3/d
Azraq	7,396	991	42,675	6,081	48,756	20.3	152	138.1	19.5	598	136	1,166		1,899	257	923	1,107	156	794	2,058	1,899
Dulail	37,790	3,309	179,126	52,111	231,237	14.3	163	48.4	9.8	2,273	343	2,197		4,813	127	3070	595	120	852	1,568	4,813
King Abdullah	-	-	42,187	21,382	63,568	0.0	0	-	-	257	20	-		277		154	-	-	1,797	1,797	277
Tatweer	8,501	1,613	70,137	11,619	81,755	19.7	104	64.0	1.4	983	118	556		1,656	195	1799	302	7	612	921	1,656
Zarqa	283,526	47,474	797,516	61,580	859,095	55.3	330	55.5	3.4	22,665	3,027	16,723		42,415	150	22988	685	42	1,118	1,845	42,415
Awajan	149,171	21,885	581,972	35,107	617,079	35.5	242	59.7	2.0	11,342	1,579	9,208		22,130	148	13614	654	22	949	1,626	22,130
Russaifah	303,448	35,921	850,446	70,369	920,815	39.0	330	50.6	1.5	18,244	2,618	15,823		36,685	121	25160	611	18	829	1,458	36,685
North	51,629	7,293	268,502	27,062	295,564	24.7	175	62.4	2.8	4,143	577	3,367		8,087	157	6127	526	23	770	1,320	8,087
West-NorthWest	12,864	2,355	221,455	20,990	242,445	9.7	53	78.7	4.0	1,932	230	1,063		3,225	251	2665	380	19	811	1,210	3,225
Non-WSA				154,529	154,529					625	276		2,961	3,861		89					3,861
TOTAL for WSAs	854,325	120,841	3,054,016	460,828	3,514,844	34.4	243	55.8	2.9	63,062	8,923	50,103	2,961	125,049	146	76,589					125,049

2030 Full Network Performance Standard

Notes on calculation of future pipe lengths and customer connection points
New primary pipes will increase at 50% of sec/tert rate
For new sec/tert pipe density 2008-2030, allow that 10% of pop increase on ex pipes
Remainder of increase on pipes at length ratio 2.14:3.34 to existing length in each separate WSA except KABA

If pop 2008	5,000	pipe l 2008	20.00	km	primary	2	sec/tert	18.00
If pop 2030	10,000	pipe l 2030	30.96		primary	2.58	sec/tert	28.38

KABA pipe length calculated: KABA pipe length 2030 = Zarqa pipe length 2030
Connections for present pop increasing by 10% to allow for additional separation of combined and inclusion of currently unknown.
Connections for future additional pop at ratio of 2.14:3.34 to existing per pop (+10%).
Connections for future KABA at 10 persons per connection
For intermediate years between 2008-2030, linear interpolation of pipe length and customer points for each WSA, except KABA
For KABA, linear interpolation of pipe length from 2008-2020

Full Network Performance Standard	hrs/wk	ILI	Admin
	168	2.00	6.2%

2030 Full Network Performance Standard

WSA	Population	connections	Pipe Length					Water usage lcd		Physical L	Admin Los	Metered	Unmetere	Total SI	avg SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd
Azraq	10,154	1,351	50,136	6,613	56,749	23.8	179	100.0	5.2	384	96	1,068		1,548	152
Dulail	55,329	4,722	220,915	58,190	279,104	16.9	198	100.0	5.2	1,503	484	5,821		7,808	141
King Abdullah	436,008	43,601	955,586	67,682	1,023,268	42.6	426	100.0	5.2	10,767	3,746	45,868		60,381	138
Tatweer	16,888	2,896	109,980	14,919	124,899	23.2	135	100.0	5.2	829	172	1,777		2,778	164
Zarqa	399,586	65,918	955,586	67,682	1,023,268	64.4	390	100.0	5.2	15,230	3,788	42,036		61,054	153
Awajan	225,680	31,985	735,934	39,751	775,685	41.2	291	100.0	5.2	7,948	2,096	23,742		33,786	150
Russaifah	450,472	51,779	1,059,966	79,037	1,139,003	45.5	395	100.0	5.2	12,634	3,970	47,390		63,994	142
North	76,008	10,449	332,533	30,288	362,821	28.8	209	100.0	5.2	2,816	715	7,996		11,527	152
West-NorthWest	19,874	3,495	284,585	23,981	308,566	11.3	64	100.0	5.2	1,316	225	2,091		3,632	183
Non-WSA					250,000					500	225		2,909	3,634	
TOTAL for WSAs	1,690,000	216,196	4,705,220	388,144	5,343,364	40.5	316	100.0	5.2	53,926	15,518	177,788	2,909	250,141	148

Population 8
Zarqa WSS
WSA & Distribution Area populations 2030

Apportionment of add pop among DAs within any WSA: 50% with ex pop and 50% with unserviced land

									SI 2030:	144,306	190,973	250,142
									av lcd 2030:	85.39	113.00	148.01
WSA / Distribution Area		**Land Area**			**GIS Customer points 200**	**Pop**	**pop/cust pt**	**add pop**	**Pop**	**System Input Volume 2030 m3/d**		
		2008	**2030**	**Total**	**Total**	**2008**	**WSA**		**2030**	**cap zero**	**cap 47000**	**no cap**
ID	**NAME**	**Serviced**	**Unserviced**				**2008**			**@ 85.4 lcd**	**@ 113.0 lcd**	**@ 148.0 lcd**
		km2	**km2**	**km2**	**no.**		**ratio**			**m3/d**	**m3/d**	**m3/d**
Az1	Azraq	5.56	13.95	19.51	923	7,396			10,154	867	1,147	1,503
AzTot		**5.56**	**13.95**	**19.51**	**923**	**7,396**			**10,154**	867	1,147	1,503
Du1	Hallabat	1.32	6.45	7.77	261	3,213		1,492	4,704	402	532	696
Du2	Dulail	7.17	44.29	51.46	2,727	33,568		12,913	46,481	3,969	5,252	6,880
Du3	Tafeh	1.51	25.07	26.58	82	1,009		3,134	4,144	354	468	613
DuTot		**9.99**	**75.81**	**85.81**	**3,070**	**37,790**	**12.31**	**17,539**	**55,329**	4,724	6,252	8,189
Ka1	King Abdullah City High	-	15.75	15.75	1	-		276,589	276,589	23,617	31,255	40,939
Ka2	King Abdullah City Low	0.19	8.89	9.08	153	-		159,419	159,419	13,613	18,015	23,596
KaTot		**0.19**	**24.64**	**24.83**	**154**	**-**		**436,008**	**436,008**	37,230	49,270	64,535
Ta1	Tatweer	1.97	13.11	15.08	1,799	8,501			16,888	1,442	1,908	2,500
TaTot		**1.97**	**13.11**	**15.08**	**1,799**	**8,501**	**4.73**	**8,387**	**16,888**	1,442	1,908	2,500
Za1	Zarqa High	3.93	- 0.00	3.93	2,133	26,308		5,370	31,677	2,705	3,580	4,689
Za2	Zarqa Mid - Batrawi	11.63	0.97	12.60	20,572	253,728		60,204	313,932	26,806	35,475	46,466
Za3	Zarqa North	0.81	5.86	6.67	283	3,490		50,487	53,977	4,609	6,100	7,989
ZaTot		**16.37**	**6.84**	**23.21**	**22,988**	**283,526**	**12.33**	**116,060**	**399,586**	34,120	45,154	59,144
Aw1	Awajan High	4.91	- 0.00	4.90	5,585	61,196		15,686	76,882	6,565	8,688	11,380
Aw2	Awajan Low	3.97	0.19	4.16	3,379	37,024		10,045	47,069	4,019	5,319	6,967
Aw3	Awajan West	3.35	6.14	9.49	2,092	22,922		23,421	46,344	3,957	5,237	6,859
Aw4	Awajan North	4.55	7.06	11.61	2,558	28,028		27,357	55,386	4,729	6,259	8,198
AwTot		**16.77**	**13.39**	**30.16**	**13,614**	**149,171**	**10.96**	**76,509**	**225,680**	19,270	25,502	33,404
Ru1	Russaifah North West	1.66	11.27	12.93	390	4,704		42,972	47,676	4,071	5,387	7,057
Ru2	Russaifah High	6.31	2.83	9.14	7,965	96,064		33,789	129,853	11,088	14,674	19,220
Ru3	Russaifah Low	3.63	- 0.00	3.63	5,743	69,265		16,774	86,039	7,347	9,723	12,735
Ru4	Hitteen Tower	0.44	0.18	0.62	1,008	12,157		3,595	15,753	1,345	1,780	2,332
Ru5	Hitteen Reservoir	6.19	5.53	11.72	10,054	121,259		49,894	171,153	14,614	19,341	25,333
RuTot		**18.24**	**19.80**	**38.04**	**25,160**	**303,448**	**12.06**	**147,024**	**450,472**	38,465	50,904	66,676
No1	Khaw	0.30	18.49	18.79	161	1,356		4,395	5,752	491	650	851
No2	Hashmeya South	0.10	3.62	3.72	74	623		945	1,568	134	177	232
No3	Hashmeya Town	4.11	3.01	7.12	3,103	26,139		6,835	32,974	2,816	3,726	4,881
No4	Hashmeya Rural	0.83	12.03	12.86	412	3,471		3,472	6,942	593	784	1,028
No5	Sukhna	5.39	18.15	23.54	2,379	20,040		8,732	28,772	2,457	3,251	4,259
NoTot		**10.73**	**55.30**	**66.03**	**6,129**	**51,629**	**8.42**	**24,379**	**76,008**	6,490	8,589	11,250
We1	Merhib	1.53	10.08	11.62	301	1,454		804	2,258	193	255	334
We2	Berein	3.58	15.00	18.58	548	2,647		1,328	3,976	339	449	588
We3	Um Rumanneh	3.90	21.07	24.97	714	3,449		1,793	5,242	448	592	776
We4	Berein North	2.08	10.66	12.74	216	1,043		716	1,759	150	199	260
We5	Sarout/Alouk	3.83	19.10	22.93	684	3,304		1,674	4,978	425	562	737
We6	Qunaya	2.09	10.66	12.75	200	966		695	1,661	142	188	246
WeTot		**17.01**	**86.58**	**103.60**	**2,663**	**12,864**	**4.83**	**7,010**	**19,874**	1,697	2,246	2,942
TOTAL for WSAs		**96.84**	**309.42**	**406.26**	**76,500**	**854,325**			**1,690,000**	**144,306**	**190,973**	**250,142**

Additional Areas outside WSAs			4,556	89
Total of Zarqa Governorate			**4,962**	**76,589**

Population 9.
Zarqa WSS
Primary System Design Flows 2030

WSA / Distribution Area		System Input Volume 2030 m3/d		
		cap zero	cap 47000	no cap
ID	NAME			
		m3/d	m3/d	m3/d
Az1	Azraq	867	1,147	1,503
AzTot		867	1,147	1,503
Du1	Hallabat	402	532	696
Du2	Dulail	3,969	5,252	6,880
Du3	Tafeh	354	468	613
DuTot		4,724	6,252	8,189
Ka1	King Abdullah City High	23,617	31,255	40,939
Ka2	King Abdullah City Low	13,613	18,015	23,596
KaTot		37,230	49,270	64,535
Ta1	Tatweer	1,442	1,908	2,500
TaTot		1,442	1,908	2,500
Za1	Zarqa High	2,705	3,580	4,689
Za2	Zarqa Mid - Batrawi	26,806	35,475	46,466
Za3	Zarqa North	4,609	6,100	7,989
ZaTot		34,120	45,154	59,144
Aw1	Awajan High	6,565	8,688	11,380
Aw2	Awajan Low	4,019	5,319	6,967
Aw4	Awajan West	3,957	5,237	6,859
Aw5	Awajan North	4,729	6,259	8,198
AwTot		19,270	25,502	33,404
Ru1	Russaifah North West	4,071	5,387	7,057
Ru2	Russaifah High	11,088	14,674	19,220
Ru3	Russaifah Low	7,347	9,723	12,735
Ru4	Hitteen Tower	1,345	1,780	2,332
Ru5	Hitteen Reservoir	14,614	19,341	25,333
RuTot		38,465	50,904	66,676
No1	Khaw	491	650	851
No2	Hashmeya South	134	177	232
No3	Hashmeya Town	2,816	3,726	4,881
No4	Hashmeya Rural	593	784	1,028
No5	Sukhna	2,457	3,251	4,259
NoTot		6,490	8,589	11,250
We1	Merhib	193	255	334
We2	Berein	339	449	588
We3	Um Rumanneh	448	592	776
We4	Berein North	150	199	260
We5	Sarout/Alouk	425	562	737
We6	Qunaya	142	188	246
WeTot		1,697	2,246	2,942
TOTAL for WSAs		**144,306**	**190,973**	**250,142**

Sources/Import:Exports

	Existing	Existing
	m3/d	m3/d
Azraq	46,375	
Corridor	25,619	
Hallabat	17,912	
Zatari	6,143	
Tamween	6,798	
Zarqa nett of Backwash	9,719	
Awajan	5,800	
Russaifah	11,198	
Hashmeya	9,377	
WestNorthWest	5,892	
Sum	144,833	
Azraq Wetland		1,987
Amman		19,257
Balqa		161
Jerash		582
Mafraq		340
		3,070
Zarqa Backwash		2545
	144,308	
Qunaya	1,432	
Merhib	2,094	
Berein	2,065	
Um Rumanneh	56	
Sarout	154	
Alouk	92	
Zat to Univ end 2009	3,000	
Zat to Univ 2010+	4,000	

Strategic System Pipelines & Source Facilities			Target Min Network Elements			Ex Network Elements			Add Required			Add Required std size		
cap zero			Pipe Size	Balancing r	PS Size	Pipe Size	Balancing re	PS Size	Pipe Size	Balancing r	PS Size	Pipe Size	Balancing r	PS Size
			at <1 m/s	at 2 hrs	at 20 hrs	at <1 m/s	at 2 hrs	at 20 hrs	at <1 m/s	at 2 hrs	at 20 hrs	at <1 m/s	at 2 hrs	at 20 hrs
	m3/d	MLD	mm	m3	m3/hr	mm	m3	m3/hr	mm	m3	m3/hr	mm	m3	m3/hr
Throughflow at Azraq Source	46,375	46.37		4,637	2,319		12,000			- 7,363	-		-	-
Throughflow at Corridor Source	25,619	25.62		2,562	1,281		1,000			1,562	-		1,500	-
Throughflow at Hallabat Source	17,912	17.91		1,791	896		1,000			791	-		800	-
Throughflow at Zatari Source	6,143	6.14		614	307		2,000			- 1,386	-		-	-
Throughflow at Khaw	88,470	88.47		8,847	4,424		12,000			- 3,153	-		-	-
Pipeline Azraq to Hallabat Junction	43,521	43.52	801			600			530			600		
Pipeline Corridor to Hallabat	25,619	25.62	614			600			132			-		
Pipeline Hallabat to Hallabat Junction	43,129	43.13	797			600			525			600		
Pipeline Hallabat Junction to Tafeh Junction	86,650	86.65	1,130			2*600			746			600		
Pipeline Zatari to Tafeh Junction	6,143	6.14	301			600			-			-		
Pipeline Tafeh Junction to Khaw	88,470	88.47	1,142			3*600			473			600		
Pipeline Khaw to Tatweer	39,069	39.07	759			600			464			600		
Pipeline Tatweer to Awajan	37,627	37.63	745			600			441			600		
Pipeline Awajan to Russaifah	24,157	24.16	597			600			-			-		
Transfer We to Russaifah/Awajan	3,110	3.11												

Distribution Areas Reservoirs and Pumping Stations			Target Min Network Elements			Ex Network Elements			Add Required			Add Required std size		
cap 47 MLD			Elevated	Balancing r	PS Size	Elevated	Balancing re	PS Size	Elevated	Balancing r	PS Size	Elevated	Balancing r	PS Size
			at 12 hrs	at 2 hrs	at 20 hrs	at 12 hrs	at 2 hrs	at 20 hrs	at 12 hrs	at 2 hrs	at 20 hrs	at 12 hrs	at 2 hrs	at 20 hrs
	m3/d	MLD	m3	m3	m3/hr	m3	m3	m3/hr	m3	m3	m3/hr	m3	m3	m3/hr
Azraq	1,147	1.15	574		57	-		-	574	-	57	600		60
Hallabat	532	0.53	266		27	-		-	266	-	27	300		-
Dulail	5,252	5.25	2,626		263	-		-	2,626	-	263	3,000		300
Tafeh	468	0.47	234		23	-		-	234	-	23	500		
King Abdullah City	49,270	49.27	24,635		340	19,500		340	5,135	-	- 0	5,000		-
Tatweer	1,908	1.91	954		95	-		-	954	-	95	1,000		100
Zarqa High	3,580	3.58	1,790	358	179	2,500		180	- 710	358	- 1	-		-
Zarqa Mid - Batrawi	35,475	35.47	17,737			18,000		-	- 263	-	-	-		-
Zarqa North	6,100	6.10	3,050			-		-	3,050	-	-	3,000		-
Awajan High	8,688	8.69	4,344		434	10,800		-	- 6,456	-	434	-		-
Awajan Low	5,319	5.32	2,659		266	1,600		-	1,059	-	266	2,000		-
Awajan West	5,237	5.24	2,618	524	262	-		-	2,618	524	262	3,000		270
Awajan North	6,259	6.26	3,129	626	313	-		-	3,129	626	313	3,000		300
Russaifah North West	5,387	5.39	2,694	539	269	-		-	2,694	539	269	3,000		270
Russaifah High	14,674	14.67	7,337		734	1,800		-	5,537	-	734	6,000		-
Russaifah Low	9,723	9.72	4,861		486	6,200		-	- 1,339	-	486	-		-
Hitteen Tower	1,780	1.78	890	178	89	300		89	590	178	0	600		-
Hitteen Reservoir	19,341	19.34	9,670		967	4,000		-	5,670	-	967	5,000		-
Khaw Local	650	0.65	325			-		-	325	-	-	300		-
Hashmeya South	177	0.18	89			-		-	89	-	-	-		-
Hashmeya Town	3,726	3.73	1,863			1,500		-	363	-	-	1,500		-
Hashmeya Rural	784	0.78	392			-		-	392	-	-			-
Sukhna	3,251	3.25	1,626			1,000		-	626	-	-	1,000		-
Merhib	255	0.26	128		13	1,000			- 872	-	13	300		105
Berein	449	0.45	225		22	1,000			- 775	-	22	300		103
Um Rumanneh	592	0.59	296		30	500			- 204	-	30	300		30
Berein North	199	0.20	99		10	-			99	-	10	-		-
Sarout/Alouk	562	0.56	281		28	400			- 119	-	28	300		30
Qunaya	188	0.19	94		9	500			- 406	-	9			
									-	-	-			
WSA Sources									-	-	-			
Tamween	6,798				340				-	-	340			
Zarqa nett of Backwash	9,719			972	486		4500		-	-	486		0	
Awajan Source + Inflow Hub	25,502			2,550	1,275		0		-	2,550	1,275		2500	
Russaifah Source + Inflow Hub	39,706			3,971	1,985		0		-	3,971	1,985		4000	
Hashmeya	9,377			938	469				-	938	469			
Qunaya	1,432				72				-	-	72			
Merhib	2,094				105		104.68		-	-	105			
Berein	2,065				103		103.25		-	-	103			
Um Rumanneh	56				3		2.79		-	-	3			
Sarout	154				8				-	-	8			
525 Alouk	92				5				-	-	5			

Population 10.

20445 Zarqa Water Supply Re-structuring and Rehabilitation

Population Prosperity Summary Data

ID	GIS Data				DOS Data						
	Zone ID	Area Name (English)	Administrative	No Of Subscribers (Dec 2009)	Population (DOS, 2008)	Poverty (DOS, 2004, 1:Poor - 4:Rich)	Length Of Water Networks (m)	Water Supply Region	Poverty Weighted Population	Weighted Poverty Rating	Population %
1	2	Hai Al Bustan	Zarqa	46	280	1.0	120	Awajan	280		
2	7	Hai Shoumar	Zarqa	104	357	1.0	0	Awajan	357		
3	16	HAI Al-Ameera Haya	Zarqa	1021	4,751	3.6	8,549	Awajan	17,104		
4	18	Hai Al-Jneeneh	Zarqa	223	1,204	1.3	403	Awajan	1,565		
5	20	Hai Az-Zawahreh	Zarqa	2616	18,831	2.3	29,492	Awajan	43,311		
6	21	Hai Al-Jaber	Zarqa	452	1,896	2.7	141	Awajan	5,119		
7	24	Hai Nassar	Zarqa	304	2,345	1.0	0	Awajan	2,345		
8	25	Hai Qurtuba	Zarqa	708	3,751	1.6	890	Awajan	6,002		
9	31	Hai Al-Ahmad	Zarqa	194	1,321	1.4	227	Awajan	1,849		
10	32	Hai Al-gamar	Zarqa	609	3,578	1.7	5,063	Awajan	6,083		
11	33	Hai Al-Madenah Al-Monawarah	Zarqa	332	1,174	1.0	2,958	Awajan	1,174		
12	34	Hai Al-Ameer Hamzah	Zarqa	1730	12,893	1.9	19,865	Awajan	24,497		
13	35	Al Jabal Al Abyad	Zarqa	47	378	1.9	0	Awajan	718		
14	38	Hai Al-Jabal Al-Abyadh	Zarqa	2021	16,259	1.9	22,257	Awajan	30,892		
15	39	Hai Um Bayadhah	Zarqa	746	3,926	1.1	0	Awajan	4,319		
16	41	Hai MAkka Al-MUkaramah	Zarqa	109	222	2.0	1,062	Awajan	444		
17	42	thawra	Zarqa	250	1,433	2.8	2,588	Awajan	4,013		
18	43	Hai Al-Dwaik	Zarqa	414	1,702	1.0	696	Awajan	1,702		
19	44	Hai Al-Ameera Rahmeh	Zarqa	1449	10,438	2.5	11,337	Awajan	26,095		
20	46	Hai Al-Falah	Zarqa	1488	9,030	1.6	8,914	Awajan	14,448		
21	47	ai Ath-Thoura Al-Arabiyah Al-Kubi	Zarqa	2206	12,646	2.8	14,725	Awajan	35,410		
22	50	Hai Al-Ameer Hasan	Zarqa	1645	11,881	2.5	17,104	Awajan	29,703		
23	51	Haii Al-Ameer Talal	Zarqa	1610	14,515	1.4	16,282	Awajan	20,321		
24	52	Hai Aljundi	Zarqa	655	5,765	1.3	7,233	Awajan	7,496		
25	54	Hai Awajan	Zarqa	329	1,668	1.9	5,949	Awajan	3,169		
26	48	Al Thawra 2	Zarqa	1499	8,593	2.8	13,111	Awajan	24,061		
					150,839				**312,476**	**2.07**	**18.2%**
27	80	Al_Azraq	Azraq	1040	**7,396**	1.5	13,889	Azraq	11,094		
					7,396				**11,094**	**1.50**	**0.9%**
28	72	Qaser_Al Hallabat	Al_Dhulial	637	5,176	1.0	21,585	East	5,176		
29	71	Taffeh	Al_Dhulial	98	1,101	1.0	47,052	East	1,101		
30	70	Al_Dhulil	Al_Dhulial	2735	31,513	1.5	28,064	East	47,270		
					37,790				**53,547**	**1.42**	**4.5%**
31	91	Abu Al-Zighan	Bireen	471	2,800	1.5		North	4,200		
32	60	Al_Hashmeieh	Al_hashmeieh	4241	29,039	1.0	113,721	North	29,039		
33	61	GHrisa _um _alsaleeh	Al_hashmeieh	417	3,199	1.0	20,767	North	3,199		
34	63	Al_Sukhneh	Al_hashmeieh	2072	14,462	2.3	49,972	North	33,263		
					49,500				**69,701**	**1.41**	**6.0%**
35	R1	Rasheed	Russaifeh	3480	24,353	2.5	19,079	Russaifah	60,883		
36	R2	Qadesiah	Russaifeh	3659	26,588	2.1	10,103	Russaifah	55,855		
37	R3	Tatweer Hadari	Russaifeh	2442	20,676	3.3	8,907	Russaifah	68,231		
38	R4	Prince Talal Housing	Russaifeh	869	4,632	3.5	1,406	Russaifah	16,384		
39	R5	Razi	Russaifeh	364	2,259	3.1	2,123	Russaifah	6,999		
40	R6	Dahereah	Russaifeh	633	5,876	2.9	2,681	Russaifah	17,110		
41	R7	Awagan	Russaifeh	2256	27,861	2.0	12,645	Russaifah	55,722		
42	R8	qunde	Russaifeh	1363	9,644	3.2	8,532	Russaifah	30,861		
43	R9	Arateqa	Russaifeh	1116	9,746	2.8	7,651	Russaifah	27,289		
44	R10	Phosphate Area	Russaifeh	21	50	1.0	0	Russaifah	50		
45	R11	Lower Rasheed	Russaifeh	1689	8,749	2.4	7,775	Russaifah	20,998		
46	R13	Northern Mountain	Russaifeh	4699	39,188	2.6	13,629	Russaifah	99,933		
47	R14	Fakhora	Russaifeh	434	2,691	2.7	0	Russaifah	7,363		
48	R15	Nakab	Russaifeh	120	3,661	1.7	0	Russaifah	6,224		
49	R16	Hashem Housing	Russaifeh	1165	9,737	2.0	9,369	Russaifah	19,474		
50	R17	Prince Fuisel Mountain	Russaifeh	2101	20,979	1.9	6,670	Russaifah	39,860		
51	R18	Nakab	Russaifeh	759	3,123	2.0	3,082	Russaifah	6,246		
52	R19	Huteen Camp	Russaifeh	4306	3,000	2.4	11,230	Russaifah	7,154		
53	R20	Msherfah	Russaifeh	419	1,500	3.5	0	Russaifah	5,250		
54	R21	Msherfah Literal Area	Russaifeh	97	500	1.5	0	Russaifah	750		
55	R22	Hussien District	Russaifeh	2234	16,643	2.5	10,082	Russaifah	41,608		
56	R24	Western Msherfah	Russaifeh	1799	13,372	1.7	16,581	Russaifah	22,732		
					254,828				**616,973**	**2.42**	**30.7%**
57	45	Hai Tareq Bin Zeyad	Zarqa	1545	6,728	3.5	7,460	Tatweer	23,548		
58	53	Hai Al-Masane'e	Zarqa	132	2,393	1.5	1,157	Tatweer	3,590		
					9,121				**27,138**	**2.98**	**1.1%**
59	65	Um_Romaneh	Bireen	311	2,479	2.0		West	4,958		
60	90	Merheb & Um Al fataier	Bireen	197	851	2.5		West	2,128		
61	92	Rajm_Alshouk	Bireen	102	786	3.5		West	2,751		
62	66	Al_A'louk	Bireen	277	1,618	2.0	7,490	West	3,236		
63	67	Biereen	Bireen	711	2,736	2.0	24,272	West	5,472		
64	68	Al_Kamsheh	Bireen	409	1,977	2.5	15,151	West	4,943		
65	69	Sarrot	Bireen	469	2,417	1.5	17,093	West	3,626		
					12,864				**27,113**	**2.11**	**1.5%**
1	1	Hai Ma'amel At-Toub	Zarqa	44	245	1.0	0	Zarqa	245		
2	3	Hai Al-hashemy	Zarqa	178	1,639	1.4	650	Zarqa	2,295		
3	4	Hai Al-Batrawi	Zarqa	3130	10,527	3.5	4,174	Zarqa	36,845		
4	5	Hai Al-Hashemeyah Al-Janoubi	Zarqa	917	5,253	2.3	2,801	Zarqa	12,082		
5	6	Hai Al-herafyeen	Zarqa	154	33	2.0	928	Zarqa	66		
6	8	Hai Al-zarqa'a Al-Jadedah	Zarqa	6720	26,495	4.0	47,824	Zarqa	105,980		
7	9	Hai Ma'asoum Ash-Shamali	Zarqa	1727	25,154	2.4	21,803	Zarqa	60,370		
8	10	Hai Al-Eskaan	Zarqa	744	4,164	3.1	1,202	Zarqa	12,908		
9	11	Hai Barrakh	Zarqa	1419	7,901	2.9	10,716	Zarqa	22,913		
10	12	Hai Ibn Sina	Zarqa	783	6,876	2.5	4,869	Zarqa	17,190		
11	13	Hai Ramzi	Zarqa	5098	32,092	3.0	37,704	Zarqa	96,276		
12	14	Hai Ma'asoum Al-Janoubi	Zarqa	1548	25,154	2.4	13,160	Zarqa	60,370		
13	15	Hai Al-Ameer Mohammad	Zarqa	1898	16,162	1.8	18,889	Zarqa	29,092		
14	17	Hai Ash-Shyoukh	Zarqa	1361	9,344	2.0	8,843	Zarqa	18,688		
15	19	Hai Al-Basateen	Zarqa	292	1,701	3.4	2,943	Zarqa	5,783		
16	22	Hai Al-Ghwaireyeh	Zarqa	3901	32,387	1.8	40,452	Zarqa	58,297		
17	23	Hai Al-Ammer Shaker	Zarqa	2062	12,795	3.0	40,452	Zarqa	38,385		
18	26	Hai An-Naser	Zarqa	2849	14,478	3.5	24,916	Zarqa	50,673		
19	27	Hai Al-Hussain	Zarqa	3330	21,924	2.5	24,548	Zarqa	54,810		
20	28	Hai An-Nuzha	Zarqa	1035	6,505	2.5	6,975	Zarqa	16,263		
21	30	Hai Al-Wasat Al-Tejari	Zarqa	5765	21,506	3.3	54,017	Zarqa	70,970		
22	36	Hai Ath-Dhubbat	Zarqa	908	4,521	2.8	9,490	Zarqa	12,659		
23	40	Hai Janna'a	Zarqa	1689	12,884	1.3	5,349	Zarqa	16,749		
24	37	Ja'nna_camb	Zarqa	1172	8,940	1.3	9,518	Zarqa	11,622		
					308,680				**811,528**	**2.63**	**37.1%**

Average	**1,387**	**14,097**	**2**	**12,946**
Sum	**123,420**	**831,018**	**193**	**1,100,414**
Min	**21**	**33**	**1**	**0**
Max	**6,720**	**254,828**	**4**	**113,721**
Standard Deviation	**1,397**	**30,502**	**1**	**16,903**

415,509

Population 11.

Water Supply Region	Poverty Weighted Population	Weighted Poverty Rating
Awajan	312,476	2.07158891
Azraq	11,094	1.5
East	53,547	1.41694893
North	69,701	1.40809293
Russaifah	616,973	2.42113356
Tatweer	27,138	2.97527683
West	27,113	2.10762593
Zarqa	811,528	2.62902812

Population 12.

Zarqa Population Distribution 2008

		MCC Priority %	MCC Priority pop	Strategic Infrastructure Population		MCC as % of Strategic	
WSA	**Population (persons)**			**%**	**Pop**	**%**	
Azraq	7,396	0%	-	100%	7,396		
Dulail	37,790	0%	-	100%	37,790		
King Abdullah	-	0%	-	100%	-		
Tatweer	8,501	100%	8,501	100%	8,501		**MCC Priority Areas**
Zarqa	283,526	80%	226,821	100%	283,526		
Awajan	149,171	100%	149,171	100%	149,171		
Russaifah	303,448	30%	91,034	100%	303,448		
North	51,629	0%	-	100%	51,629		
West-NorthWest	12,864	0%	-	0%	-		
TOTAL WSAs	**854,325**	55.7%	475,527		841,461	56.5%	

Customer Water use 1													
HH is defined in terms of water consumption as the domestic group that share the same meter.													
In the Zarqa2006 billing data 95.76% of metered units were domestic. Applying this ratio to Zarqa 2008 billing data which has 130,225							125,951	metered units gives a					
figure of	120,611	metered domestic units. Given that 98% of the population of 871600 (2008) were metered, this gives a figure of						854168	person				
metered meaning that average size of HH as defined above is			7.082	This means that	5,340	metered units are non-domestic							
Size of HH	7.082		125,951										
									nr consumers			HH con	HH con
Consumption ranges					Water quantities per con range				per con range			av annual (	av quart (n
(con range) (lcd)					HH=7.082	HH=7.082 adj			HH=7.082	HH=7.082 adj			(n
<	50		129.247	4,810,885	4,810,885	4,635,648		64,389	64,389	62,044		75	19
50	65	129.247	168.021	7,623,283	2,812,398	2,709,956		83,371	18,982	18,291		148	37
65	80	168.021	206.795	10,240,854	2,617,571	2,522,226		97,410	14,039	13,528		186	47
80	120	206.795	310.193	15,215,743	4,974,889	4,793,678		117,397	19,987	19,259		249	62
120	145	310.193	374.816	16,657,629	1,441,886	1,389,365		121,656	4,259	4,104		339	85
145	165	374.816	426.515	17,305,809	648,180	624,570		123,285	1,629	1,570		398	99
165	185	426.515	478.214	17,668,646	362,837	349,621		124,091	806	777		450	113
185	205	478.214	529.913	17,907,766	239,120	230,410		124,568	477	460		501	125
205	225	529.913	581.611	18,049,905	142,139	136,962		124,825	257	248		553	138
225	245	581.611	633.310	18,180,327	130,422	125,671		125,040	215	207		607	152
245	265	633.310	685.009	18,265,655	85,328	82,220		125,170	130	125		656	164
>	265		685.009	2,374,150	2,374,150			781	781			3,040	760
									125,951	120,611			
Totals					20,639,805	17,600,328	0	0.963574959		(total)			
Average consumption per HH:						146	56						
without project				(m³/HH/yr)	lcd			(conv factor)	120,611	domestic			
<50	62,044	domestic	4,635,648	75	29								
<265	120,611	domestic	17,600,328	146	56				5,340	non-domestic	domestic		
<265	4,559	non-domestic	665,327	146	56				4,559	non-domestic			
>265	781	non-domestic	2,374,150	3,040	1,176					<265 lcd			
									781	non-domestic			
150.015										>265 lcd			
Quantitity of water to raise consumption rate of HHs <50lcd to 60 lcd (150.015 m³)				4,671,827									
Quantitity of water to raise consumption rate of <50lcd to 65lcd (162.507³)				5,446,876									
with project													
former<50lcd													
former 50lcd<HH<165lcd													
water with project													
Customer Water use 2													

	HH bill	Domestic	Non-	Total
tariff (JD)	av yr bill (JI	Revenue	Domestic	Revenue
(JD)	(JD)	(JD)	(JD)	(JD)
3.750	15	930,654	35,181	965,835
6.525	26.1	477,384	18,046	495,430
9.961	39.844	538,995	20,375	559,370
15.761	63.044	1,214,163	45,898	1,260,060
28.603	114.412	469,531	17,749	487,281
38.759	155.036	243,354	9,199	252,554
50.686	202.744	157,459	5,952	163,412
62.318	249.272	114,572	4,331	118,903
76.388	305.552	75,667	2,860	78,527
93.247	372.988	77,271	2,921	80,192
109.108	436.432	54,670	2,067	56,736
665.775	2663.099		2,079,880	2,079,880
		3,874,082	2,244,460	6,598,180

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 1.

Scenario Settings

Year - Range 2008-2030	**2008**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**Existing**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Existing**
Domestic lcd - Existing/Full Target/Intermediate	**Existing**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Existing**

Water Network Statistics

Population with water supply (persons)	854,325	from Census and Ecoconsult data
Unit Domestic water use (lcd)	55.8	from Ecoconsult data
Unit Non-Domestic water use (lcd)	2.9	from Ecoconsult data
Pipe Length (km)	3,515	from GIS analysis
No. of Water Service Connection Points	120,841	from Ecoconsult data
Supply Continuity (hours per week)	37	from Ecoconsult data

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa	m3/d	lcd
System Input - Production	50,408,378	137,728	
System Input - Imports	3,677,248	10,047	
Export - Azraq Conservation Area	727,207	1,987	
Export - to Amman from Khaw	7,047,988	19,257	
Export - to North - Mafraq from Qunaya	124,350	340	
Export - to West - Jerash and Balqa from Um Rumanneh	272,027	743	
Export - to Desert	146,035	399	
System Input Total	**45,768,019**	**125,049**	**146.4**
Domestic Billed Metered Consumption	17,437,114	47,642	55.8
Non-Domestic Billed Metered Consumption	900,440	2,460	2.9
Billed Metered Consumption Total	**18,337,555**	**50,103**	**58.6**
Unbilled Unmetered Consumption - System Backwash / Flushing	931,513	2,545	
Unbilled Metered Consumption - Agriculture *	133,333	364	
Unbilled Metered Consumption - Tankers *	18,969	52	
Unbilled Consumption Total	**1,083,815**	**2,961**	**3.5**
Unaccounted-for Water: UFW	**26,346,649**	**71,985**	**84.3**
UFW %	57.6%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**27,430,464**	**74,947**	**87.7**
NRW %	59.9%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

UFW Assessment 1.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	84	2	4	88
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		71,985	255,305	137,981
Total UFW	% of SI		57.6%	82.8%	72.2%
System Input Total	m3/d		125,049	308,369	191,044
Supply Continuity	system hrs/wk		43	168	88
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	5,366	5,366	5,366
Meters stopped connections	% of known&metered	2%	1,052	1,052	1,052
Meters avg. under-registration for working customer meters	% underregistration av	5%	2,505	2,505	2,505
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		8,923	8,923	8,923
Total Administrative Losses	% of SI		7.1%	2.9%	4.7%
Physical (Real) Losses					
Total Physical Losses	m3/d		63,062	246,382	129,057
Total Physical Losses	% of SI		50.4%	79.9%	67.6%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		59,070	230,783	120,886
Physical Losses no of "espb"s	no.		15,386	15,386	15,386
Physical Losses espb/km	no./km		4.4	4.4	4.4
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		15.8	15.8	15.8
Total Physical Losses per connection	l/conn/d	water on	2,039	2,039	2,039
Total Physical Losses per pipeline length	m3/km/d	water on	70.1	70.1	70.1

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	2,683	2,683	2,683
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	1,690	1,690	1,690
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		4,373	4,373	4,373
Administrative Losses Target - Total	% of SI Min		6.7%	4.9%	5.9%
Administrative Losses Target - Total	% of SI Mod		6.0%	3.6%	4.9%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		7,985	31,198	16,342
Total SI target Level Min	m3/d		65,422	88,635	73,779
Total Physical Losses Target level	% of SI Min		12.2%	35.2%	22.1%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		3,993	15,599	8,171
Physical Losses no of "espb"s	no.		1,040	1,040	1,040
Physical Losses espb/km	no./km		0.30	0.30	0.30
Total Physical Losses per connection	l/conn/d	water on	258	258	258
Total Physical Losses per pipeline length	m3/km/d	water on	8.9	8.9	8.9

Water Saving on SI	m3/d		59,627	36,414	51,270
Water Saving on SI	lcapd		69.8	42.6	60.0
Domestic Water Capacity available if savings are available to customers	lcapd		125.56	98.39	115.78

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		15,970	62,396	32,684
Total SI target Level Mod	m3/d		73,407	119,833	90,121
Total Physical Losses Target level	% of SI Mod		21.8%	52.1%	36.3%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		11,978	46,797	24,513
Physical Losses no of "espb"s	no.		3,120	3,120	3,120
Physical Losses espb/km	no./km		0.89	0.89	0.89
Total Physical Losses per connection	l/conn/d	water on	516	516	516
Total Physical Losses per pipeline length	m3/km/d	water on	17.8	17.8	17.8

Water Saving on SI	m3/d		51,642	5,216	34,929
Water Saving on SI	lcd		60.4	6.1	40.9
Domestic Water Capacity available if savings are available to customers	lcd		116.21	61.87	96.65

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 2.

Scenario Settings

Year - Range 2008-2030	**2008**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**Existing**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Existing**
Domestic lcd - Existing/Full Target/Intermediate	**Existing**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Existing**

Water Network Statistics

Population with water supply (persons)	854,325	from Census and Ecoconsult data
Unit Domestic water use (lcd)	85.0	from Ecoconsult data
Unit Non-Domestic water use (lcd)	4.4	from Ecoconsult data
Pipe Length (km)	3,515	from GIS analysis
No. of Water Service Connection Points	120,841	from Ecoconsult data
Supply Continuity (hours per week)	37	from Ecoconsult data

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa	m3/d	lcd
System Input - Production	50,408,378	137,728	
System Input - Imports	3,677,248	10,047	
Export - Azraq Conservation Area	727,207	1,987	
Export - to Amman from Khaw	7,047,988	19,257	
Export - to North - Mafraq from Qunaya	124,350	340	
Export - to West - Jerash and Balqa from Um Rumanneh	272,027	743	
Export - to Desert	146,035	399	
System Input Total	**45,768,019**	**125,049**	**146.4**
Domestic Billed Metered Consumption	26,578,038	72,618	85.0
Non-Domestic Billed Metered Consumption	1,382,058	3,776	4.4
Billed Metered Consumption Total	**27,960,096**	**76,394**	**89.4**
Unbilled Unmetered Consumption - System Backwash / Flushing	931,513	2,545	
Unbilled Metered Consumption - Agriculture *	133,333	364	
Unbilled Metered Consumption - Tankers *	18,969	52	
Unbilled Consumption Total	**1,083,815**	**2,961**	**3.5**
Unaccounted-for Water: UFW	**16,724,108**	**45,694**	**53.5**
UFW %	36.5%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**17,807,923**	**48,656**	**57.0**
NRW %	38.9%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 3.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**Existing - diminishing**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Interim target Cap**
Domestic lcd - Existing/Full Target/Intermediate	**Existing - diminishing**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Existing - diminishing**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	53.0	from NOD calcs
Unit Non-Domestic water use (lcd)	2.8	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	18	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	17,163,395	47,023	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**69,835,096**	**191,329**	**113.2**
Domestic Billed Metered Consumption	32,693,048	89,570	53.0
Non-Domestic Billed Metered Consumption	1,700,038	4,658	2.8
Billed Metered Consumption Total	**34,393,087**	**94,228**	**55.8**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	36,500	100	
Unbilled Consumption Total	**1,098,437**	**3,009**	**1.8**
Unaccounted-for Water: UFW	**34,343,573**	**94,092**	**55.7**
UFW %	49.2%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**35,442,009**	**97,101**	**57.5**
NRW %	50.8%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 4.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**Existing - diminishing**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**No cap**
Domestic lcd - Existing/Full Target/Intermediate	**Existing**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Existing**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	55.8	from NOD calcs
Unit Non-Domestic water use (lcd)	2.9	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	37	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	41,529,335	113,779	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**94,201,036**	**258,085**	**152.7**
Domestic Billed Metered Consumption	34,399,344	94,245	55.8
Non-Domestic Billed Metered Consumption	1,776,358	4,867	2.9
Billed Metered Consumption Total	**36,175,702**	**99,112**	**58.6**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	36,500	100	
Unbilled Consumption Total	**1,098,437**	**3,009**	**1.8**
Unaccounted-for Water: UFW	**56,926,897**	**155,964**	**92.3**
UFW %	60.4%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**58,025,334**	**158,974**	**94.1**
NRW %	61.6%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 5.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**Restr & Rehab**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Full - No Cap**
Domestic lcd - Existing/Full Target/Intermediate	**Full Target**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Full Target**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	100.0	from NOD calcs
Unit Non-Domestic water use (lcd)	5.2	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	168	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	38,630,064	105,836	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**91,301,765**	**250,142**	**148.0**
Domestic Billed Metered Consumption	61,684,996	169,000	100.0
Non-Domestic Billed Metered Consumption	3,207,620	8,788	5.2
Billed Metered Consumption Total	**64,892,616**	**177,788**	**105.2**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	-	-	
Unbilled Consumption Total	**1,061,937**	**2,909**	**1.7**
Unaccounted-for Water: UFW	**25,347,213**	**69,444**	**41.1**
UFW %	27.8%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**26,409,149**	**72,354**	**42.8**
NRW %	28.9%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 6.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**P+S+T Rehab & Restructure**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Capped at + 47,000 m3/d**
Domestic lcd - Existing/Full Target/Intermediate	**Intermediate Target**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Intermediate**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	85.0	from NOD calcs
Unit Non-Domestic water use (lcd)	4.4	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	84	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	18,673,765	51,161	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**71,345,466**	**195,467**	**115.7**
Domestic Billed Metered Consumption	52,432,247	143,650	85.0
Non-Domestic Billed Metered Consumption	2,726,477	7,470	4.4
Billed Metered Consumption Total	**55,158,724**	**151,120**	**89.4**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	-	-	
Unbilled Consumption Total	**1,061,937**	**2,909**	**1.7**
Unaccounted-for Water: UFW	**15,124,806**	**41,438**	**24.5**
UFW %	21.2%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**16,186,742**	**44,347**	**26.2**
NRW %	22.7%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 7.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**S+T Reh&Restr only**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Capped at +47,000 m3/d**
Domestic lcd - Existing/Full Target/Intermediate	**Intermediate Target**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Intermediate**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	71.5	from NOD calcs
Unit Non-Domestic water use (lcd)	3.7	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	70	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	17,115,580	46,892	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**69,787,281**	**191,198**	**113.1**
Domestic Billed Metered Consumption	44,104,772	120,835	71.5
Non-Domestic Billed Metered Consumption	2,293,448	6,283	3.7
Billed Metered Consumption Total	**46,398,220**	**127,118**	**75.2**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	-	-	
Unbilled Consumption Total	**1,061,937**	**2,909**	**1.7**
Unaccounted-for Water: UFW	**22,327,124**	**61,170**	**36.2**
UFW %	32.0%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**23,389,060**	**64,080**	**37.9**
NRW %	33.5%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

20445. Zarqa Water Supply Re-structuring and Rehabilitation 13/04/2010
Water Audit 8.

Scenario Settings

Year - Range 2008-2030	**2030**
Network - All of Zarqa or particular WSA	**All Zarqa network**
Network Condition - Existing / Rehabilitated / Restructured & Rehabbed	**P+S+T Rehab & Restructure**
Water Supply Source Availability - Existing capped/ ex. pro-rata growth / interim target / full requirement	**Capped at + 47,000 m3/d**
Domestic lcd - Existing/Full Target/Intermediate	**Intermediate Target**
Non-domestic lcd - At 5.2% of Dom lcd	**5.2% of Dom**
Supply continuity - Existing/Full Target/Intermediate	**Intermediate**

Water Network Statistics

Population with water supply (persons)	1,690,000	from NOD calcs
Unit Domestic water use (lcd)	85.0	from NOD calcs
Unit Non-Domestic water use (lcd)	4.4	from NOD calcs
Pipe Length (km)	5,343	from NOD calcs
No. of Water Service Connection Points	216,196	from NOD calcs
Supply Continuity (hours per week)	70	from NOD calcs

Water Balance for overall Zarqa Governorate

IWA Water Balance Categories	**Water Audit**		
	Total	AD	per capita
	m3pa - 365 days	m3/d	lcd
System Input - Production	50,270,650	137,728	
System Input - Imports	3,667,201	10,047	
Additional Production / Import Requirement	17,033,455	46,667	
Export - Azraq Conservation Area	725,220	1,987	
Export - to Amman from Khaw	-	-	
Export - to North - Mafraq from Qunaya	124,010	340	
Export - to West - Jerash and Balqa from Um Rumanneh	271,284	743	
Export - to Desert	145,636	399	
System Input Total	**69,705,156**	**190,973**	**113.0**
Domestic Billed Metered Consumption	52,432,247	143,650	85.0
Non-Domestic Billed Metered Consumption	2,726,477	7,470	4.4
Billed Metered Consumption Total	**55,158,724**	**151,120**	**89.4**
Unbilled Unmetered Consumption - System Backwash / Flushing	928,968	2,545	
Unbilled Metered Consumption - Agriculture *	132,969	364	
Unbilled Metered Consumption - Tankers *	-	-	
Unbilled Consumption Total	**1,061,937**	**2,909**	**1.7**
Unaccounted-for Water: UFW	**13,484,496**	**36,944**	**21.9**
UFW %	19.3%		
Non-Revenue Water: NRW = UFW + Unbilled Consumption	**14,546,432**	**39,853**	**23.6**
NRW %	20.9%		

Water Production, Import and Export data from WAJ System Metering Records
* from GTZ Working Paper No. 205 Table 3 p12

Water Audit 9.
Zarqa WSS. Ecoconsult data 130410

From Ecoconsult Tables 10 & 11 P 74. Total SI & Water Billed

District	Total	Billed	Unbilled (NRW)	
	m3/yr	m3/yr	m3/yr	%
Zarqa + Berein	28,055,992	11,784,183	16,271,809	58.0%
Hashmeya	2,940,910	1,242,897	1,698,013	57.7%
Azraq	1,914,153	389,428	1,524,725	79.7%
Dulail	2,332,660	701,035	1,631,625	69.9%
Russaifah	9,592,791	5,772,529	3,820,262	39.8%
Total	44,836,506	19,890,072	24,946,434	55.6%

Water Audit 10.
Zarqa WSS. Water Audit Statistics 2008

	Ecoconsult Data					Dom	Non-Dom	
WSA	Conn pts	Pop2008	Poverty_sc	Lcd_Dom	Lcd_Non-Dom	m3/d	m3/d	pipe length (m)
Azraq	991	7,396	1.50	138.1	19.5	1,022	144	48,756
Dulail	3,309	37,790	1.50	48.4	9.8	1,828	370	231,237
KABA	-	-	-	-	-	-	-	63,568
Tatweer	1,613	8,501	3.08	64.0	1.4	544	12	81,755
Zarqa	47,474	283,526	2.65	55.5	3.4	15,746	977	859,095
Awajan	21,885	149,171	2.07	59.7	2.0	8,903	305	617,079
Russaifah	35,921	303,448	2.43	50.6	1.5	15,365	458	920,815
North	7,293	51,629	3.03	62.4	2.8	3,223	144	295,564
WestNW	2,355	12,864	-	78.7	4.0	1,012	51	242,445
non-WSA								154,529
Total	**120,841**	**854,325**	**2.44**	**55.8**	**2.9**	**47,642**	**2,460**	**3,514,844**

Zarqa WSS. Water Audit Statistics 2030

				Full Target		Dom	Non-Dom			Intermediate Target		Dom	Non-Dom	Sum
WSA	Conn pts	Pop2030		Lcd_Dom	Lcd_Non-Dom	m3/d	m3/d	pipe length (m)		Lcd_Dom	Lcd_Non-D	m3/d	m3/d	m3/d
Azraq	1,351	10,154		100.0	5.2	1,015	53	56,749		85.0	4.4	863	45	908
Dulail	4,722	55,329		100.0	5.2	5,533	288	279,104		85.0	4.4	4,703	245	4,947
KABA	43,601	436,008		100.0	5.2	43,601	2,267	1,023,268		85.0	4.4	37,061	1,927	38,988
Tatweer	2,896	16,888		100.0	5.2	1,689	88	124,899		85.0	4.4	1,436	75	1,510
Zarqa	65,918	399,586		100.0	5.2	39,959	2,078	1,023,268		85.0	4.4	33,965	1,766	35,731
Awajan	31,985	225,680		100.0	5.2	22,568	1,174	775,685		85.0	4.4	19,183	998	20,180
Russaifah	51,779	450,472		100.0	5.2	45,047	2,342	1,139,003		85.0	4.4	38,290	1,991	40,281
North	10,449	76,008		100.0	5.2	7,601	395	362,821		85.0	4.4	6,461	336	6,797
WestNW	3,495	19,874		100.0	5.2	1,987	103	308,566		85.0	4.4	1,689	88	1,777
non-WSA								250,000						
Total	**216,196**	**1,690,000**		**100.0**	**5.2**	**169,000**	**8,788**	**5,343,364**		**85.0**	**4.4**	**143,650**	**7,470**	**151,120**

UFW Assessment 1.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	84	2	4	88
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		71,985	255,305	137,981
Total UFW	% of SI		57.6%	82.8%	72.2%
System Input Total	m3/d		125,049	308,369	191,044
Supply Continuity	system hrs/wk		43	168	88
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	5,366	5,366	5,366
Meters stopped connections	% of known&metered	2%	1,052	1,052	1,052
Meters avg. under-registration for working customer meters	% underregistration av	5%	2,505	2,505	2,505
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		8,923	8,923	8,923
Total Administrative Losses	% of SI		7.1%	2.9%	4.7%
Physical (Real) Losses					
Total Physical Losses	m3/d		63,062	246,382	129,057
Total Physical Losses	% of SI		50.4%	79.9%	67.6%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		59,070	230,783	120,886
Physical Losses no of "espb"s	no.		15,386	15,386	15,386
Physical Losses espb/km	no./km		4.4	4.4	4.4
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		15.8	15.8	15.8
Total Physical Losses per connection	l/conn/d	water on	2,039	2,039	2,039
Total Physical Losses per pipeline length	m3/km/d	water on	70.1	70.1	70.1

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	2,683	2,683	2,683
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	1,690	1,690	1,690
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		4,373	4,373	4,373
Administrative Losses Target - Total	% of SI Min		6.7%	4.9%	5.9%
Administrative Losses Target - Total	% of SI Mod		6.0%	3.6%	4.9%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		7,985	31,198	16,342
Total SI target Level Min	m3/d		65,422	88,635	73,779
Total Physical Losses Target level	% of SI Min		12.2%	35.2%	22.1%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		3,993	15,599	8,171
Physical Losses no of "espb"s	no.		1,040	1,040	1,040
Physical Losses espb/km	no./km		0.30	0.30	0.30
Total Physical Losses per connection	l/conn/d	water on	258	258	258
Total Physical Losses per pipeline length	m3/km/d	water on	8.9	8.9	8.9

Water Saving on SI	m3/d		59,627	36,414	51,270
Water Saving on SI	lcapd		69.8	42.6	60.0
Domestic Water Capacity available if savings are available to customers	lcapd		125.56	98.39	115.78

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		15,970	62,396	32,684
Total SI target Level Mod	m3/d		73,407	119,833	90,121
Total Physical Losses Target level	% of SI Mod		21.8%	52.1%	36.3%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,993	15,599	8,171
Physical Losses - "Bursts"	m3/d		11,978	46,797	24,513
Physical Losses no of "espb"s	no.		3,120	3,120	3,120
Physical Losses espb/km	no./km		0.89	0.89	0.89
Total Physical Losses per connection	l/conn/d	water on	516	516	516
Total Physical Losses per pipeline length	m3/km/d	water on	17.8	17.8	17.8

Water Saving on SI	m3/d		51,642	5,216	34,929
Water Saving on SI	lcd		60.4	6.1	40.9
Domestic Water Capacity available if savings are available to customers	lcd		116.21	61.87	96.65

UFW Assessment 2.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	18	1	6	24
MCC Interim Target Supply Continuity	70	2	4	74
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		89,114	517,786	237,958
Total UFW	% of SI		46.6%	83.5%	70.0%
System Input Total	m3/d		191,329	620,001	340,174
Supply Continuity	system hrs/wk		24	168	74
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	10,625	10,625	10,625
Meters stopped connections	% of known&metered	2%	2,083	2,083	2,083
Meters avg. under-registration for working customer meters	% underregistration av	5%	4,960	4,960	4,960
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		17,669	17,669	17,669
Total Administrative Losses	% of SI		9.2%	2.8%	5.2%
Physical (Real) Losses					
Total Physical Losses	m3/d		71,445	500,118	220,290
Total Physical Losses	% of SI		37.3%	80.7%	64.8%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	11,877
Physical Losses - "Bursts"	m3/d		67,594	473,155	208,413
Physical Losses no of "espb"s	no.		31,544	31,544	31,544
Physical Losses espb/km	no./km		5.9	5.9	5.9
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		18.5	18.5	18.5
Total Physical Losses per connection	l/conn/d	water on	2,313	2,313	2,313
Total Physical Losses per pipeline length	m3/km/d	water on	93.6	93.6	93.6

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	12%	12,750	12,750	12,750
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	5%	5,206	5,206	5,206
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		17,956	17,956	17,956
Administrative Losses Target - Total	% of SI Min		14.0%	10.3%	12.5%
Administrative Losses Target - Total	% of SI Mod		9.1%	2.7%	5.0%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		7,704	53,926	23,753
Total SI target Level Min	m3/d		127,875	174,097	143,924
Total Physical Losses Target level	% of SI Min		6.0%	31.0%	16.5%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	11,877
Physical Losses - "Bursts"	m3/d		3,852	26,963	11,877
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		63,454	17,232	47,405
Water Saving on SI	lcapd		37.5	10.2	28.1
Domestic Water Capacity available if savings are available to customers	lcapd		93.35	66.00	83.85

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	20.00			
Total Physical Losses Target level	m3/d		77,037	539,259	237,531
Total SI target Level Mod	m3/d		197,208	659,430	357,702
Total Physical Losses Target level	% of SI Mod		39.1%	81.8%	66.4%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	11,877
Physical Losses - "Bursts"	m3/d		73,185	512,296	225,654
Physical Losses no of "espb"s	no.		34,153	34,153	34,153
Physical Losses espb/km	no./km		6.39	6.39	6.39
Total Physical Losses per connection	l/conn/d	water on	2,494	2,494	2,494
Total Physical Losses per pipeline length	m3/km/d	water on	100.9	100.9	100.9

Water Saving on SI	m3/d		- 5,879	- 468,101	- 166,373
Water Saving on SI	lcd		- 3.5	- 277.0	- 98.4
Domestic Water Capacity available if savings are available to customers	lcd		52.32	- 221.18	- 42.65

UFW Assessment 3.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	18	1	6	24
MCC Interim Target Supply Continuity	84	2	12	96
Full Supply Continuity	168	0	0	168

Parameter	**Unit**	**Value**	**At Current Supply Continuity (m3/d)**	**At Full Supply Continuity (m3/d)**	**At MCC Interim Target Supply Continuity (m3/d)**
Total UFW - Average Day	m3/d		94,092	557,952	326,022
Total UFW	% of SI		49.2%	85.2%	77.0%
System Input Total	m3/d		191,329	655,189	423,259
Supply Continuity	system hrs/wk		24	168	96
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	10,092	10,092	10,092
Meters stopped connections	% of known&metered	2%	1,979	1,979	1,979
Meters avg. under-registration for working customer meters	% underregistration av	5%	4,711	4,711	4,711
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		16,782	16,782	16,782
Total Administrative Losses	% of SI		8.8%	2.6%	4.0%
Physical (Real) Losses					
Total Physical Losses	m3/d		77,310	541,170	309,240
Total Physical Losses	% of SI		40.4%	82.6%	73.1%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	15,407
Physical Losses - "Bursts"	m3/d		73,458	514,207	293,833
Physical Losses no of "espb"s	no.		34,280	34,280	34,280
Physical Losses espb/km	no./km		6.4	6.4	6.4
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		20.1	20.1	20.1
Total Physical Losses per connection	l/conn/d	water on	2,503	2,503	2,503
Total Physical Losses per pipeline length	m3/km/d	water on	101.3	101.3	101.3

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	12%	12,110	12,110	12,110
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	5%	4,945	4,945	4,945
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		17,055	17,055	17,055
Administrative Losses Target - Total	% of SI Min		14.0%	10.1%	11.8%
Administrative Losses Target - Total	% of SI Mod		8.9%	2.6%	4.0%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		7,704	53,926	30,815
Total SI target Level Min	m3/d		121,996	168,218	145,107
Total Physical Losses Target level	% of SI Min		6.3%	32.1%	21.2%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	15,407
Physical Losses - "Bursts"	m3/d		3,852	26,963	15,407
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		69,333	23,111	46,222
Water Saving on SI	lcapd		41.0	13.7	27.4
Domestic Water Capacity available if savings are available to customers	lcapd		94.03	66.68	80.35

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	20.00			
Total Physical Losses Target level	m3/d		77,037	539,259	308,148
Total SI target Level Mod	m3/d		191,329	653,551	422,440
Total Physical Losses Target level	% of SI Mod		40.3%	82.5%	72.9%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		3,852	26,963	15,407
Physical Losses - "Bursts"	m3/d		73,185	512,296	292,740
Physical Losses no of "espb"s	no.		34,153	34,153	34,153
Physical Losses espb/km	no./km		6.39	6.39	6.39
Total Physical Losses per connection	l/conn/d	water on	2,494	2,494	2,494
Total Physical Losses per pipeline length	m3/km/d	water on	100.9	100.9	100.9

Water Saving on SI	m3/d		- 0	- 462,222	- 231,111
Water Saving on SI	lcd		- 0.0	- 273.5	- 136.8
Domestic Water Capacity available if savings are available to customers	lcd		53.00	- 220.50	- 83.75

UFW Assessment 4.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	84	2	12	96
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		155,964	558,035	326,442
Total UFW	% of SI		60.4%	84.5%	76.2%
System Input Total	m3/d		258,085	660,156	428,563
Supply Continuity	system hrs/wk		43	168	96
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	10,615	10,615	10,615
Meters stopped connections	% of known&metered	2%	2,081	2,081	2,081
Meters avg. under-registration for working customer meters	% underregistration av	5%	4,956	4,956	4,956
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		17,652	17,652	17,652
Total Administrative Losses	% of SI		6.8%	2.7%	4.1%
Physical (Real) Losses					
Total Physical Losses	m3/d		138,312	540,383	308,790
Total Physical Losses	% of SI		53.6%	81.9%	72.1%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		131,411	513,420	293,383
Physical Losses no of "espb"s	no.		34,228	34,228	34,228
Physical Losses espb/km	no./km		6.4	6.4	6.4
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		20.0	20.0	20.0
Total Physical Losses per connection	l/conn/d	water on	2,500	2,500	2,500
Total Physical Losses per pipeline length	m3/km/d	water on	101.1	101.1	101.1

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	12%	12,738	12,738	12,738
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	5%	5,201	5,201	5,201
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		17,939	17,939	17,939
Administrative Losses Target - Total	% of SI Min		13.4%	10.3%	11.9%
Administrative Losses Target - Total	% of SI Mod		7.0%	2.7%	4.2%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		13,802	53,926	30,815
Total SI target Level Min	m3/d		133,862	173,986	150,875
Total Physical Losses Target level	% of SI Min		10.3%	31.0%	20.4%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		6,901	26,963	15,407
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		124,223	84,099	107,210
Water Saving on SI	lcapd		73.5	49.8	63.4
Domestic Water Capacity available if savings are available to customers	lcapd		129.27	105.53	119.20

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	20.00			
Total Physical Losses Target level	m3/d		138,025	539,259	308,148
Total SI target Level Mod	m3/d		258,085	659,319	428,208
Total Physical Losses Target level	% of SI Mod		53.5%	81.8%	72.0%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		131,123	512,296	292,740
Physical Losses no of "espb"s	no.		34,153	34,153	34,153
Physical Losses espb/km	no./km		6.39	6.39	6.39
Total Physical Losses per connection	l/conn/d	water on	2,494	2,494	2,494
Total Physical Losses per pipeline length	m3/km/d	water on	100.9	100.9	100.9

Water Saving on SI	m3/d		0	- 401,234	- 170,123
Water Saving on SI	lcd		0.0	- 237.4	- 100.7
Domestic Water Capacity available if savings are available to customers	lcd		55.77	- 181.65	- 44.90

UFW Assessment 5.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	84	2	12	96
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		69,444	179,271	116,011
Total UFW	% of SI		27.8%	49.8%	39.1%
System Input Total	m3/d		250,142	359,968	296,708
Supply Continuity	system hrs/wk		43	168	96
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	19,041	19,041	19,041
Meters stopped connections	% of known&metered	2%	3,734	3,734	3,734
Meters avg. under-registration for working customer meters	% underregistration av	5%	8,889	8,889	8,889
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		31,664	31,664	31,664
Total Administrative Losses	% of SI		12.7%	8.8%	10.7%
Physical (Real) Losses					
Total Physical Losses	m3/d		37,780	147,607	84,347
Total Physical Losses	% of SI		15.1%	41.0%	28.4%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		30,879	120,644	68,939
Physical Losses no of "espb"s	no.		8,043	8,043	8,043
Physical Losses espb/km	no./km		1.5	1.5	1.5
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		5.5	5.5	5.5
Total Physical Losses per connection	l/conn/d	water on	683	683	683
Total Physical Losses per pipeline length	m3/km/d	water on	27.6	27.6	27.6

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	9,521	9,521	9,521
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	5,998	5,998	5,998
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		15,518	15,518	15,518
Administrative Losses Target - Total	% of SI Min		7.4%	6.2%	6.8%
Administrative Losses Target - Total	% of SI Mod		6.9%	5.1%	6.0%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		13,802	53,926	30,815
Total SI target Level Min	m3/d		210,018	250,142	227,031
Total Physical Losses Target level	% of SI Min		6.6%	21.6%	13.6%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		6,901	26,963	15,407
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		40,123	0	23,111
Water Saving on SI	lcapd		23.7	0.0	13.7
Domestic Water Capacity available if savings are available to customers	lcapd		123.74	100.00	113.68

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		27,605	107,852	61,630
Total SI target Level Mod	m3/d		223,821	304,068	257,845
Total Physical Losses Target level	% of SI Mod		12.3%	35.5%	23.9%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	15,407
Physical Losses - "Bursts"	m3/d		20,704	80,889	46,222
Physical Losses no of "espb"s	no.		5,393	5,393	5,393
Physical Losses espb/km	no./km		1.01	1.01	1.01
Total Physical Losses per connection	l/conn/d	water on	499	499	499
Total Physical Losses per pipeline length	m3/km/d	water on	20.2	20.2	20.2

Water Saving on SI	m3/d		26,321	- 53,926	- 7,704
Water Saving on SI	lcd		15.6	- 31.9	- 4.6
Domestic Water Capacity available if savings are available to customers	lcd		115.57	68.09	95.44

UFW Assessment 6.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	84	2	4	88
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		41,438	83,657	56,637
Total UFW	% of SI		21.2%	35.2%	26.9%
System Input Total	m3/d		195,467	237,686	210,666
Supply Continuity	system hrs/wk		43	168	88
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	16,185	16,185	16,185
Meters stopped connections	% of known&metered	2%	3,174	3,174	3,174
Meters avg. under-registration for working customer meters	% underregistration av	5%	7,556	7,556	7,556
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		26,914	26,914	26,914
Total Administrative Losses	% of SI		13.8%	11.3%	12.8%
Physical (Real) Losses					
Total Physical Losses	m3/d		14,523	56,743	29,722
Total Physical Losses	% of SI		7.4%	23.9%	14.1%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	14,123
Physical Losses - "Bursts"	m3/d		7,622	29,780	15,599
Physical Losses no of "espb"s	no.		1,985	1,985	1,985
Physical Losses espb/km	no./km		0.4	0.4	0.4
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		2.1	2.1	2.1
Total Physical Losses per connection	l/conn/d	water on	262	262	262
Total Physical Losses per pipeline length	m3/km/d	water on	10.6	10.6	10.6

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	8,092	8,092	8,092
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	5,098	5,098	5,098
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		13,191	13,191	13,191
Administrative Losses Target - Total	% of SI Min		7.3%	6.0%	6.7%
Administrative Losses Target - Total	% of SI Mod		6.8%	4.8%	5.9%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		13,802	53,926	28,247
Total SI target Level Min	m3/d		181,022	221,146	195,467
Total Physical Losses Target level	% of SI Min		7.6%	24.4%	14.5%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	14,123
Physical Losses - "Bursts"	m3/d		6,901	26,963	14,123
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		14,445	- 25,679	0
Water Saving on SI	lcapd		8.5	- 15.2	0.0
Domestic Water Capacity available if savings are available to customers	lcapd		93.55	69.81	85.00

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		27,605	107,852	56,494
Total SI target Level Mod	m3/d		194,825	275,072	223,714
Total Physical Losses Target level	% of SI Mod		14.2%	39.2%	25.3%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	14,123
Physical Losses - "Bursts"	m3/d		20,704	80,889	42,370
Physical Losses no of "espb"s	no.		5,393	5,393	5,393
Physical Losses espb/km	no./km		1.01	1.01	1.01
Total Physical Losses per connection	l/conn/d	water on	499	499	499
Total Physical Losses per pipeline length	m3/km/d	water on	20.2	20.2	20.2

Water Saving on SI	m3/d		642	- 79,605	- 28,247
Water Saving on SI	lcd		0.4	- 47.1	- 16.7
Domestic Water Capacity available if savings are available to customers	lcd		85.38	37.90	68.29

UFW Assessment 7.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	70	2	8	78
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		61,170	173,177	92,532
Total UFW	% of SI		32.0%	57.1%	41.6%
System Input Total	m3/d		191,198	303,205	222,560
Supply Continuity	system hrs/wk		43	168	78
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	13,614	13,614	13,614
Meters stopped connections	% of known&metered	2%	2,669	2,669	2,669
Meters avg. under-registration for working customer meters	% underregistration av	5%	6,356	6,356	6,356
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		22,640	22,640	22,640
Total Administrative Losses	% of SI		11.8%	7.5%	10.2%
Physical (Real) Losses					
Total Physical Losses	m3/d		38,530	150,537	69,892
Total Physical Losses	% of SI		20.2%	49.6%	31.4%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	12,519
Physical Losses - "Bursts"	m3/d		31,629	123,574	57,374
Physical Losses no of "espb"s	no.		8,238	8,238	8,238
Physical Losses espb/km	no./km		1.5	1.5	1.5
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		5.6	5.6	5.6
Total Physical Losses per connection	l/conn/d	water on	696	696	696
Total Physical Losses per pipeline length	m3/km/d	water on	28.2	28.2	28.2

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	6,807	6,807	6,807
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	4,289	4,289	4,289
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		11,096	11,096	11,096
Administrative Losses Target - Total	% of SI Min		7.2%	5.7%	6.7%
Administrative Losses Target - Total	% of SI Mod		6.6%	4.5%	5.8%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		13,802	53,926	25,037
Total SI target Level Min	m3/d		154,926	195,049	166,161
Total Physical Losses Target level	% of SI Min		8.9%	27.6%	15.1%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	12,519
Physical Losses - "Bursts"	m3/d		6,901	26,963	12,519
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		36,272	- 3,851	25,037
Water Saving on SI	lcapd		21.5	- 2.3	14.8
Domestic Water Capacity available if savings are available to customers	lcapd		92.96	69.22	86.32

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		27,605	107,852	50,074
Total SI target Level Mod	m3/d		168,728	248,975	191,198
Total Physical Losses Target level	% of SI Mod		16.4%	43.3%	26.2%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	12,519
Physical Losses - "Bursts"	m3/d		20,704	80,889	37,556
Physical Losses no of "espb"s	no.		5,393	5,393	5,393
Physical Losses espb/km	no./km		1.01	1.01	1.01
Total Physical Losses per connection	l/conn/d	water on	499	499	499
Total Physical Losses per pipeline length	m3/km/d	water on	20.2	20.2	20.2

Water Saving on SI	m3/d		22,470	- 57,777	0
Water Saving on SI	lcd		13.3	- 34.2	0.0
Domestic Water Capacity available if savings are available to customers	lcd		84.80	37.31	71.50

UFW Assessment 8.

UFW m3/d - one "equivalent service pipe burst" - "espb"	15 m3/d		0.625 m3/hr	
	cust hrs/week	periods/wk	start&stop hrs/wk	system hrs/wk
Current Supply Continuity	37	1	6	43
MCC Interim Target Supply Continuity	70	2	4	74
Full Supply Continuity	168	0	0	168

Parameter	Unit	Value	At Current Supply Continuity (m3/d)	At Full Supply Continuity (m3/d)	At MCC Interim Target Supply Continuity (m3/d)
Total UFW - Average Day	m3/d		36,944	66,099	44,174
Total UFW	% of SI		19.3%	30.0%	22.3%
System Input Total	m3/d		190,973	220,128	198,204
Supply Continuity	system hrs/wk		43	168	74
Administrative (Apparent) Losses					
Unknown/unmetered connections	% of known&metered	10%	16,185	16,185	16,185
Meters stopped connections	% of known&metered	2%	3,174	3,174	3,174
Meters avg. under-registration for working customer meters	% underregistration av	5%	7,556	7,556	7,556
Systematic data handling errors	% underrecording av	0%	-	-	-
Total Administrative Losses	m3/d		26,914	26,914	26,914
Total Administrative Losses	% of SI		14.1%	12.2%	13.6%
Physical (Real) Losses					
Total Physical Losses	m3/d		10,029	39,185	17,260
Total Physical Losses	% of SI		5.3%	17.8%	8.7%
Physical Losses - "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	11,877
Physical Losses - "Bursts"	m3/d		3,128	12,222	5,383
Physical Losses no of "espb"s	no.		815	815	815
Physical Losses espb/km	no./km		0.2	0.2	0.2
Infrastructure Leakage Index "ILI" = (Background+Bursts)/Background	Ratio		1.5	1.5	1.5
Total Physical Losses per connection	l/conn/d	water on	181	181	181
Total Physical Losses per pipeline length	m3/km/d	water on	7.3	7.3	7.3

Target Level of Administrative Losses

Min Level of Admin Losses only achievable with full Operational and Data Management Infrastructure, Resources and Organisational Suppo
Applicaple to both Minimum and Moderate levels of Physical Losse

Administrative Losses Target - Unknown/unmetered/stopped	% of known&metered	5%	8,092	8,092	8,092
Administrative Losses Target - Meter under-registration for working meters	% underregistration av	3%	5,098	5,098	5,098
Administrative Losses Target - Systematic data handling errors	% underrecording av	0%	0	-	-
Administrative Losses Target - Total	m3/d		13,191	13,191	13,191
Administrative Losses Target - Total	% of SI Min		7.3%	6.0%	6.9%
Administrative Losses Target - Total	% of SI Mod		6.8%	4.8%	6.1%

Minimum Level of Physical Losses

Min Level of Leakage only achievable with full R&R + VERY High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Support

Total Physical Losses Target ILI for Min Level of Leakage *	Ratio	2.00			
Total Physical Losses Target level	m3/d		13,802	53,926	23,753
Total SI target Level Min	m3/d		181,022	221,146	190,973
Total Physical Losses Target level	% of SI Min		7.6%	24.4%	12.4%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	11,877
Physical Losses - "Bursts"	m3/d		6,901	26,963	11,877
Physical Losses no of "espb"s	no.		1,798	1,798	1,798
Physical Losses espb/km	no./km		0.34	0.34	0.34
Total Physical Losses per connection	l/conn/d	water on	249	249	249
Total Physical Losses per pipeline length	m3/km/d	water on	10.1	10.1	10.1

Water Saving on SI	m3/d		9,951	- 30,173	0
Water Saving on SI	lcapd		5.9	- 17.9	0.0
Domestic Water Capacity available if savings are available to customers	lcapd		90.89	67.15	85.00

Moderate Level of Physical Losses

Moderate Level of Leakage will require full Rehabilitation + High Network Monitoring, Asset Management and Active Leakage Control Infrastructure, Resources and Organisational Suppo

Total Physical Losses Target ILI for Moderate Level of Leakage *	Ratio	4.00			
Total Physical Losses Target level	m3/d		27,605	107,852	47,506
Total SI target Level Mod	m3/d		194,825	275,072	214,726
Total Physical Losses Target level	% of SI Mod		14.2%	39.2%	22.1%
Physical Losses- "Background" @ 100l/conn/d + 1m3/km/d	m3/d		6,901	26,963	11,877
Physical Losses - "Bursts"	m3/d		20,704	80,889	35,630
Physical Losses no of "espb"s	no.		5,393	5,393	5,393
Physical Losses espb/km	no./km		1.01	1.01	1.01
Total Physical Losses per connection	l/conn/d	water on	499	499	499
Total Physical Losses per pipeline length	m3/km/d	water on	20.2	20.2	20.2

Water Saving on SI	m3/d		- 3,852	- 84,099	- 23,753
Water Saving on SI	lcd		- 2.3	- 49.8	- 14.1
Domestic Water Capacity available if savings are available to customers	lcd		82.72	35.24	70.94

Water Balance 1
Zarqa WSS

Long-Term Water Balance Scenarios

Population

Year	2008	2010	2015	2020	2025	2030
Population Total	854,325	914,916	1,253,663	1,476,249	1,575,278	1,690,000
Population Z+R+A	736,145	761,947	830,504	905,270	986,809	1,075,739
Population KABA	-	30,326	288,575	423,238	426,221	436,008

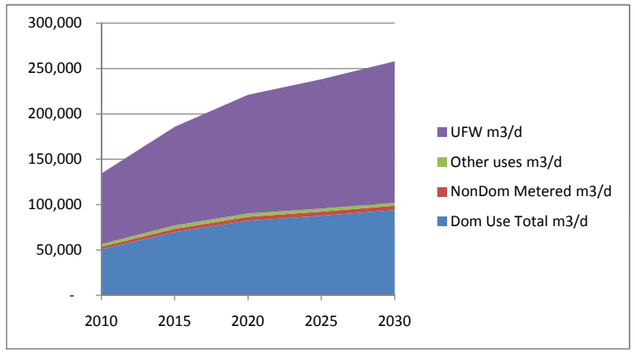
Scenario A1. No Intervention, No Cap on Production

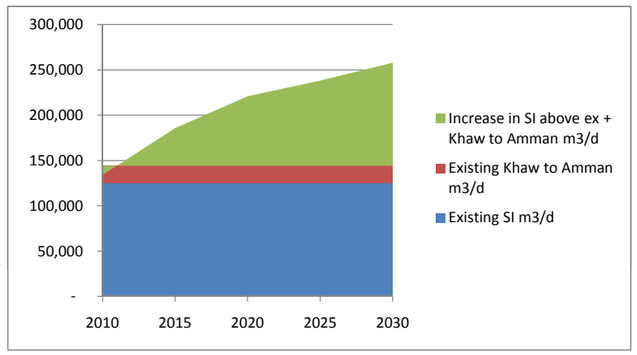
Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	55.8	55.8	55.8	55.8	55.8	55.8
NonDom Metered lcd	2.9	2.9	2.9	2.9	2.9	2.9
Other uses lcd	3.5	3.3	2.9	2.5	2.2	1.8
UFW lcd	84.3	85.0	86.8	88.6	90.5	92.3
Total lcd	146	147	148	150	151	153
Dom Use Total m3/d	47,642	51,021	69,912	82,325	87,847	94,245
NonDom Metered m3/d	2,460	2,635	3,610	4,251	4,536	4,867
Other uses m3/d	2,961	3,031	3,673	3,760	3,409	3,009
UFW m3/d	71,985	77,758	108,835	130,852	142,503	155,964
Total m3/d	125,049	134,446	186,031	221,188	238,295	258,085
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 19,257	- 9,860	41,725	76,882	93,990	113,779
Supply continuity av hrs/wk	37	37	37	37	37	37

Scenario A2. Full Intervention No Cap on Production

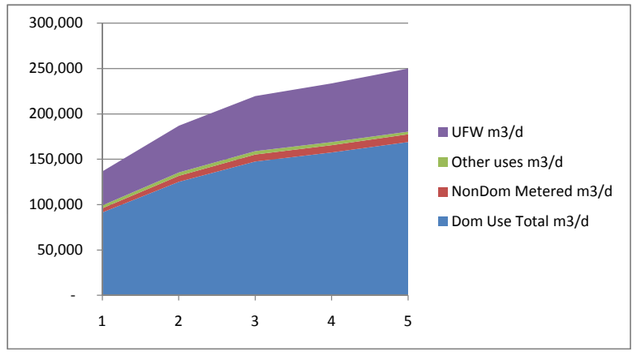
Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	100.0	100.0	100.0	100.0	100.0	100.0
NonDom Metered lcd	5.2	5.2	5.2	5.2	5.2	5.2
Other uses lcd	3.5	3.3	2.9	2.5	2.1	1.7
UFW lcd	41.1	41.1	41.1	41.1	41.1	41.1
Total lcd	150	150	149	149	148	148
Dom Use Total m3/d	85,433	91,492	125,366	147,625	157,528	169,000
NonDom Metered m3/d	4,442	4,758	6,519	7,676	8,191	8,788
Other uses m3/d	2,961	3,026	3,650	3,712	3,337	2,909
UFW m3/d	35,113	37,602	51,522	60,667	64,733	69,444
Total m3/d	127,949	136,878	187,057	219,680	233,789	250,142
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 16,357	- 7,428	42,751	75,375	89,483	105,836
Supply continuity av hrs/wk	168	168	168	168	168	168

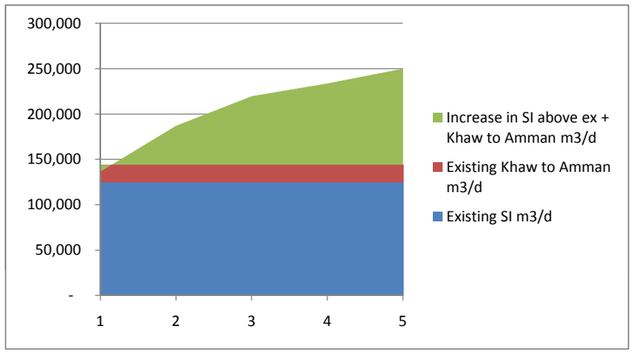
Scenario A1. No Intervention, No Cap on Production





Scenario A2. Full Intervention No Cap on Production





Water Balance 2
Zarqa WSS

Long-Term Water Balance Scenarios

Population

Year	2008	2010	2015	2020	2025	2030
Population Total	854,325	914,916	1,253,663	1,476,249	1,575,278	1,690,000
Population Z+R+A	736,145	761,947	830,504	905,270	986,809	1,075,739
Population KABA	-	30,326	288,575	423,238	426,221	436,008

Scenario B1. No Intervention, Cap on Production Increase at 47,000 m3/d at 2030

Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	55.8	55.5	54.9	54.3	53.6	53.0
NonDom Metered lcd	2.9	2.9	2.8	2.8	2.8	2.8
Other uses lcd	3.5	3.3	2.9	2.5	2.2	1.8
UFW lcd	84.3	81.7	75.2	68.7	62.2	55.7
Total lcd	146	143	136	128	121	113
Dom Use Total m3/d	47,642	50,791	68,809	80,097	84,480	89,570
NonDom Metered m3/d	2,460	2,624	3,561	4,152	4,386	4,658
Other uses m3/d	2,961	3,031	3,673	3,760	3,409	3,009
UFW m3/d	71,985	74,713	94,232	101,372	97,938	94,092
Total m3/d	125,049	131,160	170,274	189,381	190,213	191,329
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 19,257	- 13,146	25,968	45,075	45,907	47,023
Supply continuity av hrs/wk	37	35.3	31.0	26.6	22.3	18

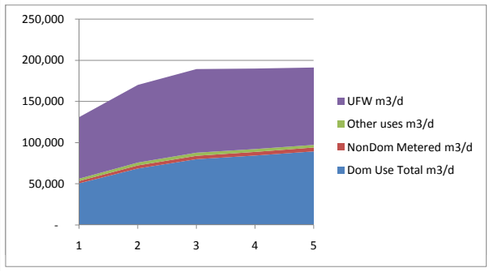
Scenario B2. Secondary & Tertiary Intervention, Intermediate Demand and Supply Continuity Levels,
Cap on Production Increase at 47,000 m3/d at 2030

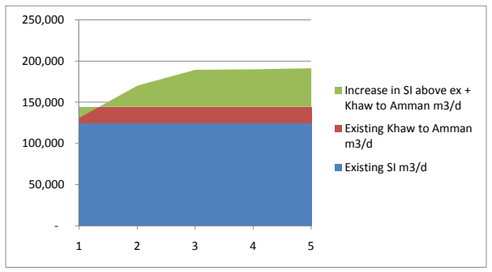
Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	71.5	71.5	71.5	71.5	71.5	71.5
NonDom Metered lcd	3.7	3.7	3.7	3.7	3.7	3.7
Other uses lcd	3.5	3.3	2.9	2.5	2.1	1.7
UFW lcd	36.2	36.2	36.2	36.2	36.2	36.2
Total lcd	115	115	114	114	114	113
Dom Use Total m3/d	61,084	65,416	89,637	105,552	112,632	120,835
NonDom Metered m3/d	3,176	3,402	4,661	5,489	5,857	6,283
Other uses m3/d	2,961	3,026	3,650	3,712	3,337	2,909
UFW m3/d	30,923	33,116	45,377	53,433	57,018	61,170
Total m3/d	98,144	104,960	143,324	168,186	178,844	191,198
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 46,161	- 39,346	- 981	23,880	34,538	46,892
Supply continuity av hrs/wk	70	70	70	70	70	70

Scenario B3. Full Intervention, Intermediate Demand and Supply Continuity Levels,
Cap on Production Increase at 47,000 m3/d at 2030

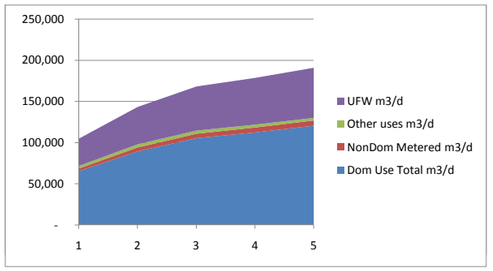
Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	85.0	85.0	85.0	85.0	85.0	85.0
NonDom Metered lcd	4.4	4.4	4.4	4.4	4.4	4.4
Other uses lcd	3.5	3.3	2.9	2.5	2.1	1.7
UFW lcd	21.9	21.9	21.9	21.9	21.9	21.9
Total lcd	115	115	114	114	113	113
Dom Use Total m3/d	72,618	77,768	106,561	125,481	133,899	143,650
NonDom Metered m3/d	3,776	4,044	5,541	6,525	6,963	7,470
Other uses m3/d	2,961	3,026	3,650	3,712	3,337	2,909
UFW m3/d	18,676	20,000	27,405	32,271	34,436	36,944
Total m3/d	98,031	104,838	143,157	167,990	178,634	190,973
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 46,275	- 39,468	- 1,148	23,684	34,328	46,667
Supply continuity av hrs/wk	70	70	70	70	70	70

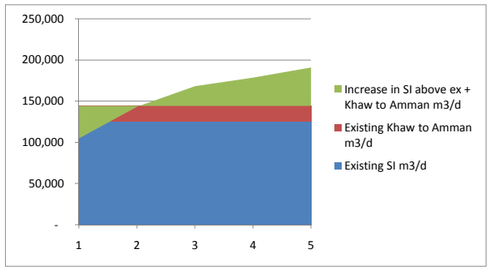
Scenario B1. No Intervention, Production Increase capped at 47,000 m3/d



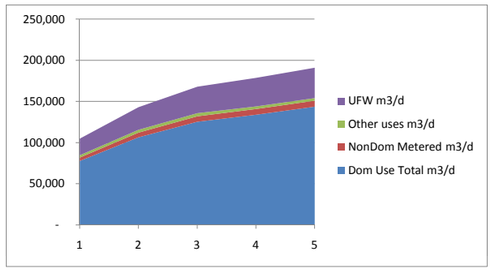


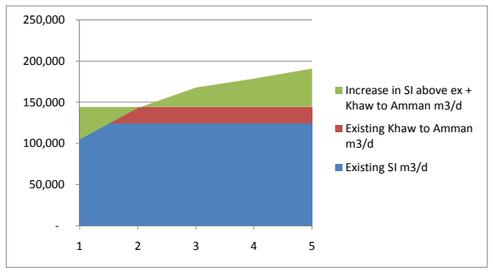
Scenario B2. Partial Intervention, Production Increase capped at 47,000 m3/d





Scenario B3. Full Intervention, Iproduction Increase Capped at 47,000 m3/d





Water Balance 3
Zarqa WSS

Long-Term Water Balance Scenarios

Population

Year	2008	2010	2015	2020	2025	2030
Population Total	854,325	914,916	1,253,663	1,476,249	1,575,278	1,690,000
Population Z+R+A	736,145	761,947	830,504	905,270	986,809	1,075,739
Population KABA	-	30,326	288,575	423,238	426,221	436,008

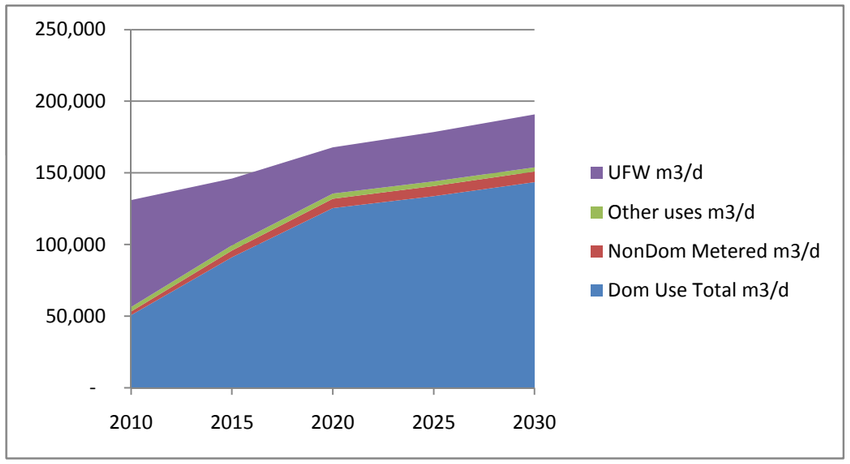
Snapshot C1a. At 2015, Secondary & Tertiary R&R completion for WSAs Zarqa + Awajan + Russaifah

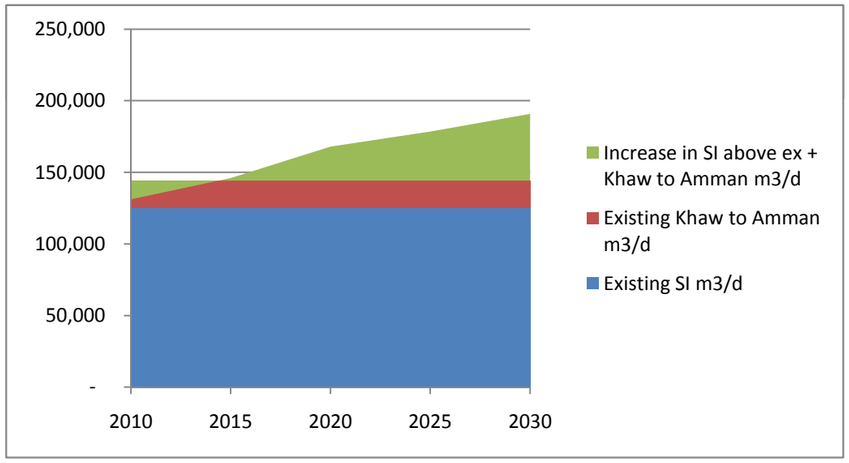
	B2 2015	B3 2015	B1 2015	
Year	Z+R+A	KABA	Others	Total
Dom Use Average lcd	71.5	85.0	54.9	
NonDom Metered lcd	3.7	4.4	2.8	
Other uses lcd	2.9	2.9	2.9	
UFW lcd	36.2	21.9	75.2	
Total lcd	114	114	136	
Dom Use Total m3/d	59,381	24,529	7,387	91,297
NonDom Metered m3/d	3,088	1,276	382	4,746
Other uses m3/d	2,418	840	394	3,652
UFW m3/d	30,060	6,308	10,116	46,485
Total m3/d	94,947	32,953	18,279	146,179
Existing SI m3/d				125,049
Existing Khaw to Amman m3/d				19,257
Increase in SI above ex + Khaw to Amman m3/d				1,873
Supply continuity av hrs/wk	70	70	31	66

Scenario C1. At 2008-2010 B1 applies, at 2015 C1a applies, at 2020-2030 B3 applies

Year	2008	2010	2015	2020	2025	2030
Dom Use Average lcd	55.8	55.5	72.8	85.0	85.0	85.0
NonDom Metered lcd	2.9	2.9	3.8	4.4	4.4	4.4
Other uses lcd	3.5	3.3	2.9	2.5	2.1	1.7
UFW lcd	84.3	81.7	37.1	21.9	21.9	21.9
Total lcd	146	143	117	114	113	113
Dom Use Total m3/d	47,642	50,791	91,297	125,481	133,899	143,650
NonDom Metered m3/d	2,460	2,624	4,746	6,525	6,963	7,470
Other uses m3/d	2,961	3,031	3,652	3,712	3,337	2,909
UFW m3/d	71,985	74,713	46,485	32,271	34,436	36,944
Total m3/d	125,049	131,160	146,179	167,990	178,634	190,973
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 19,257	- 13,146	1,873	23,684	34,328	46,667
Supply continuity av hrs/wk	37	35	66	70	70	70

Scenario C1. At 2008-2010 B1 applies, at 2015 C1a applies, at 2020-2030 B3 applies





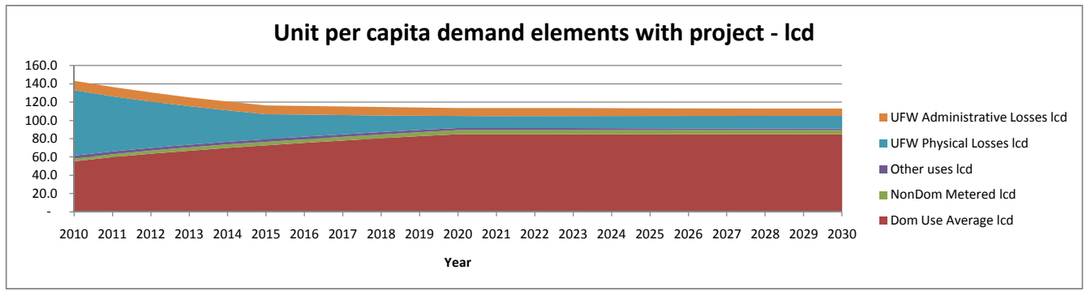
Water Balance 4
Zarqa WSS

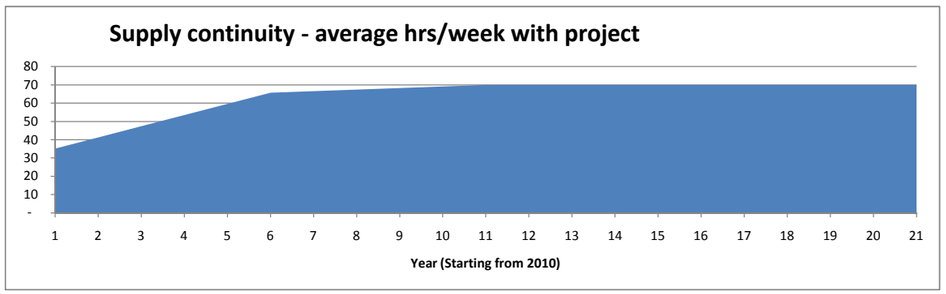
Water Use Statistics - With Project (Additional Water Production capped at 47,000 m3/d)

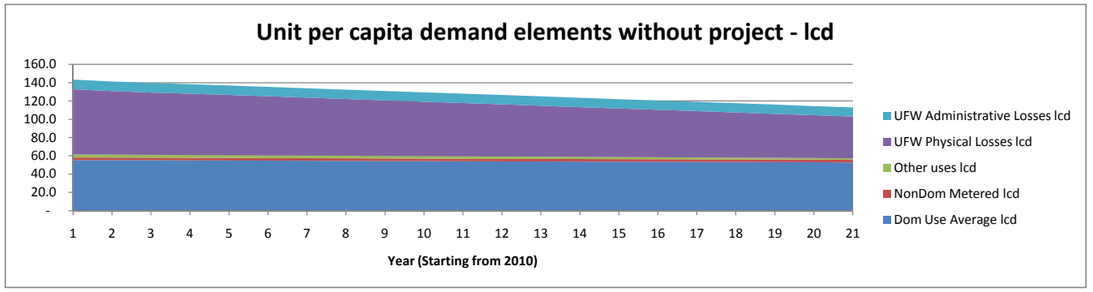
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Population	854,325	884,620	914,916	982,665	1,050,415	1,118,164	1,185,914	1,253,663	1,298,180	1,342,698	1,387,215	1,431,732	1,476,249	1,496,055	1,515,861	1,535,667	1,555,473	1,575,278	1,598,223	1,621,167	1,644,111	1,667,056	1,690,000
Dom Use Average lcd	55.8	55.6	55.5	59.9	63.8	67.2	70.2	72.8	75.6	78.2	80.6	82.9	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
NonDom Metered lcd	2.9	2.9	2.9	3.1	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.3	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Other uses lcd	3.5	3.4	3.3	3.2	3.1	3.0	3.0	2.9	2.8	2.7	2.7	2.6	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.8	1.7
UFW Physical Losses lcd	73.8	72.6	71.5	60.2	50.5	41.9	34.3	27.5	24.1	21.0	18.1	15.4	12.9	13.0	13.1	13.2	13.3	13.5	13.6	13.7	13.8	13.9	14.1
UFW Administrative Losses lcd	10.4	10.3	10.2	10.1	10.0	9.8	9.7	9.6	9.5	9.4	9.2	9.1	9.0	8.9	8.8	8.6	8.5	8.4	8.3	8.2	8.0	7.9	7.8
Total lcd	146	145	143	137	131	125	121	117	116	115	115	114	114	114	114	114	113	113	113	113	113	113	113
Dom Use Total m3/d	47,642	49,217	50,791	58,892	66,993	75,095	83,196	91,297	98,134	104,970	111,807	118,644	125,481	127,165	128,848	130,532	132,215	133,899	135,849	137,799	139,749	141,700	143,650
NonDom Metered m3/d	2,460	2,542	2,624	3,049	3,473	3,897	4,321	4,746	5,101	5,457	5,813	6,169	6,525	6,613	6,700	6,788	6,875	6,963	7,064	7,166	7,267	7,368	7,470
Other uses m3/d	2,961	2,996	3,031	3,155	3,279	3,404	3,528	3,652	3,664	3,676	3,688	3,700	3,712	3,637	3,562	3,487	3,412	3,337	3,251	3,166	3,080	2,995	2,909
UFW Physical Losses m3/d	63,062	64,219	65,377	59,190	53,004	46,817	40,630	34,444	31,350	28,257	25,164	22,071	18,978	19,421	19,865	20,308	20,752	21,196	21,707	22,219	22,730	23,242	23,753
UFW Administrative Losses m3/d	8,923	9,133	9,336	9,910	10,467	11,008	11,533	12,041	12,313	12,574	12,825	13,064	13,294	13,292	13,287	13,276	13,261	13,240	13,242	13,237	13,227	13,212	13,191
Total m3/d	125,049	128,108	131,160	134,196	137,216	140,220	143,208	146,179	150,563	154,935	159,297	163,649	167,990	170,128	172,262	174,390	176,515	178,634	181,113	183,586	186,054	188,516	190,973
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 19,257	- 16,201	- 13,146	- 10,142	- 7,138	- 4,134	- 1,131	1,873	6,235	10,597	14,960	19,322	23,684	25,813	27,941	30,070	32,199	34,328	36,796	39,264	41,732	44,199	46,667
Supply continuity av hrs/wk	37	36	35	41	47	54	60	66	67	67	68	69	70	70	70	70	70	70	70	70	70	70	70

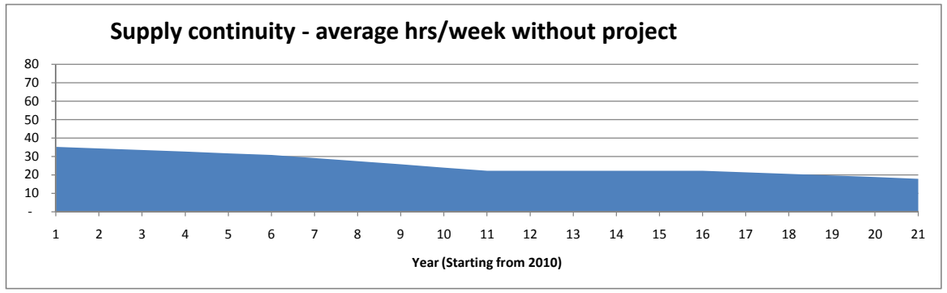
Water Use Statistics - Without Project (Additional Water Production capped at 47,000 m3/d)

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Population	854,325	884,620	914,916	982,665	1,050,415	1,118,164	1,185,914	1,253,663	1,298,180	1,342,698	1,387,215	1,431,732	1,476,249	1,496,055	1,515,861	1,535,667	1,555,473	1,575,278	1,598,223	1,621,167	1,644,111	1,667,056	1,690,000
Dom Use Average lcd	55.8	55.6	55.5	55.4	55.2	55.1	55.0	54.9	54.7	54.6	54.5	54.4	54.3	54.1	54.0	53.9	53.7	53.6	53.5	53.4	53.2	53.1	53.0
NonDom Metered lcd	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Other uses lcd	3.5	3.4	3.3	3.2	3.1	3.1	3.0	2.9	2.8	2.8	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.2	2.1	2.0	1.9	1.9	1.8
UFW Physical Losses lcd	73.8	72.5	71.2	69.6	68.2	66.9	65.8	64.8	63.4	62.0	60.7	59.5	58.4	57.1	55.7	54.5	53.2	52.0	50.6	49.3	48.0	46.8	45.6
UFW Administrative Losses lcd	10.4	10.4	10.4	10.4	10.4	10.4	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.2	10.2	10.2	10.2	10.2	10.2	10.1	10.1	10.1	10.1
Total lcd	146	145	143	141	140	138	137	136	134	133	131	130	128	127	125	124	122	121	119	118	116	115	113
Dom Use Total m3/d	47,642	49,217	50,791	54,395	57,998	61,602	65,205	68,809	71,066	73,324	75,582	77,840	80,097	80,974	81,850	82,727	83,604	84,480	85,498	86,516	87,534	88,552	89,570
NonDom Metered m3/d	2,460	2,542	2,624	2,812	2,999	3,186	3,374	3,561	3,679	3,797	3,915	4,033	4,152	4,198	4,245	4,292	4,339	4,386	4,440	4,495	4,549	4,603	4,658
Other uses m3/d	2,961	2,996	3,031	3,159	3,288	3,416	3,545	3,673	3,690	3,708	3,725	3,742	3,760	3,690	3,619	3,549	3,479	3,409	3,329	3,249	3,169	3,089	3,009
UFW Physical Losses m3/d	63,062	64,124	65,187	68,405	71,623	74,842	78,060	81,278	82,270	83,262	84,254	85,246	86,237	85,373	84,508	83,644	82,779	81,915	80,939	79,964	78,988	78,013	77,037
UFW Administrative Losses m3/d	8,923	9,225	9,526	10,216	10,904	11,589	12,272	12,953	13,392	13,830	14,266	14,701	15,135	15,314	15,492	15,670	15,847	16,024	16,231	16,438	16,645	16,850	17,055
Total m3/d	125,049	128,105	131,160	138,987	146,812	154,635	162,456	170,274	174,098	177,921	181,742	185,562	189,381	189,548	189,715	189,882	190,048	190,213	190,438	190,662	190,885	191,107	191,329
Existing SI m3/d	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049	125,049
Existing Khaw to Amman m3/d	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257	19,257
Increase in SI above ex + Khaw to Amman m3/d	- 19,257	- 16,201	- 13,146	- 5,323	2,500	10,323	18,145	25,968	29,956	33,944	37,932	41,919	45,907	45,907	45,907	45,907	45,907	45,907	46,130	46,354	46,577	46,800	47,023
Supply continuity av hrs/wk	37	36	35	34	34	33	32	31	29	28	26	24	22	22	22	22	22	22	21	21	20	19	18









APPENDIX 8 – WORKS QUANTITIES AND COSTS DATA AND CALCULATIONS

Appendix 8

- Unit Costs 1-19
- Quantities 1-14
- Overall Costs 1-12

Unit Costs 1

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate Rates for Pipeline Construction

Diameter	Material	Construction Cost Per Meter off-road	Construction Cost Per Meter in Road
mm		JoD/m length - excluding taxes	
20	MDPE	10.00	13.00
32	MDPE	10.00	13.00
50	MDPE	17.00	22.00
63	MDPE	17.00	22.00
110	HPPE	37.00	45.00
160	HPPE	45.00	55.00
200	HPPE	65.00	75.00
200	Ductile Iron (DI)	55.00	65.00
300	DI	90.00	100.00
400	DI	125.00	150.00
500	DI	200.00	250.00
600	DI	260.00	300.00
700	DI	270.00	310.00

Additional Construction Costs per linear metre of construction	
Permanent road surface reinstatement	30
Traffic management during construction	1
Temporary diversion of electricity cables	20
Temporary diversion of telecomms cables	20
Temporary diversion of drainage pipes	30
Temporary diversion of water service pipes	20
Permanent diversion of pipes, cables and ducts	50
Contractor's Overheads as % of overall construction cost	15
Construction contingencies as % of overall construction cost	5
Other costs	

Rates High-lighted to be inserted by ACEPO

Unit Costs 2

GROUP RABIEH

شركة رابية عمان للتوريدات الفنية ذ.م.م
Amman Rabieh for Tech. Supplies Co.

انتباه المهندسه نادية المحترمه
5857639

TO : TO WHOM IT MAY CONCERN

DUCTILE IRON PIPES PRICE LIST FOR APRIL 2010

Please find below our commercial offer which we hope to meet your requirements

NO.	DESCRIPTION	QTY	U.Price	Total
		m		
	Ductile Iron Pipes as per ISO2531,EN545 K9 with Cement Lining as per ISO4179 ,Zinc & coatings Quoting as per ISO8179 6/5.5 meter long,With EPDM rubber caskets			
1	DN 100	6	JOD 18.00	JOD 108.00
2	DN 150	6	JOD 23.00	JOD 138.00
3	DN 200	6	JOD 30.00	JOD 180.00
	DN 250	6	JOD 38.00	JOD 228.00
	DN 300	6	JOD 45.00	JOD 270.00
	DN 400	6	JOD 74.00	JOD 444.00
	DN 500	6	JOD 98.00	JOD 588.00
	DN 600	6	JOD 132.00	JOD 792.00
	DN 700	6	JOD 175.00	JOD 1,050.00
	DN 800	6	JOD 229.00	JOD 1,374.00
	DN 900	6	JOD 298.00	JOD 1,788.00
	DN 1000	6	JOD 348.00	JOD 2,088.00
	DN 1200	6	JOD 535.00	JOD 3,210.00

** Total CPT SITE IN JOD
** Delivery:90-120 days
** Validity: 15 days
** Country of Origin:CHINA
** A/M prices Don't include unloading on Site

Thank you and best Regards
Mohammad Abdel-Al

P.O Box 2883 Amman 11821, Jordan Tel :(19626) 5526802,Fax: (19626) 5536802)
E-mail:sales@rabiehgroup.com

Unit Costs 3

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate Rates for Land Acquisition and Wayleaves

Unit Land Costs	Unit	Rate paid to Landowner / Occupier JoD - excluding taxes
Land Purchase costs		
Rural fertile land	ha	80,000
Rural barren land	ha	30,000
Urban city site	ha	1,000,000
Urban town/village site	ha	400,000
Wayleave costs on private lands		
Rural fertile land	m length	N/A
Rural barren land	m length	N/A
Urban city area	m length	N/A
Urban town/village area	m length	N/A
Wayleave costs on public lands		
On major road	m length	N/A
On minor road	m length	N/A
Off-road	m length	N/A

Additional Purchase Costs as % of payment to landowner	%
Advisors fees - legal, valuers, surveyors, etc	2
Statutory costs - stamp duty, levies, etc	N/A
Local taxes	10
Other costs	

Rates High-lighted to be inserted by ACEPO

Unit Costs 4: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	500	m3				
Water Depth	4.5	m				
Avg. Floor Thickness	0.5	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	15	m				
Outside Breadth	9	m				
Wall Height	5.625	m				
Avg. Wall Thickness	0.47	m				
No. of Columns (at 4m c/c)	6	no.				
Area of Site	675	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	250	m3	2.5	JoD/m3	625	
Excavate Rock	125	m3	5	JoD/m3	625	
Place, level and compact crushed stone and granular fill	94	m3	15	JoD/m3	1,406	
Fill leanmix	23	m3	50	JoD/m3	1,172	
Remove spoil material from site and dispose to licensed facility	23	m3	5	JoD/m3	117	
Excavate, Store, Replace Topsoil	169	m2	5	JoD/m2	844	
Sum Earthworks						***4,789***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	144	m	20	JoD/m	2,880	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Concrete Road Kerb within site	36	m	15	JoD/m	540	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	1	no.	500	JoD/Item	500	
Site Storm Drainage Pipework 300mm diameter	30	m	50	JoD/m	1,500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	90	m	50	JoD/m	4,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	48	no.	50	JoD/Item	2,400	
Site Soft Landscaping: Soil grading and Seeding	169	m2	5	JoD/m2	844	
Sum Other Siteworks						***26,564***
					Siteworks Sub-Total	**31,353**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	135	m2	10	JoD/m2	1,350	
150mm depth of no-fines concrete	135	m2	15	JoD/m2	2,025	
100mm diameter Under-Drain Pipes at 4m c/c	76	m	50	JoD/m	3,800	
Sum Preparatory Work						***7,175***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	62.7	m2	10	JoD/m2	627	
Concrete Supply and Placement	68	m3	60	JoD/m3	4,050	
Steel Supply and Fixing	20.25	Tonne	250	JoD/Tonne	5,063	
Sum Floor						***9,740***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	62.7	m				
Wall Area one face	352.6875	m2				
Formwork Supply, erect, strike	705.375	m2	10	JoD/m2	7,054	
Concrete Supply and Placement	165.32227	m3	60	JoD/m3	9,919	
Steel Supply and Fixing	49.59668	Tonne	250	JoD/Tonne	12,399	
Sum Walls						***29,372***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	196.3125	m	8	JoD/m	1,571	
Waterproof lining of internal floor and walls	588.9375	m2	8	JoD/m2	4,712	
Sum Internal Sealing and Lining						***6,282***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.5	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	5.625	m				
Formwork Supply, erect, strike	151	m2	10	JoD/m2	1,509	
Concrete Supply and Placement	24	m3	60	JoD/m3	1,449	
Steel Supply and Fixing	7.245	Tonne	250	JoD/Tonne	1,811	
Sum Columns						***4,770***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	135	m2	50	JoD/m2	6,750	
Lift and Place Pre-cast Roof slabs	135	m2	10	JoD/m2	1,350	
Concrete Screed In-situ 150mm	135	m2	15	JoD/m2	2,025	
Supply and fit external Waterproofing Membrane	135	m2	15	JoD/m2	2,025	
Supply and place protective gravel/aggregate 150mm depth	135	m2	15	JoD/m2	2,025	
Supply and fit Roof Drainage Pipework 100mm diameter	84	m	20	JoD/m	1,680	
Sum Roof						***15,855***
					Reservoir Structure Sub-Total	**73,193**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	15	m	97.5	JoD/m	1,463	
150mm diameter DI watermain	15	m	71.5	JoD/m	1,073	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	7.5	m	97.5	JoD/m	731	
150mm diameter DI watermain	7.5	m	71.5	JoD/m	536	
Sum Water Supply Pipes						***3,803***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	2		600	JoD/item	1,200	
Sluice Valves 150mm diameter supplied and fitted	2		500	JoD/item	1,000	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	2		2,500	JoD/item	5,000	
Ultrasonic Level Monitor and display panel	1		2,000	JoD/item	2,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	0		8,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	1		5,000	JoD/item	5,000	
Miscellaneous Bends, Tees and Special Fittings	16		300	JoD/item	4,800	
Sum Pipefittings and Instrumentation						***19,000***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	48	m	50	JoD/item	2,400	
Sum Metalwork						***7,280***
					Pipes, fittings, instrumentation and metal work Sub-Total	**30,083**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	15,000	JoD/item	15,000	
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***25,000***
					Control Building and Monitoring and Treatment Sub-Total	**33,500**
Total Cost						**168,129**
Rounded Cost						**168,000**
Unit cost / m3 of storage volume:					**cost/m3**	**336.00**

Unit Costs 5: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	2,500	m3				
Water Depth	4.6	m				
Avg. Floor Thickness	0.5	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	33	m				
Outside Breadth	18	m				
Wall Height	5.75	m				
Avg. Wall Thickness	0.48	m				
No. of Columns (at 4m c/c)	32	no.				
Area of Site	2,970	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	1,250	m3	2.5	JoD/m3	3,125	
Excavate Rock	625	m3	5	JoD/m3	3,125	
Place, level and compact crushed stone and granular fill	469	m3	15	JoD/m3	7,031	
Fill leanmix	117	m3	50	JoD/m3	5,859	
Remove spoil material from site and dispose to licensed facility	117	m3	5	JoD/m3	586	
Excavate, Store, Replace Topsoil	743	m2	5	JoD/m2	3,713	
Sum Earthworks						***23,439***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	306	m	20	JoD/m	6,120	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	255	m2	20	JoD/m2	5,100	
Concrete Road Kerb within site	76.5	m	15	JoD/m	1,148	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	3	no.	500	JoD/Item	1,500	
Site Storm Drainage Pipework 300mm diameter	66	m	50	JoD/m	3,300	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	3	no.	50	JoD/Item	150	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	198	m	50	JoD/m	9,900	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	102	no.	50	JoD/Item	5,100	
Site Soft Landscaping: Soil grading and Seeding	743	m2	5	JoD/m2	3,713	
Sum Other Siteworks						***46,930***
					Siteworks Sub-Total	**70,369**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	594	m2	10	JoD/m2	5,940	
150mm depth of no-fines concrete	594	m2	15	JoD/m2	8,910	
100mm diameter Under-Drain Pipes at 4m c/c	224	m	50	JoD/m	11,200	
Sum Preparatory Work						***26,050***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	132	m2	10	JoD/m2	1,320	
Concrete Supply and Placement	297	m3	60	JoD/m3	17,820	
Steel Supply and Fixing	89.1	Tonne	250	JoD/Tonne	22,275	
Sum Floor						***41,415***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	132	m				
Wall Area one face	759	m2				
Formwork Supply, erect, strike	1518	m2	10	JoD/m2	15,180	
Concrete Supply and Placement	363.6875	m3	60	JoD/m3	21,821	
Steel Supply and Fixing	109.10625	Tonne	250	JoD/Tonne	27,277	
Sum Walls						***64,278***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	520	m	8	JoD/m	4,160	
Waterproof lining of internal floor and walls	1560	m2	8	JoD/m2	12,480	
Sum Internal Sealing and Lining						***16,640***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.5	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	5.75	m				
Formwork Supply, erect, strike	809	m2	10	JoD/m2	8,090	
Concrete Supply and Placement	129	m3	60	JoD/m3	7,766	
Steel Supply and Fixing	38.832	Tonne	250	JoD/Tonne	9,708	
Sum Columns						***25,564***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	594	m2	50	JoD/m2	29,700	
Lift and Place Pre-cast Roof slabs	594	m2	10	JoD/m2	5,940	
Concrete Screed In-situ 150mm	594	m2	15	JoD/m2	8,910	
Supply and fit external Waterproofing Membrane	594	m2	15	JoD/m2	8,910	
Supply and place protective gravel/aggregate 150mm depth	594	m2	15	JoD/m2	8,910	
Supply and fit Roof Drainage Pipework 100mm diameter	174	m	20	JoD/m	3,480	
Sum Roof						***65,850***
					Reservoir Structure Sub-Total	**239,797**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***6,825***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	2		800	JoD/item	1,600	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	3	No.	3,000	JoD/item	9,000	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	2		8,000	JoD/item	16,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	1		6,000	JoD/item	6,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	28		300	JoD/item	8,400	
Sum Pipefittings and Instrumentation						***47,400***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	102	m	50	JoD/item	5,100	
Sum Metalwork						***9,980***
					Pipes, fittings, instrumentation and metal work Sub-Total	**64,205**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	30,000	JoD/item	30,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	15,000	JoD/item	15,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***45,000***
					Control Building and Monitoring and Treatment Sub-Total	**53,500**
Total Cost						**427,871**
Rounded Cost						**428,000**
Unit cost / m3 of storage volume:					**cost/m3**	**171.20**

Unit Costs 6: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	5,000	m3				
Water Depth	6.1	m				
Avg. Floor Thickness	0.61	m				
Pre-cast Roof Thickness	0.3	m				
Outside Length	40	m				
Outside Breadth	22	m				
Wall Height	7.625	m				
Avg. Wall Thickness	0.64	m				
No. of Columns (at 4m c/c)	45	no.				
Area of Site	4,400	m2				
Distance of Site from existing public road	20	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	2,500	m3	2.5	JoD/m3	6,250	
Excavate Rock	1,250	m3	5	JoD/m3	6,250	
Place, level and compact crushed stone and granular fill	938	m3	15	JoD/m3	14,063	
Fill leanmix	234	m3	50	JoD/m3	11,719	
Remove spoil material from site and dispose to licensed facility	234	m3	5	JoD/m3	1,172	
Excavate, Store, Replace Topsoil	1,100	m2	5	JoD/m2	5,500	
Sum Earthworks						***44,953***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	372	m	20	JoD/m	7,440	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	310	m2	20	JoD/m2	6,200	
Concrete Road Kerb within site	93	m	15	JoD/m	1,395	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Pipework 300mm diameter	80	m	50	JoD/m	4,000	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	4	no.	50	JoD/Item	200	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	240	m	50	JoD/m	12,000	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	124	no.	50	JoD/Item	6,200	
Site Soft Landscaping: Soil grading and Seeding	1,100	m2	5	JoD/m2	5,500	
Sum Other Siteworks						***55,835***
					Siteworks Sub-Total	**100,788**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	880	m2	10	JoD/m2	8,800	
150mm depth of no-fines concrete	880	m2	15	JoD/m2	13,200	
100mm diameter Under-Drain Pipes at 4m c/c	320	m	50	JoD/m	16,000	
Sum Preparatory Work						***38,000***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	195.932	m2	10	JoD/m2	1,959	
Concrete Supply and Placement	537	m3	60	JoD/m3	32,208	
Steel Supply and Fixing	161.04	Tonne	250	JoD/Tonne	40,260	
Sum Floor						***74,427***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	160.6	m				
Wall Area one face	1224.575	m2				
Formwork Supply, erect, strike	2449.15	m2	10	JoD/m2	24,492	
Concrete Supply and Placement	778.11536	m3	60	JoD/m3	46,687	
Steel Supply and Fixing	233.43461	Tonne	250	JoD/Tonne	58,359	
Sum Walls						***129,537***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	813.35833	m	8	JoD/m	6,507	
Waterproof lining of internal floor and walls	2440.075	m2	8	JoD/m2	19,521	
Sum Internal Sealing and Lining						***26,027***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.61	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	7.625	m				
Formwork Supply, erect, strike	1415	m2	10	JoD/m2	14,154	
Concrete Supply and Placement	226	m3	60	JoD/m3	13,588	
Steel Supply and Fixing	67.93875	Tonne	250	JoD/Tonne	16,985	
Sum Columns						***44,726***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	880	m2	50	JoD/m2	44,000	
Lift and Place Pre-cast Roof slabs	880	m2	10	JoD/m2	8,800	
Concrete Screed In-situ 150mm	880	m2	15	JoD/m2	13,200	
Supply and fit external Waterproofing Membrane	880	m2	15	JoD/m2	13,200	
Supply and place protective gravel/aggregate 150mm depth	880	m2	15	JoD/m2	13,200	
Supply and fit Roof Drainage Pipework 100mm diameter	212	m	20	JoD/m	4,240	
Sum Roof						***96,640***
					Reservoir Structure Sub-Total	**409,358**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	40	m	130.0	JoD/m	5,200	
200mm diameter DI watermain	30	m	97.5	JoD/m	2,925	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	15	m	97.5	JoD/m	1,463	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***18,038***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	4		800	JoD/item	3,200	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	3		4,000	JoD/item	12,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	2		8,000	JoD/item	16,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	1		6,000	JoD/item	6,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	36		300	JoD/item	10,800	
Sum Pipefittings and Instrumentation						***55,600***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	124	m	50	JoD/item	6,200	
Sum Metalwork						***11,080***
					Pipes, fittings, instrumentation and metal work Sub-Total	**84,718**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	20	m2	400	JoD/m2	8,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***8,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	40,000	JoD/item	40,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	20,000	JoD/item	20,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***60,000***
					Control Building and Monitoring and Treatment Sub-Total	**68,500**
Total Cost						**663,364**
Rounded Cost						**663,000**
Unit cost / m3 of storage volume:					**cost/m3**	**132.60**

Unit Costs 7: 20445 Zarga Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	12,000	m3				
Water Depth	7.0	m				
Avg. Floor Thickness	0.7	m				
Pre-cast Roof Thickness	0.35	m				
Outside Length	59	m				
Outside Breadth	31	m				
Wall Height	8.75	m				
Avg. Wall Thickness	0.73	m				
No. of Columns (at 4m c/c)	98	no.				
Area of Site	9,145	m2				
Distance of Site from existing public road	100	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	6,000	m3	2.5	JoD/m3	15,000	
Excavate Rock	3,000	m3	5	JoD/m3	15,000	
Place, level and compact crushed stone and granular fill	2,250	m3	15	JoD/m3	33,750	
Fill leanmix	563	m3	50	JoD/m3	28,125	
Remove spoil material from site and dispose to licensed facility	563	m3	5	JoD/m3	2,813	
Excavate, Store, Replace Topsoil	2,286	m2	5	JoD/m2	11,431	
Sum Earthworks						***106,119***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	540	m	20	JoD/m	10,800	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	450	m2	20	JoD/m2	9,000	
Concrete Road Kerb within site	135	m	15	JoD/m	2,025	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	600	m2	20	JoD/m2	12,000	
Site Lighting Standard inclusive of power cables and ducting	9	no.	500	JoD/Item	4,500	
Site Storm Drainage Pipework 300mm diameter	118	m	50	JoD/m	5,900	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	5	no.	50	JoD/Item	250	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	354	m	50	JoD/m	17,700	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	180	no.	50	JoD/Item	9,000	
Site Soft Landscaping: Soil grading and Seeding	2,286	m2	5	JoD/m2	11,431	
Sum Other Siteworks						***91,106***
					Siteworks Sub-Total	**197,225**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	1829	m2	10	JoD/m2	18,290	
150mm depth of no-fines concrete	1829	m2	15	JoD/m2	27,435	
100mm diameter Under-Drain Pipes at 4m c/c	615	m	50	JoD/m	30,750	
Sum Preparatory Work						***76,475***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	324.94	m2	10	JoD/m2	3,249	
Concrete Supply and Placement	1280	m3	60	JoD/m3	76,818	
Steel Supply and Fixing	384.09	Tonne	250	JoD/Tonne	96,023	
Sum Floor						***176,090***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	232.1	m				
Wall Area one face	2030.875	m2				
Formwork Supply, erect, strike	4061.75	m2	10	JoD/m2	40,618	
Concrete Supply and Placement	1480.8464	m3	60	JoD/m3	88,851	
Steel Supply and Fixing	444.25391	Tonne	250	JoD/Tonne	111,063	
Sum Walls						***240,532***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	1467.4583	m	8	JoD/m	11,740	
Waterproof lining of internal floor and walls	4402.375	m2	8	JoD/m2	35,219	
Sum Internal Sealing and Lining						***46,959***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.7	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	8.75	m				
Formwork Supply, erect, strike	3537	m2	10	JoD/m2	35,372	
Concrete Supply and Placement	566	m3	60	JoD/m3	33,957	
Steel Supply and Fixing	169.785	Tonne	250	JoD/Tonne	42,446	
Sum Columns						***111,775***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	1,829	m2	50	JoD/m2	91,450	
Lift and Place Pre-cast Roof slabs	1829	m2	10	JoD/m2	18,290	
Concrete Screed In-situ 150mm	1,829	m2	15	JoD/m2	27,435	
Supply and fit external Waterproofing Membrane	1,829	m2	15	JoD/m2	27,435	
Supply and place protective gravel/aggregate 150mm depth	1,829	m2	15	JoD/m2	27,435	
Supply and fit Roof Drainage Pipework 100mm diameter	304	m	20	JoD/m	6,080	
Sum Roof						***198,125***
					Reservoir Structure Sub-Total	**849,955**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	200	m	195.0	JoD/m	39,000	
300mm diameter DI watermain	100	m	130.0	JoD/m	13,000	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	100	m	195.0	JoD/m	19,500	
300mm diameter DI watermain	50	m	130.0	JoD/m	6,500	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***78,000***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	16		800	JoD/item	12,800	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	3		8,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	58		300	JoD/item	17,400	
Sum Pipefittings and Instrumentation						***76,600***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	180	m	50	JoD/item	9,000	
Sum Metalwork						***13,880***
					Pipes, fittings, instrumentation and metal work Sub-Total	**168,480**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	30	m2	400	JoD/m2	12,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***12,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	80,000	JoD/item	80,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	60,000	JoD/item	60,000	
Other Treatment Process Installation	1	no.	60,000	JoD/item	-	
Sum Monitoring and Treatment						***140,000***
					Control Building and Monitoring and Treatment Sub-Total	**152,500**
Total Cost						**1,368,160**
Rounded Cost						**1,368,000**

Unit cost / m3 of storage volume:	**cost/m3**	**114.00**

Unit Costs 8: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Reservoir

Dimensions/parameters High-lighted Pink to be inserted by Designer

Item Description			Rate		Cost €	Sub-Total €
Reservoir Key Dimensions						
Design Volume Capacity	20,000	m3				
Water Depth	7.0	m				
Avg. Floor Thickness	0.7	m				
Pre-cast Roof Thickness	0.35	m				
Outside Length	76	m				
Outside Breadth	40	m				
Wall Height	8.75	m				
Avg. Wall Thickness	0.73	m				
No. of Columns (at 4m c/c)	162	no.				
Area of Site	15,200	m2				
Distance of Site from existing public road	200	m				
Siteworks						
Earthworks						
Excavate normal ground - clay, sand, gravel, etc	10,000	m3	2.5	JoD/m3	25,000	
Excavate Rock	5,000	m3	5	JoD/m3	25,000	
Place, level and compact crushed stone and granular fill	3,750	m3	15	JoD/m3	56,250	
Fill leanmix	938	m3	50	JoD/m3	46,875	
Remove spoil material from site and dispose to licensed facility	938	m3	5	JoD/m3	4,688	
Excavate, Store, Replace Topsoil	3,800	m2	5	JoD/m2	19,000	
Sum Earthworks						***176,813***
Other Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	696	m	20	JoD/m	13,920	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	580	m2	20	JoD/m2	11,600	
Concrete Road Kerb within site	174	m	15	JoD/m	2,610	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	1200	m2	20	JoD/m2	24,000	
Site Lighting Standard inclusive of power cables and ducting	15	no.	500	JoD/Item	7,500	
Site Storm Drainage Pipework 300mm diameter	152	m	50	JoD/m	7,600	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	6	no.	50	JoD/Item	300	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	456	m	50	JoD/m	22,800	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	232	no.	50	JoD/Item	11,600	
Site Soft Landscaping: Soil grading and Seeding	3,800	m2	5	JoD/m2	19,000	
Sum Other Siteworks						***129,430***
					Siteworks Sub-Total	**306,243**
Reservoir Structure						
Preparatory Work						
100mm lean-mix concrete levelling & blinding of base & making up levels	3040	m2	10	JoD/m2	30,400	
150mm depth of no-fines concrete	3040	m2	15	JoD/m2	45,600	
100mm diameter Under-Drain Pipes at 4m c/c	950	m	50	JoD/m	47,500	
Sum Preparatory Work						***123,500***
RC Standard Costs						
Formwork Supply, erect, strike			10	JoD/m2		
Concrete Supply			40	JoD/m3		
Concrete Placement			20	JoD/m3		
Steel Supply (at 10% volume: 0.3Tonne/m3 of RC)			200	JoD/Tonne		
Steel Fixing			50	JoD/Tonne		
RC Floor						
Formwork Supply, erect, strike	418.88	m2	10	JoD/m2	4,189	
Concrete Supply and Placement	2128	m3	60	JoD/m3	127,680	
Steel Supply and Fixing	638.4	Tonne	250	JoD/Tonne	159,600	
Sum Floor						***291,469***
RC Walls						
Wall Perimeter Including Center & Baffle Walls (add 10% for chambers)	299.2	m				
Wall Area one face	2618	m2				
Formwork Supply, erect, strike	5236	m2	10	JoD/m2	52,360	
Concrete Supply and Placement	1908.9583	m3	60	JoD/m3	114,538	
Steel Supply and Fixing	572.6875	Tonne	250	JoD/Tonne	143,172	
Sum Walls						***310,069***
Internal Sealing and Lining of Floor and Walls						
Floor and Wall Joints : Waterbar and Sealing	2119.3333	m	8	JoD/m	16,955	
Waterproof lining of internal floor and walls	6358	m2	8	JoD/m2	50,864	
Sum Internal Sealing and Lining						***67,819***
RC Columns						
Square Column base - dimension of each side	2.5	m				
Additional depth of base (=depth of floor)	0.7	m				
Square Column cross-section - dimension of each side	0.4	m				
Column height (=height of wall)	8.75	m				
Formwork Supply, erect, strike	5847	m2	10	JoD/m2	58,472	
Concrete Supply and Placement	936	m3	60	JoD/m3	56,133	
Steel Supply and Fixing	280.665	Tonne	250	JoD/Tonne	70,166	
Sum Columns						***184,771***
Pre-Cast Roof						
Supply and Deliver Pre-cast Roof slabs 300mm thick	3,040	m2	50	JoD/m2	152,000	
Lift and Place Pre-cast Roof slabs	3040	m2	10	JoD/m2	30,400	
Concrete Screed In-situ 150mm	3,040	m2	15	JoD/m2	45,600	
Supply and fit external Waterproofing Membrane	3,040	m2	15	JoD/m2	45,600	
Supply and place protective gravel/aggregate 150mm depth	3,040	m2	15	JoD/m2	45,600	
Supply and fit Roof Drainage Pipework 100mm diameter	392	m	20	JoD/m	7,840	
Sum Roof						***327,040***
					Reservoir Structure Sub-Total	**1,304,668**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	500	m	195.0	JoD/m	97,500	
300mm diameter DI watermain	100	m	130.0	JoD/m	13,000	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (inc within reservoir) Flanged Pipework						
400mm diameter DI watermain	250	m	195.0	JoD/m	48,750	
300mm diameter DI watermain	50	m	130.0	JoD/m	6,500	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***165,750***
Special Pipe Fittings and Instrumentation						
Sluice Valves 400mm diameter supplied and fitted	20		1,200	JoD/item	24,000	
Sluice Valves 300mm diameter supplied and fitted	8		800	JoD/item	6,400	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Ultrasonic Level Monitor and display panel	2		2,000	JoD/item	4,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 400mm diameter	4		14,000	JoD/item	56,000	
Inlet/Outlet Control Valve / Pressure Sustaining Valve / PRV 300mm diameter	0		8,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	44		300	JoD/item	13,200	
Sum Pipefittings and Instrumentation						***122,000***
Metalwork						
Fixed ladders galvanised steel 6m long	4	no.	300	JoD/item	1,200	
Heavy-Duty Galvanised-Steel Hinged Counter-weighted Safety Roof Covers with Screens 900mm*900mm square	4	no.	300	JoD/item	1,200	
Heavy-Duty Lockable Access covers 750mm*750mm square	8	no.	250	JoD/item	2,000	
Roof Ope Vent Pipes and Cowls	16	no.	30	JoD/item	480	
Galvanised Steel Roof-edge Safety Railing	232	m	50	JoD/item	11,600	
Sum Metalwork						***16,480***
					Pipes, fittings, instrumentation and metal work Sub-Total	**304,230**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	30	m2	400	JoD/m2	12,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***12,500***
Monitoring and Treatment Equipment						
Chlorination System - PVC Storage tanks 6m3 and 1m3, Cl injection pumps, Cl monitor and alarm system	1	no.	100,000	JoD/item	100,000	
Telemetry Outstation - Outstation, transducers, cabling	1	no.	80,000	JoD/item	80,000	
Other Treatment Process Installation	1	no.	80,000	JoD/item	-	
Sum Monitoring and Treatment						***180,000***
					Control Building and Monitoring and Treatment Sub-Total	**192,500**
Total Cost						**2,107,640**
Rounded Cost						**2,108,000**

Unit cost / m3 of storage volume:	**cost/m3**	**105.40**

Unit Costs 9: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.15	Static Head, m	120	Flow, m3/hr	20
Length, m	8000	Friction Loss, m	8.246	Velocity, m/s	0.314
C Value	120	Total Head, m	128.246	**REQUIRED PUMP POWER**	
C.S.A	0.018			Efficiency, %	60
				Power, kW	12

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	20	m3/hr				
No. of Pumps (one Duty / one Standby)	2	No.				
Motor Power	12	kW			1,000	***2,000***
Head Lift	128	m				
Pumping Station Key Dimensions						
Length	4	m				
Breadth	6	m				
Height	3	m				
Area of Site	120	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**2,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	60	m	20	JoD/m	1,200	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	50	m2	20	JoD/m2	1,000	
Concrete Road Kerb within site	15	m	15	JoD/m	225	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	0	no.	500	JoD/Item	-	
Site Storm Drainage Pipework 300mm diameter	8	m	50	JoD/m	400	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	1	no.	50	JoD/Item	50	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	24	m	50	JoD/m	1,200	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	20	no.	50	JoD/Item	1,000	
Site Soft Landscaping: Soil grading and Seeding	30	m2	5	JoD/m2	150	
Sum Other Siteworks						***16,125***
					Siteworks Sub-Total	**16,125**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	8	m	71.5	JoD/m	572	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	8	m	71.5	JoD/m	572	
Sum Water Supply Pipes						***1,144***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	0		600	JoD/item	-	
Sluice Valves 150mm diameter supplied and fitted	6		500	JoD/item	3,000	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	2		2,500	JoD/item	5,000	
Display panel. Control system and Telemetry Link	1		28,000	JoD/item	28,000	
Commissioning and Testing	1		2,000	JoD/item	2,000	
Pressure Transducers	4		250	JoD/item	1,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	0		6,000	JoD/item	-	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	2		5,000	JoD/item	10,000	
Miscellaneous Bends, Tees and Special Fittings	8		300	JoD/item	2,400	
Variable Speed Drive Unit	2		5,000	JoD/item	10,000	
Air Vessel - Surge Protection	1		5,000	JoD/item	5,000	
Sum Pipefittings and Instrumentation						***66,400***
Metalwork						
Pump house gantry lifting unit	1	no.	7,000	JoD/item	7,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***7,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**75,044**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	24	m2	600	JoD/m2	14,400	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***14,900***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**24,900**
Total Cost						**118,069**
Rounded Cost						**118,000**

Unit Costs 10: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.2	Static Head, m	120	Flow, m3/hr	50
Length, m	8000	Friction Loss, m	11.084	Velocity, m/s	0.442
C Value	120	Total Head, m	131.084	**REQUIRED PUMP POWER**	
C.S.A	0.031			Efficiency, %	60
				Power, kW	30

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	50	m3/hr				
No. of Pumps (one Duty / one Standby)	2	No.				
Motor Power	30	kW			10,000	***20,000***
Head Lift	131	m				
Pumping Station Key Dimensions						
Length	5	m				
Breadth	7	m				
Height	3	m				
Area of Site	175	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**20,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	72	m	20	JoD/m	1,440	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	60	m2	20	JoD/m2	1,200	
Concrete Road Kerb within site	18	m	15	JoD/m	270	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	0	no.	500	JoD/Item	-	
Site Storm Drainage Pipework 300mm diameter	10	m	50	JoD/m	500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	1	no.	50	JoD/Item	50	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	30	m	50	JoD/m	1,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	24	no.	50	JoD/Item	1,200	
Site Soft Landscaping: Soil grading and Seeding	44	m2	5	JoD/m2	219	
Sum Other Siteworks						***17,279***
					Siteworks Sub-Total	**17,279**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	0	m	130.0	JoD/m	-	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	10	m	71.5	JoD/m	715	
Sum Water Supply Pipes						***6,240***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	0		800	JoD/item	-	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	0		4,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 200mm diameter	2	No.	3,000	JoD/item	6,000	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		40,000	JoD/item	40,000	
Commissioning and Testing	1		4,000	JoD/item	4,000	
Pressure Transducers	4		250	JoD/item	1,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	2		6,000	JoD/item	12,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	2		5,000	JoD/item	10,000	
Air Vessel - Surge Protection	1		30,000	JoD/item	30,000	
Sum Pipefittings and Instrumentation						***112,600***
Metalwork						
Pump house gantry lifting unit	1	no.	10,000	JoD/item	10,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***10,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**129,340**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	35	m2	600	JoD/m2	21,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***21,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**31,500**
Total Cost						**198,119**
						198,000
Rounded Cost						

Unit Costs 11: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.3	Static Head, m	120	Flow, m3/hr	200
Length, m	8000	Friction Loss, m	20.044	Velocity, m/s	0.786
C Value	120	Total Head, m	140.044	**REQUIRED PUMP POWER**	
C.S.A	0.071			Efficiency, %	60
				Power, kW	127

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	200	m3/hr				
No. of Pumps (two Duty / two Standby)	4	No.				
Motor Power	64	kW			35,000	***140,000***
Head Lift	140	m				
Pumping Station Key Dimensions						
Length	10	m				
Breadth	14	m				
Height	3	m				
Area of Site	700	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**140,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	144	m	20	JoD/m	2,880	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Concrete Road Kerb within site	36	m	15	JoD/m	540	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	1	no.	500	JoD/Item	500	
Site Storm Drainage Pipework 300mm diameter	20	m	50	JoD/m	1,000	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	60	m	50	JoD/m	3,000	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	48	no.	50	JoD/Item	2,400	
Site Soft Landscaping: Soil grading and Seeding	175	m2	5	JoD/m2	875	
Sum Other Siteworks						***24,595***
					Siteworks Sub-Total	**24,595**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	20	m	97.5	JoD/m	1,950	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	0	m	195.0	JoD/m	-	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	5	m	97.5	JoD/m	488	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***6,338***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	10		800	JoD/item	8,000	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	2		4,000	JoD/item	8,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		40,000	JoD/item	40,000	
Commissioning and Testing	1		8,000	JoD/item	8,000	
Pressure Transducers	8		250	JoD/item	2,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	4		6,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	4		5,000	JoD/item	20,000	
Air Vessel - Surge Protection	1		40,000	JoD/item	40,000	
Sum Pipefittings and Instrumentation						***158,400***
Metalwork						
Pump house gantry lifting unit	1	no.	14,000	JoD/item	14,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***14,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**179,238**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	140	m2	600	JoD/m2	84,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***84,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**94,500**
Total Cost						**438,333**
						438,000
Rounded Cost						

Unit Costs 12: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	0.5	Static Head, m	120	Flow, m3/hr	500
Length, m	8000	Friction Loss, m	9.087	Velocity, m/s	0.707
C Value	120	Total Head, m	129.087	**REQUIRED PUMP POWER**	
C.S.A	0.196			Efficiency, %	70
				Power, kW	251

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	500	m3/hr				
No. of Pumps (two Duty / two Standby)	4	No.				
Motor Power	126	kW			40,000	***160,000***
Head Lift	129	m				
Pumping Station Key Dimensions						
Length	15	m				
Breadth	20	m				
Height	3	m				
Area of Site	1,500	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**160,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	210	m	20	JoD/m	4,200	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	175	m2	20	JoD/m2	3,500	
Concrete Road Kerb within site	52.5	m	15	JoD/m	788	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	2	no.	500	JoD/Item	1,000	
Site Storm Drainage Pipework 300mm diameter	30	m	50	JoD/m	1,500	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	90	m	50	JoD/m	4,500	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	70	no.	50	JoD/Item	3,500	
Site Soft Landscaping: Soil grading and Seeding	375	m2	5	JoD/m2	1,875	
Sum Other Siteworks						***31,863***
					Siteworks Sub-Total	**31,863**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	20	m	130.0	JoD/m	2,600	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	10	m	97.5	JoD/m	975	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***10,725***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	10		800	JoD/item	8,000	
Sluice Valves 200mm diameter supplied and fitted	4		600	JoD/item	2,400	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	2		4,000	JoD/item	8,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		50,000	JoD/item	50,000	
Commissioning and Testing	1		7,000	JoD/item	7,000	
Pressure Transducers	8		250	JoD/item	2,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	4		6,000	JoD/item	24,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	20		300	JoD/item	6,000	
Variable Speed Drive Unit	4		5,000	JoD/item	20,000	
Air Vessel - Surge Protection	1		45,000	JoD/item	45,000	
Sum Pipefittings and Instrumentation						***172,400***
Metalwork						
Pump house gantry lifting unit	1	no.	20,000	JoD/item	20,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***20,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**203,625**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	300	m2	600	JoD/m2	180,000	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***180,500***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**190,500**
Total Cost						**585,988**
						586,000
Rounded Cost						

Unit Costs 13: 20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

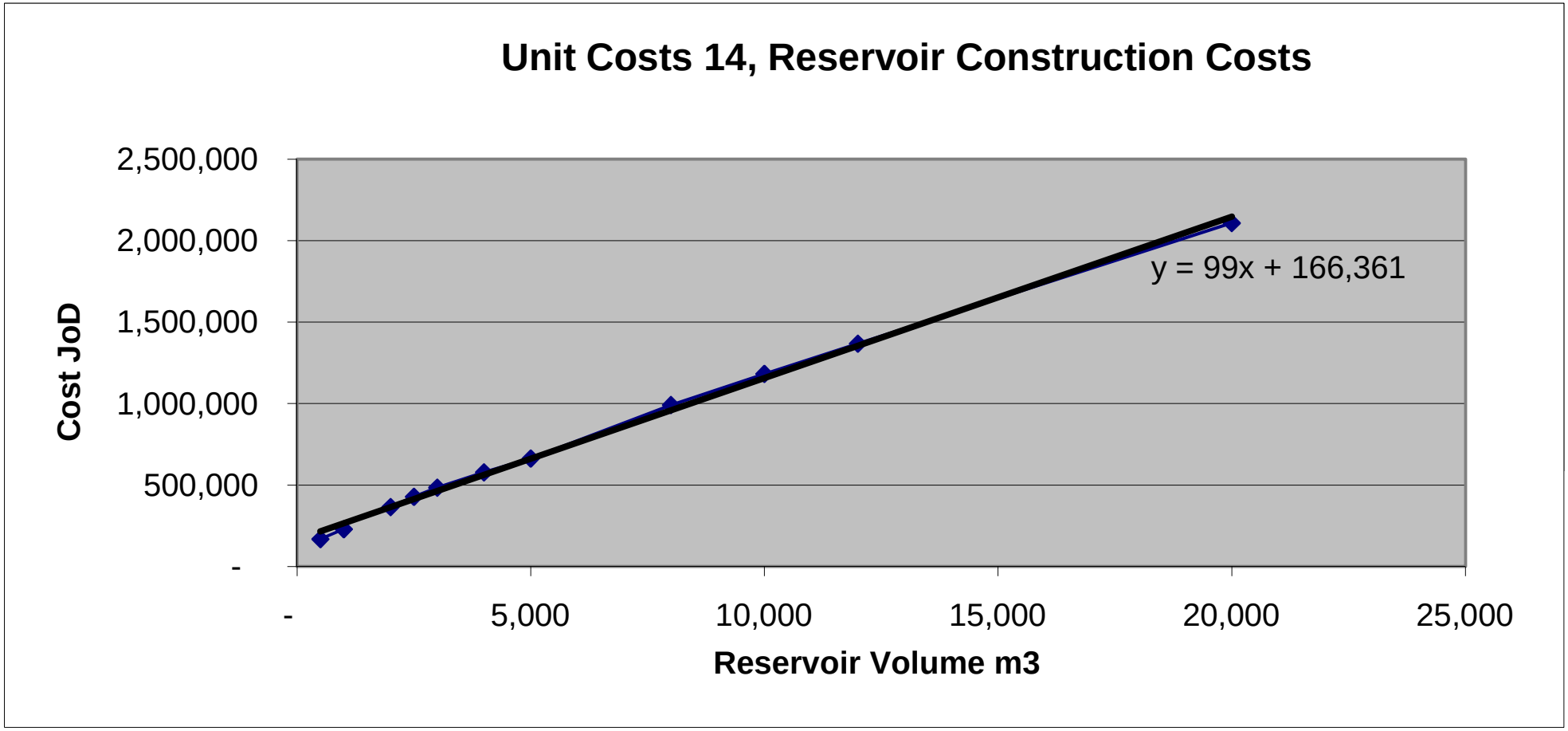
Cost Estimate for New Pumping Station

Dimensions/parameters High-lighted Pink to be inserted by Designer

PUMP REQUIREMENTS

RISING MAIN DETAILS		HEAD DETAILS		FLOW DETAILS	
Diameter, m	1.2	Static Head, m	120	Flow, m3/hr	5300
Length, m	10000	Friction Loss, m	12.655	Velocity, m/s	1.302
C Value	120	Total Head, m	132.655	**REQUIRED PUMP POWER**	
C.S.A	1.131			Efficiency, %	70
				Power, kW	2737

Item Description			Rate		Cost €	Sub-Total €
Pump Specifications						
Pumped Capacity	5,300	m3/hr				
No. of Pumps (four Duty / two Standby)	6	No.				
Motor Power	684	kW			60,000	***360,000***
Head Lift	133	m				
Pumping Station Key Dimensions						
Length	18	m				
Breadth	24	m				
Height	3	m				
Area of Site	2,160	m2				
Distance of Site from existing public road	20	m				
					Pump Sub-Total	**360,000**
Siteworks						
Site Fencing - galvanised steel palisade 2.4m high	252	m	20	JoD/m	5,040	
Entrance gate 6m wide - galvanised steel palisade 2.4m high	1	no.	500	JoD/Item	500	
Roads within site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	210	m2	20	JoD/m2	4,200	
Concrete Road Kerb within site	63	m	15	JoD/m	945	
New access road to site, 500mm crushed stone + DBM BC 60mm + DBM WC 40mm	120	m2	20	JoD/m2	2,400	
Site Lighting Standard inclusive of power cables and ducting	2	no.	500	JoD/Item	1,000	
Site Storm Drainage Pipework 300mm diameter	36	m	50	JoD/m	1,800	
Site Storm Drainage Manholes 1500mm diameter, 2m deep	4	no.	500	JoD/Item	2,000	
Site Storm Drainage Gullies	2	no.	50	JoD/Item	100	
Site 3 Phase Electricity Supply	1	Item	1,000	JoD/Item	1,000	
Miscellaneous Site Ducting 150mm diameter	108	m	50	JoD/m	5,400	
Site Ducting access chambers 500mm square, 1m deep	10	no.	300	JoD/Item	3,000	
Site Major Meter and Control Access Chambers 3m square, 2m deep	1	no.	2,000	JoD/Item	2,000	
Site Screen Planting: Indigenous bushes	84	no.	50	JoD/Item	4,200	
Site Soft Landscaping: Soil grading and Seeding	540	m2	5	JoD/m2	2,700	
Sum Other Siteworks						***36,285***
					Siteworks Sub-Total	**36,285**
Pipes, fittings, instrumentation & metal work						
Underground Spigot and Socket Pipework						
400mm diameter DI watermain	20	m	195.0	JoD/m	3,900	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Above ground (in Pump Station) Flanged Pipework						
400mm diameter DI watermain	10	m	195.0	JoD/m	1,950	
300mm diameter DI watermain	10	m	130.0	JoD/m	1,300	
200mm diameter DI watermain	0	m	97.5	JoD/m	-	
150mm diameter DI watermain	0	m	71.5	JoD/m	-	
Sum Water Supply Pipes						***8,450***
Special Pipe Fittings and Instrumentation						
Sluice Valves 300mm diameter supplied and fitted	12		800	JoD/item	9,600	
Sluice Valves 200mm diameter supplied and fitted	6		600	JoD/item	3,600	
Sluice Valves 150mm diameter supplied and fitted	0		500	JoD/item	-	
Electromagnetic Flow Meter & Fittings 300mm diameter	4		4,000	JoD/item	16,000	
Electromagnetic Flow Meter & Fittings 200mm diameter	0	No.	3,000	JoD/item	-	
Electromagnetic Flow Meter & Fittings 150mm diameter	0		2,500	JoD/item	-	
Display panel control system and telemetry link	1		60,000	JoD/item	60,000	
Commissioning and Testing	1		10,000	JoD/item	10,000	
Pressure Transducers	12		250	JoD/item	3,000	
Inlet/Outlet Control Valve / PSV / PRV 200mm diameter	6		6,000	JoD/item	36,000	
Inlet/Outlet Control Valve / PSV / PRV 150mm diameter	0		5,000	JoD/item	-	
Miscellaneous Bends, Tees and Special Fittings	30		300	JoD/item	9,000	
Variable Speed Drive Unit	6		5,000	JoD/item	30,000	
Air Vessel - Surge Protection	1		85,000	JoD/item	85,000	
Sum Pipefittings and Instrumentation						***262,200***
Metalwork						
Pump house gantry lifting unit	1	no.	28,000	JoD/item	28,000	
Heavy-Duty Lockable Access covers 750mm*750mm square	2	no.	250	JoD/item	500	
Sum Metalwork						***28,500***
					Pipes, fittings, instrumentation and metal work Sub-Total	**299,150**
Buildings, Monitoring and Treatment						
Control Building						
Floor Area	432	m2	600	JoD/m2	259,200	
Fixtures, Fittings and Furniture for one-person office and store	1	no.	500	JoD/item	500	
Sum Control Building						***259,700***
Monitoring and Treatment Equipment						
Telemetry Outstation - Outstation, PLC, 12 LCD display panels, modem, 12 transducers, 200m cabling	1	no.	10,000	JoD/item	10,000	
Other Treatment Process Installation	0	no.		JoD/item	-	
Sum Monitoring and Treatment						***10,000***
					Control Building and Monitoring and Treatment Sub-Total	**269,700**
Total Cost						**965,135**
						965,000
Rounded Cost						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2,500,000
2,000,000
1,500,000
1,000,000
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Cost JoD
y = 99x + 166,361
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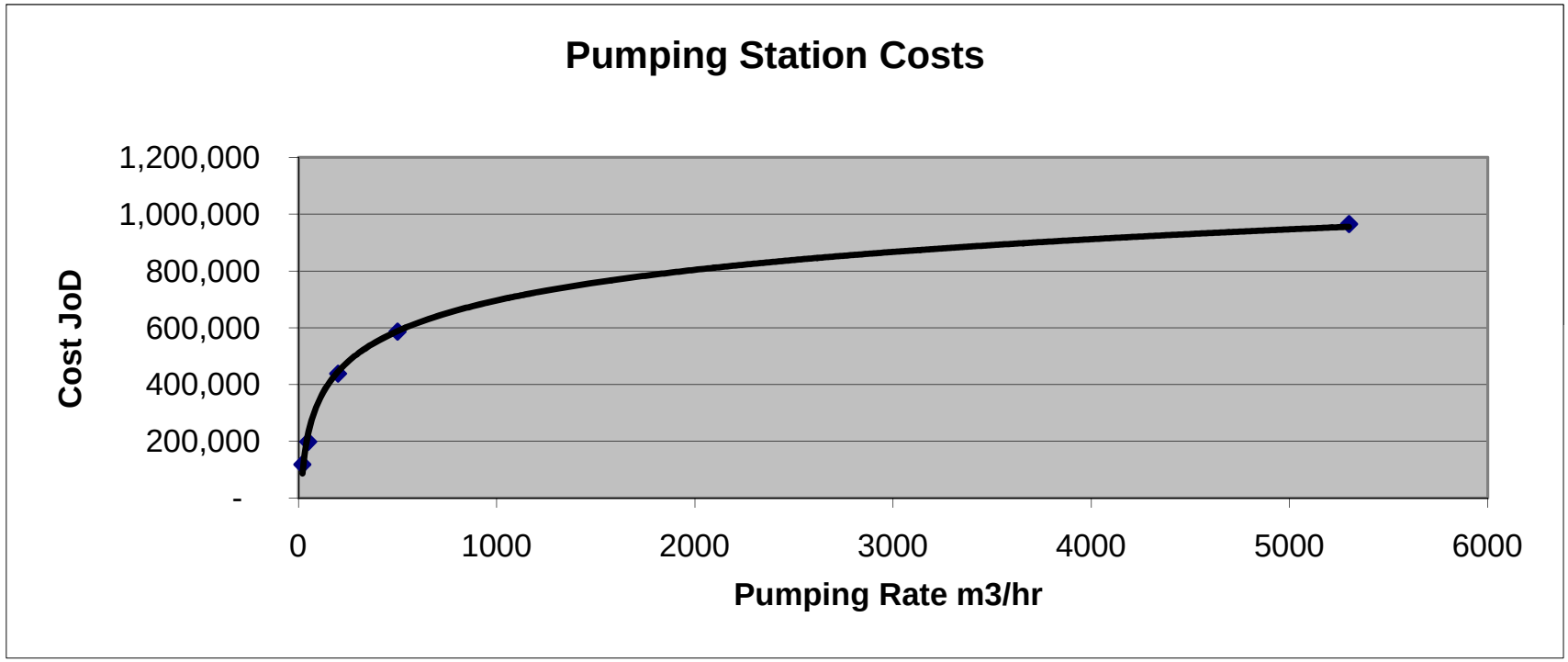
5,000
10,000
15,000
20,000
25,000
Reservoir Volume m3

Unit Costs 15

pumping rate m3/hr	Cost JoD
20	118,000
50	198,000
200	438,000
500	586,000
5300	965,000



Unit Costs 16

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points, Site Investigations, Information Systems

Strategic Infrastructure

1. Strategic Metering Infrastructure

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Electromagnetic Flow Meter 300mm-600mm	No.	5,000	65	325,000
Telemetry Outstation - 6 channel	No.	4,000	12	48,000
Telemetry Outstation - 2 channel	No.	2,500	20	50,000
Site works, civil and instrumentation inc pressure tappings, chambers, pipework	No.	10,000	32	320,000
Central Telemetry server and software	No.	60,000	1	60,000
Total Construction Cost				**803,000**

2. Mapping / GIS

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Aerial Photography Maps	km2	100	1,000	100,000
Up-dated Digital Land Maps	km2	20	1,000	20,000
Mapping co-ordinate systems reconciliation upgrade	Item	50,000	1	50,000
GPS Survey of network pipelines and features	km	50	3,515	175,750
GIS Record Update Nodes, Links, Customer Points	No.	0.50	200,000	100,000
Total Construction Cost				**445,750**

3. Condition Assessments / Site Investigations of Strategic Pipelines (c. 130 km)

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Pipe Tracing, Marking, location of other services, GPS Survey, mapping at specific locations 30m length	No.	100	260	26,000
Standard locations: Slit trench, trench and pipe measurements, pipe condition assessment, soil samples, strap-on meter flow-test	No.	400	130	52,000
Special locations: Pipe cut-out tapping, pressure-monitoring and water sampling point installation	No.	2,000	40	80,000
Air valve and wash-out valve condition check, service and refurbishment	No.	1,500	60	90,000
Sluice valve / butterfly valve / reservoir inlet/outlet valve condition check, service and refurbishment	No.	2,000	40	80,000
Laboratory tests and report	No.	50,000	1	50,000
Total Construction Cost				**378,000**

Unit Costs 17

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points, Site Investigations, Information Systems

Strategic Infrastructure

4. SCADA System

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Central System hardware, software, installation, overall system design and configuration, incorporating monitoring, control and alarm and call-out systems, commissioning, training	No.	900,000	1	900,000
Major Hub facilities sites - e.g. Large reservoir with multi-stage pumping station and several inlets and / or outlets: 2x24-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	50,000	5	250,000
Large facilities sites - e.g. Local reservoir with pumping station and more than 1 inlet and / or outlet: 24-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	40,000	14	560,000
Small facilities sites - e.g. Local reservoir with only gravity supply or pumping station with only 1 inlet and 1 outlet: 12-channel outstation, monitoring and control instrumentation, associated building works, pipework, electrical and communications services	No.	20,000	40	800,000
Total Construction Cost				**2,510,000**

5. Asset Management

Works Item Description	Unit	Unit Cost Rate (JD)	Quantity	Cost JD
Pumps and controls refurbishment and spare parts provision existing strategic pumping stations	No.	50,000	5	250,000
Pumps and controls refurbishment and spare parts provision existing local large pumping stations	No.	20,000	7	140,000
Pumps and controls refurbishment and spare parts provision existing local small/medium pumping stations	No.	10,000	12	120,000
Refurbishment of chlorine dosing, injection, lifting, handling and storage equipment at large chlorination facilities - sources and strategic hubs	No.	20,000	5	100,000
Refurbishment of chlorine dosing, injection, lifting, handling and storage equipment at local chlorination facilities - reservoirs and pumping stations	No.	10,000	10	100,000
Provision of stock of Network monitoring, measurement, data-logging and leakage detection equipment for mobile monitoring and inspection of network	Item	100,000	1	100,000
Total Construction Cost				**810,000**

Unit Costs 18

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points

DMA Connection Points

Works Item Description	**Unit Cost Rate (JD)**
Electromagnetic Flow Meter typical 200mm	3,000
Pressure-Reducing Valve typical 200mm	3,000
Telemetry Outstation - 2 channel	2,500
Site works: pressure tapping, pipework, sluice valves, hydrant/washout, power and communications	1,500
Total Construction Cost	**10,000**

Unit Costs 19

20445 Zarqa Water Supply Re-structuring and Rehabilitation
Cost Estimate Framework

Cost Estimates for Other Costs - Metering & Connection Points

Customer Connections

1. Customer Connection Control Points - Underground

Works Item Description	Unit Cost Rate (JD)
Unsuitable pipe replacement typical 3m lengt	26
Construct underground connection control point chamber and stop-valve	70
check-meter / new meter installed in 10%	4
Total Construction Cost	**100**

2. Customer Meter Replacements

Works Item Description	Unit Cost Rate (JD)
Meters, connections, customers, properties survey, database update and condition appraisal (2 meter surveys for 1 replacement)	10
Meter replacement	40
Total Construction Cost	**50**

Quantities 1

Zarqa Governorate Feasability Study

Secondary & Tertiary Network Field Study

Location : **Date of Survey:**

Area Type :

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	General Condition	No of photos taken
1	G	2"	2	OK	
1	PE	2"	1.5	OK	
2	PE	25mm	3.5	OK	
3	PE	25mm	2.5	OK	
4	PE	25mm	20	OK	
5	PE	2"	50	OK	
5	G	2"	50	OK	
6	PE	25mm	3	OK	
7	G	25mm	3	OK	
8	PE	25mm	2	OK	
10	G	2"	6	OK	
11	G	2"	25	OK	
11	PE	25mm	8	OK	
11	G	2"	30	OK	
12	PE	2"	2	OK	
12	G	2"	2	OK	
13	PE	25mm	1.5	OK	
14A	G	2"		OK	
14B	G	2"	400	OK	
15	PE	2"	20	OK	
16	PE	2"	40	OK	
17	PE	2"	15	OK	
18	G	2"	25	OK	
19	G	2"	8	OK	
20A					
20B	G	2"	205	OK	
21A					
21B	PE	2"	280	OK	
22A					
22B	G	2"	130	OK	
23A					
23B	PE	2"	60	OK	
24A					
24B	G	2"	75	OK	
25	PE	2"	5	OK	
26A					
26B	G	2"	660	OK	
27	G	2"	10	OK	
28	G	2"	12	OK	
29	PE	2"	10	OK	

Total	2167 OUT OF	11706	2"
		480	4"

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 1 **Date of Survey:** 22nd February 2010 **Survey By:** MRC & AG

Area Type : Recently (2 Years) Rehabilitated

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	Underground Length (m)	General Condition	No of Valves	No of Hydrants	No of marker posts	Other fittings	No of photos taken
1	Steel	2"	275	N/A	Good	1	0	0		1
2	Black MDPE / HDPE	2"	80	N/A	Good	0	0	0		0
3	Black MDPE / HDPE	2"	N/A	2470	Unknown	13	0	0		0
4	Steel	2"	N/A	240	Unknown	0	0	0		0
5	Steel	1"	40	N/A	Good	2	0	0		0
6	Steel	1"	N/A	70	Unknown	0	0	0		0
7	MDPE	125mm	N/A	1820	Unknown	2	0	0		0
8	DI	200mm	N/A	50	Fair	0	0	0		
9										
10										
11										
12										
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Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 1 **Date of Survey:** 24th February 2010 **Survey By:** MRC & AG

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply cover material	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?
1	Residential	1	Yes	Unmade / Tarmac	20mm Iron	11m	1	Private	Good	468281	Spannor Powx	1
2	Residential	1	Yes	Unmade / Tarmac	25mm Plastic	10m	1	Private	Good	473578	SPX	1
3	Residential	1	Yes	Unmade / Tarmac	20mm Iron	11m	1	Private	Good	99750200	SMC	1
4	Residential	2	Yes	Tarmac	25mm Plastic	1m	N/A	Private	N/A	N/A	N/A	1
5	Residential	1	No	Tarmac	25mm Plastic	2m	1	Private	Good	126897	SPX	1
6	Residential	2	No	Tarmac	20mm Iron	3m	N/A	Private	Good	25226963	SPX	1
7	Residential	4	No	Tarmac / Concrete	20mm Iron	7m	1	Private	Good	94085892	BDK	1
8	Residential	1	No	Tarmac / Concrete	20mm Iron	4m	N/A	Private	N/A	N/A	N/A	1
9	Residential	2	No	Tarmac	20mm Iron	3m	2	Private	Good	164481, 540870	SPX, SPX	2
10	Residential	1	No	Tarmac	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
11	Residential	1	Yes	Tarmac / Concrete	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
12	Residential	1	Yes	Tarmac / Concrete	25mm Plastic	3m	1	Private	Good	21052934	ABB	1
13	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	1	Private	Good	254338	SPX	1
14	Residential	2	No	Tarmac	25mm Plastic	1m	1	Private	Good	22118263	MTF	1
15	Residential	1	No	Tarmac	25mm Plastic	2m	N/A	Private	N/A	N/A	N/A	1
16	Residential	1	No	Tarmac / Concrete	25mm Plastic	7m	1	Private	Good	88184845	BAYLAN	1
17	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	1	Private	Good	22101900	MTF	1
18	Residential	1	No	Tarmac / Concrete	25mm Plastic	3m	N/A	Private	N/A	N/A	N/A	1
19	Residential	1	Yes	Tarmac	25mm Plastic	9m	N/A	Private	N/A	N/A	N/A	1
20	Residential	1	No	Tarmac / Concrete	25mm Plastic	2m	N/A	Private	N/A	N/A	N/A	1
21	Residential	1	No	Tarmac	25mm Plastic	11m	N/A	Private	N/A	N/A	N/A	1
22	Mixed	5commercial, 2 Residential	No	Tarmac / Flags	25mm Plastic	4m	1	Private	Good	361843	SPX	1
23	Mixed	5commercial, 2 Residential	No	Tarmac / Flags	25mm Plastic	14m	1	Private	Good	21035332	ABB	2
24	Commercial	1 commercial, 0 Residential	No	Tarmac	20mm Iron	6m	1	Private	Good	230943	SPX	1
25												
26												
27												
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Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 2 **Date of Survey:** 25th February 2010 **Survey By:** MRC & AG

Area Type : Mature network

Analysis of typical 5km of pipework

Map Ref	Material	Diameter	Overground Length (m)	Underground Length (m)	General Condition	No of Valves	No of Hydrants	No of marker posts	Other fittings	No of photos taken
1	Steel	2"	690m	N/A	Good	0	0	0		0
2	Plastic	2"	55m	N/A	Good	0	0	0		0
3	Ductile iron	6"	N/A	440m	Very Poor	2	0	0		0
4	Steel	2"	65m	N/A	Poor	0	0	0		0
5	Steel	1"	340m	N/A	Good	0	0	0		0
6	Plastic	2"	N/A	240m	Good	0	0	0		0
7	Plastic	1"	155m	N/A	Good	1	0	0		0
8	Steel	1"	N/A	180m	Unknown	0	0	0		
9	Ductile iron	4"	N/A	1260m	Unknown	0	0	0		
10	Steel	1"	N/A	415m	Unknown	0	0	0		
11	Plastic	1"	N/A	80m	Unknown	0	0	0		
12	Steel	1"	30m	N/A	Poor	0	0	0		
13	Unknown	Unknown	N/A	595m	Unknown	0	0	0		
14										
15										
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29										
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Total

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Hashmeya Zone 2 **Date of Survey:** 25th February 2010 **Survey By:** MRC & AG

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply cover material	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?
1	Residential	1	Yes	N/A	20mm Iron	1m	Unknown	Private	N/A	N/A	N/A	1
2	Residential	4	Yes	N/A	20mm Plastic	3m	1	Private	Good	542707	SPX	2
3	Residential	1	Yes	N/A	20mm Iron	1m	1	Private	Good	Unknown	SPX	2
4	Residential	3	Yes	N/A	20mm Plastic	1m	1	Private	Poor	332002	Not recognised	2
5	Residential	2	No	Tarmac	20mm Iron	4m	1	Private	Average	248281	SPX	1
6	Residential	4	Yes	N/A	20mm Plastic	3m	4	Private	Average	94096990, 271799, 175482, 25196458	Mados, SPX, SPX, MTF	1
7	Residential	1	Yes	N/A	20mm Plastic	6m	1	Private	Good	594321	SPX	1
8	Residential	2	Yes	Unmade	20mm Plastic	3m	1	Private	Good	94012607	SOCAM	1
9	Residential	1	No	Tarmac	20mm Plastic	5m	1	Private	Good	94111910	SOCAM	1
10	Mixed	1 commercial, 1 residential	Yes	N/A	20mm Iron	1m	1	Private	Good	25208834	MTF	1
11	Residential	1	Yes	Tarmac & Unmade	20mm Iron	12m	1	Private	Good	270443	SPX	2
12	Residential	2	Yes	N/A	20mm Plastic	10m	2	Private	Good	99742313, 273634	SMC, SPX	1
13	Residential	2	Yes	N/A	20mm Iron	2m	2	Private	Good	996100, 152342	SOCAM, SPX	1
14	Residential	3	Yes	Concrete	25mm Iron	4m	1	Private	Good	249706	SPX	1
15	Residential	6	Yes	Tarmac	20mm Iron	7m	2	Private	Good	21004290, 555686	ABB, SPX	1
16	Residential	3	Yes	Tarmac	20mm Plastic	6m	3	Private	Good	94109605, 22102043, 570130	SOCAM, MTF, SPX	1
17	Residential	8	Yes	Tarmac	20mm Iron	12m	1	Private	Good	537895	SPX	2
18	Residential	3	Yes	Concrete	20mm Plastic	1m	2	Private	Good	297574, 94051428	SPX, SOCAM	1
19	Residential	2	Yes	Tarmac	20mm Plastic	5m	2	Private	Good	152649, 581616	SPX, SPX	1
20	Residential	2	Yes	N/A	20mm Iron	7m	1	Private	Good	152341	SPX	1
21	Residential	4	Yes	N/A	25mm Plastic	4m	4	Private	Average	94092232, 94027222, 349439, 94060535	SOCAM, SOCAM, SPX, SOCAM	2
22	Residential	2	Yes	Concrete	20mm Iron	5m	1	Private	Poor	94013993	SOCAM	1
23	Residential	2	No	Tarmac	20mm Iron	8m	1	Private	Poor	94111906	SOCAM	1
24	Residential	1	Yes	Concrete	20mm Iron	6m	UNK	Private	UNK	Unknown	Unknown	1
25	Commercial	0	Yes	Concrete	20mm Iron	5m	1	Private	Poor	Unknown - not accessible	SMC	2
26	Mixed	2	Yes	Tarmac	20mm Iron	15m	2	Private	Poor	22147021, 94112724	MTF, SOCAM	2
27	Mixed	4	Yes	Concrete	20mm Plastic	12m	4	Public	Good	555415, 320408, 94025907, Sub mtr (private)	SPX, SPX, SOCAM	2
28	Residential	4	Yes	N/A	25mm Plastic	4m	4	Public	Average	90741840, 218643, 94000875, 186296	SMC, SPX, SOCAM, SPX	1
29	Mixed	1 commercial, 2 residential	Yes	N/A	25mm Plastic	6m	1	Private	Poor	159089	SPX	2
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Total

Quantities 6

Zarqa Governorate Feasability Study
Secondary & Tertiary Network Field Study

Location : Zarqa **Date of Survey:** **Survey By:**

Analysis of typical 50 Properties

Property Number (On Map)	Use Type (Residential / Commercial / Mixed)	No of residential units	Supply Pipe Visible ?	Supply Pipe Size / Material	Supply Pipe Length to Main	No of Meters	Meter Location (Public / Private)	Meter Condition	Serial Number(s)	Manufacturer	No of Photos ?		
								GOOD	25211801	MTF			
								GOOD	25205185	MTF			
								GOOD	25208905	MTF			
								GOOD	261099	SPX			
1	Residential	9	N	--	--	9	Private	GOOD	25205854	MTF			
								GOOD	25210123	MTF			
								GOOD	110921	SPX			
								GOOD	252030534	MTF			
								BAD	22085749	MTF			
								GOOD	186851	SPX			
								GOOD	942005507				SOCAM
								GOOD	584330	SPX			
								GOOD	25188988	MTF			
2	Residential	9	N	--	--	9	Private	GOOD	214102	SPX			
								GOOD	577492	SPX			
								GOOD	524594	SPX			
								GOOD	23188528	MTF			
								GOOD	141975	SPX			
3	Residential	10	N	--	--	1	Private	GOOD	129516	SPX			
								GOOD	553711	SPX			
4								GOOD	507133	SPX			
	Residential	4	N	--	--	3	Private	GOOD	133673	SPX			
5	Residential	1	N	--	--	1		GOOD	225089	SPX			
								GOOD	88129419	SPX			
								GOOD	262052	SPX			
								GOOD	22094805	MTF			
6								GOOD	324385	SPX			
								GOOD	145402	SPX			
								GOOD	88155157	SPX			
								GOOD	288392	SPX			
	Residential	8	Y	PE	4	8		GOOD	8818281	SPX			
7	Residential	8	N	----	----	----	Private	UN RECHABLE					
8	Residential	1	N	--	--	1		GOOD	43710	SPX			
9													
	Residential	6	N	--	--	2	Private	UN RECHABLE					
10								BAD	4850309	SPX			
	Residential	2	N	--	--	2	Private	GOOD	95566				SOCAM
11	Residential	2	N	--	--	1	Private	GOOD	600455	SPX			
12	MIXED	4	N	--	--	1	Private	GOOD	88126018	SPX			
13	Residential	1	N	--	--	1	Private	GOOD	115273				SOCAM
14	Residential	1	N	--	--	1	Private	GOOD	26307458	MTF			
15	MIXED	1	N	--	--	1	Private	GOOD	606016	SPX			
16	Residential	1	UN RECHABLE										
17	Residential	1	UN RECHABLE										
18	Residential	1	N	--	--	1	Private	GOOD	24150134	MTF			
19	Residential	2	N	--	--	1	Private	GOOD	21080031	ABB			
20	Residential	1	N	--	--	1	Private	UN RECHABLE					
21	Residential	1	N	--	--	1	Private	UN RECHABLE					
							Private	GOOD	9501	SPX			
22	Residential	2				2	Private	GOOD	97181				SOCAM
23	Residential	1	N	--	--	1	Private	GOOD	21043313	ABB			
								GOOD	25247306	MTF			
								GOOD	95486				SOCAM
								GOOD	21079789	ABB			
24	Residential	4	N	--	--	4	Private	GOOD	21079233	ABB			
25	Residential	4	N	--	--	1	Private	GOOD	24159653	MTF			
26	Residential	1	N	--	--	1	Private	GOOD	58092				SOCAM
	Residential							GOOD	116742	SPX			
								GOOD	537465	SPX			
								GOOD	6012				SOCAM
27		4	N	--	--	4	Private	GOOD	181504	SPX			
								GOOD	116742	SPX			
28								GOOD	537465	SPX			
								GOOD	606012	SOCAM			
	Residential	4	N	..	..	4	Private	GOOD	181504	SPX			
								GOOD	168281	SPX			
29	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	**GOOD**	184847	SPX			
								GOOD	N.A	SPX			
30	Residential	2	N	..	..	1	Private	GOOD	21057673	ABB			
31	Residential	1	Y	PLASTIC	5M	1	Private	GOOD	9839	SPX			
32	Residential	1	Y	Glvanized	7m	1	Private	GOOD	91772	socam			
33	Residential	1	n	..	..	1	Private	GOOD	20843123	MTF			
34	Residential	1	N	..	..	1	Private	GOOD	153000	SPX			
35	Residential	..	N	..	..	..	Private	..	..	..			
36	Residential	1	N	..	..	1	Private	GOOD	881165899	SPX			
37	Residential	1	N	..	..	1	Private	GOOD	318917	SPX			
								GOOD	186657	SPX			
38	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	GOOD	39765	SPX			
								GOOD	531570	SPX			
39	Residential	1	N	..	..	1	Private	GOOD	18745	SPX			
40	Residential	1	N	..	..	1	Private	..	..	..			
								GOOD	2596475	MTF			
								GOOD	2519103	MTF			
41	**Residential**	**3**	**N**	**..**	**..**	**3**	**Private**	**GOOD**	26302813	RAYLAN			
								GOOD	24169856	MTF			
42	**Residential**	**2**	**N**	**..**	**..**	**2**	**Private**	GOOD	24169996	MTF			
43	Residential	1	N	..	..	1	Private	GOOD	77724	MTF			
								GOOD	505094	SPX			
								GOOD	492964	SPX			
								GOOD	209703	SPX			
								GOOD	25189119	MTF			
								GOOD	368063	SPX			
								GOOD	750344	SPX			
								GOOD	25188345	MTF			
44	**Residential**	**8**	**N**	**..**	**..**	**8**	**Private**	**GOOD**	135776	SPX			
45	Residential	1	N	..	..	1	Private	GOOD	256398	SPX			
								GOOD	25211852	MTF			
46	**Residential**	**2**	**N**	**..**	**..**	**2**	**Private**	GOOD	25205772	MTF			

Quantities 7

Zarqa WSS

Meters Stopped Calculation

No. Of Meters stopped in any quarter from sample of meters that were working at beginning and end of sample period

Areas 1 to 6

All meters that were working at Q12003 with readings >= 10m3 (equivalent to c. 15 lcd)	12,907	
All of those meters that were still working at Q12008 with readings >= 10m3	11,461	Selected Sample

Of the Selected Sample, no. of meters that recorded <= 5m3 (c. 8 lcd) in any quarter from Q22003 to Q42007 inclusive

Quarter	No. Of Meters			
Q22003	116			
Q32003	106			
Q42003	213			
Q12004	296			
Q22004	224			
Q32004	144			
Q42004	281			
Q12005	296			
Q22005	351			
Q32005	276			
Q42005	318			
Q12006	291			
Q22006	134			
Q32006	123			
Q42006	106			
Q12007	130			
Q22007	88			
Q32007	417			
Q42007	404			
Average	227	out of	11,461	total

2.0%

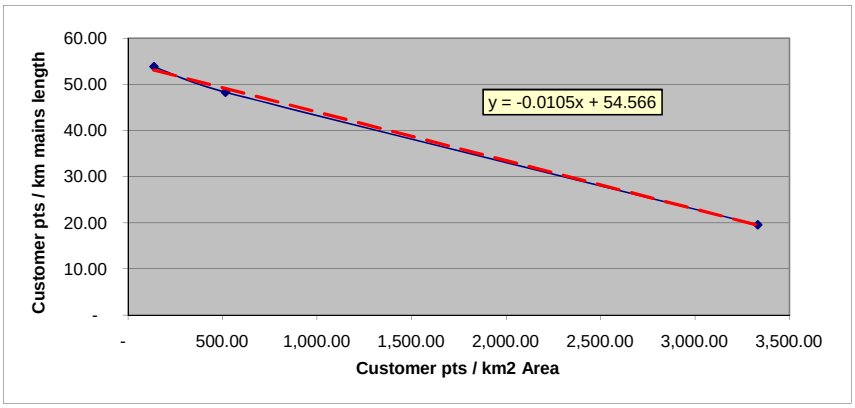
Quantities 8
Zarqa WSS
Density Statistics

Mains Length Shown on GIS

WSA		Mains
Density	NAME	Length
		(km)
High	Zarqa City	65.08
Medium	Hashmeya	96.53
Low	Berein	5.12

Mains Length Not Shown on GIS

WSA		Mains
Density	NAME	Length
		(km)
High	Zarqa City	-
Medium	Hashmeya	2.53
Low	Berein	6.30



Non-GIS Direct Measured Mains Length

Total Mains Length

WSA		Mains	Land Area	Customer points	Mains/Land Area	Customer points/ Land Area	Customer points/ Mains Length	Average Mains Length/ Customer Points (m)
Density	NAME	Length	km2	no.	(km/km2)	(No./km2)	(No./km)	
		(km)						
High	Zarqa City	65.08	1.00	3,333.00	65.08	3,333.00	51.22	19.52
Medium	Hashmeya	99.06	3.98	2,050.00	24.86	514.56	20.69	48.32
Low	Berein	12.44	1.70	231.00	7.34	136.28	18.57	53.85

Quantities 9
Zarqa WSS
Water Supply Area Statistics

WSA Distribution Area		Land Area			Customer points 2008		Development Density	Mains Length
		2008	2008	Total	Total	Density per serviced land area (No./km2)	mains length / customer pt (m)	Calculated
ID	NAME	Serviced	Unserviced					Total
		km2	km2	km2	no.			(m)
Az1	Azraq	5.56	13.95	19.51	923	166	52.8	48,756
AzTot		**5.56**	**13.95**	**19.51**	**923**			**48,756**
Du1	Hallabat	1.32	6.45	7.77	261	198	52.5	13,700
Du2	Dulail	7.17	44.32	51.49	2,739	382	50.6	138,467
Du3	Tafeh	1.51	25.08	26.59	82	54	54.0	4,428
DuTot		**9.99**	**75.86**	**85.85**	**3,082**			**156,595**
Ka1	King Abdullah City High	-	9.08	9.08	1	-	54.6	55
Ka2	King Abdullah City Low	0.19	15.57	15.76	153	801	46.2	7,061
KaTot		**0.19**	**24.65**	**24.84**	**154**			**7,116**
Ta1	Tatweer	1.97	13.12	15.09	1,822	923	44.9	81,755
TaTot		**1.97**	**13.12**	**15.09**	**1,822**			**81,755**
Za1	Zarqa High	3.93	-	3.93	2,133	542	48.9	104,246
Za2	Zarqa Mid - Batrawi	11.63	0.98	12.61	20,572	1,769	36.0	740,444
Za3	Zarqa North	0.81	5.87	6.68	283	349	50.9	14,405
ZaTot		**16.37**	**6.85**	**23.22**	**22,988**			**859,095**
Aw1	Awajan High	4.91	-	4.91	5,585	1,138	42.6	238,006
Aw2	Awajan Mid	3.97	0.19	4.16	3,379	851	45.6	154,168
Aw4	Awajan West	3.35	6.15	9.49	2,092	625	48.0	100,430
Aw5	Awajan North	4.55	7.06	11.61	2,558	562	48.7	124,475
AwTot		**16.77**	**13.40**	**30.17**	**13,614**			**617,079**
Ru1	Russaifah North West	1.66	11.26	12.92	392	236	52.1	20,420
Ru3	Russaifah High	4.15	4.99	9.14	7,965	1,917	34.4	274,294
Ru4	Russaifah Low	3.63	-	3.63	5,743	1,582	38.0	217,970
Ru5	Hitteen Tower	0.44	0.18	0.62	1,008	2,271	30.7	30,963
Ru6	Hitteen Reservoir	6.19	5.53	11.72	10,054	1,624	37.5	377,169
RuTot		**16.08**	**21.95**	**38.03**	**25,162**			**920,815**
No1	Khaw	0.30	18.50	18.80	162	539	48.9	7,922
No2	Hashmeya South	0.10	3.62	3.72	78	768	46.5	3,627
No3	Hashmeya Town	4.11	3.01	7.12	3,110	757	46.6	144,974
No4	Hashmeya Rural	0.83	12.04	12.87	413	500	49.3	20,367
No5	Sukhna	3.94	19.84	23.78	2,474	628	48.0	118,673
NoTot		**9.27**	**57.02**	**66.29**	**6,237**			**295,564**
We1	Merhib	1.53	10.09	11.62	303	198	52.5	15,905
We2	Berein	3.58	15.01	18.59	548	153	53.0	29,021
We3	Um Rumanneh	3.90	21.09	24.99	725	186	52.6	38,147
We4	Sarout	2.08	10.66	12.74	208	100	53.5	11,131
We5	Alouk	3.83	19.12	22.95	691	180	52.7	36,396
No7	Qunaya	0.65	12.11	12.76	112	172	52.8	5,910
WNWTot		**15.57**	**88.08**	**103.65**	**2,587**			**136,509**
TOTAL for WSAs		**91.80**	**314.87**	**406.67**	**76,569**			**3,123,285**

Additional Areas outside WSAs			**4,555**	**20**		
Total of Zarqa Governorate			**4,962**	**76,589**		**3,123,285**

Quantities 10 Zarqa WSS

Water Supply Area Pipe Details from GIS

WSA		Steel						Galvanised Steel						Ductile Iron					
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total
Az1	Azraq			7,808	5,096	738	13,643						-				246		246
AzTot		**-**	**-**	**7,808**	**5,096**	**738**	**13,643**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**246**	**-**	**246**
Du1	Hallabat			2,301	2,229		4,530	11,052					11,052					1,859	1,859
Du2	Dulail			16,024	12,614	13,195	41,834	95,742					95,742						-
Du3	Tafeh			9,030		22,214	31,244	12,181					12,181						-
DuTot		**-**	**-**	**27,355**	**14,843**	**35,409**	**77,608**	**118,975**	**-**	**-**	**-**	**-**	**118,975**	**-**	**-**	**-**	**-**	**1,859**	**1,859**
Ka1	King Abdullah City High						-						-			4,590	1,985	7,333	13,908
Ka2	King Abdullah City Low			1,584	497	5,886	7,966						-			11,940	5,682		17,622
KaTot		**-**	**-**	**1,584**	**497**	**5,886**	**7,966**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**16,531**	**7,666**	**7,333**	**31,530**
Ta1	Tatweer			10,356	165	7,887	18,408	396					396		2,553	1,958	3,567		8,078
TaTot		**-**	**-**	**10,356**	**165**	**7,887**	**18,408**	**396**	**-**	**-**	**-**	**-**	**396**	**-**	**2,553**	**1,958**	**3,567**	**-**	**8,078**
Za1	Zarqa High			8,357	2,273	192	10,823						-		2,568	589	4,681		7,837
Za2	Zarqa Mid - Batrawi		89	49,222	14,918	23,117	87,345	13,855					13,855		22,770	5,755	10,519	5,880	44,924
Za3	Zarqa North			6,372			6,372						-						-
ZaTot		**-**	**89**	**63,951**	**17,191**	**23,309**	**104,539**	**13,855**	**-**	**-**	**-**	**-**	**13,855**	**-**	**25,338**	**6,344**	**15,200**	**5,880**	**52,761**
Aw1	Awajan High			9,780	5,203	1,153	16,136	47	216				264		5,174	6,679	2,231	3,087	17,171
Aw2	Awajan Low			5,490	2,688	4,157	12,336	810					810		5,089	7,271	4,617	3,842	20,819
Aw3	Awajan West			12,166	699	297	13,161	5,266					5,266			1,533	1,873	1,750	5,156
Aw4	Awajan North			12,254	3,509		15,764	8,424	452				8,876		2,136	4,899			7,035
AwTot		**-**	**-**	**39,690**	**12,100**	**5,607**	**57,396**	**14,547**	**669**	**-**	**-**	**-**	**15,216**	**-**	**12,399**	**20,381**	**8,721**	**8,680**	**50,180**
Ru1	Russaifah North West			7,758			7,758	6,701					6,701				4,104	817	4,920
Ru2	Russaifah High A			31,198			31,198	84,491					84,491			73	8,733	5,228	14,034
Ru3	Russaifah Low		478	17,584	6	533	18,602	22,421					22,421			325	10,018	2,795	13,138
Ru4	Hitteen Tower			2,217			2,217	5,714					5,714				155		155
Ru5	Hitteen Reservoir			28,852		10,657	39,508	81,304					81,304				18,151	4,856	23,007
RuTot		**-**	**478**	**87,609**	**6**	**11,190**	**99,284**	**200,631**	**-**	**-**	**-**	**-**	**200,631**	**-**	**-**	**398**	**41,161**	**13,695**	**55,254**
No1	Khaw			707	2,266	1,124	4,097	1,060					1,060				4,561		4,561
No2	Hashmeya South			4,110		3,158	7,268	1,453					1,453			909	304		1,213
No3	Hashmeya Town			10,438			10,438	13,205					13,205				15,649		15,649
No4	Hashmeya Rural			7,315			7,315	345					345						-
No5	Sukhna			8,990			8,990	14,144					14,144						-
NoTot		**-**	**-**	**31,559**	**2,266**	**4,282**	**38,107**	**30,206**	**-**	**-**	**-**	**-**	**30,206**	**-**	**-**	**909**	**20,513**	**-**	**21,422**
We1	Merhib			5,923	6,009		11,932	7,058					7,058						-
We2	Berein			19,649			19,649	16,898					16,898				1,522		1,522
We3	Um Rumanneh		1,957	20,195	6,147		28,299	31,056					31,056						-
We4	Berein North			1,148			1,148	14,608					14,608						-
We5	Sarout/Alouk			5,640			5,640	44,866					44,866						-
We6	Qunaya			17,214		83	25,836	1,408					1,408						-
WeTot		**-**	**1,957**	**69,769**	**12,156**	**83**	**92,504**	**115,893**	**-**	**-**	**-**	**-**	**115,893**	**-**	**-**	**-**	**1,522**	**-**	**1,522**
TOTAL for WSAs		**-**	**2,525**	**339,681**	**64,321**	**94,390**	**509,456**	**494,504**	**-494,504**	**-**	**-**	**-**	**495,172**	**-**	**40,290**	**46,520**	**98,597**	**37,445**	**222,852**
							500,917												222,852
Additional Areas outside WSAs																			
Total of Zarqa Governorate		**-**	**2,525**	**339,681**	**64,321**	**94,390**	**509,456**	**494,504**	**-494,504**	**-**	**-**	**-**	**495,172**	**-**	**40,290**	**46,520**	**98,597**	**37,445**	**222,852**

WSA		PE / PVC						Other / Unknown						GIS Total						Density Total
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	
Az1	Azraq						-						-	-	-	7,808	5,343	738	13,889	48,756
AzTot		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7,808**	**5,343**	**738**	**13,889**	**48,756**
Du1	Hallabat						-						-	11,052	-	2,301	2,229	1,859	17,440	13,700
Du2	Dulail		22,801	9,996			32,796						-	95,742	22,801	26,020	12,614	13,195	170,373	138,467
Du3	Tafeh						-						-	12,181	-	9,030	-	22,214	43,425	4,428
DuTot		**-**	**22,801**	**9,996**	**-**	**-**	**32,796**	**-**	**-**	**-**	**-**	**-**	**-**	**118,975**	**22,801**	**37,351**	**14,843**	**37,268**	**231,237**	**156,595**
Ka1	King Abdullah City High	1,989	8,013				10,003						-	1,989	8,013	4,590	1,985	7,333	23,910	55
Ka2	King Abdullah City Low	3,977	10,093				14,070						-	3,977	10,093	13,524	6,178	5,886	39,658	7,061
KaTot		**5,966**	**18,106**	**-**	**-**	**-**	**24,072**	**-**	**-**	**-**	**-**	**-**	**-**	**5,966**	**18,106**	**18,115**	**8,163**	**13,219**	**63,568**	**7,116**
Ta1	Tatweer	2,737	27,893	3,090			33,720						-	3,133	30,446	15,405	3,732	7,887	60,603	81,755
TaTot		**2,737**	**27,893**	**3,090**	**-**	**-**	**33,720**	**-**	**-**	**-**	**-**	**-**	**-**	**3,133**	**30,446**	**15,405**	**3,732**	**7,887**	**60,603**	**81,755**
Za1	Zarqa High	4,471	45,345	129			49,945						-	4,471	47,913	9,075	6,954	192	68,605	104,246
Za2	Zarqa Mid - Batrawi	41,916	246,948	29			288,894						-	55,771	269,807	55,006	25,437	28,996	435,018	740,444
Za3	Zarqa North	15	14,355				14,370						-	15	14,355	6,372	-	-	20,742	14,405
ZaTot		**46,403**	**306,648**	**159**	**-**	**-**	**353,209**	**-**	**-**	**-**	**-**	**-**	**-**	**60,258**	**332,075**	**70,453**	**32,391**	**29,188**	**524,365**	**859,095**
Aw1	Awajan High	8,289	73,859				82,148			450			450	8,336	79,249	16,909	7,434	4,240	116,168	238,006
Aw2	Awajan Low	7,872	49,864				57,736						-	8,682	54,953	12,761	7,305	8,000	91,701	154,168
Aw3	Awajan West	644	42,417				43,062						-	5,910	42,417	13,698	2,572	2,047	66,644	100,430
Aw4	Awajan North	1,850	51,434	23			53,308						-	10,274	54,023	17,176	3,509	-	84,982	124,475
AwTot		**18,655**	**217,575**	**23**	**-**	**-**	**236,253**	**-**	**-**	**450**	**-**	**-**	**450**	**33,202**	**230,642**	**60,544**	**20,821**	**14,286**	**359,496**	**617,079**
Ru1	Russaifah North West			4,141			4,141	44	5,397	1,602			7,044	6,746	5,397	13,502	4,104	817	30,565	20,420
Ru2	Russaifah High		749				749	2,373	2,562	17,538		1,698	24,171	86,864	3,311	48,809	8,733	6,926	154,643	274,294
Ru3	Russaifah Low		828				828		9,577	3,475			13,052	22,421	10,883	21,384	10,024	3,328	68,041	217,970
Ru4	Hitteen Tower						-			272		157	428	5,714	-	2,489	155	157	8,514	30,963
Ru5	Hitteen Reservoir						-	8,882	19,508	15,705	542	1,920	46,557	90,186	19,508	44,557	18,693	17,432	190,376	377,169
RuTot		**-**	**1,577**	**4,141**	**-**	**-**	**5,719**	**11,299**	**37,044**	**38,592**	**542**	**3,775**	**91,252**	**211,930**	**39,100**	**130,741**	**41,709**	**28,660**	**452,139**	**920,815**
No1	Khaw			3,795			3,795	427		570			997	1,487	-	5,072	6,827	1,124	14,509	7,922
No2	Hashmeya South	912	1,587				2,499	105	243				348	2,470	1,830	5,019	304	3,158	12,781	3,627
No3	Hashmeya Town	5,093		9,670			14,763	23,091	48,067	4,566			75,724	41,389	48,067	24,674	15,649	-	129,778	144,974
No4	Hashmeya Rural	106		2,260			2,365		17,893	5,998			23,891	450	17,893	15,572	-	-	33,916	20,367
No5	Sukhna	1,619	2,453	4,392			8,465	8,557	31,800	15,106			55,463	24,321	34,254	28,488	-	-	87,062	118,673
NoTot		**7,729**	**4,040**	**20,117**	**-**	**-**	**31,886**	**32,181**	**98,004**	**26,240**	**-**	**-**	**156,425**	**70,117**	**102,045**	**78,824**	**22,780**	**4,282**	**278,047**	**295,564**
We1	Merhib	440	9,997				10,437						-	7,498	9,997	5,923	6,009	-	29,426	15,905
We2	Berein						-			6,366	5,213		11,578	16,898	-	26,014	6,735	-	49,647	29,021
We3	Um Rumanneh						-			2,709			2,709	31,056	1,957	22,904	6,147	-	62,065	38,147
We4	Berein North						-	301		5,658			5,959	14,909	-	6,806	-	-	21,715	11,131
We5	Sarout/Alouk						-		671	5,861			6,532	44,866	671	11,501	-	-	57,038	36,396
We6	Qunaya	230					859		1,603		2,017		3,620	1,637	1,603	17,214	2,017	83	22,554	5,910
WeTot		**670**	**9,997**	**-**	**-**	**-**	**11,296**	**301**	**2,274**	**20,594**	**7,229**	**-**	**30,398**	**116,864**	**14,228**	**90,363**	**20,907**	**83**	**242,445**	**136,509**
TOTAL for WSAs		**82,159**	**608,636**	**37,526**	**-**	**-**	**728,951**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**620,443**	**789,442**	**509,604**	**170,689**	**135,611**	**2,225,788**	**3,123,285**
Additional Areas outside WSAs																			154,529	
Total of Zarqa Governorate		**82,159**	**608,636**	**37,526**	**-**	**-**	**728,951**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**620,443**	**789,442**	**509,604**	**170,689**	**135,611**	**2,380,317**	**3,123,285**

Quantities 11 Zarqa WSS

Calculation of Secondary and Tertiary Rehabilitation and Restructuring Requirements

Prior to making allowance for recently completed works

WSA	GIS Total						Non-GIS Total (All Extra to <50mm Except Russaifah)						Density Total	Max of GIS and Density	GIS + Non-GIS Total								
	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total			up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	Tertiary %	Secondary %	Primary %
	Tertiary	Secondary	Secondary	Primary	Primary		Tertiary	Secondary	Secondary	Primary	Primary				Tertiary	Secondary	Secondary	Primary	Primary		length	length	length
Azraq	-	-	7,808	5,343	738	13,889	34,867	-	-	-	-	34,867	48,756	48,756	34,867	-	7,808	5,343	738	48,756	72%	16%	12%
Dulail	118,975	22,801	37,351	14,843	37,268	231,237	-	-	-	-	-	-	156,595	231,237	118,975	22,801	37,351	14,843	37,268	231,237	51%	26%	23%
KABA	5,966	18,106	18,115	8,163	13,219	63,568	-	-	-	-	-	-	7,116	63,568	5,966	18,106	18,115	8,163	13,219	63,568	9%	57%	34%
Tatweer	3,133	30,446	15,405	3,732	7,887	60,603	21,153	-	-	-	-	21,153	81,755	81,755	24,286	30,446	15,405	3,732	7,887	81,755	30%	56%	14%
Zarqa	60,258	332,075	70,453	32,391	29,188	524,365	334,730	-	-	-	-	334,730	859,095	859,095	394,988	332,075	70,453	32,391	29,188	859,095	46%	47%	7%
Awajan	33,202	230,642	60,544	20,821	14,286	359,496	257,584	-	-	-	-	257,584	617,079	617,079	290,786	230,642	60,544	20,821	14,286	617,079	47%	47%	6%
Russaifah	211,930	39,100	130,741	41,709	28,660	452,139	215,845	252,831	-	-	-	468,676	920,815	920,815	427,775	291,931	130,741	41,709	28,660	920,815	46%	46%	8%
North	70,117	102,045	78,824	22,780	4,282	278,047	17,517	-	-	-	-	17,517	295,564	295,564	87,634	102,045	78,824	22,780	4,282	295,564	30%	61%	9%
West NorthWest	116,864	14,228	90,363	20,907	83	242,445	-	-	-	-	-	-	136,509	242,445	116,864	14,228	90,363	20,907	83	242,445	48%	43%	9%
All WSA's	620,443	789,442	509,604	170,689	135,611	2,225,788	881,696	252,831	-	-	-	1,134,527	3,123,285	3,360,316	1,502,140	1,042,273	509,604	170,689	135,611	3,360,316	45%	46%	9%
Non WSA						154,529							-	154,529					154,529	154,529			
Total						2,380,317							3,123,285	3,514,844	1,502,140	1,042,273	509,604	170,689	290,139	3,514,844			

Rehabilitation Ratios	Rehab	Restructure
Steel	50%	100%
Galvanised Metal	100%	100%
Ductile Iron	20%	100%
PE/PVC	50%	100%
Other/Unknown	80%	100%
Non-GIS	80%	100%

Russaifah Adjustment to match aggregate tertiary ratio of Zarqa and Awajan WSAs 46.456%

427,775.32

215,845.36

Tertiary m length	Secondary m length	Primary m length
34,867	7,808	6,081
118,975	60,151	52,111
5,966	36,221	21,382
24,286	45,851	11,619
394,988	402,528	61,580
290,786	291,187	35,107
427,775	422,671	70,369
87,634	180,869	27,062
116,864	104,591	20,990
1,502,140	1,551,877	306,300
-	-	154,529
1,502,140	1,551,877	460,828

Tert+Sec m length	Primary m length	All m length
42,675	6,081	48,756
179,126	52,111	231,237
42,187	21,382	63,568
70,137	11,619	81,755
797,516	61,580	859,095
581,972	35,107	617,079
850,446	70,369	920,815
268,502	27,062	295,564
221,455	20,990	242,445
3,054,016	306,300	3,360,316
-	154,529	154,529
3,054,016	460,828	3,514,844

WSA	Rehab up to 300mm diam Total						Restructure up to 300mm diam Total					
	up to 50mm	60 - 90mm	100-150mm	200-300mm			up to 50mm	60 - 90mm	100-150mm	200-300mm		
	Tertiary	Secondary	Secondary	Primary			Tertiary	Secondary	Secondary	Primary		
Azraq	27,894	-	3,904	2,597			34,867	-	7,808	5,343		
Dulail	118,975	11,400	18,675	7,422			118,975	22,801	37,351	14,843		
KABA	2,983	9,053	4,098	1,782			5,966	18,106	18,115	8,163		
Tatweer	18,687	14,457	7,115	796			24,286	30,446	15,405	3,732		
Zarqa	304,841	158,436	33,323	11,636			394,988	332,075	70,453	32,391		
Awajan	229,942	111,936	24,293	7,794			290,786	230,642	60,544	20,821		
Russaifah	382,346	232,928	76,829	8,669			427,775	291,931	130,741	41,709		
North	73,829	80,424	47,011	5,236			87,634	102,045	78,824	22,780		
West NorthWest	116,469	7,796	51,360	12,166			116,864	14,228	90,363	20,907		
All WSA's	1,275,965	626,430	266,609	58,097	-	-	1,502,140	1,042,273	509,604	170,689		

WSA	Total Customer Connections	Total Customer Meters
Azraq	602	991
Dulail	3,689	3,309
KABA		-
Tatweer	891	1,613
Zarqa	35,157	47,474
Awajan	15,952	21,885
Russaifah	29,023	35,921
North	4,729	7,293
West NorthWest	1,247	2,355
All WSA's	91,290	120,841

Quantities 12 Zarqa WSS

Water Supply Area Pipe Details from GIS

WSA		Steel						Galvanised Steel						Ductile Iron					
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total
	Al Gwaireyeh			22,975	10,240	2,793	36,008	13,504					13,504	9,116		3,502	797	1,482	14,897
AzTot		**-**	**-**	**22,975**	**10,240**	**2,793**	**36,008**	**13,504**	**-**	**-**	**-**	**-**	**13,504**	**9,116**	**-**	**3,502**	**797**	**1,482**	**14,897**
Du1	Hallabat			2,301	2,229		4,530	11,052					11,052					1,859	1,859
Du2	Dulail			16,024	12,614	13,195	41,834	95,742					95,742						-
Du3	Tafeh			9,030		22,214	31,244	12,181					12,181						-
DuTot		**-**	**-**	**27,355**	**14,843**	**35,409**	**77,608**	**118,975**	**-**	**-**	**-**	**-**	**118,975**	**-**	**-**	**-**	**-**	**1,859**	**1,859**
Ka1	King Abdullah City High						-						-			4,590	1,985	7,333	13,908
Ka2	King Abdullah City Low			1,584	497	5,886	7,966						-			11,940	5,682		17,622
KaTot		**-**	**-**	**1,584**	**497**	**5,886**	**7,966**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**16,531**	**7,666**	**7,333**	**31,530**
Ta1	Tatweer			10,356	165	7,887	18,408	396					396		2,553	1,958	3,567		8,078
TaTot		**-**	**-**	**10,356**	**165**	**7,887**	**18,408**	**396**	**-**	**-**	**-**	**-**	**396**	**-**	**2,553**	**1,958**	**3,567**	**-**	**8,078**
Za1	Zarqa High			8,357	2,273	192	10,823						-		2,568	589	4,681		7,837
Za2	Zarqa Mid - Batrawi		89	49,222	14,918	23,117	87,345	13,855					13,855		22,770	5,755	10,519	5,880	44,924
Za3	Zarqa North			6,372			6,372						-						-
ZaTot		**-**	**89**	**63,951**	**17,191**	**23,309**	**104,539**	**13,855**	**-**	**-**	**-**	**-**	**13,855**	**-**	**25,338**	**6,344**	**15,200**	**5,880**	**52,761**
Aw1	Awajan High			9,780	5,203	1,153	16,136	47	216				264		5,174	6,679	2,231	3,087	17,171
Aw2	Awajan Mid			5,490	2,688	4,157	12,336	810					810		5,089	7,271	4,617	3,842	20,819
Aw3	Awajan West			12,166	699	297	13,161	5,266					5,266			1,533	1,873	1,750	5,156
Aw4	Awajan North			12,254	3,509		15,764	8,424	452				8,876		2,136	4,899			7,035
AwTot		**-**	**-**	**39,690**	**12,100**	**5,607**	**57,396**	**14,547**	**669**	**-**	**-**	**-**	**15,216**	**-**	**12,399**	**20,381**	**8,721**	**8,680**	**50,180**
Ru1	Russaifah North West			7,758			7,758	6,701					6,701				4,104	817	4,920
Ru2	Russaifah High A			31,198			31,198	84,491					84,491			73	8,733	5,228	14,034
Ru3	Russaifah Low		478	17,584	6	533	18,602	22,421					22,421			325	10,018	2,795	13,138
Ru4	Hitteen Tower			2,217			2,217	5,714					5,714				155		155
Ru5	Hitteen Reservoir			28,852		10,657	39,508	81,304					81,304				18,151	4,856	23,007
RuTot		**-**	**478**	**87,609**	**6**	**11,190**	**99,284**	**200,631**	**-**	**-**	**-**	**-**	**200,631**	**-**	**-**	**398**	**41,161**	**13,695**	**55,254**
No1	Khaw			707	2,266	1,124	4,097	1,060					1,060				4,561		4,561
No2	Hashmeya South			4,110		3,158	7,268	1,453					1,453			909	304		1,213
No3	Hashmeya Town			10,438			10,438	13,205					13,205				15,649		15,649
No4	Hashmeya Rural			7,315			7,315	345					345						-
No5	Sukhna			8,990			8,990	14,144					14,144						-
NoTot		**-**	**-**	**31,559**	**2,266**	**4,282**	**38,107**	**30,206**	**-**	**-**	**-**	**-**	**30,206**	**-**	**-**	**909**	**20,513**	**-**	**21,422**
We1	Merhib			5,923	6,009		11,932	7,058					7,058						-
We2	Berein			19,649			19,649	16,898					16,898				1,522		1,522
We3	Um Rumanneh		1,957	20,195	6,147		28,299	31,056					31,056						-
We4	Berein North			1,148			1,148	14,608					14,608						-
We5	Sarout/Alouk			5,640			5,640	44,866					44,866						-
We6	Qunaya			17,214		83	25,836	1,408					1,408						-
WeTot		**-**	**1,957**	**69,769**	**12,156**	**83**	**92,504**	**115,893**	**-**	**-**	**-**	**-**	**115,893**	**-**	**-**	**-**	**1,522**	**-**	**1,522**
TOTAL for WSAs		**-**	**2,525**	**354,848**	**69,464**	**96,445**	**531,821**	**508,008**	**-**	**508,008**	**-**	**-**	**-**	**508,676**	**9,116**	**40,290**	**50,022**	**99,148**	**38,927**	**237,503**
							523,282												237,503
Additional Areas outside WSAs																			
Total of Zarqa Governorate		**-**	**2,525**	**354,848**	**69,464**	**96,445**	**531,821**	**508,008**	**-**	**508,008**	**-**	**-**	**-**	**508,676**	**9,116**	**40,290**	**50,022**	**99,148**	**38,927**	**237,503**

WSA		PE / PVC						Other / Unknown						GIS Total						Density Total
ID	NAME	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	up to 50mm	60 - 90mm	100-150mm	200-300mm	350mm+	Total	
Az1	Azraq	23,560	114,129				137,689						-	46,180	114,129	26,477	11,037	4,275	202,098	48,756
AzTot		**23,560**	**114,129**	**-**	**-**	**-**	**137,689**	**-**	**-**	**-**	**-**	**-**	**-**	**46,180**	**114,129**	**26,477**	**11,037**	**4,275**	**202,098**	**48,756**
Du1	Hallabat						-						-	11,052	-	2,301	2,229	1,859	17,440	13,700
Du2	Dulail		22,801	9,996			32,796						-	95,742	22,801	26,020	12,614	13,195	170,373	138,467
Du3	Tafeh						-						-	12,181	-	9,030	-	22,214	43,425	4,428
DuTot		**-**	**22,801**	**9,996**	**-**	**-**	**32,796**	**-**	**-**	**-**	**-**	**-**	**-**	**118,975**	**22,801**	**37,351**	**14,843**	**37,268**	**231,237**	**156,595**
Ka1	King Abdullah City High	1,989	8,013				10,003						-	1,989	8,013	4,590	1,985	7,333	23,910	55
Ka2	King Abdullah City Low	3,977	10,093				14,070						-	3,977	10,093	13,524	6,178	5,886	39,658	7,061
KaTot		**5,966**	**18,106**	**-**	**-**	**-**	**24,072**	**-**	**-**	**-**	**-**	**-**	**-**	**5,966**	**18,106**	**18,115**	**8,163**	**13,219**	**63,568**	**7,116**
Ta1	Tatweer	2,737	27,893	3,090			33,720						-	3,133	30,446	15,405	3,732	7,887	60,603	81,755
TaTot		**2,737**	**27,893**	**3,090**	**-**	**-**	**33,720**	**-**	**-**	**-**	**-**	**-**	**-**	**3,133**	**30,446**	**15,405**	**3,732**	**7,887**	**60,603**	**81,755**
Za1	Zarqa High	4,471	45,345	129			49,945						-	4,471	47,913	9,075	6,954	192	68,605	104,246
Za2	Zarqa Mid - Batrawi	41,916	246,948	29			288,894						-	55,771	269,807	55,006	25,437	28,996	435,018	740,444
Za3	Zarqa North	15	14,355				14,370						-	15	14,355	6,372	-	-	20,742	14,405
ZaTot		**46,403**	**306,648**	**159**	**-**	**-**	**353,209**	**-**	**-**	**-**	**-**	**-**	**-**	**60,258**	**332,075**	**70,453**	**32,391**	**29,188**	**524,365**	**859,095**
Aw1	Awajan High	8,289	73,859				82,148			450			450	8,336	79,249	16,909	7,434	4,240	116,168	238,006
Aw2	Awajan Mid	7,872	49,864				57,736						-	8,682	54,953	12,761	7,305	8,000	91,701	154,168
Aw3	Awajan West	644	42,417				43,062						-	5,910	42,417	13,698	2,572	2,047	66,644	100,430
Aw4	Awajan North	1,850	51,434	23			53,308						-	10,274	54,023	17,176	3,509	-	84,982	124,475
AwTot		**18,655**	**217,575**	**23**	**-**	**-**	**236,253**	**-**	**-**	**450**	**-**	**-**	**450**	**33,202**	**230,642**	**60,544**	**20,821**	**14,286**	**359,496**	**617,079**
Ru1	Russaifah North West			4,141			4,141	44	5,397	1,602			7,044	6,746	5,397	13,502	4,104	817	30,565	20,420
Ru2	Russaifah High		749				749	2,373	2,562	17,538		1,698	24,171	86,864	3,311	48,809	8,733	6,926	154,643	274,294
Ru3	Russaifah Low		828				828		9,577	3,475			13,052	22,421	10,883	21,384	10,024	3,328	68,041	217,970
Ru4	Hitteen Tower						-			272		157	428	5,714	-	2,489	155	157	8,514	30,963
Ru5	Hitteen Reservoir						-	8,882	19,508	15,705	542	1,920	46,557	90,186	19,508	44,557	18,693	17,432	190,376	377,169
RuTot		**-**	**1,577**	**4,141**	**-**	**-**	**5,719**	**11,299**	**37,044**	**38,592**	**542**	**3,775**	**91,252**	**211,930**	**39,100**	**130,741**	**41,709**	**28,660**	**452,139**	**920,815**
No1	Khaw			3,795			3,795	427		570			997	1,487	-	5,072	6,827	1,124	14,509	7,922
No2	Hashmeya South	912	1,587				2,499	105	243				348	2,470	1,830	5,019	304	3,158	12,781	3,627
No3	Hashmeya Town	5,093		9,670			14,763	23,091	48,067	4,566			75,724	41,389	48,067	24,674	15,649	-	129,778	144,974
No4	Hashmeya Rural	106		2,260			2,365		17,893	5,998			23,891	450	17,893	15,572	-	-	33,916	20,367
No5	Sukhna	1,619	2,453	4,392			8,465	8,557	31,800	15,106			55,463	24,321	34,254	28,488	-	-	87,062	118,673
NoTot		**7,729**	**4,040**	**20,117**	**-**	**-**	**31,886**	**32,181**	**98,004**	**26,240**	**-**	**-**	**156,425**	**70,117**	**102,045**	**78,824**	**22,780**	**4,282**	**278,047**	**295,564**
We1	Merhib	440	9,997				10,437						-	7,498	9,997	5,923	6,009	-	29,426	15,905
We2	Berein						-			6,366	5,213		11,578	16,898	-	26,014	6,735	-	49,647	29,021
We3	Um Rumanneh						-			2,709			2,709	31,056	1,957	22,904	6,147	-	62,065	38,147
We4	Berein North						-	301		5,658			5,959	14,909	-	6,806	-	-	21,715	11,131
We5	Sarout/Alouk						-		671	5,861			6,532	44,866	671	11,501	-	-	57,038	36,396
We6	Qunaya	230					859		1,603		2,017		3,620	1,637	1,603	17,214	2,017	83	22,554	5,910
WeTot		**670**	**9,997**	**-**	**-**	**-**	**11,296**	**301**	**2,274**	**20,594**	**7,229**	**-**	**30,398**	**116,864**	**14,228**	**90,363**	**20,907**	**83**	**242,445**	**136,509**
TOTAL for WSAs		**105,719**	**722,765**	**37,526**	**-**	**-**	**866,640**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**666,623**	**903,571**	**528,272**	**176,383**	**139,147**	**2,413,997**	**3,123,285**
Additional Areas outside WSAs																			- 33,680	
Total of Zarqa Governorate		**105,719**	**722,765**	**37,526**	**-**	**-**	**866,640**	**43,780**	**137,322**	**85,876**	**7,771**	**3,775**	**278,525**	**666,623**	**903,571**	**528,272**	**176,383**	**139,147**	**2,380,317**	**3,123,285**

Quantities 13

Population 7.
Zarqa WSS Pipe Lengths, Customer Points and System Inputs

2008

Current Arrangement	hrs/wk	ILI	Admin
	43	15.8	7.1%

Nodal Demands 2008

2008 Current Arrangement

WSA	Population	connections	Pipe Length					Water usage lcd		Physical Lo	Admin Los	Metered	Unmetered	Total SI	avg SI	GIS pts	Demand per GIS pt 2008 l/d				Total SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd	no.	dom	non-dom	UFW	Total	m3/d
Azraq	7,396	991	42,675	6,081	48,756	20.3	152	138.1	19.5	598	136	1,166		1,899	257	923	1,107	156	794	2,058	1,899
Dulail	37,790	3,309	179,126	52,111	231,237	14.3	163	48.4	9.8	2,273	343	2,197		4,813	127	3070	595	120	852	1,568	4,813
King Abdullah	-	-	42,187	21,382	63,568	0.0	0	-	-	257	20	-		277		154	-	-	1,797	1,797	277
Tatweer	8,501	1,613	70,137	11,619	81,755	19.7	104	64.0	1.4	983	118	556		1,656	195	1799	302	7	612	921	1,656
Zarqa	283,526	47,474	797,516	61,580	859,095	55.3	330	55.5	3.4	22,665	3,027	16,723		42,415	150	22988	685	42	1,118	1,845	42,415
Awajan	149,171	21,885	581,972	35,107	617,079	35.5	242	59.7	2.0	11,342	1,579	9,208		22,130	148	13614	654	22	949	1,626	22,130
Russaifah	303,448	35,921	850,446	70,369	920,815	39.0	330	50.6	1.5	18,244	2,618	15,823		36,685	121	25160	611	18	829	1,458	36,685
North	51,629	7,293	268,502	27,062	295,564	24.7	175	62.4	2.8	4,143	577	3,367		8,087	157	6127	526	23	770	1,320	8,087
West-NorthWest	12,864	2,355	221,455	20,990	242,445	9.7	53	78.7	4.0	1,932	230	1,063		3,225	251	2665	380	19	811	1,210	3,225
Non-WSA				154,529	154,529					625	276		2,961	3,861		89					3,861
TOTAL for WSAs	854,325	120,841	3,054,016	460,828	3,514,844	34.4	243	55.8	2.9	63,062	8,923	50,103	2,961	125,049	146	76,589					125,049

2030 Full Network Performance Standard

Notes on calculation of future pipe lengths and customer connection points
New primary pipes will increase at 50% of sec/tert rate
For new sec/tert pipe density 2008-2030, allow that 10% of pop increase on ex pipes
Remainder of increase on pipes at length ratio 2.14:3.34 to existing length in each separate WSA except KABA

If pop 2008	5,000	pipe l 2008	20.00 km	primary	2	sec/tert	18.00
If pop 2030	10,000	pipe l 2030	30.96	primary	2.58	sec/tert	28.38

KABA pipe length calculated: KABA pipe length 2030 = Zarqa pipe length 2030
Connections for present pop increasing by 10% to allow for additional separation of combined and inclusion of currently unknown.
Connections for future additional pop at ratio of 2.14:3.34 to existing per pop (+10%).
Connections for future KABA at 10 persons per connection
For intermediate years between 2008-2030, linear interpolation of pipe length and customer points for each WSA, except KABA
For KABA, linear interpolation of pipe length from 2008-2020

Full Network Performance Standard	hrs/wk	ILI	Admin
	168	2.00	6.2%

2030 Full Network Performance Standard

WSA	Population	connections	Pipe Length					Water usage lcd		Physical Lo	Admin Los	Metered	Unmetered	Total SI	avg SI
	persons	no.	Sec + Tert m	Primary m	Total m	conns/km	persons/km	dom	non-dom	m3/d	m3/d	m3/d	m3/d	m3/d	lcd
Azraq	10,154	1,351	50,136	6,613	56,749	23.8	179	100.0	5.2	384	96	1,068		1,548	152
Dulail	55,329	4,722	220,915	58,190	279,104	16.9	198	100.0	5.2	1,503	484	5,821		7,808	141
King Abdullah	436,008	43,601	955,586	67,682	1,023,268	42.6	426	100.0	5.2	10,767	3,746	45,868		60,381	138
Tatweer	16,888	2,896	109,980	14,919	124,899	23.2	135	100.0	5.2	829	172	1,777		2,778	164
Zarqa	399,586	65,918	955,586	67,682	1,023,268	64.4	390	100.0	5.2	15,230	3,788	42,036		61,054	153
Awajan	225,680	31,985	735,934	39,751	775,685	41.2	291	100.0	5.2	7,948	2,096	23,742		33,786	150
Russaifah	450,472	51,779	1,059,966	79,037	1,139,003	45.5	395	100.0	5.2	12,634	3,970	47,390		63,994	142
North	76,008	10,449	332,533	30,288	362,821	28.8	209	100.0	5.2	2,816	715	7,996		11,527	152
West-NorthWest	19,874	3,495	284,585	23,981	308,566	11.3	64	100.0	5.2	1,316	225	2,091		3,632	183
Non-WSA					250,000					500	225		2,909	3,634	
TOTAL for WSAs	1,690,000	216,196	4,705,220	388,144	5,343,364	40.5	316	100.0	5.2	53,926	15,518	177,788	2,909	250,141	148

Quantities 14 Zarqa WSS **Population, Average System Input, UFW and Infrastructure Statistics by Distribution Area 2008 and 2030**

WSA / Distribution Area		Population		AD System Input		UFW			Infrastructure 2008		Infrastructure 2030	
		2008	2030	2008	2030	2008	2030	2030	Pipe Length	Connections	Pipe Length	Connections
ID	NAME						Without project	With project				
				m3/d	m3/d	m3/d	m3/d	m3/d	m	no	m	no
Az1	Azraq	7,396	10,154	1,937	1,147	746	563	222	48,756	991	56,749	1,351
AzTot		**7,396**	**10,154**	**1,937**	**1,147**	**746**	**563**	**222**	**48,756**	**991**	**56,749**	**1,351**
Du1	Hallabat	3,213	4,704	414	532	216	261	103	17,440	281	21,050	402
Du2	Dulail	33,568	46,481	4,271	5,252	2,203	2,578	1,016	170,373	2,939	205,640	3,967
Du3	Tafeh	1,009	4,144	296	468	234	230	91	43,425	88	52,414	354
DuTot		**37,790**	**55,329**	**4,981**	**6,252**	**2,653**	**3,069**	**1,209**	**231,237**	**3,309**	**279,104**	**4,722**
Ka1	King Abdullah City High	-	276,589	105	31,255	105	15,341	6,046	23,910	-	384,889	27,659
Ka2	King Abdullah City Low	-	159,419	174	18,015	174	8,842	3,485	39,658	-	638,380	15,942
KaTot		**-**	**436,008**	**278**	**49,270**	**278**	**24,183**	**9,531**	**63,568**	**-**	**1,023,268**	**43,601**
Ta1	Tatweer	8,501	16,888	1,697	1,908	1,112	937	369	81,755	1,613	124,899	2,896
TaTot		**8,501**	**16,888**	**1,697**	**1,908**	**1,112**	**937**	**369**	**81,755**	**1,613**	**124,899**	**2,896**
Za1	Zarqa High	26,308	31,677	4,163	3,580	2,520	1,757	692	104,246	4,405	124,167	5,226
Za2	Zarqa Mid - Batrawi	253,728	313,932	38,991	35,475	23,146	17,412	6,863	740,444	42,485	881,943	51,788
Za3	Zarqa North	3,490	53,977	555	6,100	337	2,994	1,180	14,405	584	17,158	8,904
ZaTot		**283,526**	**399,586**	**43,708**	**45,154**	**26,003**	**22,163**	**8,735**	**859,095**	**47,474**	**1,023,268**	**65,918**
Aw1	Awajan High	61,196	76,882	9,291	8,688	5,301	4,264	1,681	238,006	8,978	299,180	10,896
Aw2	Awajan Low	37,024	47,069	5,666	5,319	3,252	2,611	1,029	154,168	5,432	193,793	6,671
Aw4	Awajan West	22,922	46,344	3,530	5,237	2,035	2,570	1,013	100,430	3,363	126,243	6,568
Aw5	Awajan North	28,028	55,386	4,323	6,259	2,496	3,072	1,211	124,475	4,112	156,469	7,850
AwTot		**149,171**	**225,680**	**22,809**	**25,502**	**13,084**	**12,517**	**4,933**	**617,079**	**21,885**	**775,685**	**31,985**
Ru1	Russaifah North West	4,704	47,676	616	5,387	355	2,644	1,042	20,420	557	25,258	5,480
Ru2	Russaifah High	96,064	129,853	11,961	14,674	6,619	7,202	2,839	274,294	11,372	339,288	14,926
Ru3	Russaifah Low	69,265	86,039	8,713	9,723	4,861	4,772	1,881	217,970	8,199	269,618	9,890
Ru4	Hitteen Tower	12,157	15,753	1,497	1,780	821	874	344	30,963	1,439	38,300	1,811
Ru5	Hitteen Reservoir	121,259	171,153	15,234	19,341	8,491	9,493	3,741	377,169	14,354	466,539	19,673
RuTot		**303,448**	**450,472**	**38,022**	**50,904**	**21,147**	**24,985**	**9,847**	**920,815**	**35,921**	**1,139,003**	**51,779**
No1	Khaw	1,356	5,752	219	650	126	319	126	7,922	192	9,725	791
No2	Hashmeya South	623	1,568	101	177	58	87	34	3,627	88	4,453	216
No3	Hashmeya Town	26,139	32,974	4,194	3,726	2,399	1,829	721	144,974	3,692	177,964	4,533
No4	Hashmeya Rural	3,471	6,942	562	784	323	385	152	20,367	490	25,002	954
No5	Sukhna	20,040	28,772	3,249	3,251	1,872	1,596	629	118,673	2,831	145,677	3,956
NoTot		**51,629**	**76,008**	**8,325**	**8,589**	**4,779**	**4,216**	**1,662**	**295,564**	**7,293**	**362,821**	**10,449**
We1	Merhib	1,454	2,258	381	255	256	125	49	29,426	266	37,452	397
We2	Berein	2,647	3,976	676	449	448	221	87	49,647	485	63,187	699
We3	Um Rumanneh	3,449	5,242	870	592	573	291	115	62,065	631	78,992	922
We4	Berein North	1,043	1,759	276	199	186	98	38	21,715	191	27,637	309
We5	Sarout/Alouk	3,304	4,978	822	562	538	276	109	57,038	605	72,594	875
We6	Qunaya	966	1,661	266	188	183	92	36	22,554	177	28,705	292
WeTot		**12,864**	**19,874**	**3,291**	**2,246**	**2,184**	**1,102**	**434**	**242,445**	**2,355**	**308,566**	**3,495**
TOTAL for WSAs		**854,325**	**1,690,000**	**125,049**	**190,973**	**71,985**	**93,736**	**36,944**	**3,360,316**	**120,841**	**5,093,364**	**216,196**

In addition to UFW effects, there are other significant level of service issues incorporated into the above statistics:

At 2008 => 37 hours per week average supply, 55.8 lcd average domestic use
With Project at 2030 => 70 hours per week average supply, 85 lcd average domestic use
Without Project at 2030 => 18 hours per week average supply, 53 lcd average domestic use

Alternative scenarios to the above can be generated, depending on constraints - quantity of water available, required minimum duration of supply, required minimum unit quantity of supply, etc.

Overall Costs 1 Zarqa WSS
All WSA Projects Summary Cost Estimate, inclusive of Construction Costs and Ancillary Costs

Updated on: 07/05/2010 dm

	Strategic Infra.	Water Supply Area (WSA)									Total Cost
		Azraq	Dulail	King Abdullah City	Tatweer	Zarqa	Awajan	Russaifah	North	West-NW	
Phase 1a. MCC								30%			
Primary Network	1,984,000	-	-	-	1,664,031	3,616,787	8,182,192	1,614,147	-	-	**17,061,156**
Secondary Network	-	-	-	-	1,412,292	7,152,275	8,026,195	5,197,827	-	-	**21,788,589**
Tertiary Network	-	-	-	-	1,038,827	16,268,506	12,983,065	6,340,053	-	-	**36,630,451**
Sum	**1,984,000**	**-**	**-**	**-**	**4,115,150**	**27,037,567**	**29,191,452**	**13,152,026**	**-**	**-**	**75,480,195**
Phase 1b. Others								70%			
Primary Network	5,120,729	-	86,800	-	-	813,676	-	3,766,342	-	-	**9,787,546**
Secondary Network	-	-	2,326,919	-	-	-	-	12,128,262	7,843,329	5,085,722	**27,384,232**
Tertiary Network	-	125,121	5,481,260	-	-	-	-	14,793,456	4,161,569	4,442,093	**29,003,500**
Sum	**5,120,729**	**125,121**	**7,894,980**	**-**	**-**	**813,676**	**-**	**30,688,060**	**12,004,898**	**9,527,815**	**66,175,279**
Phase 2.											
Primary Network	29,811,513	876,516	6,862,552	3,145,012	-	5,319,600	8,622,030	11,926,148	3,028,248	4,427,274	**74,018,893**
Secondary Network	-	-	-	-	80,476	-	-	-	-	-	**80,476**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**29,811,513**	**876,516**	**6,862,552**	**3,145,012**	**80,476**	**5,319,600**	**8,622,030**	**11,926,148**	**3,028,248**	**4,427,274**	**74,099,369**
Phase 3.											
Primary Network	32,725,932	-	334,476	-	-	740,652	-	-	1,337,972	1,844,364	**36,983,397**
Secondary Network	-	-	-	-	-	-	-	-	-	-	**-**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**32,725,932**	**-**	**334,476**	**-**	**-**	**740,652**	**-**	**-**	**1,337,972**	**1,844,364**	**36,983,397**
Total											
Primary Network	69,642,174	876,516	7,283,829	3,145,012	1,664,031	10,490,714	16,804,222	17,306,636	4,366,220	6,271,638	**137,850,992**
Secondary Network	-	-	2,326,919	-	1,492,768	7,152,275	8,026,195	17,326,089	7,843,329	5,085,722	**49,253,297**
Tertiary Network	-	125,121	5,481,260	-	1,038,827	16,268,506	12,983,065	21,133,509	4,161,569	4,442,093	**65,633,951**
Sum	**69,642,174**	**1,001,637**	**15,092,008**	**3,145,012**	**4,195,626**	**33,911,495**	**37,813,482**	**55,766,234**	**16,371,118**	**15,799,454**	**252,738,240**

Overall Costs 2

All WSA Projects Summary Cost Estimate, inclusive of Construction Costs and Ancillary Costs

Updated on: 13/05/2010 tc

	Strategic Infra.	Water Supply Area (WSA)									Total Cost
		Azraq	Dulail	King Abdullah City	Tatweer	Zarqa	Awajan	Russaifah	North	West-NW	
Phase 1 (MCC)											
Primary Network	1,984,000	-	-	-	1,664,031	3,616,787	8,182,192	1,614,147	-	-	**17,061,156**
Secondary Network	-	-	-	-	1,412,292	7,152,275	8,026,195	5,197,827	-	-	**21,788,589**
Tertiary Network	-	-	-	-	1,038,827	16,268,506	12,983,065	6,340,053	-	-	**36,630,451**
Sum	**1,984,000**	**-**	**-**	**-**	**4,115,150**	**27,037,567**	**29,191,452**	**13,152,026**	**-**	**-**	**75,480,195**
Phase 1 (TBD)											
Primary Network	5,120,729	-	86,800	-	-	813,676	-	3,766,342	-	-	**9,787,546**
Secondary Network	-	-	2,326,919	-	-	-	-	12,128,262	7,843,329	5,085,722	**27,384,232**
Tertiary Network	-	125,121	5,481,260	-	-	-	-	14,793,456	4,161,569	4,442,093	**29,003,500**
Sum	**5,120,729**	**125,121**	**7,894,980**	**-**	**-**	**813,676**	**-**	**30,688,060**	**12,004,898**	**9,527,815**	**66,175,279**
Phase 2.											
Primary Network	29,811,513	876,516	6,862,552	3,145,012	-	5,319,600	8,622,030	11,926,148	3,028,248	4,427,274	**74,018,893**
Secondary Network	-	-	-	-	80,476	-	-	-	-	-	**80,476**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**29,811,513**	**876,516**	**6,862,552**	**3,145,012**	**80,476**	**5,319,600**	**8,622,030**	**11,926,148**	**3,028,248**	**4,427,274**	**74,099,369**
Phase 3.											
Primary Network	32,725,932	-	334,476	-	-	740,652	-	-	1,337,972	1,844,364	**36,983,397**
Secondary Network	-	-	-	-	-	-	-	-	-	-	**-**
Tertiary Network	-	-	-	-	-	-	-	-	-	-	**-**
Sum	**32,725,932**	**-**	**334,476**	**-**	**-**	**740,652**	**-**	**-**	**1,337,972**	**1,844,364**	**36,983,397**
Total											
Primary Network	69,642,174	876,516	7,283,829	3,145,012	1,664,031	10,490,714	16,804,222	17,306,636	4,366,220	6,271,638	**137,850,992**
Secondary Network	-	-	2,326,919	-	1,492,768	7,152,275	8,026,195	17,326,089	7,843,329	5,085,722	**49,253,297**
Tertiary Network	-	125,121	5,481,260	-	1,038,827	16,268,506	12,983,065	21,133,509	4,161,569	4,442,093	**65,633,951**
Sum	**69,642,174**	**1,001,637**	**15,092,008**	**3,145,012**	**4,195,626**	**33,911,495**	**37,813,482**	**55,766,234**	**16,371,118**	**15,799,454**	**252,738,240**

Beneficiaries Phase 1 MCC (100% beneficiaries	854,325	-	-	-	8,501	226,821	149,171	91,034	-	-	475,527
Unit cost per Beneficiary for Phase 1 MCC	2	-	-	-	484	119	196	144	-	-	159
Beneficiaries of Full IMP	854,325	7,396	37,790	-	8,501	283,526	149,171	303,448	51,629	12,864	854,325
Unit cost per Beneficiary for Full IMP	82	135	399	-	494	120	253	184	317	1,228	296

Relative VFM in Priority Areas v other areas for Full IMP

	Beneficiaries	Full IMP Cost	Unit Cost per beneficiary	Unit cost as %
Priority Areas	475,527	85,868,174	180.57	41%
Other Areas	378,798	166,870,066	440.53	100%

Overall Costs 3: 20445 Zarqa WSS — Project Works Schedule 1 Strategic Infrastructure. 23/04/10.

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
1	Strategic Infrastructure		**Strategic Metering Infrastructure**		**1a**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
1	Strategic Infrastructure		**Mapping / GIS / Condition Assessments**		**1a**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
1	Strategic Infrastructure		Construct new trunk main pipeline	Hallabat-Hallabat junction (600mm diameter, 6.9km length), possible	2	Primary			PIP.N	3			600	6.9		JOD 390	JOD 2,691,000	JOD 53,820	JOD 53,820	JOD 134,550	JOD 134,550	JOD 269,100	JOD 3,336,840
1	Strategic Infrastructure		Construct new trunk main pipeline	Khaw-Awajan (700mm diameter, 16.3 km length)	2	Primary			PIP.N	4			600	16.3		JOD 390	JOD 6,361,626	JOD 127,233	JOD 127,233	JOD 318,081	JOD 318,081	JOD 636,163	JOD 7,888,416
1	Strategic Infrastructure		Upgrade primary network pipeline	Azraq-Khaw-Russaifah (600mm diameter, 83.0 km length)	2	Primary			PIP.RH	1			600	83.0		JOD 78	JOD 6,474,000	JOD 129,480	JOD 129,480	JOD 323,700	JOD 323,700	JOD 647,400	JOD 8,027,760
1	Strategic Infrastructure		Upgrade primary network pipeline	Corridor-Khaw (600mm diameter, 46.2 km length)	2	Primary			PIP.RH	2			600	46.2		JOD 78	JOD 3,603,600	JOD 72,072	JOD 72,072	JOD 180,180	JOD 180,180	JOD 360,360	JOD 4,468,464
1	Strategic Infrastructure		Upgrade primary network pipeline	Zatari-Khaw (600mm diameter, 11.8 km length) (Governorate Boundary)	2	Primary			PIP.RH	3			600	11.8		JOD 78	JOD 920,400	JOD 18,408	JOD 18,408	JOD 46,020	JOD 46,020	JOD 92,040	JOD 1,141,296
1	Strategic Infrastructure		Rehabilitate existing primary network pipeline	Vulnerable sections of Azraq/ Corridor/ Zatari-Khaw-Russaifah	2	Primary			PIP.RH	1			600	6.0		JOD 78.00	JOD 468,000	JOD 9,360	JOD 9,360	JOD 23,400	JOD 23,400	JOD 46,800	JOD 580,320
1	Strategic Infrastructure		Rehabilitate existing primary network pipeline	Vulnerable sections of Azraq/ Corridor/ Zatari-Khaw-Russaifah	2	Primary			PIP.RH	2			600	20.0		JOD 78.00	JOD 1,560,000	JOD 31,200	JOD 31,200	JOD 78,000	JOD 78,000	JOD 156,000	JOD 1,934,400
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Hallabat (Pumping Rate 900 m3/hr)	2	Primary			PS.U	3		900				JOD 748.00	JOD 673,200	JOD 13,464	JOD 13,464	JOD 33,660	JOD 33,660	JOD 67,320	JOD 834,768
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Khaw (Pumping Rate 4,400 m3/hr)	2	Primary			PS.U	5		4,400				JOD 207.00	JOD 910,800	JOD 18,216	JOD 18,216	JOD 45,540	JOD 45,540	JOD 91,080	JOD 1,129,392
1	Strategic Infrastructure		Upgrade existing reservoir	Azraq (Pump Flow-balancing Reservoir 12,000 m3)	2	Primary			RES.U	1	12,000					JOD 13.79	JOD 165,528	JOD 3,311	JOD 3,311	JOD 8,276	JOD 8,276	JOD 16,553	JOD 205,255
1	Strategic Infrastructure		Upgrade existing reservoir	Hallabat (Pump Flow-balancing Reservoir 1,000 m3)	2	Primary			RES.U	3	1,000					JOD 47.86	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
1	Strategic Infrastructure		Upgrade existing reservoir	Khaw (Pump Flow-balancing Reservoir 12,000 m3)	2	Primary			RES.U	5	12,000					JOD 13.79	JOD 165,528	JOD 3,311	JOD 3,311	JOD 8,276	JOD 8,276	JOD 16,553	JOD 205,255
1	Strategic Infrastructure		Construct new trunk main pipeline	Azraq-Khaw (600mm diameter, 64.0 km length), possible	3	Primary			PIP.N	1			600	64.0		JOD 390	JOD 24,960,000	JOD 499,200	JOD 499,200	JOD 1,248,000	JOD 1,248,000	JOD 2,496,000	JOD 30,950,400
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Corridor (Pumping Rate 1,300 m3/hr)	3	Primary	A & B		PS.U	2		1,300				JOD 562.78	JOD 731,610	JOD 14,632	JOD 14,632	JOD 36,581	JOD 36,581	JOD 73,161	JOD 907,196
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Zatari (Pumping Rate 300 m3/hr)	3	Primary	A & B		PS.U	4		300				JOD 1,933.80	JOD 580,140	JOD 11,603	JOD 11,603	JOD 29,007	JOD 29,007	JOD 58,014	JOD 719,374
1	Strategic Infrastructure		Upgrade existing reservoir	Corridor (Pump Flow-balancing Reservoir 1,000 m3)	3	Primary	A & B		RES.U	2	1,000					JOD 47.86	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
1	Strategic Infrastructure		Upgrade existing reservoir	Zatari (Pump Flow-balancing Reservoir 2,000 m3)	3	Primary	A & B		RES.U	4	2,000					JOD 36.14	JOD 72,270	JOD 1,445	JOD 1,445	JOD 3,614	JOD 3,614	JOD 7,227	JOD 89,615
1	Strategic Infrastructure		Upgrade/refurbish existing pumping station	Azraq (Pumping Rate 2,400 m3/hr)	1b	Primary			PS.U	1		2,400				JOD 345.68	JOD 829,620	JOD 16,592	JOD 16,592	JOD 41,481	JOD 41,481	JOD 82,962	JOD 1,028,729
1	Strategic Infrastructure		**SCADA System**		**1b**	Primary											JOD 2,500,000	JOD 50,000	JOD 50,000	JOD 125,000	JOD 125,000	JOD 250,000	JOD 3,100,000
1	Strategic Infrastructure		**Asset Management - Spares, Contingencies**		**1b**	Primary											JOD 800,000	JOD 16,000	JOD 16,000	JOD 40,000	JOD 40,000	JOD 80,000	JOD 992,000
													Phase 1a		Primary		JOD 1,600,000	JOD 32,000	JOD 32,000	JOD 80,000	JOD 80,000	JOD 160,000	JOD 1,984,000
													Phase 1b		Primary		JOD 4,129,620	JOD 82,592	JOD 82,592	JOD 206,481	JOD 206,481	JOD 412,962	JOD 5,120,729
													Phase 2		Primary		JOD 24,041,543	JOD 480,831	JOD 480,831	JOD 1,202,077	JOD 1,202,077	JOD 2,404,154	JOD 29,811,513
													Phase 3		Primary		JOD 26,391,881	JOD 527,838	JOD 527,838	JOD 1,319,594	JOD 1,319,594	JOD 2,639,188	JOD 32,725,932
													Total				JOD 56,163,044	JOD 1,123,261	JOD 1,123,261	JOD 2,808,152	JOD 2,808,152	JOD 5,616,304	JOD 69,642,174

Overall Costs 4:20445 Zarqa WSS

Project Works Schedule 2 Azraq
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
2	Azraq		Construct new pumping station	At Azraq Water Tower	2	Primary			PS.N	1		60				JOD 4,056	JOD 243,348	JOD 4,867	JOD 4,867	JOD 12,167	JOD 12,167	JOD 24,335	JOD 301,752
2	Azraq		Construct new water tower	Azraq Water Tower	2	Primary			RESW.N	2	600					JOD 739	JOD 443,520	JOD 8,870	JOD 8,870	JOD 22,176	JOD 22,176	JOD 44,352	JOD 549,965
2	Azraq		Install new DMA connection point	Install new DMA connection points	2	Primary			DMA.N	3					2	JOD 10,000	JOD 20,000	JOD 400	JOD 400	JOD 1,000	JOD 1,000	JOD 2,000	JOD 24,800
		Az1				Tertiary		No.	CM.N				50% Replac	495		50	JOD 24,750	JOD 495	JOD 495	JOD 1,238	JOD 1,238	JOD 2,475	JOD 30,690
		Az1				Tertiary		No.	CP.RS				100% Restr	762		100	JOD 76,154	JOD 1,523	JOD 1,523	JOD 3,808	JOD 3,808	JOD 7,615	JOD 94,431
														Phase 1b		Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD 100,904	JOD 2,018	JOD 2,018	JOD 5,045	JOD 5,045	JOD 10,090	JOD 125,121
																Total	JOD 100,904	JOD 2,018	JOD 2,018	JOD 5,045	JOD 5,045	JOD 10,090	JOD 125,121

Overall Costs 5: 20445 Zarqa WSS

Project Works Schedule 3 Dulail
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
3	Dulail		Construct new water tower	Hallabat Water Tower (Distribution Storage Reservoir 300 m3)	2	Primary			RESW.N	1	300					JOD 739.20	JOD 221,760	JOD 4,435	JOD 4,435	JOD 11,088	JOD 11,088	JOD 22,176	JOD 274,982
3	Dulail		Construct new pumping station	Dulail Highest Levels Boosters (Target Pumping Rate 35 m3/hr)	3	Primary			PS.N	1		35				JOD 5,421	JOD 189,735	JOD 3,795	JOD 3,795	JOD 9,487	JOD 9,487	JOD 18,974	JOD 235,271
3	Dulail		Construct new reservoir	Dulail (Distribution Storage Reservoir 3,000 m3)	2	Primary			RES.N	2	3,000					JOD 177.47	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
3	Dulail		Construct new pumping station	Tafeh Highest Levels Boosters (Target Pumping Rate 12 m3/hr)	3	Primary			PS.N	2		12				JOD 6,667	JOD 80,004	JOD 1,600	JOD 1,600	JOD 4,000	JOD 4,000	JOD 8,000	JOD 99,205
3	Dulail		Construct new reservoir	Tafeh (Distribution Storage Reservoir 500 m3)	2	Primary			RES.N	3	500					JOD 369.60	JOD 184,800	JOD 3,696	JOD 3,696	JOD 9,240	JOD 9,240	JOD 18,480	JOD 229,152
3	Dulail		Rehabilitate existing Primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200 - 300	7.422		JOD 55.25	JOD 410,066	JOD 8,201	JOD 8,201	JOD 20,503	JOD 20,503	JOD 41,007	JOD 508,481
3	Dulail		Construct new pumping station	Tafeh (to Dulail and Tafeh Distribution Storage Reservoirs - Target Pumping Rate 300 m3/hr)	2	Primary			PS.N	5		300				JOD 1,844	JOD 553,300	JOD 11,066	JOD 11,066	JOD 27,665	JOD 27,665	JOD 55,330	JOD 686,092
3	Dulail		Construct new primary network pipeline	Tafeh PS to Dulail Reservoir (400mm diameter, 2.9 km length)	2	Primary			PIP.N	7			400	2.9		JOD 195	JOD 565,500	JOD 11,310	JOD 11,310	JOD 28,275	JOD 28,275	JOD 56,550	JOD 701,220
3	Dulail		Construct new primary network pipeline	Dulail Reservoir to Dulail Distribution Area (400mm diameter, 2.0 km length)	2	Primary			PIP.N	8			400	2.0		JOD 195	JOD 390,000	JOD 7,800	JOD 7,800	JOD 19,500	JOD 19,500	JOD 39,000	JOD 483,600
3	Dulail		Restructure primary network pipeline	Restructure existing and rehabilitated Primary network pipelines	2	Primary			PIP.RS	8			200-300	14.843		JOD 12.16	JOD 180,491	JOD 3,610	JOD 3,610	JOD 9,025	JOD 9,025	JOD 18,049	JOD 223,809
3	Dulail		Construct new primary network pipeline	Dulail Reservoir to Dulail Distribution Area (300mm diameter 9.0 km length)	2	Primary			PIP.N	9			300	9.0		JOD 130	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
3	Dulail		Construct new primary network pipeline	Tafeh PS to Tafeh Reservoir (200mm diameter, 5.6 km length)	2	Primary			PIP.N	10			200	5.6		JOD 97.50	JOD 546,000	JOD 10,920	JOD 10,920	JOD 27,300	JOD 27,300	JOD 54,600	JOD 677,040
3	Dulail		Construct new primary network pipeline	Tafeh Reservoir to Tafeh Distribution Area (300mm diameter, 6.0 km length)	2	Primary			PIP.N	11			300	6.0		JOD 130	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
3	Dulail		Install new DMA connection point	DMA connection points	1b	Primary			DMA.N	12					7	JOD 10,000	JOD 70,000	JOD 1,400	JOD 1,400	JOD 3,500	JOD 3,500	JOD 7,000	JOD 86,800
		Du1				Secondary		m	PIP.RH				100 - 150mr	1,150		58.5	JOD 67,295	JOD 1,346	JOD 1,346	JOD 3,365	JOD 3,365	JOD 6,730	JOD 83,446
		Du1				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du1				Secondary		m	PIP.RS				100 - 150mr	2,301		8.77	JOD 20,177	JOD 404	JOD 404	JOD 1,009	JOD 1,009	JOD 2,018	JOD 25,020
		Du1				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du1				Tertiary		No.	CM.N				50% Replac	141		50	JOD 7,025	JOD 141	JOD 141	JOD 351	JOD 351	JOD 703	JOD 8,711
		Du1				Tertiary		No.	CP.RS				100% Restr	216		100	JOD 21,615	JOD 432	JOD 432	JOD 1,081	JOD 1,081	JOD 2,162	JOD 26,803
		Du1				Tertiary		m	PIP.RH				≤ 50mm	11,052		28.6	JOD 316,077	JOD 6,322	JOD 6,322	JOD 15,804	JOD 15,804	JOD 31,608	JOD 391,936
		Du1				Tertiary		m	PIP.RS				≤ 50mm	11,052		5.72	JOD 63,215	JOD 1,264	JOD 1,264	JOD 3,161	JOD 3,161	JOD 6,322	JOD 78,387
		Du2				Secondary		m	PIP.RH				100 - 150mr	13,010		58.5	JOD 761,086	JOD 15,222	JOD 15,222	JOD 38,054	JOD 38,054	JOD 76,109	JOD 943,747
		Du2				Secondary		m	PIP.RH				60 - 90mm	11,400		28.6	JOD 326,048	JOD 6,521	JOD 6,521	JOD 16,302	JOD 16,302	JOD 32,605	JOD 404,299
		Du2				Secondary		m	PIP.RS				100 - 150mr	26,020		8.77	JOD 228,196	JOD 4,564	JOD 4,564	JOD 11,410	JOD 11,410	JOD 22,820	JOD 282,963
		Du2				Secondary		m	PIP.RS				60 - 90mm	22,801		5.72	JOD 130,419	JOD 2,608	JOD 2,608	JOD 6,521	JOD 6,521	JOD 13,042	JOD 161,720
		Du2				Tertiary		No.	CM.N				50% Replac	1,470		50	JOD 73,475	JOD 1,470	JOD 1,470	JOD 3,674	JOD 3,674	JOD 7,348	JOD 91,109
		Du2				Tertiary		No.	CP.RS				100% Restr	2,261		100	JOD 226,077	JOD 4,522	JOD 4,522	JOD 11,304	JOD 11,304	JOD 22,608	JOD 280,335
		Du2				Tertiary		m	PIP.RH				≤ 50mm	95,742		28.6	JOD 2,738,229	JOD 54,765	JOD 54,765	JOD 136,911	JOD 136,911	JOD 273,823	JOD 3,395,404
		Du2				Tertiary		m	PIP.RS				≤ 50mm	95,742		5.72	JOD 547,646	JOD 10,953	JOD 10,953	JOD 27,382	JOD 27,382	JOD 54,765	JOD 679,081
		Du3				Secondary		m	PIP.RH				100 - 150mr	4,515		58.5	JOD 264,132	JOD 5,283	JOD 5,283	JOD 13,207	JOD 13,207	JOD 26,413	JOD 327,524
		Du3				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du3				Secondary		m	PIP.RS				100 - 150mr	9,030		8.77	JOD 79,195	JOD 1,584	JOD 1,584	JOD 3,960	JOD 3,960	JOD 7,919	JOD 98,201
		Du3				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		Du3				Tertiary		No.	CM.N				50% Replac	44		50	JOD 2,200	JOD 44	JOD 44	JOD 110	JOD 110	JOD 220	JOD 2,728
		Du3				Tertiary		No.	CP.RS				100% Restr	68		100	JOD 6,769	JOD 135	JOD 135	JOD 338	JOD 338	JOD 677	JOD 8,394
		Du3				Tertiary		m	PIP.RH				≤ 50mm	12,181		28.6	JOD 348,369	JOD 6,967	JOD 6,967	JOD 17,418	JOD 17,418	JOD 34,837	JOD 431,977
		Du3				Tertiary		m	PIP.RS				≤ 50mm	12,181		5.72	JOD 69,674	JOD 1,393	JOD 1,393	JOD 3,484	JOD 3,484	JOD 6,967	JOD 86,395

	Restructure customer connection points	**Phase 1b**	Primary Network	JOD 70,000	JOD 1,400	JOD 1,400	JOD 3,500	JOD 3,500	JOD 7,000	JOD 86,800
	Replace customer meters		Secondary Network	JOD 1,876,548	JOD 37,531	JOD 37,531	JOD 93,827	JOD 93,827	JOD 187,655	JOD 2,326,919
			Tertiary Network	JOD 4,420,371	JOD 88,407	JOD 88,407	JOD 221,019	JOD 221,019	JOD 442,037	JOD 5,481,260
			Total	JOD 6,366,919	JOD 127,338	JOD 127,338	JOD 318,346	JOD 318,346	JOD 636,692	JOD 7,894,980
		Phase 2	Primary Network	JOD 5,534,316	JOD 110,686	JOD 110,686	JOD 276,716	JOD 276,716	JOD 553,432	JOD 6,862,552
			Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
			Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
			Total	JOD 5,534,316	JOD 110,686	JOD 110,686	JOD 276,716	JOD 276,716	JOD 553,432	JOD 6,862,552

Overall Costs 6: 20445 Zarqa WSS

Project Works Schedule 4 King Abdullah WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
4	King Abdullah City		Construct new reservoir	King Abdullah Bin Aziz City Strategic Reservoir (Distribution Storage Reservoir 5,000 m3)	2	Primary			RES.N	1	5,000					JOD 145.86	JOD 729,300	JOD 14,586	JOD 14,586	JOD 36,465	JOD 36,465	JOD 72,930	JOD 904,332
4	King Abdullah City		Construct new trunk main pipeline	Khaw to New King Abdullah Reservoir	2	Primary			PIP.N	4			800	2.2		JOD 520	JOD 1,144,000	JOD 22,880	JOD 22,880	JOD 57,200	JOD 57,200	JOD 114,400	JOD 1,418,560
4	King Abdullah City		Construct new trunk main pipeline	Tamween to New King Abdullah Reservoir (400mm diameter, 3.4 km length)	2	Primary			PIP.N	5			400	3.4		JOD 195	JOD 663,000	JOD 13,260	JOD 13,260	JOD 33,150	JOD 33,150	JOD 66,300	JOD 822,120
															Phase 2	Primary Network	JOD 2,536,300	JOD 50,726	JOD 50,726	JOD 126,815	JOD 126,815	JOD 253,630	JOD 3,145,012
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 2,536,300	JOD 50,726	JOD 50,726	JOD 126,815	JOD 126,815	JOD 253,630	JOD 3,145,012

Overall Costs 7: 20445 Zarga WSS

Project Works Schedule 5 Tatweer WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
5	Tatweer		Construct new reservoir	Tatweer (Distribution Storage Reservoir 1,000 m3)	1a	Primary			RES.N	1	1,000					JOD 252	JOD 251,900	JOD 5,038	JOD 5,038	JOD 12,595	JOD 12,595	JOD 25,190	JOD 312,356
5	Tatweer		Construct new pumping station	Tatweer (to Tatweer Distribution Storage Reservoir - Target Pumping Rate 100 m3/hr)	1a	Primary			PS.N	2		100				JOD 3,597	JOD 359,700	JOD 7,194	JOD 7,194	JOD 17,985	JOD 17,985	JOD 35,970	JOD 446,028
5	Tatweer		Construct new primary network pipeline	Tatweer PS to Tatweer Reservoir (200mm diameter, 3.6 km length)	1a	Primary			PIP.N	3			200	3.6		JOD 97.50	JOD 351,000	JOD 7,020	JOD 7,020	JOD 17,550	JOD 17,550	JOD 35,100	JOD 435,240
5	Tatweer		Construct new pumping station	Tatweer (High level booster PS - Target Pumping Rate 10 m3/hr)	2	Secondary			PS.N	3		10				JOD 6,490	JOD 64,900	JOD 1,298	JOD 1,298	JOD 3,245	JOD 3,245	JOD 6,490	JOD 80,476
5	Tatweer		Construct new primary network pipeline	Tatweer Reservoir to Tatweer Distribution Area (300mm diameter, 2.0 km length)	1a	Primary			PIP.N	4			300	2.0		JOD 130	JOD 260,000	JOD 5,200	JOD 5,200	JOD 13,000	JOD 13,000	JOD 26,000	JOD 322,400
5	Tatweer		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	0.796		JOD 55.25	JOD 43,979	JOD 880	JOD 880	JOD 2,199	JOD 2,199	JOD 4,398	JOD 54,534
5	Tatweer		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	5					3	JOD 10,000	JOD 30,000	JOD 600	JOD 600	JOD 1,500	JOD 1,500	JOD 3,000	JOD 37,200
5	Tatweer		Restructure existing primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	3.732		JOD 12.16	JOD 45,381	JOD 908	JOD 908	JOD 2,269	JOD 2,269	JOD 4,538	JOD 56,273
		Ta1			1a	Secondary		m	PIP.RH				100 - 150mm	7,115		58.5	JOD 416,228	JOD 8,325	JOD 8,325	JOD 20,811	JOD 20,811	JOD 41,623	JOD 516,123
		Ta1			1a	Secondary		m	PIP.RH				60 - 90mm	14,457		28.6	JOD 413,467	JOD 8,269	JOD 8,269	JOD 20,673	JOD 20,673	JOD 41,347	JOD 512,699
		Ta1			1a	Secondary		m	PIP.RS				100 - 150mm	15,405		8.77	JOD 135,102	JOD 2,702	JOD 2,702	JOD 6,755	JOD 6,755	JOD 13,510	JOD 167,526
		Ta1			1a	Secondary		m	PIP.RS				60 - 90mm	30,446		5.72	JOD 174,148	JOD 3,483	JOD 3,483	JOD 8,707	JOD 8,707	JOD 17,415	JOD 215,944
		Ta1			1a	Tertiary		No.	CM.N				50% Replace	807		50	JOD 40,325	JOD 807	JOD 807	JOD 2,016	JOD 2,016	JOD 4,033	JOD 50,003
		Ta1			1a	Tertiary		No.	CP.RS				100% Restru	1,241		100	JOD 124,077	JOD 2,482	JOD 2,482	JOD 6,204	JOD 6,204	JOD 12,408	JOD 153,855
		Ta1			1a	Tertiary		m	PIP.RH				≤ 50mm	18,687		28.6	JOD 534,446	JOD 10,689	JOD 10,689	JOD 26,722	JOD 26,722	JOD 53,445	JOD 662,713
		Ta1			1a	Tertiary		m	PIP.RS				≤ 50mm	24,286		5.72	JOD 138,916	JOD 2,778	JOD 2,778	JOD 6,946	JOD 6,946	JOD 13,892	JOD 172,256
															Phase 1a	Primary Network	JOD 1,341,960	JOD 26,839	JOD 26,839	JOD 67,098	JOD 67,098	JOD 134,196	JOD 1,664,031
																Secondary Network	JOD 1,138,946	JOD 22,779	JOD 22,779	JOD 56,947	JOD 56,947	JOD 113,895	JOD 1,412,292
																Tertiary Network	JOD 837,764	JOD 16,755	JOD 16,755	JOD 41,888	JOD 41,888	JOD 83,776	JOD 1,038,827
																Total	JOD 3,318,669	JOD 66,373	JOD 66,373	JOD 165,933	JOD 165,933	JOD 331,867	JOD 4,115,150

Overall Costs 8: 20445 Zarqa WSS

Project Works Schedule 6 Zarqa WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
6	Zarqa		Construct new primary network pipeline	Batrawi and Zarqa High Reservoirs to Distribution Areas (300mm diameter, 9.0 km length)	1a	Primary			PIP.N	7			300	9.0		JOD 130	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
6	Zarqa		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	9					63	JOD 10,000	JOD 630,000	JOD 12,600	JOD 12,600	JOD 31,500	JOD 31,500	JOD 63,000	JOD 781,200
6	Zarqa		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	11.636		JOD 55.25	JOD 642,889	JOD 12,858	JOD 12,858	JOD 32,144	JOD 32,144	JOD 64,289	JOD 797,182
6	Zarqa		Restructure secondary and tertiary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	32.391		JOD 12.16	JOD 393,875	JOD 7,877	JOD 7,877	JOD 19,694	JOD 19,694	JOD 39,387	JOD 488,404
6	Zarqa		Upgrade existing reservoir	Zarqa PS Reservoir (Pump Flow-balancing Reservoir 4,500 m3)	1a	Primary			RES.U	1	4,500					JOD 17.78	JOD 80,000	JOD 1,600	JOD 1,600	JOD 4,000	JOD 4,000	JOD 8,000	JOD 99,200
		Za1			1a	Secondary			PIP.RH				100 - 150mm	4,361		58.5	JOD 255,113	JOD 5,102	JOD 5,102	JOD 12,756	JOD 12,756	JOD 25,511	JOD 316,340
		Za1			1a	Secondary			PIP.RH				60 - 90mm	23,186		28.6	JOD 663,122	JOD 13,262	JOD 13,262	JOD 33,156	JOD 33,156	JOD 66,312	JOD 822,271
		Za1			1a	Secondary			PIP.RS				100 - 150mm	9,075		8.77	JOD 79,587	JOD 1,592	JOD 1,592	JOD 3,979	JOD 3,979	JOD 7,959	JOD 98,688
		Za1			1a	Secondary			PIP.RS				60 - 90mm	47,913		5.72	JOD 274,062	JOD 5,481	JOD 5,481	JOD 13,703	JOD 13,703	JOD 27,406	JOD 339,837
		Za1			1a	Tertiary			CM.N				50% Replac	2,203		50	JOD 110,125	JOD 2,203	JOD 2,203	JOD 5,506	JOD 5,506	JOD 11,013	JOD 136,555
		Za1			1a	Tertiary			CP.RS				100% Restru	3,388		100	JOD 338,846	JOD 6,777	JOD 6,777	JOD 16,942	JOD 16,942	JOD 33,885	JOD 420,169
		Za1			1a	Tertiary			PIP.RH				≤ 50mm	30,218		28.6	JOD 864,246	JOD 17,285	JOD 17,285	JOD 43,212	JOD 43,212	JOD 86,425	JOD 1,071,665
		Za1			1a	Tertiary			PIP.RS				≤ 50mm	39,450		5.72	JOD 225,652	JOD 4,513	JOD 4,513	JOD 11,283	JOD 11,283	JOD 22,565	JOD 279,809
		Za2			1a	Secondary			PIP.RH				100 - 150mm	13,589		58.5	JOD 794,934	JOD 15,899	JOD 15,899	JOD 39,747	JOD 39,747	JOD 79,493	JOD 985,718
		Za2			1a	Secondary			PIP.RH				60 - 90mm	71,008		28.6	JOD 2,030,827	JOD 40,617	JOD 40,617	JOD 101,541	JOD 101,541	JOD 203,083	JOD 2,518,225
		Za2			1a	Secondary			PIP.RS				100 - 150mm	28,529		8.77	JOD 250,200	JOD 5,004	JOD 5,004	JOD 12,510	JOD 12,510	JOD 25,020	JOD 310,248
		Za2			1a	Secondary			PIP.RS				60 - 90mm	155,678		5.72	JOD 890,478	JOD 17,810	JOD 17,810	JOD 44,524	JOD 44,524	JOD 89,048	JOD 1,104,193
		Za2			1a	Tertiary			CM.N				50% Replac	13,113		50	JOD 655,625	JOD 13,113	JOD 13,113	JOD 32,781	JOD 32,781	JOD 65,563	JOD 812,975
		Za2			1a	Tertiary			CP.RS				100% Restru	20,173		100	JOD 2,017,300	JOD 40,346	JOD 40,346	JOD 100,865	JOD 100,865	JOD 201,730	JOD 2,501,452
		Za2			1a	Tertiary			PIP.RH				≤ 50mm	247,507		28.6	JOD 7,078,703	JOD 141,574	JOD 141,574	JOD 353,935	JOD 353,935	JOD 707,870	JOD 8,777,592
		Za2			1a	Tertiary			PIP.RS				≤ 50mm	309,343		5.72	JOD 1,769,440	JOD 35,389	JOD 35,389	JOD 88,472	JOD 88,472	JOD 176,944	JOD 2,194,106
		Za3			1a	Secondary			PIP.RH				100 - 150mm	3,186		58.5	JOD 186,373	JOD 3,727	JOD 3,727	JOD 9,319	JOD 9,319	JOD 18,637	JOD 231,102
		Za3			1a	Secondary			PIP.RH				60 - 90mm	7,178		28.6	JOD 205,277	JOD 4,106	JOD 4,106	JOD 10,264	JOD 10,264	JOD 20,528	JOD 254,544
		Za3			1a	Secondary			PIP.RS				100 - 150mm	6,372		8.77	JOD 55,880	JOD 1,118	JOD 1,118	JOD 2,794	JOD 2,794	JOD 5,588	JOD 69,291
		Za3			1a	Secondary			PIP.RS				60 - 90mm	14,355		5.72	JOD 82,111	JOD 1,642	JOD 1,642	JOD 4,106	JOD 4,106	JOD 8,211	JOD 101,817
		Za3			1a	Tertiary			CM.N				50% Replac	292		50	JOD 14,600	JOD 292	JOD 292	JOD 730	JOD 730	JOD 1,460	JOD 18,104
		Za3			1a	Tertiary			CP.RS				100% Restru	449		100	JOD 44,923	JOD 898	JOD 898	JOD 2,246	JOD 2,246	JOD 4,492	JOD 55,705
		Za3			1a	Tertiary			PIP.RH				≤ 50mm	8		28.6	JOD 216	JOD 4	JOD 4	JOD 11	JOD 11	JOD 22	JOD 268
		Za3			1a	Tertiary			PIP.RS				≤ 50mm	15		5.72	JOD 86	JOD 2	JOD 2	JOD 4	JOD 4	JOD 9	JOD 107
6	Zarqa		Construct new primary network pipeline	Batrawi Reservoir to Distribution Areas	2	Primary			PIP.N	3			600	8.0		JOD 390	JOD 3,120,000	JOD 62,400	JOD 62,400	JOD 156,000	JOD 156,000	JOD 312,000	JOD 3,868,800
6	Zarqa		Upgrade primary network pipeline	Khaw PS to Batrawi Reservoir	2	Primary			PIP.U	4			400	9.0		JOD 39.00	JOD 351,000	JOD 7,020	JOD 7,020	JOD 17,550	JOD 17,550	JOD 35,100	JOD 435,240
6	Zarqa		Upgrade primary network pipeline	Khaw PS to Batrawi Reservoir (700mm diameter, 9.0 km length)	2	Primary			PIP.U	3			700	9.0		JOD 91.00	JOD 819,000	JOD 16,380	JOD 16,380	JOD 40,950	JOD 40,950	JOD 81,900	JOD 1,015,560
6	Zarqa		Construct new reservoir	Additional Batrawi-level reservoir (Distribution Storage Reservoir 3,000 m3)	3	Primary			RES.N	1	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
6	Zarqa		Construct new pumping station	Zarqa High - Highest Levels Boosters (Target Pumping Rate 10 m3/hr)	3	Primary			PS.N	2		10				JOD 6,490	JOD 64,900	JOD 1,298	JOD 1,298	JOD 3,245	JOD 3,245	JOD 6,490	JOD 80,476
6	Zarqa		Upgrade existing pumping station	Zarqa PS (to Batrawi Distribution Storage Reservoir - Target Pumping Rate 500 m3/hr)	1b	Primary			PS.U	2		500				JOD 1,160	JOD 580,140	JOD 11,603	JOD 11,603	JOD 29,007	JOD 29,007	JOD 58,014	JOD 719,374
6	Zarqa		Upgrade primary network pipeline	Zarqa PS to Batrawi Reservoir (400mm diameter, 2.0 km length)	1b	Primary			PIP.U	5			400	2.0		JOD 39.00	JOD 76,050	JOD 1,521	JOD 1,521	JOD 3,803	JOD 3,803	JOD 7,605	JOD 94,302
															Phase 1a	Primary Network	JOD 2,916,764	JOD 58,335	JOD 58,335	JOD 145,838	JOD 145,838	JOD 291,676	JOD 3,616,787
																Secondary Network	JOD 5,767,963	JOD 115,359	JOD 115,359	JOD 288,398	JOD 288,398	JOD 576,796	JOD 7,152,275
																Tertiary Network	JOD 13,119,763	JOD 262,395	JOD 262,395	JOD 655,988	JOD 655,988	JOD 1,311,976	JOD 16,268,506
																Total	JOD 21,804,490	JOD 436,090	JOD 436,090	JOD 1,090,224	JOD 1,090,224	JOD 2,180,449	JOD 27,037,567
															Phase 2	Primary Network	JOD 4,290,000	JOD 85,800	JOD 85,800	JOD 214,500	JOD 214,500	JOD 429,000	JOD 5,319,600
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 4,290,000	JOD 85,800	JOD 85,800	JOD 214,500	JOD 214,500	JOD 429,000	JOD 5,319,600

Overall Costs 9: 20445 Zarqa WSS

Project Works Schedule 7 Awajan WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
7	Awajan		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	23					13	JOD 10,000	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
7	Awajan		Construct new primary network pipeline	Awajan West Reservoir to Distribution (300mm diameter, 6.4 km length)	1a	Primary			PIP.N	4			300	6.4		JOD 130	JOD 832,000	JOD 16,640	JOD 16,640	JOD 41,600	JOD 41,600	JOD 83,200	JOD 1,031,680
7	Awajan		Construct new primary network pipeline	Awajan High Reservoir to new Awajan West Reservoir (300mm diameter, 4.5 km length)	1a	Primary			PIP.N	12			300	4.5		JOD 130	JOD 585,000	JOD 11,700	JOD 11,700	JOD 29,250	JOD 29,250	JOD 58,500	JOD 725,400
7	Awajan		Construct new primary network pipeline	Awajan West Reservoir to Distribution (300mm diameter, 6.1 km length)	1a	Primary			PIP.N	19			300	6.1		JOD 130	JOD 793,000	JOD 15,860	JOD 15,860	JOD 39,650	JOD 39,650	JOD 79,300	JOD 983,320
7	Awajan		Construct new primary network pipeline	Awajan North Reservoir to Distribution (300mm diameter, 6.0 km length)	1a	Primary			PIP.N	22			300	6.0		JOD 130	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
7	Awajan		Construct new primary network pipeline	Awajan Low Reservoir to new Awajan North Reservoir (300mm diameter, 2.4 km length) Part	1a	Primary			PIP.N	15 B			300	2.4		JOD 130	JOD 312,000	JOD 6,240	JOD 6,240	JOD 15,600	JOD 15,600	JOD 31,200	JOD 386,880
7	Awajan		Upgrade primary network pipeline	Awajan High Reservoir to Distribution (250mm diameter, 0.4 km length)	1a	Primary			PIP.U	16			250	0.4		JOD 22.10	JOD 8,840	JOD 177	JOD 177	JOD 442	JOD 442	JOD 884	JOD 10,962
7	Awajan		Upgrade primary network pipeline	Awajan High Reservoir to Distribution (300mm diameter, 3.0 km length)	1a	Primary			PIP.U	17			300	3.0		JOD 26	JOD 78,000	JOD 1,560	JOD 1,560	JOD 3,900	JOD 3,900	JOD 7,800	JOD 96,720
7	Awajan		Upgrade primary network pipeline	Awajan Low Reservoir to new Awajan North Reservoir (300mm diameter, 3.2 km length) Part	1a	Primary			PIP.U	15 A			300	3.2		JOD 26	JOD 83,200	JOD 1,664	JOD 1,664	JOD 4,160	JOD 4,160	JOD 8,320	JOD 103,168
7	Awajan		Construct new pumping station	Awajan High Reservoir PS (to Awajan West Distribution Storage Reservoir - Target Pumping Rate 270 m3/hr)	1a	Primary			PS.N	6		270				JOD 1,980	JOD 534,600	JOD 10,692	JOD 10,692	JOD 26,730	JOD 26,730	JOD 53,460	JOD 662,904
7	Awajan		Construct new pumping station	Awajan Low Reservoir PS (to Awajan North Distribution Storage Reservoir - Target Pumping Rate 300 m3/hr)	1a	Primary			PS.N	7		300				JOD 1,844	JOD 553,300	JOD 11,066	JOD 11,066	JOD 27,665	JOD 27,665	JOD 55,330	JOD 686,092
7	Awajan		Construct new reservoir	Awajan West Reservoir (Distribution Storage Reservoir 3,000 m3)	1a	Primary			RES.N	3	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
7	Awajan		Construct new reservoir	Awajan North Reservoir (Distribution Storage Reservoir 3,000 m3)	1a	Primary			RES.N	4	3,000					JOD 177	JOD 532,400	JOD 10,648	JOD 10,648	JOD 26,620	JOD 26,620	JOD 53,240	JOD 660,176
		Aw1				Secondary		m	PIP.RH				100 - 150mm	6,586		58.5	JOD 385,269	JOD 7,705	JOD 7,705	JOD 19,263	JOD 19,263	JOD 38,527	JOD 477,734
		Aw1				Secondary		m	PIP.RH				60 - 90mm	38,181		28.6	JOD 1,091,967	JOD 21,839	JOD 21,839	JOD 54,598	JOD 54,598	JOD 109,197	JOD 1,354,039
		Aw1				Secondary		m	PIP.RS				100 - 150mm	16,909		8.77	JOD 148,291	JOD 2,966	JOD 2,966	JOD 7,415	JOD 7,415	JOD 14,829	JOD 183,881
		Aw1				Secondary		m	PIP.RS				60 - 90mm	79,249		5.72	JOD 453,306	JOD 9,066	JOD 9,066	JOD 22,665	JOD 22,665	JOD 45,331	JOD 562,100
		Aw1				Tertiary		No.	CM.N				50% Replac	4,489		50	JOD 224,450	JOD 4,489	JOD 4,489	JOD 11,223	JOD 11,223	JOD 22,445	JOD 278,318
		Aw1				Tertiary		No.	CP.RS				100% Restr	6,906		100	JOD 690,615	JOD 13,812	JOD 13,812	JOD 34,531	JOD 34,531	JOD 69,062	JOD 856,363
		Aw1				Tertiary		m	PIP.RH				≤ 50mm	101,662		28.6	JOD 2,907,534	JOD 58,151	JOD 58,151	JOD 145,377	JOD 145,377	JOD 290,753	JOD 3,605,342
		Aw1				Tertiary		m	PIP.RS				≤ 50mm	130,174		5.72	JOD 744,595	JOD 14,892	JOD 14,892	JOD 37,230	JOD 37,230	JOD 74,459	JOD 923,297
		Aw2				Secondary		m	PIP.RH				100 - 150mm	4,199		58.5	JOD 245,654	JOD 4,913	JOD 4,913	JOD 12,283	JOD 12,283	JOD 24,565	JOD 304,611
		Aw2				Secondary		m	PIP.RH				60 - 90mm	25,950		28.6	JOD 742,167	JOD 14,843	JOD 14,843	JOD 37,108	JOD 37,108	JOD 74,217	JOD 920,287
		Aw2				Secondary		m	PIP.RS				100 - 150mm	12,761		8.77	JOD 111,914	JOD 2,238	JOD 2,238	JOD 5,596	JOD 5,596	JOD 11,191	JOD 138,774
		Aw2				Secondary		m	PIP.RS				60 - 90mm	54,953		5.72	JOD 314,331	JOD 6,287	JOD 6,287	JOD 15,717	JOD 15,717	JOD 31,433	JOD 389,771
		Aw2				Tertiary		No.	CM.N				50% Replac	2,716		50	JOD 135,800	JOD 2,716	JOD 2,716	JOD 6,790	JOD 6,790	JOD 13,580	JOD 168,392
		Aw2				Tertiary		No.	CP.RS				100% Restr	4,178		100	JOD 417,846	JOD 8,357	JOD 8,357	JOD 20,892	JOD 20,892	JOD 41,785	JOD 518,129
		Aw2				Tertiary		m	PIP.RH				≤ 50mm	54,719		28.6	JOD 1,564,976	JOD 31,300	JOD 31,300	JOD 78,249	JOD 78,249	JOD 156,498	JOD 1,940,570
		Aw2				Tertiary		m	PIP.RS				≤ 50mm	71,149		5.72	JOD 406,970	JOD 8,139	JOD 8,139	JOD 20,349	JOD 20,349	JOD 40,697	JOD 504,643
		Aw3				Secondary		m	PIP.RH				100 - 150mm	6,389		58.5	JOD 373,776	JOD 7,476	JOD 7,476	JOD 18,689	JOD 18,689	JOD 37,378	JOD 463,482
		Aw3				Secondary		m	PIP.RH				60 - 90mm	21,209		28.6	JOD 606,567	JOD 12,131	JOD 12,131	JOD 30,328	JOD 30,328	JOD 60,657	JOD 752,143
		Aw3				Secondary		m	PIP.RS				100 - 150mm	13,698		8.77	JOD 120,133	JOD 2,403	JOD 2,403	JOD 6,007	JOD 6,007	JOD 12,013	JOD 148,965
		Aw3				Secondary		m	PIP.RS				60 - 90mm	42,417		5.72	JOD 242,627	JOD 4,853	JOD 4,853	JOD 12,131	JOD 12,131	JOD 24,263	JOD 300,857
		Aw3				Tertiary		No.	CM.N				50% Replac	1,682		50	JOD 84,075	JOD 1,682	JOD 1,682	JOD 4,204	JOD 4,204	JOD 8,408	JOD 104,253
		Aw3				Tertiary		No.	CP.RS				100% Restr	2,587		100	JOD 258,692	JOD 5,174	JOD 5,174	JOD 12,935	JOD 12,935	JOD 25,869	JOD 320,778
		Aw3				Tertiary		m	PIP.RH				≤ 50mm	32,617		28.6	JOD 932,836	JOD 18,657	JOD 18,657	JOD 46,642	JOD 46,642	JOD 93,284	JOD 1,156,716
		Aw3				Tertiary		m	PIP.RS				≤ 50mm	39,696		5.72	JOD 227,061	JOD 4,541	JOD 4,541	JOD 11,353	JOD 11,353	JOD 22,706	JOD 281,555
		Aw4				Secondary		m	PIP.RH				100 - 150mm	7,118		58.5	JOD 416,427	JOD 8,329	JOD 8,329	JOD 20,821	JOD 20,821	JOD 41,643	JOD 516,370
		Aw4				Secondary		m	PIP.RH				60 - 90mm	26,597		28.6	JOD 760,664	JOD 15,213	JOD 15,213	JOD 38,033	JOD 38,033	JOD 76,066	JOD 943,223
		Aw4				Secondary		m	PIP.RS				100 - 150mm	17,176		8.77	JOD 150,633	JOD 3,013	JOD 3,013	JOD 7,532	JOD 7,532	JOD 15,063	JOD 186,785
		Aw4				Secondary		m	PIP.RS				60 - 90mm	54,023		5.72	JOD 309,010	JOD 6,180	JOD 6,180	JOD 15,451	JOD 15,451	JOD 30,901	JOD 383,173
		Aw4				Tertiary		No.	CM.N				50% Replac	2,056		50	JOD 102,800	JOD 2,056	JOD 2,056	JOD 5,140	JOD 5,140	JOD 10,280	JOD 127,472
		Aw4				Tertiary		No.	CP.RS				100% Restr	3,163		100	JOD 316,308	JOD 6,326	JOD 6,326	JOD 15,815	JOD 15,815	JOD 31,631	JOD 392,222
		Aw4				Tertiary		m	PIP.RH				≤ 50mm	40,944		28.6	JOD 1,170,987	JOD 23,420	JOD 23,420	JOD 58,549	JOD 58,549	JOD 117,099	JOD 1,452,024
		Aw4				Tertiary		m	PIP.RS				≤ 50mm	49,767		5.72	JOD 284,669	JOD 5,693	JOD 5,693	JOD 14,233	JOD 14,233	JOD 28,467	JOD 352,990
7	Awajan		Construct new primary network pipeline	Awajan North Reservoir to Distribution (300mm diameter, 6.5 km length)	2	Primary			PIP.N	5			300	6.5		JOD 130	JOD 845,000	JOD 16,900	JOD 16,900	JOD 42,250	JOD 42,250	JOD 84,500	JOD 1,047,800
7	Awajan		Construct new primary network pipeline	Interim point to new Awajan Hub Reservoir / PS (600mm diameter, 0.3 km length)	2	Primary			PIP.N	9			600	0.3		JOD 390	JOD 117,000	JOD 2,340	JOD 2,340	JOD 5,850	JOD 5,850	JOD 11,700	JOD 145,080
7	Awajan		Construct new primary network pipeline	New Awajan Hub PS to interim point (600mm diameter, 0.3 km length)	2	Primary			PIP.N	10			600	0.3		JOD 390	JOD 117,000	JOD 2,340	JOD 2,340	JOD 5,850	JOD 5,850	JOD 11,700	JOD 145,080
7	Awajan		Construct new primary network pipeline	New Awajan Hub PS to interim point (500mm diameter, 0.3 km length)	2	Primary			PIP.N	13			500	0.3		JOD 325	JOD 97,500	JOD 1,950	JOD 1,950	JOD 4,875	JOD 4,875	JOD 9,750	JOD 120,900
7	Awajan		Construct new primary network pipeline	Interim point to Awajan Low Reservoir (500mm diameter, 3.7 km length)	2	Primary			PIP.N	14			500	3.7		JOD 325	JOD 1,202,500	JOD 24,050	JOD 24,050	JOD 60,125	JOD 60,125	JOD 120,250	JOD 1,491,100
7	Awajan		Construct new primary network pipeline	Awajan High Reservoir to Distribution (300mm diameter, 11.6 km length)	2	Primary			PIP.N	18			300	11.6		JOD 130	JOD 1,508,000	JOD 30,160	JOD 30,160	JOD 75,400	JOD 75,400	JOD 150,800	JOD 1,869,920
7	Awajan		Construct new primary network pipeline	Awajan Low Reservoir to Distribution (300mm diameter, 2.1 km length)	2	Primary			PIP.N	21			300	2.1		JOD 130	JOD 273,000	JOD 5,460	JOD 5,460	JOD 13,650	JOD 13,650	JOD 27,300	JOD 338,520
7	Awajan		Upgrade primary network pipeline	Strategic Ring Main connection point to interim point (600mm diameter, 3.6 km length)	2	Primary			PIP.U	8			600	3.6		JOD 78	JOD 280,800	JOD 5,616	JOD 5,616	JOD 14,040	JOD 14,040	JOD 28,080	JOD 348,192
7	Awajan		Upgrade primary network pipeline	Interim point to Awajan High Reservoir (600mm diameter, 2.1 km length)	2	Primary			PIP.U	11			600	2.1		JOD 78	JOD 163,800	JOD 3,276	JOD 3,276	JOD 8,190	JOD 8,190	JOD 16,380	JOD 203,112
7	Awajan		Upgrade primary network pipeline	Awajan Low Reservoir to Distribution (400mm diameter, 8.0 km length)	2	Primary			PIP.U	20			400	8.0		JOD 39	JOD 312,000	JOD 6,240	JOD 6,240	JOD 15,600	JOD 15,600	JOD 31,200	JOD 386,880
7	Awajan		Construct new pumping station	Awajan West Highest Levels Boosters (Target Pumping Rate 30 m3/hr)	2	Primary			PS.N	2		30				JOD 5,858	JOD 175,725	JOD 3,515	JOD 3,515	JOD 8,786	JOD 8,786	JOD 17,573	JOD 217,899
7	Awajan		Construct new pumping station	Awajan North Highest Levels Boosters (Target Pumping Rate 30 m3/hr)	2	Primary			PS.N	3		30				JOD 5,858	JOD 175,725	JOD 3,515	JOD 3,515	JOD 8,786	JOD 8,786	JOD 17,573	JOD 217,899
7	Awajan		Construct new pumping station	Awajan Hub PS (to Awajan High and Awajan Low Distribution Storage Reservoirs - Target Pumping Rate 1,300 m3/hr)	2	Primary			PS.N	5		1,300				JOD 625	JOD 812,900	JOD 16,258	JOD 16,258	JOD 40,645	JOD 40,645	JOD 81,290	JOD 1,007,996
7	Awajan		Construct new reservoir	Awajan Low Additional Reservoir (Distribution Storage Reservoir 2,000 m3)	2	Primary			RES.N	1	2,000					JOD 201	JOD 401,500	JOD 8,030	JOD 8,030	JOD 20,075	JOD 20,075	JOD 40,150	JOD 497,860
7	Awajan		Construct new reservoir	Awajan Hub Reservoir (Pump Flow-balancing Reservoir 2,500 m3)	2	Primary			RES.N	2	2,500					JOD 188	JOD 470,800	JOD 9,416	JOD 9,416	JOD 23,540	JOD 23,540	JOD 47,080	JOD 583,792
7	Awajan		Install new DMA connection point	DMA connection points	1a	Primary			DMA.N	23					16	JOD 10,000	JOD 160,000	JOD 3,200	JOD 3,200	JOD 8,000	JOD 8,000	JOD 16,000	JOD 198,400
7	Awajan		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable Primary network pipelines	1a	Primary			PIP.RH	4			200 - 300	7.794		JOD 55.25	JOD 430,619	JOD 8,612	JOD 8,612	JOD 21,531	JOD 21,531	JOD 43,062	JOD 533,967
7	Awajan		Restructure primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a	Primary			PIP.RS	8			200-300	20.821		JOD 12.16	JOD 253,183	JOD 5,064	JOD 5,064	JOD 12,659	JOD 12,659	JOD 25,318	JOD 313,947
															Phase 1a	Primary Network	JOD 6,598,542	JOD 131,971	JOD 131,971	JOD 329,927	JOD 329,927	JOD 659,854	JOD 8,182,192
																Secondary Network	JOD 6,472,738	JOD 129,455	JOD 129,455	JOD 323,637	JOD 323,637	JOD 647,274	JOD 8,026,195
																Tertiary Network	JOD 10,470,214	JOD 209,404	JOD 209,404	JOD 523,511	JOD 523,511	JOD 1,047,021	JOD 12,983,065
																Total	JOD 23,541,494	JOD 470,830	JOD 470,830	JOD 1,177,075	JOD 1,177,075	JOD 2,354,149	JOD 29,191,452
															Phase 2	Primary Network	JOD 6,953,250	JOD 139,065	JOD 139,065	JOD 347,663	JOD 347,663	JOD 695,325	JOD 8,622,030
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 6,953,250	JOD 139,065	JOD 139,065	JOD 347,663	JOD 347,663	JOD 695,325	JOD 8,622,030

Overall Costs 10: 20445 Zarqa WSS

Project Works Schedule 8
Russaifah WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
8	Russaifah		Install new DMA connection point	DMA connection points	1a 30%, 1b 70%	Primary			DMA.N	25					26	JOD 10,000	JOD 260,000	JOD 5,200	JOD 5,200	JOD 13,000	JOD 13,000	JOD 26,000	JOD 322,400
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to Russaifah High Distribution part (600mm diameter, 2.0 km length)	1a 30%, 1b 70%	Primary			PIP.N	20			600	2.0		JOD 390	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
8	Russaifah		Construct new primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (400mm diameter, 4.0 km length)	1a 30%, 1b 70%	Primary			PIP.N	22			400	4.0		JOD 195	JOD 780,000	JOD 15,600	JOD 15,600	JOD 39,000	JOD 39,000	JOD 78,000	JOD 967,200
8	Russaifah		Upgrade primary network pipeline	Basateen PS to Russaifah Low Reservoir part distance (400mm diameter, 4.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	15			400	4.0		JOD 39.00	JOD 156,000	JOD 3,120	JOD 3,120	JOD 7,800	JOD 7,800	JOD 15,600	JOD 193,440
8	Russaifah		Upgrade primary network pipeline	Basateen PS to Russaifah Low Reservoir part distance (500mm diameter, 5.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	16			500	5.0		JOD 65.00	JOD 325,000	JOD 6,500	JOD 6,500	JOD 16,250	JOD 16,250	JOD 32,500	JOD 403,000
8	Russaifah		Upgrade primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (500mm diameter, 2.0 km length)	1a 30%, 1b 70%	Primary			PIP.U	21			500	2.0		JOD 65.00	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
8	Russaifah		Construct new pumping station	Basateen PS (to Russaifah Low Storage Reservoir - Target Pumping Rate 560 m3/hr)	1a 30%, 1b 70%	Primary			PS.N	11		560				JOD 1,188	JOD 665,000	JOD 13,300	JOD 13,300	JOD 33,250	JOD 33,250	JOD 66,500	JOD 824,600
8	Russaifah		Upgrade existing reservoir	Basateen Reservoir (Flow-balancing Reservoir 500 m3)	1a 30%, 1b 70%	Primary			RES.U	6	500					JOD 74	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
		Ru1				Secondary		m	PIP.RH				100 - 150ø	7.232		58.5	JOD 423,044	JOD 8,461	JOD 8,461	JOD 21,152	JOD 21,152	JOD 42,304	JOD 524,575
		Ru1				Secondary		m	PIP.RH				60 - 90mm	4.318		28.6	JOD 123,491	JOD 2,470	JOD 2,470	JOD 6,175	JOD 6,175	JOD 12,349	JOD 153,129
		Ru1				Secondary		m	PIP.RS				100 - 150ø	13.502		8.77	JOD 118,411	JOD 2,368	JOD 2,368	JOD 5,921	JOD 5,921	JOD 11,841	JOD 146,829
		Ru1				Secondary		m	PIP.RS				60 - 90mm	5.397		5.72	JOD 30,873	JOD 617	JOD 617	JOD 1,544	JOD 1,544	JOD 3,087	JOD 38,282
		Ru1				Tertiary		No.	CM.N				50% Repla	279		50	JOD 13,925	JOD 279	JOD 279	JOD 696	JOD 696	JOD 1,393	JOD 17,267
		Ru1				Tertiary		No.	CP.RS				100% Res	428		100	JOD 42,846	JOD 857	JOD 857	JOD 2,142	JOD 2,142	JOD 4,285	JOD 53,129
		Ru1				Tertiary		m	PIP.RH				≤ 50mm	6.737		28.6	JOD 192,672	JOD 3,853	JOD 3,853	JOD 9,634	JOD 9,634	JOD 19,267	JOD 238,913
		Ru1				Tertiary		m	PIP.RS				≤ 50mm	6.746		5.72	JOD 38,585	JOD 772	JOD 772	JOD 1,929	JOD 1,929	JOD 3,859	JOD 47,845
		Ru2				Secondary		m	PIP.RH				100 - 150ø	29.644		58.5	JOD 1,734,180	JOD 34,684	JOD 34,684	JOD 86,709	JOD 86,709	JOD 173,418	JOD 2,150,383
		Ru2				Secondary		m	PIP.RH				60 - 90mm	52.967		28.6	JOD 1,514,860	JOD 30,297	JOD 30,297	JOD 75,743	JOD 75,743	JOD 151,486	JOD 1,878,426
		Ru2				Secondary		m	PIP.RS				100 - 150ø	48.809		8.77	JOD 428,055	JOD 8,561	JOD 8,561	JOD 21,403	JOD 21,403	JOD 42,805	JOD 530,788
		Ru2				Secondary		m	PIP.RS				60 - 90mm	66.400		5.72	JOD 380,321	JOD 7,606	JOD 7,606	JOD 19,016	JOD 19,016	JOD 38,032	JOD 471,598
		Ru2				Tertiary		No.	CM.N				50% Repla	5.686		50	JOD 284,300	JOD 5,686	JOD 5,686	JOD 14,215	JOD 14,215	JOD 28,430	JOD 352,532
		Ru2				Tertiary		No.	CP.RS				100% Res	8.748		100	JOD 874,769	JOD 17,495	JOD 17,495	JOD 43,738	JOD 43,738	JOD 87,477	JOD 1,084,714
		Ru2				Tertiary		m	PIP.RH				≤ 50mm	129.539		28.6	JOD 3,704,803	JOD 74,096	JOD 74,096	JOD 185,240	JOD 185,240	JOD 370,480	JOD 4,593,955
		Ru2				Tertiary		m	PIP.RS				≤ 50mm	140.800		5.72	JOD 805,379	JOD 16,108	JOD 16,108	JOD 40,269	JOD 40,269	JOD 80,538	JOD 998,670
		Ru3				Secondary		m	PIP.RH				100 - 150ø	11.637		58.5	JOD 680,773	JOD 13,615	JOD 13,615	JOD 34,039	JOD 34,039	JOD 68,077	JOD 844,159
		Ru3				Secondary		m	PIP.RH				60 - 90mm	71.648		28.6	JOD 2,049,137	JOD 40,983	JOD 40,983	JOD 102,457	JOD 102,457	JOD 204,914	JOD 2,540,930
		Ru3				Secondary		m	PIP.RS				100 - 150ø	21.384		8.77	JOD 187,540	JOD 3,751	JOD 3,751	JOD 9,377	JOD 9,377	JOD 18,754	JOD 232,550
		Ru3				Secondary		m	PIP.RS				60 - 90mm	90.050		5.72	JOD 515,087	JOD 10,302	JOD 10,302	JOD 25,754	JOD 25,754	JOD 51,509	JOD 638,708
		Ru3				Tertiary		No.	CM.N				50% Repla	4.100		50	JOD 204,975	JOD 4,100	JOD 4,100	JOD 10,249	JOD 10,249	JOD 20,498	JOD 254,169
		Ru3				Tertiary		No.	CP.RS				100% Res	6.307		100	JOD 630,692	JOD 12,614	JOD 12,614	JOD 31,535	JOD 31,535	JOD 63,069	JOD 782,058
		Ru3				Tertiary		m	PIP.RH				≤ 50mm	76.489		28.6	JOD 2,187,591	JOD 43,752	JOD 43,752	JOD 109,380	JOD 109,380	JOD 218,759	JOD 2,712,612
		Ru3				Tertiary		m	PIP.RS				≤ 50mm	90.006		5.72	JOD 514,836	JOD 10,297	JOD 10,297	JOD 25,742	JOD 25,742	JOD 51,484	JOD 638,397
		Ru4				Secondary		m	PIP.RH				100 - 150ø	1.326		58.5	JOD 77,555	JOD 1,551	JOD 1,551	JOD 3,878	JOD 3,878	JOD 7,756	JOD 96,168
		Ru4				Secondary		m	PIP.RH				60 - 90mm	9.483		28.6	JOD 271,209	JOD 5,424	JOD 5,424	JOD 13,560	JOD 13,560	JOD 27,121	JOD 336,299
		Ru4				Secondary		m	PIP.RS				100 - 150ø	2.489		8.77	JOD 21,824	JOD 436	JOD 436	JOD 1,091	JOD 1,091	JOD 2,182	JOD 27,062
		Ru4				Secondary		m	PIP.RS				60 - 90mm	11.854		5.72	JOD 67,802	JOD 1,356	JOD 1,356	JOD 3,390	JOD 3,390	JOD 6,780	JOD 84,075
		Ru4				Tertiary		No.	CM.N				50% Repla	720		50	JOD 35,975	JOD 720	JOD 720	JOD 1,799	JOD 1,799	JOD 3,598	JOD 44,609
		Ru4				Tertiary		No.	CP.RS				100% Res	1.107		100	JOD 110,692	JOD 2,214	JOD 2,214	JOD 5,535	JOD 5,535	JOD 11,069	JOD 137,258
		Ru4				Tertiary		m	PIP.RH				≤ 50mm	13.810		28.6	JOD 394,962	JOD 7,899	JOD 7,899	JOD 19,748	JOD 19,748	JOD 39,496	JOD 489,753
		Ru4				Tertiary		m	PIP.RS				≤ 50mm	15.834		5.72	JOD 90,569	JOD 1,811	JOD 1,811	JOD 4,528	JOD 4,528	JOD 9,057	JOD 112,306
		Ru5				Secondary		m	PIP.RH				100 - 150ø	26.990		58.5	JOD 1,578,926	JOD 31,579	JOD 31,579	JOD 78,946	JOD 78,946	JOD 157,893	JOD 1,957,868
		Ru5				Secondary		m	PIP.RH				60 - 90mm	94.512		28.6	JOD 2,703,039	JOD 54,061	JOD 54,061	JOD 135,152	JOD 135,152	JOD 270,304	JOD 3,351,768
		Ru5				Secondary		m	PIP.RS				100 - 150ø	44.557		8.77	JOD 390,766	JOD 7,815	JOD 7,815	JOD 19,538	JOD 19,538	JOD 39,077	JOD 484,550
		Ru5				Secondary		m	PIP.RS				60 - 90mm	118.140		5.72	JOD 675,760	JOD 13,515	JOD 13,515	JOD 33,788	JOD 33,788	JOD 67,576	JOD 837,942
		Ru5				Tertiary		No.	CM.N				50% Repla	7.177		50	JOD 358,850	JOD 7,177	JOD 7,177	JOD 17,943	JOD 17,943	JOD 35,885	JOD 444,974
		Ru5				Tertiary		No.	CP.RS				100% Res	11.042		100	JOD 1,104,154	JOD 22,083	JOD 22,083	JOD 55,208	JOD 55,208	JOD 110,415	JOD 1,369,151
		Ru5				Tertiary		m	PIP.RH				≤ 50mm	155.772		28.6	JOD 4,455,073	JOD 89,101	JOD 89,101	JOD 222,754	JOD 222,754	JOD 445,507	JOD 5,524,291
		Ru5				Tertiary		m	PIP.RS				≤ 50mm	174.389		5.72	JOD 997,504	JOD 19,950	JOD 19,950	JOD 49,875	JOD 49,875	JOD 99,750	JOD 1,236,905
8	Russaifah		Construct new primary network pipeline	Strategic Ring Main connection point to new Russaifah Hub Res/PS (800mm diameter, 1.0 km length)	2	Primary			PIP.N	5			800	1.0		JOD 520	JOD 520,000	JOD 10,400	JOD 10,400	JOD 26,000	JOD 26,000	JOD 52,000	JOD 644,800
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to Russaifah High Distribution part (400mm diameter, 6.0 km length)	2	Primary			PIP.N	6			400	6.0		JOD 195	JOD 1,170,000	JOD 23,400	JOD 23,400	JOD 58,500	JOD 58,500	JOD 117,000	JOD 1,450,800
8	Russaifah		Construct new primary network pipeline	Russaifah Low Reservoir to Russaifah Low Distribution part (300mm diameter, 4.0 km length)	2	Primary			PIP.N	7			300	4.0		JOD 130	JOD 520,000	JOD 10,400	JOD 10,400	JOD 26,000	JOD 26,000	JOD 52,000	JOD 644,800
8	Russaifah		Construct new primary network pipeline	Hitteen Reservoir to Hitteen Res Distribution Area part (700mm diameter, 1.0 km length)	2	Primary			PIP.N	8			700	1.0		JOD 455	JOD 455,000	JOD 9,100	JOD 9,100	JOD 22,750	JOD 22,750	JOD 45,500	JOD 564,200
8	Russaifah		Construct new primary network pipeline	New Russaifah Hub PS to Russaifah High Reservoir additional pipe (400mm diameter, 5.8 km length)	2	Primary			PIP.N	13			400	5.8		JOD 195	JOD 1,131,000	JOD 22,620	JOD 22,620	JOD 56,550	JOD 56,550	JOD 113,100	JOD 1,402,440
8	Russaifah		Construct new primary network pipeline	Russaifah High Reservoir to New Russaifah NorthWest Reservoir (200mm diameter, 5.5 km length)	2	Primary			PIP.N	17			200	5.5		JOD 97.50	JOD 536,250	JOD 10,725	JOD 10,725	JOD 26,813	JOD 26,813	JOD 53,625	JOD 664,950
8	Russaifah		Construct new primary network pipeline	Russaifah Hub PS to Hitteen Reservoir (600mm diameter, 0.5 km length)	2	Primary			PIP.N	18			600	0.5		JOD 390	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
8	Russaifah		Construct new primary network pipeline	Hitteen Reservoir to Hitteen WT environs pipework (200mm diameter, 0.5 km length)	2	Primary			PIP.N	19			200	0.5		JOD 97.50	JOD 48,750	JOD 975	JOD 975	JOD 2,438	JOD 2,438	JOD 4,875	JOD 60,450
8	Russaifah		Construct new primary network pipeline	Hitteen Water Tower to Hitteen WT Distribution Area (200mm diameter, 0.1 km length)	2	Primary			PIP.N	24			200	0.1		JOD 97.50	JOD 9,750	JOD 195	JOD 195	JOD 488	JOD 488	JOD 975	JOD 12,090
8	Russaifah		Upgrade primary network pipeline	New Russaifah Hub PS to Russaifah High Reservoir (400mm diameter, 4.8 km length)	2	Primary			PIP.U	12			400	4.8		JOD 39.00	JOD 187,200	JOD 3,744	JOD 3,744	JOD 9,360	JOD 9,360	JOD 18,720	JOD 232,128
8	Russaifah		Upgrade primary network pipeline	Russaifah High Reservoir to Russaifah Low Reservoir (300mm diameter, 1.4 km length)	2	Primary			PIP.U	14			300	1.4		JOD 26	JOD 36,400	JOD 728	JOD 728	JOD 1,820	JOD 1,820	JOD 3,640	JOD 45,136
8	Russaifah		Upgrade primary network pipeline	Hitteen Reservoir to Hitteen Res Distribution Area part (300mm diameter, 7.0 km length)	2	Primary			PIP.U	23			300	7.0		JOD 26	JOD 182,000	JOD 3,640	JOD 3,640	JOD 9,100	JOD 9,100	JOD 18,200	JOD 225,680
8	Russaifah		Construct new pumping station	Russaifah North-West Highest Levels Boosters (Target Pumping Rate 15 m3/hr)	2	Primary			PS.N	4		15				JOD 6,453	JOD 96,795	JOD 1,936	JOD 1,936	JOD 4,840	JOD 4,840	JOD 9,680	JOD 120,026
8	Russaifah		Construct new pumping station	New Russaifah Hub PS (to Hitteen and Russaifah High Distribution Storage Reservoirs - Target Pumping Rate 2,000 m3/hr)	2	Primary			PS.N	8		2,000				JOD 445	JOD 889,900	JOD 17,798	JOD 17,798	JOD 44,495	JOD 44,495	JOD 88,990	JOD 1,103,476
8	Russaifah		Construct new pumping station	Russaifah High Reservoir PS (to Russaifah North-West Storage Reservoir - Target Pumping Rate 62 m3/hr)	2	Primary			PS.N	10		62				JOD 4,516	JOD 280,000	JOD 5,600	JOD 5,600	JOD 14,000	JOD 14,000	JOD 28,000	JOD 347,200
8	Russaifah		Upgrade existing pumping station	Hitteen Reservoir PS (to Hitteen Water Tower Storage Reservoir - Target Pumping Rate 52 m3/hr)	2	Primary			PS.U	9		52				JOD 4,240	JOD 220,500	JOD 4,410	JOD 4,410	JOD 11,025	JOD 11,025	JOD 22,050	JOD 273,420
8	Russaifah		Construct new reservoir	New Russaifah Hub Reservoir (Flow-Balancing Reservoir 4,000 m3)	2	Primary			RES.N	1	4,000					JOD 159	JOD 635,800	JOD 12,716	JOD 12,716	JOD 31,790	JOD 31,790	JOD 63,580	JOD 788,392
8	Russaifah		Construct new reservoir	Hitteen Reservoir Additional (Distribution Storage Reservoir 5,000 m3)	2	Primary			RES.N	1	5,000					JOD 146	JOD 729,300	JOD 14,586	JOD 14,586	JOD 36,465	JOD 36,465	JOD 72,930	JOD 904,332
8	Russaifah		Construct new reservoir	Hitteen Water Tower Additional (Distribution Storage Reservoir 600 m3)	2	Primary			RES.N	2	600					JOD 370	JOD 221,760	JOD 4,435	JOD 4,435	JOD 11,088	JOD 11,088	JOD 22,176	JOD 274,982
8	Russaifah		Construct new reservoir	Russaifah High Reservoir Additional (Distribution Storage Reservoir 6,000 m3)	2	Primary			RES.N	3	6,000					JOD 142	JOD 849,556	JOD 16,991	JOD 16,991	JOD 42,478	JOD 42,478	JOD 84,956	JOD 1,053,449
8	Russaifah		Construct new reservoir	Basateen Reservoir Additional (Distribution Storage Reservoir 700 m3)	2	Primary			RES.N	4	700					JOD 312	JOD 218,350	JOD 4,367	JOD 4,367	JOD 10,918	JOD 10,918	JOD 21,835	JOD 270,754
8	Russaifah		Construct new reservoir	Russaifah North-West (Distribution Storage Reservoir 1,500 m3)	2	Primary			RES.N	5	1,500					JOD 218	JOD 326,700	JOD 6,534	JOD 6,534	JOD 16,335	JOD 16,335	JOD 32,670	JOD 405,108
8	Russaifah		Upgrade existing reservoir	Hitteen Reservoir (Distribution Storage Reservoir 4,000 m3)	2	Primary			RES.U	2	4,000					JOD 24	JOD 95,370	JOD 1,907	JOD 1,907	JOD 4,769	JOD 4,769	JOD 9,537	JOD 118,259
8	Russaifah		Upgrade existing reservoir	Hitteen Water Tower (Distribution Storage Reservoir 300 m3)	2	Primary			RES.U	3	300					JOD 208	JOD 62,480	JOD 1,250	JOD 1,250	JOD 3,124	JOD 3,124	JOD 6,248	JOD 77,475
8	Russaifah		Install new DMA connection point	DMA connection points	1a 30%, 1b 70%	Primary			DMA.N	25					22	JOD 10,000	JOD 220,000	JOD 4,400	JOD 4,400	JOD 11,000	JOD 11,000	JOD 22,000	JOD 272,800
8	Russaifah		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	1a 30%, 1b 70%	Primary			PIP.RH	4			200-300	8.669		JOD 55.25	JOD 478,962	JOD 9,579	JOD 9,579	JOD 23,948	JOD 23,948	JOD 47,896	JOD 593,913
8	Russaifah		Restructure primary network pipeline	Restructure existing and rehabilitated primary network pipelines	1a 30%, 1b 70%	Primary			PIP.RS	8			200-300	41.709		JOD 12.16	JOD 507,181	JOD 10,144	JOD 10,144	JOD 25,359	JOD 25,359	JOD 50,718	JOD 628,905

Phase 1a	Primary Network	JOD 1,301,731	JOD 26,035	JOD 26,035	JOD 65,087	JOD 65,087	JOD 130,173	JOD 1,614,147
	Secondary Network	JOD 4,191,796	JOD 83,836	JOD 83,836	JOD 209,590	JOD 209,590	JOD 419,180	JOD 5,197,827
	Tertiary Network	JOD 5,112,946	JOD 102,259	JOD 102,259	JOD 255,647	JOD 255,647	JOD 511,295	JOD 6,340,053
	Total	JOD 10,606,472	JOD 212,129	JOD 212,129	JOD 530,324	JOD 530,324	JOD 1,060,647	JOD 13,152,026
Phase 2	Primary Network	JOD 9,617,861	JOD 192,357	JOD 192,357	JOD 480,893	JOD 480,893	JOD 961,786	JOD 11,926,148
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 9,617,861	JOD 192,357	JOD 192,357	JOD 480,893	JOD 480,893	JOD 961,786	JOD 11,926,148

Overall Costs 11: 20445 Zarqa WSS

Project Works Schedule 9 North
WSA. 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(unit)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
9	North		Install new DMA connection point	DMA connection points	2	Primary			DMA.N	6					15	JOD 10,000	JOD 150,000	JOD 3,000	JOD 3,000	JOD 7,500	JOD 7,500	JOD 15,000	JOD 186,000
9	North		Construct new primary network pipeline	Khaw North WT Khaw Distribution Area	2	Primary			PIP.N	4			400	1.0		JOD 195	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
9	North		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200-300	5.236		JOD 55.25	JOD 289,289	JOD 5,786	JOD 5,786	JOD 14,464	JOD 14,464	JOD 28,929	JOD 358,718
9	North		Restructure secondary and tertiary network pipeline	Restructure existing and rehabilitated secondary and tertiary network pipelines	2	Primary			PIP.RS	8			200-300	22.780		JOD 12.16	JOD 277,005	JOD 5,540	JOD 5,540	JOD 13,850	JOD 13,850	JOD 27,700	JOD 343,486
9	North		Upgrade existing primary network pipeline	Hashmeya PS to Zarqa PS (400mm diameter, 5.4 km length)	2	Primary			PIP.U	5			400	5.4		JOD 39	JOD 208,741	JOD 4,175	JOD 4,175	JOD 10,437	JOD 10,437	JOD 20,874	JOD 258,839
9	North		Upgrade existing pumping station	Hashmeya PS pumping to Zarqa - Target Pumping Rate 425 m3/hr)	2	Primary			PS.U	2		425				JOD 1,458	JOD 619,850	JOD 12,397	JOD 12,397	JOD 30,993	JOD 30,993	JOD 61,985	JOD 768,614
9	North		Construct new reservoir	Khaw North Water Tower (Distribution Storage Reservoir 2,000 m3)	2	Primary			RES.N	1	2,000					JOD 351	JOD 702,250	JOD 14,045	JOD 14,045	JOD 35,113	JOD 35,113	JOD 70,225	JOD 870,790
		No1				Secondary		m	PIP.RH				100 - 150mm	2,707		58.5	JOD 158,360	JOD 3,167	JOD 3,167	JOD 7,918	JOD 7,918	JOD 15,836	JOD 196,366
		No1				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD
		No1				Secondary		m	PIP.RS				100 - 150mm	5,072		8.77	JOD 44,481	JOD 890	JOD 890	JOD 2,224	JOD 2,224	JOD 4,448	JOD 55,157
		No1				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		No1				Tertiary		No.	CM.N				50% Replac	96		50	JOD 4,800	JOD 96	JOD 96	JOD 240	JOD 240	JOD 480	JOD 5,952
		No1				Tertiary		No.	CP.RS				100% Restr	148		100	JOD 14,769	JOD 295	JOD 295	JOD 738	JOD 738	JOD 1,477	JOD 18,314
		No1				Tertiary		m	PIP.RH				≤ 50mm	1,401		28.6	JOD 40,081	JOD 802	JOD 802	JOD 2,004	JOD 2,004	JOD 4,008	JOD 49,701
		No1				Tertiary		m	PIP.RS				≤ 50mm	1,487		5.72	JOD 8,505	JOD 170	JOD 170	JOD 425	JOD 425	JOD 851	JOD 10,546
		No2				Secondary		m	PIP.RH				100 - 150mm	2,237		58.5	JOD 130,844	JOD 2,617	JOD 2,617	JOD 6,542	JOD 6,542	JOD 13,084	JOD 162,246
		No2				Secondary		m	PIP.RH				60 - 90mm	988		28.6	JOD 28,257	JOD 565	JOD 565	JOD 1,413	JOD 1,413	JOD 2,826	JOD 35,039
		No2				Secondary		m	PIP.RS				100 - 150mm	5,019		8.77	JOD 44,014	JOD 880	JOD 880	JOD 2,201	JOD 2,201	JOD 4,401	JOD 54,577
		No2				Secondary		m	PIP.RS				60 - 90mm	1,830		5.72	JOD 10,468	JOD 209	JOD 209	JOD 523	JOD 523	JOD 1,047	JOD 12,980
		No2				Tertiary		No.	CM.N				50% Replac	44		50	JOD 2,200	JOD 44	JOD 44	JOD 110	JOD 110	JOD 220	JOD 2,728
		No2				Tertiary		No.	CP.RS				100% Restr	68		100	JOD 6,769	JOD 135	JOD 135	JOD 338	JOD 338	JOD 677	JOD 8,394
		No2				Tertiary		m	PIP.RH				≤ 50mm	1,993		28.6	JOD 56,994	JOD 1,140	JOD 1,140	JOD 2,850	JOD 2,850	JOD 5,699	JOD 70,673
		No2				Tertiary		m	PIP.RS				≤ 50mm	2,470		5.72	JOD 14,127	JOD 283	JOD 283	JOD 706	JOD 706	JOD 1,413	JOD 17,517
		No3				Secondary		m	PIP.RH				100 - 150mm	13,707		58.5	JOD 801,837	JOD 16,037	JOD 16,037	JOD 40,092	JOD 40,092	JOD 80,184	JOD 994,278
		No3				Secondary		m	PIP.RH				60 - 90mm	38,454		28.6	JOD 1,099,781	JOD 21,996	JOD 21,996	JOD 54,989	JOD 54,989	JOD 109,978	JOD 1,363,728
		No3				Secondary		m	PIP.RS				100 - 150mm	24,674		8.77	JOD 216,388	JOD 4,328	JOD 4,328	JOD 10,819	JOD 10,819	JOD 21,639	JOD 268,321
		No3				Secondary		m	PIP.RS				60 - 90mm	48,067		5.72	JOD 274,945	JOD 5,499	JOD 5,499	JOD 13,747	JOD 13,747	JOD 27,495	JOD 340,932
		No3				Tertiary		No.	CM.N				50% Replac	1,846		50	JOD 92,300	JOD 1,846	JOD 1,846	JOD 4,615	JOD 4,615	JOD 9,230	JOD 114,452
		No3				Tertiary		No.	CP.RS				100% Restr	2,840		100	JOD 284,000	JOD 5,680	JOD 5,680	JOD 14,200	JOD 14,200	JOD 28,400	JOD 352,160
		No3				Tertiary		m	PIP.RH				≤ 50mm	38,774		28.6	JOD 1,108,932	JOD 22,179	JOD 22,179	JOD 55,447	JOD 55,447	JOD 110,893	JOD 1,375,076
		No3				Tertiary		m	PIP.RS				≤ 50mm	47,076		5.72	JOD 269,274	JOD 5,385	JOD 5,385	JOD 13,464	JOD 13,464	JOD 26,927	JOD 333,900
		No4				Secondary		m	PIP.RH				100 - 150mm	9,585		58.5	JOD 560,747	JOD 11,215	JOD 11,215	JOD 28,037	JOD 28,037	JOD 56,075	JOD 695,326
		No4				Secondary		m	PIP.RH				60 - 90mm	14,315		28.6	JOD 409,401	JOD 8,188	JOD 8,188	JOD 20,470	JOD 20,470	JOD 40,940	JOD 507,657
		No4				Secondary		m	PIP.RS				100 - 150mm	15,572		8.77	JOD 136,567	JOD 2,731	JOD 2,731	JOD 6,828	JOD 6,828	JOD 13,657	JOD 169,343
		No4				Secondary		m	PIP.RS				60 - 90mm	17,893		5.72	JOD 102,350	JOD 2,047	JOD 2,047	JOD 5,118	JOD 5,118	JOD 10,235	JOD 126,914
		No4				Tertiary		No.	CM.N				50% Replac	245		50	JOD 12,250	JOD 245	JOD 245	JOD 613	JOD 613	JOD 1,225	JOD 15,190
		No4				Tertiary		No.	CP.RS				100% Restr	377		100	JOD 37,692	JOD 754	JOD 754	JOD 1,885	JOD 1,885	JOD 3,769	JOD 46,738
		No4				Tertiary		m	PIP.RH				≤ 50mm	397		28.6	JOD 11,367	JOD 227	JOD 227	JOD 568	JOD 568	JOD 1,137	JOD 14,095
		No4				Tertiary		m	PIP.RS				≤ 50mm	450		5.72	JOD 2,576	JOD 52	JOD 52	JOD 129	JOD 129	JOD 258	JOD 3,195
		No5				Secondary		m	PIP.RH				100 - 150mm	18,776		58.5	JOD 1,098,380	JOD 21,968	JOD 21,968	JOD 54,919	JOD 54,919	JOD 109,838	JOD 1,361,991
		No5				Secondary		m	PIP.RH				60 - 90mm	26,667		28.6	JOD 762,675	JOD 15,253	JOD 15,253	JOD 38,134	JOD 38,134	JOD 76,267	JOD 945,717
		No5				Secondary		m	PIP.RS				100 - 150mm	28,488		8.77	JOD 249,840	JOD 4,997	JOD 4,997	JOD 12,492	JOD 12,492	JOD 24,984	JOD 309,801
		No5				Secondary		m	PIP.RS				60 - 90mm	34,254		5.72	JOD 195,931	JOD 3,919	JOD 3,919	JOD 9,797	JOD 9,797	JOD 19,593	JOD 242,955
		No5				Tertiary		No.	CM.N				50% Replac	1,416		50	JOD 70,775	JOD 1,416	JOD 1,416	JOD 3,539	JOD 3,539	JOD 7,078	JOD 87,761
		No5				Tertiary		No.	CP.RS				100% Restr	2,178		100	JOD 217,769	JOD 4,355	JOD 4,355	JOD 10,888	JOD 10,888	JOD 21,777	JOD 270,034
		No5				Tertiary		m	PIP.RH				≤ 50mm	31,264		28.6	JOD 894,141	JOD 17,883	JOD 17,883	JOD 44,707	JOD 44,707	JOD 89,414	JOD 1,108,735
		No5				Tertiary		m	PIP.RS				≤ 50mm	36,151		5.72	JOD 206,782	JOD 4,136	JOD 4,136	JOD 10,339	JOD 10,339	JOD 20,678	JOD 256,409
9	North		Construct new primary network pipeline	Hashmeya Reservoir additional to Hashmeya Distribution Area (300mm diameter, 3.0 km length)	3	Primary			PIP.N	5			300	3.0		JOD 130	JOD 390,000	JOD 7,800	JOD 7,800	JOD 19,500	JOD 19,500	JOD 39,000	JOD 483,600
9	North		Construct new pumping station	Hashmeya Rural Highest Levels Boosters (Target Pumping Rate 7 m3/hr)	3	Primary			PS.N	3		7				JOD 7,886	JOD 55,205	JOD 1,104	JOD 1,104	JOD 2,760	JOD 2,760	JOD 5,521	JOD 68,454
9	North		Construct new pumping station	Sukhna Highest Levels Boosters (Target Pumping Rate 7 m3/hr)	3	Primary			PS.N	4		7				JOD 7,886	JOD 55,205	JOD 1,104	JOD 1,104	JOD 2,760	JOD 2,760	JOD 5,521	JOD 68,454
9	North		Construct new reservoir	Hashmeya Additional reservoir (Distribution Storage Reservoir 1,500 m3)	3	Primary			RES.N	1	1,500					JOD 218	JOD 326,700	JOD 6,534	JOD 6,534	JOD 16,335	JOD 16,335	JOD 32,670	JOD 405,108
9	North		Construct new reservoir	Sukhna Additional reservoir (Distribution Storage Reservoir 1,000 m3)	3	Primary			RES.N	2	1,000					JOD 252	JOD 251,900	JOD 5,038	JOD 5,038	JOD 12,595	JOD 12,595	JOD 25,190	JOD 312,356
															Phase 1b	Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Secondary Network	JOD 6,325,265	JOD 126,505	JOD 126,505	JOD 316,263	JOD 316,263	JOD 632,527	JOD 7,843,329
																Tertiary Network	JOD 3,356,104	JOD 67,122	JOD 67,122	JOD 167,805	JOD 167,805	JOD 335,610	JOD 4,161,569
																Total	JOD 9,681,370	JOD 193,627	JOD 193,627	JOD 484,068	JOD 484,068	JOD 968,137	JOD 12,004,898
															Phase 2	Primary Network	JOD 2,442,135	JOD 48,843	JOD 48,843	JOD 122,107	JOD 122,107	JOD 244,214	JOD 3,028,248
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 2,442,135	JOD 48,843	JOD 48,843	JOD 122,107	JOD 122,107	JOD 244,214	JOD 3,028,248
															Phase 3	Primary Network	JOD 1,079,010	JOD 21,580	JOD 21,580	JOD 53,951	JOD 53,951	JOD 107,901	JOD 1,337,972
																Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
																Total	JOD 1,079,010	JOD 21,580	JOD 21,580	JOD 53,951	JOD 53,951	JOD 107,901	JOD 1,337,972

Overall Costs 12: 20445 Zarga WSS

Project Works Schedule 10 West-NorthWest WSA, 23/04/10

WSA ID	WSA	Distribution Area (DA)	Action	Project Element	Phase	Network	Option	Contract(units)	Code	Ref ID	Reservoir Capacity, m3	Pumping Capacity, m3/h	Pipe Diameter, mm	Quantity Pipe Length, km	No.	Unit cost, JD	Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
10	West-Northwest		Install new DMA connection point	DMA connection points	2	Primary			DMA.N	29					2	JOD 10,000	JOD 20,000	JOD 400	JOD 400	JOD 1,000	JOD 1,000	JOD 2,000	JOD 24,800
10	West-Northwest		Construct new primary network pipeline	Berein Reservoir to Um Rumanneh Reservoir/PS (200mm diameter, 3.7 km length)	2	Primary			PIP.N	17			200	3.7		JOD 97.50	JOD 360,750	JOD 7,215	JOD 7,215	JOD 18,038	JOD 18,038	JOD 36,075	JOD 447,330
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh PS to new Berein High Reservoir (200mm diameter, 2.5 km length)	2	Primary			PIP.N	18			200	2.5		JOD 97.50	JOD 243,750	JOD 4,875	JOD 4,875	JOD 12,188	JOD 12,188	JOD 24,375	JOD 302,250
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh PS to new Um Rumanneh High Reservoir (200mm diameter, 2.1 km length)	2	Primary			PIP.N	19			200	2.1		JOD 97.50	JOD 204,750	JOD 4,095	JOD 4,095	JOD 10,238	JOD 10,238	JOD 20,475	JOD 253,890
10	West-Northwest		Construct new primary network pipeline	Berein High Reservoir to Berein South Distribution (200mm diameter, 2.0 km length)	2	Primary			PIP.N	20			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Berein High Reservoir to Berein North Distribution (150mm diameter, 2.0 km length)	2	Primary			PIP.N	21			150	2.0		JOD 71.50	JOD 143,000	JOD 2,860	JOD 2,860	JOD 7,150	JOD 7,150	JOD 14,300	JOD 177,320
10	West-Northwest		Construct new primary network pipeline	Alouk PS to Alouk High Reservoir (100mm diameter, 2.5 km length)	2	Primary			PIP.N	26			100	2.5		JOD 58.50	JOD 146,250	JOD 2,925	JOD 2,925	JOD 7,313	JOD 7,313	JOD 14,625	JOD 181,350
10	West-Northwest		Construct new primary network pipeline	Sarout Reservoir to Alouk High Reservoir (150mm diameter, 3.0 km length)	2	Primary			PIP.N	27			150	3.0		JOD 71.50	JOD 214,500	JOD 4,290	JOD 4,290	JOD 10,725	JOD 10,725	JOD 21,450	JOD 265,980
10	West-Northwest		Rehabilitate existing primary network pipeline	Rehabilitate existing unsuitable primary network pipelines	2	Primary			PIP.RH	4			200-300	12.166		JOD 55.25	JOD 672,172	JOD 13,443	JOD 13,443	JOD 33,609	JOD 33,609	JOD 67,217	JOD 833,493
10	West-Northwest		Restructure Primary network pipeline	Restructure existing and rehabilitated primary network pipelines	2	Primary			PIP.RS	8			200-300	20.907		JOD 12.16	JOD 254,229	JOD 5,085	JOD 5,085	JOD 12,711	JOD 12,711	JOD 25,423	JOD 315,244
10	West-Northwest		Upgrade primary network pipeline	Merhib PS to new Merhib High Reservoir (300mm diameter, 3.7 km length)	2	Primary			PIP.U	14			300	3.7		JOD 26.00	JOD 96,200	JOD 1,924	JOD 1,924	JOD 4,810	JOD 4,810	JOD 9,620	JOD 119,288
10	West-Northwest		Upgrade primary network pipeline	Berein Reservoir to Berein East Distribution (150mm diameter, 2.0 km length)	2	Primary			PIP.U	22			150	2.0		JOD 14.30	JOD 28,600	JOD 572	JOD 572	JOD 1,430	JOD 1,430	JOD 2,860	JOD 35,464
10	West-Northwest		Construct new pumping station	Um Rumanneh PS (to new Berein High Reservoir and new Um Rumanneh High Reservoir - Target Pumping Rate 90 m3/hr)	2	Primary			PS.N	11		90				JOD 3,667	JOD 330,000	JOD 6,600	JOD 6,600	JOD 16,500	JOD 16,500	JOD 33,000	JOD 409,200
10	West-Northwest		Construct new pumping station	Alouk PS (to new Alouk High Reservoir - Target Pumping Rate 5 m3/hr)	2	Primary			PS.N	13		5				JOD 10,000	JOD 50,000	JOD 1,000	JOD 1,000	JOD 2,500	JOD 2,500	JOD 5,000	JOD 62,000
10	West-Northwest		Upgrade existing pumping station	Merhib PS (to new Merhib High Reservoir - Target Pumping Rate 105 m3/hr)	2	Primary			PS.U	9		105				JOD 3,149	JOD 330,660	JOD 6,613	JOD 6,613	JOD 16,533	JOD 16,533	JOD 33,066	JOD 410,018
10	West-Northwest		Construct new reservoir	Berein High Reservoir (Distribution Storage Reservoir 300 m3)	2	Primary			RES.N	5	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Upgrade existing reservoir	Merhib Reservoir (Flow-Balancing Storage Reservoir 1,000 m3)	2	Primary			RES.U	1	1,000					JOD 48	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
10	West-Northwest		Upgrade existing reservoir	Berein Reservoir (Distribution and Flow-Balancing Reservoir 1,000 m3)	2	Primary			RES.U	3	1,000					JOD 48	JOD 47,861	JOD 957	JOD 957	JOD 2,393	JOD 2,393	JOD 4,786	JOD 59,348
10	West-Northwest		Upgrade existing reservoir	Um Rumanneh Reservoir (Flow-Balancing Storage Reservoir 500 m3)	2	Primary			RES.U	4	500					JOD 74	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
10	West-Northwest		Upgrade existing reservoir	Sarout Reservoir (Distribution and Flow-Balancing Storage Reservoir 400 m3)	2	Primary			RES.U	7	400					JOD 92	JOD 36,960	JOD 739	JOD 739	JOD 1,848	JOD 1,848	JOD 3,696	JOD 45,830
		We1				Secondary		m	PIP.RH				100 - 150mm	2.961		58.5	JOD 173,244	JOD 3,465	JOD 3,465	JOD 8,662	JOD 8,662	JOD 17,324	JOD 214,822
		We1				Secondary		m	PIP.RH				60 - 90mm	4.998		28.6	JOD 142,953	JOD 2,859	JOD 2,859	JOD 7,148	JOD 7,148	JOD 14,295	JOD 177,261
		We1				Secondary		m	PIP.RS				100 - 150mm	5.923		8.77	JOD 51,944	JOD 1,039	JOD 1,039	JOD 2,597	JOD 2,597	JOD 5,194	JOD 64,410
		We1				Secondary		m	PIP.RS				60 - 90mm	9.997		5.72	JOD 57,181	JOD 1,144	JOD 1,144	JOD 2,859	JOD 2,859	JOD 5,718	JOD 70,905
		We1				Tertiary		No.	CM.N				50% Replac	133		50	JOD 6,650	JOD 133	JOD 133	JOD 333	JOD 333	JOD 665	JOD 8,246
		We1				Tertiary		No.	CP.RS				100% Restr	205		100	JOD 20,462	JOD 409	JOD 409	JOD 1,023	JOD 1,023	JOD 2,046	JOD 25,372
		We1				Tertiary		m	PIP.RH				≤ 50mm	5.998		28.6	JOD 171,553	JOD 3,431	JOD 3,431	JOD 8,578	JOD 8,578	JOD 17,155	JOD 212,726
		We1				Tertiary		m	PIP.RS				≤ 50mm	7.498		5.72	JOD 42,888	JOD 858	JOD 858	JOD 2,144	JOD 2,144	JOD 4,289	JOD 53,182
		We2				Secondary		m	PIP.RH				100 - 150mm	14.917		58.5	JOD 872,634	JOD 17,453	JOD 17,453	JOD 43,632	JOD 43,632	JOD 87,263	JOD 1,082,066
		We2				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We2				Secondary		m	PIP.RS				100 - 150mm	26.014		8.77	JOD 228,145	JOD 4,563	JOD 4,563	JOD 11,407	JOD 11,407	JOD 22,815	JOD 282,900
		We2				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We2				Tertiary		No.	CM.N				50% Replac	243		50	JOD 12,125	JOD 243	JOD 243	JOD 606	JOD 606	JOD 1,213	JOD 15,035
		We2				Tertiary		No.	CP.RS				100% Restr	373		100	JOD 37,308	JOD 746	JOD 746	JOD 1,865	JOD 1,865	JOD 3,731	JOD 46,262
		We2				Tertiary		m	PIP.RH				≤ 50mm	13.518		28.6	JOD 386,626	JOD 7,733	JOD 7,733	JOD 19,331	JOD 19,331	JOD 38,663	JOD 479,416
		We2				Tertiary		m	PIP.RS				≤ 50mm	16.898		5.72	JOD 96,657	JOD 1,933	JOD 1,933	JOD 4,833	JOD 4,833	JOD 9,666	JOD 119,854
		We3				Secondary		m	PIP.RH				100 - 150mm	12.265		58.5	JOD 717,490	JOD 14,350	JOD 14,350	JOD 35,874	JOD 35,874	JOD 71,749	JOD 889,687
		We3				Secondary		m	PIP.RH				60 - 90mm	979		28.6	JOD 27,990	JOD 560	JOD 560	JOD 1,400	JOD 1,400	JOD 2,799	JOD 34,708
		We3				Secondary		m	PIP.RS				100 - 150mm	22.904		8.77	JOD 200,869	JOD 4,017	JOD 4,017	JOD 10,043	JOD 10,043	JOD 20,087	JOD 249,077
		We3				Secondary		m	PIP.RS				60 - 90mm	1,957		5.72	JOD 11,196	JOD 224	JOD 224	JOD 560	JOD 560	JOD 1,120	JOD 13,883
		We3				Tertiary		No.	CM.N				50% Replac	316		50	JOD 15,775	JOD 316	JOD 316	JOD 789	JOD 789	JOD 1,578	JOD 19,561
		We3				Tertiary		No.	CP.RS				100% Restr	485		100	JOD 48,538	JOD 971	JOD 971	JOD 2,427	JOD 2,427	JOD 4,854	JOD 60,188
		We3				Tertiary		m	PIP.RH				≤ 50mm	24.845		28.6	JOD 710,566	JOD 14,211	JOD 14,211	JOD 35,528	JOD 35,528	JOD 71,057	JOD 881,102
		We3				Tertiary		m	PIP.RS				≤ 50mm	31.056		5.72	JOD 177,642	JOD 3,553	JOD 3,553	JOD 8,882	JOD 8,882	JOD 17,764	JOD 220,275
		We4				Secondary		m	PIP.RH				100 - 150mm	5.101		58.5	JOD 298,382	JOD 5,968	JOD 5,968	JOD 14,919	JOD 14,919	JOD 29,838	JOD 369,993
		We4				Secondary		m	PIP.RH				60 - 90mm	-		28.6	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We4				Secondary		m	PIP.RS				100 - 150mm	6.806		8.77	JOD 59,689	JOD 1,194	JOD 1,194	JOD 2,984	JOD 2,984	JOD 5,969	JOD 74,015
		We4				Secondary		m	PIP.RS				60 - 90mm	-		5.72	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
		We4				Tertiary		No.	CM.N				50% Replac	96		50	JOD 4,775	JOD 96	JOD 96	JOD 239	JOD 239	JOD 478	JOD 5,921
		We4				Tertiary		No.	CP.RS				100% Restr	147		100	JOD 14,692	JOD 294	JOD 294	JOD 735	JOD 735	JOD 1,469	JOD 18,218
		We4				Tertiary		m	PIP.RH				≤ 50mm	11.927		28.6	JOD 341,112	JOD 6,822	JOD 6,822	JOD 17,056	JOD 17,056	JOD 34,111	JOD 422,979
		We4				Tertiary		m	PIP.RS				≤ 50mm	14.909		5.72	JOD 85,278	JOD 1,706	JOD 1,706	JOD 4,264	JOD 4,264	JOD 8,528	JOD 105,745
		We5				Secondary		m	PIP.RH				100 - 150mm	7.509		58.5	JOD 439,278	JOD 8,786	JOD 8,786	JOD 21,964	JOD 21,964	JOD 43,928	JOD 544,705
		We5				Secondary		m	PIP.RH				60 - 90mm	537		28.6	JOD 15,349	JOD 307	JOD 307	JOD 767	JOD 767	JOD 1,535	JOD 19,033
		We5				Secondary		m	PIP.RS				100 - 150mm	11.501		8.77	JOD 100,868	JOD 2,017	JOD 2,017	JOD 5,043	JOD 5,043	JOD 10,087	JOD 125,076
		We5				Secondary		m	PIP.RS				60 - 90mm	671		5.72	JOD 3,837	JOD 77	JOD 77	JOD 192	JOD 192	JOD 384	JOD 4,758
		We5				Tertiary		No.	CM.N				50% Replac	303		50	JOD 15,125	JOD 303	JOD 303	JOD 756	JOD 756	JOD 1,513	JOD 18,755
		We5				Tertiary		No.	CP.RS				100% Restr	465		100	JOD 46,538	JOD 931	JOD 931	JOD 2,327	JOD 2,327	JOD 4,654	JOD 57,708
		We5				Tertiary		m	PIP.RH				≤ 50mm	35.892		28.6	JOD 1,026,523	JOD 20,530	JOD 20,530	JOD 51,326	JOD 51,326	JOD 102,652	JOD 1,272,888
		We5				Tertiary		m	PIP.RS				≤ 50mm	44.866		5.72	JOD 256,631	JOD 5,133	JOD 5,133	JOD 12,832	JOD 12,832	JOD 25,663	JOD 318,222
		We6				Secondary		m	PIP.RH				100 - 150mm	8.607		58.5	JOD 503,519	JOD 10,070	JOD 10,070	JOD 25,176	JOD 25,176	JOD 50,352	JOD 624,363
		We6				Secondary		m	PIP.RH				60 - 90mm	1.283		28.6	JOD 36,681	JOD 734	JOD 734	JOD 1,834	JOD 1,834	JOD 3,668	JOD 45,485
		We6				Secondary		m	PIP.RS				100 - 150mm	17.214		8.77	JOD 150,970	JOD 3,019	JOD 3,019	JOD 7,548	JOD 7,548	JOD 15,097	JOD 187,202
		We6				Secondary		m	PIP.RS				60 - 90mm	1.603		5.72	JOD 9,170	JOD 183	JOD 183	JOD 459	JOD 459	JOD 917	JOD 11,371
		We6				Tertiary		No.	CM.N				50% Replac	89		50	JOD 4,425	JOD 89	JOD 89	JOD 221	JOD 221	JOD 443	JOD 5,487
		We6				Tertiary		No.	CP.RS				100% Restr	136		100	JOD 13,615	JOD 272	JOD 272	JOD 681	JOD 681	JOD 1,362	JOD 16,883
		We6				Tertiary		m	PIP.RH				≤ 50mm	1.310		28.6	JOD 37,463	JOD 749	JOD 749	JOD 1,873	JOD 1,873	JOD 3,746	JOD 46,454
		We6				Tertiary		m	PIP.RS				≤ 50mm	1.637		5.72	JOD 9,366	JOD 187	JOD 187	JOD 468	JOD 468	JOD 937	JOD 11,614
10	West-Northwest		Construct new primary network pipeline	Inlet-Outlet branch pipework to new Merhib High Reservoir (300mm diameter, 1.0 km length)	3	Primary			PIP.N	15			300	1.0		JOD 130.00	JOD 130,000	JOD 2,600	JOD 2,600	JOD 6,500	JOD 6,500	JOD 13,000	JOD 161,200
10	West-Northwest		Construct new primary network pipeline	Merhib High Reservoir to Merhib Distribution (200mm diameter, 2.0 km length)	3	Primary			PIP.N	23			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Um Rumanneh High Reservoir to Um Rumanneh Distribution (200mm diameter, 2.0 km length)	3	Primary			PIP.N	24			200	2.0		JOD 97.50	JOD 195,000	JOD 3,900	JOD 3,900	JOD 9,750	JOD 9,750	JOD 19,500	JOD 241,800
10	West-Northwest		Construct new primary network pipeline	Alouk High Reservoir Alouk Distribution (150mm diameter, 2.3 km length)	3	Primary			PIP.N	28			150	2.3		JOD 71.50	JOD 164,450	JOD 3,289	JOD 3,289	JOD 8,223	JOD 8,223	JOD 16,445	JOD 203,918
10	West-Northwest		Upgrade primary network pipeline	New Merhib High Reservoir/PS to Berein Reservoir (300mm diameter, 2.9 km length)	3	Primary			PIP.U	16			300	2.9		JOD 26.00	JOD 75,400	JOD 1,508	JOD 1,508	JOD 3,770	JOD 3,770	JOD 7,540	JOD 93,496
10	West-Northwest		Construct new pumping station	Berein Highest Levels Boosters (Target Pumping Rate 5 m3/hr)	3	Primary			PS.N	5		5				JOD 6,490	JOD 32,450	JOD 649	JOD 649	JOD 1,623	JOD 1,623	JOD 3,245	JOD 40,238
10	West-Northwest		Construct new pumping station	Um Rumanneh Highest Levels Boosters (Target Pumping Rate 5 m3/hr)	3	Primary			PS.N	6		5				JOD 6,490	JOD 32,450	JOD 649	JOD 649	JOD 1,623	JOD 1,623	JOD 3,245	JOD 40,238
10	West-Northwest		Construct new pumping station	Merhib High Reservoir PS (to existing Berein Reservoir - Target Pumping Rate 90 m3/hr)	3	Primary			PS.N	10		90				JOD 3,667	JOD 330,000	JOD 6,600	JOD 6,600	JOD 16,500	JOD 16,500	JOD 33,000	JOD 409,200
10	West-Northwest		Construct new reservoir	Merhib High Reservoir (Distribution and Flow-Balancing Storage Reservoir 300 m3)	3	Primary			RES.N	2	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Construct new reservoir	Um Rumanneh High Reservoir (Distribution Storage Reservoir 300 m3)	3	Primary			RES.N	6	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491
10	West-Northwest		Construct new reservoir	Alouk High Reservoir (Distribution Storage Reservoir 300 m3)	3	Primary			RES.N	8	300					JOD 370	JOD 110,880	JOD 2,218	JOD 2,218	JOD 5,544	JOD 5,544	JOD 11,088	JOD 137,491

		Infrastructure cost, JD	ESI mitigation @ 2.0%, JD	Physical contingencies @ 2.0%, JD	Price contingencies @ 5%, JD	MCC management @ 5%, JD	Engineering and project management @ 10%	Total cost, JD
Phase 1b	Primary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Secondary Network	JOD 4,101,389	JOD 82,028	JOD 82,028	JOD 205,069	JOD 205,069	JOD 410,139	JOD 5,085,722
	Tertiary Network	JOD 3,582,333	JOD 71,647	JOD 71,647	JOD 179,117	JOD 179,117	JOD 358,233	JOD 4,442,093
	Total	JOD 7,683,722	JOD 153,674	JOD 153,674	JOD 384,186	JOD 384,186	JOD 768,372	JOD 9,527,815
Phase 2	Primary Network	JOD 3,570,383	JOD 71,408	JOD 71,408	JOD 178,519	JOD 178,519	JOD 357,038	JOD 4,427,274
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 3,570,383	JOD 71,408	JOD 71,408	JOD 178,519	JOD 178,519	JOD 357,038	JOD 4,427,274
Phase 3	Primary Network	JOD 1,487,390	JOD 29,748	JOD 29,748	JOD 74,370	JOD 74,370	JOD 148,739	JOD 1,844,364
	Secondary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Tertiary Network	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -	JOD -
	Total	JOD 1,487,390	JOD 29,748	JOD 29,748	JOD 74,370	JOD 74,370	JOD 148,739	JOD 1,844,364