# WATER LEAKAGE SUMMIT Middle East 2012

# Exploring new and developing technologies

Watch Leak Management System and GIS

to

Optmise municipal water Leakage Management

Khalid Ismail, Project Manager November 21, 2012



#### Introduction

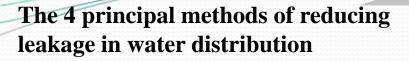
- Founded in Riyadh since 1990 (22yrs)
- Head Office in Riyadh, Branch offices in Jeddah, Dammam/AlKhobar, Al Ahsa, Madinah, Abha and Tabuk.
- Specialised in No-Dig Water Leak detection and Test and Repair for Water & Sewer Networks (Pipelines Inspection and Rehabilitation).
- IAC have morethan 400 employees.



## **IWA Standard Water Balance**

		Billed Authorized	Billed Metered Consumption	Revenue	
	Authorized	Consumption	Billed Unmetered Consumption	Water	
	Consumption	Unbilled Authorized	Unbilled Metered Consumption		
System		Consumption	Unbilled Unmetered Consumption		
Input		Apparent	Unauthorized Consumption	Non	
Volume		(commercial) Losses	Customer Meter Inaccuracies and Data Handling Errors	Revenue	
	Water Losses	Real (physical) Losses	Leakage on Transmission and Distribution Mains	Water	
			Leakage and Overflows at Storage Tanks		
			Leakage on Service Connections up to point of Customer Meter		





Pressure Management

Speed and Quality of Repairs Unavoidable Annual Real Losses (UARL)

Current Annual Real Losses (CARL)

Active Leakage Control

Pipeline and
Assets
Management:
Selection,
Installation,
Maintenance,
Renewal,
Replacement



## DMZ / DMA Approach

- ☐ Water Auditing process is an effective tool available to utilities to quantify consumption and losses that occur in the distribution system.
- ☐ Sectoring the water distribution system by establishing pressure zones and DMAs become common and it has become a highly useful techniques for monitoring the occurrence of customer consumptions and leakages.
- **☐** Use latest technologies.

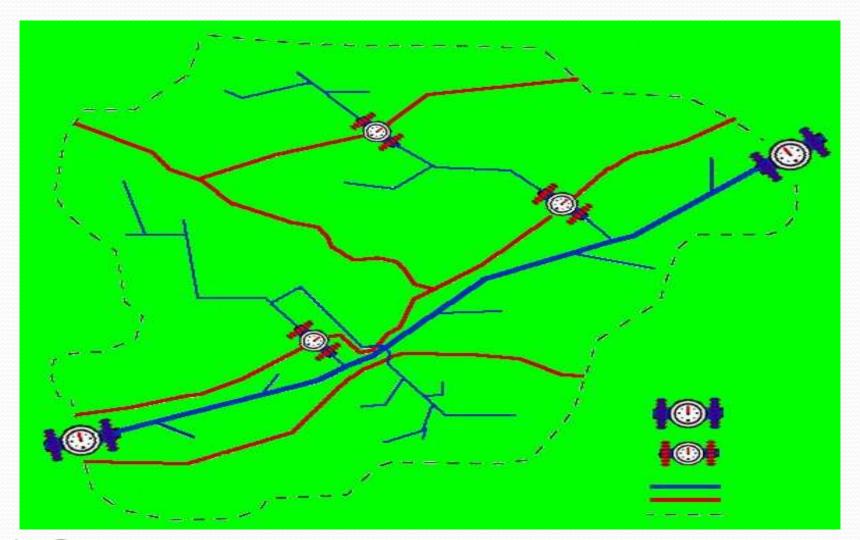


## **Zone (DMZ or DMA) Monitoring**

- **□** Volume of water
- ☐ Cost of lost water
- ☐ Prioritizing system
- ☐ Allows the operator to focus leak location effort to give most benefit

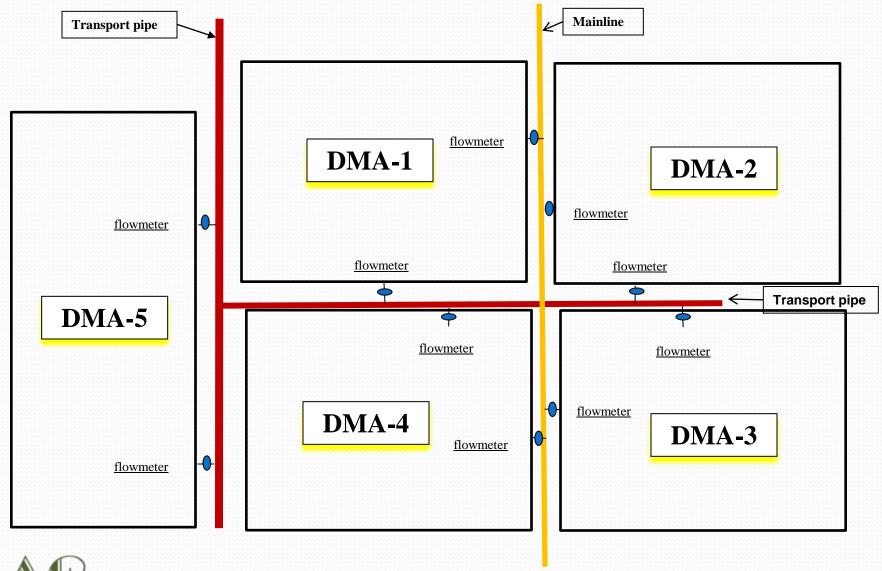


# **District Metered Area (DMA)**





# Typical District Metered Area (DMA) Design





## **Establishing a Standard Water Balance of DMA**

- Step 1 Determining system input volume
- Step 2 Determining authorized consumption
- Step 3 Estimating apparent losses
- Step 4 Calculating real losses
- Step 5 Quantifying real loss components



# The Water Solution for Remote Readings





## Electromagnetic Flowmeter Installation







## **Pressure Management**

- Pressure Management Area (PMA)
- (One-off) Reduction in Leakage
- Design within DMA

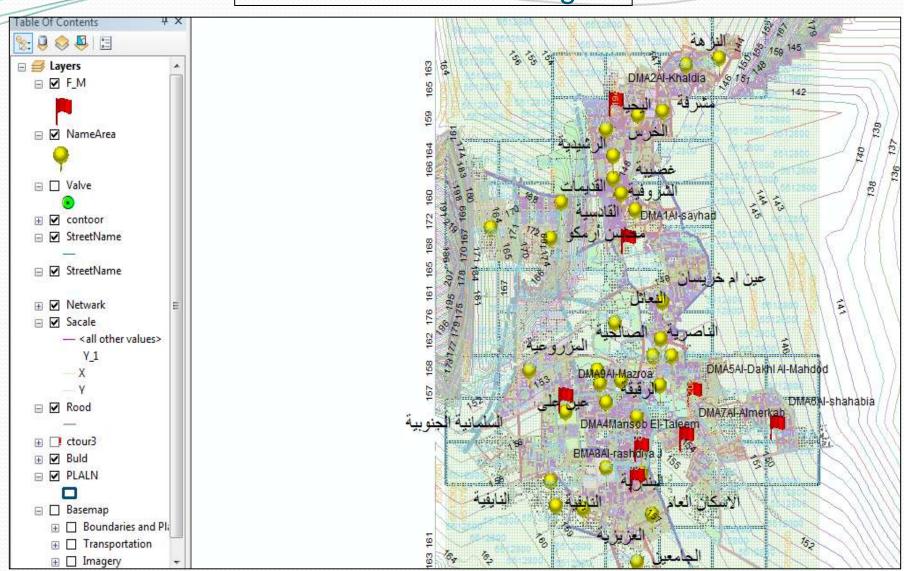




**Pressure Relief Valves** 

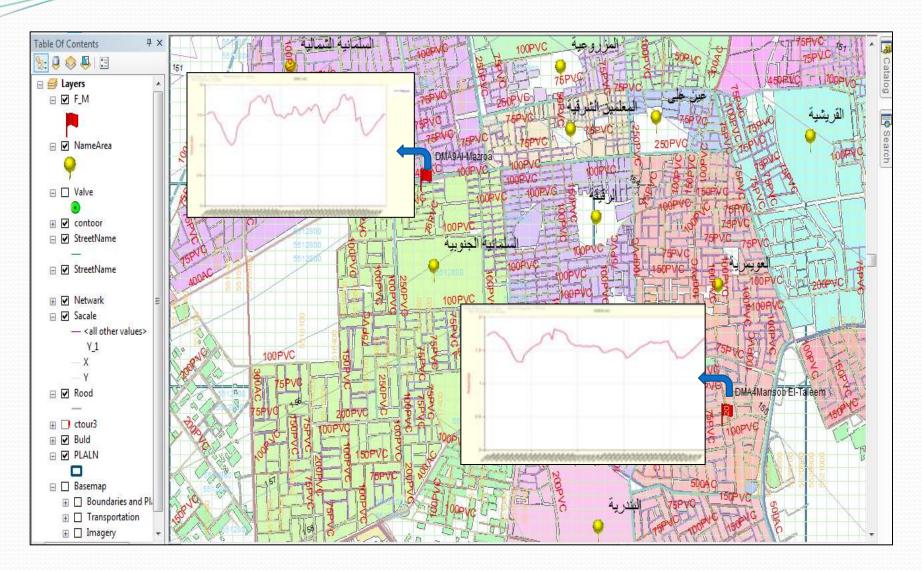


## **Pressure Monitoring**



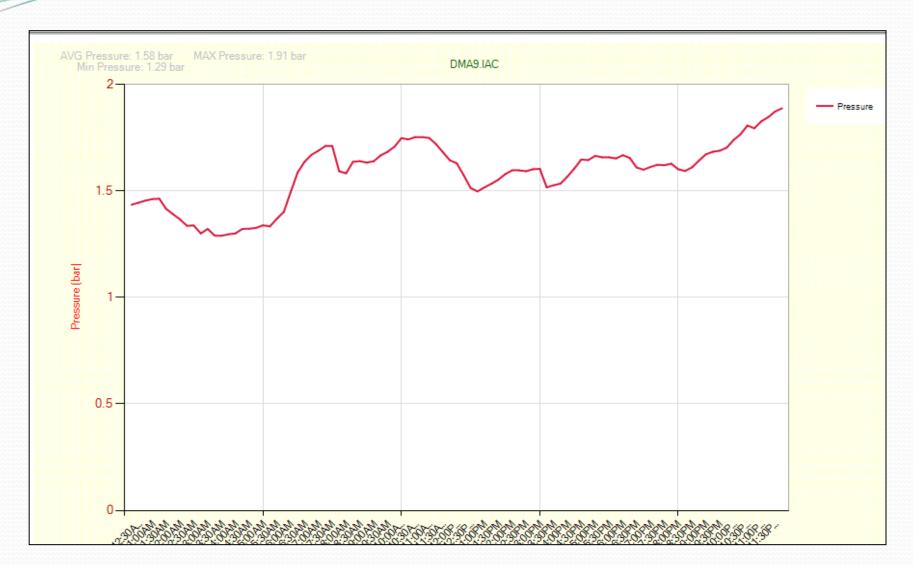


# **Pressure Monitoring**





# **Pressure Monitoring**

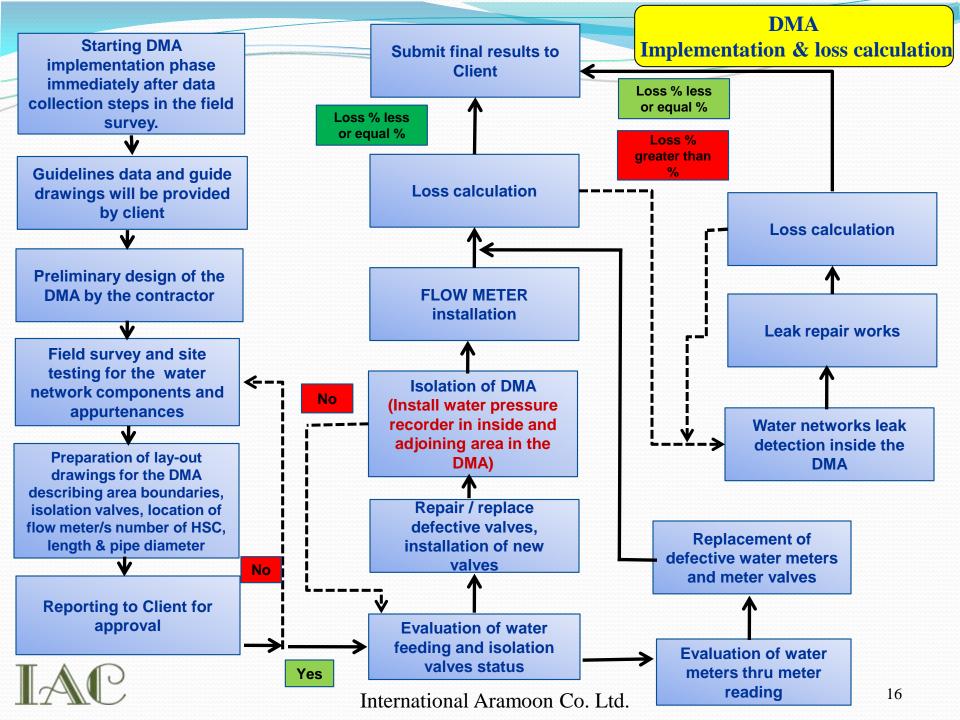




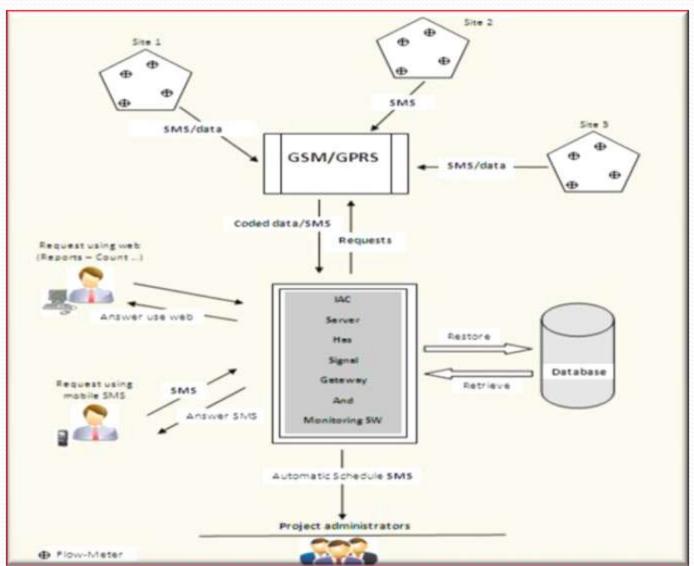
## **Active Leakage Control**

- Leakage monitoring (zones)
- Analysis of data
- Leak detection programs:
  - leak localizing (noise loggers)
  - survey (correlator/sounding)
  - leak location





# **System Overview**





## **Advantages**



Program to monitor all changes in the water network (flow and pressures, etc.) for selected points in the network. Analysis and recall data in the form of reports to help in decision making.

- 1. The program works as a web-based application, whether internal network or through the internet at the same time.
- 2. Details of the work of great powers to the users both in the pages or only certain zones.
- 3. Data to accommodate an infinite number of years and readings stored and retrieved at any time
- 4. Export all reports directed by the program to the office programs like Word, Excel and thus can make adjustments before printing



## **Watch Leak Operations**

- 1 Network Map
  - Delivers advanced functionality for GIS
- 8 Remote Reading Status
  Send reports for any defect (Data Logger)

2 Flow & Pressure

Continuous Monitoring for water distribution systems (Data & Graph)



7 Alarm

Warnings issued by the meter

3 Water Supply

DMZ & DMA (Data & Graph)

6 Continuous Losses Monitoring
Automatically for the DMA daily,
Monthly, yearly

4 Losses Calculation

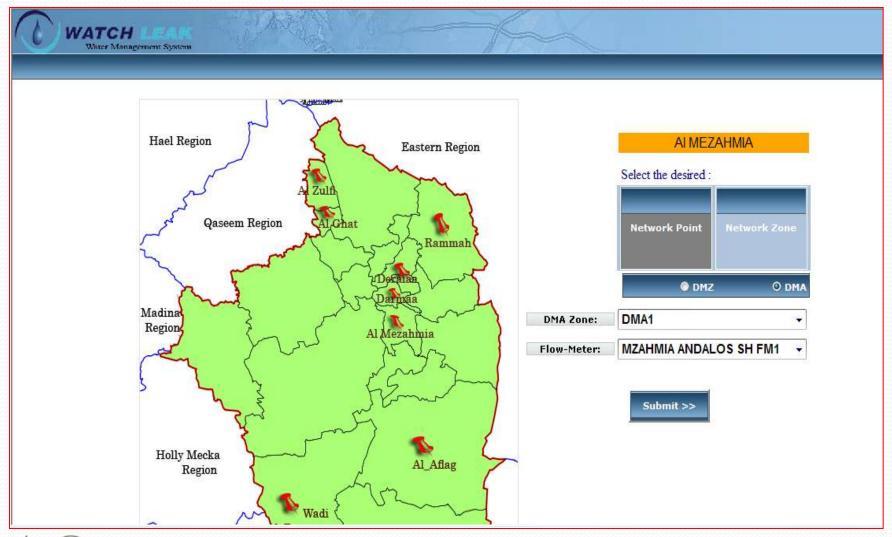
Automatically for the DMA stored in the system

5 Leak Test

Actual Leak Test for DMA including Step Test



# Easy Access DMZ & DMA Logging



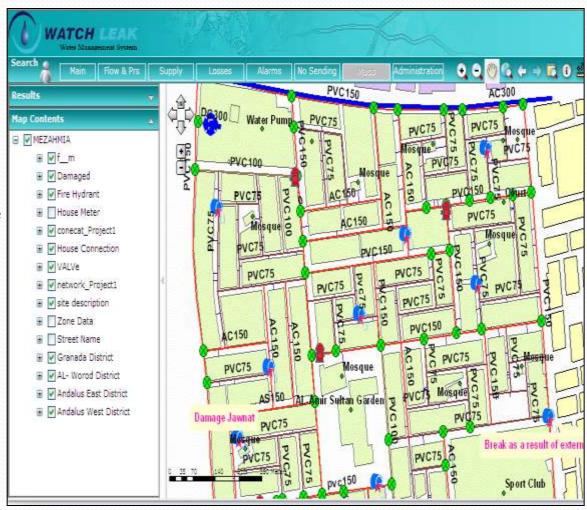


## **Network Map**

#### **GIS Integration**

- ☐ Geographic information System (GIS) on the points and lengths of pipes and their actual locations and all components of the network up to date
- ☐ Compatible with (ARC GIS) and provided the full control of all the information about the network in the form of maps up to date
- ☐ Adding of variables on the grid in the area map designated as an example of knowledge of breaks and the dates of repair & reform of existing company, etc. through a constantly updated map of the area
- **☐** Networks Maintenance Schedule

#### **GIS File**





## **Reporting & Alarms**

- 1.0 Flow & Pressure
  - a) Daily / Weekly / Monthly of each DMA
  - b) Entire DMZ in a chart
  - 2.0 Water Supply
    - a) Daily / Weekly / Monthly of each DMA
    - b) Entire DMZ in a chart
    - 3.0 Water Balance
      - a) Each DMA water supply and use
      - b) Entire DMZ water supply and use



## Alarms

#### Anternational Aramoon Corp. II من المناويط المناط المناويط المناط No - Dig Test & Repair for Water & Sewer Network



Flow-Meter MZAHMIA DMZ Sim: +966563855803

From: :1/12/2010 31/12/2010

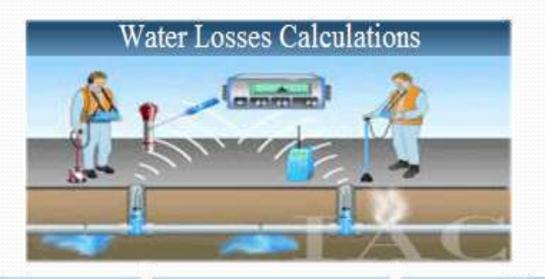
#### Flow-Meter Sending Status

8	Day	Flow	Pressure	Total	
1	01/12/2010	OK	ОК	ОК	
2	02/12/2010	OK	DK		
3	03/12/2010	OK	OK	OK	
4	04/12/2010	OK	OK	OK.	
5	05/12/2010	OK	OK	OK	
6	06/12/2010	OK	OK	OK.	
7	07/12/2010	OK	DK	OK	
8	08/12/2010	OK	DK	OK	
9	09/12/2010	OK	DK	OK	
10	10/12/2010	OK	DK	OK	
11	11/12/2010	OK	DK	OK.	
12	12/12/2010	OK	DK	OK.	
13	13/12/2010	OK	OK	OK	
14	14/12/2010	-	-	-	
15	15/12/2010	-	-	-	
16	16/12/2010	-			
17	17/12/2010	-	-	-	
18	18/12/2010	-	-	-	
19	19/12/2010	-	-	-	
20	20/12/2010	-	-	-	
21	21/12/2010	•	-	•	
22	22/12/2010	-		-	
23	23/12/2010	-	-	-	
24	24/12/2010	_	-	-	
25	25/12/2010	-		-	
26	26/12/2010	_	-	-	
27	27/12/2010	-			
28	28/12/2010	-	-		
29	29/12/2010	-	-	-	
30	30/12/2010	-		-	
31	31/12/2010	-	-		
Page 1 of 1 Print Date					



Print Date: 13/12/2010

#### **Water Losses Calculation**



Consumption

RLK

**AVG Flow** 

customers' consumption using minimum flow

using total water supply and (Rate of Loss per Kilometer) using the AVG flow for the

zone and the minimum flow



## **Losses Calculation**



Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
<u>5</u>	6	Z	8	9	10	11
12	13	14	<u>15</u>	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	Z	8

Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
<u>5</u>	6	Z	8	9	10	11
12	<u>13</u>	14	<u>15</u>	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

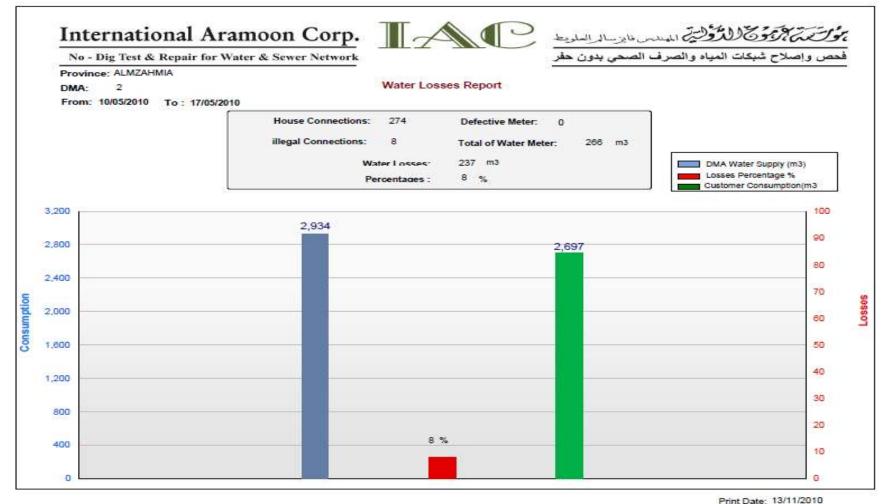
Analysis >
Total Water Supply: 2750 m3
Manual Customers consumption
2120 m3
Automatic

Get Report



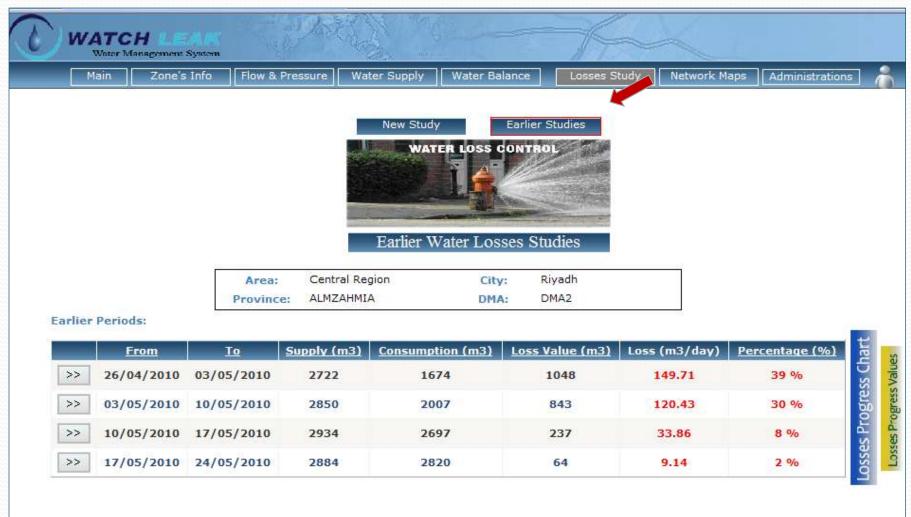
## **Cont/. Losses Calculation**

## **Consumption Method**





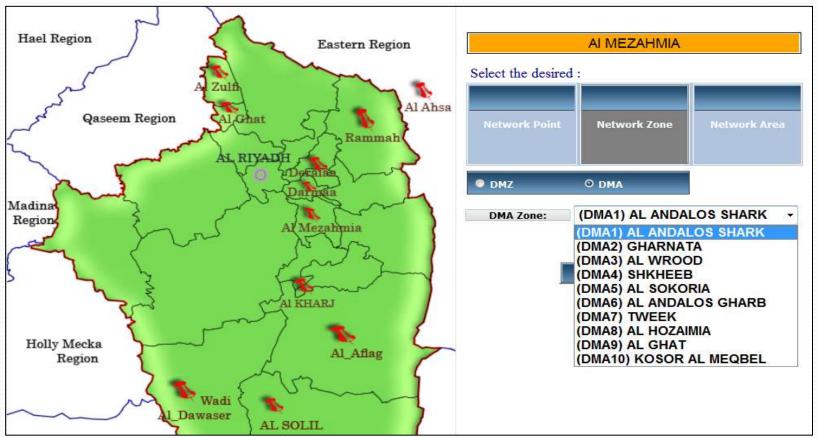
### **Cont/. Losses Calculation**





## **CASE STUDY**

#### One (DMZ) 10 DMA





#### One (DMZ)

#### (DMZ)&(DMA) Water Balance

#### International Aramoon Corp.

No - Dig Yest & Repoir for Water & Sewer Network

LAC

مَوْلَ مَنْ الْأَوْلُ لَلْدُوْلِيِّ نَهِنَدِرِ عَالِرِ السَّرِيطِ فَعِينَ وَالْسَرِيطِ لَسَمِي بِنُونِ هِلْرَ فعص واسلاح شيئات العياد والصرف الصحى بنون هذ

Province: ALMZAHMIA

From: \$10/2011 To : \$1/10/2011 DMZ/DMA Water Balance Data Sheet

Zone	Туре	Total Water Supply (m3)	Daily Water Supply (m3)
MZAHWIA DMZ	DMZ	147070.00	4744.19
DMAs Total	DMAs Total	138015.00	4452.10
(DMA1) AL ANDALOS SHARK	DMA	9386.00	302.77
(DMA2) GHARNATA	DMA	14013:00	452.03
(DMA3) AL WROCO	DMA	12951,00	414.55
(DMA4) SHKHEEB	DMA	6723.00	216.87
(DMA5) AL SOKORIA	DMA	27488.00	886.71
(DMA6) AL ANDALOS GHARS	DMA	23705.00	764,68
(DMA7) TWEEK	DMA	1965.00	44.03
(DMA8) AL HOZAMIA	DMA	12766.00	411/81
(DMAS) AL GHAT	DMA	11900.00	383.87
(DMA10) KOSOR AL MEGBEL	DMA	17818.00	574.77

Total Diff. Between DMZs total and DMAs total is: 9055.00 m3

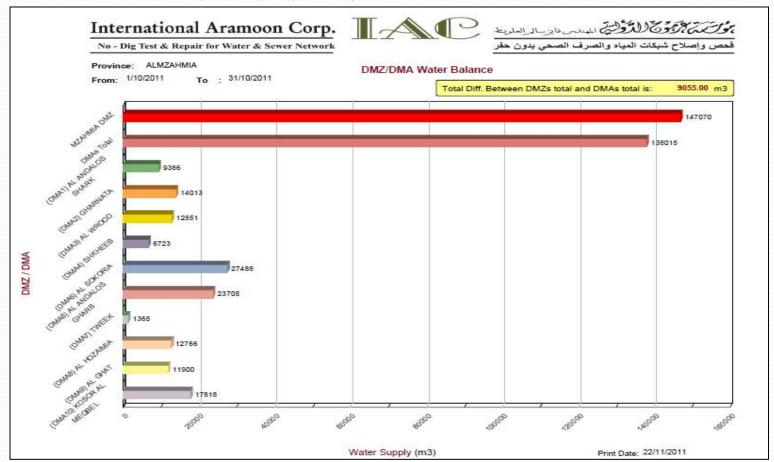
Average Daily Water Supply is: 292.10 m3



## **CASE STUDY**

One (DMZ) 10 DMA

#### (DMZ)&(DMA) Water Balance







## **Thank You**

