



# Δ.Ε.Υ.Α.Λ.

Δημοτική Επιχείρηση Ύδρευσης - Αποχέτευσης Λιβαδειάς

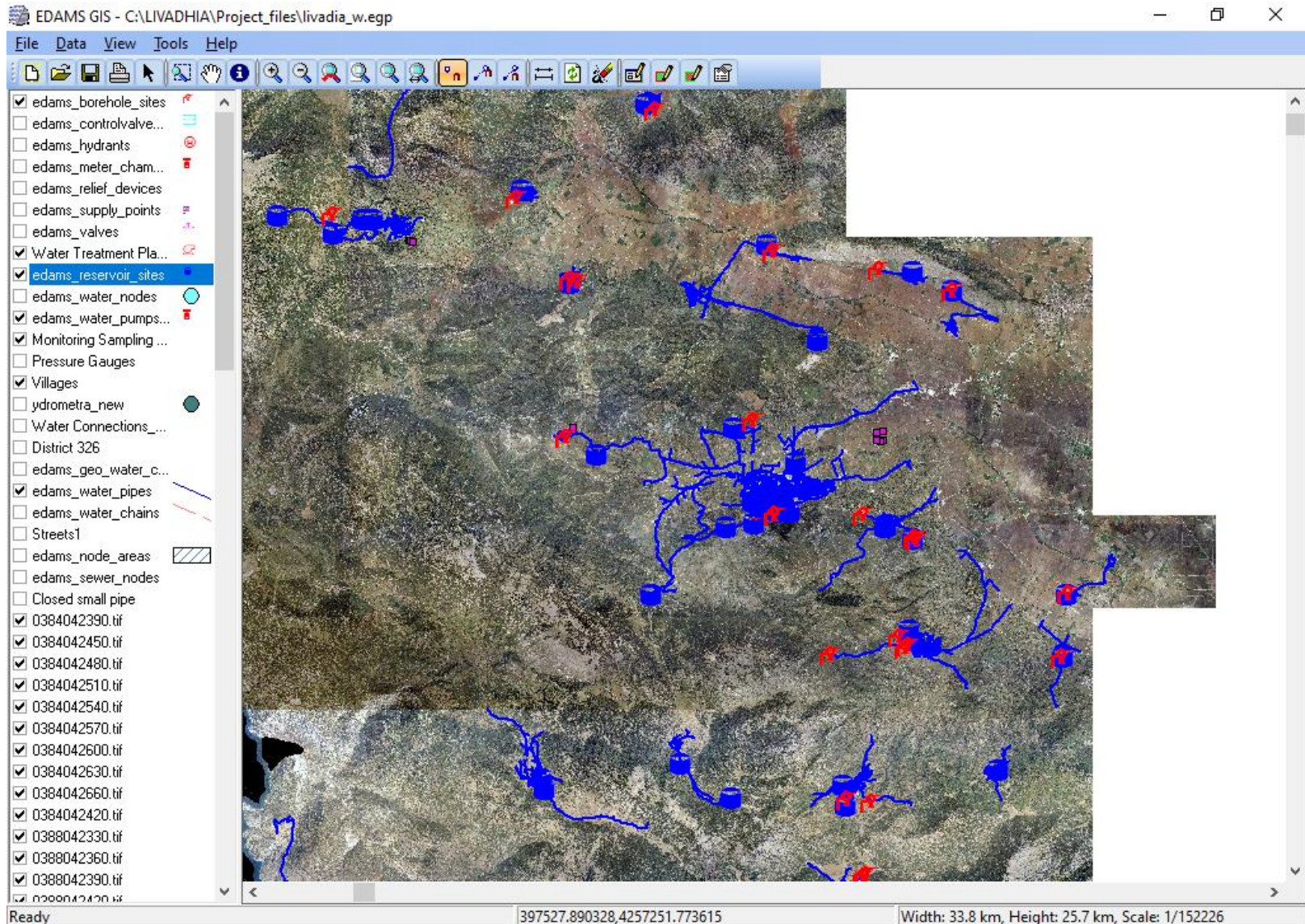
- ΖΩΝΟΠΟΙΗΣΗ ΔΙΚΤΥΩΝ ΥΔΡΕΥΣΗΣ
- ΜΕΘΟΔΟΣ TOP DOWN / ΥΔΑΤΙΚΟ ΙΣΟΖΥΓΙΟ
- ΠΑΡΑΔΕΙΓΜΑ ΕΦΑΡΜΟΓΗΣ

**ΧΡΗΣΤΟΣ ΜΠΙΜΗΣ**  
**ΓΕΝ. Δ/ΝΤΗΣ ΔΕΥΑ ΛΙΒΑΔΕΙΑΣ**



# ΔΙΑΧΕΙΡΙΣΗ ΤΕΧΝΙΚΩΝ ΔΕΔΟΜΕΝΩΝ

## ΔΗΜΙΟΥΡΓΙΑ ΒΑΣΗΣ ΔΕΔΟΜΕΝΩΝ ΤΩΝ ΥΠΟΔΟΜΩΝ



# ΔΙΑΧΕΙΡΙΣΗ ΤΕΧΝΙΚΩΝ ΔΕΔΟΜΕΝΩΝ

# ΔΗΜΙΟΥΡΓΙΑ ΒΑΣΗΣ ΔΕΔΟΜΕΝΩΝ ΤΩΝ ΥΠΟΔΟΜΩΝ

The screenshot displays the EDAMS software interface for managing technical data of infrastructure. The main window is titled "Water Pipe 2192 - Water Pipe 2192". It features several tabs: Location, Logs, Condition Assessment, Valuation Information, History, and Editing History. Below these are sub-tabs: Main, Graphical, Connections, Spatial Relate, General, Losses, and Consumption Analysis.

The left sidebar shows the "Elements Hierarchical View" tree, listing various infrastructure elements such as Reservoir Sites (e.g., "Δ.Δ. ΚΥΡΙΑΚΙΟΥ/ΚΑΡΥΩΤΗΣ - ΚΕΝΤΡΙΚΗ Δ/Σ 'ΚΑΡΥΩΤΗ - ΤΑΡΣΟΥ' (Reservoir Site 56)"), Water Pumpstations (e.g., "Antliostasio Xamilis Zonis (Water Pumpstation 1)"), and Control Valve Chambers (e.g., "Ctrl Valve Chamber 3 (Control Valve Chamber 3)").

The main area shows the properties of the selected "Water Pipe 2192". The "Material Type" is "Steel - B". The "Diameter" is "264 mm", the "Nominal Diam." is "250 mm", and the "Thickness" is "4.0 mm". The "Pressure" is "0.000 m". The "Lining" section shows "Lining type: no lining" and "Lining material:".

The right side of the interface shows a toolbar with various infrastructure elements, each with a corresponding icon and keyboard shortcut:

- Sewer Node (Ctrl + N) Ctrl+N
- Sewer Chain (Ctrl + C) Ctrl+C
- Manhole Area
- Sewer (Ctrl + S) Ctrl+S
- Conduit
- Pump Line
- Manhole
- Sewer Pumpstation
- Storage Pond
- Treatment Works
- Geo Sewer Connection
- Gully And Connection
- Gully
- Isolation Structures
- Sampling Point
- Sewer Pump
- Flow Measuring Point
- Water Node (Ctrl + N) Ctrl+N
- Water Chain (Ctrl + C) Ctrl+C
- Node Area
- Water Pipe (Ctrl + P) Ctrl+P
- Reservoir Site
- Water Pumpstation
- Ctrl Valve Chamber
- Valve
- Relief Device
- Supply Point
- Borehole Site
- Meter Chamber
- Hydrant
- Geo Water Connection
- Fitting
- Air Valve
- Water Treatment Plant
- Water Chamber
- Pressure Gauge
- Sampling Point
- Reservoir
- Water Pump
- Bulk Meter
- Control Valve
- Billing Connections

# ΔΙΑΧΕΙΡΙΣΗ ΤΕΧΝΙΚΩΝ ΔΕΔΟΜΕΝΩΝ

## ΔΗΜΙΟΥΡΓΙΑ ΒΑΣΗΣ ΔΕΔΟΜΕΝΩΝ ΤΩΝ ΥΠΟΔΟΜΩΝ

### ΒΙΒΛΙΟΘΗΚΕΣ ΥΠΟΔΟΜΩΝ

**Material Library**

Only non-empty groups

- AC-CID
- AC-COD
- Cast Iron
- Water Pipe : 41

**Water Pipe : 41**

General | Cost | Operational Limits

Material: UPVC Class: 09

Description: 90

Nominal Diam.: 90 mm

Inside Diameter: 82 mm

Mass/ Meter: 100.00 kg

Thickness: 3.0 mm

Replacement: UPVC - 09 90

OK Cancel

**Pumps Library**

- GRUNDFOS
  - CR 8-80
  - CR 8-100
  - CR 8-120
  - CR 8-140
- Pump Data
- KS
- Ra
- WB
- Err
- Ho
- ter

Supplier: GRUNDFOS RPM: 2900

Model No.: LP 100-200 Impeller Size: 210 mm

General | Pump Curve | Data | Cost | Operational Limits

Pump Curve  NPSH  Show all Impeller Sizes

Efficiency (%)  Power

Flow: m<sup>3</sup>/hour

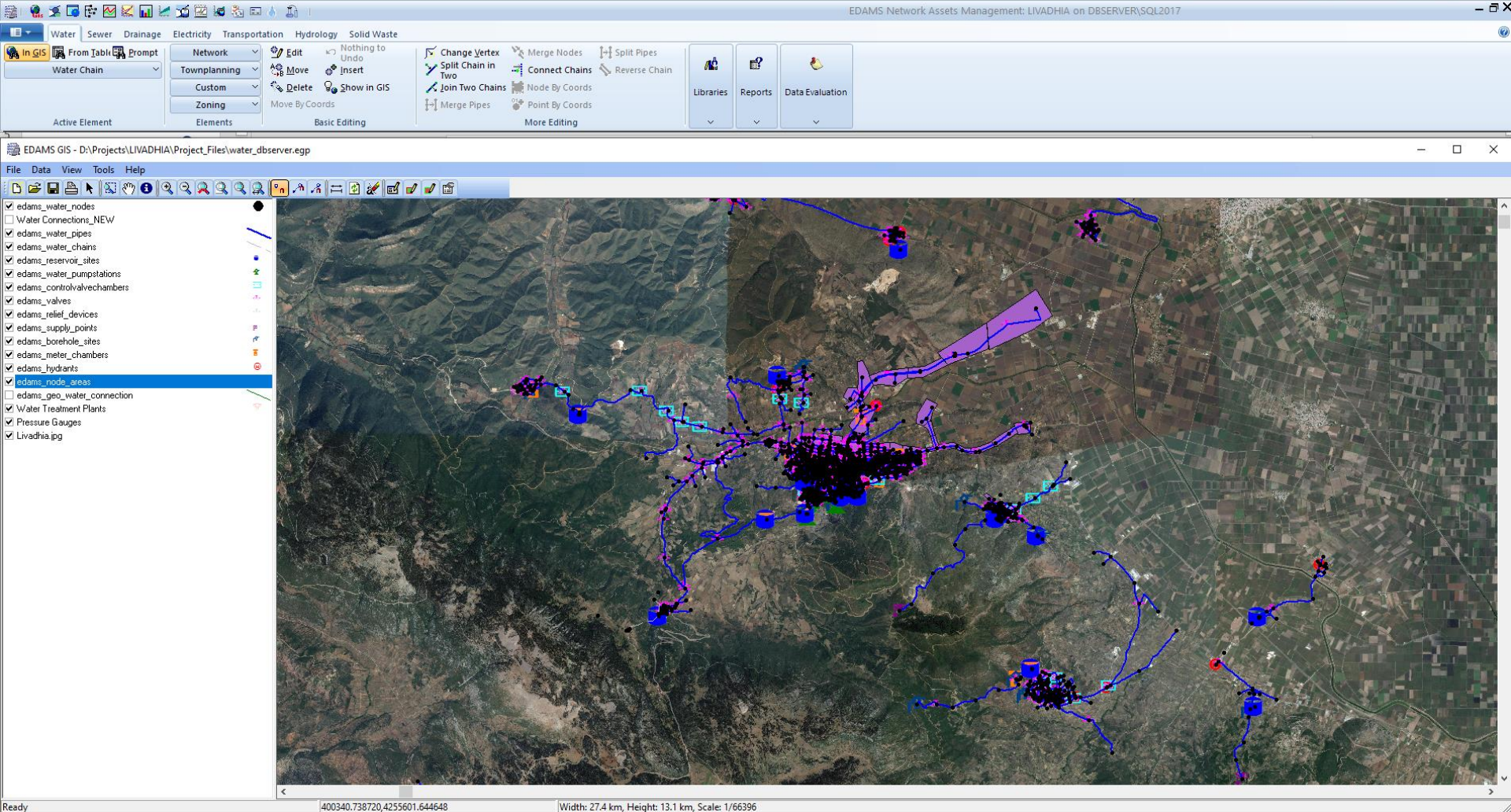
Head: m

Power: kW

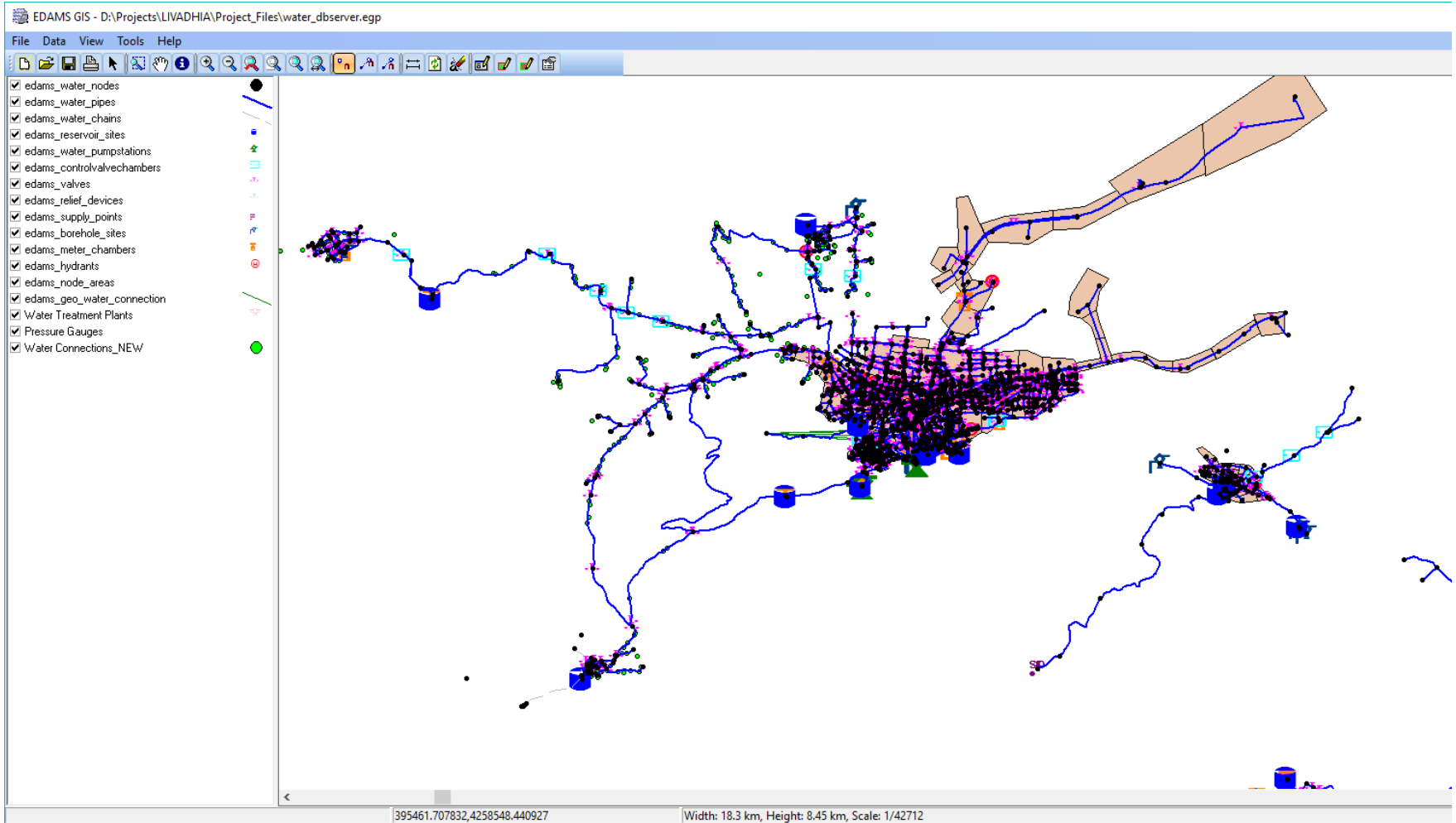
Pump Flow (m <sup>3</sup> /hour)	Head (m)
0	60
80,000	58
160,000	43

OK Cancel

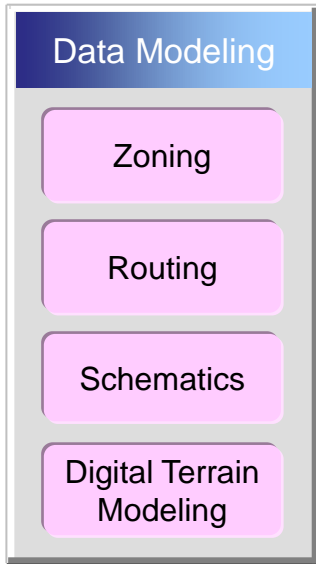
# ΔΙΑΧΕΙΡΙΣΗ ΤΕΧΝΙΚΩΝ ΔΕΔΟΜΕΝΩΝ ΔΙΚΤΥΟ ΥΔΡΕΥΣΗΣ



# ΔΙΑΧΕΙΡΙΣΗ ΤΕΧΝΙΚΩΝ ΔΕΔΟΜΕΝΩΝ ΔΙΚΤΥΟ ΥΔΡΕΥΣΗΣ



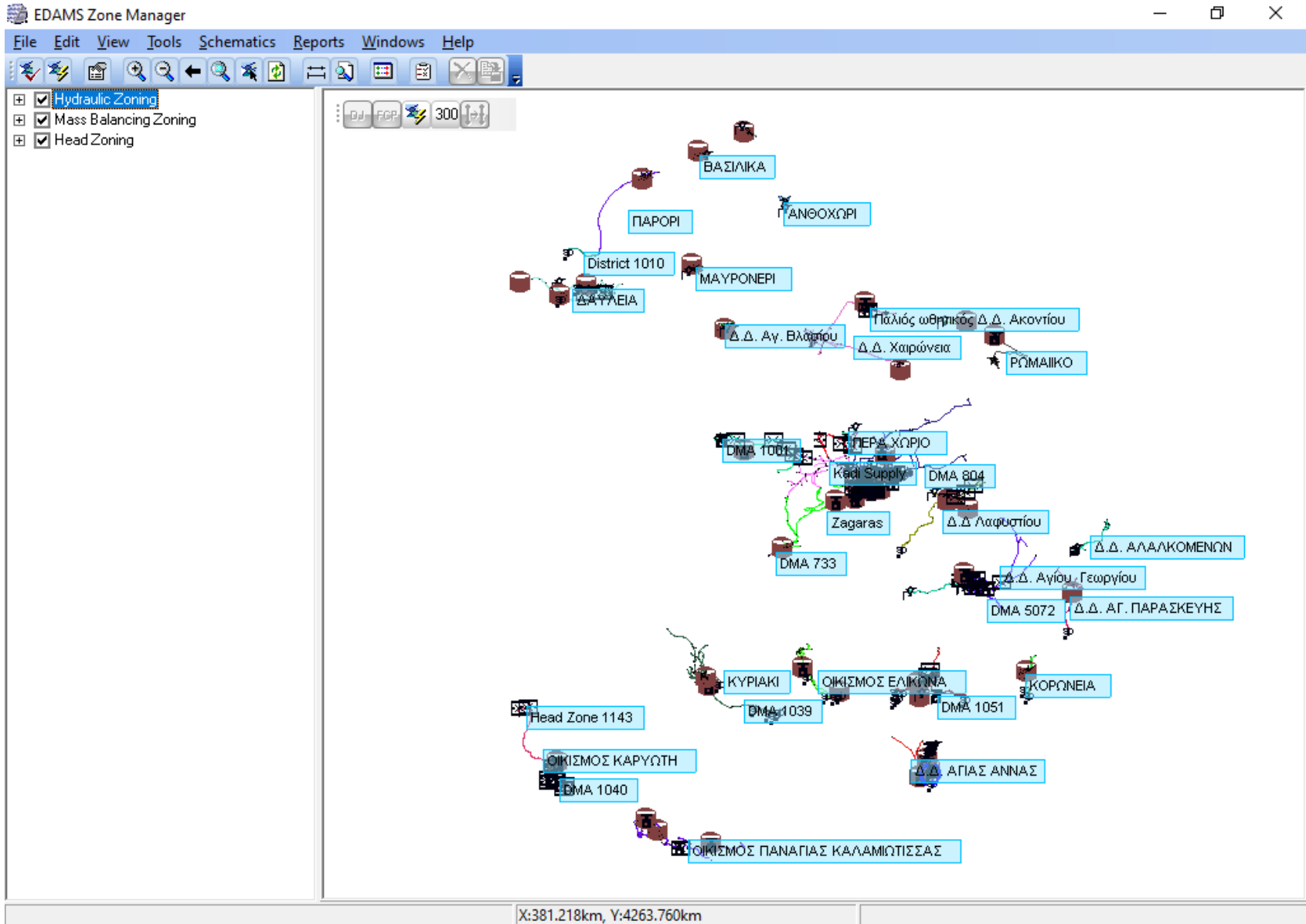
# Zone Management



- Το “Zone Manager” είναι ένα εργαλείο που βοηθά την ΔΕΥΑ στην επικύρωση, διαχείριση, παρακολούθηση και έλεγχο των ζωνών των δικτύων ύδρευσης.
- Εκτελεί δυναμική ανάλυση στις ζώνες καταγράφοντας τις αλλαγές στο δίκτυο που πραγματοποιούνται με το χρόνο και μπορούν να αναπαραχθούν άμεσα οι ζώνες υδατικού ισοζυγίου καθώς και οι ζώνες πίεσης.
- Διαθέτει διάφορα μοντέλα για την προσομοίωση της συμπεριφοράς του δικτύου

# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ ΕΛΕΓΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ

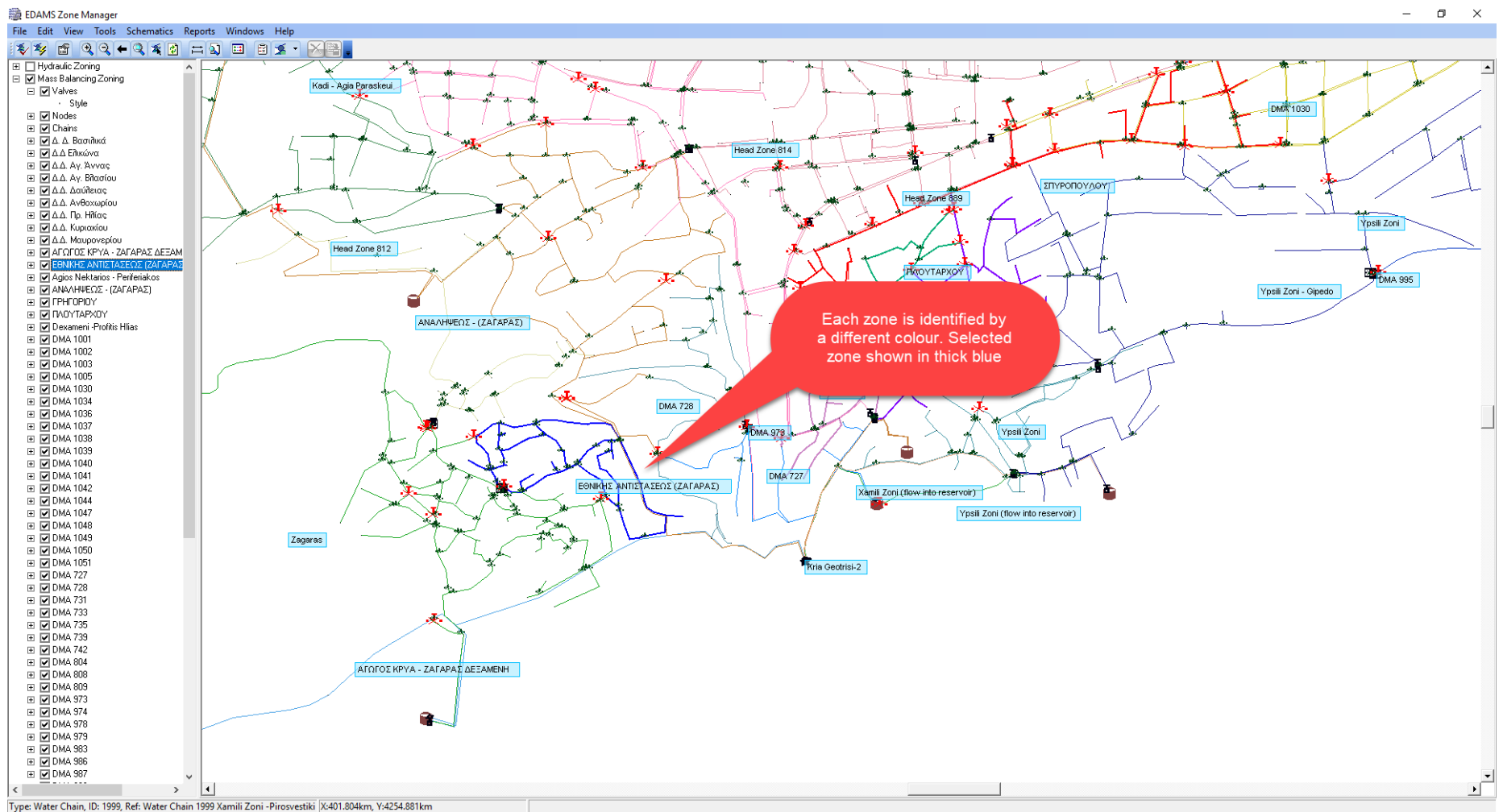
## Zoning Management





# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ ΕΛΕΓΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ

## Zoning Management



# ΔΙΑΧΕΙΡΙΣΗ ΖΩΝΩΝ – ΥΔΡΑΥΛΙΚΕΣ ΖΩΝΕΣ ΛΙΒΑΔΕΙΑ

The screenshot displays the 'Zone Properties (District)' dialog box in a GIS application. The main window shows a list of elements, and a secondary dialog box provides summary statistics.

**Main Window: Zone Properties (District)**

Boundary Type	ID	Ref	Direction
Closed Valve	51	Diam = 65	
Closed Valve	160	Valve 160	
Closed Valve	277	Valv	
Closed Valve	434	Valv	
Closed Valve	436	Valv	
Closed Valve	552	Valv	
Closed Valve	737	Valv	
Closed Valve	785	Valv	
Closed Valve	829	Valv	
Closed Valve	834	Valv	
Closed Valve	911	Valv	
Closed Valve	928	Valv	
Closed Valve	1082	Valv	
Closed Valve	1154	Valv	
Closed Valve	1159	Valv	
Closed Valve	1169	Valv	
Closed Valve	1276	Valv	
Closed Valve	1733	Valv	
Closed Valve	1971	Valv	
Closed Valve	1993	Valv	
Closed Valve	2052	Valv	

**Zone Properties (District) - Summary**

Total Length of Chains: 73.299012 km

Type	Count
Water Nodes	1084
Water Chains	1178

# ΔΙΑΧΕΙΡΙΣΗ ΖΩΝΩΝ – ΥΔΡΑΥΛΙΚΕΣ ΖΩΝΕΣ

## ΑΓ. ΓΕΩΡΓΙΟΣ

The screenshot displays a software interface with multiple overlapping 'Zone Properties (District)' dialog boxes. The foremost dialog box has the 'Statistics' tab selected. A red rectangle highlights the 'Total Length of Chains' field, which shows the value '25.056876' and a unit dropdown menu set to 'km'.

Below this field is the 'Elements Statistics' section, which contains a table with the following data:

Type	Count
Water Nodes	193
Water Chains	247

At the bottom of the dialog box, there are 'OK' and 'Cancel' buttons.

# ΔΙΑΧΕΙΡΙΣΗ ΖΩΝΩΝ – ΥΔΡΑΥΛΙΚΕΣ ΖΩΝΕΣ

ΑΓ. ΓΕΩΡΓΙΟΣ

The screenshot displays a software interface for managing water zones. Multiple overlapping windows titled "Zone Properties (District)" are visible. The foreground window shows a table with the following data:

Category	Sub-category	Value
Avg. Supply Flow (m3/day)	Estimated	515.71
	Metered	649.66
Meter Chambers	Meter Chamber 49	515.71 (+)

The interface also includes a legend for meter status:

- No Meter exists (Pink)
- Meter exists - no readings available in the period (Green)
- Meter exists & has readings in the period (Cyan)

The background shows a map with a blue boundary line indicating the zone's extent.

# ΔΙΑΧΕΙΡΙΣΗ ΖΩΝΩΝ – ΖΩΝΕΣ ΠΙΕΣΗΣ

## ΑΓ. ΓΕΩΡΓΙΟΣ

The screenshot displays a software interface for water network management. The main window is titled 'Head Zone' and contains a 'Statistics' tab. The 'Total Length of Chains' is shown as 5.993027 km. Below this, an 'Elements Statistics' table lists various components and their counts. The background shows a map with a green line representing a water network and a yellow line representing a road. Two labels on the map indicate 'Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - "ΝΤΑΝΟΣ" 6' and 'Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - "ΝΤΑΝΟΣ" 5'.

Type	Count
Water Nodes	51
Water Chains	59
Water Pipes	102
Reservoir Sites	2
Water Pumpstations	0
Control Valve Chambers	0
Valves	46
Relief Devices	0
Supply Points	0
Borehole Sites	8
Meter Chambers	6
Hydrants	0
Node Areas	0
Fittings	0
Air Valves	0
Water Treatment Plants	0
Pressure Gauges	0

Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - "ΝΤΑΝΟΣ" 6

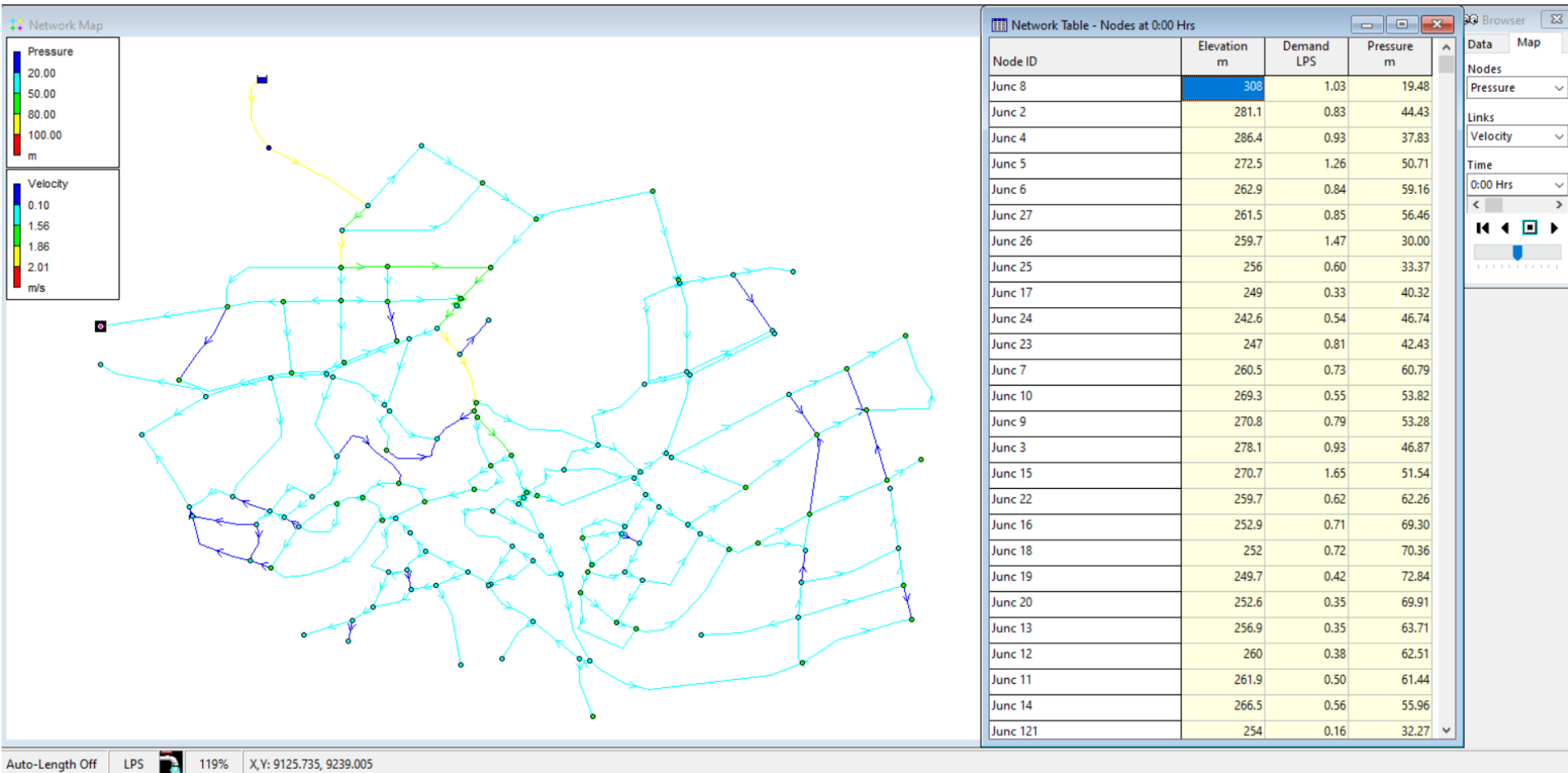
Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - "ΝΤΑΝΟΣ" 5

ΔΕΥΑ ΛΙΒΑΔΕΙΑΣ

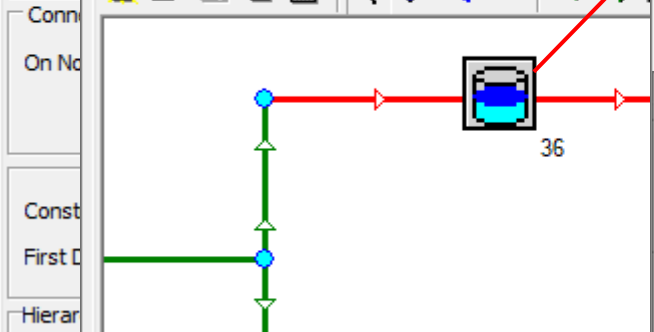
OK Cancel

# ΔΙΑΧΕΙΡΙΣΗ ΖΩΝΩΝ – ΥΔΡΑΥΛΙΚΕΣ ΖΩΝΕΣ

## ΑΓ. ΓΕΩΡΓΙΟΣ



User Ref.: Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - ΚΕΝΤΡΙΚΗ ΔΕΞΑΜΕΝΗ  
Type: 1: Act as Reservoir



Reservoir Site 37 - Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - ΚΕΝΤΡΙΚΗ ΔΕΞΑΜΕΝΗ  
Images | Condition Assessment | Valuation Information  
Main | Graphical | Spatial Relate | Quality Records

Reservoir Site Capacity:  
Top Water Level:

- DMA 80
- DMA 80
- DMA 80
- DMA 97
- DMA 97
- DMA 97

User Ref.: Reservoir 36  
Type: 2: Rectangular

Main Group: Reservoir Dimensions | Reservoir Type

Location: Δ.Δ. ΑΓΙΟΥ ΓΕΩΡΓΙΟΥ - ΚΕΝΤΡΙΚΗ ΔΕΞΑΜΕΝΗ

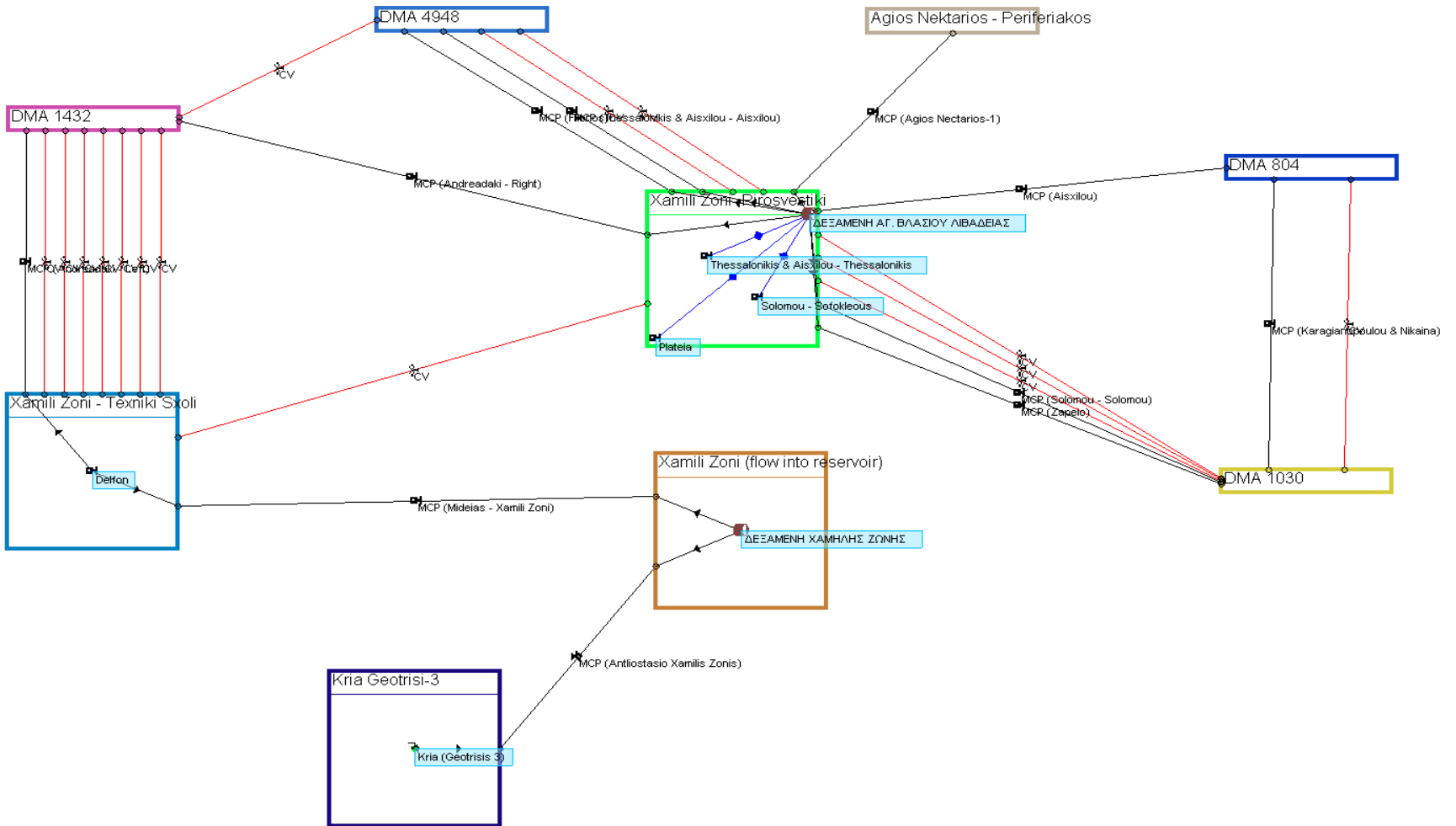
Ground Elevation at Reservoir:	325.000	m
Height of Bottom of Reservoir from Ground:	0.200	m
Height from Bottom of Reservoir to TWL:	2.700	m
Reservoir Capacity:	283.838	m <sup>3</sup>
Top Water Level:	327.900	m

Apply

Conversion of Reservoir Levels to Volume Readings (inflow/outflow)

Conversion Factor: 0.00

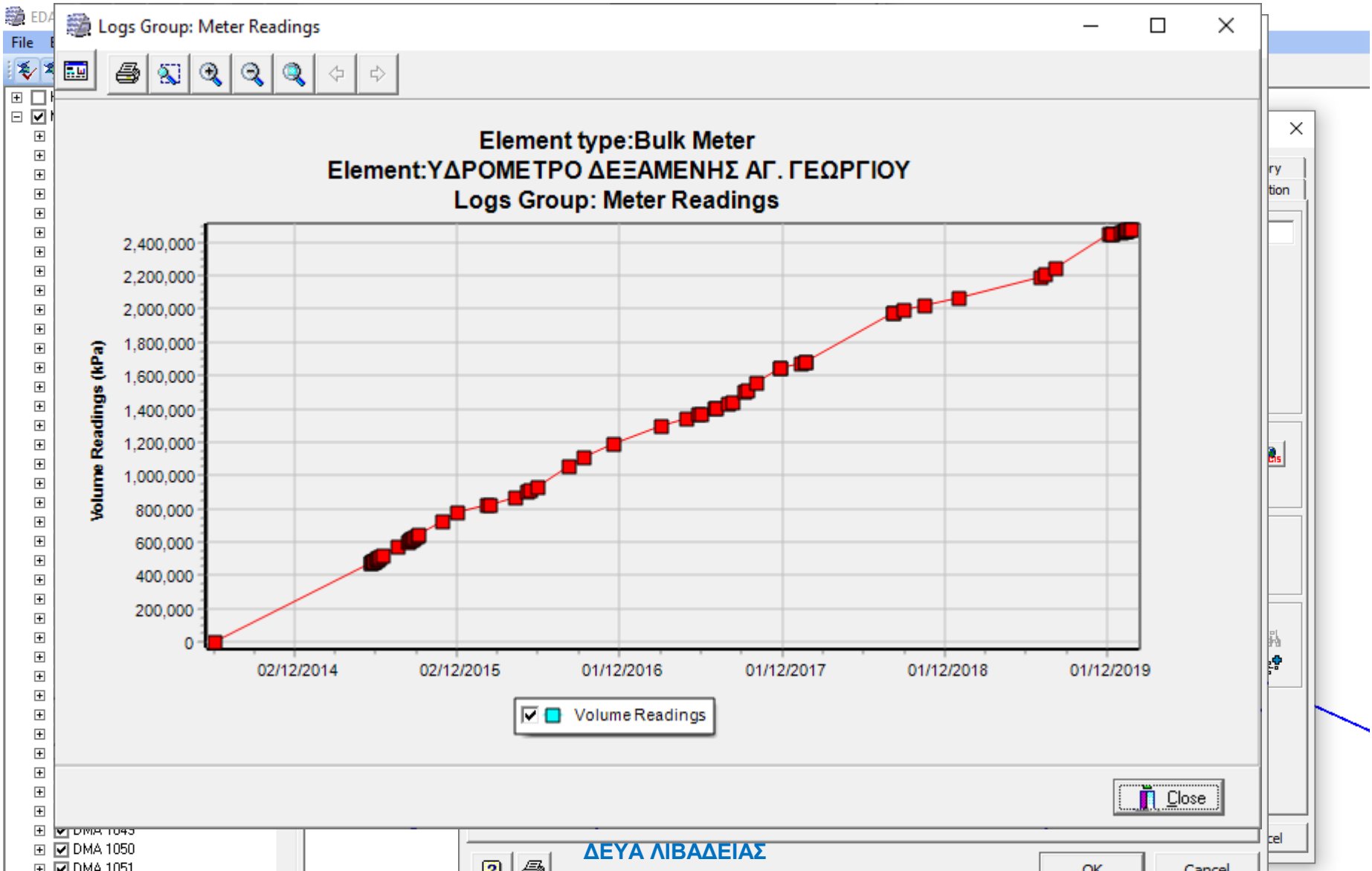
Update Volume Readings





# Metering Module

## ΑΓ. ΓΕΩΡΓΙΟΣ – ΥΔΡΟΜΕΤΡΟ ΔΕΞΑΜΕΝΗΣ



# ΛΟΓΙΣΜΙΚΟ ΜΕΤΡΗΣΕΩΝ

## ΚΕΝΤΡΙΚΟ ΥΔΡΟΜΕΤΡΟ ΑΓ. ΓΕΩΡΓΙΟΥ – ΑΝΑΛΥΣΗ ΧΡΟΝΟΣΕΙΡΑΣ

**Time Series Analysis**

Summary | Data | Decomposition | Forecasting

General

No. of months: 30

Mean:

Minimum:

Maximum:

Average Dev:

Standard Dev:

Linear Regression

Slope (b):

Intercept (a):

**Time Series Analysis**

Summary | Data | Decomposition | Forecasting

Seasonal Indices | Components

Smoothing Method: Henderson's 5-point weighted moving averages

Trend-Cycle(kPa)

Remainder(%)

07/2015

**Time Series Analysis**

Summary | Data | Decomposition | Forecasting

Method: Holt-Winters' exponential smoothing - No Trend

Smoothing parameters

Level (alpha): 0.95

Trend (beta): 0.03

Seasonal: 0.50

Projection Period (in months): 6

Error Analysis

Proportional error of estimate: 0.06

Reduced error of estimate: 0.27

Percentage error in mean (%): -19.4

Correlation coefficient: 0.65

**Time Series Analysis**

Summary | Data | Decomposition | Forecasting

Volume Readings(kPa)

01/2016 01/2018 01/2020

**Time Series Analysis**

Summary | Data | Decomposition | Forecasting

Seasonal Indices

Month	Value
Jan	1.03
Feb	0.97
Mar	1.04
Apr	1.01
May	0.99
Jun	1.01
Jul	1.00
Aug	1.00



# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ ΛΟΓΙΣΜΙΚΟ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ

*Meter flow generation / flow aggregation per DMA  
(averages)*

Water Auditing (Balancing) Manager

Operations Balancing NRW Auditing Settings File Edit View Selection Tools Help

Network Map

Element Views

- ✓ Billing Connections
- ✓ Pressure Gauges
- ✓ Water Treatment Plants
- ✓ Meter Chambers
- ✓ Borehole Sites
- ✓ Supply Points
- ✓ Valves
- ✓ Control Valve Chambers
- ✓ Water Pumpstations
- ✓ Reservoir Sites
- ✓ Water Nodes
- ✓ Water Pipes
- ✓ Water Chains

GIS Layers

- Water Connections\_NEW
- Spatial Images
- ✓ Livadhia.jpg

DMA List

- Δ. Δ. Βασιλικά
- Δ. Δ. Ελικώνα
- Δ. Δ. Αγ. Άννας
- Δ. Δ. Αγ. Βλασίου
- Δ. Δ. Αγίου Γεωργίου
- Δ. Δ. Δαύλειος
- Δ. Δ. Ανθοχωρίου
- Δ. Δ. Πρ. Ηλίας
- Δ. Δ. Κυριαδού
- Δ. Δ. Μαυρονερίου
- ΑΓΩΓΟΣ ΚΡΥΑ - ΖΑΓΑΡΑΣ ΔΕΞΑΜΕΝΗ
- ΕΘΝΙΚΗΣ ΑΝΤΙΣΤΑΣΕΩΣ (ΖΑΓΑΡΑΣ)
- Αγιος Νεκταριος - Periferiakos
- ΑΝΑΛΗΨΕΩΣ - (ΖΑΓΑΡΑΣ)
- ΓΡΗΓΟΡΙΟΥ
- ΠΛΟΥΤΑΡΧΟΥ
- Dexameni - Profitis Hlias
- DMA 1001
- DMA 1002

Metered Flow Generations

Flow Generation Steps

- 1. Pre-process Connections Readings** ⚡ ✓
- 2. Link Water Pipes to Flow Elements** ⚡ ✓  
Tolerance (Buffer width around pipes in m): 50  
Exclude Bulk Supply based on: Zoning & Diameter  
Max Pipe Diameter: 300  
Max % of Connection allowed without coordinates: 0.5 %
- 3. Link Water Connections to Pipes Manually** ⚡ ?  
Note: Use buttons to graphically allocate/deallocate Water Connections
- 4. Allocate Demands to Water Pipes and Mass Balancing Zones** ⚡ ✓
- 5. Regenerate Bulk Supply Flows** ⚡ ✓

Control

- Settings
- ✓ Skip Step 2

Notes

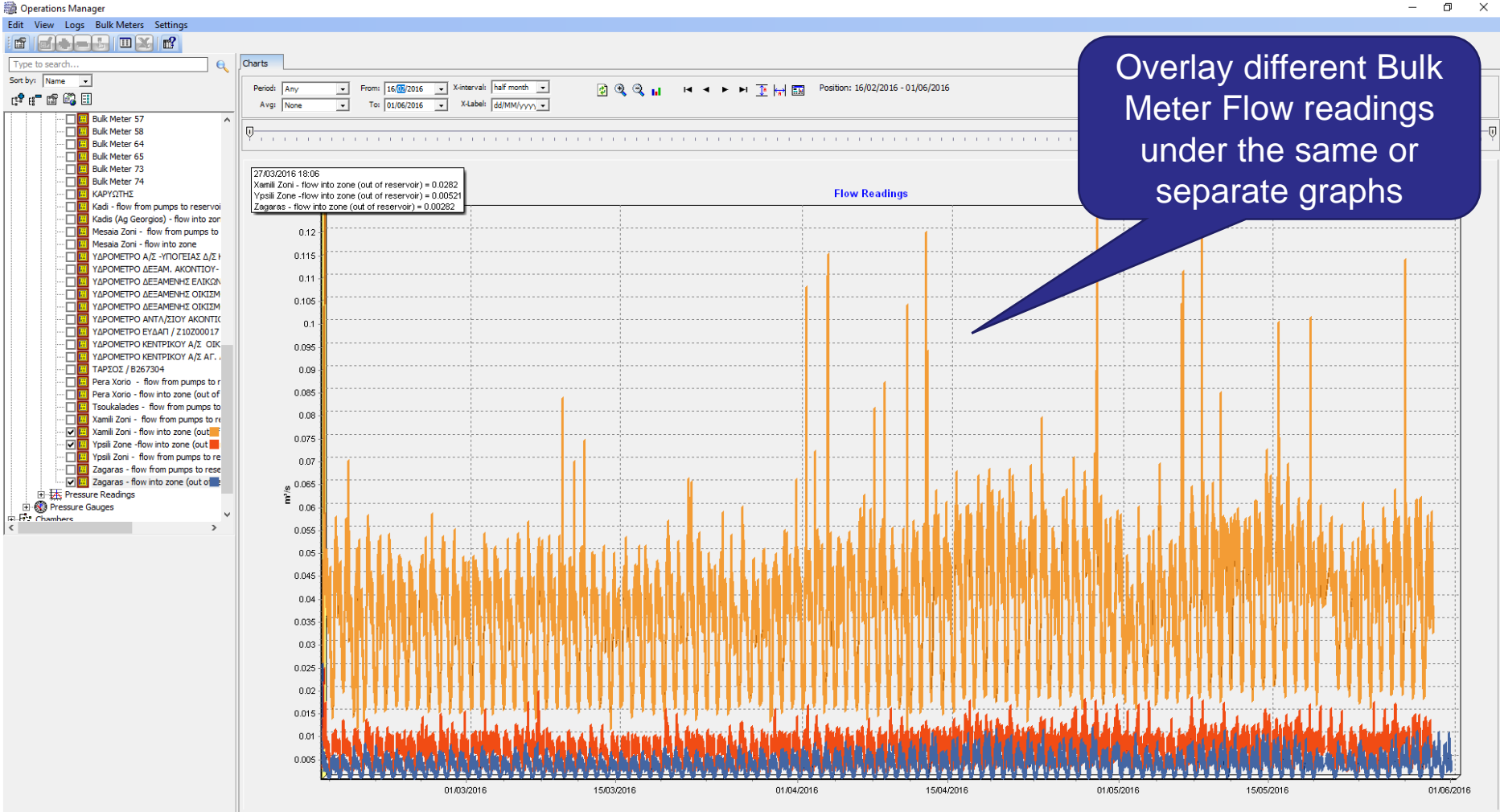
If any changes are made in GIS (element deletions, inserts, splits or joins) you need to re-generate the zoning information and then re-run the flow generation steps in order to be up to date.

X:405.807km, Y:4250.968km Width: 3.98 km, Height: 2.22 km ΔΕΥΑ ΑΙΒΑΔΕΙΑΣ

# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ

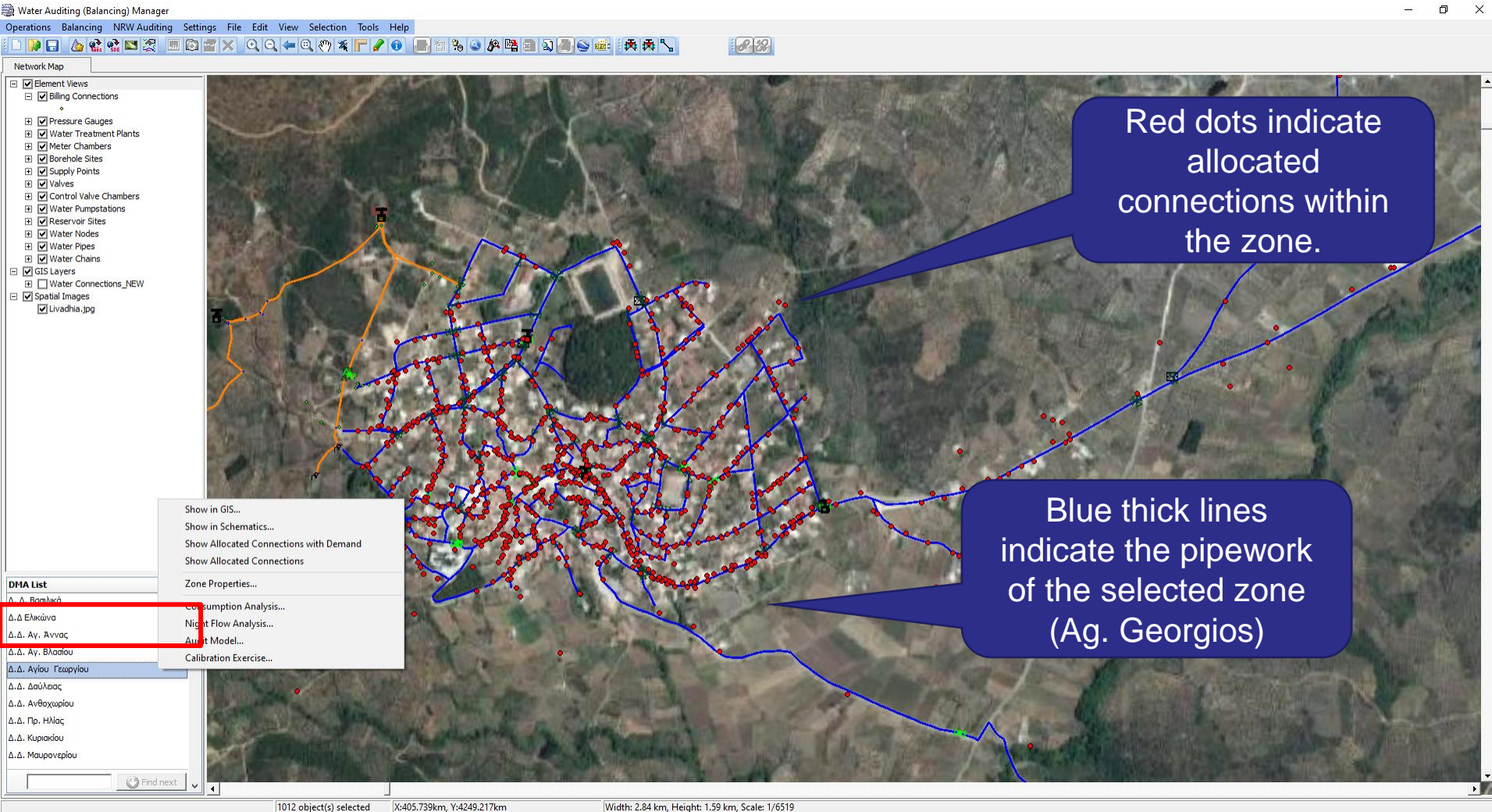
## ΕΛΕΓΧΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ

## Metering / Logs Management



# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ ΕΛΕΓΧΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ

ΖΩΝΕΣ ΣΥΣΧΕΤΙΣΜΕΝΕΣ ΜΕ ΤΑ ΥΔΡΟΜΕΤΡΑ ΤΩΝ ΚΑΤΑΝΑΛΩΤΩΝ



# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ

## ΕΛΕΓΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ–Top/Down Approach

Water Auditing (Balancing) Manager

Operations Balancing NRW Auditing Settings File Edit View Selection Tools Help

Net Balancing (Top/Down Approach)

Zone Type: District DMA  
 Period: User Defined  
 User Definable period: From: 01/01/2017 To: 31/12/2017  
 Period Length: 365 days

UfW Calculation Option  
 Use only Metered Supply & Consumption Records  
 Use Corrected/Calculated Supply & Consumption

Analysis Type  
 Balancing / UfW  
 Leakage Indices

2017

Zone Id	Name	Network Length (m)	No of Service Connections	Avg. Supply Flow (Metered)	Avg. Supply Flow (Calculated)	Consumption (Volume)	Consumption (Flow)	Billing Period	UfW	UfW
				(m3/day)	(m3/day)	(m3)	(m3/day)	(days)	(m3/day)	%
A - DMA zones that can balance (+ve balance)										
735	Δ.Δ. Αγίου Γεωργίου	25056	1	452.4	452.4	131066.0	359.1	364,365	93.3	20.62
B - DMA zones that can not balance due to unreliable meter readings or wrong positioning of meters (-ve balance)										
990	Δ. Δ. Βασιλικά	1900	0					365		

DMA List

- Δ. Δ. Βασιλικά
- Δ.Δ.Ελικώνα
- Δ.Δ. Αγ. Άννας
- Δ.Δ. Αγ. Βλασίου
- Δ.Δ. Αγίου Γεωργίου
- Δ.Δ. Δούλας
- Δ.Δ. Ανθοχωρίου
- Δ.Δ. Πρ. Ηλίας
- Δ.Δ. Κυριακού
- Δ.Δ. Μαυρονερίου

1012 object(s) selected | X:406.883km, Y:4250.543km | Width: 2.84 km, Height: 1.59 km, Scale: 1/6519

2019

# ΔΙΑΧΕΙΡΙΣΗ ΔΙΚΤΥΟΥ ΔΙΑΝΟΜΗΣ

## ΕΛΕΓΟΣ ΥΔΑΤΙΚΟΥ ΙΣΟΖΥΓΙΟΥ–Top/Down Approach

ΥΔΡΟΜΕΤΡΟ ΔΕΞΑΜΕΝΗΣ ΑΓ. ΓΕΩΡΓΙΟΥ	
Ημερομηνία	Ένδειξη (m3)
31/12/2018	2094470
05/07/2019	2193820
15/07/2019	2195650
06/08/2019	2205350
06/12/2019	2231830
10/12/2019	2243930
01/01/2020	2260116

Εισερχόμενος Όγκος Νερού (m3)	169,309	Εξουσιοδοτημένη Κατανάλωση (m3)	Τιμολογούμενη Κατανάλωση (m3)	Τιμολογούμενη Μετρούμενη Κατανάλωση (m3)	Ανταποδοτικό Νερό (m3)	
		131,066	130,411	129,954 77%	130,411	
		77.4%	77.0%	Τιμολογούμενη μη Μετρούμενη Κατανάλωση (m3)		
				457 0.3%		
				Μη Τιμολογούμενη Κατανάλωση (m3)	Μη τιμολογούμενη μετρούμενη κατανάλωση (m3)	Μη Ανταποδοτικό Νερό (m3)
				655	0	38,898
				0.4%	Μη τιμολογούμενη μη μετρούμενη κατανάλωση (m3)	
				$=0,5\% * 131.066$	655 0.4%	
				Φαινομενικές Απώλειες (m3)	Μη Εξουσιοδοτημένη κατανάλωση (m3)	
				$=0,5\% * 131.066$	655 0.4%	
		38,243	5,898	Λάθη μετρητών/μετρήσεων (m3)		
		22.6%	3.5%	$=4,0\% * 131.066$		
			5,243	3%		
			Πραγματικές Απώλειες (m3)	Απώλειες στους αγωγούς μεταφοράς/δίκτυο διανομής (m3)		
			32,345	28,760 17%		
			19.1%	Υπερχειλίσεις Δεξαμενών (m3)		
				350 0.2%		
				Απώλειες στις συνδέσεις υδατοπαροχών (m3)		
				3,234 2%		
				$=10\% * 32495$		

# ΕΡΩΤΗΣΕΙΣ & ΑΝΤΑΛΛΑΓΗ ΑΠΟΨΕΩΝ

