

# How the City of Valencia has improved the operational efficiency of their water supply network through the implementation of a Digital Twin



# Agenda

1. Xylem Introduction
2. Digitalisation
3. Digital Twin Description
4. Digital Twin Case Study - Valencia, Spain



# Xylem

Collaborating with customers to tackle water scarcity, quality, resilience, and affordability with innovative solutions around the world.



**350+**

Locations around the world.



**100+**

Years of innovation, leadership, and service to customers.



**~150**

Countries where xylem solutions solve water.



**\$8.1B**

2023 revenue



**5,100+**

Patents and trademarks.



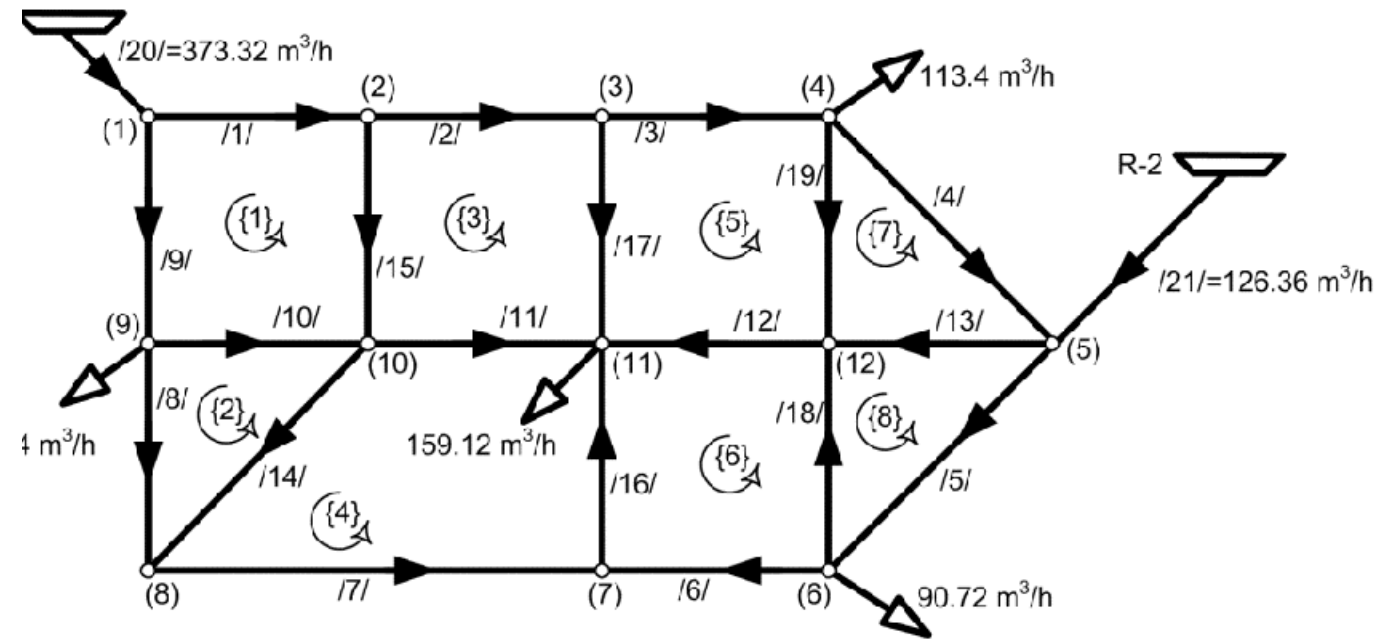
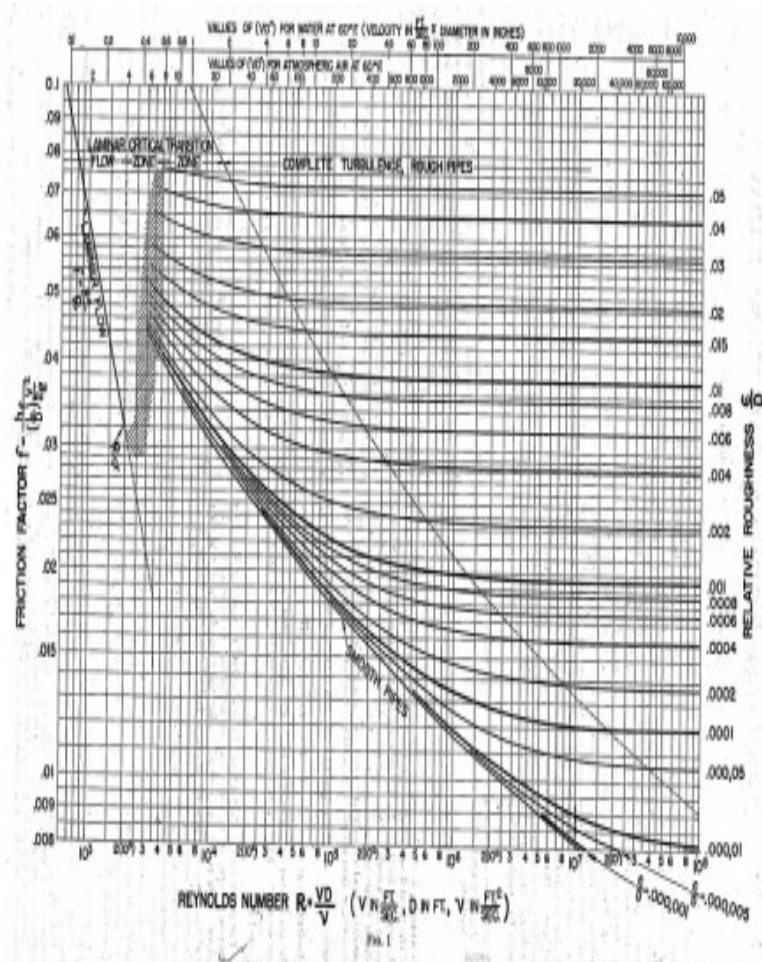
**23,000**

Colleagues with water expertise.



# Digitalisation

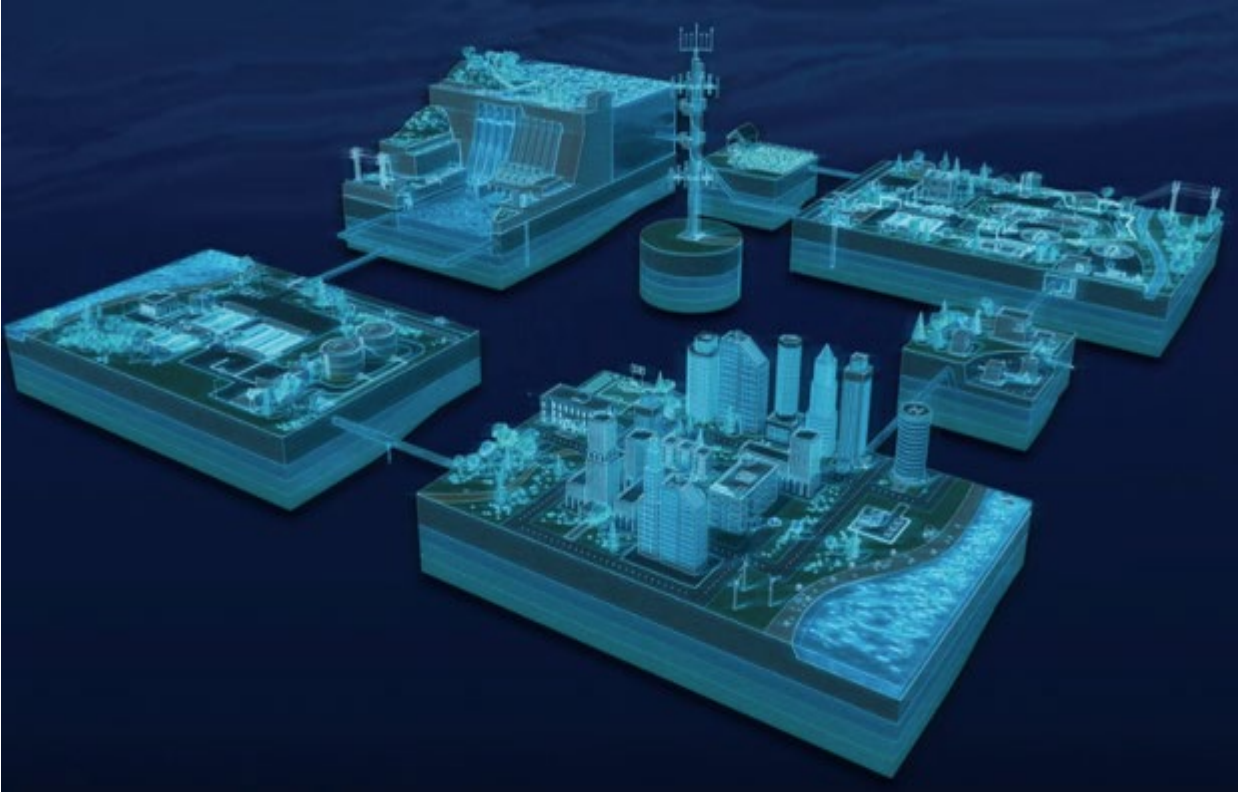
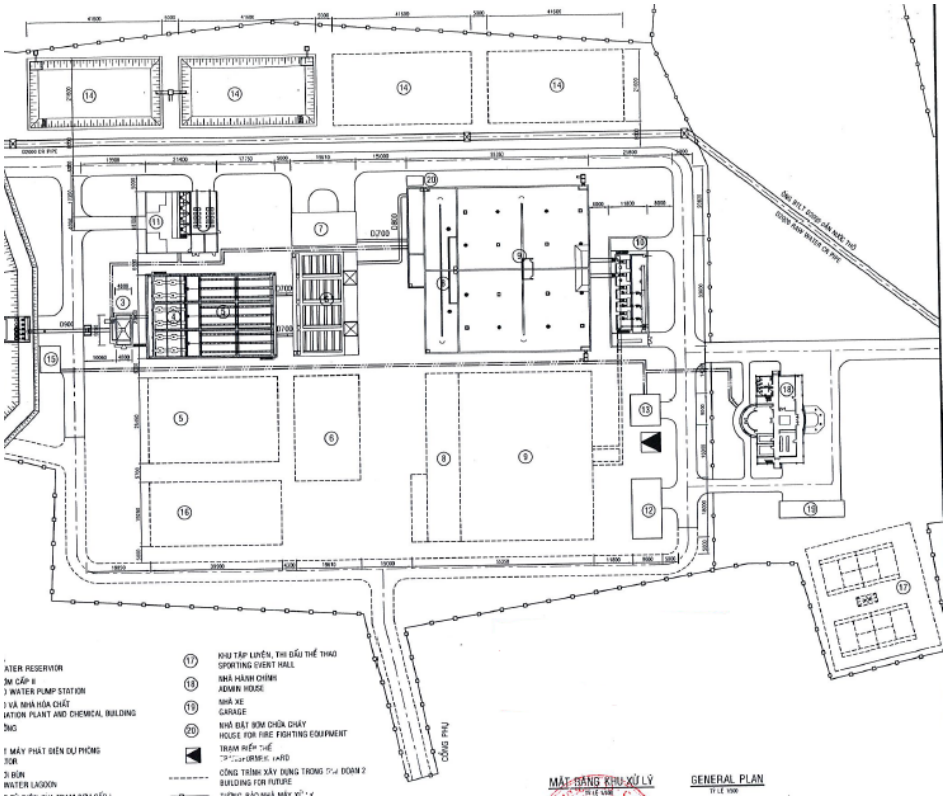
# Network Design



\*note-all flow rates for calculation must be expressed in  $\text{m}^3/\text{s}$

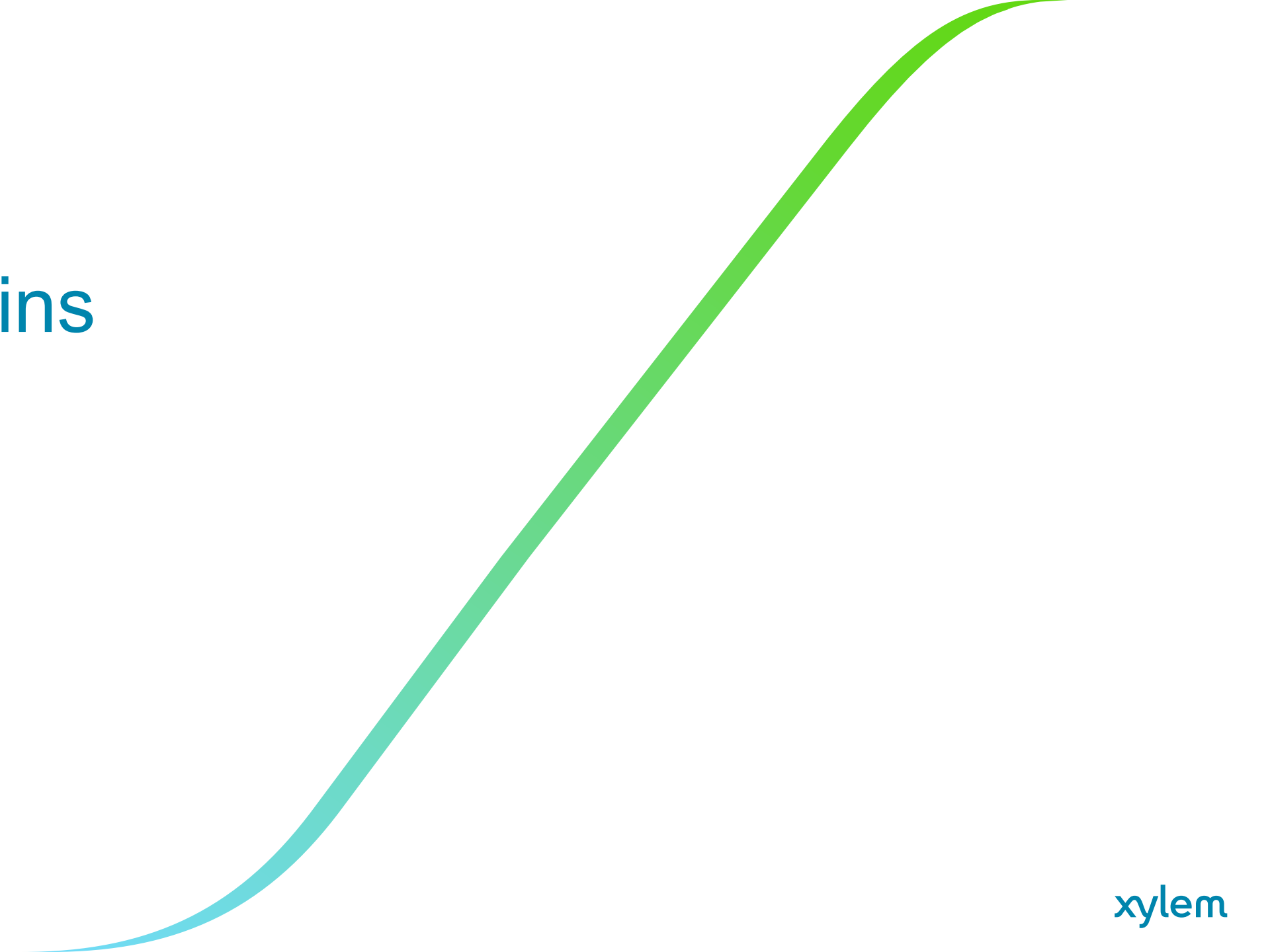
Figure 4: Moody Diagram from Lewis Moody's 1944 *Transactions of the A.S.M.E.* paper entitled "Friction Factors for Pipe Flow"

# 2D Design to 3D Design

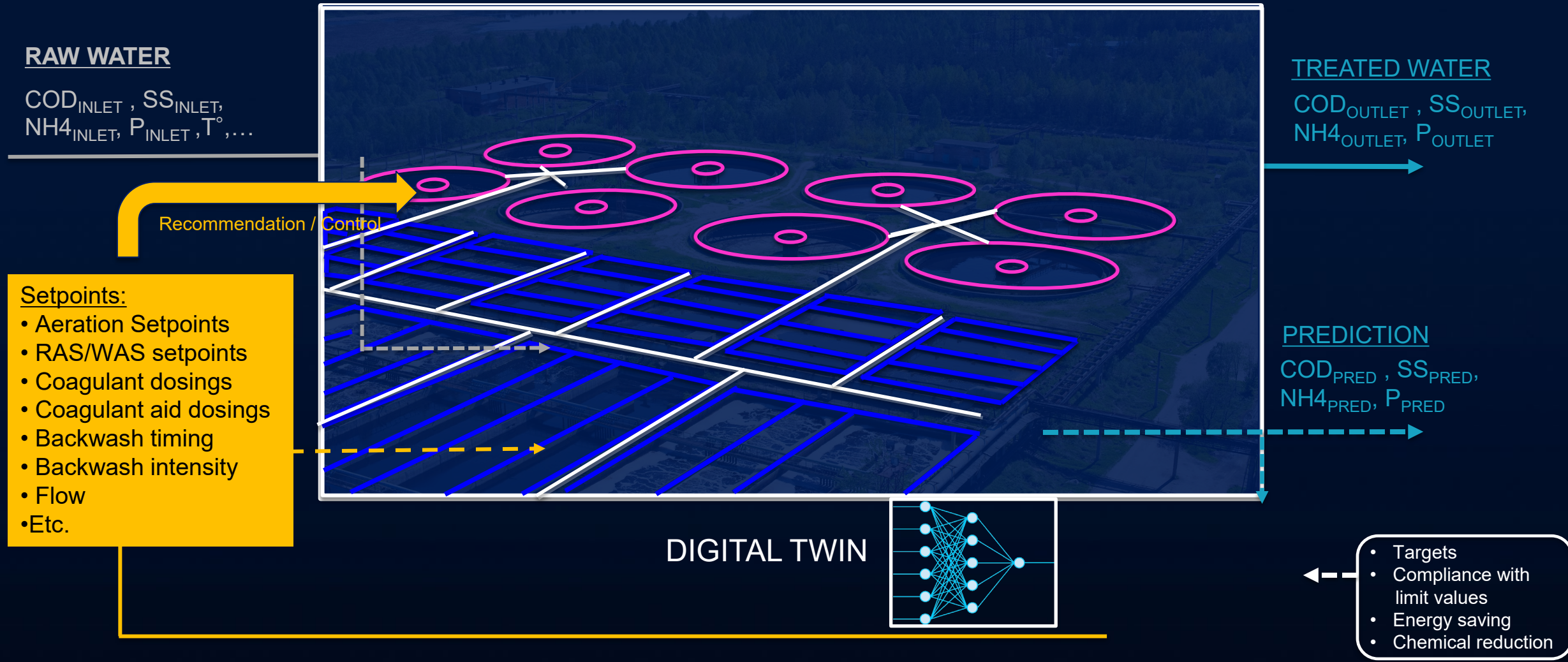




# Digital Twins



# Digital Twin for Process Optimisation

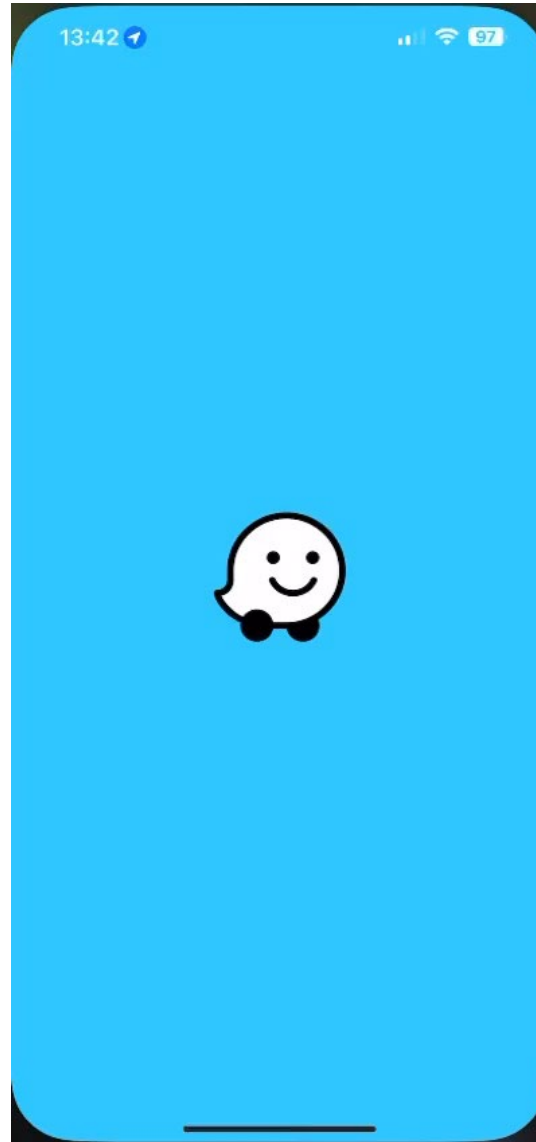


HOLISTIC OPTIMISATION





# Process Optimisation Simplified



# Treatment Plant Optimisation

ETAP

xylem vue

M1 M2

## Operation

Dashboard

Inlet flow

2,804 l/s

Inlet channel level

2.22 m



Exit tanks

|              | Gallery                | Tank   |
|--------------|------------------------|--------|
| M1           | 2,88 m                 | 4,11 m |
| M2           | 2,96 m                 | 4,15 m |
| M3           | -                      | 4,33 m |
| Total volume | 125.870 m <sup>3</sup> |        |

Exit flow rates

| Montserrat | Turís  | Pedralba | El Pedregal | Alcalans |
|------------|--------|----------|-------------|----------|
| 1,399 l/s  | 53 l/s | 515 l/s  | 134 l/s     | 0 l/s    |
| 2,101 l/s  |        |          |             |          |

### Intake

Turbidity

3.37 NTU

7.7% Increase in the last 10 minutes

COT

1.41 mg/l

0.4% Increase in the last 10 minutes

Raw water quality

Good

Desinfection  
0,03 ppm

Residual ozone

0,01 ppm

Residual chlorine

0 ppm

Chlorine dioxide

### Decantation

Turbidity

1.29 NTU

69% Reduction

COT

0.99 mg/l

68% Reduction

Polychloride dose

19 ppm

16 ppm Recommendation 16

Disinfection

0,7 ppm

Residual chlorine

### Filtration

Turbidity

0.02 NTU

97% Reduction

COT

0.16 mg/l

78% Reduction

Outlet turbidity

0.11 NTU

Backwash Queue

14/16 Pending washing

Disinfection

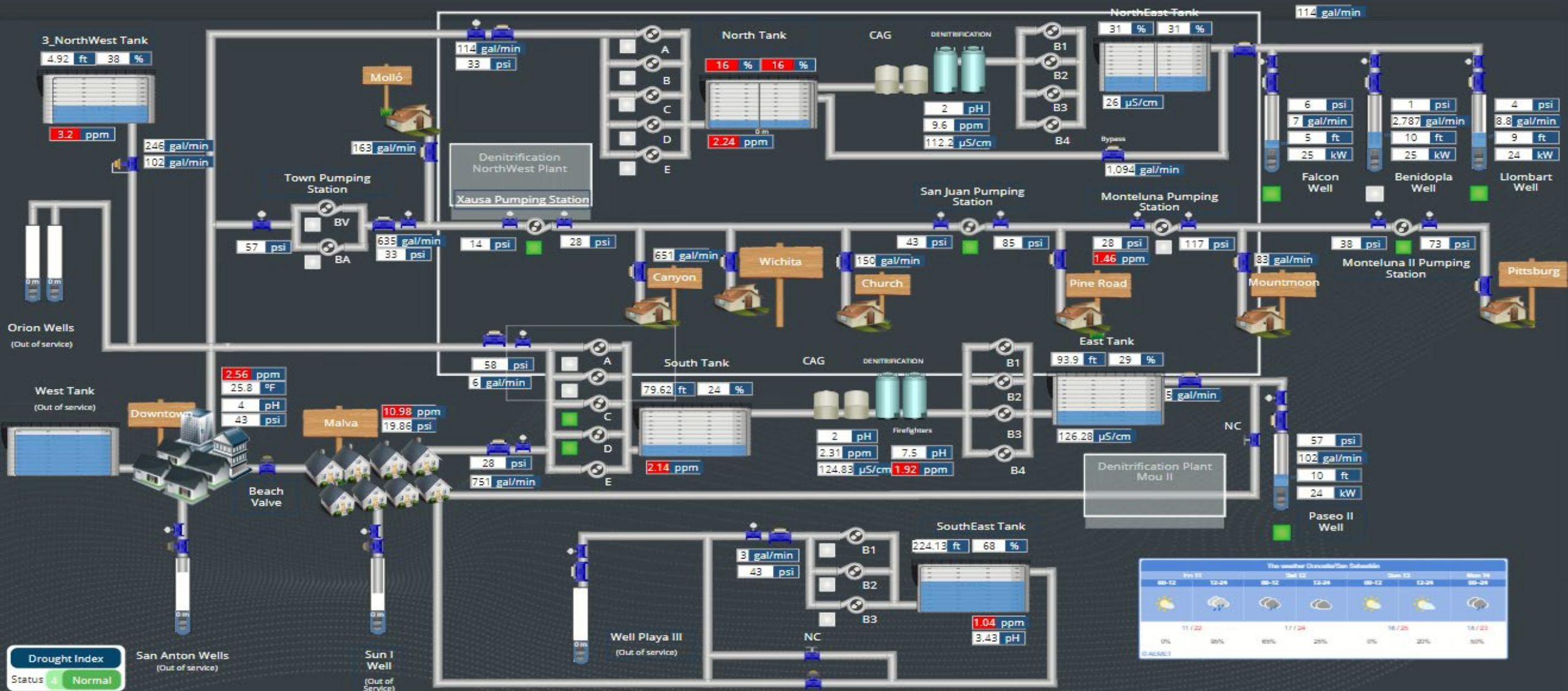
1,13 ppm

Residual chlorine

1,07 ppm

Residual chlorine plant output

# Operational Situational Awareness



# Operational Optimisation

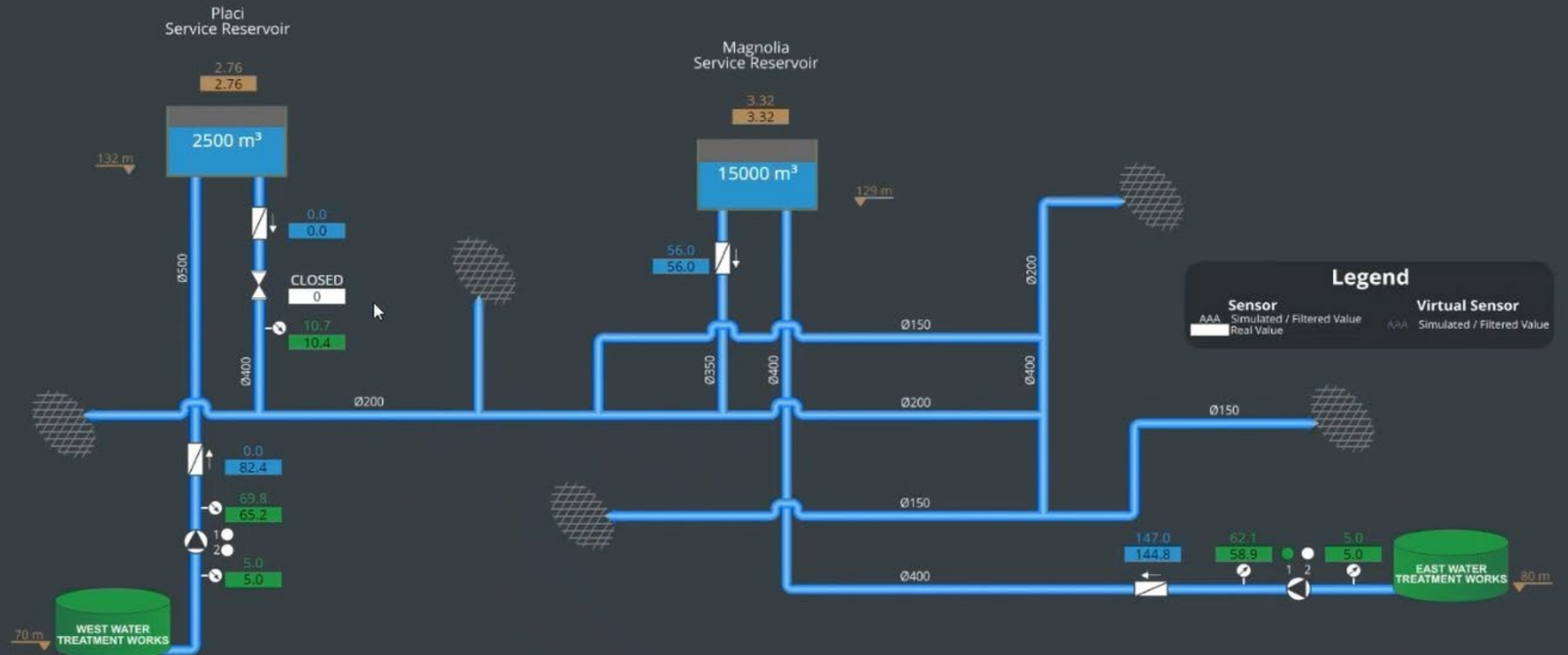
DEMO > Island Network > HM\_2024

xylem **vue** DRINKING WATER  
powered by go-ai@iit

Digital Twin Team

## Island Network, Principal

xylem **vue** DRINKING WATER  
powered by go-ai@iit





# Network Digital Twin - València, SPAIN



*global omnium*

xylem

# Digital Twin Main Drivers



01

Water security



02

Operational efficiency



03

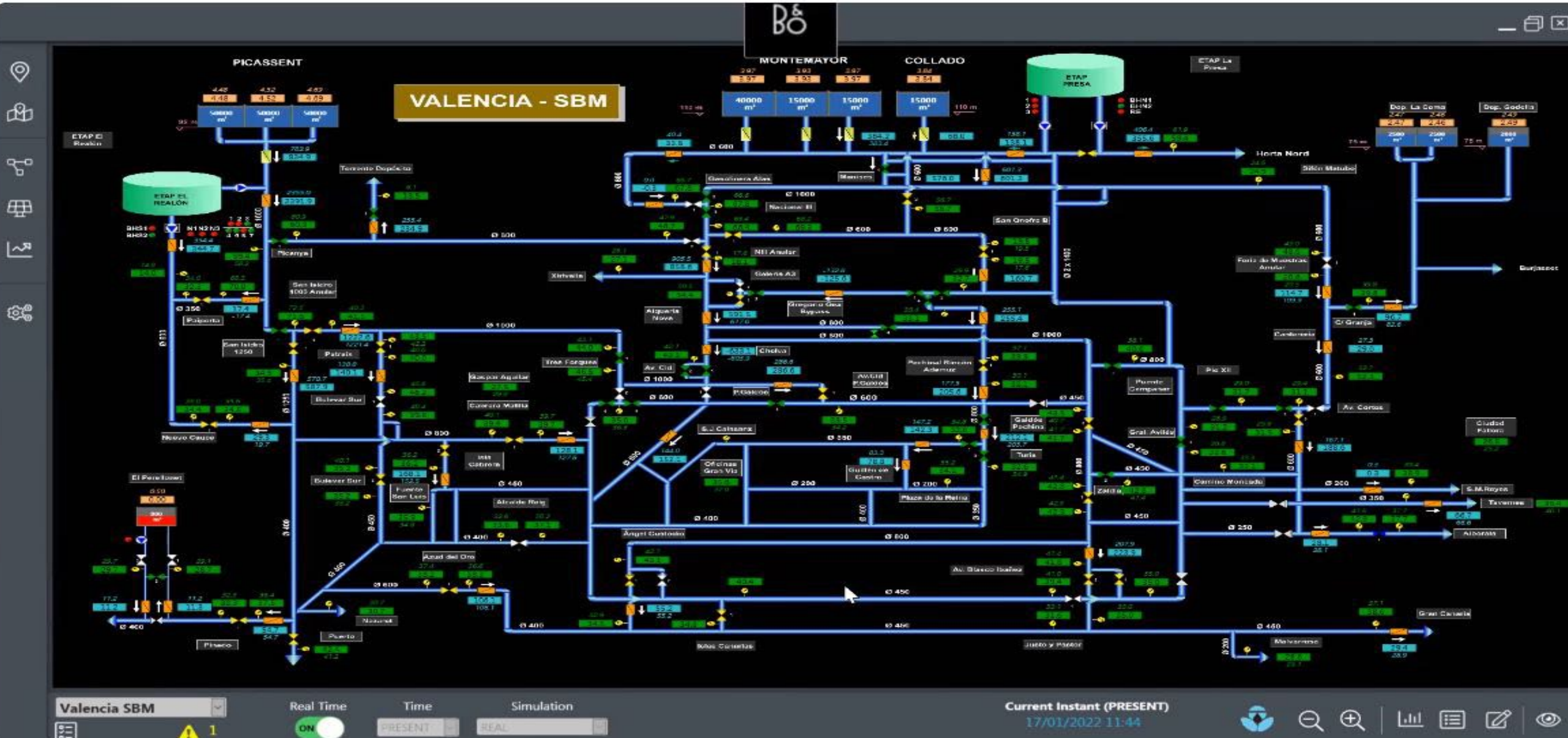
Customer satisfaction



04

Differentiation

# Network Digital Twin Valencia

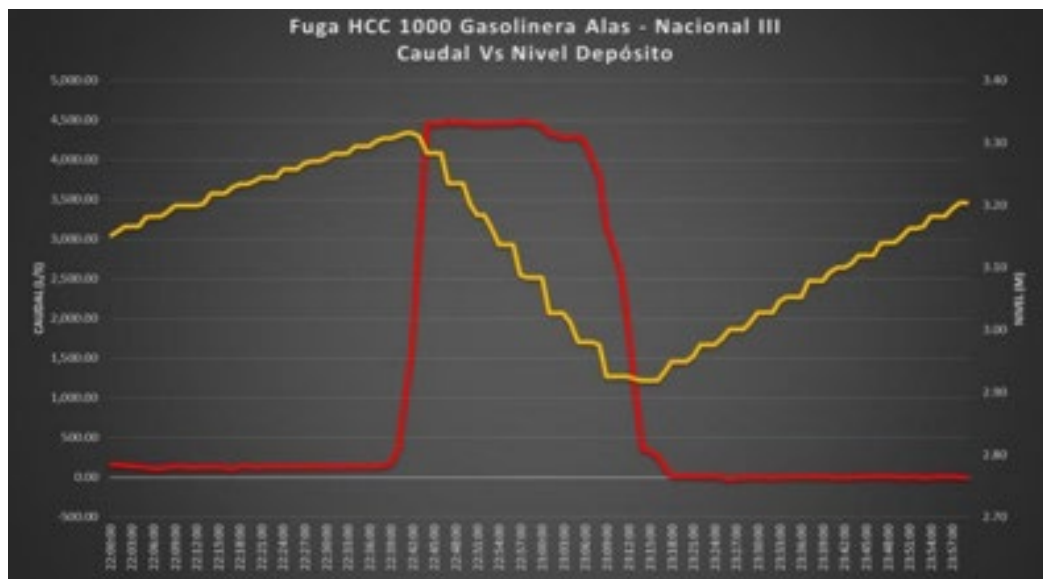
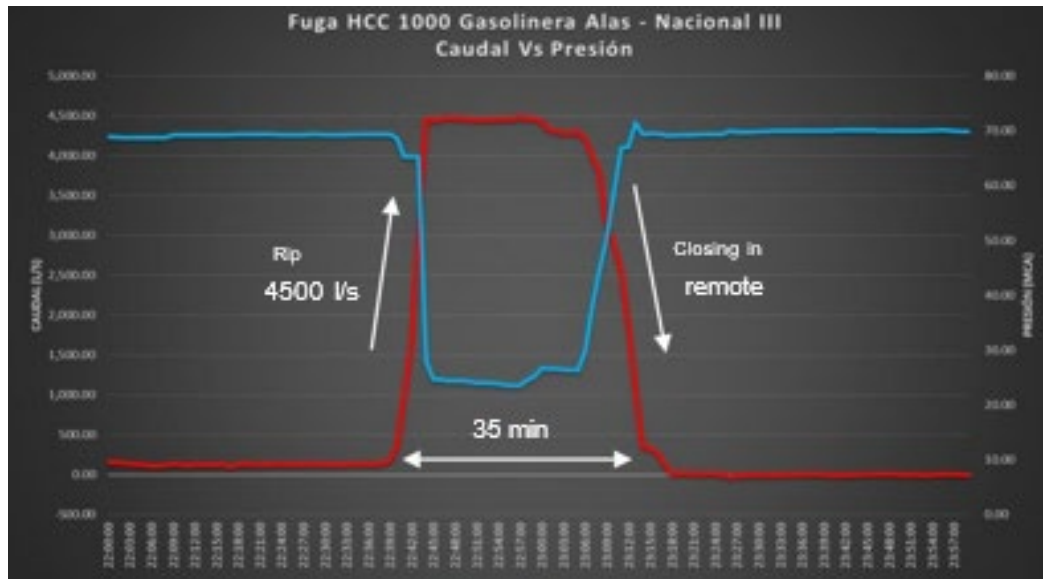


# Valencia Control Room (24/7): Control, Network Operation and Incident Detection

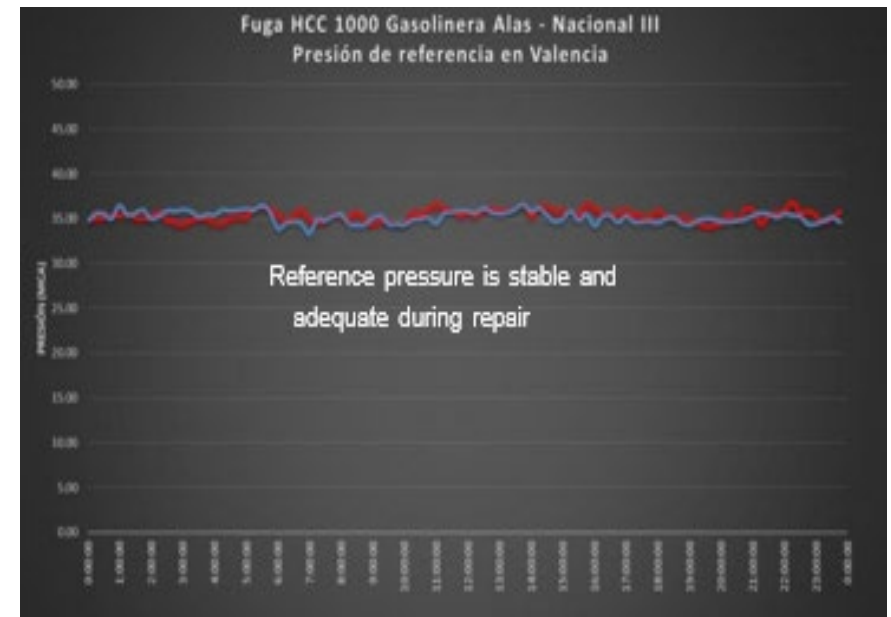
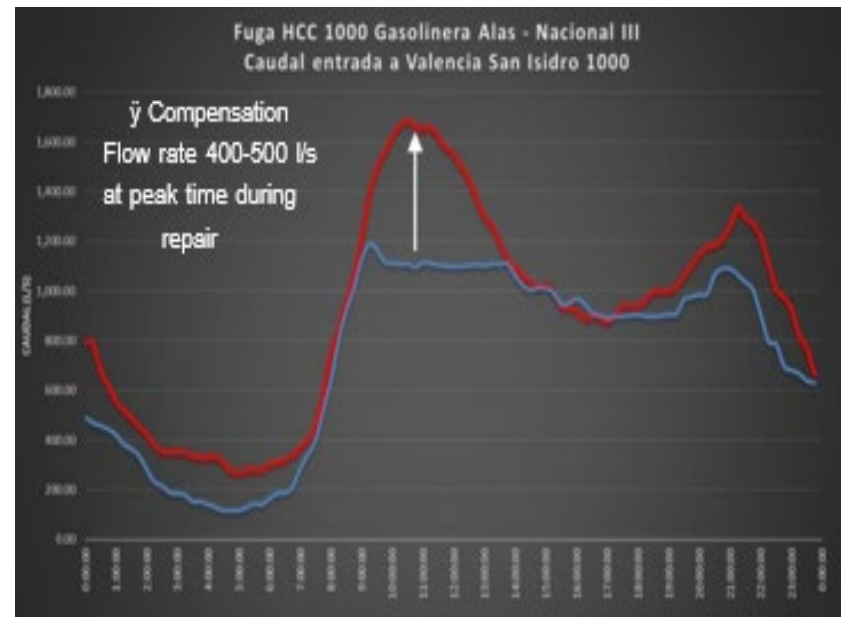
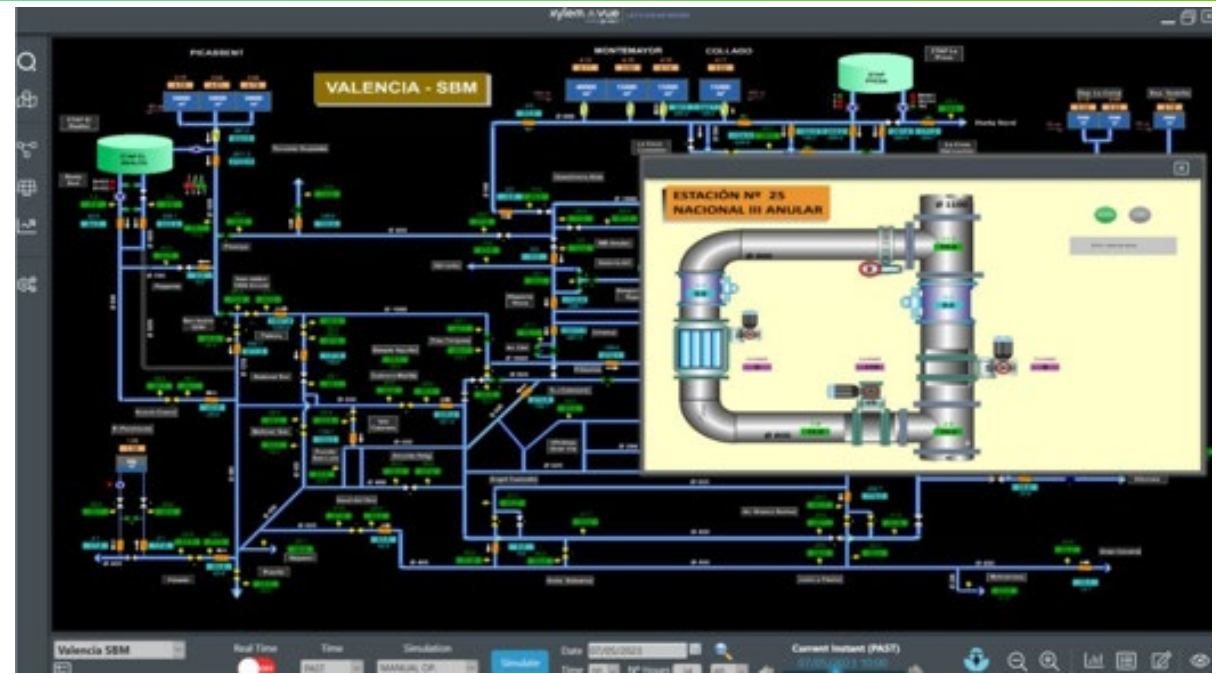




# 1,000mm Main Burst

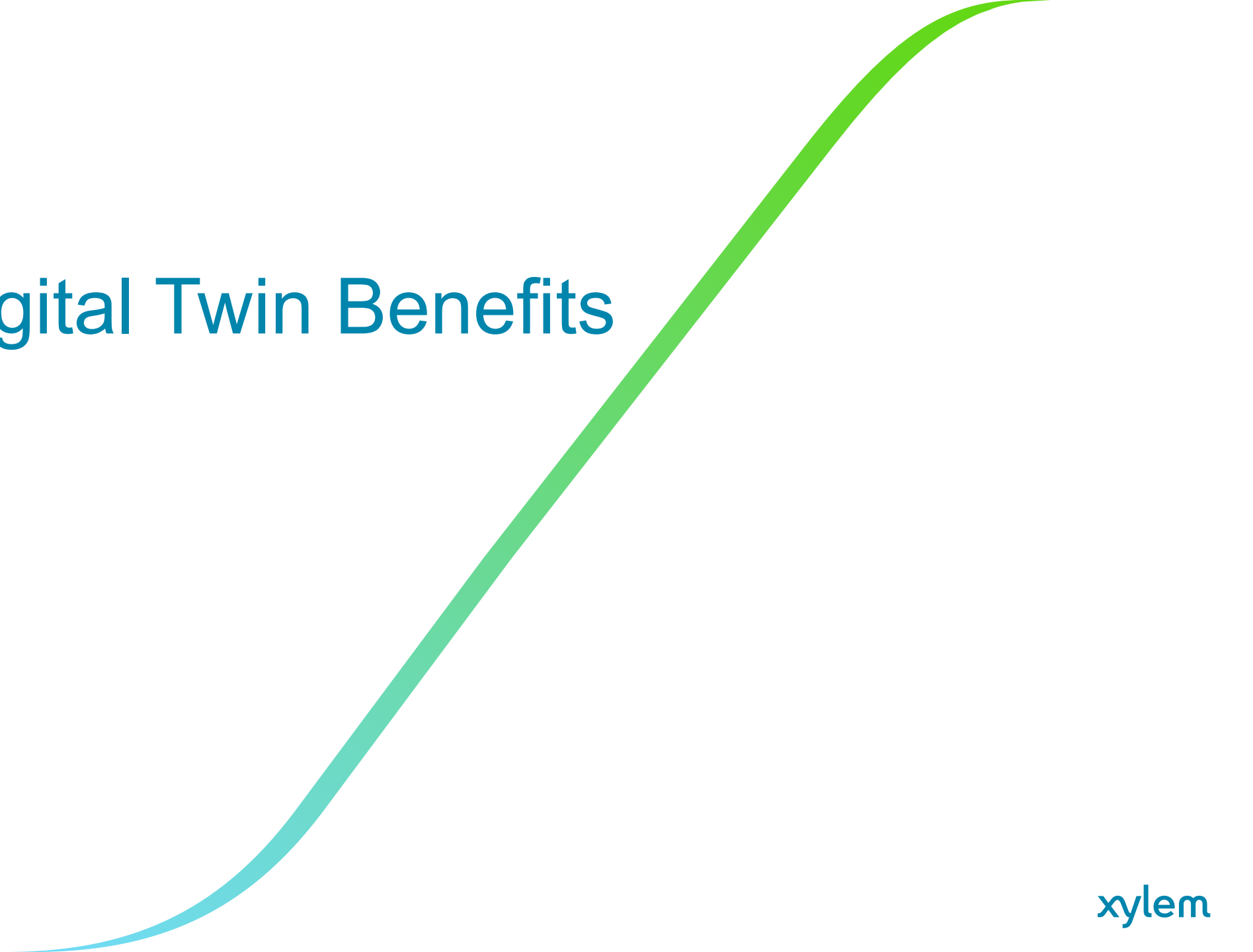


# 1,000mm Main Burst Response





# Valencia Digital Twin Benefits





**30% NRW**



↓ 20%

Maintenance OPEX



↓ 4500 TnCO<sub>2</sub>/year



60%

reduction in complaints

Thank you



**Martin Shaw**

**Business Development**

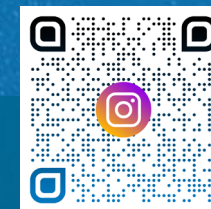
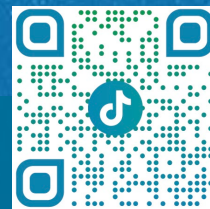
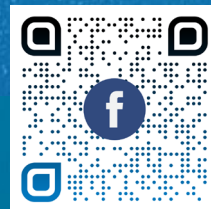
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Let's Solve Water