

# AQUADVANCED® Urban Drainage

Real-time optimisation of network operations to reduce overflows and achieve compliance



## AQUADVANCED® Urban Drainage, the real time optimisation software solution from SUEZ, was chosen to control the operations of SIVOM's network assets.

The SIVOM de la Région Mulhousienne (SIVOM) is responsible for the management of waste and wastewater in the Alsace region of France. The wastewater system includes a wastewater treatment plant (WWTP) to serve a population of 490,000 across a network of 791km with 40 stormwater facilities.

### Client issue

The combined urban stormwater and wastewater network in the Mulhouse region was built between 1897-1902.

SIVOM was facing challenges as the infrastructure wasn't designed to meet the new, 21<sup>st</sup> century, wastewater system regulations.

SIVOM challenges included:

- 15% overflows from the network, compared with the 4% allowed. This was the most pressing concern.
- Limited measurement points on the network
- Unused capacity at the wastewater treatment plant

To comply with local regulations, the initial master plan, written in 2003, required the utility to build additional storage of 45,000m<sup>3</sup>.

They realised that this focus on building 'grey' infrastructure was going to be expensive and add little value to the network.

A re-evaluation in 2015 suggested a smart network approach instead, implementing metrology and a real-time optimisation of the combined network operations. A new plan was devised.

This new plan involved several major changes such as:

- Creating a new pumping station
- Installing storage and regulation devices
  - 9 large storage valves on the largest interceptors
  - 13 controlled weirs, covering 80% of the main overflow points
- Building much smaller storage tanks
- Implementing a software to operate this evolved network in real-time.

### Solution implemented

SIVOM worked with SUEZ and chose its digital solutions. They recognized that SUEZ has 160 years of real world experience in the industry as a water operator as well as decades of market leading digital innovation.



Once the network upgrades had been completed, SIVOM was then ready to implement a digital solution to monitor and optimise network operations. They chose AQUADVANCED® Urban Drainage from SUEZ.

This solution has three levels of increasing decision support, each adding more functionalities for the management of the urban drainage system to avoid overflows:

1. Monitoring Module
2. Early Warning Module
3. Advanced Control Module



- **Monitoring module:** The starting level provides operators with real-time 360 degrees visualisation of network performance, showing the water levels at every designed overflow point, using metrology such as level sensors and rain gauges. This view of actual overflows also provides the operator with alerts, events, dashboards and the ability to run data analysis and customize KPIs. This can be directly exported for compliance reporting.
- **Early Warning Module:** The key addition here is the ability to anticipate the hydraulic behaviour of the network for the next three hours, up to three days in the future. This is done thanks to a hydraulic model and a detailed rainfall forecast provided at a one square km spatial scale, updated every 5 minutes. The software models and predicts water levels at any point in the network to help prevent flooding and pollution in river networks. It is the forecast of potential overflows that enables the operator to take action before the event happens.
- **Advanced Control Module:** At this level, the software facilitates the system to keep potential overflows within the network, using the regulation devices. AQUADVANCED® Urban Drainage enables the calculations of optimised operation strategies depending on network performance as well as current and future weather conditions. The set of strategies are used in real-time, controlling the regulation devices in the network.

Each of these modules can be implemented separately. However, the full combination of all three modules offers a complete solution towards overflow reduction, moving away from the need to build new assets.

## Differentiating factors

Most other solutions for sewage and stormwater stop at data visualisation, consolidation and reporting. The difference with the AQUADVANCED® Urban

Drainage solution is that it not only offers a state-of-the-art data monitoring in real time and reporting, but also gives the ability to predict water levels in the network and to make a significant difference in actually reducing the number and volumes of overflows.

Other features that make this solution a market leader include the way it eases the daily management of the network. It gives a clear vision and forecasts of the risks which allows the operator to prioritise tasks and resources, saving costs and energy. All data sources, processed information and decision-making tools are accessed from a single screen.

Available are a range of options. Examples include:

- Algorithm estimating pumping station flows and monitoring pump performance
- Calculation of the period of return of each rain event
- Monitoring of blockages and anticipation of the clogging of pipes
- Inflow and infiltration analysis. Assessing the capacity of the pipes taken by storm and ground water is a significant advantage to inform the network management strategy.
- Real-time multi-simulation and "What If" scenario work

The users are able to operate the tool via a user-friendly interface, creating and selecting as much analysis as required and visualise and automatically download comprehensive reports in minimal time.

Each network is unique and the software adapts to the local situation and requirements.

## The results

SIVOM chose to deploy the Advanced Control module, a full 360 automated option that has increased control over the whole urban drainage system.

It has enabled the operators to:

- Anticipate levels at any point in the network for the next 3 hours
- Detect anomalies and support equipment maintenance
- Visualise rainfall intensities of the past days, zooming in on the map to identify rain on a particular area
- Control the network automatically and in real time depending on the weather conditions
- Visualise all the operations in a single platform, accessed remotely using different devices
- Have a better understanding and forecast the impact in the receiving environment
- Easily identify the locations and impacts of impervious surfaces
- Monitor the energy consumption and flow of each pump in the pump station.
- These features have enabled the following tangible benefits:
- Comply with regulation, decreasing overflows by a staggering 75%, going from 15% to less than 4% of the collected flows
- Reduce the implementation cost by ~55%
- Operators were able to manage their time more efficiently, reducing the time invested on overflow mitigation.

The Advanced Control module of the AQUADVANCED® Urban Drainage added value to the management of the wastewater network by not only cutting investment and operating costs, but also by saving valuable time previously dedicated to network data visualisation, management and reporting. The system also exceeded the legal requirements of the regulator.

**The implementation of this real time solution helped cut a 55% of the initial investment required**

## The future

For the Mulhouse region, SIVOM has gone beyond their initial scope of the Advanced Control module of the AQUADVANCED® Urban Drainage.

Having achieved compliance, the operators are looking at other positive impacts the tool can have, now focusing on the wastewater treatment plant. For example they forecast 250k€ savings in energy costs by treating flows at night using off-peak energy tariffs. They can treat at night, because they now can hold flows in the network.

They are thinking of using AAUD to help assess future and possible events and risks in different scenarios. SIVOM is not only using the platform and the extra features and options consistently, but they are now also connecting the open platform with other innovations to make sure they excel on their daily and future challenges.

The SIVOM experience shows the adaptability and strength of the software; a proven solution for robust overflow and flood protection for all areas at risk.

### Need more info?

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## AQUADVANCED®, your choice

Unlike other existing solutions in the market, the suite of AQUADVANCED® represents a full ecosystem of solutions that covers the whole water cycle. These can be easily combined offering a full range of features to manage water resources, treatment plants, water networks and real time optimisation and control of the water supply network.

With more than 160 years of experience in water operations and more than 1000 AQUADVANCED® installed across the globe, this solution has become a world leader in water operations systems.

