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Case Study WTW Modernisation and Capacity Enhancement

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Axius Water companies

CASE STUDY

Wiltshire, WTW Modernisation and Capacity Enhancement



Project Overview

The Wastewater Treatment Works (WTW) in rural Wiltshire is a facility that supports a catchment of 3,225 Population Equivalent (PE), with growth expected to reach 3,518 PE by 2035. In response to increasing demands and regulatory pressure, a comprehensive modernisation project was initiated to enhance capacity and ensure long-term compliance.

Background & Challenges

The WTW faced two key regulatory drivers:

- U_IMP5: Increase Flows to Full Treatment (FFT) capacity
- U_IMP6: Expand stormwater storage capacity

Both objectives had to be achieved by March 31, 2025, while accommodating projected population growth. Hydraulic limitations and aging infrastructure required significant upgrades in flow control, stormwater management, and process automation.

Existing Infrastructure

- Sewer Network: Gravity-based with 5 pumping stations
- Screening: Dual 6mm 2D Rotamat screens
- Primary Treatment: 2 Primary Settlement Tanks (PSTs)
- Biological Treatment: 3 Mineral Media Trickling Filters
- Final Settlement: 4 Humus Tanks (1 conical, 3 pyramidal)
- Storm Management: 2 Storm Tanks
- Sludge Handling: 2 Sludge Holding Tanks

Modernisation Solutions

Storm Storage Enhancement

- Installation of new storm tank (glass-coated steel)
- New gravity-fed pipeline connecting existing and new storm tanks in series
- Flyjet-type cleaner pump for sediment management
- Storm return pumps in duty/standby configuration with new 100mm rising main
- MCERTs-compliant event duration monitoring

Flow Control and Flume Improvements

- New packaged GRP inlet flume installed 250mm higher to correct head loss
- Actuated penstock for flow control
- 28 l/s FFT target achieved with upsized feed pipework
- Existing flume retained during commissioning of the new flume for seamless transition

Recirculation and Automation

- Replacement of Xylem NP3085 pumps with updated models
- New automatic control system integrates:
 - Flow to treatment
 - Storm return flow
 - Works return pump status
- System governed via 24-hour programmable logic with real-time monitoring
- HMI panel for user interface and control



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Engineering Works

Civil

- New concrete bases for flume and storm tank
- Pipe trenching (approx. 80m) for storm return rising main
- Core drilling and inlet/outlet connections
- Storm tank access platform installation

Mechanical

- Glass-coated steel storm tank
- Dry well storm return pumps
- Storm tank cleaner pump
- New penstock, inlet pipework, and tank cleaning jet systems

Electrical

- New form 4 control panel with:
 - ABB ACQ580 VSDs for recirculation
 - Starter sections for all pumps
 - Mitsubishi PLC and RS232/HMI interface
 - Ultrasonic level monitoring and flow control

instrumentation

- Integration of controls, alarms, and out-of-hours operation capabilities

Project Highlights

- Automated recirculation management using real-time flow data
- Packaged GRP flume enables minimal civil disruption
- Reuse of existing infrastructure where feasible for cost-efficiency
- Modular design allows future scalability

Outcomes

- Regulatory compliance achieved (U_IMP5 & U_IMP6)
- FFT capacity increased to 28 l/s
- Enhanced storm resilience with additional 56m³ storage
- Reduced operational risk with automated control
- Designed to support growth to 3,518 PE by 2035

Key Learnings

- Importance of early planning to account for future population growth
- Seamless integration of new and legacy systems
- Automation significantly boosts operational reliability
- Stakeholder collaboration (civils, ICA, mechanical) is key to delivering complex upgrades

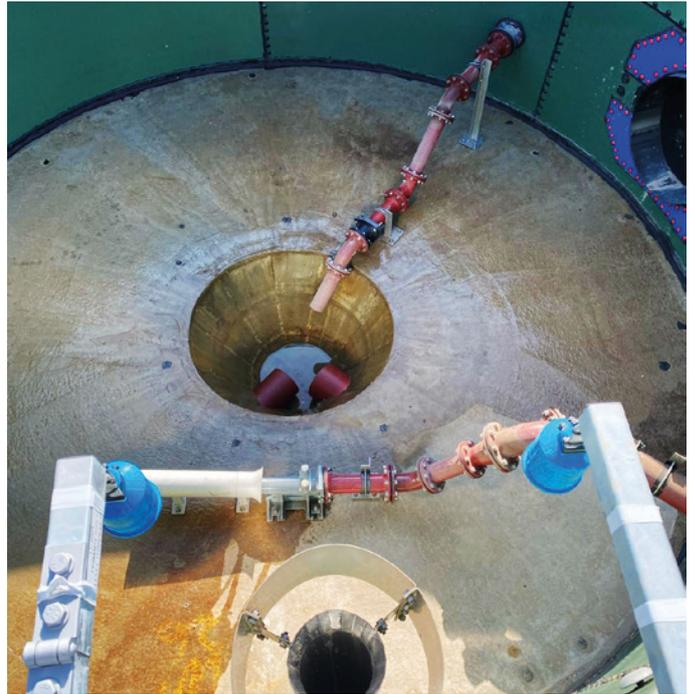
This project serves as an example of how rural wastewater treatment facilities can be upgraded to meet both current regulatory requirements and future capacity needs while maintaining operational efficiency.



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