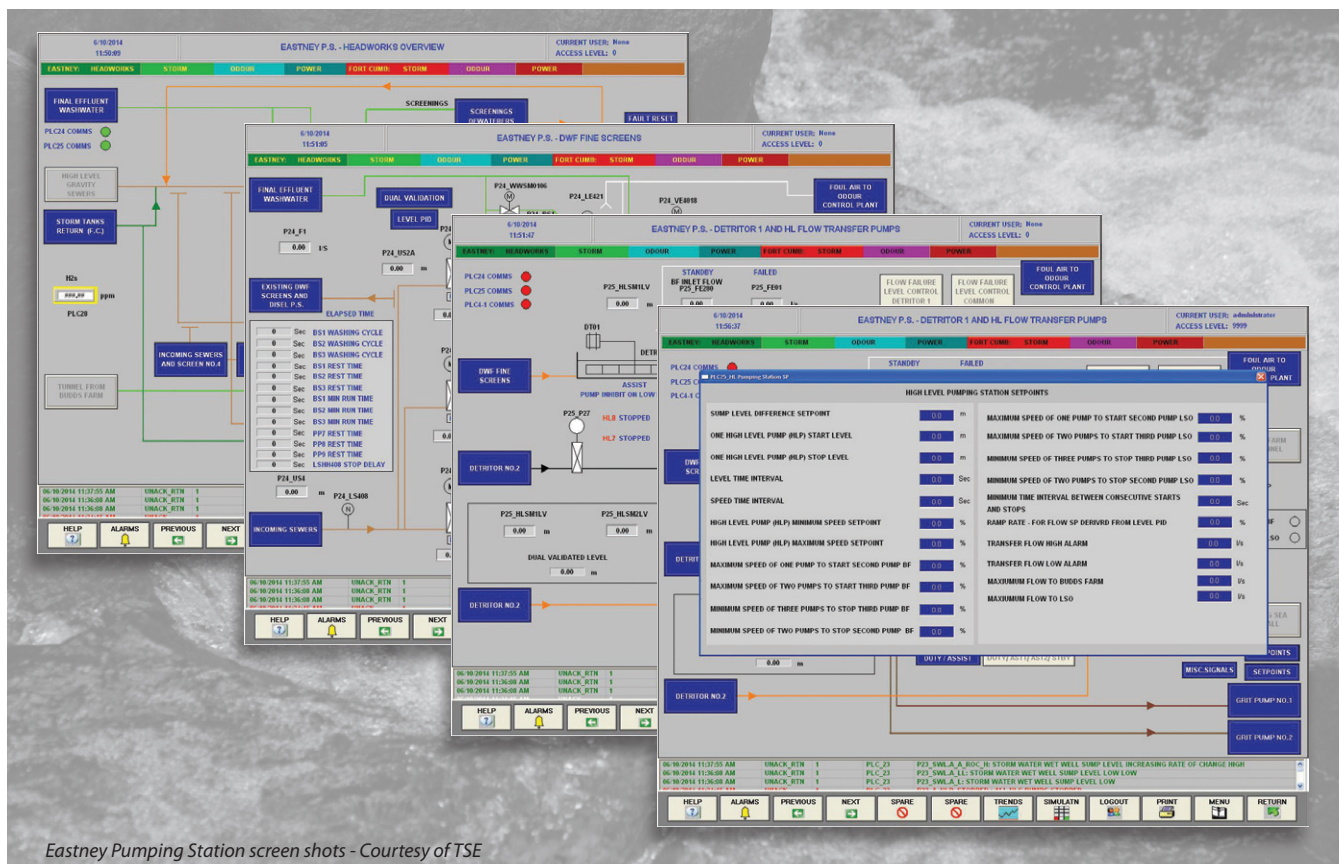


# Eastney Pumping Station SCADA Upgrade

## upgrading an obsolete system that is no longer supported by the vendors

Eastney Wastewater Pumping Station is located in Portsmouth in Hampshire and manages flows from both Budds Farm treatment works and local sewers. During storm conditions, the site also pumps to Fort Cumberland storm tank. Southern Water's wastewater headworks and pumping station at Eastney has been in operation since 1868, the year of three prime ministers – the Earl of Derby, Disraeli and Gladstone. The James Watt & Co. beam engine pumps of 1887, housed in the original Victorian engine house, were replaced with diesel engine-powered pumps in 1954 and preserved as museum pieces.



### Background

The site is controlled by 17 (No.) PLCs with interlocks and control interactions between them. Nine of these PLCs are GEM80 type, which are obsolete and are no longer supported by their vendors. Spares are almost impossible to obtain and consequently, the systems are not maintainable. The site currently has two types of SCADA system, Wonderware Intouch and Imagem.

### Undertakings

BTU, a Southern Water Tier 1 contractor, appointed TSE to refurbish and upgrade the site-wide SCADA at Eastney WwPS. The contract was awarded in April 2013 and is due for completion 31 October 2014. BTU provide design, construction and asset optimisation services in reactive and planned maintenance and capital projects region-wide in both water and wastewater non-infrastructure and infrastructure.

### Eastney WPS - existing works

Eastney WPS had a new control system installed in the early 1980s. The system employed at the time was the Alstom Gem80

platform which was extensively used in industrial automation. The PLC hardware is now predominately of two variant types; (i) GEM80/131 and GEM80/400s, and (ii) Allen Bradley SLC 5/05s. Each of the Gem80s is connected to one other to form a communications network via an existing GEMLAN-T Ethernet network. The existing SCADA visualization system Imagem is connected locally to the site master PLC via RGB cable. The existing SLCs are connected via a more recent (circa 2000) fibre-optic, Ethernet-based system.

### Eastney WPS - improvements

After commencement of the work, the scope was critically reviewed and shortcomings in relation to the effectiveness of the scheme were identified. These scope items are essential for the current project to meet the desired objectives. Following a detailed study of the existing systems at Eastney, Wastewater Pumping Station the following upgrades and refurbishments were identified:

- The upgrade to a modern serviceable system that is easily maintained ensures reliability and allows for future expansion, additions and modifications.



Refurbishment of 6 nr diesel engine control panels at Eastney WPS  
Courtesy of TSE



Eastney Pumping Station  
Courtesy of TSE

- The control philosophy contained within existing GEM80 PLC code was reverse-engineered and re-implemented in Rockwell Allen-Bradley Control Logix PLCs. A new integrated Wonderware InTouch SCADA system replaced all existing SCADA/HMI components to provide a single site-wide SCADA system.
- In order to provide the most reliable system available, high reliability SCADA architecture was employed consisting of a 'self healing' fibre optic ring for site wide communications (<10ms recovery time), dual SCADA servers and an ultra high reliability historic data storage server, provided by Stratus Technologies.

times, taking typically less than 2 minutes to reconfigure a new client, thanks to the implementation of the ACP thin client manager software suite. The entire system is backed by a UPS system to ensure any power shortage has no effect on the control systems.

The SCADA project is just one of a number of improvements being undertaken by Southern Water at Eastney Pumping Station to ensure the site run as efficiently as possible.

Commissioning of the SCADA project comprised a rolling programme over a period of 12 months, phased by process area in order to manage risk.

**System architecture**

For further system integrity, thin client technology has been utilised. This ensures that exterior influences are not able to infiltrate the system from the control room. This also allows for very fast recovery

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