

# Southern Water K3 West Region

## 3 example upgrades within five year £120 million investments

by  
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**D**uring the five year period 2000 – 2005 Southern Water will have invested £120 million in more than 60 different schemes; three of which are featured in the following pages. Firstly, a £4.2 million scheme at Storrington, West Sussex, which is a good example of an upgrade being carried out on a confined site. The second is a £1.2 million scheme at Forest Row, East Sussex where the solution focussed on the site's rural location. Finally, a £1.4 million scheme at Alresford, Hampshire, which has improved the water quality in areas sustaining watercress beds and a trout farm.



Storrington WwTW overview

courtesy Southern Water

### Storrington

Storrington Wastewater Treatment Works was built in 1961 as a conventional biological filter bed works to serve the village (design population 7,100). The works was previously consented to discharge treated effluent with a maximum concentration of 40mg/l (SS); 20mg/l BOD); and a peak flow to treatment of 46.8 l/s. The scheme driver was to improve quality of the final effluent and increase the capacity of the works, so that full flow to treatment was 47 l/s with 432 l/s being taken as the maximum flow received. The solutions have also overcome historic problems of localised flooding at the treatment works under storm conditions.

Flooding was largely occurring because the outlet pipe from the old storm tanks was too small at 275mm. During the project the outlet was replaced with a 700mm pipe and the inlet works upgraded with new screens and a pumping station. In addition, two new storm tanks were constructed on the site, as was a new pumping station to receive drainage flows from an adjacent depot.

Tertiary treatment in the form of two moving bed sand filters and

introduction of two new conical primary tanks, together with various improvements throughout the treatment works, have improved the final effluent quality. In addition, facilities for treating sludge have been upgraded with a new sludge thickener, thickened sludge transfer pumps and a sludge storage tank being installed.

The site is controlled by a new SCADA system operating via a *Profibus* network with “intelligent” motor starters. This is only the second system of its type used within Southern Water and offers several benefits, including a smaller and cheaper motor control centre (MCC) and enhanced fault detection and control systems. All routine control is performed from a touch-screen interface. Intelligent MCCs are now being used on several other schemes.

All improvements to the treatment works have been designed to have a minimal impact to the environment and, where feasible, the natural environment has been enhanced. The site includes an area of overgrown land that had become a habitat for deer, badgers



Storrington: Storm screen & humus tanks

courtesy: Southern Water

and grass snakes. Early in the scheme the team decided to leave the area undisturbed by construction work and fence it off to prevent unauthorised access. This made the site particularly compact and meant that all new structures had to be built on the existing operational site, using space occupied by the existing works or by redundant structures. Careful programming and liaison with operational staff ensured that consent compliance was maintained during construction, using overpumping and temporary process units where necessary.

## Forest Row

Forest Row Wastewater Treatment Works is a conventionally configured biological filter bed works with a design population of 4,508. It needed upgrading to meet the updated Environment Agency discharge consent of 15mg/l SS, and 10mg/l BOD with a new ammonia standard of 5mg/l, in addition the capacity of the works needed increasing to 35 l/s (3DWF).

Four reed beds were installed to achieve the tighter consent standard instead of the alternative option of sand filters. This was largely because a field adjacent to the site (owned by Southern Water and used for grazing cattle) was big enough to house approximately 2,700m<sup>2</sup> total reed bed area and because reed beds suited the rural environment of the Forest Row site. The robust operation, relatively low capital cost of reed beds and low operating costs made them the favoured option.

One of the main issues at the site, however, was access, because the site is reached via approximately 1.5 miles of single track road which also serves several houses. This was an issue, particularly when 1,200 tonnes of gravel needed to be imported onto the site, to fill the reed beds in 120 lorry loads. *BVC* developed a system in which lorries would work in convoy, escorted by site staff, and implemented a one way system for construction traffic. All of these measures helped to develop good local public relations, and were rewarded by a letter of congratulations from a resident following completion of the work.

## Spring Gardens

The Spring Gardens site at Alresford, in Hampshire comprised a terminal Wastewater Pumping Station (WPS) with an unconsented Combined Sewer Overflow (CSO) in a semi-rural location with both a farm and houses bounding the site. The WPS serves a

population of 5,450 from the village and surrounding rural area, transferring all flows to the New Alresford Wastewater Treatment Works. The work undertaken was necessary to satisfy Environment Agency requirements that the CSO achieve a consent with all storm flows being screened and every spill event recorded via telemetry. A trout farm and watercress beds are nearby, so the reduction in spills and the screening at the CSO was important to improve water quality in the area.

One option considered was to upgrade the existing pumping station and rising main, but a more favourable option presented was that of installing an on-site stormwater storage tank. Additional works included constructing a 350mm diameter pipeline and headwall, installing telemetry, a motor control centre within a GRP kiosk and a screen in the CSO structure.

*BVC* constructed the stormwater tank to a depth of 11 metres and 10.5 metres in diameter, giving a storage volume of 340,000 litres. Groundwater levels at the surface complicated construction, with excavation through hard chalk having to be carried out underwater. Concrete was poured to a depth of six metres to form a plug and prevent infiltration.

The site was within 300 metres of an SSSI so, secure two-stage drainage lagoons were built to de-water spoil from the site. Precautionary water samples taken both upstream and downstream of the site indicated that no contamination of the local stream or SSSI had occurred.

The scheme was successfully accelerated to achieve the consent compliance of 31st March 2004, nine months earlier than the original planned completion date.

*Many of the capital investment schemes in Southern Water's 2000 – 2005 programme are being designed and constructed by two contractor-led teams including integrated Southern Water staff. In the West Region, the Black & Veatch/Costain (BVC) joint venture is managing the contract. ■*

**Note on the authors:** Jeremy Biddle, Lead Engineer with *Black & Veatch/Costain (BVC)* wrote the articles on Storrington & Forest Row; Philip Wiltshire, Scheme Manager, *BVC*, wrote the 'Spring Gardens' article.