

Kinson, Palmersford & Wimborne STWs installing tertiary ultraviolet (UV) disinfection

by

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Wessex Water's AMP3 programme required three sewage treatment works (STWs) located in Dorset to be fitted with tertiary Ultraviolet (UV) disinfection. The plants at Kinson, Palmersford and Wimborne, had to be operational by 31 March 2004. These three projects followed the new UV disinfection projects successfully installed at Poole, Wareham and Lytchett Minster STWs by the 31 March 2003. UV disinfection is required at the three sites to meet Christchurch Harbour bathing water requirements.



Installing tertiary UV disinfection at Wessex STWs

courtesy: Wessex Water

Background

Parameters for each site are:

	Wimborne	Kinson	Palmersford
Consented DWF	122 l/s	216 l/s	64.8 l/s
Consented FFT	370 l/s	452 l/s	194 l/s
Effluent Quality BOD/SS/AmmN	20/40/10	15/25/5	30/40/15
Population Equivalent (2021)	51,236	49,915	30,842

Technical solution & standards

The additional consent requirements of the Environment Agency for the UV plants were as follows:

Intensity	5 mW/cm ²
Applied UV dose	30 mJ/cm ² at Kinson and Wimborne 34mJ/cm ² at Palmersford
Minimum Transmissivity	45%

Each site has been fitted with three banks of low pressure, high intensity UV lamps mounted in a single concrete channel. The banks operate as duty, assist, standby units. The output from each bank can be varied within a fixed range by controlling the power supplied. This is adjusted according to dosing requirement, calculated from flow rate and effluent transmissivity.

The UV equipment is from *Trojan UV 3000* range, supplied by *Sunwater*.

At **Kinson** and **Wimborne** the existing gravity final effluent discharge pipe has been diverted to new pumping stations that lift flows to the new UV plants. The pumping stations are fitted with duty/assist/standby variable speed pumps whose operation is matched to the rate of inflow. The pumping stations are needed as the available head in the existing system was less than the head loss through the UV plant. At these sites it was also necessary to raise the UV channel above the flood level.

At **Palmersford**, a smaller pumping station was needed to transfer flow from one of the three treatment lanes to the new UV plant.

Other works included new standby generators at Kinson and Wimborne, new inlet screen at Wimborne and various operational improvements. The total cost of works at the three sites is approximately £4.5 million.

Programme management & strategy

Kinson, Palmersford and **Wimborne** are located within 10 miles of each other, to the north and north east of the Poole and Bournemouth area. The three projects were managed so that contractors could make good use of the summer period of 2003. The intention was to test and commission the sites by the end of 2003, well ahead of the regulatory deadline of 31 March 2004. A single Wessex Water project manager was put in charge of all three schemes to ensure:

- * consistency of designs and specifications set for suppliers;
- * continuity - using lessons learnt on Wessex Water’s earlier UV projects;
- * co-ordinated delivery of outputs with the company’s operations and commissioning staff.

Kinson and **Palmersford** were indeed fully tested and operational by Christmas 2003. **Wimborne** was operational with its new inlet screens by early March 2004. All were completed successfully by the regulatory deadline of 31 March 2004.

Procurement strategy

In 2002, Wessex Water had allocated the three projects to its alliance arrangement with contractor *Costain Ltd* and designer *Carl Bro/Haswell*.

They were advanced to the outline design stage by the alliance, where target costs were then agreed with *Costain Ltd*, using option C of the new engineering contract. This work was co-ordinated in order to maximise the use of the summer months on site in 2003.

By grouping the three schemes as a single bundle of work the Alliance made significant savings. For example:

- * management supervision was targeted at using a single agent and quantity surveyor for the three sites;
- * the same Wessex Water commissioning engineer worked on the three projects;
- * the same Wessex Water operational contact worked on the three projects;
- * design work was undertaken in a co-ordinated sequence by the same team members, ensuring consistency and use of previous lessons learnt;
- * construction work was organised so that sub-contractors and suppliers (carpenters, fixers, concrete gangs etc) could move from one site to the other, in a logical planned sequence

The UV supply was tendered and awarded by Wessex Water to *Sunwater Ltd*. This contract was then novated across to *Costain Ltd*, once the target costs had been agreed.

Whilst preparing the UV tender documents and in the assessments of the tender received, the project team focussed on assessing the likely whole life cost of the plant. Wessex Water has built more than ten UV plants since 1998.

Conclusion

Procuring these UV projects as a bundle of work has proved to be more efficient and successful for Wessex Water. ■

Note on the authors: *D. Powell is Project Manager & D Modley: Programme Manager, both with Wessex Water.*



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courtesy: Wessex Water