

Yorkshire Water – Crofton WwTW

meeting consent & improving river quality

by

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Yorkshire Water's Crofton STW, located just to the south west of Wakefield, serves a population equivalent of 9,640. The existing works comprised of a raised inlet works, two primary tanks, a pair of activated sludge lanes and two final settlement tanks with co-settled sludge stored within lagoons. The works must comply with the UWWTR and also has to meet a RQO spot final effluent consent of 13 mg/l BOD and 6 mg/l Ammonia. It does not currently comply with the required quality standards.



Removing groundwater for construction of final settlement tanks

courtesy: Gleeson/MWh JV

The works effluent currently meets the existing consent of 35 mg/l SS and 25 mg/l BOD but is some way off the future standard and much of the mechanical and electrical equipment is life expired. In addition, the plant is to be capable of treating a DWF of 4,550m³/D as against the current 2,300 m³/D

Rejected options

The new consent reflects the sensitive nature of the receiving watercourse, therefore, options considered included transferring existing effluent to the nearest alternative less sensitive river. On site alternatives included provision of tertiary nitrifying filters or sand filters to remove solids and associated BOD. These options were rejected either on the ground of risk or excessive cost.

Description of chosen option

- * refurbish existing inlet screw pumps and provide a new pumping station with submersible pumps to pump storm flows;

- * replace existing screens with 6mm 2d *Jones & Atwood* band inlet screens complete with bypass and new screenings handling and grit removal plant;
- * provide new *Longwood Escalator* storm screen, screenings handling plant and *Flyjet* storm tank cleaning;
- * provide anoxic selector zone within existing activated sludge tanks, revised aeration facilities to reprofile the aeration lanes and a new control system;
- * refurbish RAS screw pump and provide new control system;
- * provide scum removal to existing final settlement tanks;
- * new 22.5m dia. final settlement tank;
- * new sludge storage tank with liquor decant;
- * 2 No. sampling facilities;
- * miscellaneous maintenance and safety items.

The work is predominantly of mechanical and electrical refurbishment with the exception of the final tank where extensive civil works are required.



Bridge Street

courtesy: KMI Water

The team

Wastewater West is a Joint Venture team of *MJ Gleeson and MWH* working in partnership with Yorkshire Water to deliver wastewater schemes during AMP3 in the mainly urban area of the M62 corridor. The schemes are awarded under the Capital Solutions Partnering Agreement with individual contracts issued as a brief containing a description of the problem to be solved, the Target Cost and required date for completion.

Construction

Site investigations revealed that ground water was not present at the depth required for construction of the new final settlement tank. However, during excavation within the fissured mudstone, excessive ingress of water was experienced. The source of ingress was assumed to be from old mine workings in the area.

Design checks revealed that the proposed tank did not require amendment to account for groundwater. However, diesel pumps were required to operate constantly in an effort to keep the excavation dry. The initial concrete pour to the sump was affected by water ingress and operations ceased in order to investigate alternative methods of construction.

Well point dewatering was rejected, as it was not clear if flows within the fissured mudstone would reach the well points. Eventually, it was decided to place three 150mm dia. pipes vertically at the corners of the excavation, to below the base slab level, with submersible pumps placed in each pipe to transfer ground water via settlement tanks away from the excavation.

Rather than attempt to repair the defective sump a novel solution was adopted. This consisted of removing the top 50mm of the existing slab and replacing it with a 25mm thick *Scotchcote* coated steel tub complete with shear connectors placed onto a bedding screed. Reinforcement to the base slab is tied into the shear connectors. The tub now forms part of the permanent installation. Working this way enabled working in the dry until sufficient strength had been achieved to facilitate removal of the pumps and will ensure the project is completed within the required timescale.

Frail equipment

The frail nature of mechanical equipment on the site was highlighted by the complete failure of the bottom bearing to the RAS screw pump only a few weeks prior to work commencing on refurbishment of the pump. Operational and construction staff met to discuss how to continue the operation of this important process. The remedy was installation of a temporary pump and associated pipework enabling the works to remain within consent. This incident highlighted the good working relationships with all members of the team.

Programme

The date when new consent comes into force is the 16th of June, so all major process work has to be beneficially complete by this time. Contractual completion is 30th September 2004. At the time of writing the work is on programme to meet the specified date. ■

Note on the authors: *David Young is the Project Manager seconded to the Gleeson MWH Joint Venture from MWH; Ronney Vas is Yorkshire Water Solution Manager.*