

# Corsehouse WTW Upgrade

## £7.5m project to upgrade water quality in Ayrshire

by Brian Martins

**T**he Corsehouse WTW supplies the town of Stewarton and the villages of Dunlop, Lugton and part of Fenwick as well as the surrounding area. The population served is approximately 8,900. The treatment works is supplied from two raw water sources at Corsehouse & Whiteloch Reservoirs and has a design throughput of 5.5 MI/d. Increased throughput to the existing works has resulted in water quality problems with PCV failures for THM, aluminium and manganese. The upgrade under Scottish Water's Q & S IIIa programme will enable works to meet compliance for drivers for THM100, Manganese, Aluminium, Crypto and Disinfection Control and improve performance of the works to handle the raw water quality at maximum throughput and remain compliant with DWQR Regulations. It will also improve operator safety.



Corsehouse WTW MCC Room during installation

photo courtesy of GMJV

### Existing works

Built in 1974, Corsehouse WTW currently treats raw water abstracted from Corsehouse and Whiteloch Reservoirs to supply the local town of Stewarton and surrounding farms. To supplement the available yield, raw water is also pumped from Long Loch.

The works is primarily a two stage process comprising of a works inlet chamber, two pulsator clarifiers, three rapid gravity filters, a contact tank/backwash tank, a clear water tank and three washwater recovery tanks.

Sludge from the clarifiers and wash water recovery system are discharged to a sludge lagoon where the solids are settled and the supernatant discharged to a local watercourse. The sludge is removed periodically by tanker for treatment elsewhere. Supernatant from the wash water recovery system is returned to the works inlet where it is blended with the influent raw water.

### Options

Options considered involved laying a large diameter main through local communities but have now been dropped in favour of upgrading the existing water treatment works.

### Solution

A new inlet dosing and mixing tank is being constructed to optimise the chemical dosing.

As the existing RGF's do not operate effectively there was insufficient capacity to comply with current design requirements. This meant that four new Primary RGFs were required and these have been constructed and are housed in a steel framed building.

The existing filters are being modified to become secondary manganese removal filters and interstage pumping has been provided between the new primary and the now secondary filters.



Corsehouse WTW Inlet works under construction

courtesy of GMJV

To meet quality drivers the following upgrade to the works has been undertaken:

- \* **Inlet Works:** Addition of new modulating inlet valves, flowmeters and new flash mixing chambers for lime & alum.
- \* **Clarification:** The existing pulsator clarifiers will remain in current operation.
- \* **Primary RGF:** A new primary rapid gravity filter building will be constructed to house five filters, backwash & interstage pumping, new poly plant, new chlorine plant, air blowers and associated MCC.
- \* **Secondary RGF:** The existing primary RGF will now become secondary filters. Filter media will be changed, nozzles replaced and open/close actuated inlet valves added but the rest of the process & kit will remain as currently installed.
- \* **Chlorine Contact tank:** The existing chlorine contact tank will remain as existing with new chlorine dosing line and residual monitoring.
- \* **Washwater Recovery:** Three existing tanks will be refurbished, one new tank will be added, four actuated penstocks and eight actuated valves. New wash water pump house will consist of two sludge transfer pumps, two supernatant return pumps (VSD), two sludge lagoon pumps and associated MCC.
- \* **Mains Power:** The existing 50KVA mains power supply will be upgraded to 150KVA with new main switchboard.

- \* **PLC/SCADA:** The existing PLC & SCADA will be upgraded to include new MCCs via serial interface.

The existing Coagulation dosing system will **also be upgraded**. Although the existing storage tanks will remain the dosing pumps and pipe work will be replaced. A new bund will be constructed around the existing tanks.

The existing lime dosing system will be completely upgraded to include new lime silo with new batch weighing system including conveyors, 2 additional dosing pumps and upgrade existing pipe work with automated valves, new dosing lines, new lime MCC and replacement of existing VSD drives. A new bund will be constructed around the existing tanks.

A new poly plant will be installed within the new filter building and the existing poly plant will be de-commissioned. A new chlorine plant will be installed within the new filter building and the existing Chlorine Plant will be decommissioned.

The existing control equipment, which has virtually no automatic control, is being de-commissioned to allow the plant to operate to original design specification including washing on a 24 hour cycle and utilisation of air scour with overall control now being fully automated.

As current disinfection control is poor due to the condition of the existing shared contact tank and wash water recovery, a separate chlorine contact tank will be provided.

Other work includes the upgrading of the existing lime handling and dosing system to include the provision of a new silo, screw feeders,

mixing tanks and an automated dosing system and the provision of Polymer and Aluminium dosing plant.

### Undertakings

The upgrade of Coursehouse WTW started in March 2007 and is due to complete in December 2008. The main contractors for the project are **GMJV (Galliford Try/Morgan Est joint venture)** in partnership with Scottish Water Solutions, and the consultants are **Entec**. The principal sub-contractors are **WGM** for the mechanical installation and pipework, **EPL** for the electrical installation, **Cema** for the MCC & Scada/PLC and **Processplus** for the instrumentation. Process plant suppliers included **Proshield** for lime and alum, **Nomenca** for poly & chlorine and **AMT** for the filters.

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Coursehouse WTW - generator

courtesy of GMJV



Coursehouse WTW - New Washwater Recovery Tank

courtesy of GMJV