Ford Quality Scheme
new service reservoir for Mid-Kent Water

Water from Mid Kent Water's borehole at Ford, Near Herne Bay in Kent contains unacceptably high levels of fluoride when the borehole is operated at maximum capacity. Current and future demands in the Herne Bay and Canterbury areas have made it necessary to increase the utilisation of this borehole. Options to deal with the fluoride were considered and the chosen option was dilution by blending with waters from three other borehole sources. This blending is achieved in a new service reservoir.

Ford Quality Scheme:New service reservoir under construction *photo courtesy Jacobs Babtie*

Modelling of the local distribution system had revealed the need for 8.5Ml of storage to provide the required security of supply during peak demand in the summer and in the event of temporary loss of supply from one or more of the boreholes. A service reservoir of approximate dimensions 60m x 40m x 4.5m high was, therefore, designed.

Blending is achieved by a combination of stainless steel baffles and mixing of waters as they passed through the service reservoir. The service reservoir is constructed as two cells to allow one half to be emptied for maintenance purposes. The inlet pipework has been designed to act also as a reservoir by pass thus eliminating lengths of dead water. The bypass is provided for the extremely unlikely event of needing to take both cells of the reservoir out of service simultaneously,

The service reservoir is constructed on the Woolwich Beds sand. The geotechnical investigation of the site indicated that this material would be prone to washing out, forming large voids in the event of a leak from the service reservoir. Consequently, an impermeable layer and under-slab drainage system have been provided to both prevent this occurrence and to detect any leakage as soon as it occurs. Mid Kent Water had suffered a previous problem of a service reservoir being undermined and were obviously keen to avoid a repetition. The under slab drainage comprises an impermeable layer protected by fine sand and a drainage membrane that will convey any water that does leak from the base or walls of the reservoir to a system of pipes and a measuring chamber.

Contract

The form of contract adopted for this scheme was the EEC Option D. Under this form, the designers, Jacobs Babtie, undertook detailed design and produced a Bill of Quantities for Contractors to price. The successful contractor, Nuttall Hynes, was then incentivised, by means of a pain gain share mechanism, to bring the contract within the target cost. Nuttall Hynes employed their own designers Pell Frischman, to undertake the RC design in such a way as to allow them to achieve savings in materials and to adopt their preferred column layout.

Ford Quality Scheme: under construction

photo courtesy Jacobs Babtie

The contractor identified that the service reservoir could be built larger, providing additional storage, at virtually just the increased cost of materials. This was due to the dimensions of the formwork the Contractor proposed to use. Mid Kent Water agreed to this change as it provided an additional factor of safety on the security of supply at a very economic rate.

Standard Peri form systems were adopted for both the wall and roof construction. The wall forms were in 7.5m lengths full height. A total of 3 pairs of wall forms were used with a 2 day turnaround. This allowed a wall pour every day. The roof was cast in four sections with a set of rolling table forms that matched the centres of the columns. A typical turnaround on the tables from striking was 1.5 weeks. To speed construction of the walls, prefabricated reinforcement cages were used. Columns were formed using purpose made circular steel shutters, with a conical top, which split vertically and are bolted together.

Pumping station

Water is delivered into supply by pumping station with a maximum capacity 18Mld, which has been constructed immediately adjacent to the service reservoir. A novel design was adopted due to the sensitive location of the service reservoir. Landscaping has been designed so as to blend the service reservoir into the landscape. This was one of the issues addressed by the Planning Application to reduce the visual impact of a large service reservoir located on high ground. Security fencing is provided around the service reservoir but carefully designed planting has provided an effective screen.

At the design stage badgers were found in a neighbouring disused sandpit. Redesign of the incoming mains and the erection of temporary fencing to create an exclusion zone, allowed construction to take place without disturbance to the badgers.

Commissioning

Testing and commissioning of the service reservoir and pumping station were successfully completed. Once commissioned, the pumps were delivering the water directly into supply. Careful planning of the testing and commissioning was, therefore, required, including assessing the risk of disruption to customer's supply. Mid Kent Water and Nuttall Hynes worked closely together to ensure that the new system was brought seamlessly on line. The new facilities enable Mid Kent Water to draw more water from the Ford borehole close to Herne Bay and have the spin-off benefit of having the operational flexibility of the supply zone.

The new service reservoir is now allowing Ford Borehole to be operated at an increased rate, which is immediately of benefit during the current water shortages in the South East of England and will provide increased security of supply to Mid Kent Water's customers in the years ahead. ■

Note: *The Editor & Publishers wish to thank Jacobs Babtie for providing the above article.*