

Melbourne WTW—High Lift Pump Sump Bypass

Project Profile

Client: MWH Treatment/Severn
Trent Water

Designers: MWH

Value: £1.1m



Melbourne WTW's is one of Severn Trent's largest works serving large population centres in South Derbyshire and Leicestershire. Following a works process review Severn Trent had identified the High Lift Sump as a potential single point of failure which was subsequently assessed as an unacceptable risk. The existing pipework and chamber configuration at the site restricted shutdowns to a maximum of 36 hours duration, making any significant remedial works to the Sump impossible. A fast track approach to address this risk required significant collaboration, innovation and commitment from all parties.

This project involved installation of a new 1400mm diameter Carbon Steel bypass pipework system running from the existing contact tank directly to the high lift pumping station to enable the High Lift Pump Sump chamber to be isolated and taken off-line, thereby allowing maintenance works to be completed. The scheme was to be delivered in the shortest practicable timescale, taking into account planning of works shutdowns, materials sourcing and resource availability.

We were invited by MWH to be involved with the project on an 'early contractor involvement' (ECI) basis and we provided key input into the scheme development, taking a key role in collaborative planning meetings which were used as the main tool in the design development phase to identify all risks and opportunities including;

- Identification of all information requirements including necessary information on the construction of the existing structures (Contact Tank, High Lift Pump Sump and High Lift Pumping Station) in order to assess structural integrity
- Interfaces with existing pipework, structures and site services.
- Siting of craneage, crane selection and construction of crane pad so not to impact on existing structures
- Ensuring the importance of construction methodology, site access restrictions and associated temporary works were taken into account in the permanent works design. Typically this included;
 - ◇ Investigation of all underground services for clashes, diversions or flow maintenance
 - ◇ Soils investigation – to inform temporary works designs
 - ◇ Accurately locate the existing diaphragm wall which isolates the works from the adjacent reservoir
- Programme reviews to ensure works sequencing would have minimal affect on STW operations and ensure key shutdown dates were achieved while highlighting key programme risks e.g. valves were on a twelve week lead-in period
- Value engineering solutions for material selection and availability to minimise lead in time impact or curing periods including;
 - ◇ Thrust block design
 - ◇ Using appropriate concrete mix design to minimise curing time (Rapid set concrete mix designs introduced)
 - ◇ Pipe type, fittings and valves procurement to meet programme.



Melbourne WTW—High Lift Pump Sump Bypass (Cont'd)

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The collaborative planning sessions ran weekly and were attended by senior management from both MWH and STW (Project Team & Operations) together with our proposed delivery team (Commercial and Contract). We also provided 'Open Book' budget costings and programmes at various stages in the design development process that incorporated any recommendations and risks identified.

The main elements of work included;

- 95m of 1422 mm OD x 12mm wall Freeflow carbon steel pipes (rolled steel tube, fusion bonded epoxy resin coated) circa 6m deep.
- Pipework included an 1800/1400mm mixer 'T' connection at the contact tank with spool piece, 45° and 90° bends, 'S' bend to drop into manifold chamber and a new manifold with 2 x 'T' connections at the high lift pumping station.
- Pipework Installed as 3m long pipes with 1m rockers and make up pieces fabricated to suit on site dimensions coupled using Nova Siria 'Multisize' – 'Largesize' Series Straight Couplings - 1400m dia.
- 1 no 1800mm and 2 no 1400mm dia gate valves.
- In-situ reinforced concrete Manifold chamber 7.5m deep with pre-cast cover slab (cast on site).
- De-chlorination chamber pump and pipework replacement.
- Existing 450mm dia SW pipeline diverted to accommodate new pipeline.
- Constructed 9 no 45° & 90° thrust blocks, 2 no thrust slabs and chamber wall thickenings.
- A 60 tonne crawler crane was required to service the pipework and valve installation at the contact tank (Chamber 50).



Programme delivery was key to the success of the scheme and all parties contributed in the planning process to focus on meeting the critical shutdown dates and complete the necessary connection works. We ensured the necessary resource levels and skill sets were available from our experienced multi-skilled workforce to meet these critical dates and that back up and emergency contingency measures were in place at all times.

The project was successfully delivered in 7 months at a value of £1.1m which excluded the provision of all pipes, fittings and valves as these were sourced direct by the client.

