

Foxton Road UID, Ward End, Birmingham

Project Profile

Client: Severn Trent Water
(AMP4 Sewerage Framework).

Designer: Mott McDonald

Value: £2.7m



This contract was a major UID project (Unsatisfactory Intermittent Discharge) to replace an underperforming CSO as part of the 'River Tame Catchment Quality Improvements' and was intended to prevent foul water discharge to the local Washwood Heath brook during periods of heavy rain.

The scheme was carried out under Severn Trent Water's AMP4 Sewerage Framework Contract and the design required a permanent pumped return shaft tank of 12.5m diameter and 18m in depth to provide 1000m³ of storage capacity with 2 duty pumps of 40 l/s capacity.

The ground conditions at the tank location were extremely poor and consisted of 25m of wet silty sand. Various methods were assessed for the shaft construction however settlement to adjacent properties and damage to utilities were identified as key risks for any method which resulted in any ground water lowering or dewatering.

Working with designers Mott McDonald and specialist piling contractor Bachy Soletanche, the shaft tank was designed as a 3 stage construction. An initial 'temporary' shaft constructed using secant piling techniques, a base plug formed by jet grouting and construction of a 'permanent' 18m deep x 12m finished diameter shaft tank pumping station within the piled structure.

The 'temporary' shaft was constructed by drilling a ring of 72 nr x 18m long x 900mm dia secant piles (male/female) at an internal diameter of 13m. This was followed by creation of a 5m deep jet grouted 'base' at a depth of 13m to 18m. Following completion of the jet grouting, internal excavation of the shaft was completed and a reinforced concrete base slab constructed which was dowelled into the piles. The Internal segmental shaft and pre-cast roof slab were then completed to form the final shaft tank pumping station.

As can be seen from the photographs above the site was in an extremely confined location, particularly considering the construction work to be completed, the size of plant involved and the delivery of plant and materials to the site.



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In order to allow continuous monitoring of groundwater behaviour and ground movement both during and post construction, an extensive array of borehole monitoring systems and precise levelling points were established both inside and outside the shaft which included piezometers, extensometers and inclinometers.

In the event the success of the method was confirmed from recording only minor groundwater fluctuations and no ground movement.

The contract also involved;

- Utilities diversions and 2 sewer diversions to allow construction of the shaft tank at this location,
- Construction of a WAPUG standard CSO chamber 8.5m long, 3.4m wide and 2.3m deep incorporating a Longwood mechanical screen.
- Overflow pipework, pumping main and M&E installation.
- 50m of upsized 900mm pipework in open cut up to 3.2m deep
- Extensive traffic management was required with road closures and diversion routes established.

The site team carried out an extensive customer care liaison strategy during the project as the impact on local residents was significant. This included providing replacement secure parking arrangements for those residents who lost their vehicle access and parking spaces during the work.

This was the first time the Secant Piling construction method had been used in the Severn Trent region for shaft tank construction and its success has ensured that similar projects in difficult ground conditions can be constructed with confidence.

