

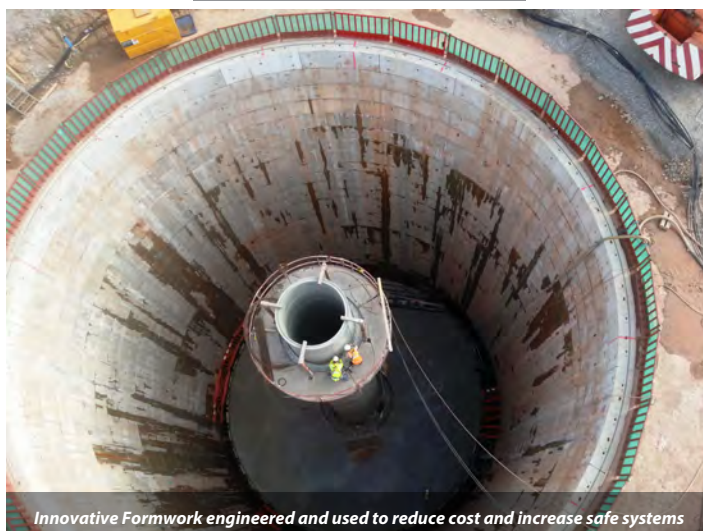
Tyldesley UID - 20m underpinned shaft

Client: United Utilities

Location: Tyldesley

Value: 1.6 million

Duration: 35 weeks



Summary...

The scheme was required to address the Unsatisfactory Intermittent Discharge (UID) from Tyldesley WwTW, The treatment works discharges in Astley Brook and the UID designation was on the basis of aesthetic and river impact grounds. The UID was to be resolved during the AMP5 phase of works.

Challenges and Solutions...

The scheme for Active Tunnelling Limited (ATL) consisted of a 20m diameter shaft 30m deep (Detention tank), also a 10m diameter shaft 12m deep (Storm Pumping Station). The scheme had a high water table and the Client had concerns regarding a sand lense evident on the site investigation report at 7-9m. Through early contractor involvement ATL were able to provide a solution based on innovation and experience to mitigate the risk to the project and substantially reduce the Clients costs.

The detention tank was installed adopting the underpinning method using a 23t excavator in the shaft, and a combination of a telescopic grab, 90t crane and skips were utilized for muck removal to 20m deep, then solely crane and skips from 20m to 26m deep. The base consisted of a bespoke design which incorporated a dished base 4m below the bottom ring, an under-reamed ring beam and a top slab. The under-ream was excavated 1.5m beyond the ring and 2m deep and supported using timber headings, reinforcement was then pre-fabricated using 40mm diameter radial bars at the surface and offered into the under-ream using an excavator, the ring beam was then concreted in sections. Stone backfill was then placed to the dished base and the top slab was traditionally constructed.

ATL also secured the internals package which involved the construction of a Vacflush column, installation of approximately 730m³ of benching concrete, installation of culvert sections, construction of the inlet portal, installation of the inlet hopper and associated pipework, placement of the cover slab and structural beams. This package of works was awarded on the basis of program savings ATL were able to offer the Client, derived from their approach to executing the works.

The Vacflush column was constructed using ATL developed hydraulic 'jump' shutter, this removed the requirement for a scaffold and allowed certain activities to be carried out simultaneously rather than consecutively (i.e vacflush and benching). The benching concrete was placed utilizing two pumps achieving a 525m³ pour initially with a subsequent pours of 52m³ and 153m³ achieving the finish and falling channel.

The inlet portal was constructed installing structural steel, jacking into position and supporting an 8 tonne culvert section which projected into the shaft 1125mm. The portal reinforcement/ concrete was then installed and the temporary works were removed upon the concrete achieving full strength. The Storm Pumping Station was constructed using the caisson method. An 8 tonne excavator was used in the shaft and a telescopic grab was used for muck away. The shaft was taken down to 12m in silty/ sandy conditions and the plug and reinforced base was then constructed.