# Stoke UID Improvement Project

## 'no dig' methods reduced impact on local community

by
**Graham Morris, John Hensman, Iqbal Rassool**

**The second phase of Severn Trent Water's Stoke UID programme is designed to deliver environmental improvements required as a result of unsatisfactory intermittent discharges from the combined sewer system. The project will benefit residents in the city of Stoke and the conurbation of Newcastle-under-Lyme (population 325,000. An urban pollution management study in the first phase, was used to identify the most effective locations for providing storage to alleviate the need to overflow to water courses and thus reduce pollution of the River Trent and its tributaries. Second phase of the project includes construction of more than two kilometres of new or replacement sewer in both urban and rural locations, pumping stations, storage tanks, overflow chambers and the installation of both mechanical and static screens.**

Stoke UID: Boathouse Tunnel Entrance *courtesy: Haswell Consulting Engineers & Severn Trent Water Ltd*

**Delivery**

Successful delivery of this programme relied on the integration of the whole supply chain: The contractor, *DCT Civil Engineering Ltd*, and construction staff worked closely with the design teams from Severn Trent Water and *Haswell Consulting Engineers* throughout the design phase to ensure buildability and that value driven approaches were taken at all times.

This was ably demonstrated by the use of 'no-dig' methods at three locations, helping to overcome problems where excavation was likely to have significant impact on the local community.

**Boathouse Road**

Options developed at feasibility stage were for an open cut solution to provide 1500m$^3$ of storage. These were assessed with respect to cost, risk and disruption. The team soon began to investigate a no-dig solution, as alternative solutions have a number of implications.

* closure of Boathouse Road, a single track road that provides access to two landfill sites and the adjoining Gipsy and Traveller site would require a substantial traffic diversion and the upgrading of the alternative access to a suitable standard;

* removal of a 200m stretch of Japanese Knotweed, together with the risk of spreading;

* excavation and disposal of contaminated material associated with a former rural sewage treatment works and fly tipping over a number of years;

* costly overpumping of the existing combined sewer with the associated risks of flooding and pollution during storm;

* health & safety risks associated with crossing beneath low overhead 33kV electricity cables;

**A34 Stone Road crossing**
Two sections of micro tunnel were installed beneath and adjoining the A34 (T) Stone Road, and alongside the River Trent at Hanford to allow the abandonment of a combined sewer overflow causing pollution. As a result of a number of difficulties associated with open cut excavation the section of sewer downstream was converted to a micro-tunnel drive using a remote controlled tunnelling machine, Herrenknecht TBM 1200 XC. This provided operational safety, complying with tightened health & safety legislation. The machine operator was able to control and supervise excavation and muck transport from the operating container on the surface via video cameras installed in the tunnelling machine.

**Church lane diversion**
Design development for this section of work centred on minimising excavation within the highway, and constructing a new sewer at depths of over 4m through land occupied by mature trees adjacent to OAP accommodation.

*DCT* engaged the services of trenchless specialist *Perco* to install 35m of 225mm clay pipe using a *Herrenknecht/Bohrtec BM150 D* guided auger bore machine. The machine was driven from a sheeted pit within open land beneath the mature trees and collected from an excavation within Church Lane. The reception excavation was converted to a manhole over a weekend and the road was opened to traffic by Monday morning.

**Environmental impact of "no dig"**
All no dig projects provide clear and obvious environmental benefits in that they minimise surface disruption but the solutions developed in Stoke provided additional benefits when compared to preferred options following feasibility work.

* reduced disposal and haulage costs associated with waste materials generated by open trench methods;
* sustainability benefits - imported aggregates and concrete for surrounds and backfilling unnecessary;
* less disruption to the local road network;
* potentially dangerous overnight working;
* fewer disturbances to existing woodland or riverside habitats;
* less impact on agricultural land;
* less visual intrusion for users of riverside footpaths;
* avoided interaction with Japanese Knotweed.

**Stakeholder Management**
The project team carried out a coordinated approach liaising with a variety of stakeholders such as local authorities, regulatory bodies, landowners and both the travelling and resident public. Often difficult discussions regarding choice of solution and implications for others were made easier by the team's intention to adopt trenchless solutions where appropriate. Such solutions provided clear and demonstrable benefits both in terms of environmental impact and cost implications.

Considerate customer care during construction was important.

The project team maintained face-to-face contact with householders local councillors and MPs to explain project progress.

The team worked closely with the Rivers of Renewal Partnership; to incorporate improvements such as Riverside footpaths, flood plain compensation and wetland habitat creation.

**Value for money**
The client's objective has been to obtain the most assured least risk solution that offered the best value. By working in a collaborative way throughout the design and construction period, with actions taken to minimise risks throughout and by careful assessment of trenchless alternatives the solution clearly and demonstrably provided value for money.

For the second section of microtunnel on the A34 Stone Road crossing alone the project team was able to demonstrate a saving of over £20,000.

In areas where trenchless solutions were undertaken, the original predominantly open trench design incurred greater uncertainties regarding ground conditions, site conditions and weather.

The overwhelming environmental benefits of "no dig" were decisive in coming to this conclusion.■

**The team:** *Client: Severn Trent Water Limited; Designer: Haswell Consulting Engineers; Contractor: DCT Civil Engineering Ltd.*

**Note on the authors:** *Graham Morris, Severn Trent Water Ltd; John Hensman, DCT Civil Engineering Ltd; Iqbal Rassool, Haswell Consulting Engineers.*

Stoke UID: Boathouse Tunnel *courtesy: Haswell Consulting Engineers & Severn Trent Water Ltd*