

Cawood, Kellfield & Wistow providing sewage facilities for 3 Yorkshire villages

by

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Compliance with the Urban Waste Water Treatment Directive (UWWTD) required the provision of treatment facilities to achieve standards of 60mg/l suspended solids and 40mg/l BOD for three villages north west of Selby, North Yorkshire. In addition, flows above Formula A must pass through 6mm two dimensional screens prior to discharge to river. To achieve these standards required the provision of treatment works to serve a total population of almost 3,000 in the three villages.



Market Place pit (courtesy MWH).

Existing facilities

At the village of **Cawood**, foul flows from the population of 1474 discharged directly to surface water ditches, or a culvert to four pumping stations dotted along the River Ouse. At both **Kellfield** (pop.357) and **Wistow** (pop.1125), the public sewers convey foul flows to a pumping station for discharge into the river. Extensive land searches revealed limited availability for the construction of treatment works, the majority of land is in a very flat area being situated within the flood plain. However, farm land was identified adjacent to **Kellfield** that will not be affected by floods and is sufficiently remote to not intrude on residents. The strategy, therefore, was to construct a series of pumping stations and rising mains to convey flows from both **Kellfield** and **Cawood** to this site for treatment in a single works. At **Wistow** it was possible to build a treatment plant very close to the existing pumping station.

Work on these schemes involved:

Bishop Dyke to Old Boys PS

This 120m length of pumping main was to be installed within the existing flood defences in ground conditions of silty clay and gravels with a high water table and close to the river. To minimise risk, it was decided to employ a full face TBM 600ID to carry out this work. The machine was launched from a 4m diameter segmental shaft within the flood plain. The shaft had to be raised to a level equal to that of the flood defences so that in the event of a storm river water could not enter the shaft and also, therefore, the tunnel machine.

Old Road to Market Place

Lengthy consultations with the North Yorkshire Highways was necessary because of the very narrow road width in Market Place. It was not possible to close one lane to construct a reception shaft.



Bishop Dyke 2 (courtesy MWH).

It was, therefore, necessary to re-align the tunnel and introduce an additional manhole so as to locate a reception shaft in the road whilst keeping the traffic moving. Again the 600ID TBM was used to install this 110m length.

Old Road to Bishop Dyke PS

During preliminary work it had been discovered that Old Road had been constructed over the original flood defences, including original bridge abutments, before the defences had been reconstructed in their present position. There would be considerable risk in launching the TBM for this drive given the high chance of encountering a buried obstruction. It was decided to upsize this length to 900mm diameter so that a hand shield could be employed. This was just as well as various concrete obstructions as well as old timber piles were removed in the shield during the 25m drive.

Bishop Dyke PS

In very limited space and adjacent to the existing building two pumping stations were constructed. The shaft housing the foul pumps is 2.44m diameter and 9.5m deep to formation. At 4.5m in diameter the storm shaft was larger but shallower at only 6m deep to formation level. The shaft houses three Flygt 3170 pumps operating in duty/assist and standby mode as well as a **Huber Rotomat** storm screen.

Church End PS to Kellfield STW

Part of the design was to pump flows from Church End pumping station to the new works. This involved crossing the river, flood defences and numerous agricultural areas. Although the river crossing had been designed to be directionally drilled an early decision was taken to also install the remainder of this pipeline by the same method. This proved to be beneficial not only saving surface reinstatement costs but also in not having to repair the complicated land drainage system which existed through most of the agricultural areas. In total, 1800m of 225mm dia. MDPE was installed including a twin 120 metre long river crossing. As the use of directional

drilling had proved a success due to minimised disruption and favourable ground conditions other sections of work were redesigned to adopt this method and a further 2.9km of main was laid this way.

New works

At **Kellfield** the new works consists of a 6mm screen, a combined storm/balancing tank, two steel primary and final settlement tanks, 6 *Hi-Paf* biological treatment units and a sludge storage tank. The works have been landscaped to shield it as much as possible. The **Wistow** plant though slightly smaller is of similar layout.

Public Relations

The scheme involved extensive work within the villages and a public relations strategy was implemented to explain the proposed work, how it was to be implemented and the time scale involved. At the first public meeting support for the scheme was impressive. A series of public forums continued to be held throughout the project life cycle to explain progress and listen to issues. This strategy was a major factor in the ultimate successfully delivery of the project.

The provision of schemes for these three villages was a joint venture between *MJ Gleeson and MWH* along with strategic partners *Mowlem Johnston and Peter Duffy Ltd* which provides a design and construction service for all wastewater schemes in the western area of Yorkshire Water. The schemes are awarded under a framework agreement with individual contracts issued as a brief with a description of the problem to be solved. Construction of the treatment plants was carried out by *MJ Gleeson* with all pumping station, civil works and pipelines installed by *Mowlem Johnston*. *MJG* were also responsible for installation of *M & E* plant. *MWH* carried out detailed design of all elements on this difficult scheme which was completed in March 2003. ■

Note: The author *Dave Young* is Project Manager for *MWH*