

Swaledale Supply Project

changing water quality standards for some 700 properties

by
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Swaledale is the most northerly of the Yorkshire Dales and was supplied by two water treatment works (WTWs) at West Stonesdale and Langthwaite. West Stonesdale WTW is a membrane plant supplying the upper parts of the Dale. Langthwaite WTW received raw water from an addit, which was treated by chlorination and contact retention, before passing into supply by gravity to Langthwaite and onward, via Reeth SR, to the villages of Reeth, Grinton, Fremington and to Healaugh where the distribution system connects with that supplied from West Stonesdale WTW. The Swaledale Supply project has enabled compliance with changing water quality standards for some 700 properties in the Yorkshire Dales National Park. This was achieved by providing suitable infrastructure to supply the area from Thornton Steward WTW and by closing Langthwaite WTW.



Swaledale: Aerial view showing route for pipeline laying

courtesy Costain

The project undertaken by CostainMP for Yorkshire Water Services Ltd enabled YWS to comply with the water quality standards by abandoning the WTW and, in line with their WTW Rationalisation Strategy, supply the area with water from Thornton Steward WTW in lower Wensleydale. The forecast demands (average day peak week) for 2029/30 are 1.0ML/d for Langthwaite and 1.65 ML/d for the whole of Swaledale.

Options

The option of providing improved treatment facilities at Langthwaite was rejected because it did not provide any potential for increase in supplies to the area. A marginally shorter route passing straight over the hills was also considered. This was rejected on the grounds of higher costs associated with increased pumping.

Design

The components of the chosen solution are:

- * a water pumping station (WPS) at Friar Ings near Bellerby;
- * 12.7km of 250mm HPPE trunk main to Reeth Bridge;
- * 2.0km of 180mm HPPE from Reeth Bridge to Reeth Service Reservoir (SR);
- * a WPS at Reeth SR to supply to the Langthwaite area;
- * control building at Reeth SR;
- * abandonment of Langthwaite WTW.

The water supply to the new booster pumping station at Friar Ings is taken from an existing 8" gravity outlet main from Yarker Bank SR. This in turn is supplied by a pumping main from Thornton Steward WTW. Upgrading this WTW forms part of a separate project.

Friar Ings WPS contains duty/standby pumps rated at 15.4 l/s at 44m head to allow the forecast Langthwaite daily demands to be pumped over 18 hours. The design allows space in the building for uprated pumps and surge vessels to be installed. The fixed speed pumps are controlled on the level in the receiving Reeth SR via BT “private wire” telephone line. The telemetry system, as well as providing alarms back to the YWS Regional Operation Control Centre (ROCC), allows remote control of the pumps, which is part of the YWS Clearwater strategy.

The main from Friar Ings to Reeth Bridge was sized to allow the future flows to the whole of Swaledale. Where possible the main has been laid in road verges but the majority is laid in fields with some short sections in road. The principal obstacles in the route are the River Swale and Arkle Beck, which have been crossed by directional drilling. Concerns about security of this critical main under such a major watercourse, which would traditionally have been duplicated, have been cost effectively overcome by the installation of blanked-off emergency tees on each bank, which would allow a by pass to be laid should the main under the river get disturbed.

Reeth WPS takes water from Reeth SR and pumps up the original main that supplied Reeth SR from Langthwaite WTW. The fixed speed duty/standby pumps are rated at 1.9 l/s at 68m head, recreating the head experienced by the distribution system when supplied from Langthwaite WTW. The pumps are controlled so that they maintain a delivery pressure set point.

Secondary disinfection, in the form of a sodium hypochlorite dosing system, has been installed to boost chlorine residuals prior to distribution. This is housed in the control building at Reeth SR which also contains a standby generator. This has been deemed necessary following a standardised YWS risk assessment, which takes into account such factors as electricity supply reliability and criticality of equipment.

Construction

If not well managed, pipelaying in rural areas can easily lead to dissatisfied landowners and significant compensation claims. The contractor *Contain Ltd.*, in conjunction with Yorkshire Water, set about building a good working relationship with landowners, occupiers and residents at an early stage.

An example was the use of **good quality post and wire/netting fence** to demarcate the working strip in fields. This was a sustainable solution as farmers were willing to dismantle and re-use the fencing.

High quality final reinstatement is essential to minimise compensation costs, this was achieved by a combination of positive plans:-

- * Undertaking a land drainage survey during design stage to identify potential problem areas and to enable reinstatement to be planned.
- * Use of directional drilling where possible on road crossings and where woodland could not easily be avoided;
- * Turf stripping in the field used for the Reeth Show. This enabled the field to be handed back in time with minimal disruption.
- * Use of a local pipelaying sub-contractor who has extensive knowledge of the farming industry.

As a result of these actions, YWS were able to settle land compensation claims on a ‘full and final’ basis more rapidly.

In order to minimise waste, a machine was customised to improve the placement of pipe bedding. A conveyor was installed on the hopper trailer, which can be run-out to either side. This, combined with a skilled operator, allows very accurate placement and high rate of application of the bedding into the trench. This innovation not only enabled a reduction in materials use but also speeded up pipelaying.

It was found to be more efficient to lay the main continuously without any fittings and return to “cut-in” fittings, such as air valves and hydrant/washouts, later.

Environmental/Planning issues

The cultural heritage in the area was widely researched during design, initially by a desk-based appraisal, then a walkover survey. An archaeological mitigation strategy was prepared and routes modified accordingly. A “watching” brief was also carried out during all the topsoil stripping, but no finds were made.

An ecological walkover survey, crayfish survey and an otter survey were all undertaken as part of the environmental investigations.

With the entire project within the Yorkshire Dales National Park, planning requirements for the above ground structures at Friar Ings and Reeth were stringent. At each location, buildings were constructed of local stone with a slate roof.

Community

During the course of the project, close liaison with the local community has been developed and maintained by Open Evenings and letter drops. Financial support has been given to the local nursery, Swaledale Seedlings and Low Row Institute. Funding for school trips was also provided. In addition, the Swaledale Festival was sponsored. Members of the project team also took part in a “Business in the Community Cares Challenge” which involved painting the local Reeth Village Hall.

Third parties

New power supplies have been obtained for the WPSs at Friar Ings and at Reeth. Negotiations with the regional electricity company for the supply at Friar Ings revealed that they were planning a new sub-station at the same location. and the WPS site layout was modified to accommodate their future plans.

The team

The project was delivered for YWS by the AMP4 Clean Water (East) Joint Delivery Team (JDT), which comprises YWS and Contain Ltd. Design consultancy services were provided by Mouchel Parkman. All staff involved, working as CostainMP were co-located at offices in Castleford, W. Yorkshire.

Project out-turn costs are in the order of £3.3m ■

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