Esk Valley Burghs CSO Regulation Project

major scheme to improve quality of water courses, access areas

by
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Scottish Water's Esk Valley Burghs CSO regulation project is a major scheme to improve the performance of CSOs throughout the subsidiary sewers system of the Esk Valley Burghs. Previously, the combined sewerage system was able to spill diluted sewage directly to the local watercourses during periods of heavy rainfall with no screening and minimal, if any pre-treatment. The project provides environmental benefits to the Esk Valley watercourses. This will include the removal of any unsightly aesthetic pollution and increase their water quality There will be a significant direct impact on the smaller low flow watercourses.

Tunnel set up shaft D *(courtesy Hyder Consulting).*

Catchment

Esk Valley Sewerage Catchment lies to the south east of Edinburgh. It is a largely combined sewerage network that serves the mixed town (burghs) e.g. Dalkeith and rural communities' e.g. Carberry within the river valleys of the north and south Esks. Subsidiary sewerage networks of the Esk Valley burgh catchments provide a controlled flow to treatment via the Esk Valley Trunk Sewer system. The network's Combined Sewer Overflow (CSO) relief controls are close to and impact on the rivers North and South Esk and their tributaries.

The EC's Urban Wastewater Directive (UWWTD) and the Urban Wastewater Treatment (Scotland) Regulations 1994 (UWWT) are the main legislative drivers for the Esk Valley improvements. The Scottish Environment Protection Agency (SEPA), is the government regulatory body and Scottish Water (SW) the statutory authority responsible for their implementation. SEPA, in accord with Scottish Water identified the unsatisfactory (u) CSOs within the Esk Valley Burghs Catchment sewerage network to be addressed within the CSO regulations project and allocated regulatory compliance dates.

After completing a feasibility study Scottish Water commissioned *Hyder Consulting (UK) Ltd., (HCL)* to complete a review of their findings. In addition, *HCL* were employed to carry out detail design for the project, receiving separate commissions for a hydraulic modelling review & design and construction supervision for the project.

The Esk Valley Burgh CSO Regulation project has been undertaken within an evolving and fluid environment that has required interdependent information transfer and planning, with interactive design decisions from other related SW ongoing projects. Namely, the Esk Valley Purification Project (Scottish Water's Esk Valley Trunk Sewer and WWT PFI works, managed and operated by Stirling Water), Sewerage Infrastructure Investment and Operational Planning Project (SHOP) (Sw's drainage area planning project) and both the Water Mains and Sewerage Rehabilitation and Renewal Projects. The complex and interdependent nature of the project has an impact on the achievement of regulatory compliance dates.

SW prioritised the uCSOs and structured discrete schemes and programmed their refurbishment/replacement accordingly. SEPA and SW identified six high priority Phase 1 schemes that are now at various stages of progress. The Phase 1 schemes identified include uCSOs at Dalkeith, Bonnyrigg, Lasswade and Cowbridge (Dalkeith) in Midlothian and at Whitecraig and Carberry Mains in East Lothian.

In addition to dealing with the uCSOs within the system, the Bonnyrigg Sewerage scheme also reduces the flow to Hardengreen Storm Water Works (SWW) that contributes overflows to a small, low flow watercourse. The reduced flow to Hardengreen SWW will enable it to comply with UWWTD and UWWT Regs.

The £5.4m project for Phase 1 schemes allows for the rationalisation of the uCSOs within the Esk Valley sewerage system. UCSO's and their outfalls are intercepted/abandoned where appropriate and/or replaced with new outfalls and CSO structures provided with the latest 6mm bi-directional screen technology, where necessary. The proposed sewerage systems include the provision of carrier and relief sewers and tunnels. associated pumping stations and storage structures.

HCL undertook an extensive data acquisition and verification exercise that involved management of several of SW's framework contractors. Details of the existing sewerage system, ground investigations, flow monitoring and the location and identification of underground services were all obtained in this manner. Their multi-disciplined in-house engineering services completed the feasibility review and produced the detail design of the Esk Project. As well as the general civil and structural design, *HCL's* project management, hydraulic modelling, geotechnical, environmental and M & E functions have all had input.

Impact on watercourses/communities

Issues highlighted and requiring input have included the impact of works on the watercourses themselves. Parts of the works are within conservation areas and designed landscapes whilst others impact directly within communities. The improvements are within strategically important highways that connect commuter traffic to Edinburgh. The Esk Valleys have a significant historic heritage and some of the construction works are in the vicinity of listed buildings and others are affected by old railway land and coal mine workings.

Regular close collation with SW's asset management and operations functions ensures their satisfaction. Project "Value" was considered via value engineering studies conducted throughout the decision making process and value management workshops held at the appropriate SW approval stage.

The project compliance date having expired at an early stage, many project decisions have been made to accelerate completion. The method of procurement of construction services was determined accordingly.

Preliminary designs for all phase 1 schemes were complete with reasonably detailed drawings available. Detail designs for most of these schemes were close to completion. However, due to unavailability of information some elements of detail design for the project were suspended and, therefore, detail designs of the schemes incomplete.

Tenders

Tender documents based on preliminary design of the Phase 1 schemes were prepared by HCL. Tenderers submitted tenders for the project as a whole, with their rates for five of the schemes to be used as a basis to build a target cost for the schemes once the detail design was completed. The Dalkeith scheme design was detailed enough for tenderers to provide a target cost at tender stage.

After assessment of the tenders *Byzack Ltd* was awarded the contract to construct the available elements of the project. The delivery team was extended to a partnership arrangement with the appointment of *Faithful & Gould* as cost consultants and *Byzack Ltd* as contractor. Scheme target costs are developed by the partnership where the contractor is reimbursed on a combination of cost plus basis and a pain/gain element.

SW has a serious commitment to customer care. The increased environmental benefits of the Esk Valley project to their customers are easily identifiable but SW also recognises that many of their customers will be inconvenienced by its construction. In an attempt to minimise the inconvenience SW and *HCL* have engaged in considerable consultation with roads authorities, public transport planners & providers, landowners, local business/commercial leaders, schools, community councils and leaders, the public and other stake holders including emergency services and environmental bodies. Presentations have been delivered and queries answered at public and key influencer meetings to ensure that all are informed and had an opportunity to consult with SW, their designer and contractor.

Minimising public inconvenience

Mitigation measures to minimise inconvenience to SW's customer base have included the advanced laying of a rising main across the Cow Bridge (Dalkeith) for the Cow Bridge Sewerage Scheme, by the Water Mains Rehab contractor. It was agreed with Midlothian Council, a school, and business leaders that some elements of phase 1 schemes would be carried out at an early stage within the school summer holilday, period.

Ongoing construction of the Dalkeith and Bonnyrigg Part 1 Sewerage Schemes, therefore, began on 1 July 2002. These works required joint programming with the Water Mains Rehab works.

Construction of Carberry Mains and Bonnyrigg Part 2 schemes are to commence imminently whilst approval of the Whitecraig and Cow Bridge schemes are expected shortly.

SEPA and SW have reprioritised CSOs within the Lasswade scheme and as a consequence the phase 1 scheme has been withdrawn.

Once completed, this project will provide the people of the Esk Valleys with improved quality for their watercourses and improved amenity of public access areas. It will also provide Scottish Water with an updated and compliant sewerage system with improved storm sewage control and treatment. ■

Note: *The author of this article, David J. Forward, is Design Team Leader for the Esk Valley Burghs CSO Regulation Project.*