Mid Kent Mains Renovation

£18.5m scheme with a customer focus

by
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Who's for a glass of brown water? Not surprisingly, although it might be safe to drink, the supply of discoloured water does not sit well with the high standards expected of a 21st Century water industry. Nevertheless, this is what customers in many parts of the country have had to put up with from time to time in recent years. This phenomenon has its roots in our ageing infrastructure. Most water mains installed in the 19th and first part of the 20th century were made of cast iron, the durability of this material being demonstrated by the many Victorian water mains still giving good service in the majority of our towns and cities. However, the difficulty lies not in their durability but in the characteristic internal tuberculation occurring over time in such mains. Corrosion products build up inside the mains forming nodules which substantially reduce the hydraulic capacity of pipework and also lead to discolouration of the water supply when deposits are disturbed. This can happen with flow reversal or high velocities due to burst mains and peak demands.

Mid Kent Water: Laying new mains, West Peckham

Because the strength of the main is often not in question the most cost effective solution is usually to scrape off internal deposits and spray apply an internal epoxy resin lining on site. Many contractors have developed specialist teams to carry out this work.

Mid Kent Water (MKW) in common with other water companies throughout the country started tackling the problem under their AMP1 and 2 Capital programmes. For AMP3, the commitment was particularly demanding and an undertaking was given to the Drinking Water Inspectorate (DWI) to more than double the lengths renovated under AMP2. The planned 350km would complete all remaining renovation and at a cost of £18.5m this was by far the largest project in the company's Capital programme.

Setting up the solution

Halcrow Water Services (HWS) have been assisting, MKW with their mains renovations programme since 1995, with initial input centred around water quality investigations and scheme identification. Although this type of project has not traditionally been undertaken by consultants, for the AMP3 programme *HWS* were given overall responsibility for setting up the project, including development of strategy and administration for the renovation contract. Also included were the key areas of customer services and operational liaison.

Because of the operational and customer interface, close cooperation of all parties was essential to minimise customer impact. Accordingly, an NEC target cost contract with a Declaration of Cooperation was chosen for the work. An integrated project office was set up to accommodate the project team, comprising the contractor *Balfour Beatty Utilities Limited,* client and consultant staff.

The benefits of this were immediately apparent in terms of communication, effective planning and direct information for the customer service hotline also located within the project team. The team had to be set up without delay as the first DWI 'milestone' was approaching. This meant investigation and design had to be

carried out to a very tight timescale to keep ahead of the renovation gangs.

Renovation criteria

Careful targeting of mains for renovation is an essential part of the design process as funding is limited and not all mains can be treated. The criteria for identifying key mains were based on the complaint data, water quality investigations and customer questionnaire triggers set out below. HWS carried out rigorous statistical analysis to ensure water quality improvements could be demonstrated to the degree of significance required by the DWI.

In conjunction with the water quality and customer survey data the condition of mains was assessed by analysis of burst history and inspection of cut-outs taken at strategic locations. The Waterfowl programme was used to identify mains which would benefit from replacement based on whole life costing. Epoxy lining was chosen for the majority of mains, but unserviceable mains were replaced with polyethylene pipe, using pipe bursting techniques to minimise cost and disruption. For operationally sensitive mains, rapid cure polymeric lining was used to allow return to service the same day.

Other innovative techniques employed include directional drilling and narrow trenching of new mains. A strategy of cleaning for mains not subject to renovation was also proposed to ensure post renovation water quality standards were achieved.

Lined mains

Customer focus

The AMP3 renovation was concentrated in a relatively small geographic area with up to seven lining and replacement gangs working at any one time. Meticulous planning was essential to minimise disruption to customers. A programme of enabling works including temporary supplies and back feeds was implemented to keep network downtime as short as possible. Operational procedures developed by HWS for this work were subsequently implemented as a standard for all similar work in the water company. A great deal of energy was committed to ensuring the highest standards of customer services were achieved. The consultant team was responsible for a number of initiatives including a new suite of customer notices and information leaflets, parish council visits and daily updates of the programme and whereabouts of renovation gangs to the MKW customer service group.

In spite of challenging deadlines, the key DWI 'milestone' to complete the first 104kms of renovation, was reached five weeks ahead of schedule with very positive feedback from MKW customer service managers. The project is by far MKW's largest involving customer contact and an Ofwat audit carried out during the work resulted in MKW achieving the highest possible ranking for customer service.

The AMP3 renovation programme has recently been completed and is regarded as a success by all parties, not least the customers now guaranted a supply which will always look, as well as taste, good. ■

Unlined mains

Note: *The author of this article, Justin Southwell, is Project Manager, Halcrow Water Services Ltd.*

Criteria	Pre-Renovation Trigger	Post Renovation Improvement
Iron concentration at customer tap	>10%> 100 µg/l	<10%> = 100µ/l & 50% reduction in failures
Customer Questionnaires*	>10%> 2 discolouration events per year	<10%> = 2 incidents per year & 50% reduction in failures
Average iron pick up	>20µg/l between input & dead end samples	<20µg/l between input & dead end & 50% reduction in pre renovation results
Discolouration complaints	> 2 per 1000 population	<2 per 1,000 population & 50% reduction
Iron concentration	Any >PCV+	50% reduction in failures & <10%> =100µg/l

* Customer questionnaires taken at same address as iron concentration.

\+ PCV = Permitted concentration or Value.