

Windermere WwTW Refurbishment

two drivers resolved by refurbishment project

by
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Windermere WwTW is situated on the shores of Lake Windermere, some 6km to the south of Bowness on Windermere and in the heart of the Lake District National Park. Two drivers were identified that needed to be resolved by the refurbishment project. The first was that of population growth in the contributing catchment from 9,100, which the works was designed for, to 16,100, with a consented flow to full treatment of 15.5 Ml/day. The second driver related to a tightening of the Phosphorous discharge standards to the lake from 2mg/l to 1mg/l. As it transpired, each of these drivers was resolved in a completely separate manner.



Refurbished Trickling Filters at Windermere WwTW

photo courtesy of MWH Ltd

Filter media replacement

A hydraulic analysis of the works showed that aside from a lack of capacity in the inlet screens, there was enough capacity at the works to deal with the increase in flows. However, the existing trickling filters were not performing adequately. Of the 13 filters on the site, seven dated back to 1917 and the original gravel media was beyond its useful life. Moreover, the side walls were constructed in dry stone wall and their condition was unknown. The solution developed for population growth was to replace the gravel media with blast furnace slag, and also to rebuild the inlet works to accommodate an additional inlet screen.

It was identified early that there may be an opportunity to accelerate the delivery of the project by releasing an element of the work for construction earlier than would normally be the case. Under a traditional approach, construction would not be likely to start until

Summer 2007. With constraints on the number of filters that could be taken out of service as there was a significant risk that it would not be possible to complete the media replacement by the regulatory date of March 2009. Therefore, the decision was made to replace the media in two of the filters in the Summer 2006, so that the condition of the existing walls could be assessed. The ability to do this was made easier thanks to the partnership approach adopted within United Utilities strategic integrated Alliance between themselves, MWH (as designers) and KMI+ as construction partners. Accordingly, a scope of works was developed and media replacement commenced in August 2006 with KMI+ as main contractors and Bagnall Ltd as specialist sub-contractor for this work. This work went much better than could have been hoped, as thankfully the filter walls were found to be in excellent condition. After a successful trial on the first two filters, the decision was taken to extend this work package for all 7 dilapidated filters, with a result that media replacement was completed in December 2007.



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The Discfilter at Windermere WTW

photo courtesy MWH Ltd

Inlet screens & Discfilters

Whilst the media replacement was being undertaken, design to resolve the other aspects of the project were being developed in parallel. The design of the additional inlet screens was relatively straightforward as provision for an extra screen had been considered when the original inlet works was built in 1992. However, the resolution of the tighter phosphorous standard presented a quite different challenge.

Phosphorous was already being controlled at the works by means of dosing Ferric Sulphide at the final tanks. However, in order to meet the new tighter consent, tertiary solids removal would need to be provided. Up until then, the United Utilities asset standard for a works of this size would have called for COUFs. Unfortunately the constraints of the site meant that such a process would not fit within the site boundary. Given that the works is bounded on three sides by designated ancient woodland, and by Lake Windermere itself on the fourth, extending the works outside the boundary was not a viable option. Therefore, an alternative process had to be found.

Solution

The solution was to use Veolia Discfilters, which are a compact fine filtration unit that use 6 micron mesh to remove solids from final tank effluent. The overall footprint of the two Discfilter units was only 11m by 9m. In addition with an overall height of only 2.4m (excluding handrails) they presented a much smaller visual impact

than COUFs would have, a significant factor in the Lake District National Park.

Though the Discfilter unit has been used successfully with other water companies this was the first time that it had been used on a United Utilities site. So far it has proved to be a successful installation and Discfilters are now being considered for use on several other United Utilities sites.

Project construction & completion

Construction on the second phase of the project started in April 2007 and was completed in January 2008. This represented an overall schedule saving of 14 months against the OFWAT regulatory date of March 2009. Moreover, the overall outturn cost of £4.5m represented a significant saving against the original OFWAT sanctioned project budget of £9.8m. These savings were largely made possible by the collaborative nature of the partners in the integrated Alliance (United Utilities, MWH Ltd, and KMI+ with support from detailed designers GHA Livigunn). From the outset all partners were involved in the design process. As a result the solution developed met all stakeholders requirements and the result is a project, which has been delivered early, under budget, and which is meeting all its output standards.

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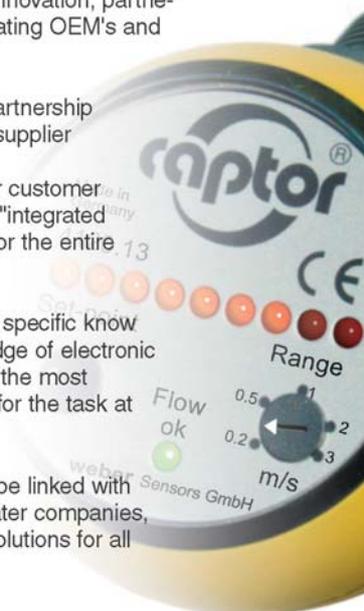
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