

Lamaload Water Treatment Works

engineering award claim for upgrade in tranquil beauty spot

by Stewart King

Lamaload Water Treatment Works (WTW) has been put forward for the BCI Civil Engineering Award because it demonstrates how a major upgrade to a water treatment works can be located in a tranquil and beautiful part of the Peak District National Park in the hills above Macclesfield, Cheshire, yet integrated into the countryside with minimum visual impact to the local environment. The success of the scheme was achieved through close cooperation between the Client, Planning Authority, contractor and designers.



Lamaload Water Treatment Works in a 'farmyard setting'.

courtesy: Atkins Water

Requirement

The client's requirement for the project is to upgrade the existing WTW to satisfy European legislation regarding the removal of cryptosporidium and Manganese from raw water.

Existing WTW

The existing works are located in the shadow of the Lamaload Reservoir Dam in the National Park. It is an area enjoyed by ramblers and the general public all the year round. The existing works consisted primarily of a stone clad single storey building housing vertical pressure filters and a sodium hypochlorite and phosphate dosing facility plus an office, control room, kitchen and various store rooms.

New WTW

An extension to the existing works was required to meet the new European Drinking Water Quality Directive that represented approximately a three fold increase in plan area to accommodate the new process plant.

This has all been sympathetically incorporated into the design by housing much of the plant within a rectangular courtyard bounded on four sides by the existing filter building and by three new buildings.

This layout is reminiscent of a farmyard with its associated out buildings, helping to disguise the nature of the works and hiding the process plant as much as was practicably possible.

Extensive discussions

The final scheme outline was only agreed after extensive discussion and scheme development between *United Utilities*, *MWH (United Utilities Engineering Service Provider)* and the *Peak Park Planning Authority*. Final agreement was achieved with the aid of a three-dimensional animated 'fly-by' which showed the existing plant and then the artistic impression of the proposed new plant.

The concept design was then developed by *Galliford-Costain Joint Venture*, *United Utilities'* AMP3 Design & Build Contractor for the project, *Akins and Degremont UK* were responsible for turning the concept design into a detail design.

The detailed design of the buildings was carried out with regular design co-ordination meetings between engineers and architects from all the above parties to ensure that the design did not deviate from the client's brief and gave the opportunity for *Galliford Costain* to review the design for buildability.

Extremely congested process and drainage pipe work for the site was designed and detailed in 3D. This ensured that potential pipe clashes could be identified and avoided at design stage.

Exhaustive consultation with the Peak Park Planners during the superstructure detail design ensured that the scheme satisfied the projects planning requirements. This included great attention to detail in respect of the stone type and bond details, the eaves

Water Treatment & Supply



courtesy: Atkins Water

details, masonry arched lintel details and roof finishes. A “Kingspan” roof system was adopted as a support system for the tiled roof. This gave the contractor greater flexibility to part complete roofs to suit his programme. Design life for the structures and buildings is 60 years for concrete structures and 40 years for steel structures (20 years to first maintenance).

Local craftsmen were employed, working with locally hewed stone. Bespoke single piece stone arches were utilised for most of the openings, which speeded up the wall construction.

Single stage commissioning

The original programme for the scheme involved a lengthy two stage commissioning period. By modifying the scheme, a single stage commissioning plan was developed by *Degremont* which trimmed nine months off the programme. Off site equipment testing meant that time could be saved on site testing, again saving time on the programme. Civils programme duration was shortened by designing out the piling requirements for the buildings.

Teamwork was a key part of the scheme. The project was one of the first on United Utilities Southern Area Framework to work with a ‘seamless’ team, the ethos of which is to engender trust and individual responsibility within the design team and work without the inefficiencies of duplication of roles. This had the benefit that decisions that were needed were reached quicker with the integrated team.

The Site Safety record was excellent during the construction period with over 250,000 man-hours without a lost-time accident. Several safety initiatives were implemented including “Just Do The Right Thing” which encouraged a positive view towards site safety.

The end result of the design team’s efforts is a scheme utilising state of the art water treatment technology, built to the highest specification in a “farm-yard” setting that satisfies the client and his operatives, and that sympathetically blends in to its environment.

The treatment works now produces treated water to the required drinking water standards for customers of United Utilities. ■

Note: *The author of this article Stewart King, is Project Manager, Atkins Water*