

Wolsingham Sewage Treatment Works (STW)

Winner of
Innovation Award

Project Details

Location	Durham
Contract value	£6.023M
Type of work	New Build with some existing asset refurbishment
Construction type	New Sewage Treatment Works
Client	Northumbrian Water Limited
Start date	10/2019
End date	05/2021
Area	7,500m ²
Main Contractor	Tilbury Douglas



Project Requirements






Northumbrian Water Limited (NWL) and its delivery team used the Wolsingham STW refurbishment to showcase the benefits of Design for Manufacture and Assembly (DFMA) and off-site construction on water industry projects. There has been a slow uptake of off-site construction within the water industry and the team wanted to test an 'Off-site By Default' approach.

Wolsingham STW, located by the River Wear between Crook and Stanhope in North-West Durham, contains a biological filtration plant serving a population equivalent of 2,259. The works had suffered performance-related issues and some assets had reached the end of their useful life. The site, in its existing condition, would fail new consents stipulated by the Environment Agency which needed to be met by December 2021. These, combined with planned development and catchment area growth, meant that the works required upgrading.

The objectives were to drive quality, cut the programme to meet the consent date deadline and reduce site staff numbers/hours whilst delivering a high-value, cost-effective solution. All of which were achieved.

The project scope included: new inlet works, primary and secondary pumping stations, primary tanks, flow distribution and de-sludging; de-scum facilities, humus tanks and de-sludging facilities, a wash water system, storm tank and site-wide cabling.

Project enablers

-  Client commitment to innovation
-  Exemplar collaboration and team integration
-  Removed the need to work at height
-  Factory testing of M&E equipment
-  'Offsite By Default' ethos pushed the boundaries of existing technologies

Project outcomes

-  Circa £1M savings, from £6.02M to £5.1M.
-  Construction completed four months ahead of programme
-  Person hours onsite reduced from approximately 65,000 to 31,600
-  Improved access and operability of plant and equipment
-  Repeatability - Created a DfMA blueprint for future water treatment projects along with supply chain relationships needed to deliver
-  Future projects will benefit from shorter design periods, reduced development and manufacturing costs and, optimised construction durations.

The Solution

The team embraced the 'Offsite By Default' ethos and pushed the boundaries of existing technologies, making them adaptable to a wide number of sites and applications.

Rather than accepting existing products or reverting to traditional in-situ, labour-intensive solutions, the team worked with suppliers to enhance/amend their standard designs and collaboratively explored these new solutions, including:

Siris developed a self-contained flow measurement and flow control structure to house their standard screen. Aquardia developed a two-way flow splitting chamber, manufactured entirely from HDPE (High Density Polyethylene) and delivered to the site for installation as a single element.

Seepex developed a skid-mounted, twin pump primary de-sludge and de-scum system complete with valves, interconnecting pipework and instruments that were assembled and part-commissioned off-site. This was delivered as a single unit for installation on a concrete plinth.

In partnership with JHT, a local metalwork supplier, the team developed a steel MCC (Modern Methods of Construction) kiosk standard design. The design uses standard end panels and is expandable in 1m lengths to suit any size of MCC and can be security rated to suit any Water Industry site. The system used in the project has now been recognised by the client as the framework standard.



Conclusion

The on-site works has improved safety by improving access and operability of plant and equipment. Quality standards were improved due to the greater accuracy and higher tolerances achievable in a factory environment. All parties benefited from a more controlled, less variable construction environment, compared to traditional works, and reduced time/resources on-site. This reduced hazard exposure and improved workforce health, safety, and welfare.



The environmental and social benefits of this project included less waste being produced, reduced commuting journeys, less transportation/haulage emissions, less raw material used, and less disruption to the local community.

The 'Off-site by Default' approach could be adopted on almost any water or wastewater project as the designs are scalable and repetitive. Future projects will benefit from shorter design periods, reduced development and manufacturing costs and quicker onsite construction.