

Case study

Modular treatment plants deliver flexible upgrade for UU



UK manufacturer WPL has installed enhanced models of its Hybrid-SAF™ (submerged aerated filter) modular wastewater treatment plants at two United Utilities (UU) sites - Sandbach in Cheshire and Lawton Gate in Staffordshire.

Some 12 WPL Hybrid SAF modules have been installed in four treatment streams at Sandbach wastewater treatment works (WwTW). Meanwhile, six WPL Hybrid-SAF modules are now providing two additional treatment streams at Lawton Gate WwTW.

Each of the two site installations was delivered and offloaded over two days and was set up and commissioned within five days – Lawton Gate in October and Sandbach in early November 2015 and the plants are likely to be needed at these sites for approximately five years. However, they can be transported from site-to-site as required in the future.

WPL utility and industrial sales manager Andrew Haywood explained: “United Utilities were very clear about the number of streams they wanted and the need for the SAF units to be transportable. They didn’t want to be left with stranded assets if the requirements of the site changed after five years and saw the flexibility of the WPL Hybrid-SAF as a key advantage.”



WPL Hybrid-SAF units can operate as individual treatment plants or the modular design means they can be connected in series to form larger plants. The plants are built offsite in a specially controlled environment, which minimizes the time required for onsite installation.

The units are lightweight, which means they can be delivered and off-loaded with a Hiab lorry. This flexibility removes the need for large lifting equipment onsite during installation and reduces delivery costs.



The modular nature of the WPL Hybrid-SAF means units can be installed even where sites face height and width constraints. In certain circumstances, WPL can increase the height or width of individual units at the design stage to accommodate site constraints.

High ammonia loadings

WPL was asked to develop the transportable systems by contractor Nomenca as the existing single-stage rock trickling filter plants were experiencing ammonia compliance incidents during low flow and colder conditions. The new plants are



required to achieve an effluent quality of 4mg/l ammonia and can be switched off when warmer weather returns – saving energy.

WPL technical director Andrew Baird said: “In dry weather and colder weather the levels of ammonia in untreated effluent can rise considerably. Last winter United Utilities had to hire additional packaged plants from WPL at short notice when the plant at Lawton Gate struggled to cope with the higher levels of ammonia.”

“Rather than having to hire equipment Nomenca and United Utilities decided to upgrade Sandbach and Lawton Gate by adding SAF units.”

The SAF systems have been individually sized to treat the dry weather flow (DWF) for each site: 2,050m³/d for Lawton Gate and 4,000 m³/d for Sandbach. Each stream treats a nominal 1,000m³ wastewater and the additional treatment is expected to be required for three-to-five months a year.

The client specified variable speed drives (VSDs) on the blowers to optimise energy efficiency. The use of VSDs can achieve an energy saving of up to 30% over standard drives.

Low-level access

Design developments focusing on health and safety issues have removed the requirements for high-level access for routine maintenance. The WPL Hybrid-SAF units at Sandbach and Lawton Gate have ground-level sensors and fixed diffusers which remove the need for high-level bubble inspection.



Cutting out the need for operatives to work-at-height reduces the cost of manufacture, installation and maintenance. Importantly, it also reduces on-site health and safety risks.

Andrew Baird said: “Removing top-level access makes maintenance easier and has real benefits in terms of health and safety. New regulations are coming in all the time about high-level working which lead to additional costs and risks for operators.”

Long-term investment

The improved WPL Hybrid-SAF is made of hot-dip galvanised steel and glass reinforced plastic (GRP) with only GRP used below the waterline, ensuring compliance with asset standards. The GRP is UV stabilised with an external gel coating to extend asset life.

The use of GRP in the tank structure has significantly reduced offsite manufacture and assembly time. This means three WPL Hybrid-SAF plants can typically take two weeks to produce, compared with six-to-eight weeks for three steel SAF tanks.

The system can be customised to suit customers’ site-specific requirements for standards on discharge consents, energy efficiency, blowers, physical footprint, installation and cost.

New regulatory guidance for AMP6 (2015-2020) asks English and Welsh water utilities to calculate new investment based on total expenditure (totex) - capital cost plus 20 years’ operational cost. This means utilities are able to invest in new equipment according to whole-life installation and operational costs.

Divisional director Simon Kimber says: “We have created the WPL Hybrid-SAF packaged plant in response to our clients’ requirements for AMP6. One of the requirements is for new equipment to be manufactured and engineered off-site as much as possible.



“This cuts down the installation time, reduces the carbon footprint and also reduces the health and safety risks.”

Partnership working

Neil Wilkinson, Projects Manager, Nomenca said: “The modular nature of WPL’s Hybrid-SAFs gives the wastewater treatment plant managers at Sandbach and Lawton Gate flexibility in terms of operation along with the additional capacity required. They can work alongside existing process systems, so they were a good choice at these sites.

“Working in close partnership with WPL, each process plant was delivered on time and within budget.”

WPL has more than 25 years’ experience of manufacturing packaged plants in both steel and GRP at its precision engineering facility in Waterlooville, Hampshire. The company launched the WPL Hybrid-SAF after extensive research into creating the most durable combination of materials.



About WPL

Environmental wastewater treatment solutions

We offer a comprehensive range of wastewater solutions designed to deliver long term cost-effective on-site treatment at even the most challenging sites; meeting customer specific requirements in terms of stringent environmental discharge consent standards, physical footprint, site access, ease of installation and refurbishment.

Our packaged wastewater treatment systems are designed by an expert team of process engineers and manufactured at our dedicated quality controlled UK facility.

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