



**Wessex Water's Avonmouth wastewater recycling, bioresources and renewable energy park is set to serve its 1,000,000+ population for decades to come following a major overhaul to inlet pumping station, which is one of the largest of its kind in the UK.**

The two Archimedes screws at the inlet works have proven the durability of this pump type. These essential pieces of plant each measure 20 metres in length, 3.1 metres in diameter and weigh 21 tonnes with a 3645 litres per second capacity. However, after 40 years' service, one had become so worn that ECS Engineering Services was asked for proposals to replace it.

## ECS refurbishes screw pump to keep sewage works operating



Case Study: 061

## ECS refurbishes giant screw pump to keep sewage works operating

An inspection showed that the drive gear was still good condition, but the screw body was heavily worn, so ECS developed a plan that retained the motor and the gearbox while the time-expired parts were replaced.

A replacement screw body was made in Holland by partner company Landustrie working to a design that followed that of the original screw. Made in mild steel, it has a high-performance corrosion-resistant coating that will give it a working life measured in decades in line with the WIMES specification. Once the fabrication was complete, ECS organised specialist shipping to get it to site.

"As part of this contract, we also made new side profiles," says Jake Laughton, who managed the project for ECS. "The replacement pump bodies were almost identical to the original design, but we used finite element analysis techniques to optimise them for withstanding the pumping pressure based on new standards."

While the top bearing was in good condition and could be reused, the bottom bearing needed replacement. ECS installed a free

issued bottom bearing that matched the other screw pump at the inlet, thus minimising parts inventory for the works and minimising financial impact to the client.

The first stage in refurbishing the pump was to drain down the pump and remove the old screw. Jake recalls: "We had to make and fit a special stanking plate to the penstock before we could start the drainage to ensure protection of the works. We needed a crane for removing the old screw and fitting the new one so this was also used for installing the plate for the client."

Jake, like many other ECS employees, is a qualified crane appointed person, this allows ECS to plan and undertake crane operations quickly, efficiently and safely without having to bring in outside contractors and keeping costs to a minimum.

With the old screw removed it was time to break up and remove the old screed. For this ECS used a remote-controlled, robotic breaker so that the task was completed quickly and safely.

The new screw then had to be lifted into place. This, due to the size of the screw, required

some detailed planning and the application of significant expertise. It was not possible to lift the screw off the ground with it slung at the correct angle for installation - the weight would have caused significant damage to the flights. To overcome this problem, ECS used an air-powered hoist that allowed the screw to be lifted parallel to the ground and then the angle adjusted by lengthening one hoist chain until the angle matched the concrete trough. Once aligned, it was connected up to the existing drive motor and gearbox and finally, the bearing was cast in and new screed hand formed into the trough.

Jake again: "By reusing the existing motor and gearbox, which are in good condition ECS has brought this pumping station back up to a level of reliable operation, while keeping the clients expenditure under close control."

With the screw pump now refurbished Wessex Water's Avonmouth wastewater recycling, bioresources and renewable energy park is set to continue serving its local population well into the future.

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