Waveney, Lower Yare and Lothingland Drainage Board

Norton & Raveningham Pumping Station Replacement

December 2024

Protecting the future of the Norfolk and Suffolk Broads

The Waveney, Lower Yare & Lothingland Internal Drainage Board's (IDB) replacement Norton Pumping Station represents a significant achievement in enhancing resilience to climate change and protecting vital habitats and communities at risk to flooding.

The pumping station removes excess water from the surrounding floodplain into the River Yare, which is perched above the low-lying marshland. Pumping is the only way to manage water levels within this sensitive manmade landscape.

Aerial Image of the completed Norton Pumping Station. Photo Credit BAM UK

The Broads are England's largest freshwater habitat and one of Europe's most important wetland areas. Without pumping stations the catchment would fill with water causing flooding and permanent damage to habitat and key species such as rare aquatic plants found within the dykes, diverse flora, rare molluscs and breeding and over-wintering birds.

Failure of the pumping system would result in a breach of statutory legal obligations to manage water levels within functionally linked and priority habitat, resulting in the uncontrolled flooding of property, national rail network, agricultural land, public highways, utility infrastructure and recreational and tourism businesses.

Combining Norton and Raveningham catchments

The Norton and Raveningham catchments consists of 788 hectares of sensitive conservation grazing marsh and agricultural land. Water levels were previously managed by two pumping stations. The Norton pumping station, built in 1945, had suffered major structural failure and Defra funding was secured to build a single replacement pumping station at Norton to manage water levels within both Norton and Raveningham catchments.

Archimedes screw pumps

The Fish Friendly Archimedes Screw Pumps and the new Weed Screen system. Photo credit: WMA

The replacement pumping station features two Archimedes screw pumps, which when full of water each weigh 20.5 tonnes. The 2 meter diameter enclosed screws can pump 1.5m³/second of water, which represents a 50% increase in duty capacity, based on climate change predictions for intense rainfall events.

The screw pump is one of the oldest positive displacement pump designs dating back over 2,000 years. The latest novel design removes the leakage path by fixing the rotating screw augers to the outside casing, resulting in enhanced pump efficiency and is the most fish friendly pump available. Other improvements have been incorporated into the outlet arrangement to minimise external stresses on fish/eels passing through the pumping station.

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Advanced Water Management Control

The pumping station's control and instrumentation includes the capability to adjust water levels providing adaptability for any future changes in land management such as paludiculture and wetland habitat creation. The replacement pumping station can achieve enhanced water level management using Variable Frequency Drives allowing the pump to operate over a broad range of flows and having the ability to achieve a steady upstream water level which offers significant betterment to local water quality and biodiversity than was possible with the previous pumps. A cloud based telemetry system, allows the station to be remotely monitored and controlled.

Recognised for Innovation and Collaboration

The project was designed by Jacobs UK Ltd and constructed by BAM Nuttall Ltd.

The Norton Pumping Station project won the "Large Project of the Year" award at the Institution of Civils Engineers East of England Awards 2024, a significant recognition of its successes. The judges were particularly impressed by the "*project team's outstanding collaboration during very complex operations, often with limited historic data and tight time constraints. The team evidenced exceptional planning, technical and communication skills to deliver effective solutions, safely and sustainability, under pressure. A shining example of civil engineering at its finest".*

This award not only acknowledges the project's immediate impact on flood resilience, but also underscores its long-term contributions to safeguarding the unique landscape of the Norfolk and Suffolk Broads.

The Team attend the ICE East of England Award Ceremony in Cambridge. Sept 2024. Photo credit: ICE

Celebrating Future Engineers

Competition Entrants. Photo credit: WMA

In the school autumn term, the IDB ran a STEM (Science, Technology, Engineering & Maths) competition, offering Thurlton Primary School students the chance to connect with the Norton Pumping Station project by designing a 'pumping station of the future'. Submissions showcased the children's creativity and vision, informed by insights gained from site visits and presentations about the critical role of pumping stations in flood management.

The competition concluded with an awards ceremony where certificates and prizes were presented to all participants. Among the exceptional entries, Billy and Frankie were announced as the winning duo. Their innovative design earned them a unique honour: the two new Archimedes screw pumps at Norton will bear their names at the opening ceremony in 2025.

This initiative highlights the importance of engaging young minds in engineering and demonstrates how projects like this can inspire future generations to contribute to their communities.

Projects on the Horizon

With the Norton Pumping Station project complete, focus now shifts to the Broads IDB, which is planning to replace pumping stations along the River Thurne. The first four pumping station replacements are scheduled to commence in February 2025.

Read about the Upper Thurne Integrated Drainage Improvements Project as it progresses:
https://www.wlma.org.uk/news/

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