

Specialist gate engineering design for water control

Water control gate engineering design is a specialist engineering discipline requiring a unique combination of engineering expertise, familiarity and practice, and we are proud to have more years of experience in this field than any other UK engineering consultancy. For flood defence, river control, hydropower, dams, navigable waterways and pumping stations, the KGAL team has unparalleled expertise and experience. Here are just a few examples of some of our current and recent projects.

Kariba Spillway Cofferdam

Readers will recall our feature on the ongoing work we are involved with at Kariba Dam in the Kariba Gorge of the Zambezi river basin between Zambia and Zimbabwe. With manufacturing now underway, the Client's Resident Engineer, Marion Chambart from Stucky, has shared some of her recent photos of the spillway cofferdam with us.



Portal frame used to lift and handle the needles

Kariba Spillway Cofferdam Continued

The photo of the built-in parts under fabrication is courtesy of our Engineer, Mike Askwith, taken during the first factory inspection in 18 months.



Spillway handle and hanging beam



Built-in parts under fabrication



Top hanging beam, two setting needles and top support

Flood control at Pevensey

We have been appointed by JBA Consulting, on behalf of the Environment Agency, to design and specify two replacement flood control gates at Pevensey in East Sussex. The new gates will replace the existing vertical lift wheel gates and provide enhanced regulation capabilities by way of an integrated tilting weir on each gate.

This is the second significant appointment between the two companies within this Environment Agency Regional Hub under the NGSA CDF Framework. KGAL Managing Director, Russ Digby, confirmed "We're pleased to be appointed again to further develop our excellent working relationship with JBA Consulting."

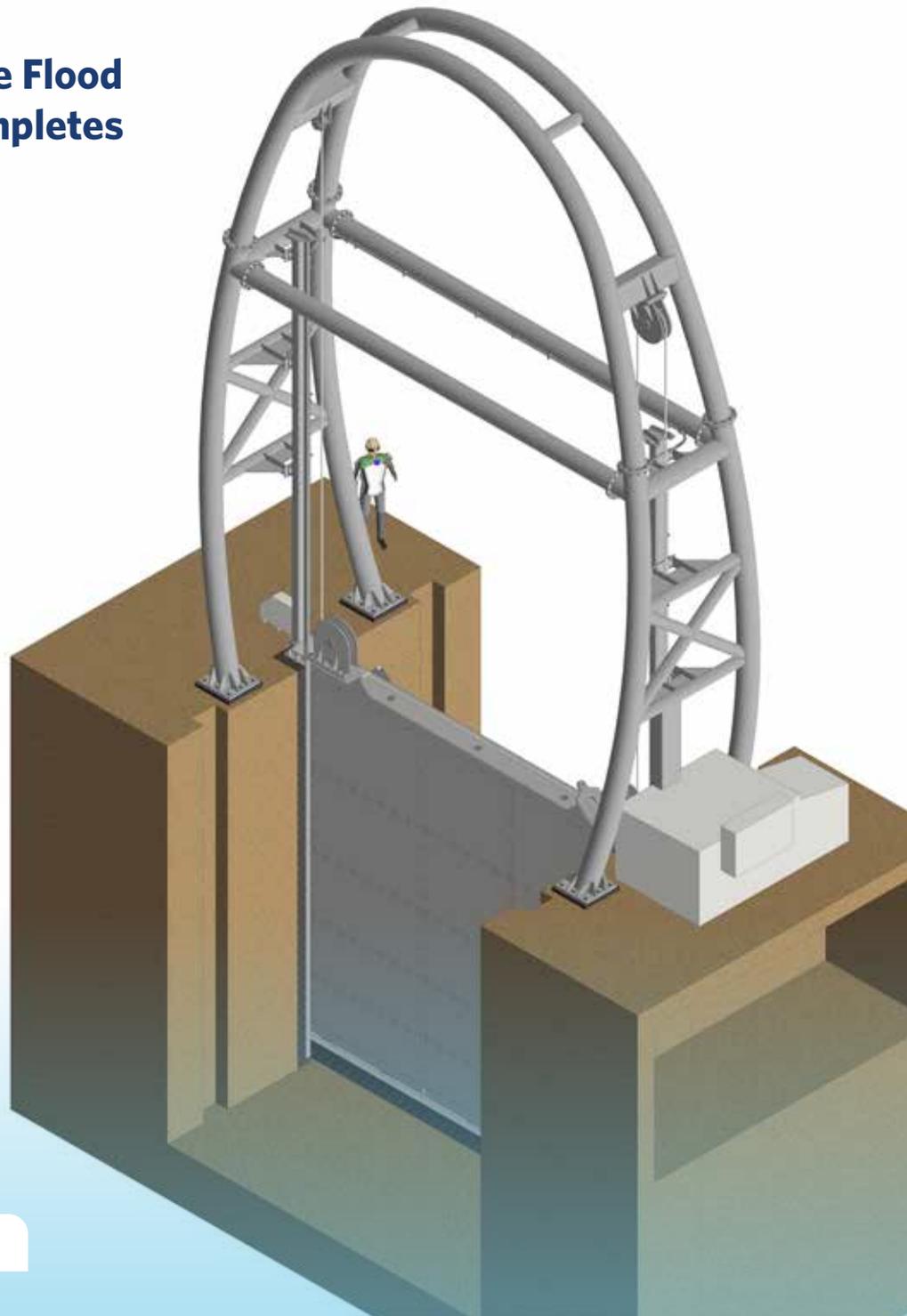
The design work will be handled within the KGAL Wakefield office, where our engineers have already established a working relationship with JBA on the Lincoln Washlands improvement works.

Rotherham Renaissance Flood Alleviation Scheme completes

Design work on the new flood control gate for the Rotherham Renaissance Flood Alleviation Scheme has now been completed by the KGAL Wakefield team.

Fitting in with the architectural vision for the area, the gate has been designed to be operated beneath a superstructure comprising two elliptical arches. Mechanical and electrical operating and control equipment will be positioned predominantly at ground level to minimise visual impact and facilitate easier maintenance without the need to work at height.

KGAL was appointed to design the gate and associated operating system by Pell Frischmann, with the ultimate Client being Rotherham Metropolitan Borough Council.



Surveying on the River Nene

KGAL has been commissioned by Arup to carry out asset condition surveys on two sites on the River Nene; Nunn Mills and Islip. The surveys comprise of a mechanical assessment of the gates, operating structure and operating gear, and an electrical survey of the controls regime and equipment.

Situated in Northampton, the Nunn Mills sluices site consists of three vertical lift wheel gates operated by Rotork actuators. During the survey, back in February, one of the gates was operated to allow our engineers to assess the operating gear and the serviceability of the gate wheels etc., and condition assessment reports were compiled and submitted to the Environment Agency for consideration.

The Islip sluice site, which is situated approximately seven miles east of Kettering, consists of one vertical lift wheel gate, which was operated by the electrical motor during the survey, carried out in July, so that we could assess the operating gear and wheels. Condition assessment reports are currently being compiled.

These reports will be used by the Environment Agency to build different model scenarios in order to decide whether to refurbish or replace the gates.

Operation Assessment of Gate R55 at Beannachran Dam

KGAL has been retained by SSE Renewables to assist in overcoming issues with the existing R55 culvert gate at Beannachran Dam in Glen Strathfarrar, near Inverness. We've undertaken a study using mathematical analysis to predict the operating torques required from the existing gate drive unit for a range of specific gate operating conditions.

Once the model was completed, a series of on-site tests were undertaken, with the gate operating under balanced and then full head conditions, thereby enabling the model-calculated torques to be verified for all conditions using actual site data. Once this exercise was completed, the predictive calculations and data were used to identify any operational issues that might pertain to the gate and its drive mechanisms, allowing design actions to be undertaken to remediate them.



Projects Update

Shiplift survey at Hythe Shipyard

We have been contracted by Fairline Yachts Ltd to investigate and survey their large slipway shiplift at Hythe Shipyard in Southampton, which lifts out a variety of vessels, both private and commercial, for refit work in the shipyard.

The slipway, designed by Rendel Palmer & Tritton Consulting Engineers, was put into service in the late 1950s and has provided a sterling service over the years for both private and military owners. It is now beginning to show its age, however, despite a full removal, service and re-paint in Portsmouth in the 1980s.

KGAL engineers Andy McGhee, Adam Wilson and George Stacey donned their dry suits and got down and dirty on the structure, taking steel thickness measurements and photographs with the maintenance team responsible for keeping the shiplift operational all the time.

We have teamed up again with Pro Steel Engineering Ltd, who compiled a very detailed estimate of the costs associated with new wheels, beams, lifting out, painting and generally bringing the shiplift back up to its original condition, ready to do another 60+ years of hard labour.

Fairline and Hythe Shipyard are now investigating these options, together with an option to replace the shiplift in its entirety, but at a slightly lower than its current 1000 tonne capacity. We look forward to being of service to Fairline, whichever route they choose.



KGAL engineers, Andy McGhee, George Stacey and Adam Wilson inspecting the slipway shiplift

Projects Update Continued

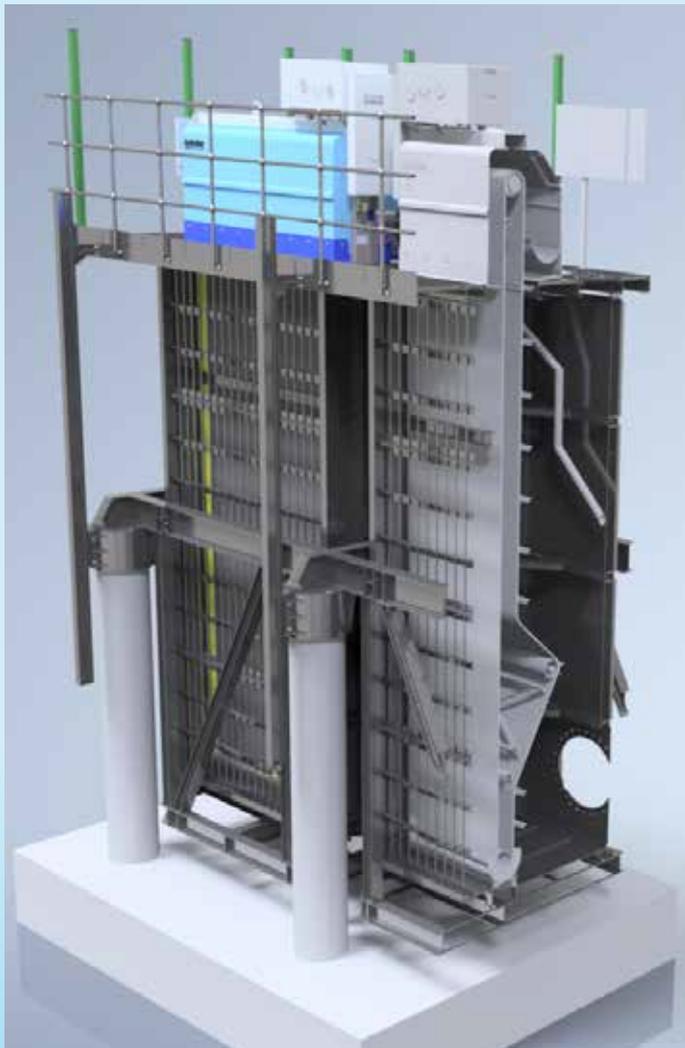
Mythe 1964 Eel Screen

Following on from our first 1941 Mythe water intake project, Pro Steel Engineering Ltd contracted KGAL to design a second frame to support the Hydrolox eel screen in the adjacent 1964 water intake near Tewkesbury.

This design concept was different from the first in that Costain and Pro Steel in combination had proposed a design which was to be supported on six river bed driven piles. In combination with Costain (the main contractor) and Pro Steel, we developed the concept of a frame and a 'cassette' into which the Hydrolox unit could be lowered. This enabled the amount of diver work to be kept to a minimum and the design to also cater for wider fabrication tolerances, yet still be able to maintain a tight 2-4mm tolerance to prevent any elvers from passing in to the water intake. A further complication was the need to maintain the total fabricated weight to a minimum to facilitate a single crane lift from a confined area with a large outreach.

We achieved a tight programme to deliver manufacturing drawings, as did Pro Steel for fabrication. Along with Costain's assistance, the end client, Severn Trent Water, achieved a functioning eel screen within programme.

This is our second successful partnership with Pro Steel and we look forward to progressing our efficient and successful working relationship in the future.



3D model of the 'cassette' style frame at the design stage



The cassette style frame in the water

Award-winning teamwork

We're delighted to have been recognised as part of the award-winning team involved in the Boston Barrier project.

The Environment Agency was recently announced as winner of the ICE East Midlands Sustainability Award and their Large Projects Award 2021, which recognises the work undertaken to protect over 13,000 homes, to date, from tidal surge events, as well as providing the local community with one of the best levels of protection outside London.

The project has also been shortlisted in the Association for Project Management's Engineering, Construction and Infrastructure Project of the Year Awards 2021 to be held in November.



More information about the Boston Barrier, including a short video giving an outline of the project and those involved, can be found [here](#).

News in brief...

KGAL has passed the annual QA Audit with flying colours again and we're proud to remain certified to international standards ISO9001:2015 Quality, ISO14001:2015 Environmental and ISO45001:2018 Health & Safety. Our thanks go to our Compliance Manager, Jacqui O'Donnell, for keeping us on the right path.

Wishing a happy retirement to two of the team

Time to relax for KGAL founder, Ken Grubb...

Ken Grubb has decided it is time to step down from the frontline. Ken set up what was to become KGAL in 1991 and has always been a very hands on leader, growing the business into what it has become today, demonstrating best practice in everything he does and establishing our shared values, of which we are all very proud. Whilst now being able to relax, enjoy life and spend more time with his family, we're still hoping to be seeing him occasionally as we continue to call on his vast expertise from time to time.



We all owe him a huge debt of gratitude for his legacy and wish him all the very best for a happy and healthy future, much of which will be spent cycling around the south coast.

...and Associate Director, Andy McGhee

We're sorry to be saying goodbye to Andy McGhee too, who is also retiring. Andy has been a solid member of the KGAL team since 2013, adding a wealth of experience from the Ports and Maritime sector. He has been actively involved in delivering high quality design solutions on key projects, such as TEAM 2100, WEM and even Norwegian hydropower! A keen sailor, he's now looking forward to spending time in a voluntary role mentoring and teaching sailing, and we all wish him well.

