

Keeping you up to date with KGAL **January 2024**



Kariba Dam on the Zambezi River

## Round up on a very busy year!

2023 was a busy year for **KGAL**! We were retained to work on some significant projects both UK and Overseas.



New lock gates and associated infrastructure at Tilbury

In the UK, work continued on a number of coastal and river flood control structures, including the Lowestoft Flood Barrier and Tilbury DFLGs with Jacobs, Bridgwater Barrier and Sutton Harbour with Atkins, Leigh Barrier and Star Inn Gates at Pevensey with JBA, River Hull Tidal Surge Barrier, Humber Flood Defence Assets and Beckingham Sluice with Arup, Keadby Pumping Station Rehabilitation and Looe Barrier with WSP, Rotherham Flood Defence Gate, Colwick Sluice Fish Pass and a number of smaller, but critical, flood and river control structures with Jackson Civil Engineering.

Whilst Overseas, we continue to work on a number of large capital projects including Kariba Dam Spillway Rehabilitation with Gruner Stucky, Singapore Coastal Reservoirs with CH2M/Jacobs and a number of Reliability Assessments on Dam Spillways in Canada, for Metro Vancouver and BC Hydro.

In addition, we were appointed by our Parent Company, Whessoe Sdn Bhd, to design circa 25,000 Tonnes of Hydraulic Steel Structures for the Luang Prabang HEPP on the Mekong River, in Lao PDR.

In our line of business, no two jobs are alike, each one presenting their own unique challenge to overcome. That's why we enjoy what we do.

For 2024 we look forward to building on these existing relationships, with new challenges on new projects.

We wish all our clients, suppliers and partners a happy and prosperous New Year!

**Dave Griffiths, CEO**





## Bridgwater Tidal Barrier

**KGAL** has been retained by **AtkinsRéalis (AR)** to prepare the detailed mechanical design of the two new vertical lift wheel gates (i.e. gates fitted with rollers to permit movement under hydrostatic load) that will form the physical moveable flood defence elements of the overall **Bridgwater Tidal Barrier** structure design being prepared by **AR** on behalf of the **Environment Agency**.

Our scope of design work also includes the detailed design of the mechanical and electrical winch hoisting systems for the gates and the preparation of the functional outline design of the Motor Control Centres (MCCs) for the winches. In addition, we have been asked to prepare the detailed design of the wheeled stoplog systems to enable the gates to be isolated for both initial installation and future maintenance activities. Further to this, we have also designed a dedicated powered winching system to enable trolley-mounted stoplogs to be stored in a building that will provide protection and the ability to maintain the stoplogs.

## Tilbury Lock receives ICE Award

The Tilbury Dual Function Lock Gates project has been honoured with the **Institution of Civil Engineers (ICE) East of England Team Achievement Merit Award**, for outstanding service to civil engineering.

Acting as sub-consultants to **Jacobs**, **KGAL** completed the detailed design of the 220 tonne mitre gates that were common to the three installed positions (inner, middle and outer gates). In the case of the outer gates, we also provided the design of a dedicated sill support 'shot bolt' and top level 'reverse head' propping system, enabling the gates to be deployed to resist a flood tide.

Chair of the ICE East of England Regional Committee, Peter Lawton, said 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 were commended for exceptional planning, technical and communication skills, delivering effective solutions safely and sustainably under pressure.

He added everyone had '*dug deep and worked really hard on teamwork to ensure the success of the project which was a 'shining example' of civil engineering at its finest.*'



*Current radial gate installation*





View from the upstream side with Sluice 6 on the left, showing the transfer of Cofferdam 1 between Sluices 6 and 5, Cofferdam 2 in Sluice 3 and the stoplogs in Sluice 2



KGAL design sill being aligned in Sluice 3



Needle C1 of Cofferdam 1 being transferred between Sluice 6 and 5

## Kariba Dam Update

Site progress on the spillway rehabilitation at Kariba Dam on the Zambezi River, one of **KGAL**'s longest running and most important projects, has picked up rapidly on site in recent months.

Since starting the project in January 2016, **KGAL** has been involved in design, quality assurance, factory inspections, site inspections and continued technical support to the client, the Zambezi River Authority (ZRA).

The Sluice 6 works are now substantially complete, and the sluice has been rewatered. Sluice 2 is nearing the point at which it can be rewatered, and Sluice 3 built-in parts are being installed.

Cofferdam 1 is being transferred from Sluice 6 to Sluice 5 in preparation for the start of work on Sluice 5 in January 2024.

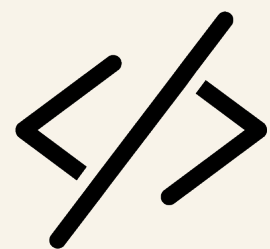
The 16th Joint Mission, which brings together the financiers, the Panel of Experts and all the regional stakeholders, was held between 6th and 10th November in Siavonga, Zambia, where **KGAL** was represented by Nick Crosby, who presented the progress on the hydromechanical works.

A further stage of works to replace the six hoists that operate the spillway gates has been tendered and **KGAL** undertook the technical evaluation of the bids in December in Harare, Zimbabwe.

## Partick to Govan bridge lifted into place

The Partick to Govan bridge span was transported by barge from Belgium in October, successfully being lifted into place by crane barge.

The **KGAL-designed** slewing system was successfully tested at the Contractor's works in Belgium and was installed on site prior to the installation of the bridgedeck. The electrical system has been installed, with testing now underway.







## Copperhouse Sluice

**KGAL** has been commissioned by **A&T Services** on behalf of the **Environment Agency** to initially carry out a design options study for designing a method of supporting the vertical lift gate at **Copperhouse Sluice**, in case the existing single rope drive arrangement fails.

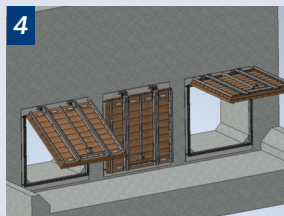
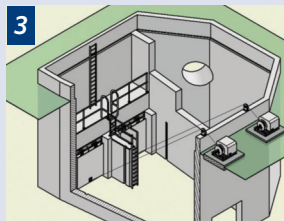
The gate, located in the popular tourist destination of Hayle, Cornwall, is used to control flows from Copperhouse Pool to the sea. However, the gate channel is easily accessible to the general public at low tide and the Environment Agency has raised safety concerns over possible rope failure when personnel are under the gate.

Subsequent to the submission of the **KGAL** design options report and meeting with the Client Team, a preferred design option was chosen, enabling **KGAL** to now proceed to the next phase, the detailed design.

A site survey was recently successfully carried out by Jasper Taylor and Matt Hockham to confirm existing dimensions on site, as well as sampling the local Cornish pasties and ice creams!

## Jesson and Grand Re-doubt Outfalls

**KGAL** was commissioned by **Ardent Consulting Engineers** on behalf of **Jackson Civils** and the **Environment Agency** to produce a condition report and outline design package for replacing the existing pointing doors at **Jesson Outfall** (Dymchurch) with composite stainless/HDPE flap gates.



In addition, the scope included a condition survey and design package for re-designing the seals on the existing flap gates at **Grand Re-doubt Outfall** (Dymchurch), as the **Environment Agency** had reported that the existing seals had been regularly failing/falling off in the flows.

Site surveys were successfully carried out at both sites by Jasper Taylor in May 2023, enabling the production of condition reports, 3D models/drawings and design specifications for the two sites. The final packages were submitted to Jackson Civils and the EA in July 2023.

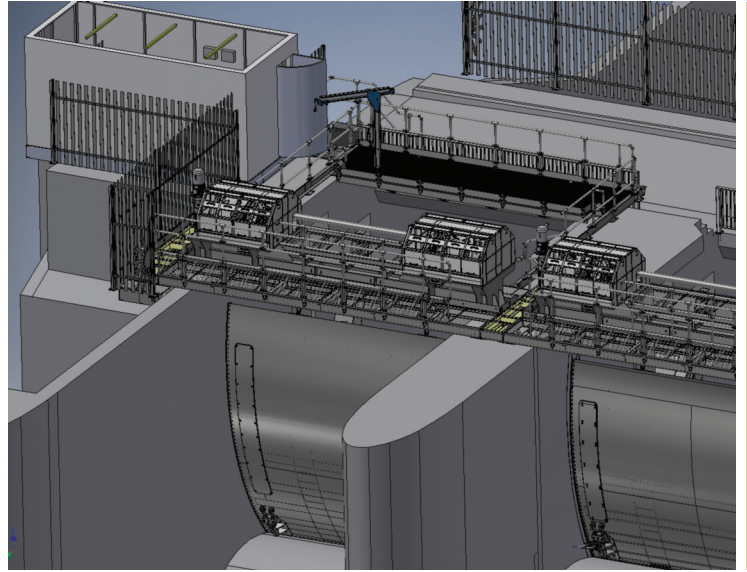
Of personal interest to Jasper, the **Jesson Outfall** had been previously worked on in the 1950s by his Late Grandfather (J.I.Taylor M.B.E., B.Sc., M.I.C.E., Engineer to the Board), who at that time was Chief Engineer for Kent Waterways and was shown as checker on the **Jesson Outfall** historic drawings.

1. View looking at Jesson Outfall pointing doors
2. View looking down at the RE-doubt outfall flap gates
3. Model view of the flaps and winches at Jesson
4. The **KGAL** modelled flap gates and sealing frames





Current radial gate installation



Model view

## Leigh Expansion and Hildenborough Embankment Scheme (LEHES)



View during Renold FAT Test

We are carrying out vital flood defence works on behalf of the **Environment Agency** on the **Leigh Flood Storage Area (FSA)** control structure situated on the River Medway in Kent.

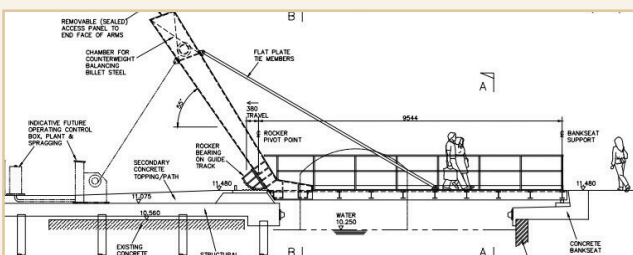
The control structure, which consists of a central radial gate, two identical side radial gates and a small penstock, helps to manage river levels in high flow to reduce the impact of flooding for homes and businesses in the Hildenborough and Tonbridge area. It impounds water in an upstream storage area during periods of peak flow and provides a controlled release of the water when conditions are suitable, or when the upstream storage capacity is reached. This work will replace the three radial gates and the three drives operating the gates, with three new radial gates and three new rope winch systems.

The project is progressing well and has evolved from its original objectives, which involved replacing the lead screw drive mechanism with a winch drive while also increasing the impound height, which required modification to the three original radial gates. The scope now involves replacing all three radial gates with new fabrications in order to meet the programme delivery. The gate and winch design has been completed, **Factory Acceptance Testing (FAT)** has been undertaken, and fabrication is well underway. Further design scope has been added for a moving platform, which enables improved access for winch equipment inspection and maintenance requirements.

Installation of the South Gate is due to start in Q2 2024. The programme target is to replace all three gates before winter 2025.

## Gwasted Bridge

**KGAL** has been appointed by Cass Hayward to design the electrical and mechanical aspects of a new movable bascule bridge to be built across the Monmouthshire & Brecon Canal, next to an existing fixed masonry arch bridge adjacent to Lock No.2, near Malpas in South Wales.



Design drawing of the new Gwasted Bridge

The "Mon and Brec", as it is fondly known, is a very picturesque canal originally connecting the county town of Brecon with the port of Newport. The southern portion is not currently navigable and this new bridge will be an important step in reopening the canal along its entire length.

The lifting bridge structure, comprising a 3m wide x 8.5m deck and a counterweight arm, was designed by Cass Hayward. The lifting principle will utilise a small electrically powered winch and wire ropes.





## Great Yarmouth

The double leaf bascule bridge for road traffic, pedestrians and cyclists at Great Yarmouth is now complete and now awaiting site testing.

The bridge has been declared operational, though it has not yet been opened to road traffic (pending final site acceptance tests and work to associated roadworks on the west side of the bridge).

**KGAL** continues to support Norfolk County Council ensuring completion of final snagging issues and witnessing site acceptance testing scheduled for early in the New Year.

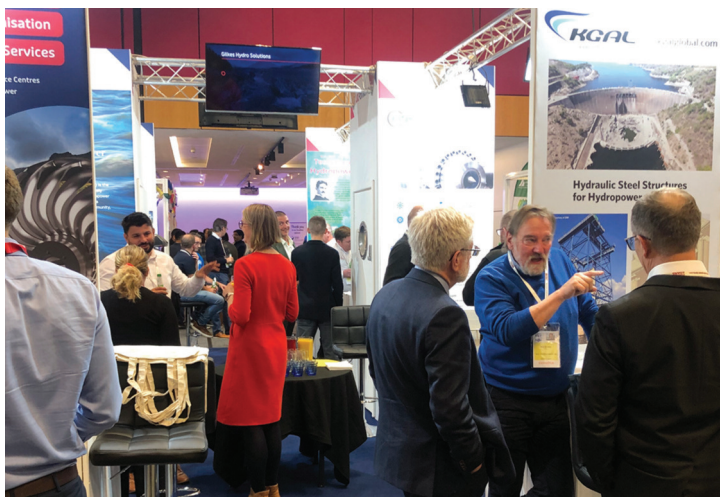
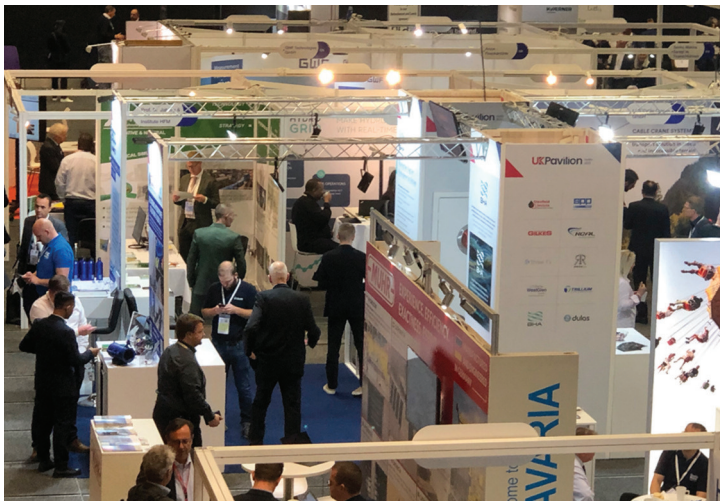




## Exposure HYDRO 2023

**KGAL** participated on the UK Pavilion at HYDRO 2024 in Edinburgh in October and it was a superb event.

Dave Griffiths, Nick Crosby and Yue He were kept busy with lots going on - interesting conference sessions, fabulous social events and a buzzing exhibition stand - and it was great to see lots of friends, colleagues and partners from the international hydropower industry again. We're looking forward to the next one in Graz, Austria, November 2024.



### news in brief

#### **Luang Prabang HEP, Lao PDR**

**KGAL** has been appointed by our parent company, Whesoe SDN BHD to provide the design for circa 25 tonnes of hydraulic steel structures for the Luang Prabang Hydro Electric Project (HEP) on the Mekong River.

This is a follow-on project from the Xayaburi HEP, which completed in 2019. Brent Imlison visited site in December - a progress report will be published on our next issue of Fluid.

#### **Portavogie, Ireland**

**KGAL** has been instructed by Qualter Hall & Co. Ltd, to provide the structural and mechanical design for the under-carriages, keel support structures and adjustable bilge arms, for a new ship haul out facility at Portavogie in Northern Ireland.

Qualter Hall has been appointed by Northern Ireland Fishery Harbour Authority to design and build this new facility, including the adjustable carriage and haul out winch, with integrated hydraulic and electrical operating and control systems.



#### **Bermuda Bascule Bridge**

We're happy to report that we have secured the contract for a CAT 3 check on the new Bermuda Bascule Bridge, one of two replacement highway bridges commissioned by the Government of Bermuda.

As well as providing critical connections, the bridges will form distinctive landmarks, creating the 'first impression' for visitors arriving at LF Wade International Airport.



## New Faces

Adding more engineering talent to the **KGAL** team.



### Ross Strickland

*Poole Office*

We welcomed Ross Strickland to our Poole office team in December.

Ross is an Engineer who will primarily be working on the design of water control gates. A Degree qualified Design Engineer with over 20 years' experience in various engineering design roles, Ross spent 10 years with Wartsila before moving into the metal industry, where he worked on the design of filtration systems for metal mills at Primetal Technologies.

Ross has extensive experience using Inventor 3D drawing software, experience in steel structures and a good working knowledge of hydraulic systems.

Since 2020, he has also worked as a Lecturer, teaching various engineering subjects at Eastleigh College. He has now made the move to KGAL where he can get back into industry and back to hands on designing.



### Jonathan Lee

*Wakefield Office*

We are also pleased to welcome Jonathan Lee into the **KGAL** team in Wakefield.

Jonathan will be employed as a Senior Engineer. He started his engineering career on the shop floor as a CNC machinist for a well-known Hydraulic Cylinder manufacturer, and progressed to the design office, where he learned 3D and 2D CAD skills.

He gained NVQ Levels 2 and 3, before going on to add HNC, HND and a BEng (Hons) in Engineering with Technology Management. He has since gained a wide range of experience in design of pressure vessels, accumulator cylinders and sub-sea assemblies for the Oil and Gas sector.

## and finally... Go Karting Mini Prix

Our Poole office team took time out in October to hold a Mini Prix at South Coast Go Karting.

Bringing out the competitive streak in everyone, it was a nail-biting finish, with Matt Hockham taking 1st place, followed by Shane Thomas in 2nd and Adam Wilson in 3rd.



*The Team (Dawn, Mark, George, Shane, Matt, Adam, Paul, Jasper and, Russ)*