



Wave & Tidal Energy

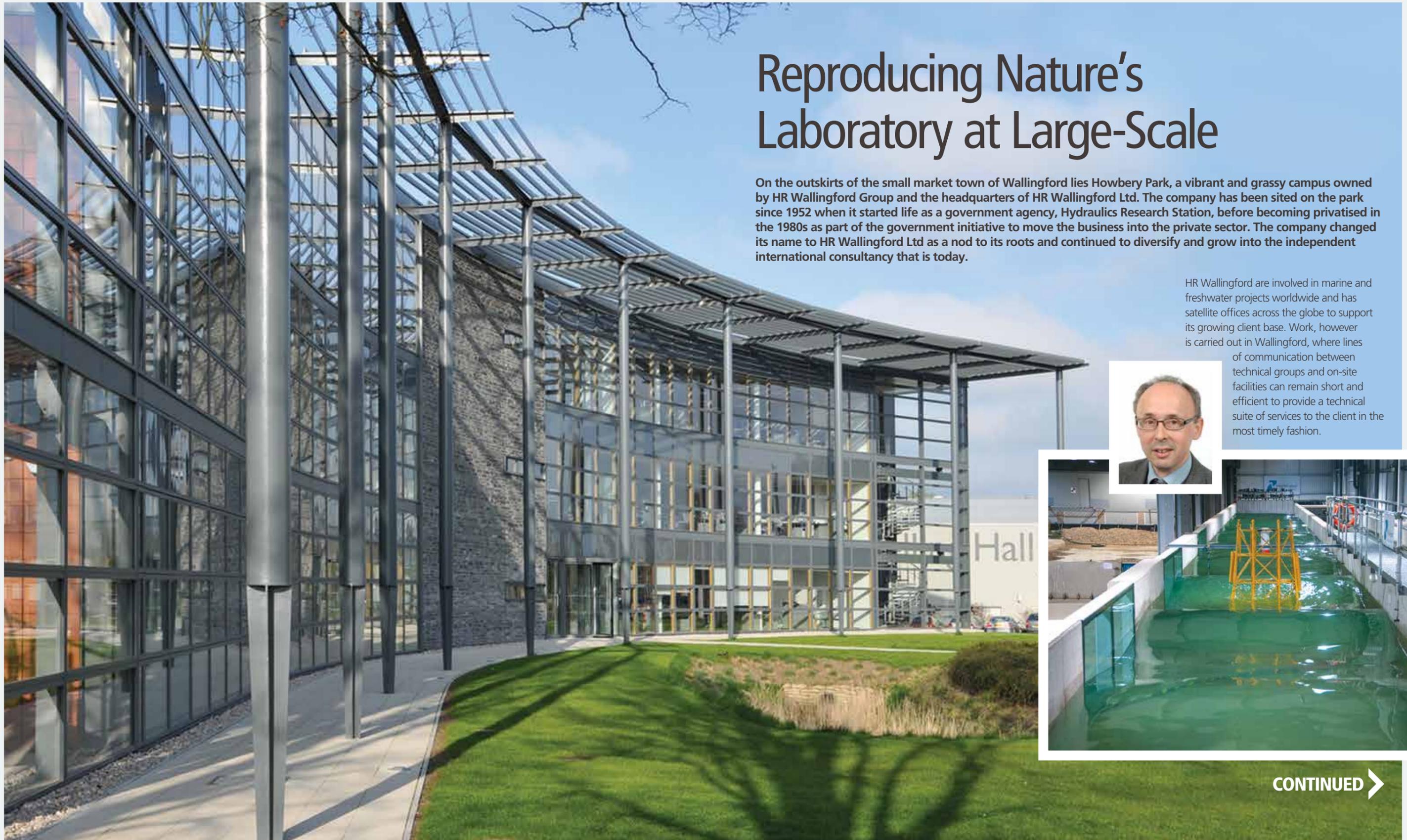
NETWORK

COMMUNICATION HUB FOR THE WAVE & TIDAL ENERGY INDUSTRY

UNDERWATER NOISE

SPOTLIGHT ON...
IRELAND

Innovations



Reproducing Nature's Laboratory at Large-Scale

On the outskirts of the small market town of Wallingford lies Howbery Park, a vibrant and grassy campus owned by HR Wallingford Group and the headquarters of HR Wallingford Ltd. The company has been sited on the park since 1952 when it started life as a government agency, Hydraulics Research Station, before becoming privatised in the 1980s as part of the government initiative to move the business into the private sector. The company changed its name to HR Wallingford Ltd as a nod to its roots and continued to diversify and grow into the independent international consultancy that is today.

HR Wallingford are involved in marine and freshwater projects worldwide and has satellite offices across the globe to support its growing client base. Work, however is carried out in Wallingford, where lines of communication between technical groups and on-site facilities can remain short and efficient to provide a technical suite of services to the client in the most timely fashion.



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R&D PROJECTS AT THE CUTTING EDGE...

The in house acoustic modelling tool, **HAMMER**, is compliant with the most recent guidance on underwater sound measurement and modelling and has been peer reviewed, validated and benchmarked against collected data and other models using standard methods.

This will allow a wider range of tsunami hazards to be investigated as well as exploring more fundamental behaviour within a larger facility than previously possible.

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HR Wallingford developed **SMARTide** (Simulated Marine Array Resource Testing), a unique suite of two dimensional (2D) hydrodynamic

WORLD CLASS FACILITIES...

Although investment into facilities is an ongoing concept for the company, its physical modelling hall and navigation centre was catapulted into the limelight in October 2014 with a grand opening by Lord Heseltine. The UK Ship Simulation Centre was purpose built to house HR Wallingford's suite of four real-time simulators. At the same time the physical modelling hall was expanded to accommodate the next generation of physical modelling facilities – the 75 m long, 8 m wide Fast Flow Facility.

The company remains at the forefront of technological advancements within industry through both its pool of technical specialists and its unrelenting investment into a self-funded program of research and development. With many staff retaining active roles of PhD supervisors, visiting professors as well as members of various working groups and councils, HR Wallingford is in a unique position to co-fund and invest in areas of innovative research to bridge challenging knowledge gaps realised by their clients.

models of the UK's continental shelf including the North-West European coastline. The model was commissioned and funded by the Energy Technologies Institute (ETI) with the purpose of creating a valuable tool in site selection as it assesses the interactions between tidal energy systems (tidal range and tidal stream) at high resolution.

A European Research Council funded grant (**URBANWAVES**) joint with University College London will use HR Wallingford's world leading pneumatic Tsunami Simulator later this year to investigate tsunami loading on single and multiple buildings among other phenomena.

The progress of the tidal energy industry has driven the requirement for physical modelling at large scales due to the increased costs and risks associated with cable and foundation protection. As such the key area of interest in physical modelling was to be able to include sediment into the mix of wave and current interaction in order to combat potentially the most technically challenging issue of foundation and cable protection in highly dynamic environments.

...AND NOW TO THE NEW FLUME

An insight to the Fast Flow Facility in Fast Forward...click on the QR Code/video link at the end of this article to see the 6 month development captured in 3 minutes.

"We realised the need to create a facility large enough to accommodate models at a scale which closer represents the conditions present in the natural environment. Our aim was simple: rule out more simplifications from physical modelling and reduce scale effects so that the models we test perform more like they would in the field, providing greater confidence in the feasibility of projects to developers and investors alike."

In essence, Richard wanted to 'Reproduce Nature's Laboratory at Large-Scale'.

FAST FLOW FACTS...

The Fast Flow Facility provides the opportunity to explore structural interactions in a controlled environment at a larger scale and in more detail than has previously been possible. This facility builds upon 70 years of modelling experience with 15 years' experience in the offshore wind sector

to provide practical solutions for complex challenges to facilitate more effective asset management. It is anticipated that the use of large-scale physical modelling facilities will significantly reduce the costs associated with marine renewable development through the optimisation of foundation design and scour protection.



PROJECTS UNDERWAY...

Renewables Business Development Manager, Samantha Dawson provided an insight to the projects underway: *"To date, we have used the Fast Flow Facility on a range of projects – both commercial and research. It provides us with a controlled environment where we can evaluate new and innovative scour protection systems for cables and help developers investigate novel foundation performance for large offshore developments."*

HR Wallingford

[Click to view more info](#)

[Click to view video](#)

The continuous sediment movement in the sea is reproduced within the Fast Flow Facility, an essential element for the successful modelling

Professor Richard Whitehouse is a Technical Director at HR Wallingford and highly acclaimed expert in his field of sediment dynamics, having published over 30 papers with over 60 authors and receiving almost 500 citations. The new facility is the brainchild of Richard and his team.

of seabed processes and wave-current-sediment interaction, while the deep sediment pit provides the capability to simulate deep foundations and buried assets, such as subsea cabling.

