GOING DIGITAL:
Celebrating Achievement In Water And Wastewater Infrastructure Development

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Following two years of hosting remotely, Bentley Systems returned to a live setting for its annual *Year in Infrastructure and Going Digital Awards* event, held November 14-15 in London, England. Bentley welcomed 114 press members from 23 countries to celebrate some of the most impressive infrastructure projects of the past year, including those from the water/wastewater sector.

On Day One of the proceedings, the finalists presented their projects — most characterized by uncommon scope and difficulty; all reliant on engineering and digital technology innovation for success — as they vied for the favor of the judging panel. The event also featured new product announcements, breakout discussions, and a plenary session covering the ongoing evolution and potential of digital technologies. Plenty of networking among finalists, journalists, and Bentley staff was interspersed throughout, culminating on Day Two with a lavish awards dinner reminiscent of the Academy Awards ...or at least the Golden Globes.

I had the privilege of attending the event and the opportunity to hear from all three finalists from the Water and Wastewater category. Here are some details from each of the nominated projects.

Jacobs and PUB, Singapore's National Water Agency

Tuas Water Reclamation Plant (TWRP)

Tuas Water Reclamation Plant (TWRP) is part of Singapore's larger deep tunnel sewerage system, designed to provide a cost-effective and sustainable solution to the country's long-term needs for water collection, treatment, reclamation, and disposal. Phase One of the project was completed in 2008 and serves the eastern part of Singapore, while Phase Two, for which Jacobs was appointed as detail design consultant in 2017, is scheduled for completion in 2026. Once finished, it will extend the deep tunnel sewerage system to the western and southern regions and make TWRP the largest membrane bioreactor (MBR) facility in the world.

OhSung Kwan, manager for TWRP, described how digital tools are essential for managing the multitude of contract packages onsite — 17 in total — starting from the "bid" stage by assisting with and expediting tenders via the sharing of 3D project models, on through the construction stage by allowing for efficient management and better decision-making across different project teams by sharing and standardizing data, and into operations (upon completion) due to a full virtual rendering of the plant for smarter O&M.

OhSung Kwan (left) of Jacobs and
Tion Seng of PUB meet with Angela Godwin for Water Online.

2022 Going Digital Awards in Infrastructure winners *(courtesy of Bentley Systems)*

Kwan spoke of how Bentley's iTwin platform was put to the test, noting how the TWRP project is on pace to include 3,500 information files, whereas a typical project might only have hundreds. However, he recognized the importance of the human element, stating that "Technology is great, but quality and consistency is needed to make the data valuable."

MWH Treatment, as Part of Advance Plus Framework Joint Venture with J. Murphy & Sons

Burnley WwTW Capital Investment Project

The Burnley Wastewater Treatment Works (WwTW) project, which forms part of United Utilities Water Company, was initiated to improve current site capabilities and comply with tightened regulatory standards to accommodate population growth in Northwest United Kingdom. MWH Treatment (MWHT) was commissioned as the design and solutions provider, with construction and engineering services provided by J. Murphy & Sons. The Advance Plus Framework is their joint venture for AMP7 — a five-year period (2020-2025) for privatized water companies to meet established Ofwat regulatory requirements to ensure quality service, affordability, and resiliency, as well as innovation — on behalf of United Utilities. MWHT answers the call for innovation with its digital delivery approach, which breaks down into five key steps: survey, model, rehearse, assemble, and transfer.

The Burnley WwTW project came as a challenge due to its

Adam Robson and Clare Kovacs of MWHT with Angela Godwin.

significant time and cost constraints, with just 36 months and GBP 90 million to deliver a new 12,000-meter concrete detention tank and pumping station, a 32-meter-diameter primary settling tank, a below-ground in-situ activated sludge plant, a 6-meter-deep interstage pumping station, a surplus activated sludge thickening plant, site-wide mechanical and electrical work, and temporary works to keep the plant online. As a result of the complexities of the scheme, which included 12 different contractors and work crews, MWHT decided that digital rehearsals would be key to the project's success.

Leveraging Bentley's SYNCHRO with interactive onsite safety induction software, the team generated a 4D construction model to visualize and support phased workflows. Using the model, they performed monthly rehearsals to review the program and provide a holistic view of the project as it progressed. The inte-

grated digital solution facilitated proactive logistics management and interactive, intelligent workflows, saving eight weeks and GBP 80,000. The 4D model also serves as a digital twin, enabling informed decision-making for the life of the plant.

Adam Robson and Clare Kovacs of MWHT even described a situation where Canadian geese had settled onsite and, in order not to disturb their nest and eggs, workflow was re-routed without disrupting the project's timeline — something that could never have been done without their digital approach.

Larsen & Toubro Construction (L&T)

Utility Development and Management for Nadaprabhu Kempegowda Layout (NPKL)

As part of a mission to create a dynamic and sustainable NPKL township, the Bangalore Development Authority initiated an integrated area development project to deliver potable water supply, sewerage collection, and recycled water network through a piped system for 3,032 homes, with L&T responsible for design, construction, commissioning, and O&M over 10 years. Faced with a constrained construction area and multiple disciplines working within a tight schedule, L&T realized that conventional methods were too time-consuming, delivered inaccurate results, and were prone to rework in design and execution stages, especially since the scope of the project involves extensive house service connections and the placing of multiple utilities in the same constrained area. It was clear, therefore, that they needed an integrated hydraulic and structural modeling solution.

Leveraging OpenFlows WaterSight and 3D Structural Analysis And Design Software (STAAD) from Bentley, L&T modeled and analyzed multiple hydraulic operating scenarios to ensure that the sewer and water network is optimized and performed structural design and analysis for 125 different structures. The integrated technology solution saved 40% in engineering resource

The winning team of Jacobs and PUB accepting their award.

hours and assisted in completing the engineering works in six months versus a projected nine months using manual processes. Establishing collaborative digital workflows avoided clashes and minimized rework while improving productivity by 25%, according to Debidutta Mishra, manager of L&T's wastewater business unit. Furthermore, the digital monitoring systems will enable remote O&M functions for ongoing smart-utility management.

And The Winner Is...

Jacobs and PUB claimed the honor on awards night, but it was surely a difficult decision for the judges given the strength of the candidates and their projects.

And it was an honor, personally, to learn from some of the brightest minds in our industry, innovating and utilizing digital solutions that will guide infrastructure development in perpetuity — the only question being, 'Where can we go next'? It will be interesting to see at the 2023 *Year in Infrastructure* and *Going Digital Awards*. ■

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