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## Water and Sanitation in the News

CELEBRATING

## Engineering the Future: Tools for Wastewater Plant Design

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One of the most technically difficult and exacting tasks within the wastewater treatment industry has always been the engineering design process. Rife with mechanical pitfalls and complex componential manoeuvring, designing a wastewater treatment plant takes hundreds of hours and near-infinite calculation. New tools leverage computing power to take away some of the strain on engineers and open up a digital world of possibility for wastewater plant design.

To procure the engineering documents necessary for designing a new plant or making upgrades, wastewater engineers traditionally start with process flow diagrams outlining the course of the plant in question and its equipment. These diagrams are used by mechanical engineers to outline instrumentation and major equipment, by civil engineers to determine the physical configurations and arrangement of the equipment, and possibly by architects who are responsible for making the physical design functional and efficient. Meanwhile, electrical and control engineers design the electrical and instrumentation aspects of the facility. After all of this, which can take hundreds of hours of labour, the team arrives at a set of initial engineering documents from which to work.

These documents are crucial because they give the engineers a sense of capital and operating costs, where to optimally build the facility, what permits and approvals might be necessary, and how to begin the bidding process to get the plant built. With the advent of digital technology, it is now possible to drastically cut down on the time it takes to arrive at these initial documents with use of design platform like Organica Water's Organica Central Station (OCS). "OCS provides all of the [engineering] documents — a complete preliminary engineering design suitable to calculate budgetary cost and footprint for a WWTP of virtually any size — in a matter of hours and entirely with a software tool," said Ari Raivetz, CEO of Organica Water. "A user can run unlimited iterations of WWTP designs to get to an optimal solution and doesn't need to spend weeks or hundreds of thousands of dollars to do so."

A user inputs the specific influent characteristics and desired treated water quality and the program takes it from there. OCS was designed to go through the same processes that wastewater engineers would for days in six to eight hours of running algorithms. The program currently applies to traditional activated sludge or Organica-powered plants only.

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"Every design task where the process can be standardized and a lot of data is to be handled is an excellent candidate to be carried out by automated design," said Raivetz. "The good news is that this will leave more time to humans for the creative aspects of the design work and will help solve some of the most pressing issues we face related to aging infrastructure and climate change."



... "There are many new processes used in the wastewater treatment industry that are being combined in novel ways that simple spreadsheet tools cannot handle," said Malcolm Fabiyi, president of Hydromantis USA, which has offered commercial wastewater modelling platforms since 1992. "All of these technologies have unique mechanisms and characteristics that are not addressed by simple modelling tools." Of all the parties involved in wastewater treatment, engineers are near the top in terms of technical savvy. It is likely that many of them apply these tools or similar ones to their work. But the capabilities of these design aides offer a glimpse into just how much is changing thanks to computers — and, with some imagination, what might be next.

Source: Water Online, 1 June 2016

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