

## SMART WATER WATCH

# Opti takes US by storm to combat CSOs and flooding

With hurricanes Harvey and Irma bringing stormwater management into focus, innovative stormwater solutions are in high demand. Can smarter monitoring and control platforms provide the key?

OptiRTC, a “smart” stormwater management specialist, is dramatically upscaling in the US after receiving \$5.5 million of investment in February 2017 following a spate of successful pilots. The company currently has systems spread across 21 states with a customer base including many of the major cities in the US, including Philadelphia, PA, Denver, CO, Omaha, NE, and Chicago, IL.

Marcus Quigley, CEO and founder of Opti, told GWI that the company is focused on “direct continuous monitoring and adaptive control of stormwater infrastructure”, deploying systems that manage clients’ existing stormwater infrastructure to address three issues: flooding, improvement of discharged water quality and combined sewer overflow (CSO) reduction.

Quigley explained that Opti differs from players such as EmNet who provide site specific or client specific hardware and software that is “single tenant and customised.” He said that Opti’s software-defined configuration for civil infrastructure control via a “standardised product strategy” means that customers can reconfigure deployed products, rather than re-design and re-deploy site specific integrations as they scale up or as conditions change over time. Opti’s stormwater management platform integrates off-the-shelf sensors and valves, weather forecasts and microcontrollers.

“We’ve had to do some specific custom development to support the use cases that are specific to stormwater, for example, running our own firmware on the microcontrollers and building all of our cloud applications,” said Quigley. The accumulated data is typically communicated by cellular telemetry and combined in algorithms that calculate how much water to release from stormwater storage infrastructure so that rainfall can be stored during peak flows (see figure, facing page). Customers access data through Opti web portals and services such as their public application programming interface (API).

Opti diverged from its parent company, Geosyntec Consultants, to become independent in 2014, and investors have put close to \$11 million into developing the

## STORMING AHEAD

Marcus Quigley sees opportunity for smarter stormwater management across the globe.



company. “In the near term we’re focused on the US market because it’s such a large and well-developed market, with a number of cities transitioning from implementing our technology on a smaller number of sites to evaluating and deploying at scale,” said Quigley, who estimated the addressable US CSO market at about \$3-4 billion a year.

Figures such as these have sparked more smart stormwater projects in academia with the National Science Foundation (NSF) granting \$1.8 million to the University of Michigan in October 2017 for a three-year project investigating prototyping and development of smart stormwater systems for reducing the impacts of flooding. This came after an \$800,000 NSF award in 2014 for a project on self-learning algorithms and green infrastructure, which should reach completion in July 2018.

Oregon’s regional stormwater management utility, Clean Water Services (CWS), began implementing Opti’s technology in 2014 and is now upscaling to integrate the system at the watershed level. Richard Boyle, engineering project manager at CWS, told GWI that they were working on “logical parameters” to support multiple system

integration in order to make informed decisions based on pending rainfall on a stream reach scale, expanding beyond “single point facilities.”

“Rain falls differently throughout a basin. We’re investigating the parameters necessary for multiple systems to operate together so that decisions for facility operation are based on where rain actually falls, stream health and positive environmental impacts,” said Boyle.

Boyle told GWI that following introduction of the watershed-based permit under the Clean Water Act, CWS has been working with Opti to investigate how land use changes affect the water quality of receiving streams and are developing “procedures and methodologies” to maximise the benefits of its actions.

The US EPA estimates that roughly 850 billion gallons of untreated wastewater and stormwater are released as CSOs annually in the US. Opti has worked closely with the City of Albany, NY, which experiences 60-70 CSO events in a typical year.

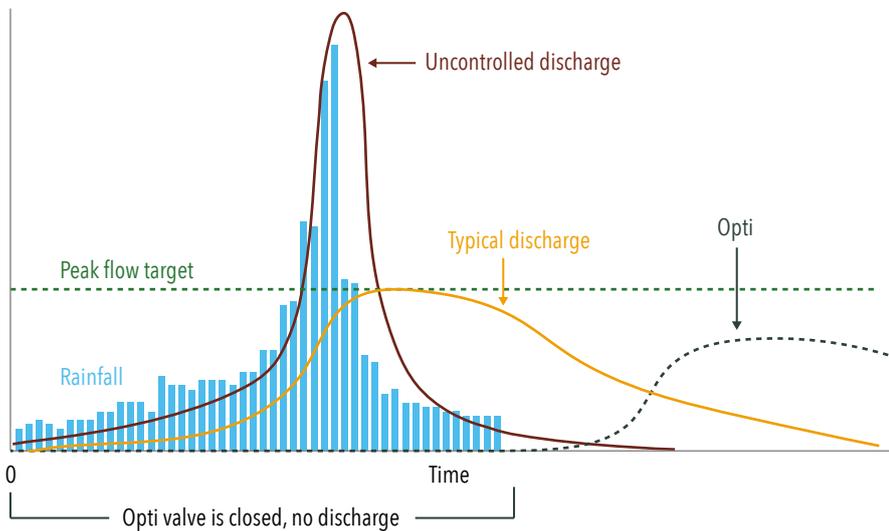
“Every few years we’ve had flash-flooding within the combined sewer area, resulting in property damage and sewer back-ups into buildings,” said William Simcoe, deputy commissioner of the department of water supply in the City of Albany. The City has undertaken two major projects with Opti to tackle these challenges, one of which is the Hansen and Ryckman project, a green infrastructure project where Opti manages storage in a constructed wetland system. Designs have been drawn up for potential underdrains to convey runoff to a pumping station for stormwater reuse in the future.

“In preparation of anticipated rainfall events, the Opti system allows the City to perform pre-event drawdowns to ensure that the required storage is available for the mitigation or the management of the wet weather flows,” said Michael Miller, vice president at Albany’s partner CHA Consulting.

Quigley highlighted cost-effectiveness as one of Opti’s greatest benefits. “In most cases we end up being 50-90% less expensive than the available alternatives,” he said. Miller added that Albany’s Hansen and ▶

## TAKING CHARGE OF DISCHARGE

Opti's technology stores rainfall to reduce discharge during peak flows, releasing it after a storm event. Uncontrolled discharge and typical discharge occur during or soon after peak flows, impacting water quality.



Source: OptiRTC

Ryckman project proved to be a “very cost-effective solution compared to more traditional grey infrastructure that would have replicated [the project].”

Opti has not attributed its success to its low-pricing alone, however. “Typically, with green infrastructure and stormwater there’s no data about what communities are actually getting for the money they’re investing,” said Quigley. “When you control stormwater infrastructure with Opti, you have data continuously flowing back that allows you to verify that the systems are working and audit their performance on an ongoing basis.”

Introduction of a new law in New York requiring stormwater utilities to report wet weather discharges into the Hudson River drove Opti’s uptake in Albany. “In order to comply with sewage pollution ‘right to know law’ requirements, we have installed new instrumentation and adaptive controls so we can tell when overflows are occurring and we can monitor and control our in-system storage,” said Simcoe. “In the past, we didn’t have instrumentation and telemetry and we couldn’t check the effectiveness of our mitigation measures.”

Simcoe described future plans for mitigating the water quality impacts of CSOs in the City of Albany, which include adding five new floatable control facilities (whereby CSOs pass through screens before discharge) in 2018 and constructing a facility to screen and disinfect CSOs. “We want smart controls to be built into this whole thing so

that adjustments will be made automatically based on weather conditions,” he said.

Albany already has a SCADA system for its sewers that monitors CSOs and the flow of the wastewater treatment plant in real-time. Miller said that the smart monitoring tools were “helping identify potential problems and operational issues while also helping to guide how [the City] prioritises improvements and future capital investments.”

In the long term, Quigley told GWI he is thinking globally, foreseeing Opti having a role “in every community in the world.” “We built our core infrastructure around Microsoft cloud services. Microsoft enables us to deploy almost anywhere in the world with only a few limitations,” he said.

Ecosystem Integrity Fund (EIF) put up a significant proportion of the \$5.5 million invested in Opti in 2017, choosing to invest when it saw the company moving towards more of a mass adoption phase. EIF partner James Everett told GWI he believes Opti has potential “to be considered the best practice in stormwater management.”

Simcoe sees a positive future for smart stormwater technologies with a growing number of successful use cases raising awareness of these new options. “We have identified our next couple of large flood mitigation projects. We’re thinking green infrastructure and optimisation, and we’re [...] realising there are more opportunities. We just need to change our attitude towards what’s possible.” ■

# WATER'S DIGITAL FUTURE



The outlook for monitoring, control and data management systems

Big data is changing the face of the water industry, and the management of data-driven monitoring and control systems will increasingly infiltrate every part of the water business. Water's Digital Future is the first report of its kind that provides a comprehensive guide to the entire monitoring, control and data system market across the full breadth of the water industry.

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