

Project Status, February 2018: CS-175; Dynamic Collection System Control

Summary

The two areas of focus for the project CS-175; Dynamic Collection System Control are: analysis of dynamic control for the GDRSS system, and an operator decision support dashboard. Here we provide a review of progress made for each of these tasks and discuss future work.

Updates

Decision Support Dashboard

In last month's update we released the first version of the Decision Support Dashboard, a web-based map tool to view real-time flows from throughout the GDRSS along with observed and forecasted precipitation products. In conversations after the launch, we determined that a meeting with all interested parties was the next step in the development of this deliverable. In the meantime, work continues on the Kerkez Laboratory web-based map tool, offering new capabilities that can be extended to the GLWA product.

Dynamic Control for the GDRSS

In last month's update, we reported that we had extracted from the GDRSS model the portion that contributes to the DRI. This was done to decrease computation time and speed up the analysis process at the designated control points, the in-line storage dams (ISD) and the CSO-RTB complex on the east side.

Since the initial report, this model has been expanded to include the five ISD devices on the Wyoming Relief, Weatherby, Livernois, and Joy sewers. This adjusted model now incorporates all fourteen ISD structures under direct control of the Authority. Representation of the ISDs have been reworked in the GDRSS SWMM to allow easier simulation of real-time control. We are currently analyzing the capabilities of dynamic deployment of the ISD assets. This includes level-based control rules and market-based control algorithms. System response and asset control is currently being studied with three historical storms: May 30-31 (2.4 in.), 2015; September 28-29, 2016 (5.4 in.); and May 4, 2017 (1.1 in.). Moving forward, we will be evaluating more control strategies using the ISD devices and Conner Creek CSO basin.

See next page for preliminary results. Figure 1 shows the geographic and model locations of the simulated hydrographs downstream of ISD assets for the May 2015 rain event shown in Figure 2. These hydrographs are preliminary results of controlling in-system dams using a simple local control scheme. Our next steps will work on system-level coordination.

Future Work

What we need: A meeting with GLWA stakeholders and us is now a priority. Stakeholders include: Wendy Barrott, Andrea Busch, Biren Saparia and his team, Matthew Starrman, and David McCord. The University of Michigan team will work with Wendy Barrott to schedule a meeting time that will accommodate all stakeholders.

Reporting

We look forward to providing an update of our progress on March 30, 2018.



Project Contacts:
Branko Kerkez
bkerkez@umich.edu



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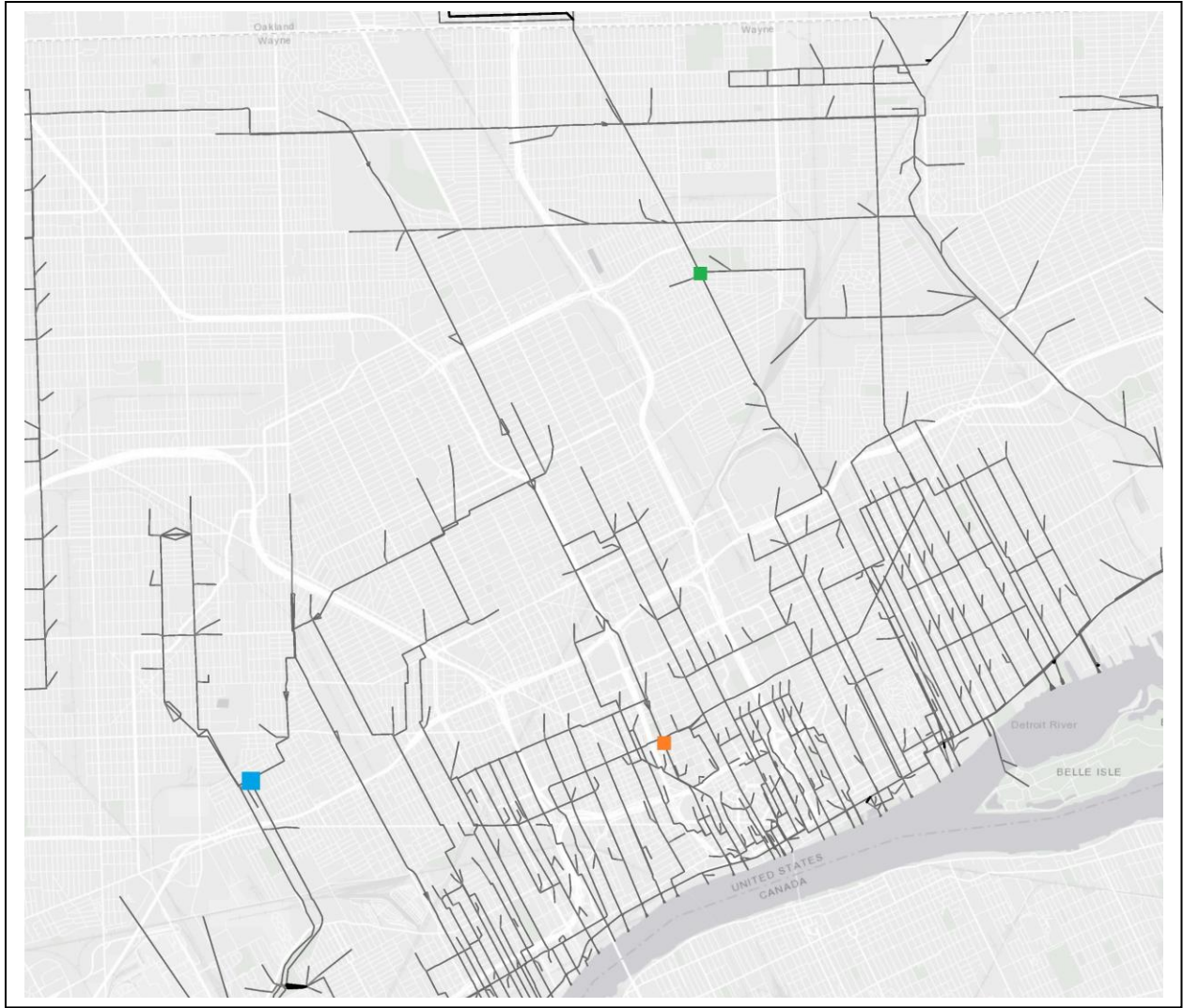


Figure 1 GDRSS Layout and Color-coded location of hydrographs in Figure 2.

Simulated Hydrographs Downstream of Control Assets, May 2015

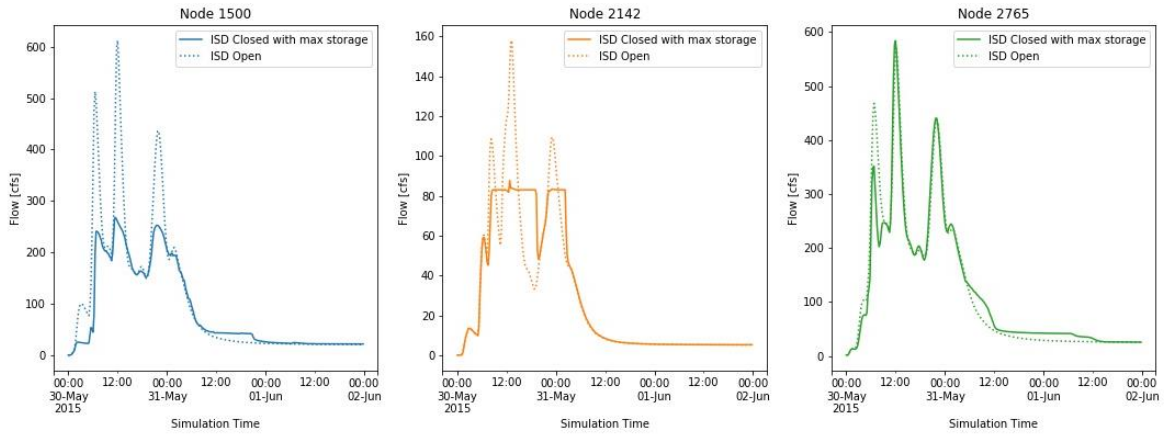


Figure 2 Simulated hydrographs at locations downstream of ISD assets.



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Branko Kerkez
bkerkez@umich.edu

