A balancing act!

Resources  Scope

Objectives  Model Complexity

Budget  Schedule  Constraints

Hindsight

A balancing act!
Objective

Evaluate system capacity limitations using XP-SWMM 2D at the inlet and pipe level of detail and recommend feasible solutions.

The Method

Simplify inlet capacity calculations in XP-SWMM 2D
Modeling objective

- Identify flood risks and prioritize solutions
- Isolate problems as inlet capacity v. pipe capacity issue

Hydrology

- SCS Hydrology developed in 1D
- Outflow hydrographs applied to model at nodes

How to simplify inlet modeling?

Options explored:
- Full Capture
- Dummy Nodes
- Inlet Capacity at 50%
- Others...
Full Capture

- Assumes adequate collection (neglects inlet capacity)
- Represents worst case for pipes
- Did not satisfy the objective of the study

Dummy Nodes

- Transfers all flow to the 2D Grid
- Inlet capacity regulated by 2D inflow capture
- Misapplication of the model

Inlet Capacity at 50%

- Uses 1D rating curve to limit inlet capacity by 50%
- Generic rating curve not based on number or sizes of inlets
- Unable to evaluate inlet-based alternatives
Selected Method

Curb inlet-based rating curve

- Individual rating curves were computed based on sum of curb inlet length
- Limitation: bypass flow cannot be intercepted

Lessons Learned

- You can overcomplicate a problem by trying to simplify it.
- Where inlet level evaluation is required, you should expect to model every inlet.
- Know your software capabilities and limitations.

Thank you