



“I know there is capacity in these pipes – find it and use it!”

Buffalo Sewer Authority

NACWA Facilities and Collection Systems Committee

February 3, 2014



Real Time Decision Support Systems

Real Time Control Definition: a system that dynamically adjusts the operation of facilities in response to online measurements in the field to maintain and meet the operational objectives, both during dry and wet weather conditions.

Real Time Control of Urban Drainage Networks, USEPA, 2006

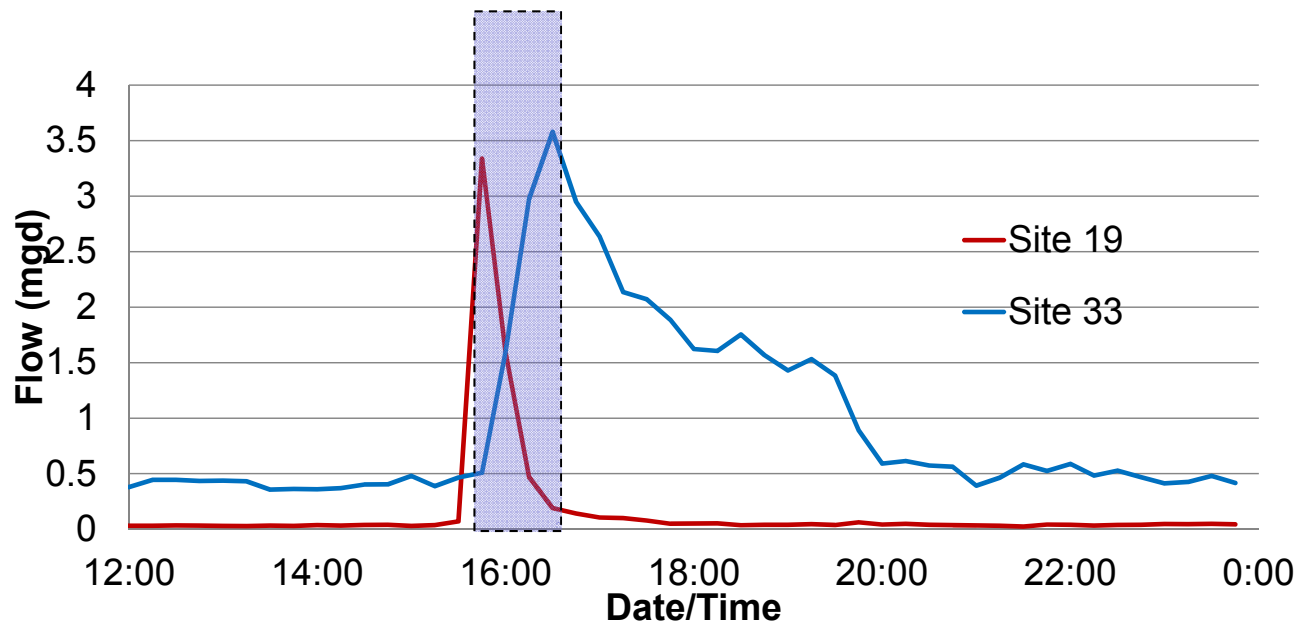
Real Time Decision Support Systems

Real Time Decision Support Systems:

- Utilizes large sensor data sets
- Utilizes advanced computing platforms
- Interactive
- Multi Objective

What to look for?

- Timing differentials
- Large tanks with complex controls
- Drainage basins with diverse compliance limits
- Conveyance versus storage tradeoffs
- Multiple treatment facilities



Keys to Success

Transparent: Glass Box approach enables 3rd party verification

Collaborative: Co-design with utility staff and consultants

Sustainable: Open source and open architecture design

Scalable: Iterative or comprehensive implementation

Robust: Fault tolerance built in by design

Partnership: Continuous system improvement over time



Background

Customer base: 450,000 (Buffalo + surrounding villages)

WWTP Capacity: 560MGD

Service Area: 110mi²

LTCP Submitted

North District

- 6 CSOs
- Main Receiving Water – Niagara River

South Central District

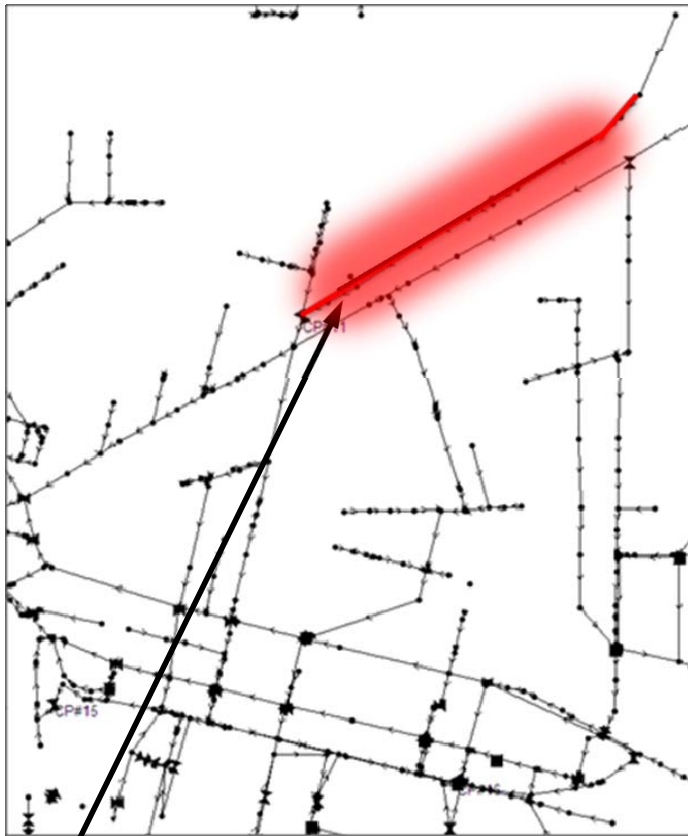
- 42 CSOs
- Main Receiving Waters – Cazenovia Creek and Buffalo River

Scajaquada District

- 11 CSOs
- Main Receiving Waters – Black Rock Canal and Scajaquada Creek

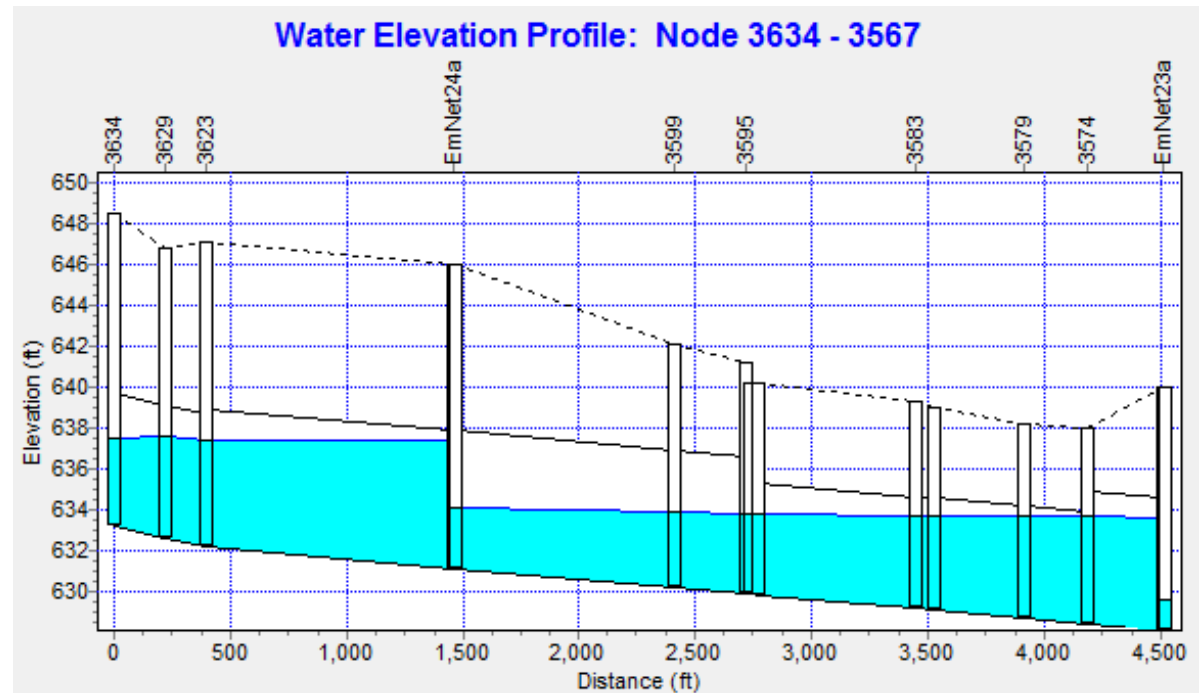


Stage 1: Asset Identification

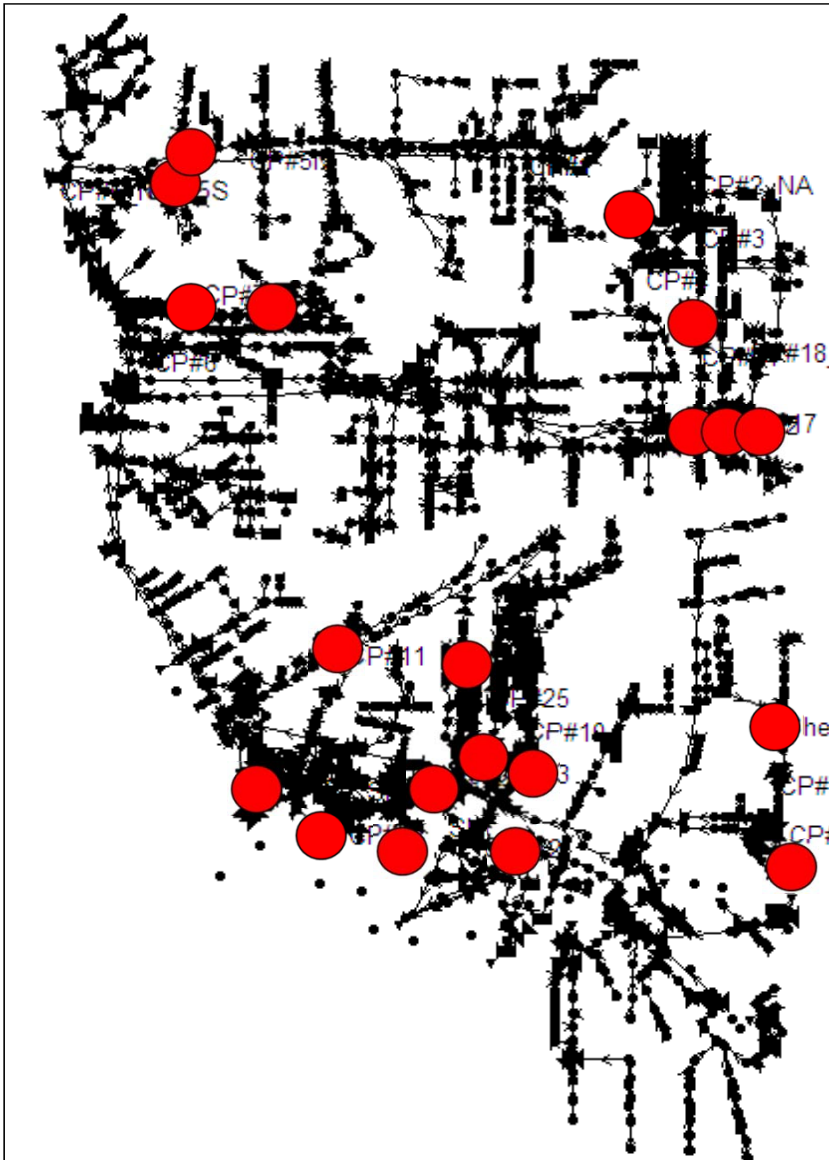


Genesee In-Line Storage
Control Point ID: CP11
Capacity: 1.1 Million Gal.
Usable Length: 5000 ft.

- Selection of controllable assets
- Improved conveyance
- In-line storage
- Off-line storage



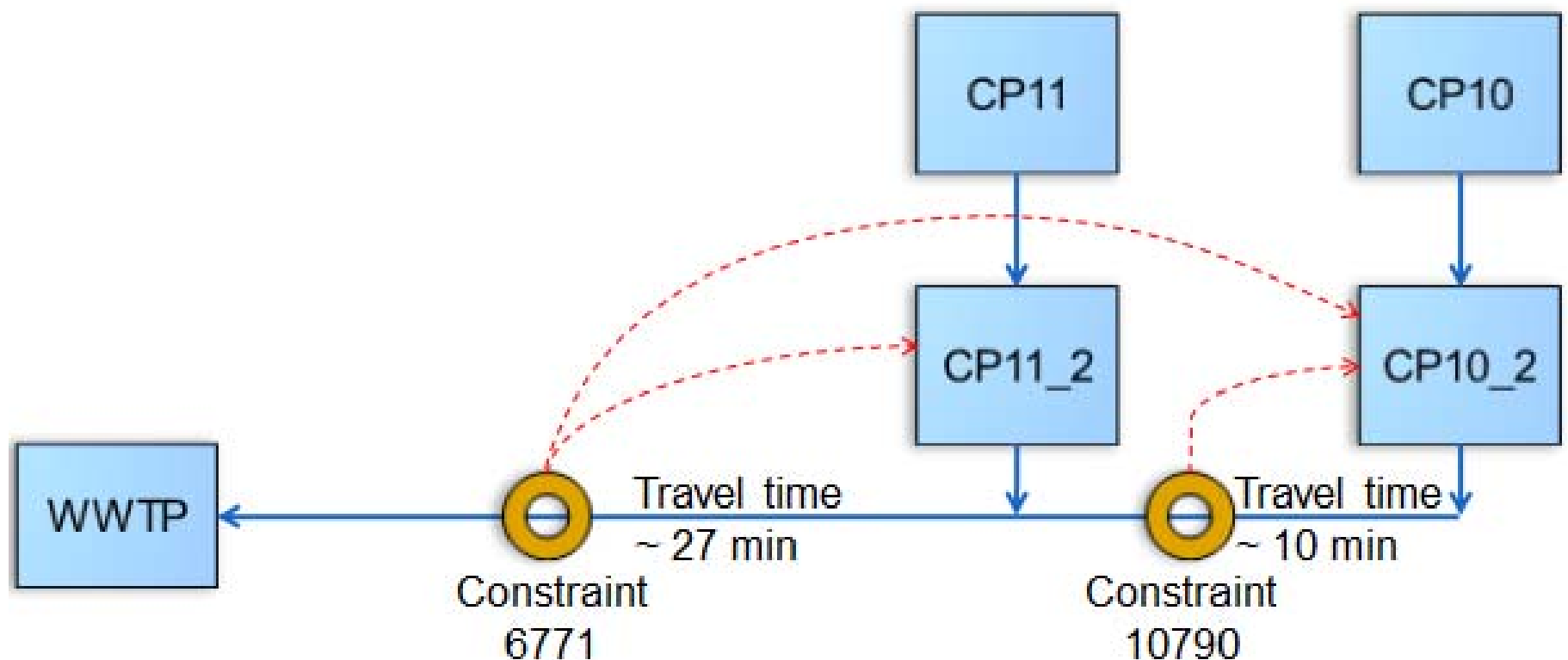
Stage 2: Control Location Selection



- Only locations that can have a significant impact are selected
- Other issues:
 - Constructability
 - Structural Integrity
 - Projected developments

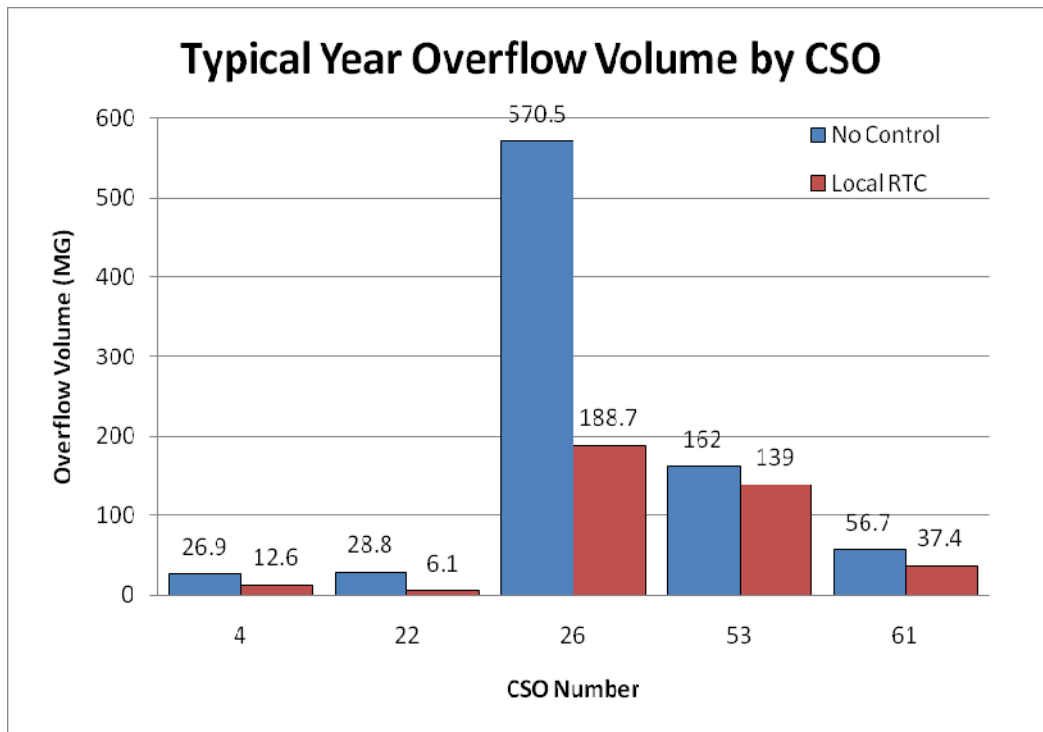
Stage 3: Control Rules Design

- Principle #1: keep it simple
- Open source and open architecture allows 3rd party verification and implementation



Stage 4: ROI Evaluation

- ROI figures of 5X or larger are considered viable
- Unit cost of avoided CSO is typically < \$2 per gallon
- 423MG of avoided CSO during the typical year @ \$37M



Site	CSO storage	Cost	\$/gal
Lang Bird	2.4MG	\$3.5M	\$1.46
Smith	4.2MG	\$1.5M	\$0.36

Summary

- Real Time Decision Support Systems help optimize collection systems to reduce CSO volumes
- Open architecture and co-design ensure success of project
- Expected ROI figures: 5X with respect to traditional solutions

Questions?

