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# CSO Program Stakeholder Workgroup: Meeting #6B Collection System Capacity Assessment Results and Introduction to System Master Plan Control Options

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City Hall – Council Chambers

May 3, 2012



# Welcome & Introductions

- City Representatives
  - Julia Forgue – Director of Utilities
- CH2M HILL
  - Mike Domenica – Program Manager
  - Peter von Zweck – Project Manager
  - Becky Weig – Public Involvement
  - Jen Reiners – Water Resources Engineer
- Stakeholder Workgroup Participants

# Objective for This Meeting

*The objective for this meeting is to review level of control and preliminary findings from the CSCA and to discuss potential SMP control technologies that are aligned to meeting the stakeholder's priorities.*

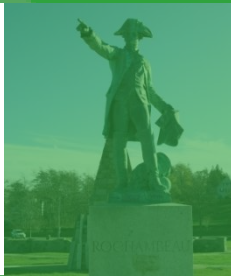
# Meeting Agenda

- Overview of the CSO Program Schedule
- Approval of Previous Minutes
- Parking Lot Follow-up Items
- Key Meeting Topics
  - Results of Stakeholder Prioritization of Evaluation Criteria – Round 2
  - Collection System Capacity Assessment Findings – Larger Storms
  - Potential SMP Control Technologies
- Future Meetings, Wrap-up, Comments



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# OVERVIEW OF THE STAKEHOLDER WORKGROUP

# Schedule of CSO Stakeholder Meetings

	2011												2012											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Meeting #1 - Overview		●																						
CSO System Tours			●																					
Meeting #2 - Metering & Extraneous Flow Investigations				●																				
Meeting #3 - GIS, CMOM & WPCP							●																	
Meeting #4 - Harbor Water Quality								●																
Meeting #5 - Financing & Rates										●														
Meeting #6 - Alternatives Evaluation Process														●										
Meeting #6a - Alternatives Evaluation Process Cont.															●									
Meeting #6b - Alternatives Evaluation Process Cont. (if needed)																								
Meeting #7 - Draft Collection System Capacity Assessment & SMP																								
Meeting #8 - Updated SMP																								
SMP - Final to EPA																								

We are here



The first 5 meetings focused on existing conditions in the collection system, the harbor and rates.

The last 5 meetings focus on future conditions including: evaluation criteria, technologies, expected benefits, costs and implementation schedules.

# CSO Program Stakeholder Workgroup Mission Statement

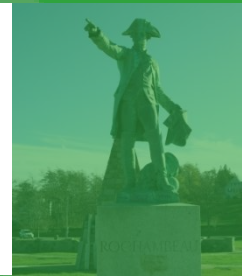
- To review proposed plans and projects for the CSO Program and *provide recommendations* to the City about the potential benefits and impacts of proposed plans and projects to all users of the system.
- To share CSO Program plans and project information with each stakeholder's organization to aid the City in its efforts to communicate CSO Program information.
- To support the CSO Program's public education efforts through participation in CSO Program public education activities.





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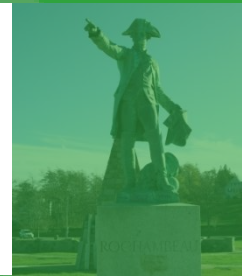
# PREVIOUS MEETING'S MINUTES





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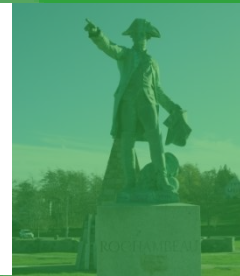


**PARKING LOT FOLLOW-UP  
ITEMS - NONE THIS MEETING**



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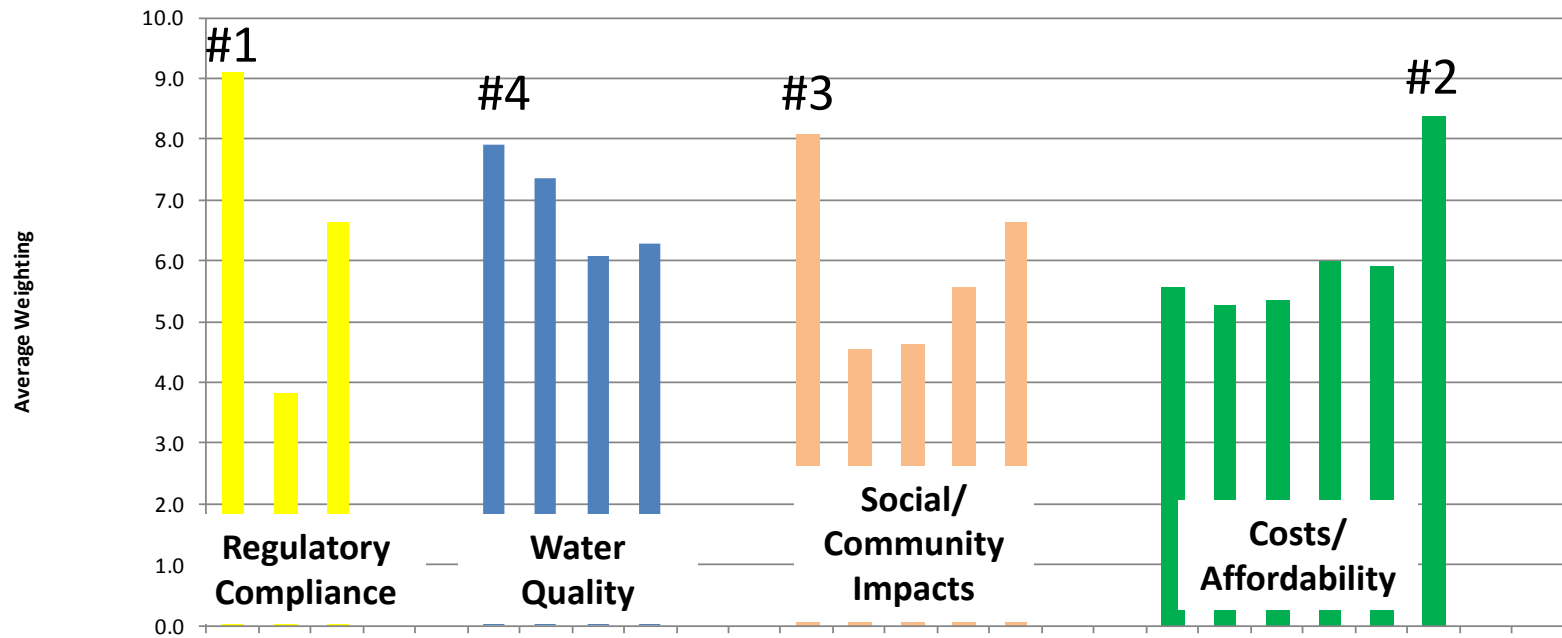


# RESULTS OF STAKEHOLDER PRIORITIZATION OF EVALUATION CRITERIA - ROUND 2

# Results from the Stakeholder's Initial Prioritization of Evaluation Criteria



### CSO Factors Prioritization Results

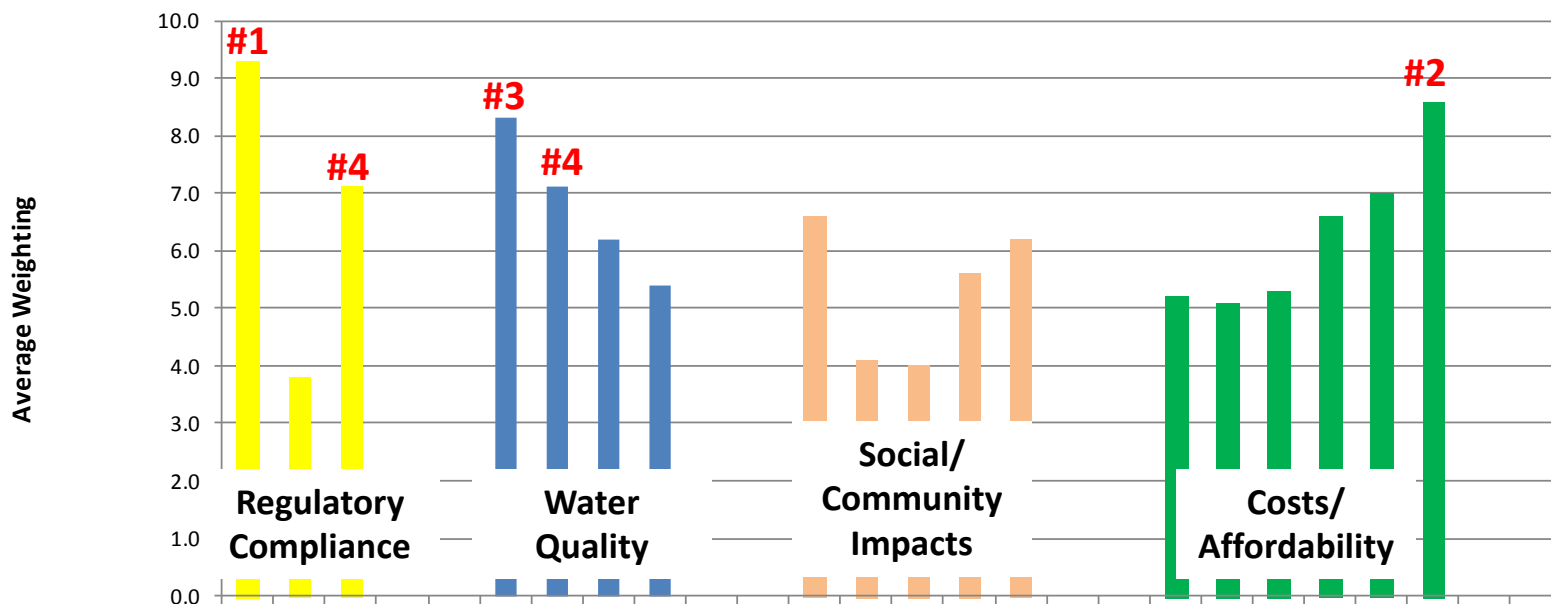


The top 4 criteria:

1. Meeting CWA requirements
2. Maintaining affordable rates
3. Reducing beach closures
4. Meeting WQ standards

# Results from the Stakeholder's 2<sup>nd</sup> Prioritization of Evaluation Criteria

CSO Factors Prioritization Results - Round 2



1<sup>st</sup> Evaluation, the top 4 criteria:

1. Meeting CWA requirements
2. Maintaining affordable rates
3. Reducing beach closures
4. Meeting WQ standards

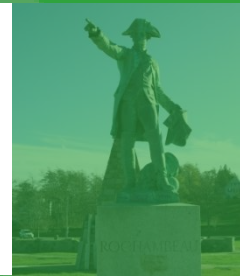
2<sup>nd</sup> Evaluation, the top 4 criteria:

1. Meeting CWA requirements
2. Maintaining affordable rates
3. Meeting WQ standards
4. Compliance w/Implementation Schedule & Supporting Designated Uses in Newport Harbor



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# SYSTEM BEHAVIORS AND CONTROL TECHNOLOGIES - COLLECTION SYSTEM CAPACITY ASSESSMENT

# Overview of System Behaviors and Control Technologies

## Step 1 – Collection System Capacity Assessment (CSCA) Report

### Infiltration/Inflow Reduction

- Control technologies for I/I reduction
- Model results for I/I reduction

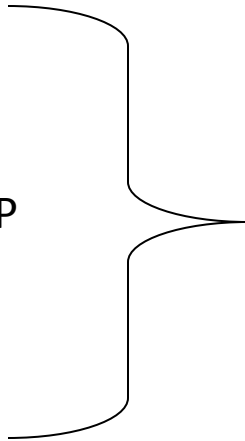
### Conveyance System and Plant Improvements

- Overview of current characteristics
- Control technologies for optimization of the existing system
- Model results for conveyance and plant optimization

## Step 2 – System Master Plan (SMP)

### CSO Control Projects

- New conveyance facilities
- Improvements to existing CSO treatment
- Increasing the design capacity of the WPCP
- In-line and/or Offline Storage
- Green technologies



The SMP applies if wet weather discharges cannot be eliminated cost effectively with CSCA technologies



# Hydraulic Model Background

*The hydraulic model is the key tool being used to analyze CSCA and SMP control technologies.*

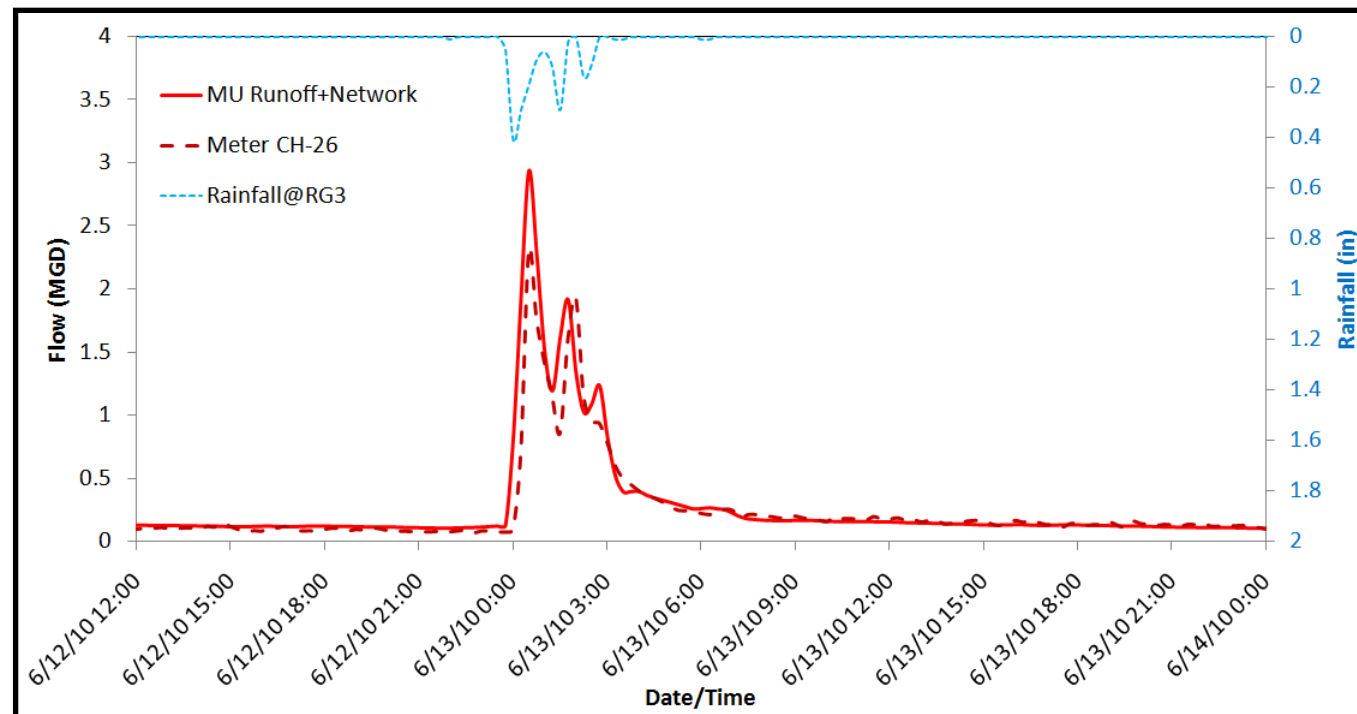
- Hydraulic model basic information
  - Mike Urban – model software
  - Includes all combined & sanitary sewer pipes of 12" or greater and key smaller diameter pipes
  - Simulates all flow contributed by City of Newport, Town of Middletown, Navy & Private Sewer Area where they enter the system
  - Includes all public Force Mains
  - Includes all regulator structures (i.e. weirs)
  - Includes both CSO Treatment Facilities & WPCP



# Hydraulic Model - Calibration

*Calibration of a hydraulic model is important to ensure that the model accurately represents the collection system behaviors.*

- Newport's model was first calibrated in April 2010
  - Calibrated to 3 events from 2010
  - Verified to 1 event from 2010
- Prior to starting the CSCA, the model was updated and recalibrated in 2011 to account for recent system improvements



# Collection System Improvements Included in Hydraulic Model

- The September 2011 hydraulic model updates & calibration incorporated key system improvements into the model:
  - 2007 Catch Basin Separation
  - 2009 Long Wharf FM Emergency Repair
  - 2010 Railroad Interceptor Repairs
  - 2010 Area 6 Catch Basin Separation
  - 2010 Phase 1 High Priority Sewer Repairs
  - 2011 Wellington Ave. Interceptor Replacement
  - 2011 Thames St. Interceptor Rehabilitation – Interceptor lining was not complete, but key hydraulic adjustments, such as removal of weirs and sediment were completed prior to calibration storm event
  - Any disconnects prior to April 2011

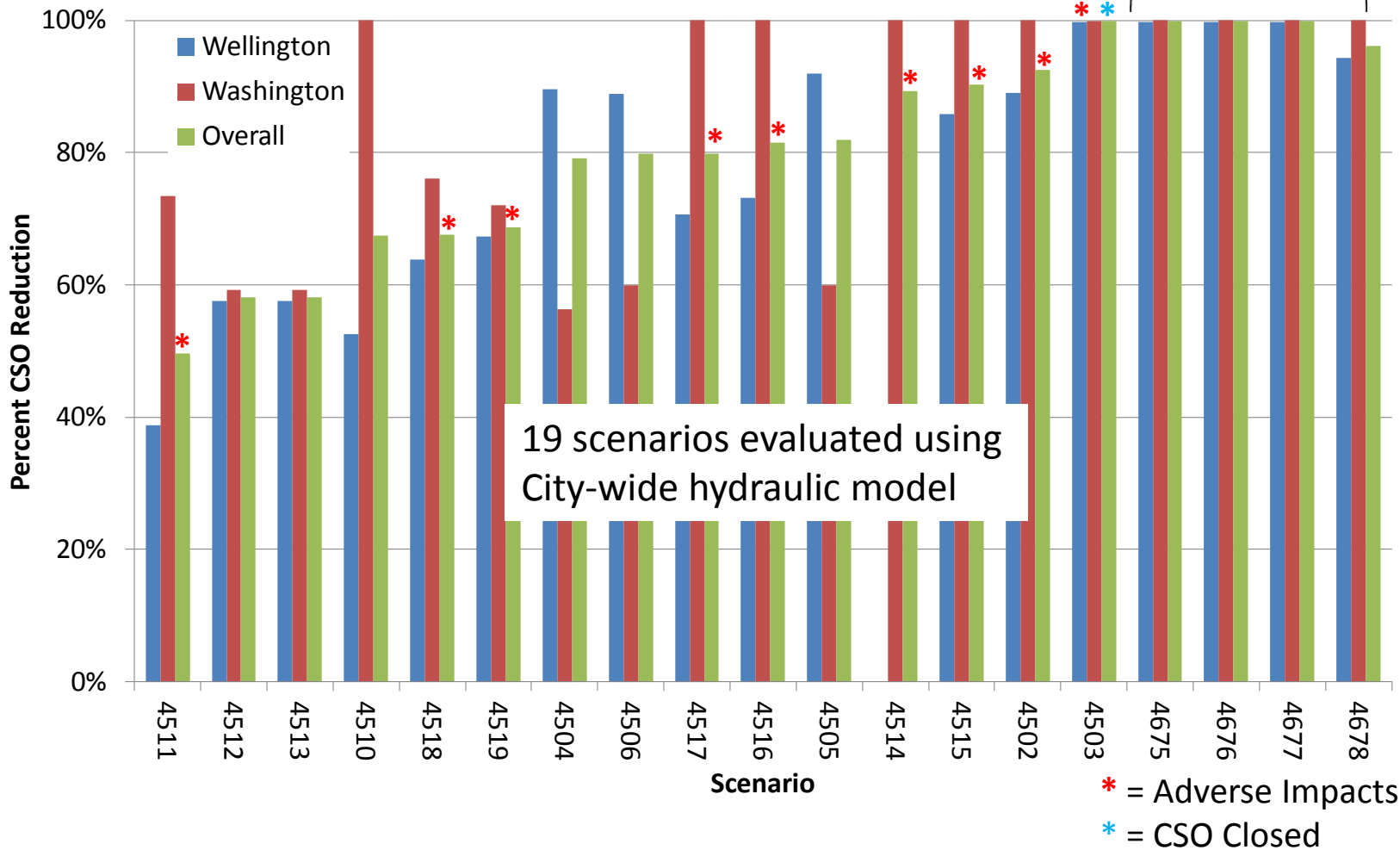
# Overview of CSCA Findings Presented at Meeting #6A

- Findings were for a 2-yr, 6-hr duration storm
- Model results indicated that no single control technology achieved CSO elimination
- Model results indicated that a combination of control technologies do not achieve CSO elimination without going to extreme levels of I/I reduction
- Discussion at meeting #6A indicated that elimination for a 2-yr, 6-hr storm would not qualify as “elimination”

# Model Results of Combinations of Control Technologies

## CSO Overflow Percent Reduction 2-Year, 6-Hour Duration Event

Combinations with Maximum I/I Reduction



# Methodology to Calculate Estimated City-wide I/I Reductions

Scenario	Methodology
Conservative – 36% I/I reduction city-wide	<ul style="list-style-type: none"><li>• Based on field investigations of connections and defects</li><li>• City-wide counts were projected based on quantities of inspections completed to date</li><li>• Removal of <u>all</u> catch-basins</li><li>• Removal of 92% of downspouts &amp; 33% sump pumps</li></ul>
Planning – 46% I/I reduction city-wide	<ul style="list-style-type: none"><li>• Based on field investigations of connections and defects</li><li>• City-wide counts were projected based on quantities of inspections completed to date</li><li>• Removal of <u>all</u> catch-basins, downspouts &amp; sump pumps</li></ul>
Maximum – 65% I/I reduction city-wide	<ul style="list-style-type: none"><li>• Based on 1-yr of flow measurements at 35 meter locations</li><li>• Average RDII rates over 29 events vary from 2 – 22 gal/in/lf among metersheds</li><li>• Changed model parameters to RDII rates of 2-6 gal/in/lf for all metersheds</li><li>• Required reductions ranging from 10 – 80% by metershed</li></ul>



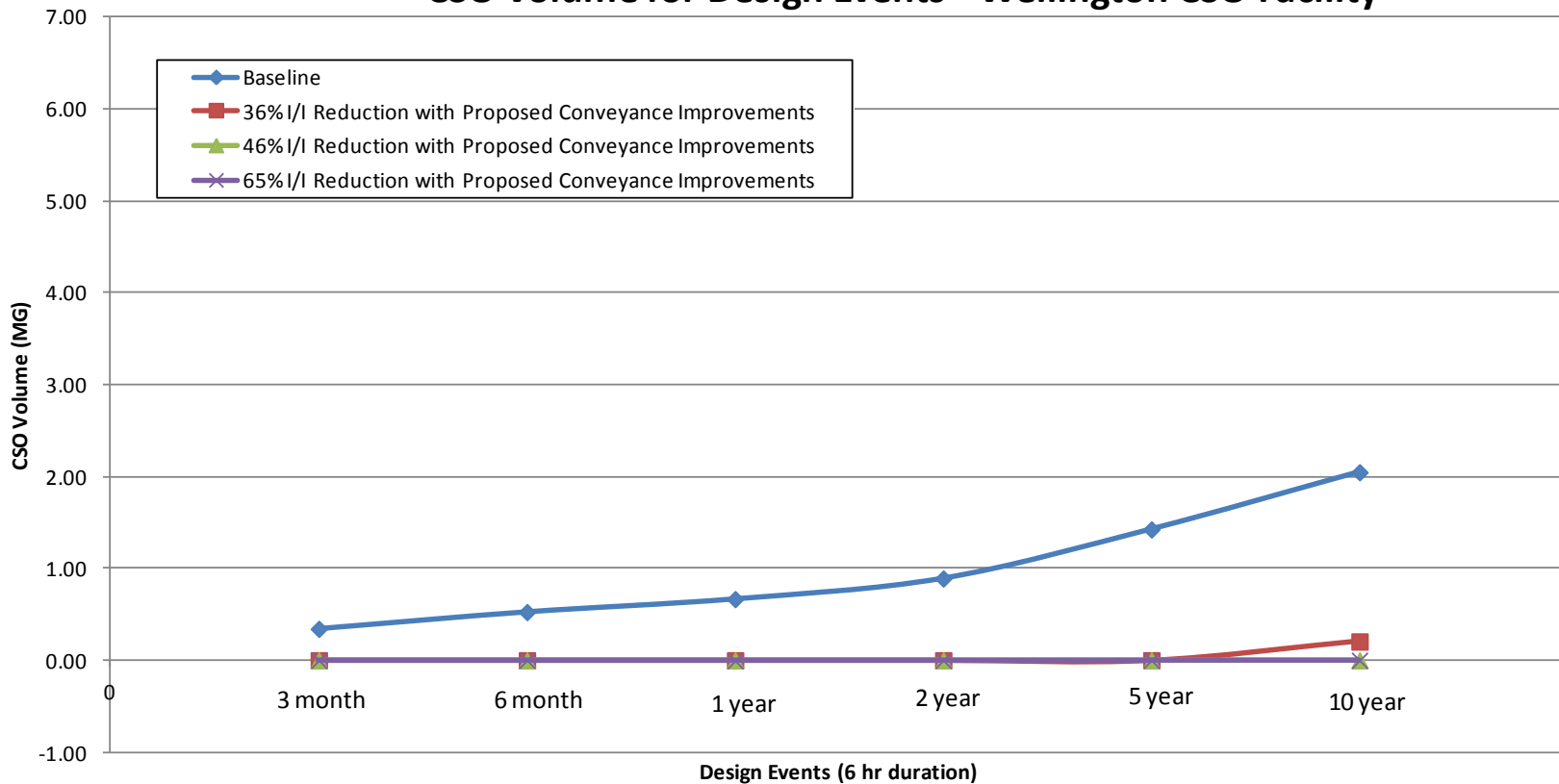
# Field Investigation Data - Citywide

Type	Count of Existing Connections	Percent of Existing Verified	Count of Projected Connections	Total Potential Connections (Existing + Projected)
Catch Basins	33	57%	17	50
Downspouts	3,241	41%	2,960	6,201
Sump Pumps	945	41%	1,425	2,370

Note: Based on field inspections completed through January 2012<sub>21</sub>

# Model Results for Wellington Area

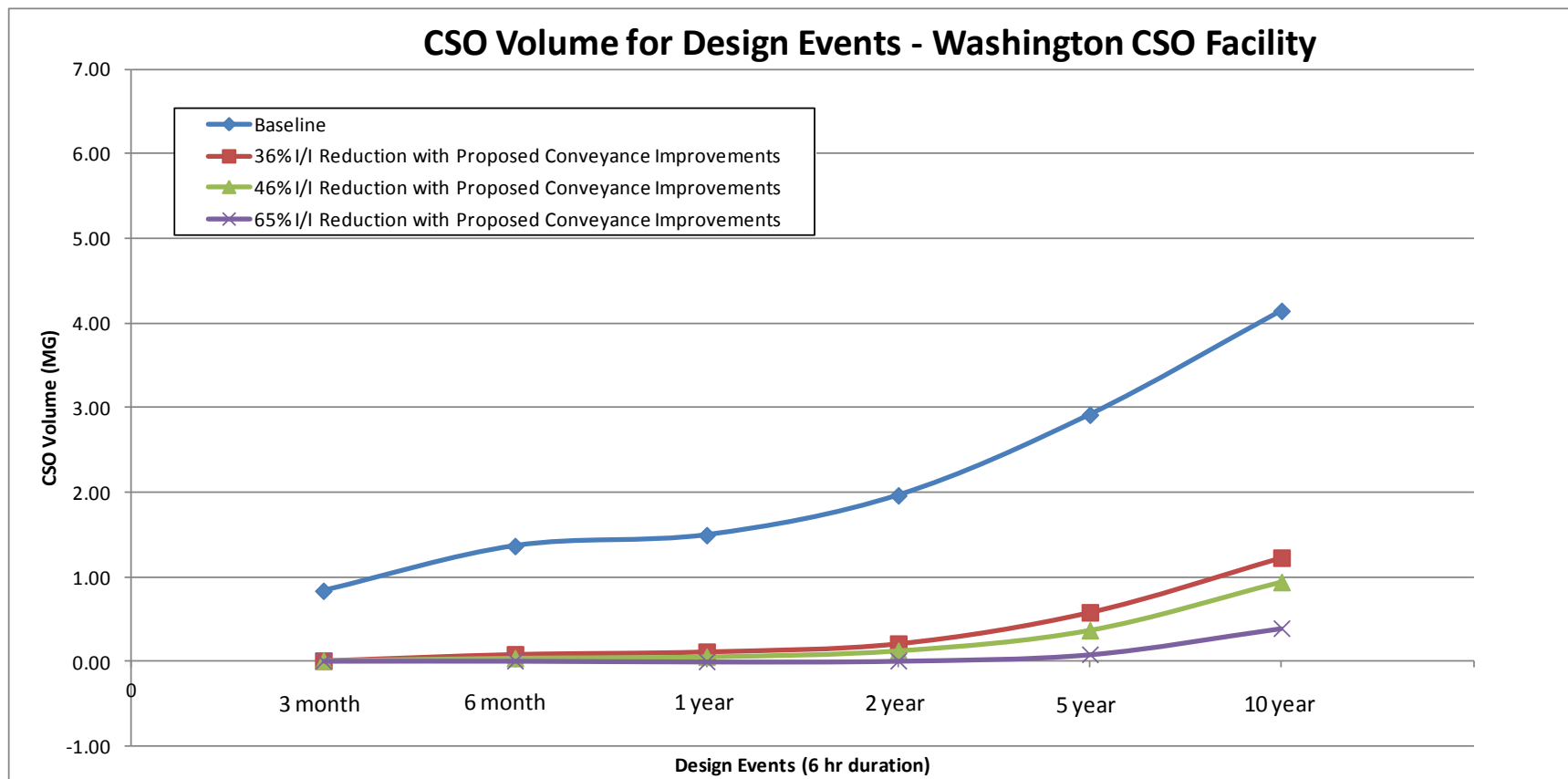
## CSO Volume for Design Events - Wellington CSO Facility



### Proposed Conveyance Improvements include:

- Pipe upsizing for locations with identified capacity issues or that cause system bottlenecks
- Increasing the weir heights for the 5 weirs on the parallel (twin) 54" pipes and the weir on the pipe that connects Thames Street to the Wellington CSO Facility
- Increasing pumping at the Wellington CSO Facility and the Long Wharf Pump Station by operating the standby<sup>22</sup> pumps during peak flow periods.

# Model Results for Washington Area



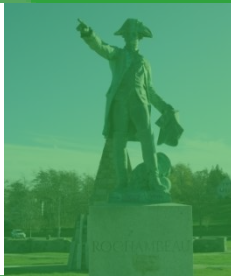
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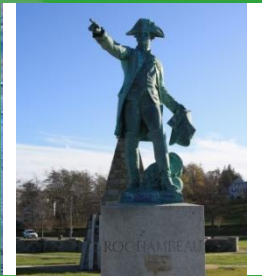


# DISCUSSION



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# SMP CSO CONTROL TECHNOLOGIES

# Regulatory Framework for Evaluating System Improvements

Consent Decree Item #65

*If the City determines that its proposed Collection System replacement and rehabilitation measures, its public infiltration/inflow, private rainfall induces infiltration and inflow removal programs, and its WPCP flow optimization will not result in the elimination of overflows, including the Wellington Avenue and Washington Street Outfalls, then the Capacity Assessment shall include an identification and evaluation of additional measures.....*



# CSO Control Technologies

## Designated for Evaluation in SMP

- WPCP Improvements
  - CEPT
  - Improvements to increase design flows
- Storage
  - Offline Tanks
  - In-line conduits
- New Conveyance Facilities
  - Pump Stations
- Green Technologies
- CSO Treatment Facilities
  - Component Upgrades



CEPT – adding additional chemicals (i.e. ferric chloride or alum) to the primary clarifiers get more solids settling

- Benefits

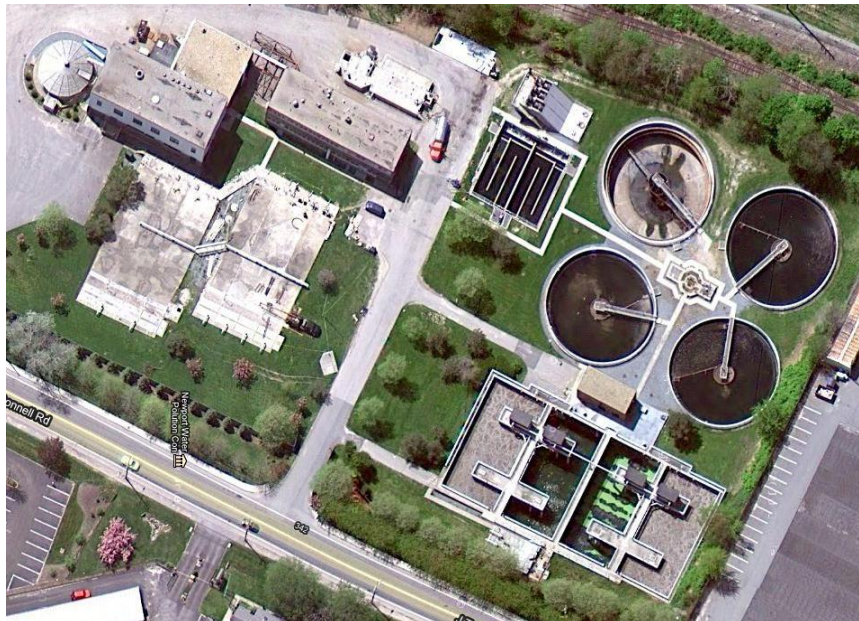
- Allows more flow through the WPCP with existing footprint – no capital investment

- Drawbacks

- Greater O&M costs
- Larger volume of solids for disposal
- Would need to negotiate a waiver for 85% TSS removal during wet weather

# WPCP Flow Upgrades

- Benefits:
  - Would allow more flow through WPCP, thereby reducing CSOs



- Drawbacks:
  - Limited footprint
  - Limited conveyance to WPCP of Long Wharf FM could require upsizing or parallel FM
  - Large capital investment

# Storage: Off-line Facilities

Offline storage takes combined flow to a storage facility that is not a part of the dry weather flow conveyance system.

- Benefits

- Multiple locations are viable options allowing maximization of CSO reduction
- Can be low capital cost
- Gives the City operational flexibility

- Drawbacks

- Additional facilities requiring O&M

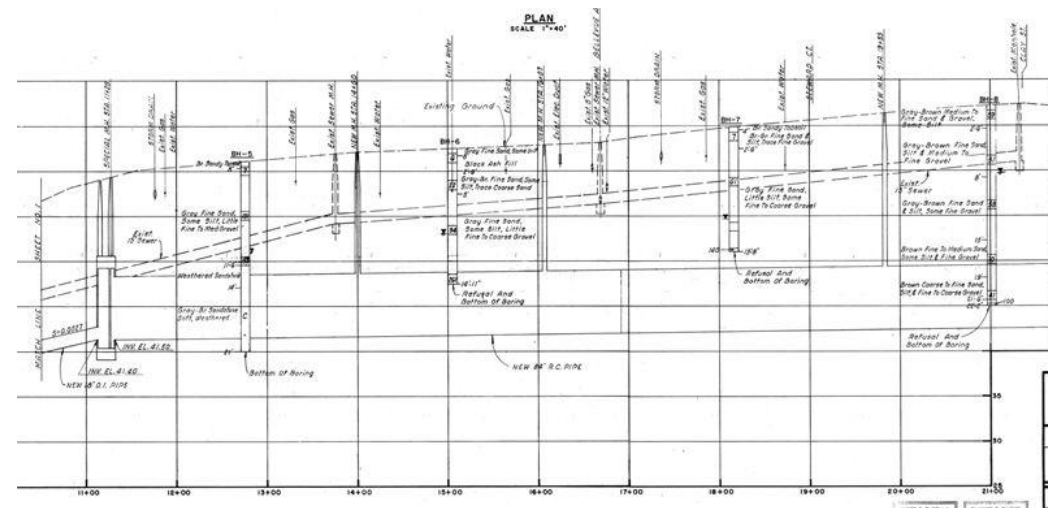




# Storage: In-Line Conduits

In-line storage holds combined flow in a storage facility that is a part of the dry weather flow conveyance system.

- Benefits
  - Can be low capital cost
  - Within an existing utility corridor minimizing disruption/need for new land
  - Provides operational flexibility
- Drawbacks
  - Additional facilities requiring O&M

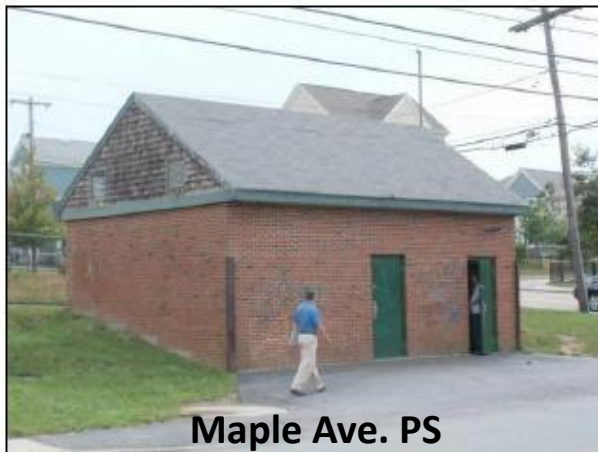


Existing Narragansett Storage Conduit Schematic

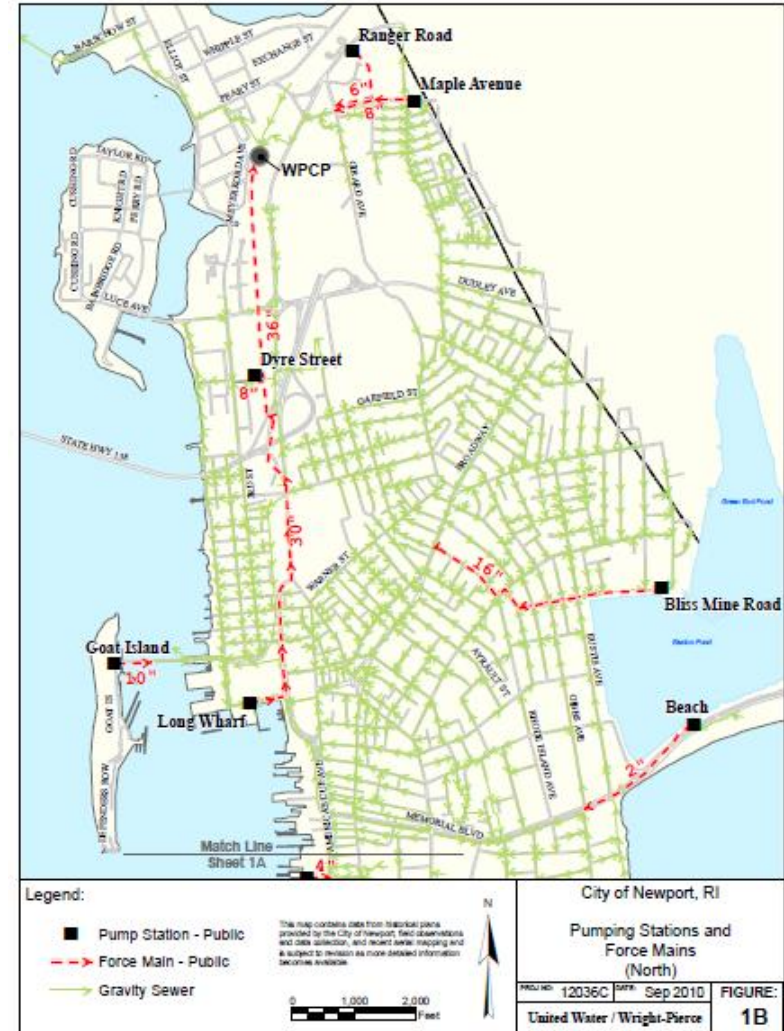
# New Conveyance Facilities

New conveyance facilities could consist of new pipes or pump stations.

- Benefits
  - Can improve system operations
- Drawbacks
  - Additional facilities requiring O&M



Maple Ave. PS



# Green Technologies

Green technologies may include porous pavement, green roofs, rain gardens.

- Benefits

- Low capital cost
- Increases natural groundwater recharge
- Offers some level of stormwater treatment
- Can be visually attractive



- Drawbacks

- Need a large number to achieve significant CSO reduction
- Require additional O&M costs
- Newport specific limitations with soils and ledge



# CSO Treatment Facility Upgrades

CSO treatment facility upgrades may include improved or additional CSO treatment.

- Benefits
  - Better CSO effluent quality
- Drawbacks
  - Additional facilities requiring O&M



Wellington Ave. CSO Treatment Facility

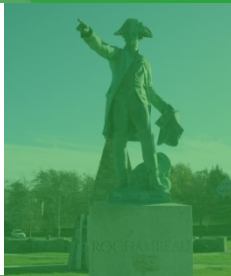
# Review Potential CSO Controls

- 15-minute break
- Review maps at each station
- Suggest additional CSO controls
- Report back after break



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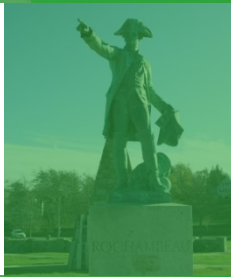


# DISCUSSION



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NEXT MEETING

# Next Meeting

Topics: 1) Model Results for SMP Control Technologies  
2) Draft SMP Recommendations

Date: July 12, 2012

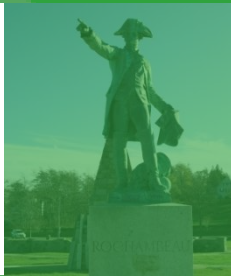
Time: 3:00 PM

Location: Council Chambers



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# DISCUSSION