

Background Information on Newport Combined Sewer System and Combined Sewer Overflow (CSO) Program for Stakeholder Workgroup Meeting #1

TO: Newport CSO Program Stakeholder Workgroup

COPIES: Julia Forgue/City of Newport
Ken Mason/City of Newport
Jim Lauzon/United Water

FROM: Becky Weig/CH2M HILL

DATE: February 1, 2011

Introduction

The purpose of this document is to provide the members of the Combined Sewer Overflow (CSO) Stakeholder Workgroup with basic background information about the City of Newport's (the City's) combined sewer system and its ongoing Combined Sewer Overflow CSO Program in advance of the first CSO Stakeholder Workgroup meeting schedule for February 3, 2011. It is recommended that the CSO Stakeholder Workgroup members review the included information prior to the meeting, if possible, to familiarize themselves with the City's system and the CSO Program in order to facilitate discussions at the meeting.

Members of the CSO Stakeholder Workgroup may be unfamiliar with many of the terms and acronyms associated with CSO systems. For this reason, we have included a list of terms and acronyms in Attachment 1 to this memorandum. In addition, at the first CSO Stakeholder Workgroup meeting, each participant will be given a notebook to keep materials distributed and a copy of Attachment 1 will be included in this notebook for reference.

Throughout this memorandum as well as at CSO Stakeholder Workgroup meetings, we will be discussing the City's combined sewer system. A *combined sewer system* is a collection system designed or intended to convey wastewater and storm water in a single pipe to the Water Pollution Control Facility (WPCF) or other authorized discharge point. A *separate sewer system* is a two-pipe collection system, where one pipe network is designed or intended to convey wastewater to the WPCF and there is a second pipe network to convey storm water from storm drainage conduits directly to receiving waterbodies.

Background Information on the City's CSO System

The City's wastewater collection system consists of approximately ninety (90) miles of gravity sewers and force mains. An additional nine (9) miles of privately owned and operated force mains, primarily located in the Newport Neck area, are also connected to the City's collection system. The City also receives wastewater flow from the Town of Middletown through two (2) force mains and flow from Naval Station Newport through three (3) force mains. Of these five (5) force main connections, four (4)

discharge directly at the WPCF and one (1), Middletown's Wave Ave. Pump Station, discharges into the City's collection system. The City's collection system consists of gravity sewers and force mains ranging in diameter from 6 to 84 inches. In addition there are fourteen (14) pump stations, two (2) CSO treatment facilities, one (1) CSO storage conduit, three (3) permitted CSO outfalls and one (1) wastewater treatment facility.

An 11"X17" figure of the City's system will be distributed at the first CSO Stakeholder Workgroup meeting on February 3, 2011.

It should be noted that while the City has three (3) permitted CSO outfalls, the Long Wharf CSO outfall has been plugged and is no longer in use.

History of the CSO System

Table 1 below shows key milestones and upgrades to the City's CSO system.

TABLE 1
History of the Newport CSO System

Year(s)	Activities
1800s – 1970s	Operates as a completely combined system
1970s	Implemented a sewer separation program
1978	Wellington Ave. CSO Treatment Facility constructed
1991	Washington St. CSO Treatment Facility constructed
1994	EPA CSO Policy Issued
1999	City signs a consent agreement with RIDEM
1999 - 2008	City working under RIDEM direction on CSO Program
2008	EPA supersedes RIDEM consent agreement negotiations with Request for Information (RFI)
2009 – 2011	City enters and maintains ongoing negotiations on a CSO Corrective Action Plan (CAP) with EPA & RIDEM
2010	City begins implementing activities from draft CAP

Overview of the CSO Program

As shown in Table 1 above, the City has been working on reducing the number and volume of CSOs since the 1970s. The purpose of this section will be to present an overview of the CSO Program that the City has been implementing since 2009. In addition to the information provided in this document, the City has posted a significant amount of information about its wastewater system and CSO Program on the Department of Utilities page on the City's web-site at the following link:

http://www.cityofnewport.com/departments/utilities/pollution_control/home.cfm

The information included on this site includes, but is not limited to the following:

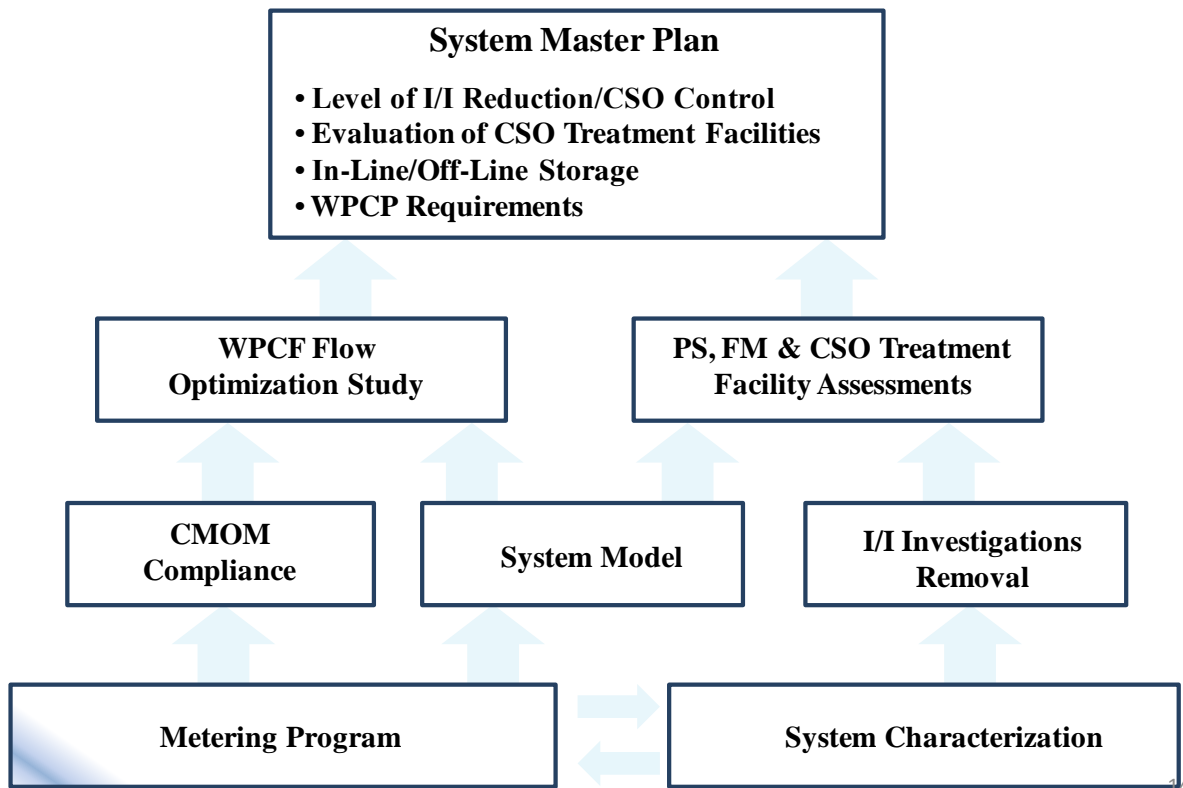
- Previously completed CSO Control Plan Reports

- CSO Information
- CSO Program Newsletters
- Harbor Monitoring Program, including water quality monitoring results
- On-going Smoke Testing & Building Inspection Programs

It is recommended that the CSO Stakeholder Workgroup members visit this site when they have time to become more familiar with the City’s wastewater system and the CSO Program.

In the fall of 2009, the City issued a Request for Proposal (RFP) for a CSO Program Manager to assist with CSO related activities. The purpose of the CSO Program is to utilize information generated from studies of the CSO system to develop a System Master Plan (SMP) that will recommend improvements to the system that will reduce CSOs for the least cost. Figure 1 below shows how current CSO Program activities will feed into the SMP.

FIGURE 1
Development of a System Master Plan



Results of Recent CSO Program Activities

The following sections present the results of the CSO Program activities completed in 2010.

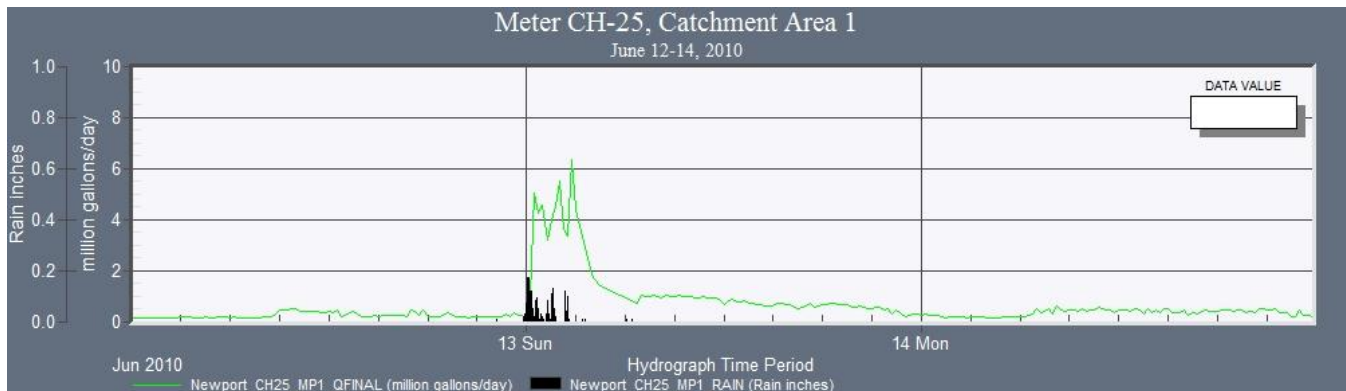
Metering

In March and April 2010, the City installed 30 flow meters in the collection system to monitor flows. The purpose of the metering was to support system modeling and to identify which areas of the system are the “wettest”, or those are that allow the greatest Infiltration/Inflow (I/I) into the system.

Infiltration is defined as the water that enters the collection system indirectly (including sewer service connections) from the ground through such means as, but not limited to, defective pipes, pipe joints, connections or manholes. *Inflow* is defined as all water that enters the collection system directly (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, sump pumps, area drains, foundation drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, storm waters, surface runoff, street wash waters, or drainage. *Infiltration/Inflow (I/I)* is defined as the total quantity of water from both Infiltration and Inflow without distinguishing the source.

In a combined sewer system, stormwater from precipitation events enters the City’s collection system and can exceed the system’s collection capacity, therefore leading to overflows from the Wellington Ave. CSO Facility and the Washington St. CSO Facility to Newport Harbor. The “wettest” areas or catchments are those that show the greatest increases in flow during precipitation events. Figure 2 below shows the metering results from a June 2010 precipitation event at meter CH-25, which is in Catchment Area 1 and has been identified as the “wettest” location in the collection system. As the figure shows, total flow in the collection system at this location increases greatly with the precipitation event.

FIGURE 2
Flow Metering Results at Meter CH-25 from June 2010 Precipitation Event



Based upon the analyses of the June precipitation event, as well as others since, the City’s Catchment Areas have been ranked from “wettest” to “least wet” as shown in Table 2.

TABLE 2
 Catchment "Wetness" Ranking Based Upon Collection System Metering

Basin Priority	Catchment Area	Major Area
1	1	Wellington
2	11	Washington
3	4	Washington
4	8	WPCF
5	6	Wellington
6	2	Wellington
7	7	Wellington
8	11	Washington
9	13	Long Wharf
10	12	Washington
11	8	WPCF
12	3	Wellington
13	11	Washington
14	10	Washington
15	10	Washington
16	4	Wellington
17	12	Washington
18	4	Wellington
19	7	Wellington

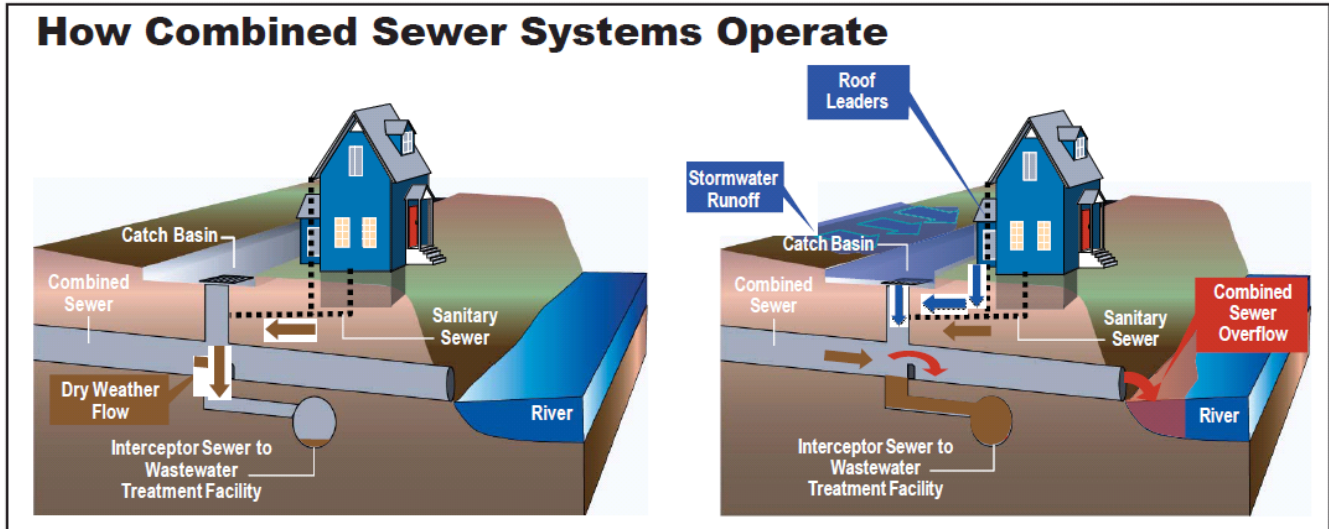
CCTV and Pipe Condition

In an effort to identify those pipes that are in the worst condition and most likely to fail or allow I/I into the system, the City has been conducting closed circuit television (CCTV) inspections of the collection system. Through September 2010, 158,116 linear feet of pipe has been inspected. Of the pipes inspected, 15,354 linear feet have been recommended for repair and/or rehabilitation and the City is currently in the process of procuring services for the design of these repairs.

I/I Investigations

When investigating and removing I/I from the collection system, the City looks for both public and private sources of I/I. Public sources of I/I would be those that enter the system through publically owned assets such as catch basins, manholes, and sewer lines. Private sources of I/I would be those that enter the system through privately owned assets such as service laterals, roof leaders, cellar drains, yard drains, sump pumps, area drains, and foundation drains. Figure 3 shows how I/I can enter the collection system from public and private sources.

FIGURE 3
How I/I Enters a Collection System



Based upon the results of the metering, the City began a field inspection program in 2010 to identify and remove sources of I/I in the wettest catchments. For private sources of I/I, 2,159 building inspections have been attempted, 692 first-time building inspections completed and 110 disconnections of sources of I/I from private properties have been verified. For public sources of I/I, 100,672 linear feet of pipe have been smoke tested and 403 manholes have been inspected. (All results are through January 15, 2011.) The data collected through these studies is being stored in a database that the City will use to prioritize future improvement projects.

Based upon previous studies, the City completed private I/I investigations via building inspections prior to 2010. The results of these investigations were submitted to the Environmental Protection Agency (EPA) and the Rhode Island Department of Environmental Management (RIDEM) in December 2010. Figure 4 below shows an example of the type of information submitted to the EPA.

FIGURE 4
Example of Private I/I Investigation Results



Deliverables Submitted to EPA

In addition to the activities described above, the City has submitted the following deliverables to the EPA and RIDEM:

- Inventory & CMOM (see definition of CMOM in Attachment 1) Self-Assessment
- CMOM Corrective Action Plan
- Pump Station & Force Main Evaluation
- WPCF Flow Optimization Study & CEPT Scope of Work
- Wellington Ave. CSO & Washington St. CSO Influent & Effluent Monitoring Plan
- Evaluation of Wellington Ave. CSO Facility, Washington St. CSO Facility & Narragansett Ave. Storage Conduit
- Initial Wellington Ave. CSO Extraneous Flow Remedial Plan
- Wellington Ave. Outfall Private Extraneous Flow Investigations

Construction Activities

While there is still much about the CSO system to be studied in order to develop the SMP, the City has completed and initiated a number of construction activities for those projects that were identified during previous studies to help reduce overflows. The following is a list of completed and active construction projects:

- Railroad Interceptor Rehabilitation – completed
- Long Wharf Force Main Emergency Repair – completed
- 2007-2008 Catch Basin Separation Improvements – completed
- 2008 Sanitary Sewer Manhole Rehabilitation Project (repair of 146 defective manholes in the Wellington area) - completed
- 2010 Catch Basin CA-6 Disconnection - completed
- Wellington Ave. Interceptor Replacement - completed
- High priority sewer replacement project construction – substantially complete
- Thames St. Interceptor rehabilitation – in progress

Attachment 1 – Key Terms & Acronyms

Key Terms

Capacity, Management, Operations & Maintenance (CMOM) - an EPA program to establish a process and framework that allows collection system owners and operators to optimize the performance of their system

Combined Sewer System - a collection system designed or intended to convey wastewater and storm water in a single pipe to the Water Pollution Control Facility (WPCF) or other authorized discharge point
Combined Sewer Overflow - the discharge of wastewater and stormwater from a combined sewer system directly to a receiving waterbody during wet weather

Infiltration - the water that enters the collection system indirectly (including sewer service connections) from the ground through such means as, but not limited to, defective pipes, pipe joints, connections or manholes.

Inflow - all water that enters the collection system directly (including sewer service connections) from sources such as, but not limited to, roof leaders, cellar drains, yard drains, sump pumps, area drains, foundation drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catch basins, storm waters, surface runoff, street wash waters, or drainage

Infiltration/Inflow (I/I) - the total quantity of water from both Infiltration and Inflow without distinguishing the source

Separate Collection System - a two-pipe collection system, where one pipe network is designed or intended to convey wastewater to the WPCF and there is a second pipe network to convey stormwater from storm drainage conduits directly to receiving waterbodies

Key Acronyms

- CCTV - Closed Circuit Television
- CMOM - Capacity, Management, Operations & Maintenance
- CSO - Combined Sewer Overflow
- EPA - Environmental Protection Agency
- FM - Force Main
- GIS - Geographic Information System
- I/I - Infiltration & Inflow
- LTCP - Long Term Control Plan
- O&M - Operations & Maintenance
- PS - Pump Station
- RIDEM - Rhode Island Department of Environmental Management

- SEP - Supplemental Environmental Project
- SMP - System Master Plan
- WPCF - Water Pollution Control Facility