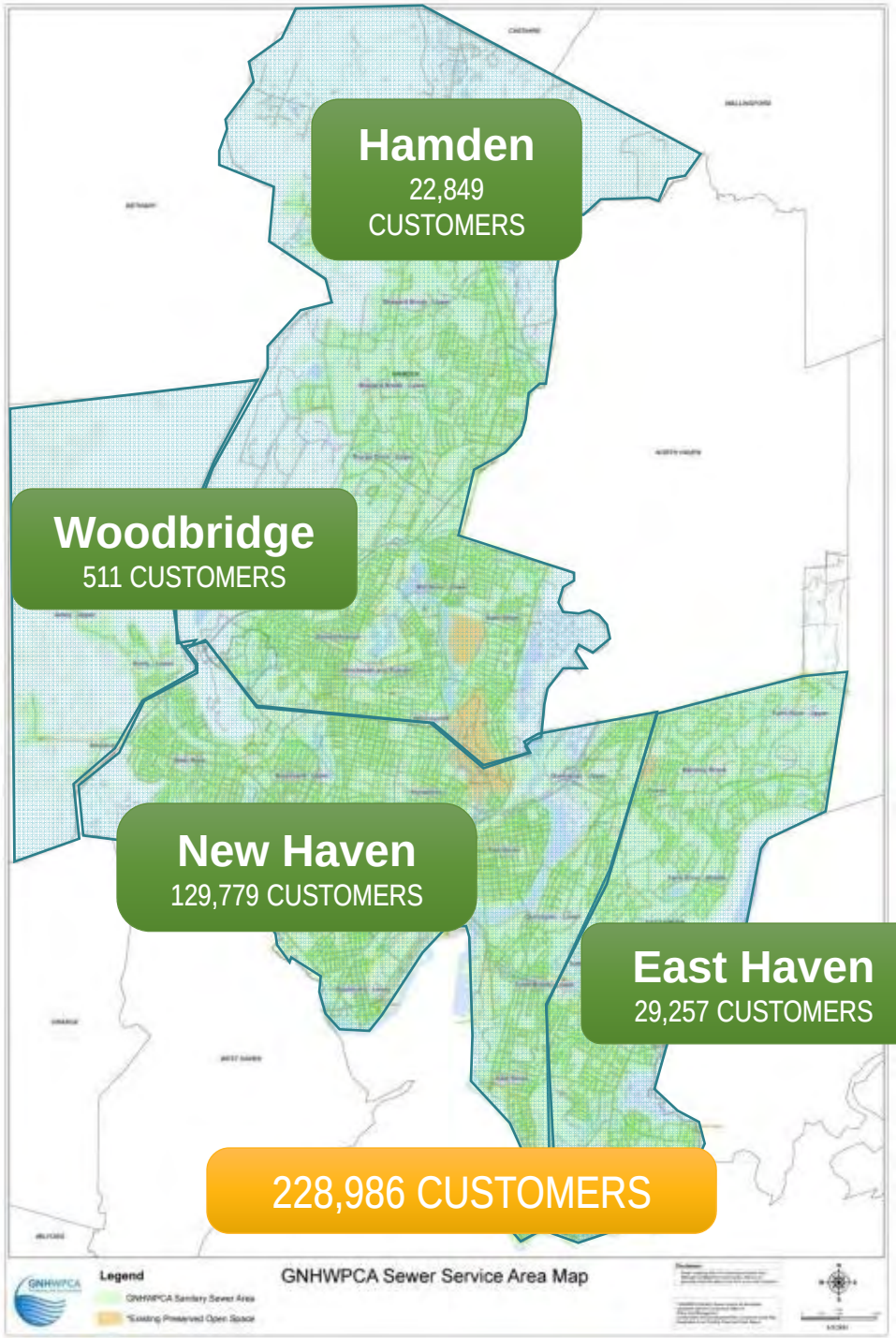

GNHWPCA
Protecting the Environment
PUBLIC
INFORMATION
MEETING
City of New Haven's
Combined Sewer Overflow Long Term Control Plan Update
Public Information Meeting
Report Prepared by CH2MHill on behalf of the
Greater New Haven Water Pollution Control Authority
FEBRUARY 14, 2017

Meeting Agenda

- **About the Authority**
- **Overview of the City of New Haven LTCP Updates**
- **Rainfall Conditions**
  - Metered or Measured Flow
  - 2-year, 6-hour Design Storm
  - Typical Rainfall Year
- **2016 Baseline Conditions Model**
- **Long Term Control Plan Update Recommended Plan:**
  - **Short Term Improvements**
  - **Intermediate Term Improvements**
  - **Long Term Improvements**
- **LTCP Update Project Schedule & Costs**



Greater New Haven Water Pollution Control Authority

WWW.GNHWPCA.COM

- Four Member Communities
  - Hamden
  - East Haven
  - Woodbridge
  - New Haven
- Over 500 Miles of Collections Systems
- 30 Pump Stations
- East Shore Treatment Plant
  - 29 MGD – Average
  - 40 MGD – Secondary Design Flow
  - 100 MGD – Wet Weather Primary

We are not a manufacturing facility!

Rather, we clean whatever you put down the pipes of your home!

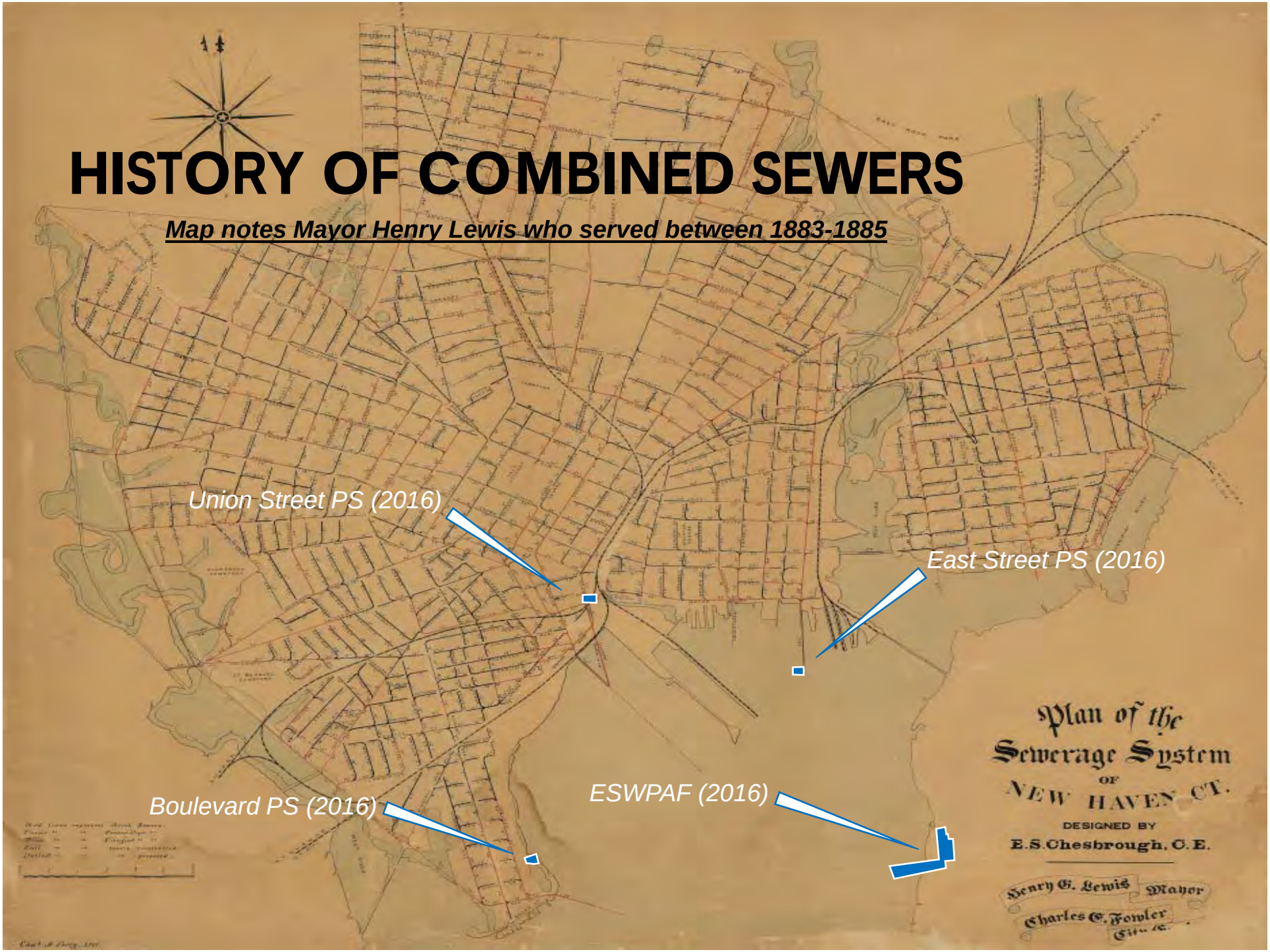
Challenging work!

PROTECTING THE ENVIRONMENT

PROTECTING THE ENVIRONMENT

HISTORY OF COMBINED SEWERS

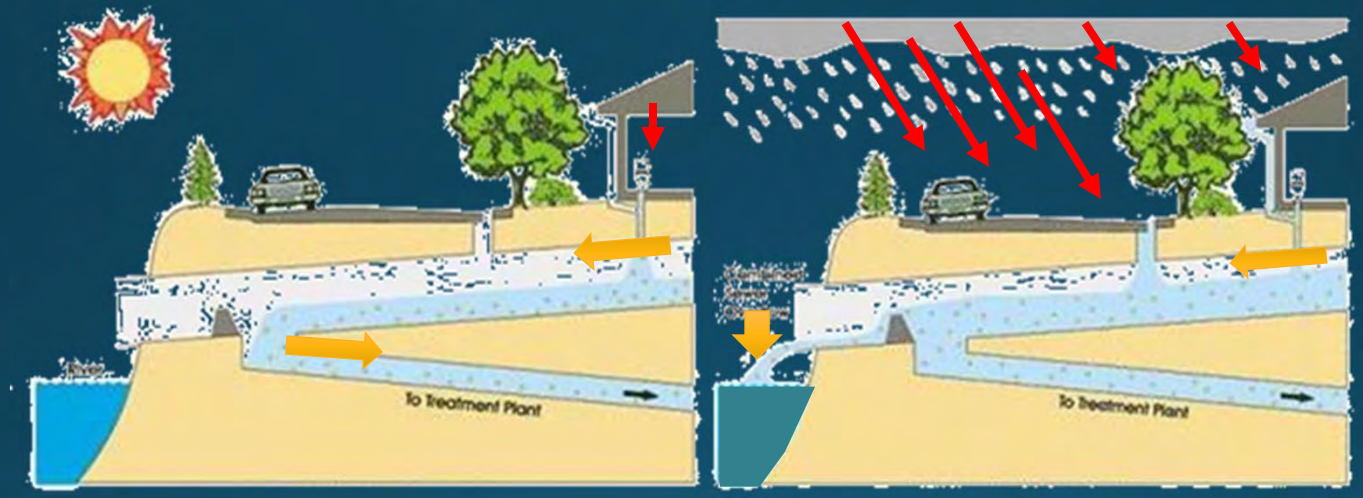
Map notes Mayor Henry Lewis who served between 1883-1885



Wastewater Collection and Treatment

What Is A Combined Sewer?

Combined Sewer Overflow Diagram



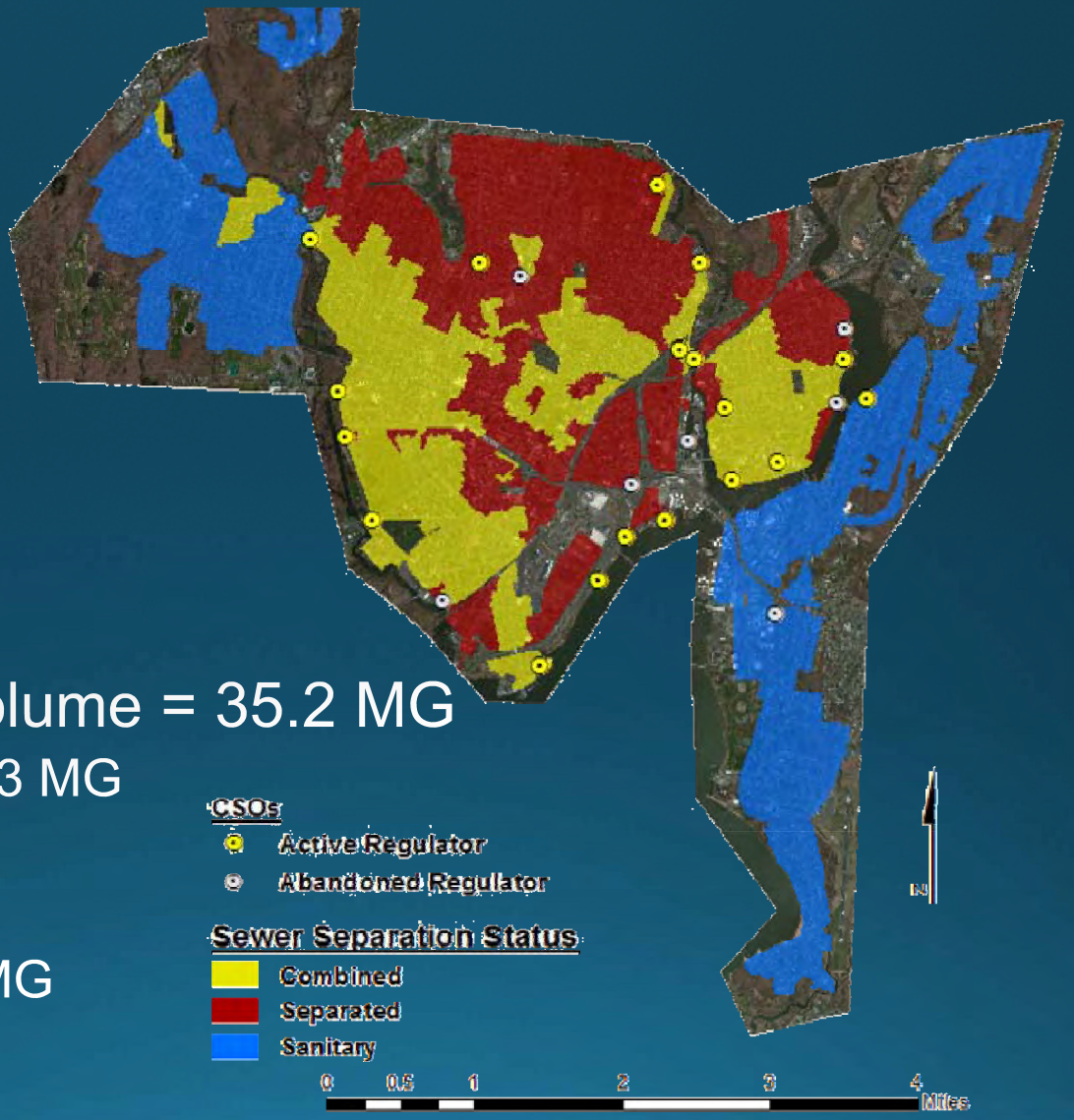
Dry Weather: Weir Wall Directs Flow To Treatment Plant

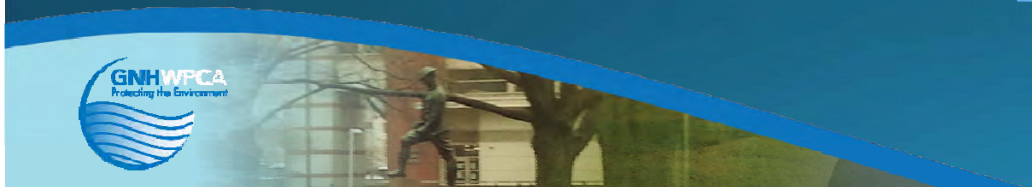
Wet Weather: Some Flow Passes Over Weir Wall

Where are The GNHWPCA CSO's?

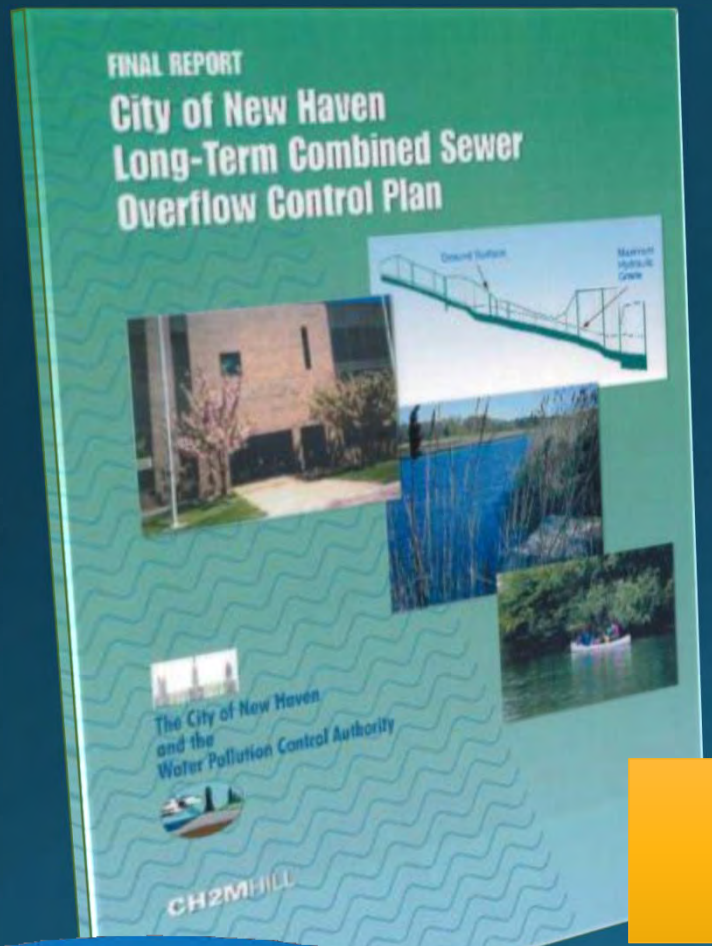
- 13 CSO Outfalls
  - 3 New Haven Harbor
  - 4 West River
  - 3 Mill River
  - 3 Quinnipiac River

- 2016 Annual Metered Volume = 35.2 MG
  - New Haven Harbor = 15.73 MG
  - West River = 6.16 MG
  - Mill River = 2.22 MG
  - Quinnipiac River = 11.11 MG





CONNECTICUT DEEP APPROVED CITY OF NEW HAVEN'S LONG TERM CONTROL PLAN (LTCP)



- ORIGINAL LTCP APPROVED IN 2003
- LAST UPDATED IN 2011
- 2015 DEEP AMENDED CONSENT ORDER REQUIRES AN UPDATE EVERY 5 YEARS (NEXT DUE BY THE END OF 2016)

Goal:
The ultimate objective is to provide measures necessary to achieve zero discharge from all CSO outfalls during the 2-year, 6-hour storm by 2040

GNHWPCA
Protecting the Environment

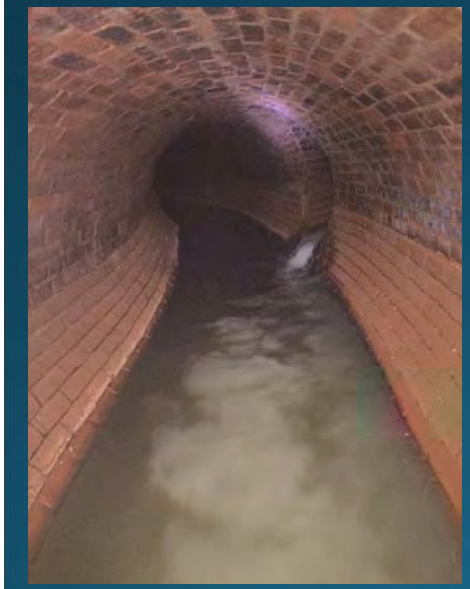
LTCP Work Completed

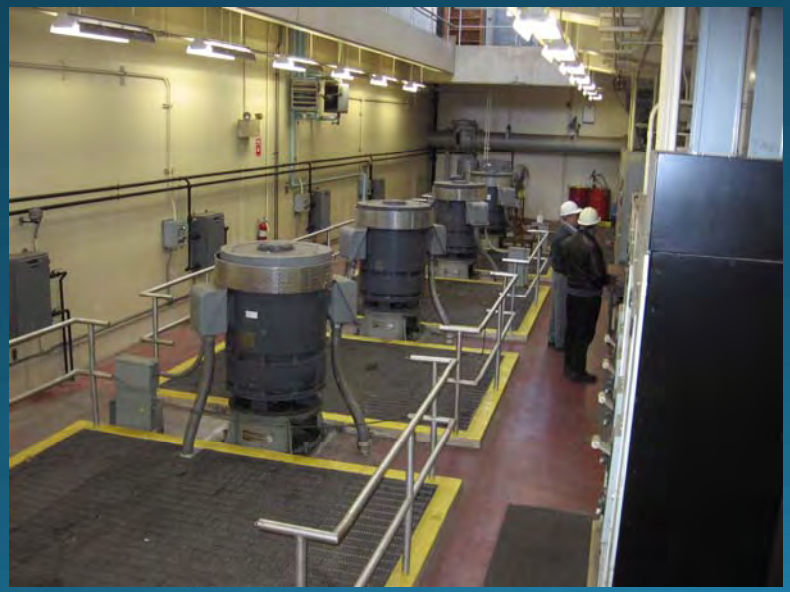
- **The City of New Haven and, since 2005, GNHWPCA have made improvements to the combined sewer system that have reduced CSO frequency, duration and volume**
  - **Sewer separation projects**
  - **Truman CSO Storage Tank**
  - **Phase I Wet Weather Capacity Improvements at the ESWPAF**
    - **To be complete in 2017 at a cost of $60 M**
  - **Regulator improvement projects**
    - **Utilizing data from CSO Flow Monitoring and Hydraulic Modeling**
- **Between 1997 and 2015, CSO volume has effectively been reduced by**
  - **46% during the design storm from 26 MG to 14 MG**
  - **66% during the typical year from 126 MG over 51 events to 43 MG over 30 events**

2016 LTCP UPDATE FOCUS

MAXIMIZE FLOW TO THE EAST SHORE ABATEMENT FACILITY BY:

- **MAXIMIZING USE OF STORAGE AND CONVEYANCE**
- **IMPROVEMENTS TO KEY PUMP STATIONS**
- **GREEN INFRASTRUCTURE**





UNDERSTANDING RAINFALL CONDITIONS

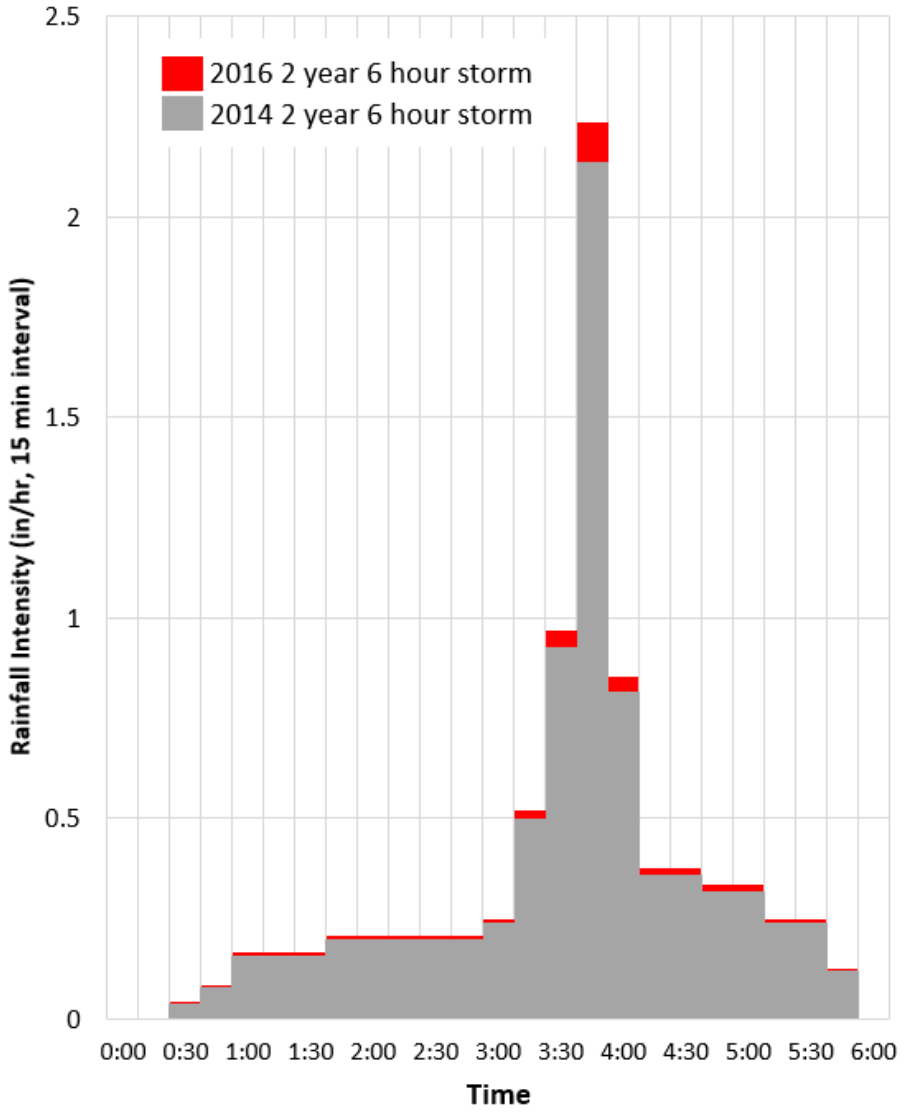
KEY TERMINOLOGY:

- **2-YEAR DESIGN STORM**
- **TYPICAL YEAR RAINFALL**
- **MODELING / METERED FLOW**

Rainfall Conditions

2-year 6-hour Design Storm

- The 2-year, 6-hour design storm represents the level of control required in the Consent Decree
- During the 2001 LTCP, the rainfall depth was **2.05 inches** (used during the 2015 Hydraulic Model Update)
- Due to climate change and increased extreme weather, storm frequencies change overtime and need to be reevaluated
- Rainfall depth increased to **2.13 inches** (Cornell, NRCC)
- Change has some effect on system performance
  - 2.05 in: 12.9 MG of Overflow (2016 model)
  - 2.13 in: 14.3 MG of Overflow (2016 model)

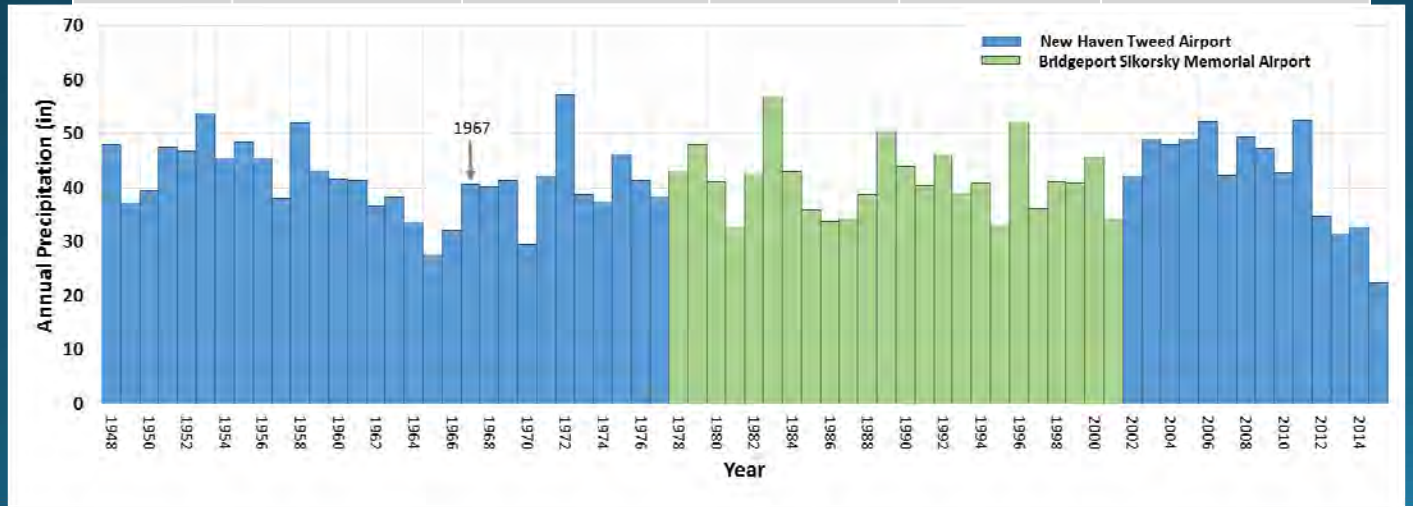


Rainfall Conditions

Typical Year Rainfall

- During the 2001 LTCP, 1967 was determined as a typical year of rainfall from the Tweed-New Haven Airport
- Due to climate change, increased extreme weather, and more available data, a typical year was reevaluated
- 1967 still the most typical year of rainfall in New Haven

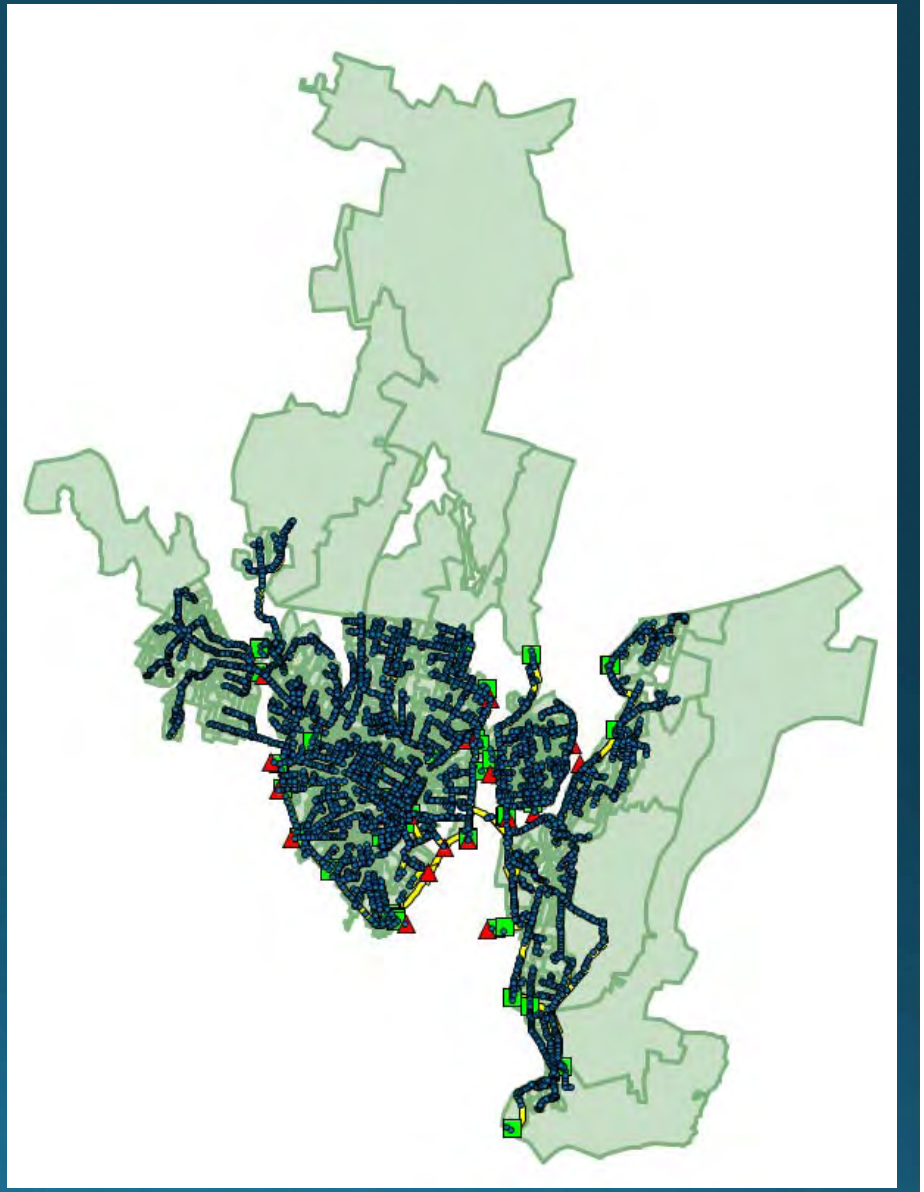
Year	Annual Precipitation	Monthly Precipitation	Number of Events	Maximum Event Volume	Maximum Event Intensity
1967	✓	✓		✓	✓
1991	✓		✓		✓
2007	✓		✓		



2016 Baseline Conditions Model

Overview

- The baseline conditions model is used as the standard in which all control strategies are measured against
- The baseline conditions model reflects existing conditions to avoid inaccurate benefits of the control strategies
- The 2014 Condition Model was updated to reflect 2016 Conditions
- Model calibration was validated with historic flow monitoring data collected from 30+ meters (metered flow) within the CSO system.



EPA SWM Hydraulic Model 5

How Did We Get Immediate Benefits?

KNOWLEDGE IS POWER!

- Near-term solutions
  - Reduce CSOs by modifying existing regulator structures
  - Maximize conveyance and storage in the Boulevard Trunk Sewer
- Maximize/Optimize use of the Truman Tank
- Maximize use of the Boulevard Pump Station
- Green Infrastructure Redevelopment Requirements

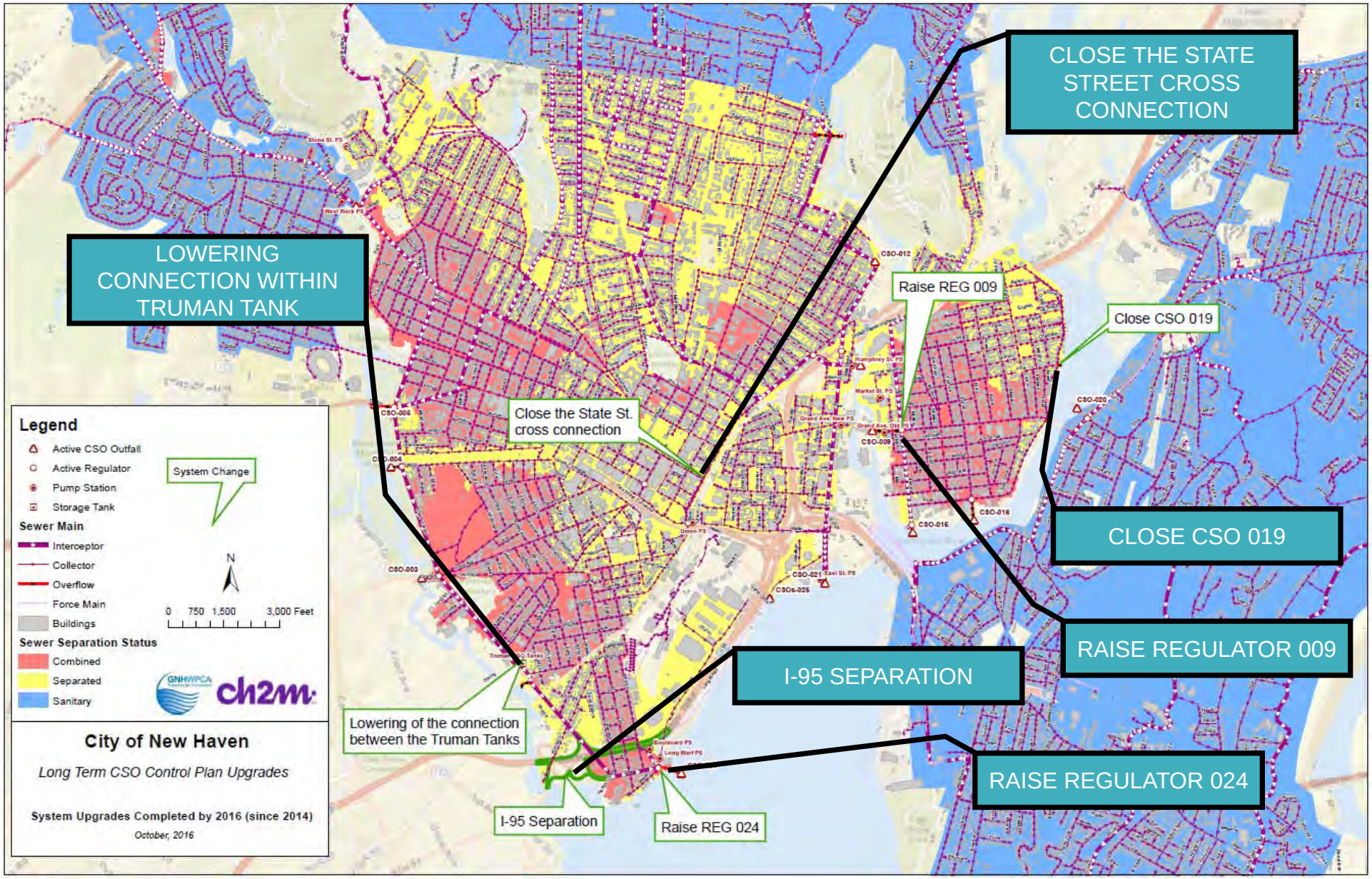
2016 LTCP KEY MILESTONES

- SUMMARY OF PROJECTS SINCE 2014 *(2014-2016)*
- SHORT TERM CONTROL PLAN *(2016-2018)*
- INTERMEDIATE TERM CONTROL PLAN *(2018-2028)*
- LONG TERM CONTROL PLAN *(2028-2040)*

LTCP UPDATES ARE REQUIRED BY OUR CONSENT ORDER EVERY 5-YEAR SO PROJECTS AND SCHEDULES MAY CHANGE

2016 Baseline Conditions Model

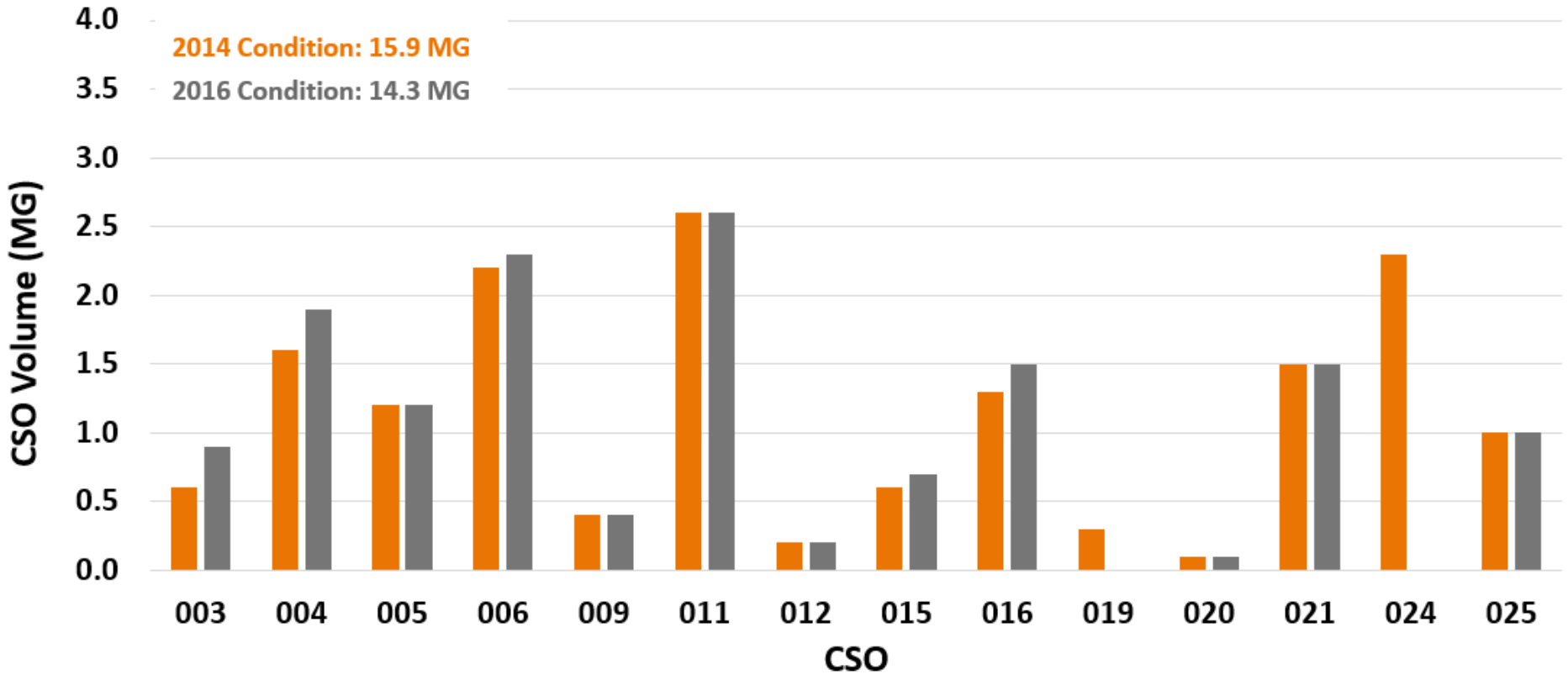
Completed Projects Since 2014



2016 Baseline Conditions Model

System Performance: 2-year, 6-hour Design Storm

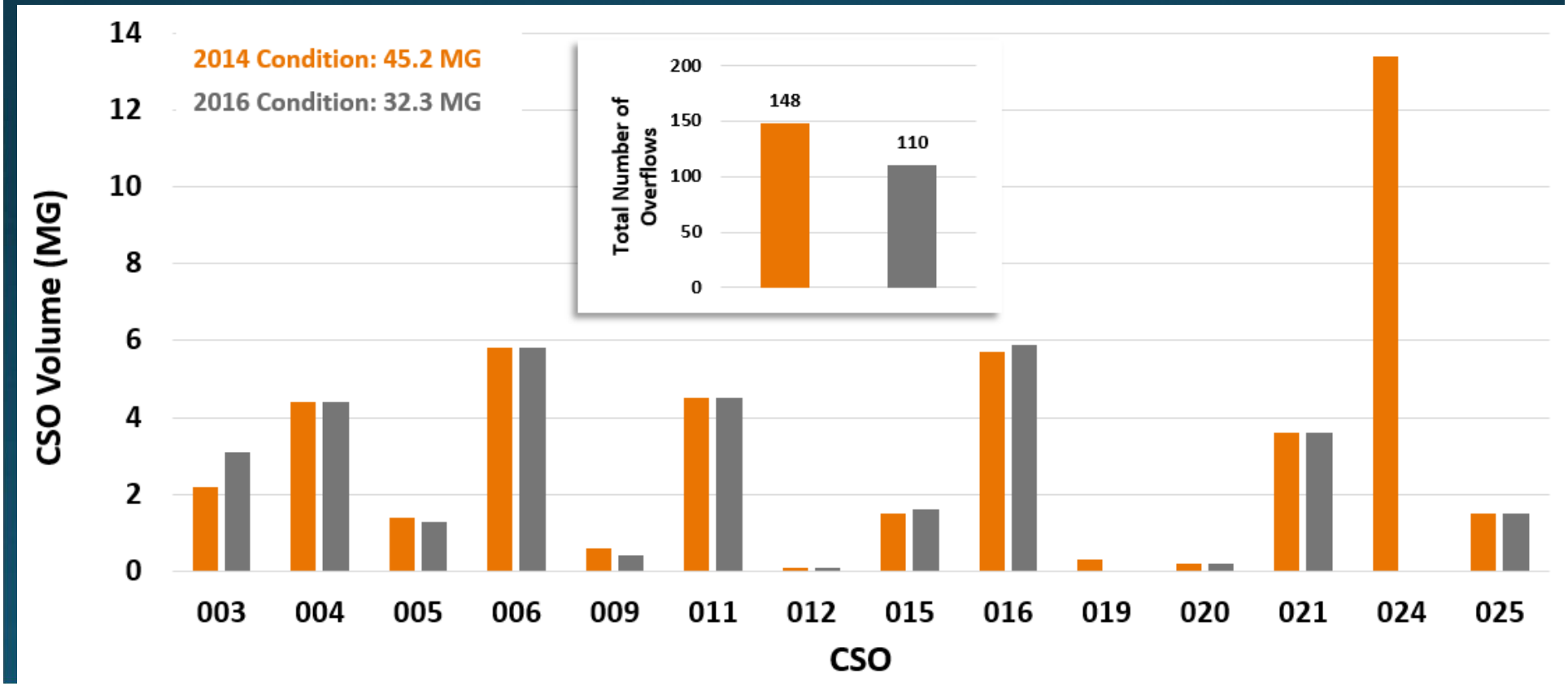
- 2014 total CSO volume: **15.9 MG**
- 2016 total CSO volume: **14.3 MG**
- CSO volume reduction: **1.6 MG**



2016 Baseline Conditions Model

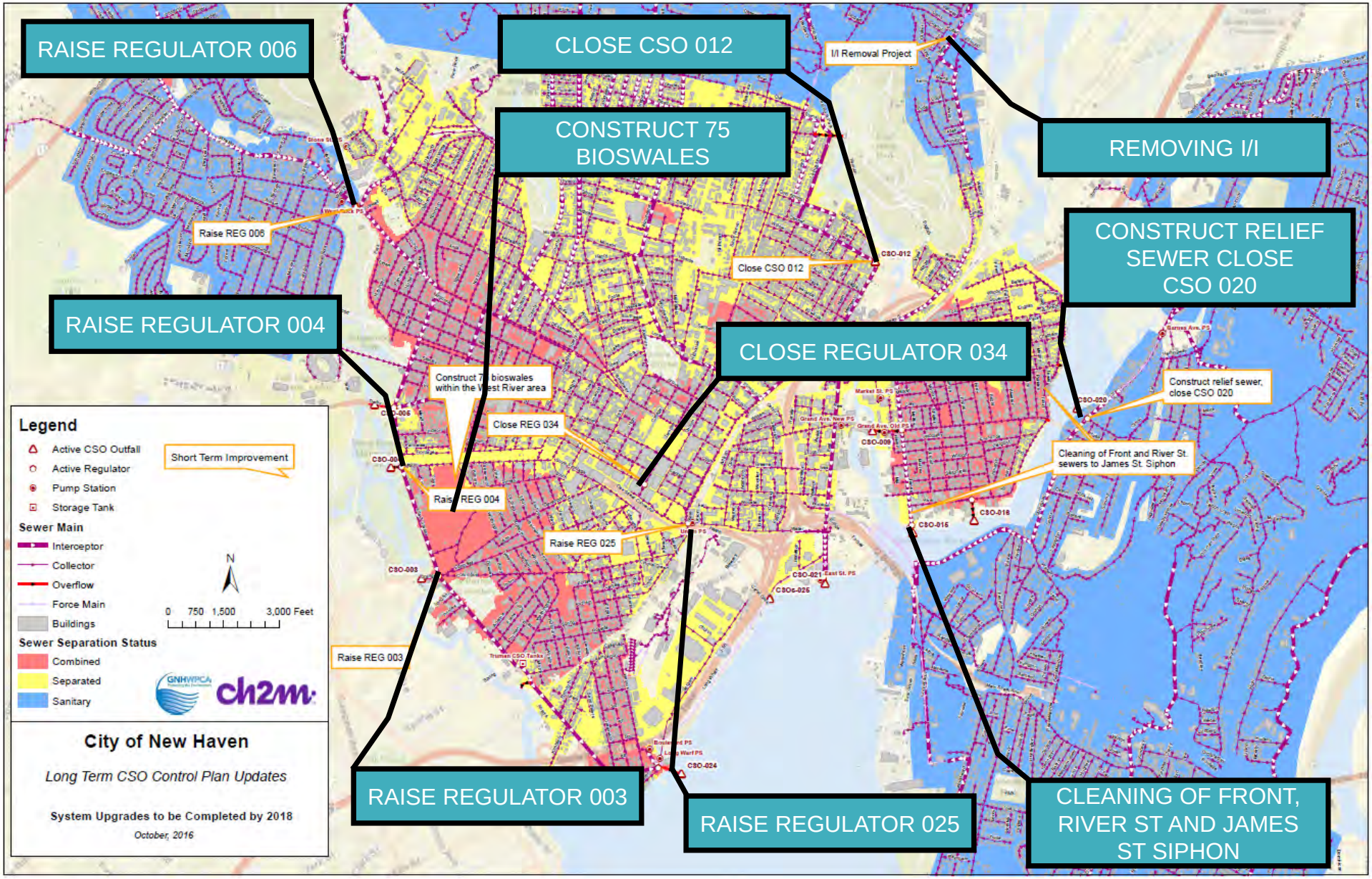
System Performance: Typical Year

- 2014 total CSO volume: **45.2 MG**
- 2016 total CSO volume: **32.3 MG**
- CSO volume reduction: **12.9 MG**



Short Term Control Plan

Components



Short Term Control Plan

STCP Flow Diagram

2-yr 6-hr. Design Storm

James St. Siphon

22 MGD

Quinnipiac Ave.

8 MGD

2 MGD

Local Sewers

Union Pump Station

15 MGD

Morris Cove Pump Station

18 MGD

East Street Pump Station

30 MGD

Boulevard Pump Station

30 MGD

60 MGD

30 MGD

2 MGD

18 MGD

ESWPAF

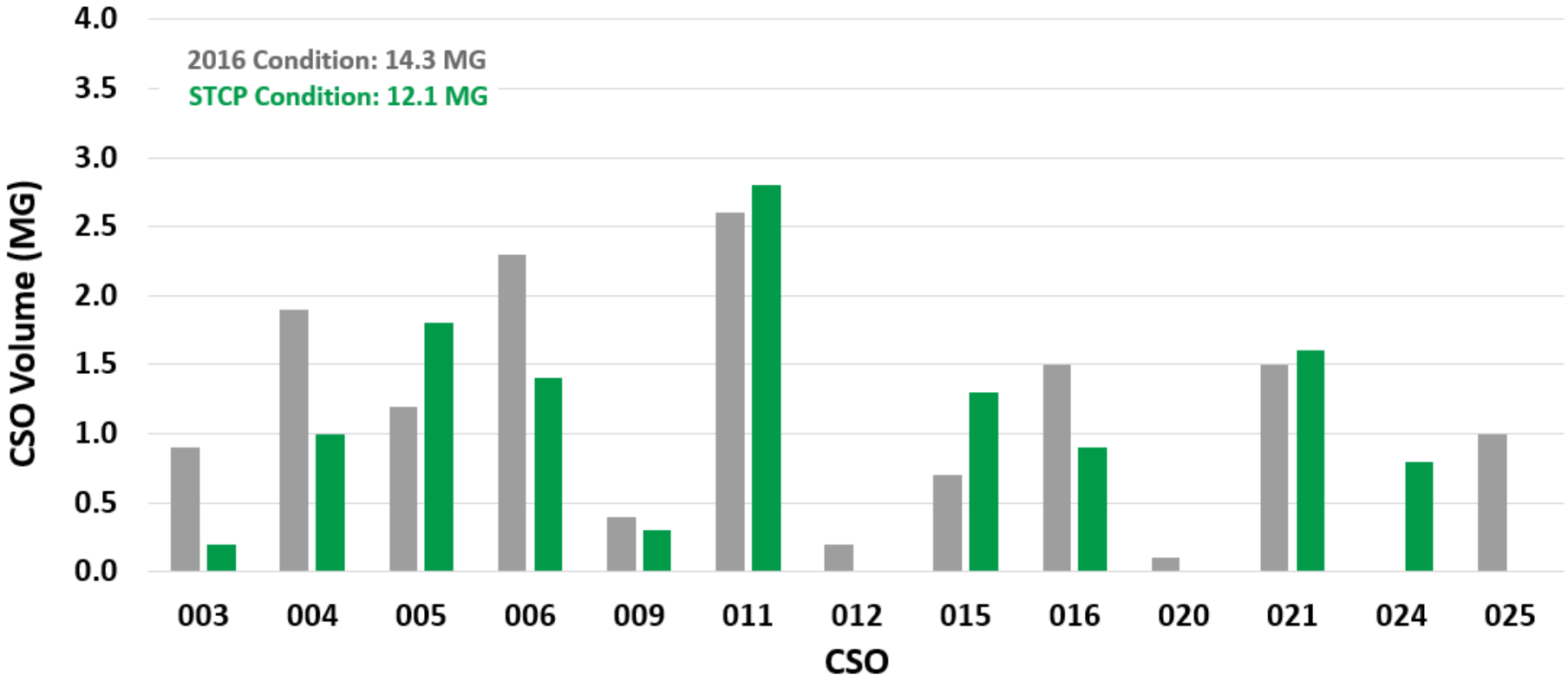
110 MGD

Effluent

Short Term Control Plan

System Performance: 2-year, 6-hour Design Storm

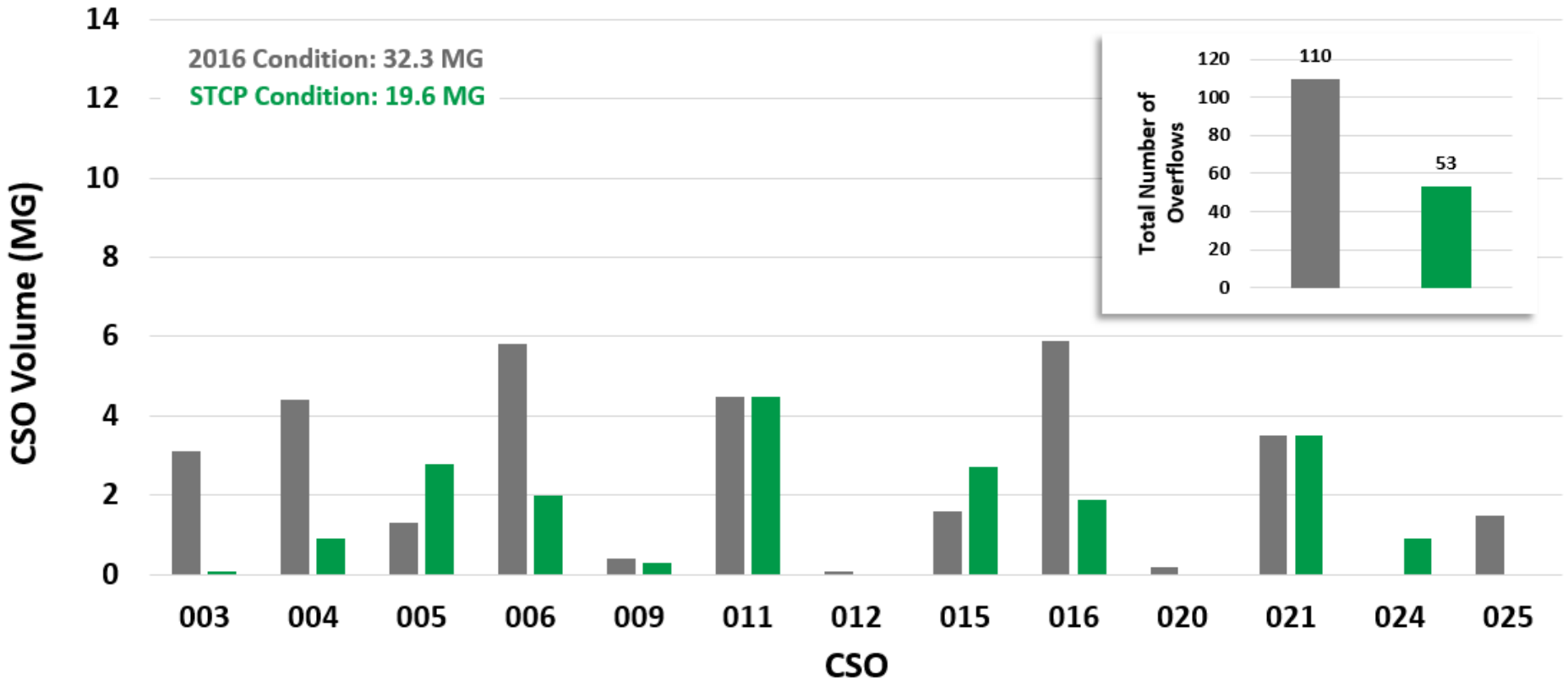
- 2016 Total CSO Volume: **14.3 MG**
- STCP Total CSO Volume: **12.1 MG**
- CSO volume reduction: **2.2 MG**



Short Term Control Plan

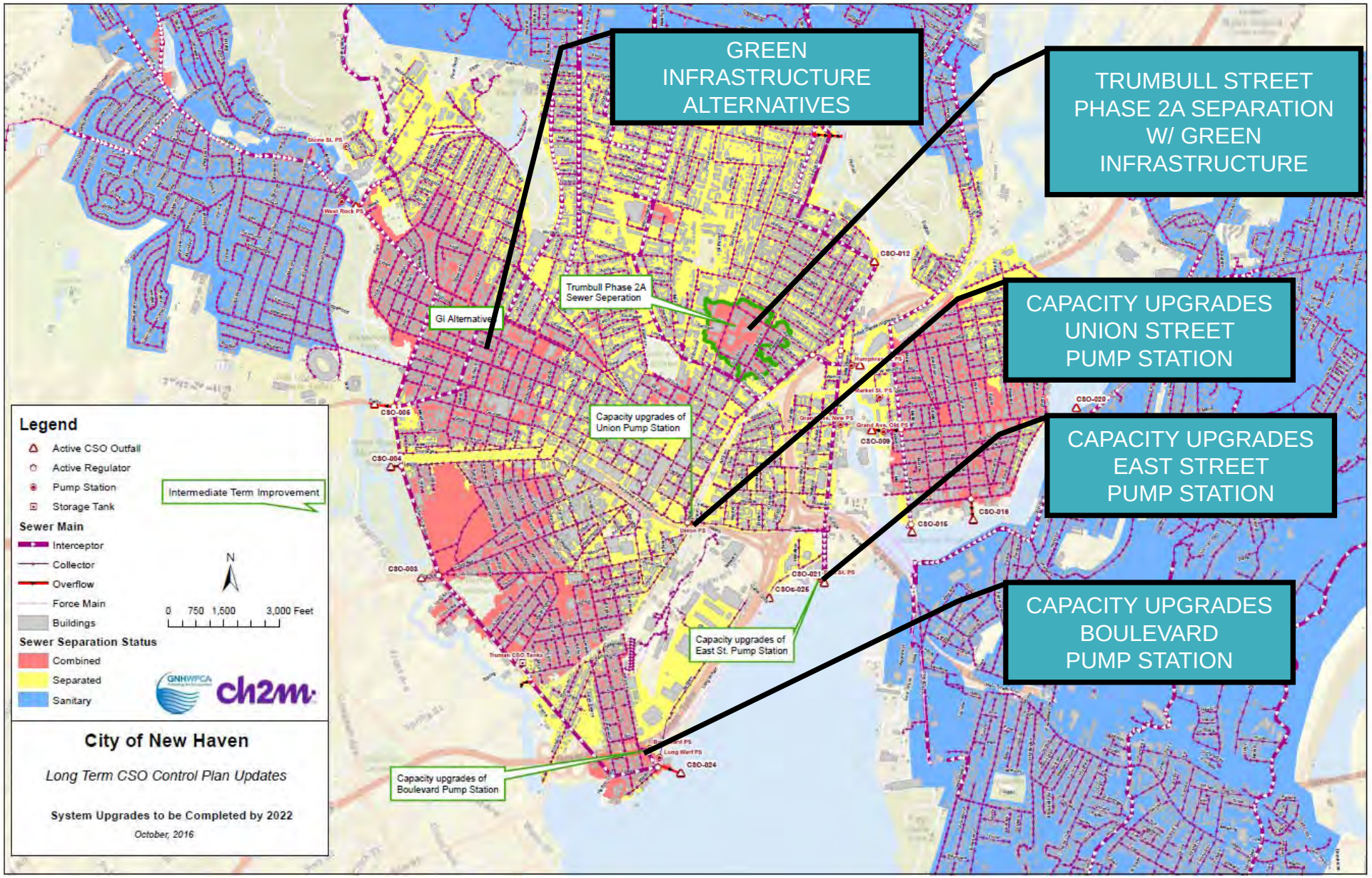
System Performance: Typical Year

- 2016 Total CSO Volume: **32.3 MG**
- STCP Total CSO Volume: **19.6 MG**
- CSO volume reduction: **12.7 MG**



Intermediate Term Control Plan

Components

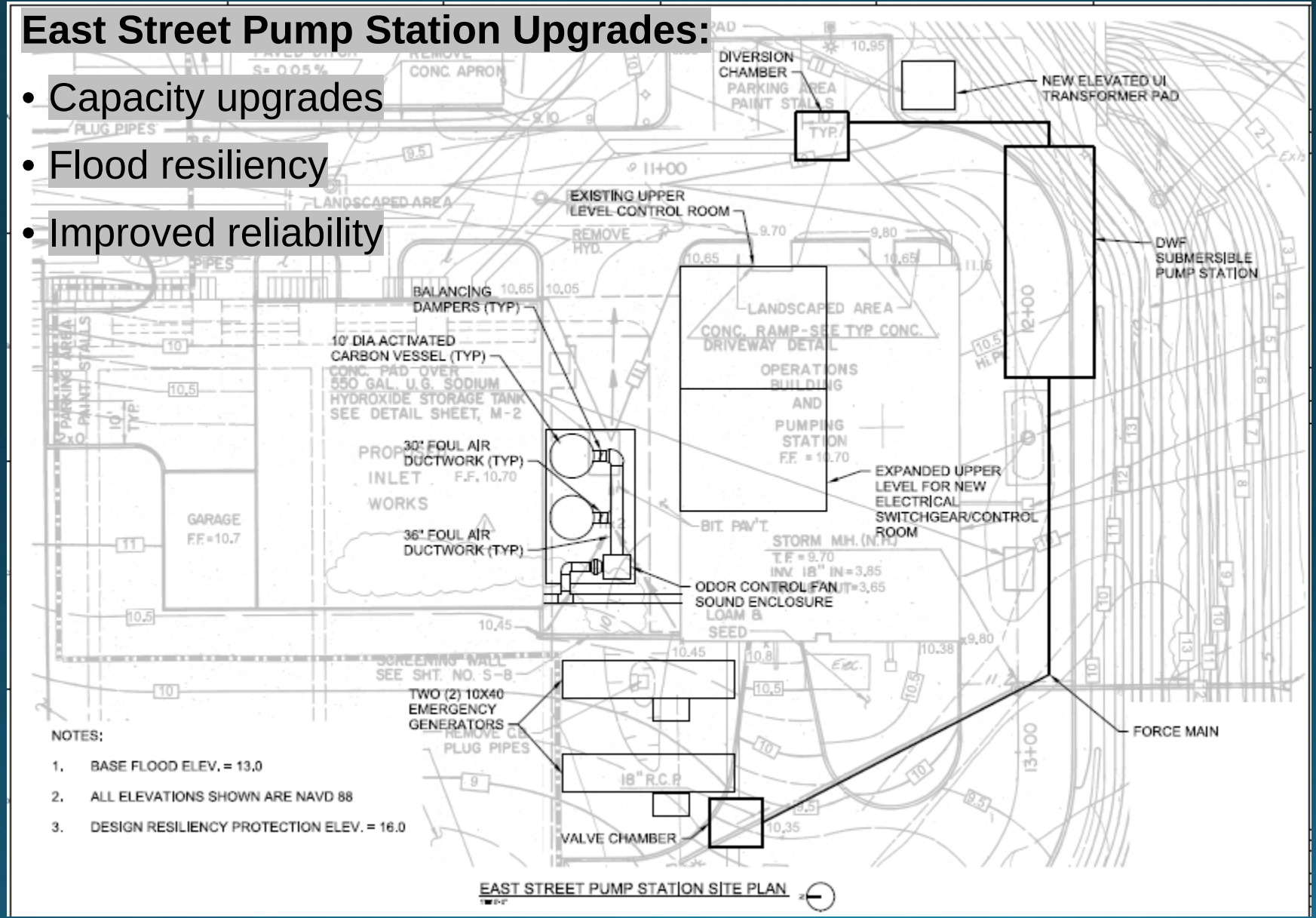


Intermediate Term Control Plan

East Street Pump Station Site Plan

East Street Pump Station Upgrades:

- Capacity upgrades
- Flood resiliency
- Improved reliability



Intermediate Term Control Plan

East Street Pump Station Dry and Wet Weather Pumps

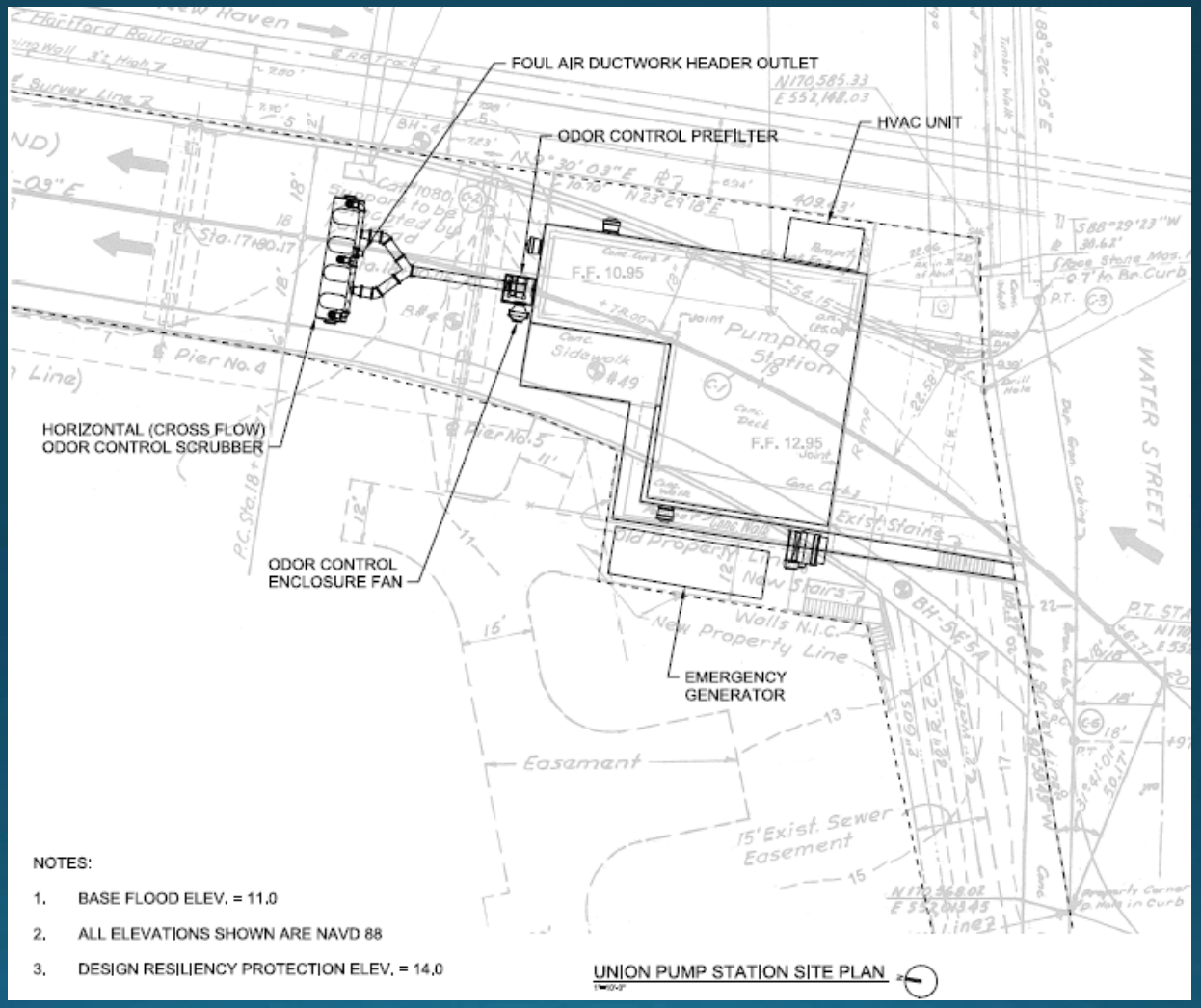
Design Criteria	Dry Weather	Wet Weather
Number of pumps	3	5
Max flow	8.4 MGD	16.25 MGD

Intermediate Term Control Plan

Union Pump Station Site Plan

Union Pump Station Upgrades:

- Capacity upgrades
- Flood resiliency
- Improved reliability



Intermediate Term Control Plan

Union Pump Station Dry and Wet Weather Pumps

Design Criteria	Dry Weather	Wet Weather
Number of pumps	2	3
Max flow	6.2 MGD	17.5 MGD

Intermediate Term Control Plan

Union Pump Station Force Main Replacement and Pipe Bridge Rehabilitation

CONSTRUCTION CHALLENGES

Existing 24-in Force main to be replaced

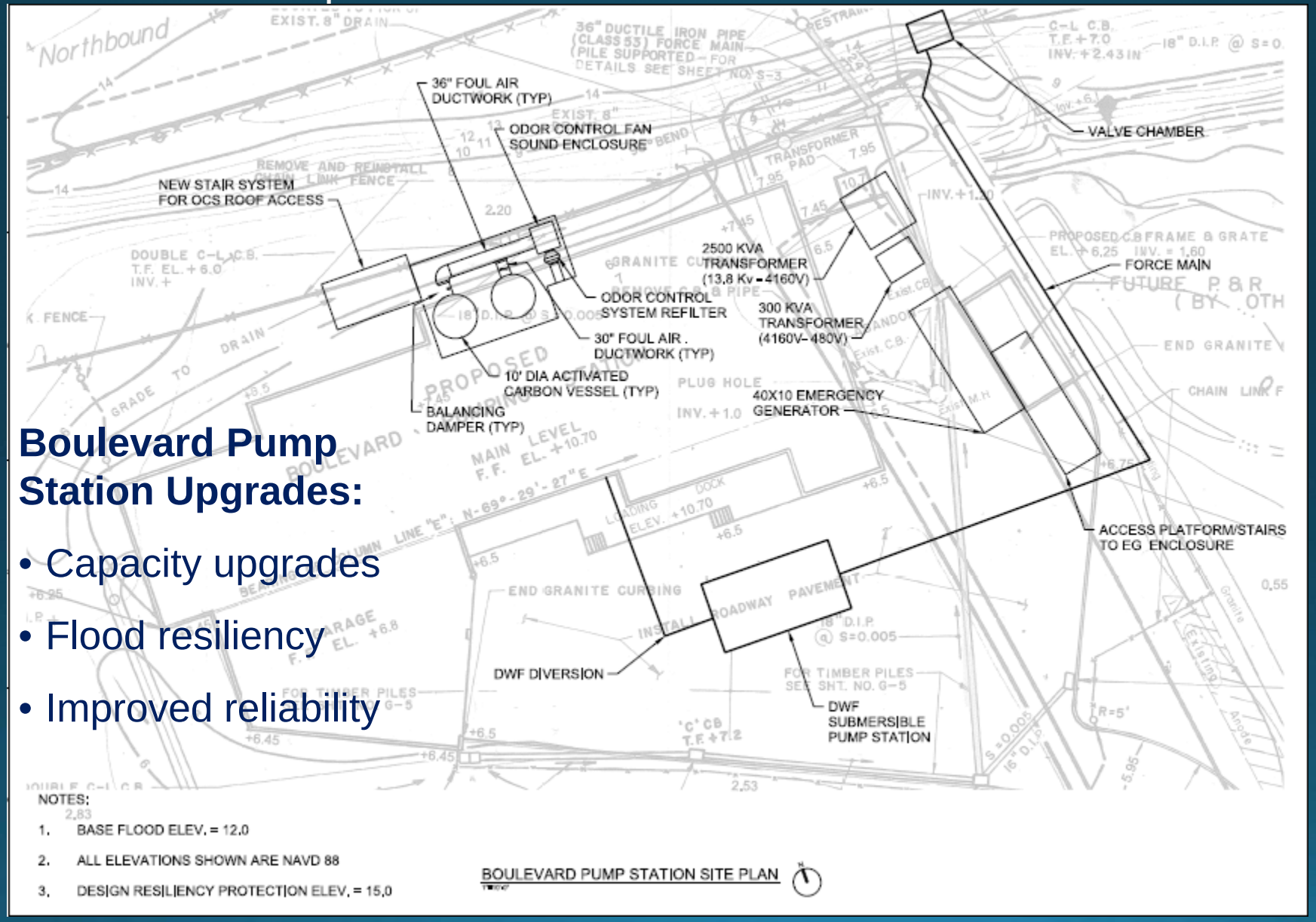
- Union Pump Station will require bypass pumping
- Railroad to require casing over new 24-inch force main
- Structural Evaluation to Consider Increased Load – Rehab to Address

- Rehabilitate existing pipe bridge over railroad

- Consider RR track shutdown requirements and permitting requirements with RR

- The Gas Company added a gas main to the original bridge structure. Main will require relocation prior to our construction.

Intermediate Term Control Plan
Boulevard Pump Station Site Plan



Boulevard Pump Station Upgrades:

- Capacity upgrades
- Flood resiliency
- Improved reliability

Intermediate Term Control Plan

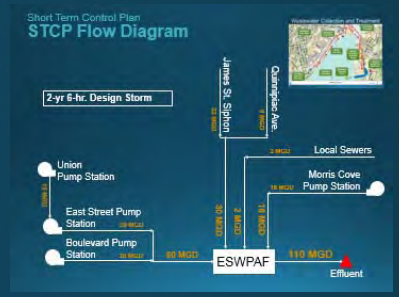
Boulevard Pump Station Dry and Wet Weather Pumps

Design Criteria	Dry Weather	Wet Weather
Number of pumps	3	4
Max flow	9.08 MGD	15 MGD

Intermediate Term Control Plan

ITCP Flow Diagram

Maximizing Use of Our Existing Infrastructure



2-yr 6-hr. Design Storm

James St. Siphon — 22 MGD

Quinnipiac Ave. — 8 MGD

Union Pump Station
(35 MGD Capacity)

15 MGD

East Street Pump Station
(65 MGD Capacity)

40 MGD

Boulevard Pump Station
(45 MGD Capacity)

30 MGD

70 MGD

30 MGD

2 MGD Local Sewers

2 MGD

Morris Cove Pump Station

18 MGD

18 MGD

ESWPAF

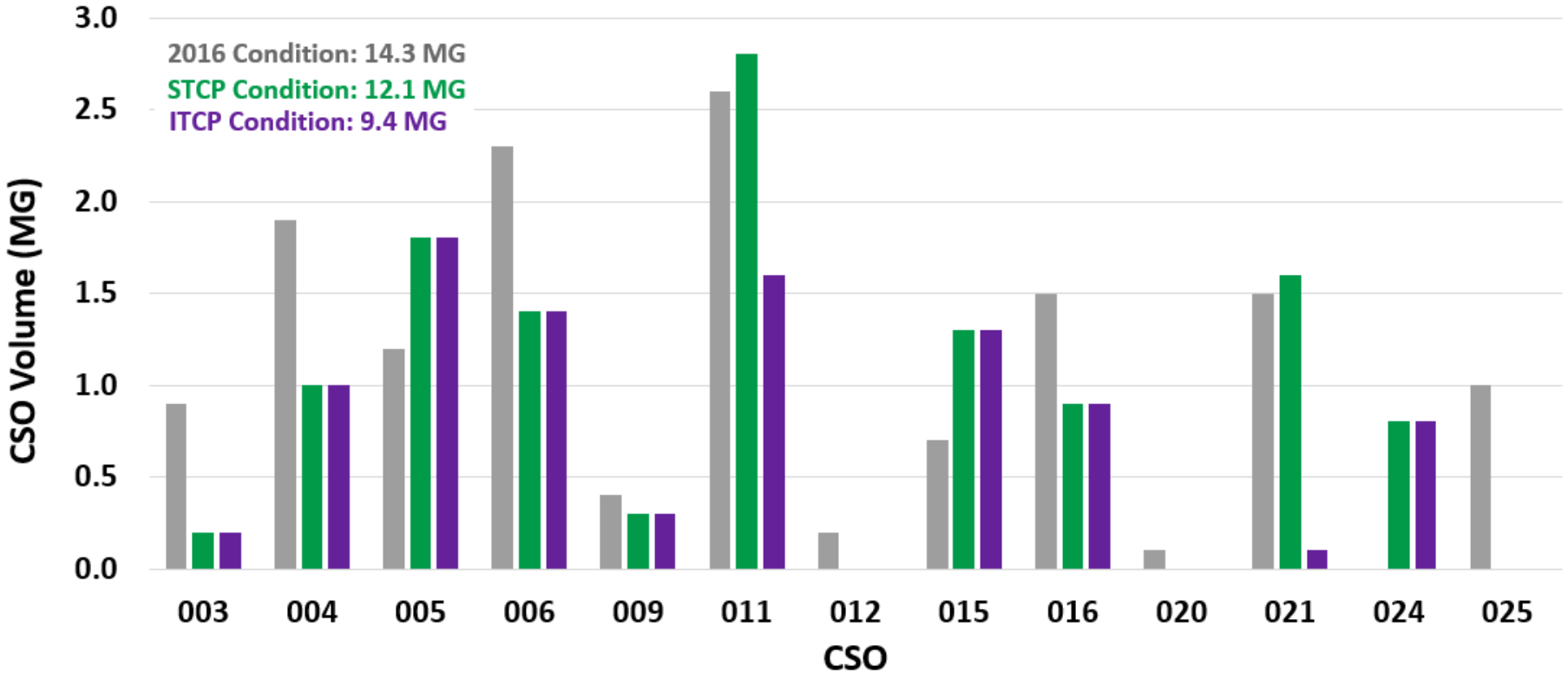
120 MGD

Effluent

Intermediate Term Control Plan

System Performance: 2-year, 6-hour Design Storm

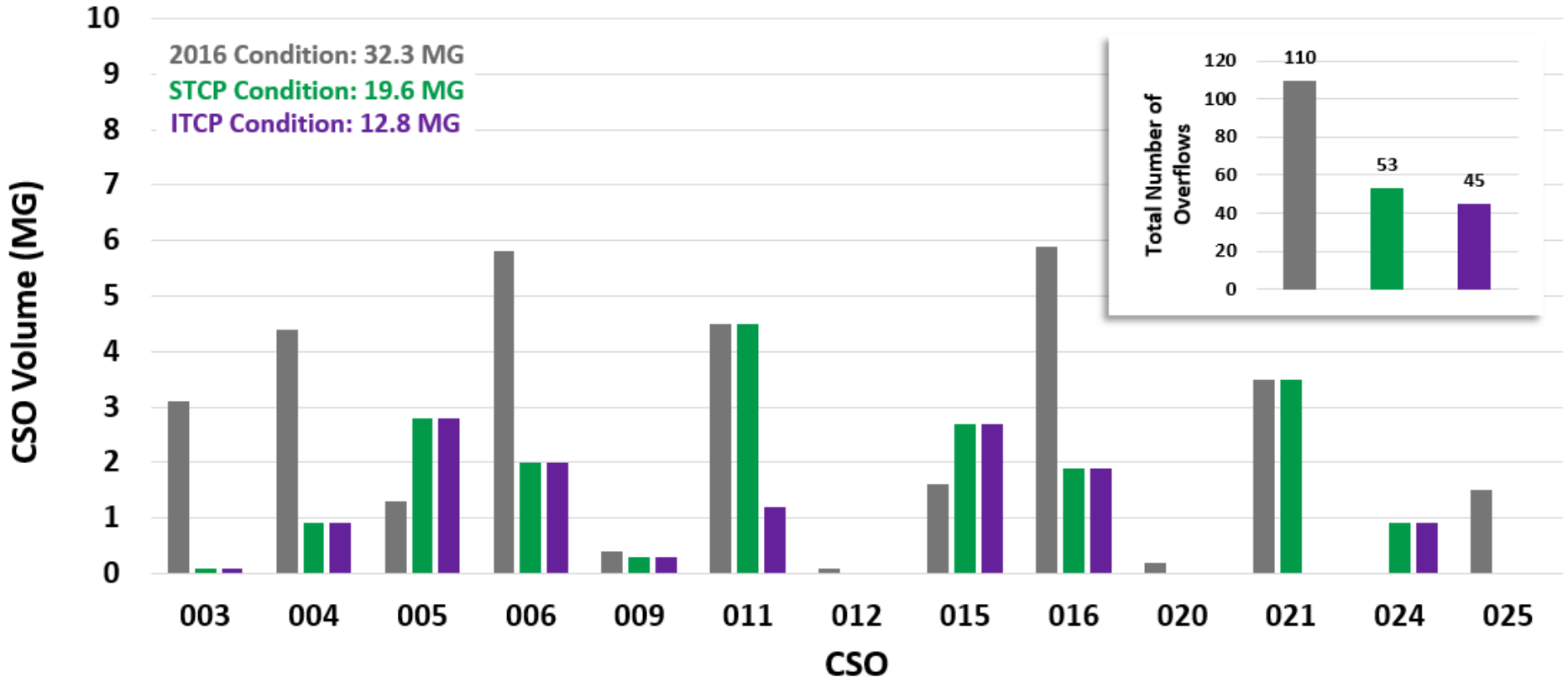
- STCP Total CSO Volume: **12.1 MG**
- ITCP Total CSO Volume: **9.4 MG**
- CSO volume reduction: **2.7 MG**



Intermediate Term Control Plan

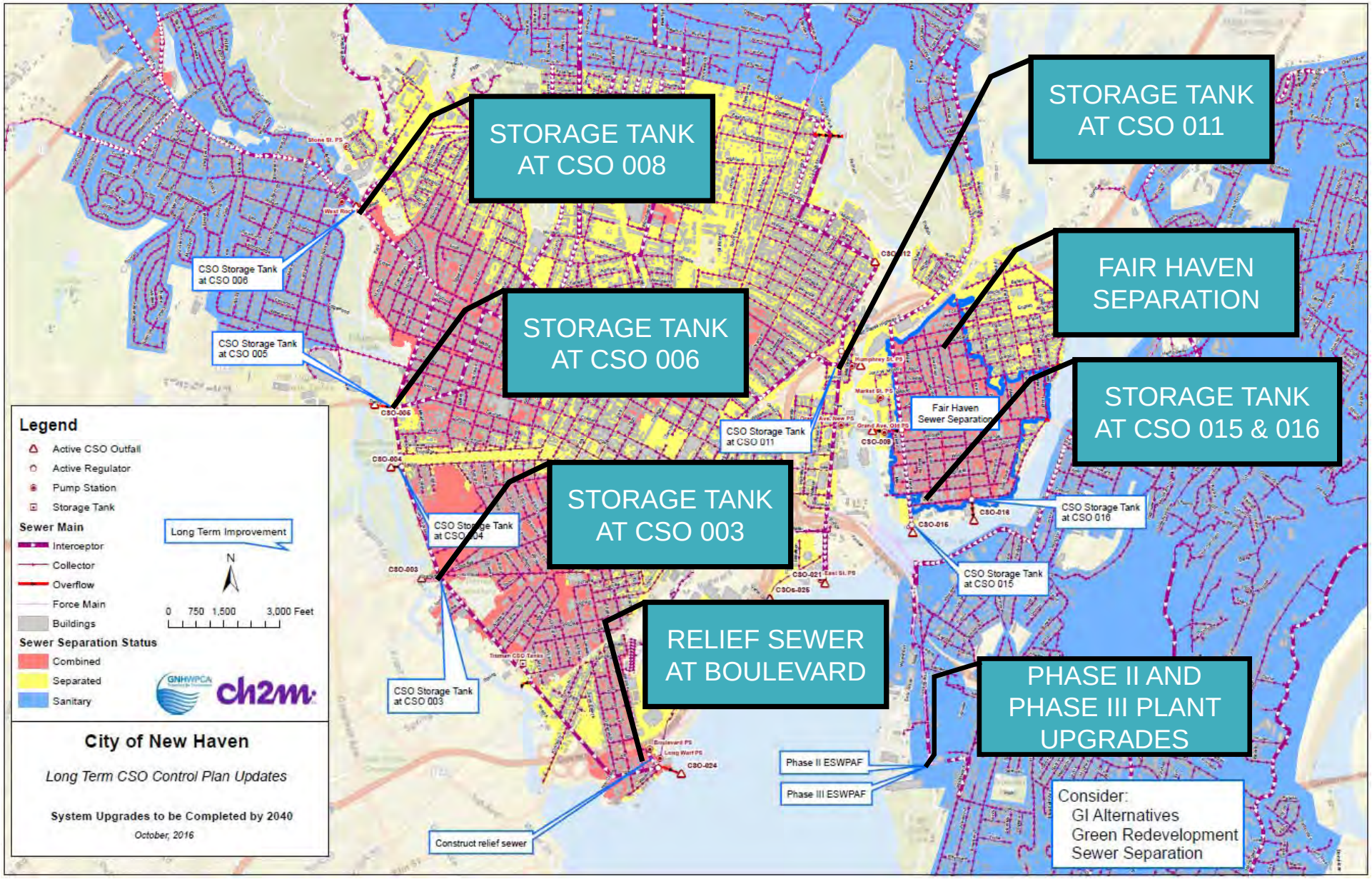
System Performance: Typical Year

- STCP Total CSO Volume: **19.6 MG**
- ITCP Total CSO Volume: **12.8 MG**
- CSO volume reduction: **6.8 MG**



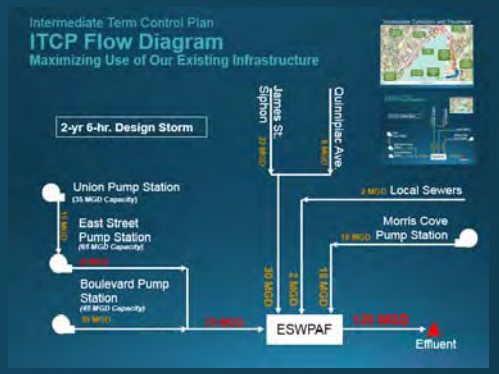
Long Term Control Plan

Components



Long Term Control Plan

LTCP Flow Diagram



2-yr 6-hr. Design Storm

James St. Siphon

22 MGD

Quinnipiac Ave.

8 MGD

2 MGD Local Sewers

Union Pump Station

35 MGD

East Street Pump Station

65 MGD

Boulevard Pump Station

45 MGD

110 MGD

30 MGD

2 MGD

18 MGD

18 MGD Morris Cove Pump Station

ESWPAF

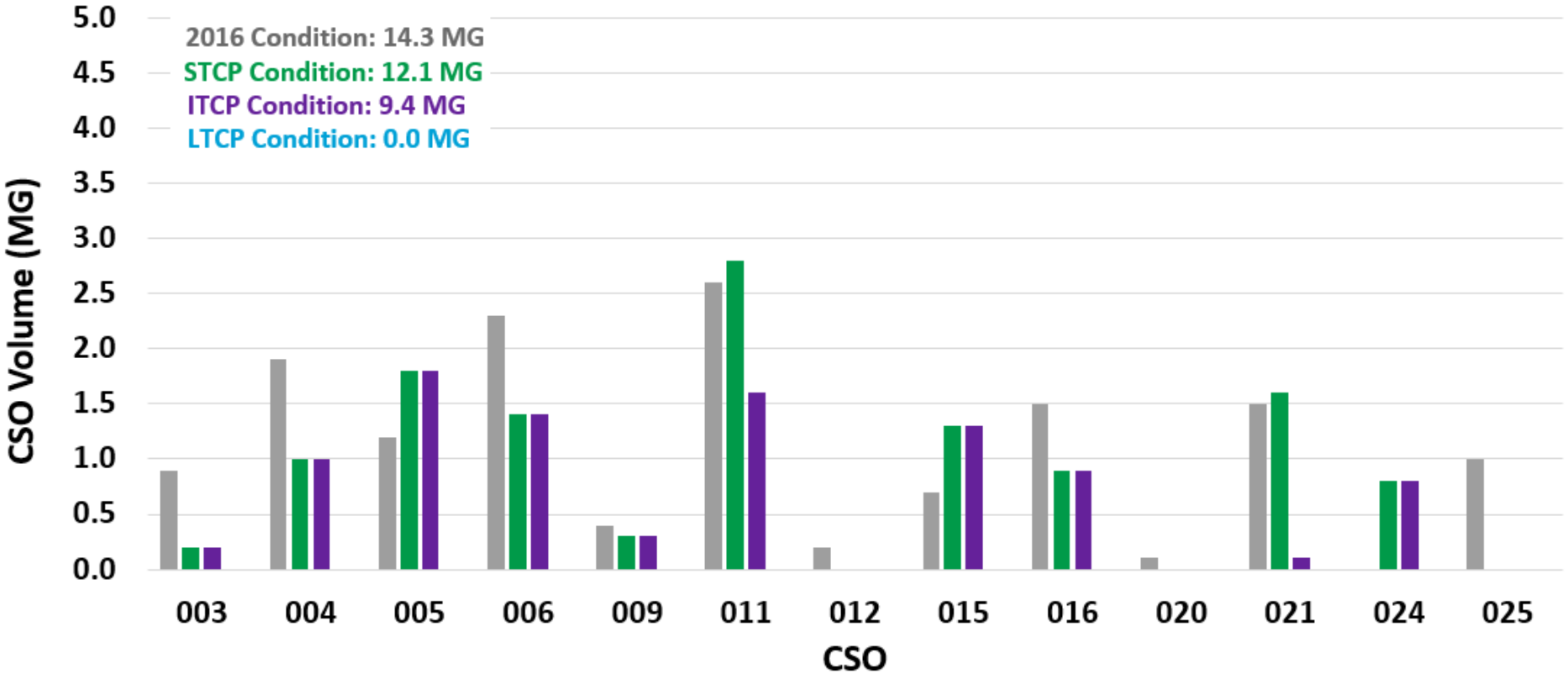
160 MGD

Effluent

Long Term Control Plan

System Performance: 2-year, 6-hour Design Storm

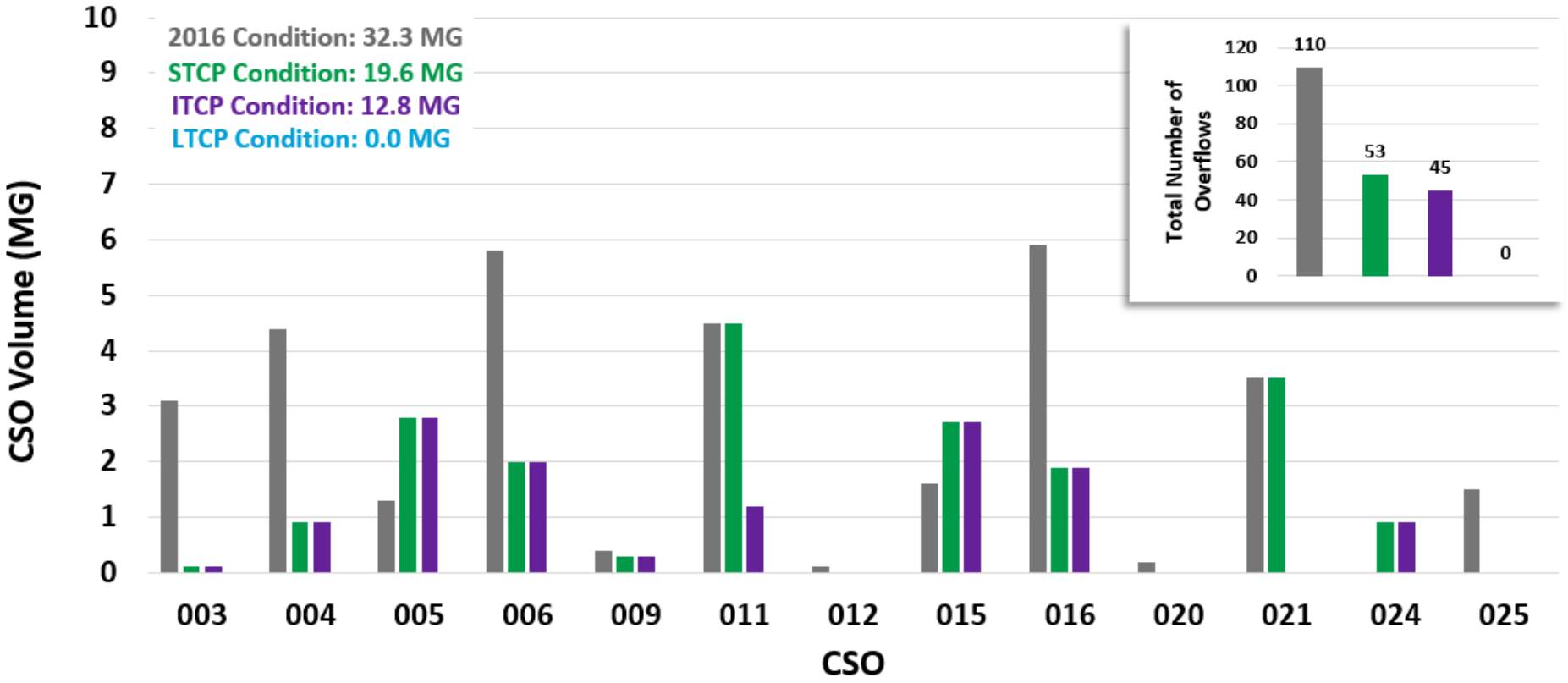
- ITCP Total CSO Volume: **9.4 MG**
- LTCP Total CSO Volume: **0.0 MG**



Long Term Control Plan

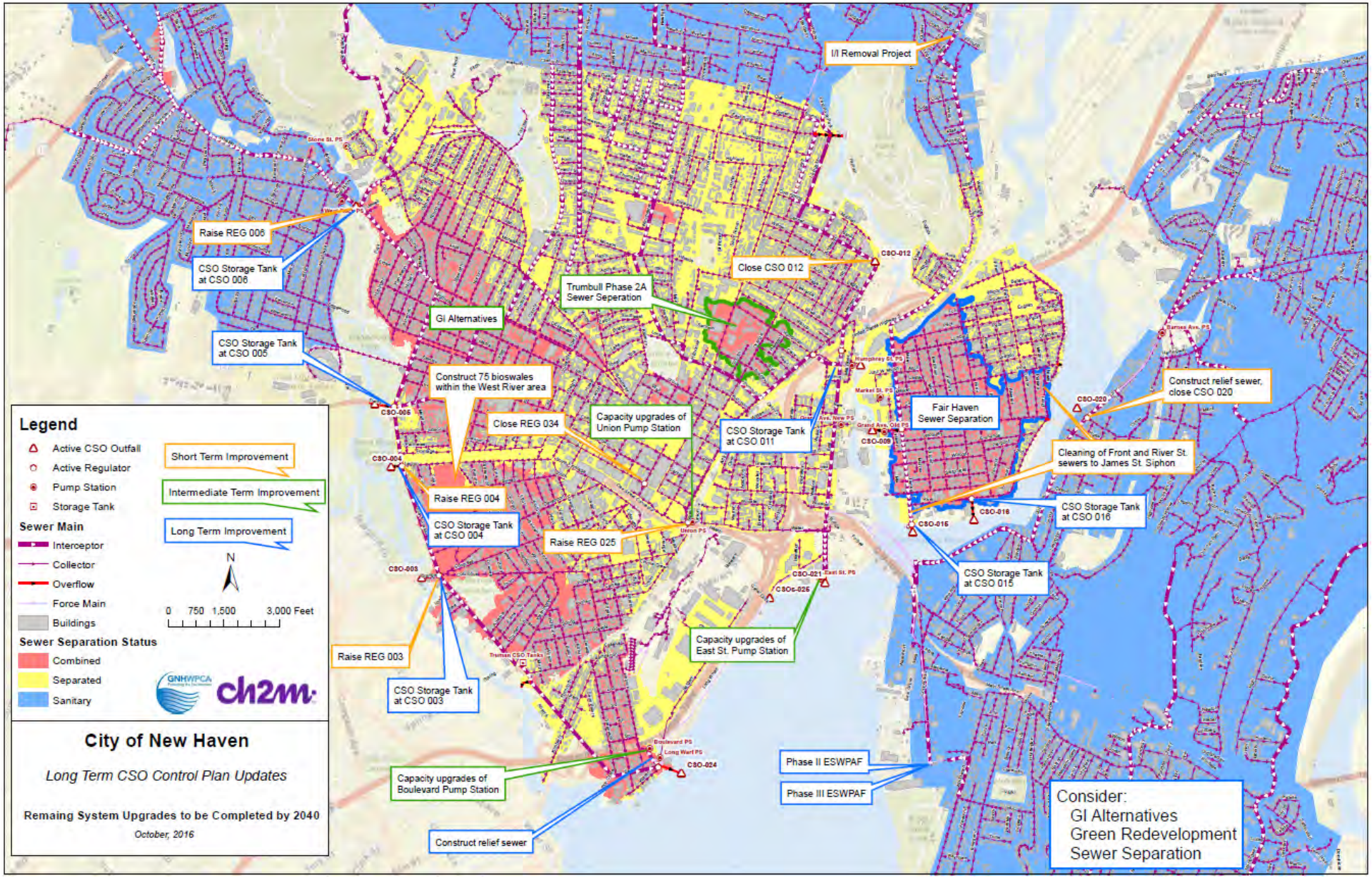
System Performance: Typical Year

- ITCP Total CSO Volume: **12.8 MG**
- LTCP Total CSO Volume: **0.0 MG**



CSO Long Term Control Plan

Components



Evaluate Additional Methods to Minimize CSOs

- Evaluate Green Infrastructure alternatives within the Boulevard sewer tributary area – can they reduce CSOs?
- Do we continue sewer separation in CSO sewersheds?
- Do we need to site CSO storage tanks in the future?

Each decisions will be based on a combination of all solutions evaluated on a sub-sewershed basis

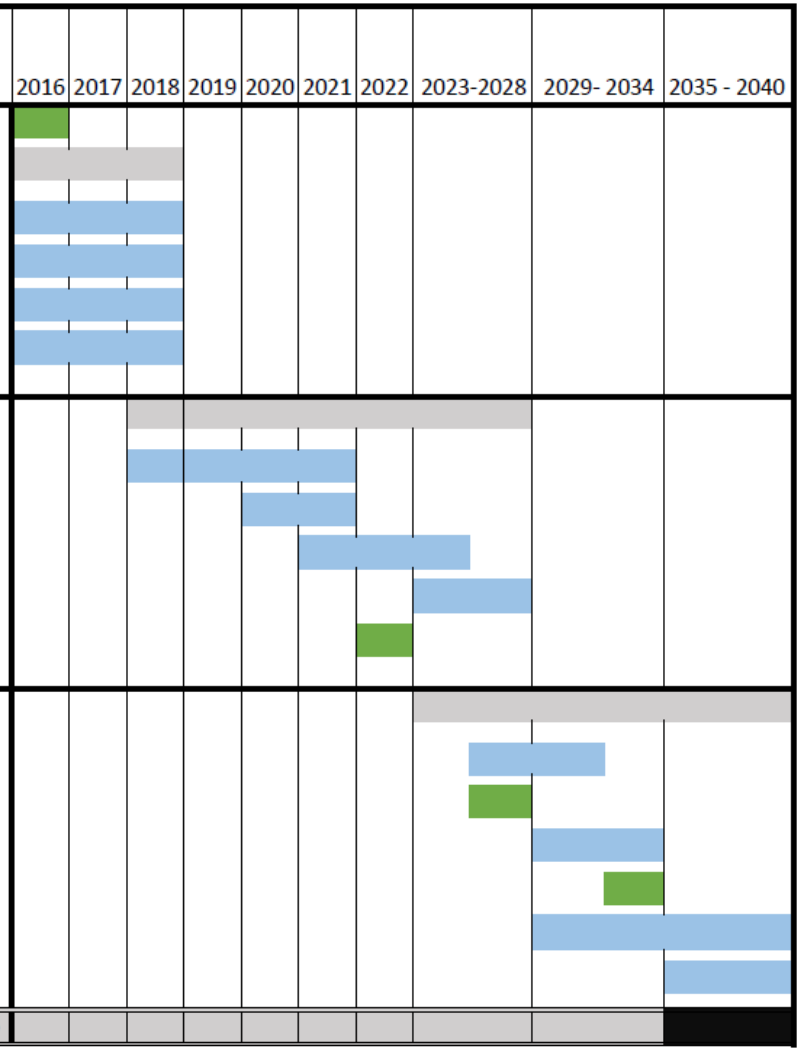
CSO Long Term Control

Project Cost Estimate Basis

- Project Costs are Expressed in 2016 Dollars and Include
  - Construction Cost Estimates
  - Contingency – 20 to 35%
  - Engineering and Administration Allowance - 20%

Implementation Schedule and Project Cost Estimates

CSO LTCP COMPONENTS	Million (2016 $)	Grant %	CWF Grant	NH Loan Share	GNH Loan Share
2016 Long Term Control Plan Update					
Short Term Improvements (2016-2018)	***$ 10.4***				
Regulators 012 and 020 Relief Sewers (CWF 2016-02)	5.4	50%	2.7	1.1	1.6
West River CSO Improvements (CWF 2016-03)	2.5	50%	1.3	0.5	0.8
Regulator 034 Relief Sewer (CWF 2016-05)	1.0	50%	0.5	0.2	0.3
Green Infrastructure Improvements (CWF 2016-07)	1.5	50%	0.8	0.3	0.5
Intermediate Term Improvements (2018-2028)	***$ 99.5***				
Capacity Upgrade of East Street Pump Station	35.0	50%	17.5	7.0	10.5
Yale Campus/Trumbull Street Phase 2A Separation (CWF 2009-04)	12.0	50%	6.0	2.4	3.6
Capacity Upgrade of Union Pump Station	17.0	50%	8.5	3.4	5.1
Capacity Upgrade of Boulevard Pump Station	35.0	50%	17.5	7.0	10.5
2022 Long Term Control Plan Update	0.5	55%	0.3	0.1	0.1
Long Term Improvements (2024-2040)	***$325.0***				
Phase II ESWPAF Wet Weather Capacity Improvements	134.5	40%	53.8	32.3	48.4
2028 Long Term Control Plan Update	0.5	55%	0.3	0.1	0.1
Phase III ESWPAF IFAS/Incinerator Improvements	34.5	23%	8.1	0.0	26.4
2034 Long Term Control Plan Update	0.5	55%	0.3	0.1	0.1
Fair Haven Sewer Separation	95.0	50%	47.5	19.0	28.5
CSO Storage Tanks/Separation/GI Alternatives	60.0	50%	30.0	12.0	18.0
Elimination of CSOs during a 2-year, 6 hr storm	**$434.9**	**45%**	**$194.9**	**$85.4**	**$154.5**



We Stay Engaged With Our Community


Facility Tours


Hamden Middle School Tour


Peabody Museum Public Outreach


Coats for Tots


Kayaking West River

Please Stay Engaged with us!

- Additional Information and Periodic Updates: www.gnhwpca.com
- GNHWPCA Board Meetings
- Community Activities
- Community Environmental Benefit Fund
- Contact Us – Engineering Department
  Telephone: (203) 466-5280 ext 321
- 24 hour Emergency number: (203) 466-5260
- LTCP Question Submission Deadline – March 15, 2017
  email to: Engineering@GNHWPCA.com