



North Hudson Sewerage Authority Long Term Control Plan

Public Meeting



11.18.2019

Agenda

- Methodology
 - 4 Overflows/Year
 - 85% Capture
- 4 Overflows/Year Analysis
 - Adams Street WWTP Service Area Scenarios
 - River Road WWTP Service Area Scenarios
- 85% Percent Capture Analysis
 - Adams Street WWTP Service Area Scenarios
 - River Road WWTP Service Area Scenarios
- Summary
 - Adams Street WWTP Service Area
 - River Road WWTP Service Area

Methodology

- Requirements: Permit Compliance can be achieved in two methods
 - Reduce annual overflows to 4 per year systemwide
 - Capture 85% of wet weather volume annually

Methodology

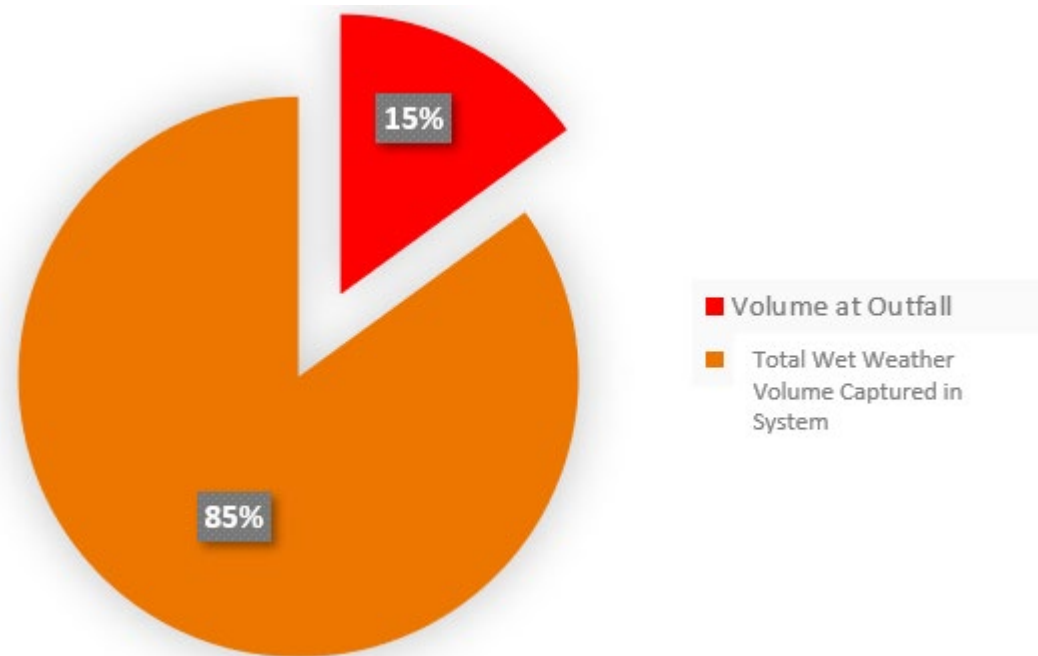
4 Overflows Per Year Systemwide

- Each outfall currently has a range of 12 to 60 overflows per year, ranging in volume.
- To achieve permit compliance through this plan, there is a maximum of 4 overflows allotted at all outfalls per year per service area.

Methodology

Percent Capture

- Percent Capture =
$$\frac{\text{Total Wet Weather Volume Captured at WWTP (MG)}}{\text{Total Wet Weather Volume in System, (Volume at WWTP plus Volume at Outfalls)(MG)}}$$
- This method analyzes the system as a whole as opposed to by drainage basin, potentially reducing the need for extensive construction in one drainage basin over another
- Percent Capture Goal: 85%



Analysis in Adams Street WWTP Service Area
4 Overflows Per Year Systemwide

Methodology

4 Overflows Per Year Systemwide – Adams Street WWTP Service Area

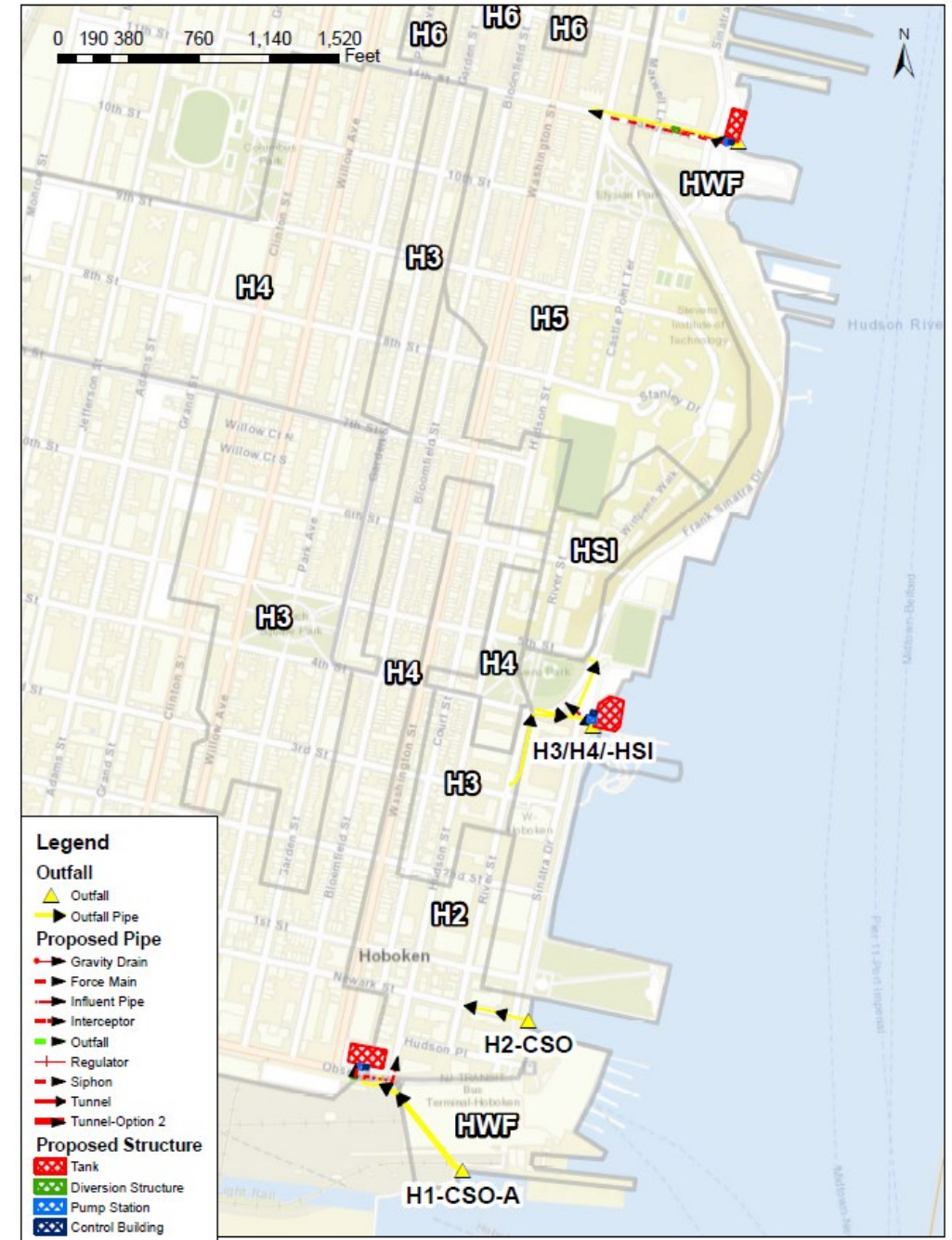
- Each outfall currently has a range of 12 to 60 overflows per year, ranging in volume.
- To achieve permit compliance through this plan, there is a maximum of 4 overflows allotted at all outfalls per year.
- This would require an increase in capacity in all drainage basins whether through storage tanks, pump stations to convey flow back to the plant, and/or additional piping.

Drainage Basin	Outfall	Current Estimated Number of Overflows Per Year
H1	002A	33
H3/H4/HSI	005A	45
H5	006A	16
H6/H7	008A	15
18st. Pump Station	012A	12
W1234	013A	60
W5	015A	24

Analysis

4 Overflows Per Year Systemwide-Adams Street

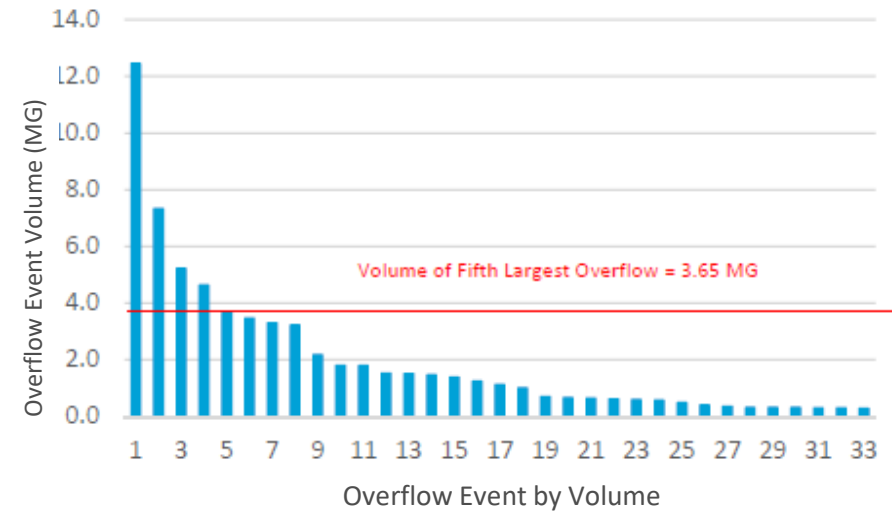
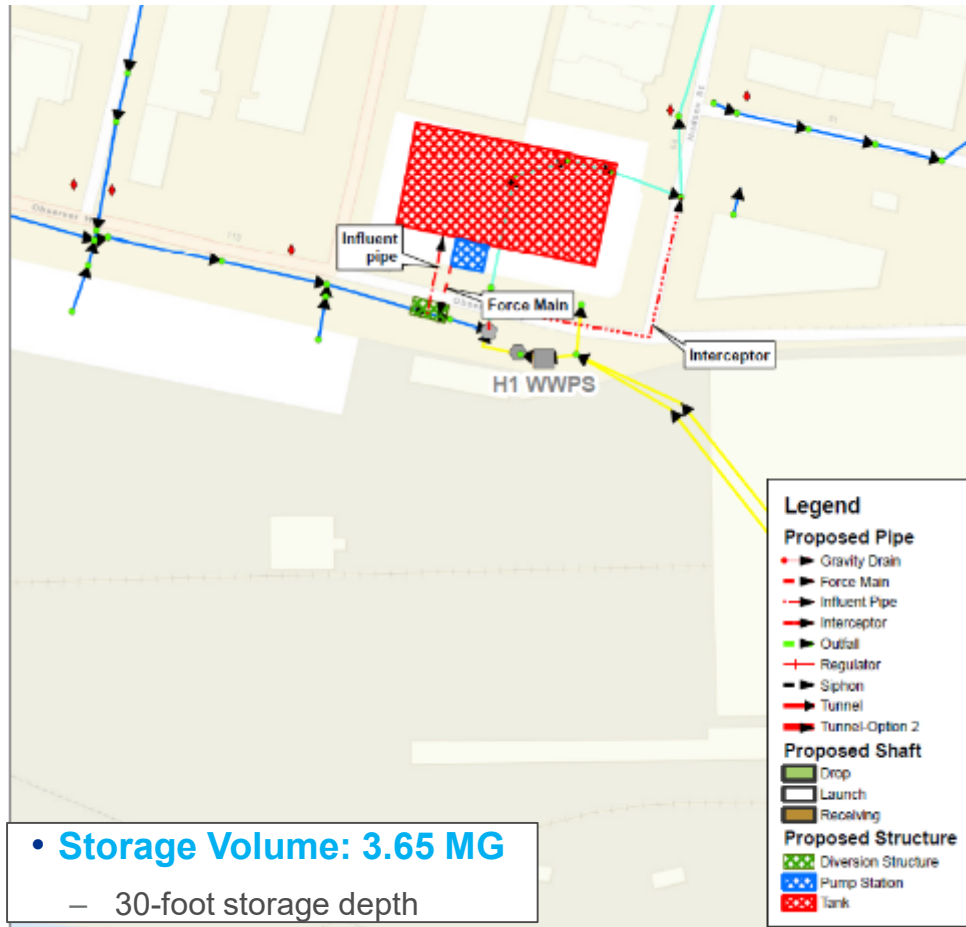
- To achieve no more than 4 overflows in the system annually, the storage tanks and red piping shown in Hoboken may be required
- These storage tanks would capture volume during a rainstorm. After the storm, the volume would be pumped to the treatment plant
- Yellow piping is the existing outfall pipe and outfall structure



Analysis

4 Overflows Per Year Systemwide-Adams Street

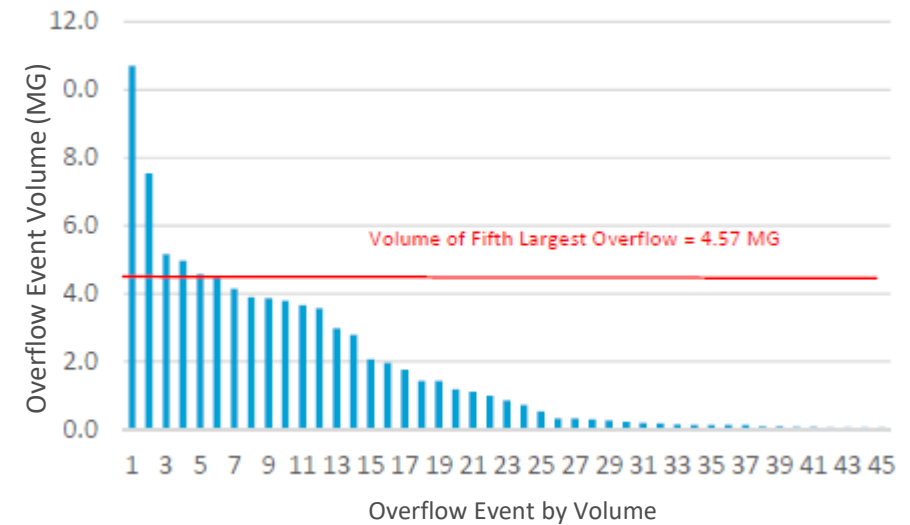
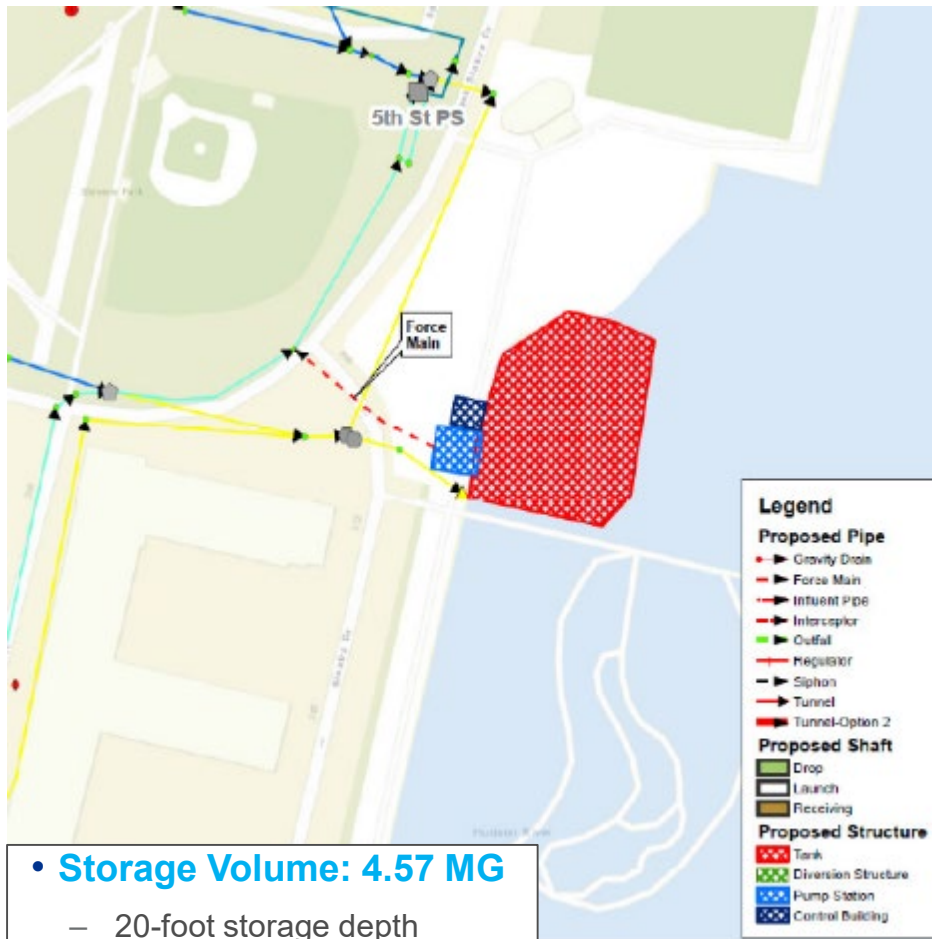
Example: CSO Storage Structure at Lot at Observer Highway and Hudson Street



Analysis

4 Overflows Per Year Systemwide-Adams Street

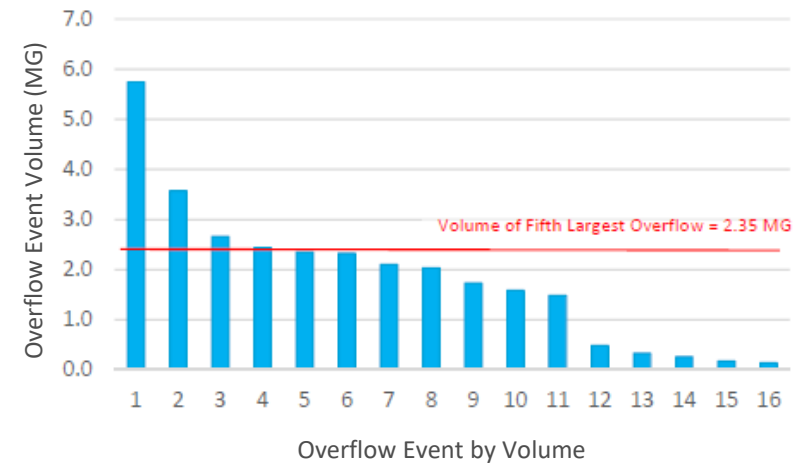
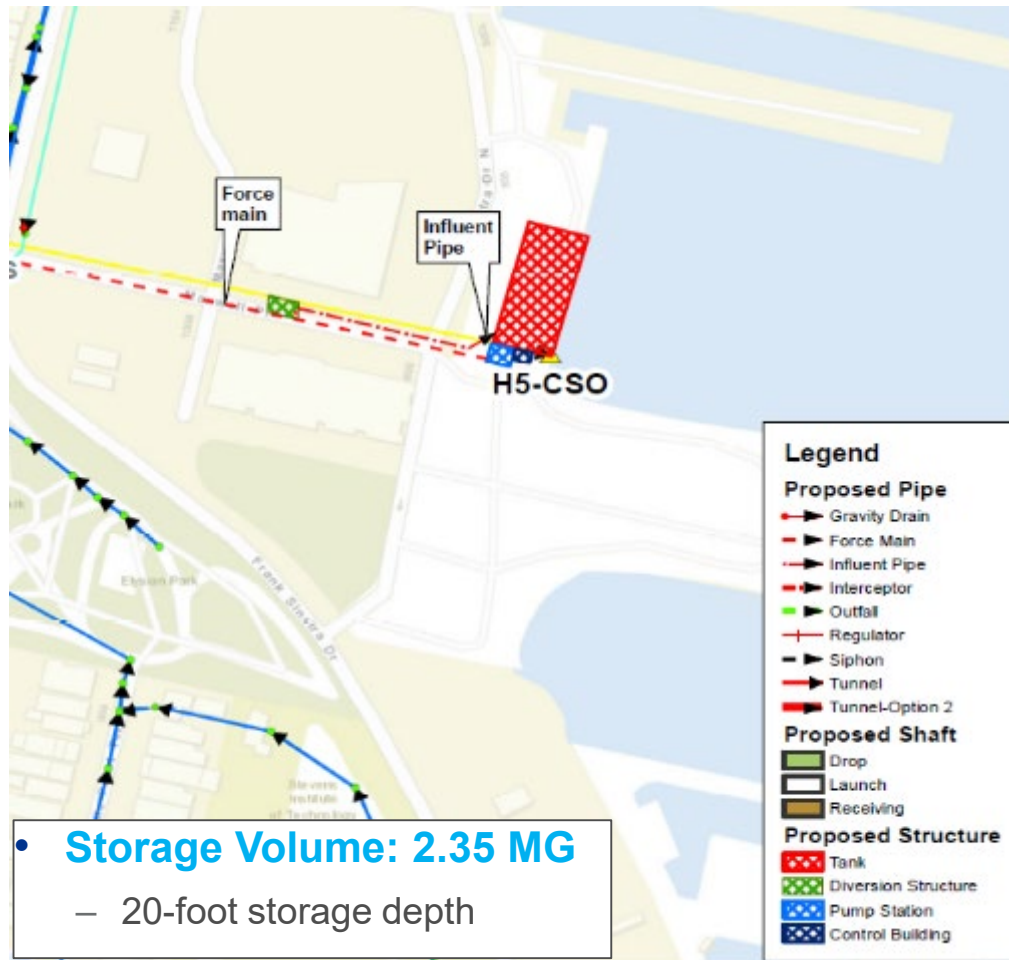
Example: In-Water CSO Storage Structure Near Pier C Park



Analysis

4 Overflows Per Year Systemwide-Adams Street

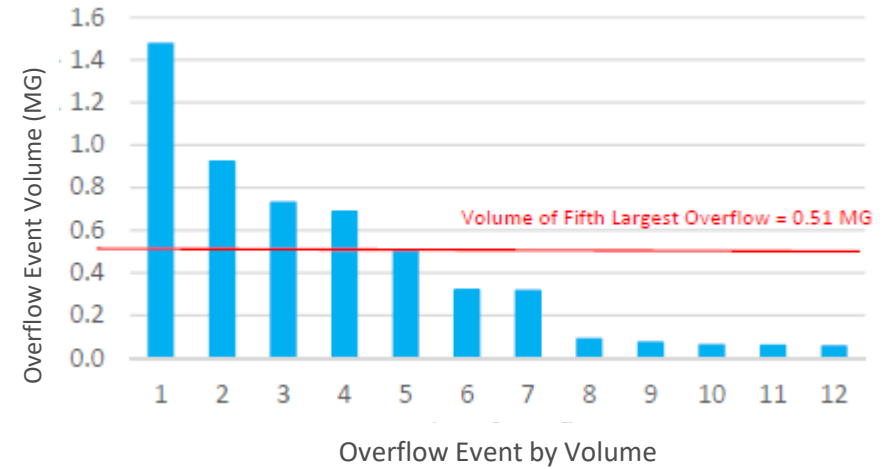
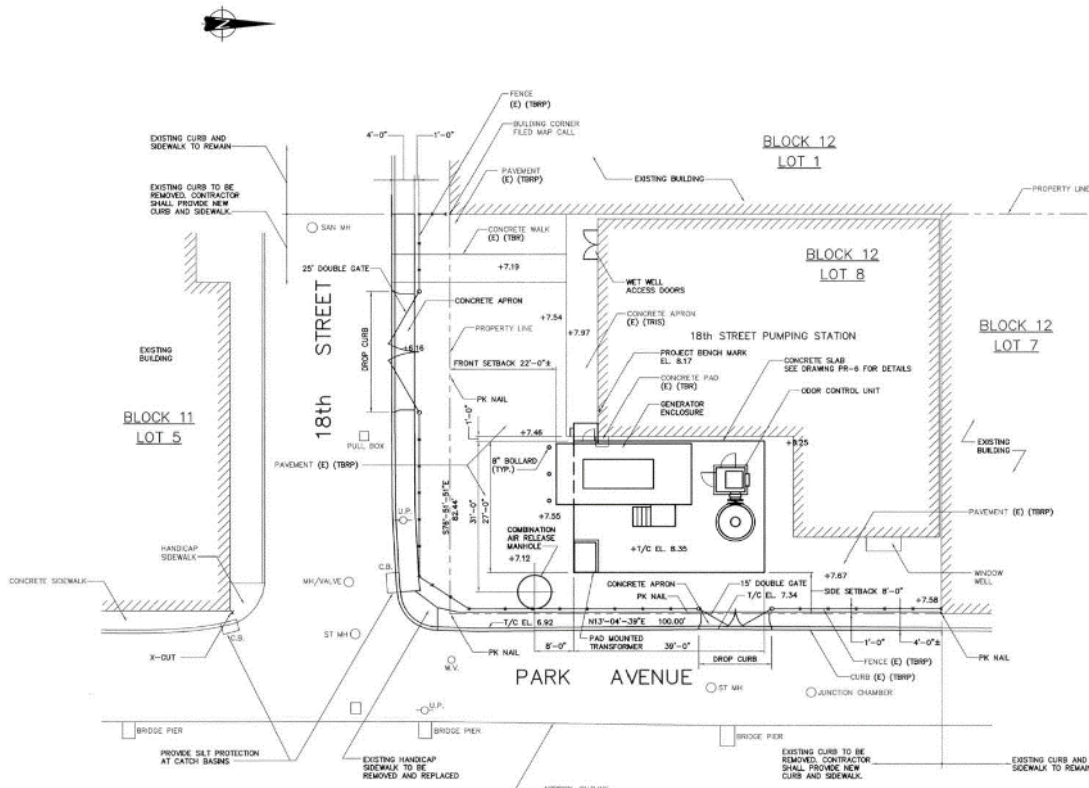
Example: CSO Storage Structure Near Maxwell Place



Analysis

4 Overflows Per Year Systemwide-Adams Street

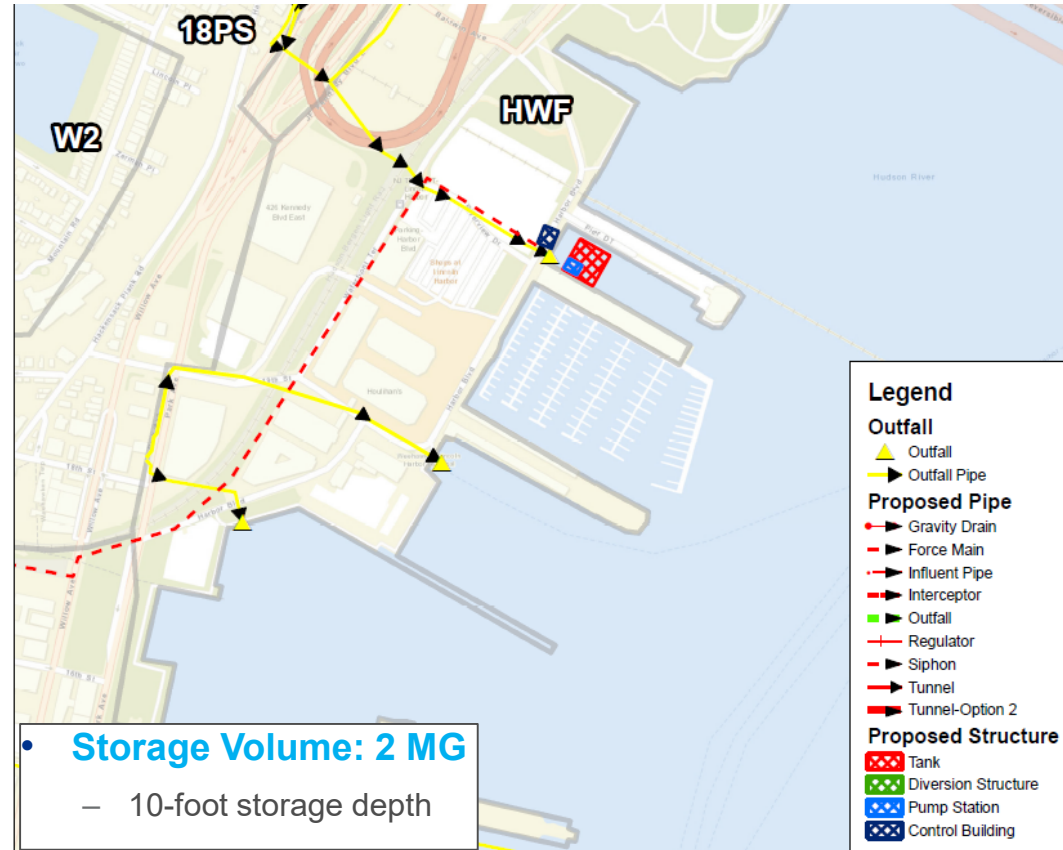
Example: Increase Capacity of 18th Street PS from 5 mgd to 18 mgd



Analysis

4 Overflows Per Year Systemwide-Adams Street

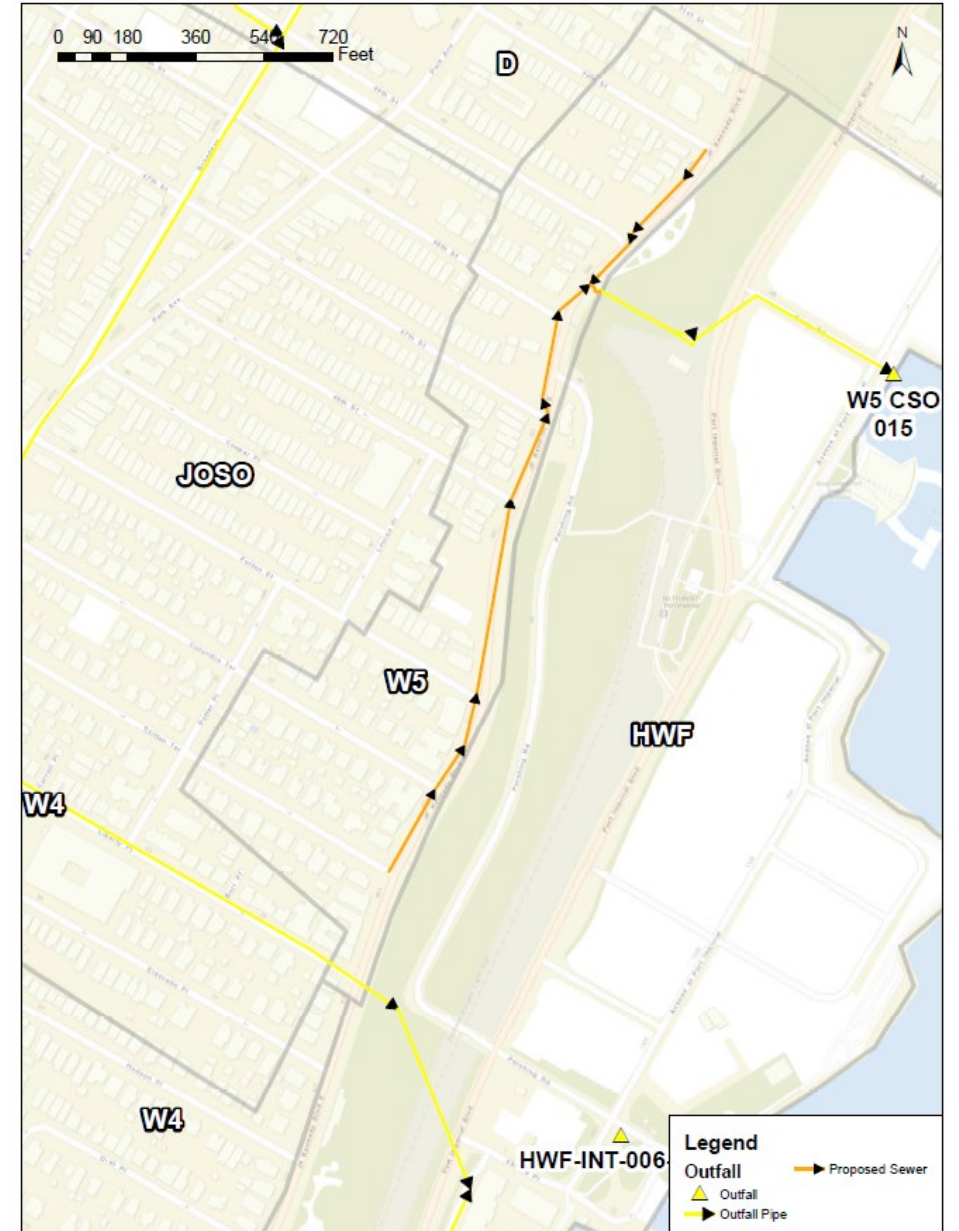
Example: New 72" Siphon Along Park Avenue and In-Water Storage at the Outfall



Analysis

4 Overflows Per Year Systemwide-Adams Street

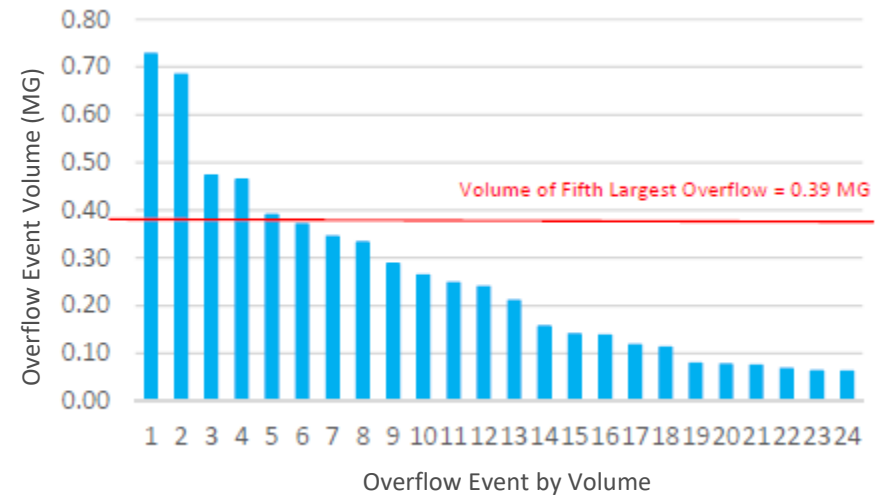
- To achieve no more than 4 overflows in the system annually, in addition to the proposed storage tanks in Hoboken and the piping, storage tank, and pump station upgrades in Weehawken, the proposed piping in Weehawken, the proposed piping in Weehawken may also be required
- Yellow piping is the existing outfall pipe and outfall structure



Analysis

4 Overflows Per Year Systemwide-Adams Street

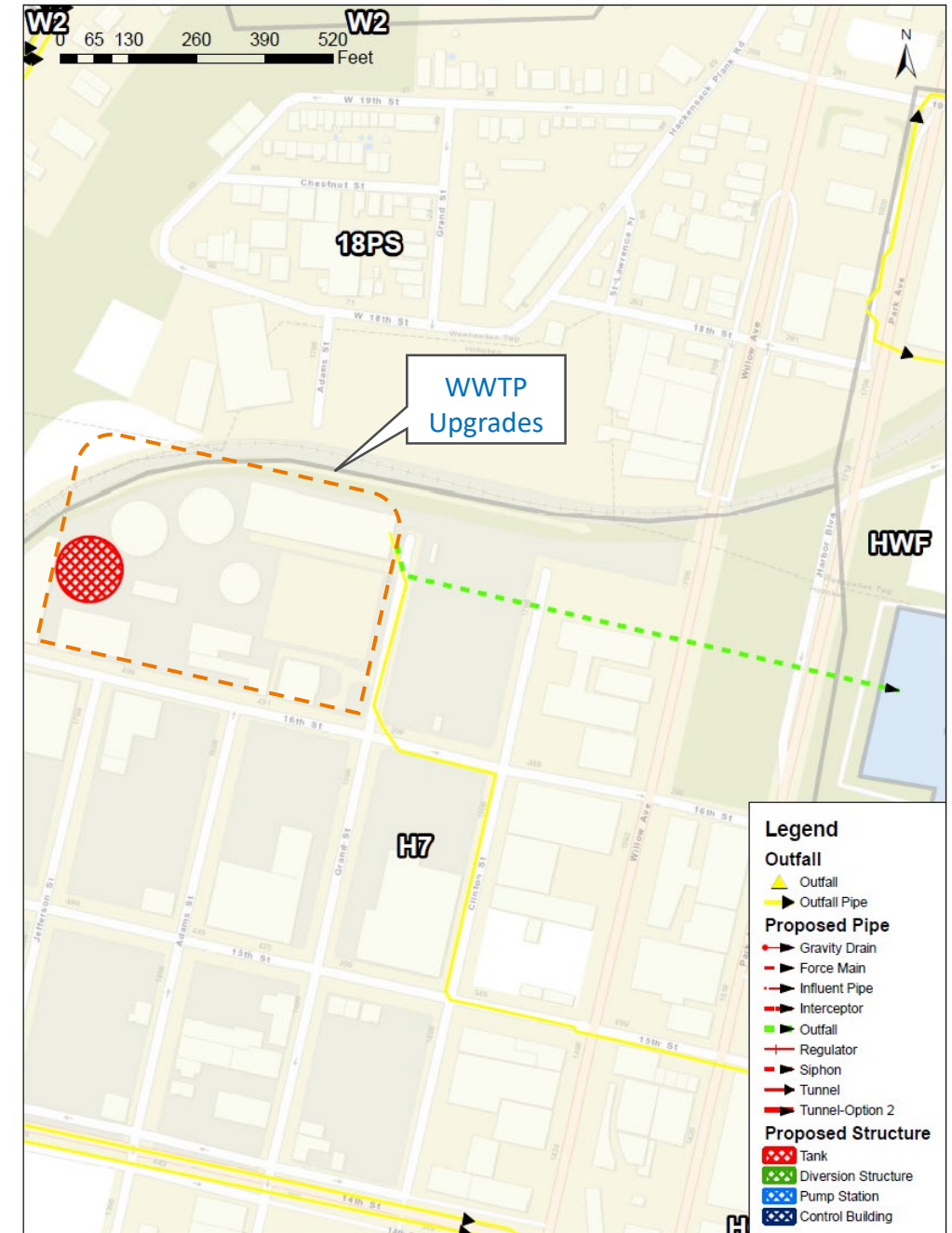
Example: Construct High Level Storm Sewer Along Blvd East



Analysis

4 Overflows Per Year Systemwide-Adams Street

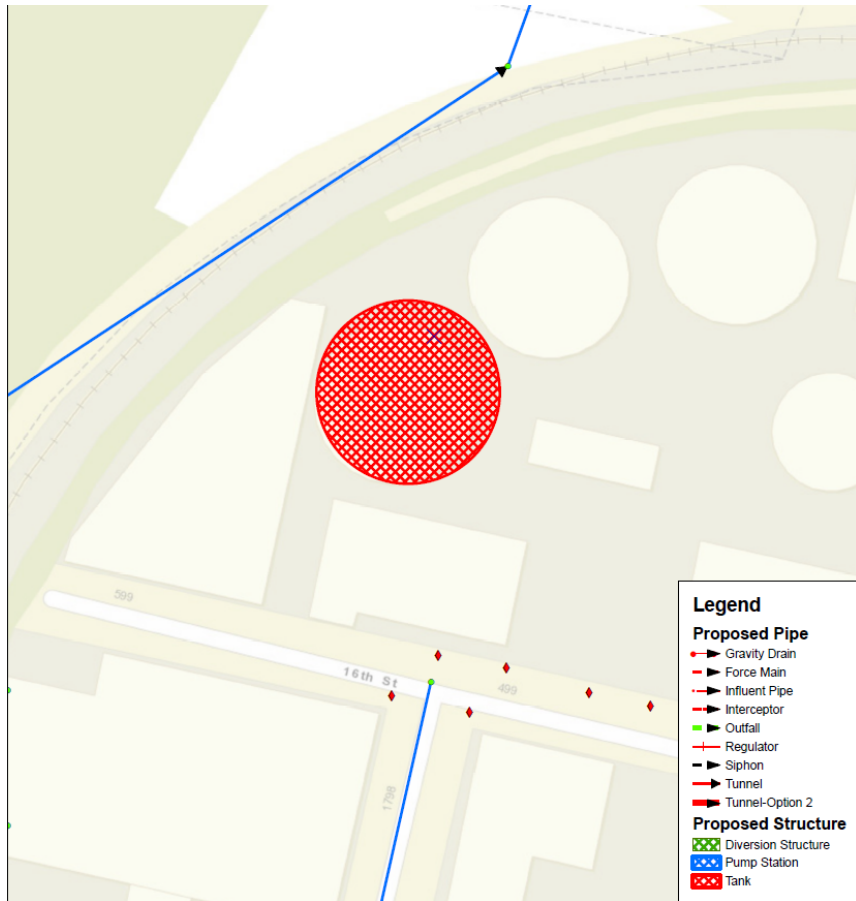
- To achieve no more than 4 overflows in the system annually, in addition to the proposed upgrades in Hoboken, Weehawken and Union City, the following upgrades at the WWTP may be required
- Yellow piping is the existing outfall pipe and outfall structure



Analysis

4 Overflows Per Year Systemwide-Adams Street

Example: Replace Existing Trickling Filter with a 20 MG CSO Storage Tank

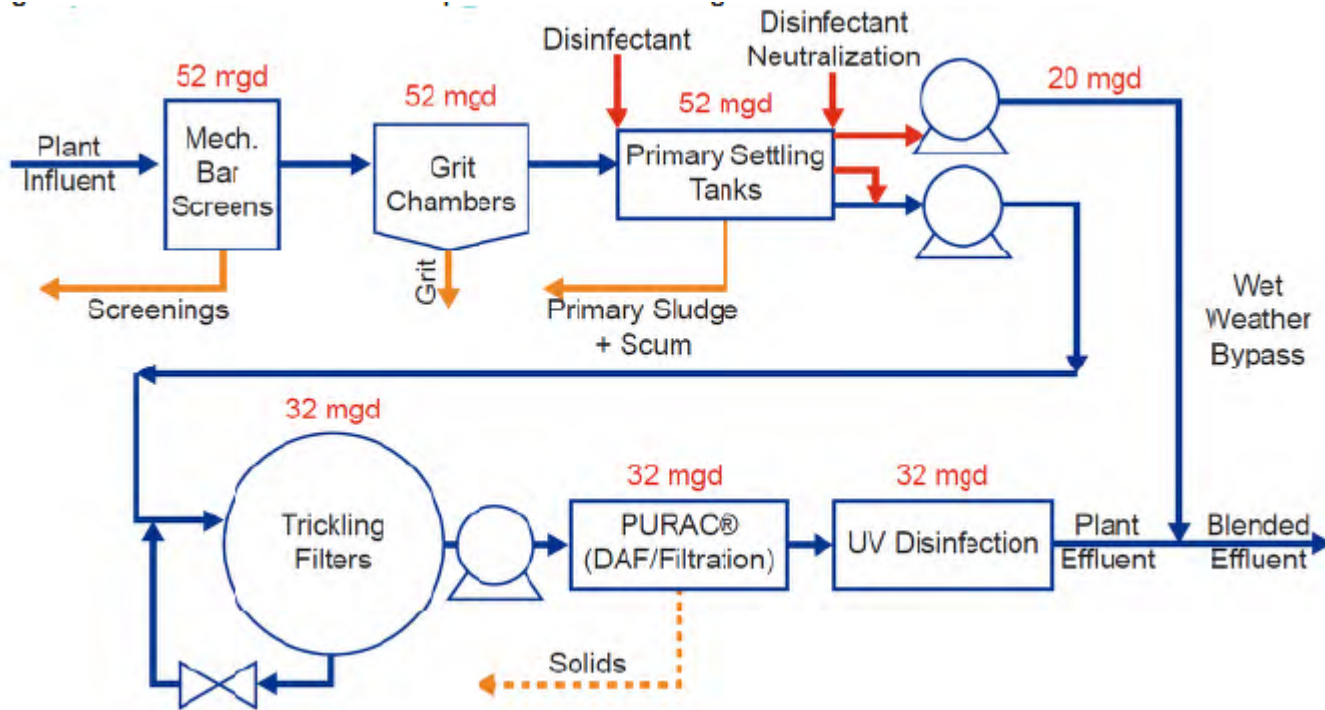


- 118' Diameter
- Based on preliminary geotechnical analysis, the maximum available depth below ground surface is approximately 92 ft to avoid rock excavation
- Based on the available dimensions, the volume below ground is approximately 7 MG
- This would require approximately 160 ft above ground for 13 MG of storage at 20 MG total

Analysis

4 Overflows Per Year Systemwide-Adams Street

Example: Increase Capacity of WWTP Through Side Stream Treatment



- Recent regulations have approved side stream treatment as a form of treatment during wet weather to meet effluent standards.
- This diagram represents treatment during wet weather, where the maximum capacity would be 52 mgd

Analysis

4 Overflows Per Year Systemwide-Adams Street

Example: Construct New Plant Outfall



- To handle upgrade capacity of WWTP, a new WWTP outfall must be installed.
- This would run along 17th street at an estimated diameter of 66". This diameter is dependent on the slope of the pipe and would be finalized in design.

Analysis

4 Overflows Per Year Systemwide-Adams Street

- In summary, to achieve no more than 4 overflows in the system annually, the following projects may be required in tandem:

Drainage Basin	Outfall	Requirements for 4 overflows/year
H1	002A	3.65 MG Underground Storage Tank at Observer Highway and Hudson Street
H3/H4/HSI	005A	4.67 MG In-Water Storage Tank
H5	006A	2.35 MG In-Water Storage Tank at Maxwell Place
18PS	012A	Increase Capacity of Pump Station at 18 th Street
W1234	013A	<ul style="list-style-type: none">• 2 MG In-Water Storage Tank at W1234 Outfall• Construct 72" Parallel Siphon Along Park Avenue back to Adams Street WWTP
W5	015A	Construct High Level Storm Sewer along Boulevard East
Adams Street WWTP	001A	Construct Larger Outfall Increase capacity by 20 MGD with side stream treatment Replace trickling filter with 20 MG storage tank

Analysis in River Road WWTP Service Area

4 Overflows Per Year Systemwide

Analysis

4 Overflows Per Year Systemwide-River Road WWTP Service Area

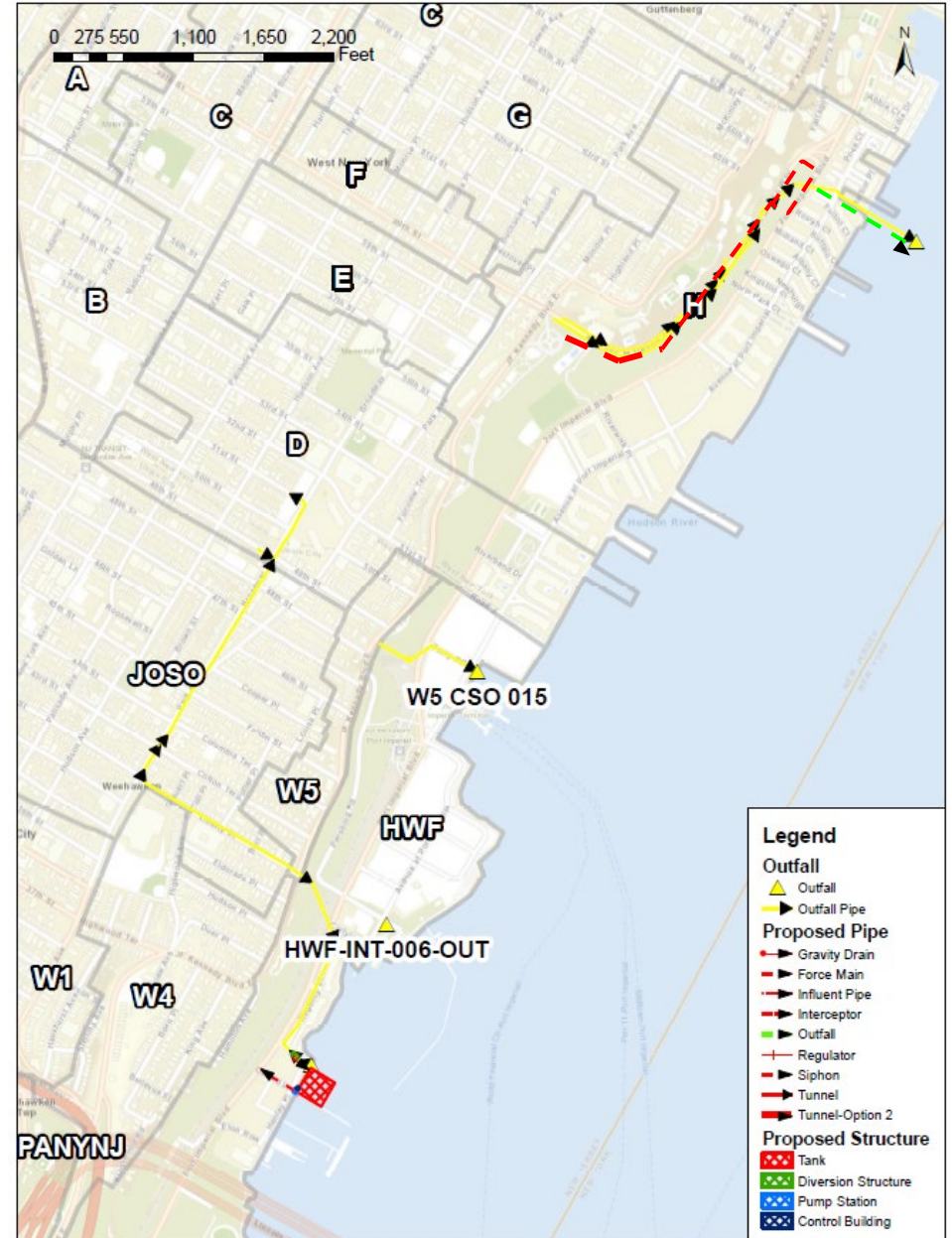
- Each outfall currently has a range of 48 to 53 overflows per year, ranging in volume.
- To achieve permit compliance through this plan, there is a maximum of 4 overflows allotted at all outfalls per year.
- This would require an increase in capacity in all drainage basins whether through storage tanks, pump stations to convey flow back to the plant, or additional piping.

Drainage Basin	Outfall	Current Estimated Number of Overflows Per Year
JOSO	002A	48
WNY1	005A	53

Analysis

4 Overflows Per Year Systemwide-River Road

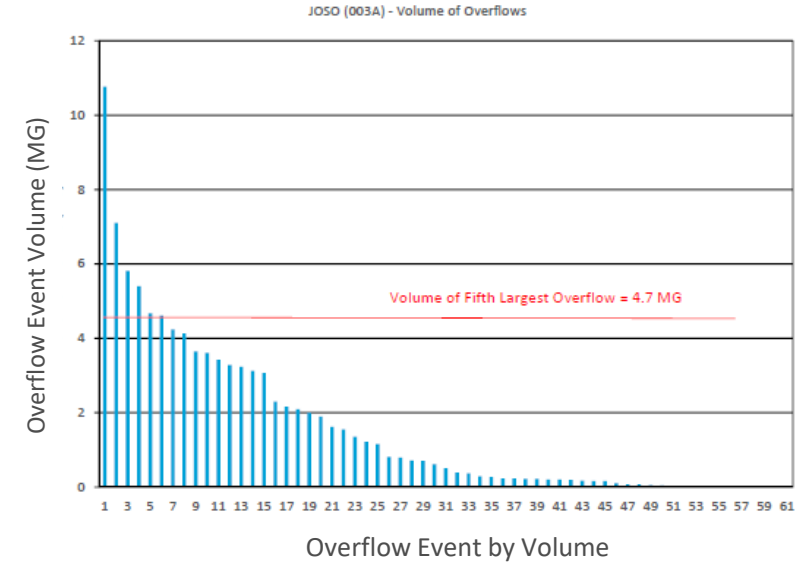
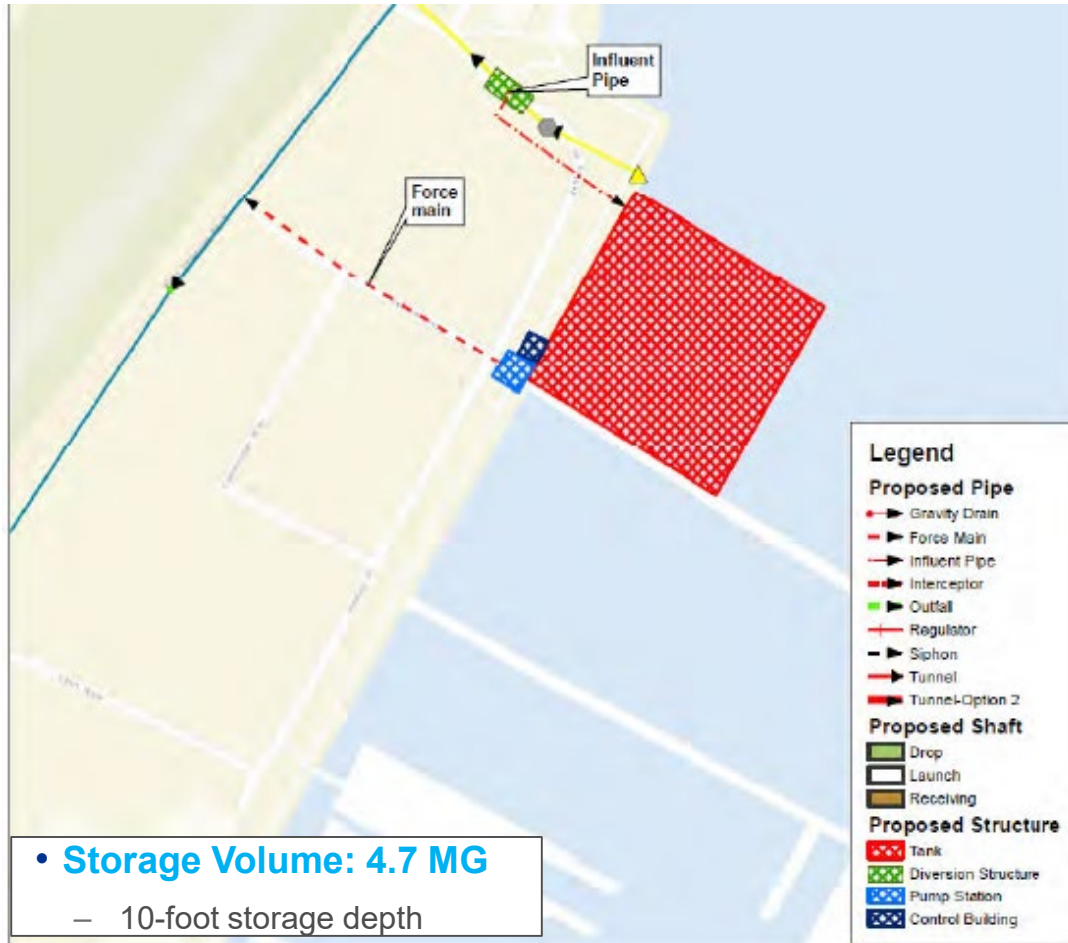
- To achieve no more than 4 overflows in the system annually, the storage tanks shown in the service area may be required
- These storage tanks would capture volume during a rainstorm. After the storm, the volume would be pumped to the treatment plant



Analysis

4 Overflows Per Year Systemwide-River Road

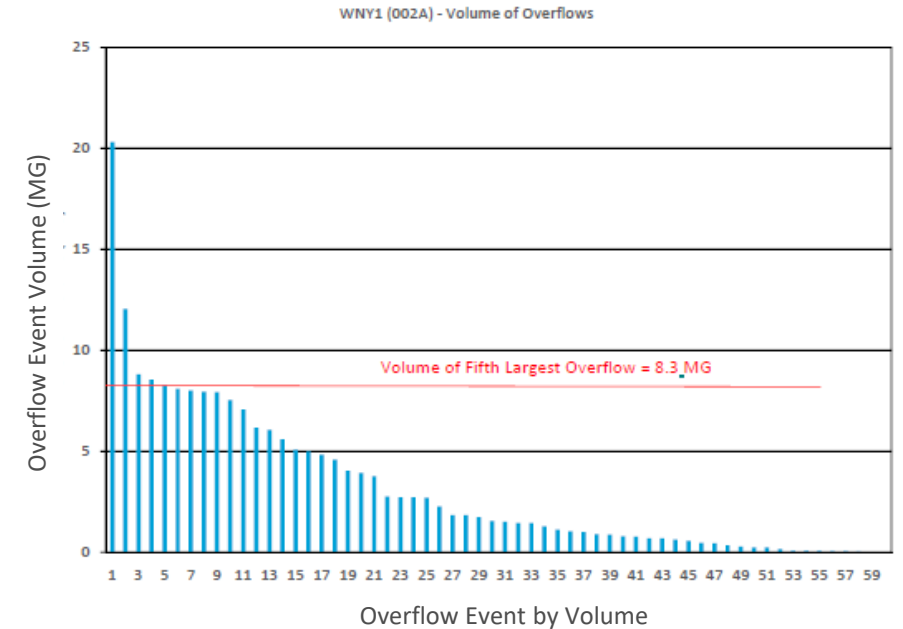
Example: In-Water CSO Storage Structure in Hudson River



Analysis

4 Overflows Per Year Systemwide-River Road

Example: Linear Storage Tunnel at Anthony M. Defino Way, Treatment and Parallel Outfall



(Reduces overflows to 0)

Analysis

4 Overflows Per Year Systemwide-River Road

- In summary, to achieve no more than 4 overflows in the system annually, the following projects may be required in tandem:

Drainage Basin	Outfall	Requirements for 4 overflows/year
JOSO	002A	4.7 MG In-Water Storage Tank
WNY1	001A	-Construct 8.3 MG Tunnel and Treatment on Anthony M. Defino Way -Construct Parallel Outfall

Analysis in Adams Street WWTP Service Area

Percent Capture

Analysis

Percent Capture – Adams Street WWTP

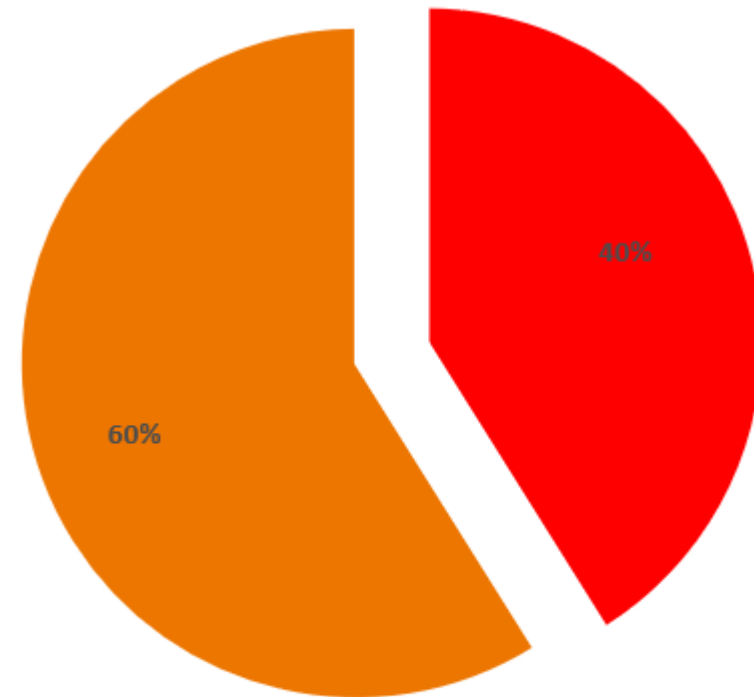
- Two main elements to maximizing the percent capture of the Adams Street service area:
 - Maximize the capacity of the Adams Street WWTP either through treatment processes or storage
 - Minimize the amount of volume at the outfalls by diverting to the WWTP

Analysis

Percent Capture – Adams Street

Including the control methods within H6/H7 and high level storm sewer in W5, current Percent Capture is **60%**

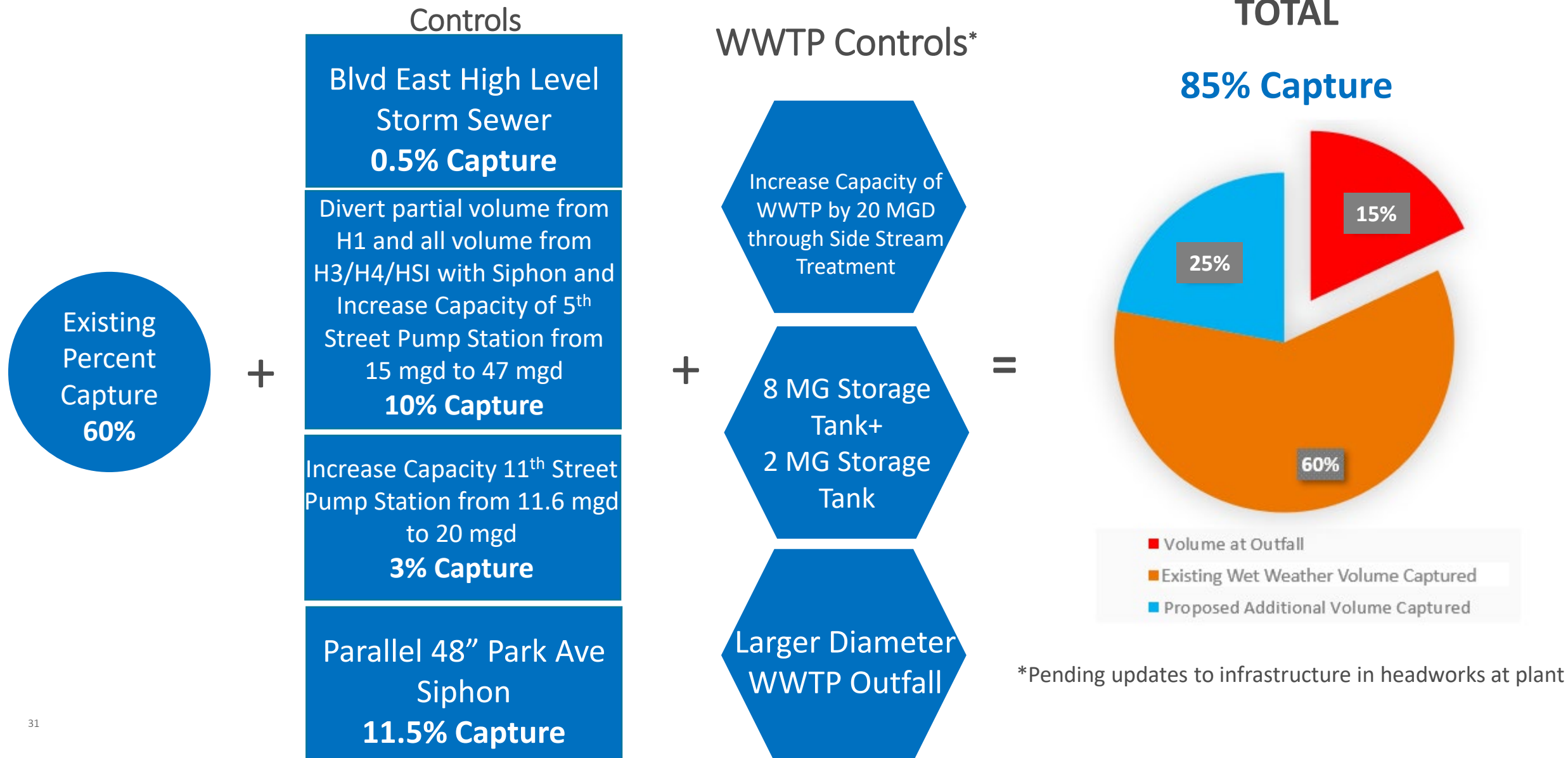
	Existing Overflow Volume in Typical Year, MG
H1 Outfall	45
H3/H4 Outfall	78
H5 Outfall	24
18PS Outfall	5
W1234 Outfall	243



- Volume at Outfall
- Total Wet Weather Volume Captured in System

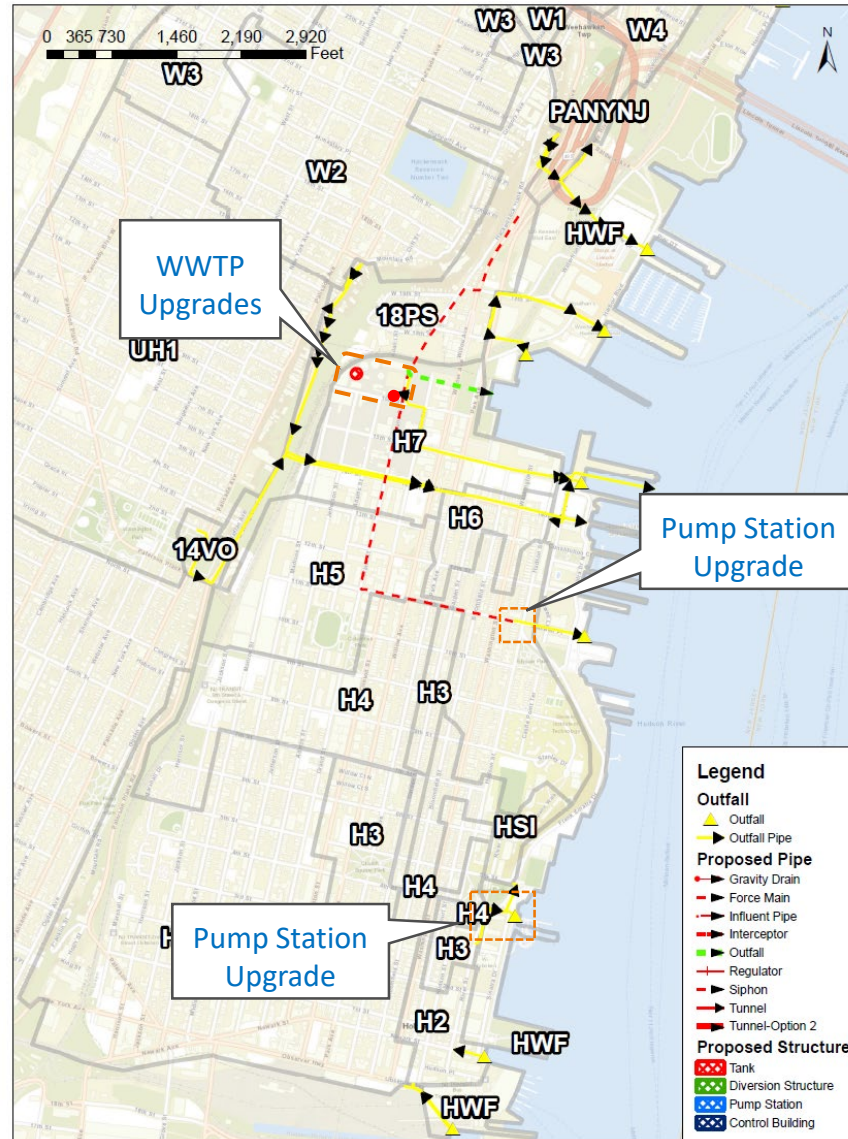
Analysis

Percent Capture – Adams Street Scenario 1:



Analysis

Percent Capture – Adams Street



Analysis

Percent Capture – Adams Street

Scenario 2:

Collection System Controls

Divert partial volume from H1 and all volume from H3/H4/HSI with Siphon and Increase Capacity of 5th Street Pump Station from 15 mgd to 47 mgd
10% Capture

1.5 MG Underground Storage at H1
2% Capture

Parallel 42" Park Ave Siphon
8.5% Capture

1.3 MG In-Water CSO Storage Tank at W1234
4% Capture

WWTP Controls*

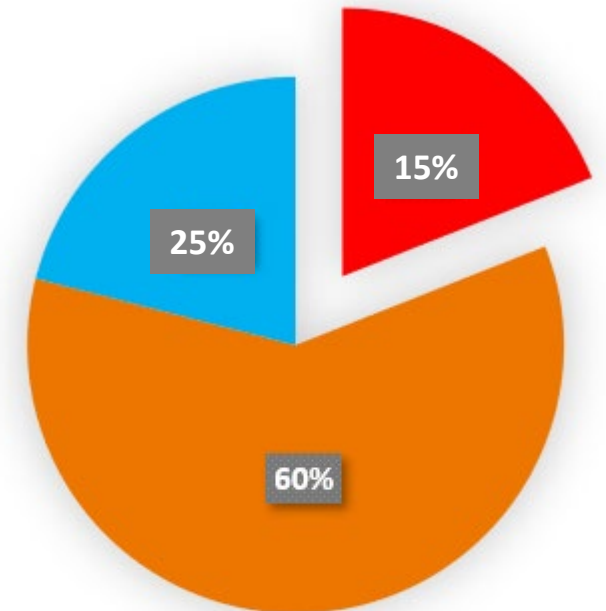
Increase Capacity of WWTP by 20 MGD through Side Stream Treatment

8 MG Storage Tank

Larger Diameter WWTP Outfall

TOTAL

85% Capture



■ Volume at Outfall
■ Existing Wet Weather Volume Captured
■ Proposed Additional Volume Captured

*Pending updates to infrastructure in headworks at plant

Existing Percent Capture
60%

+

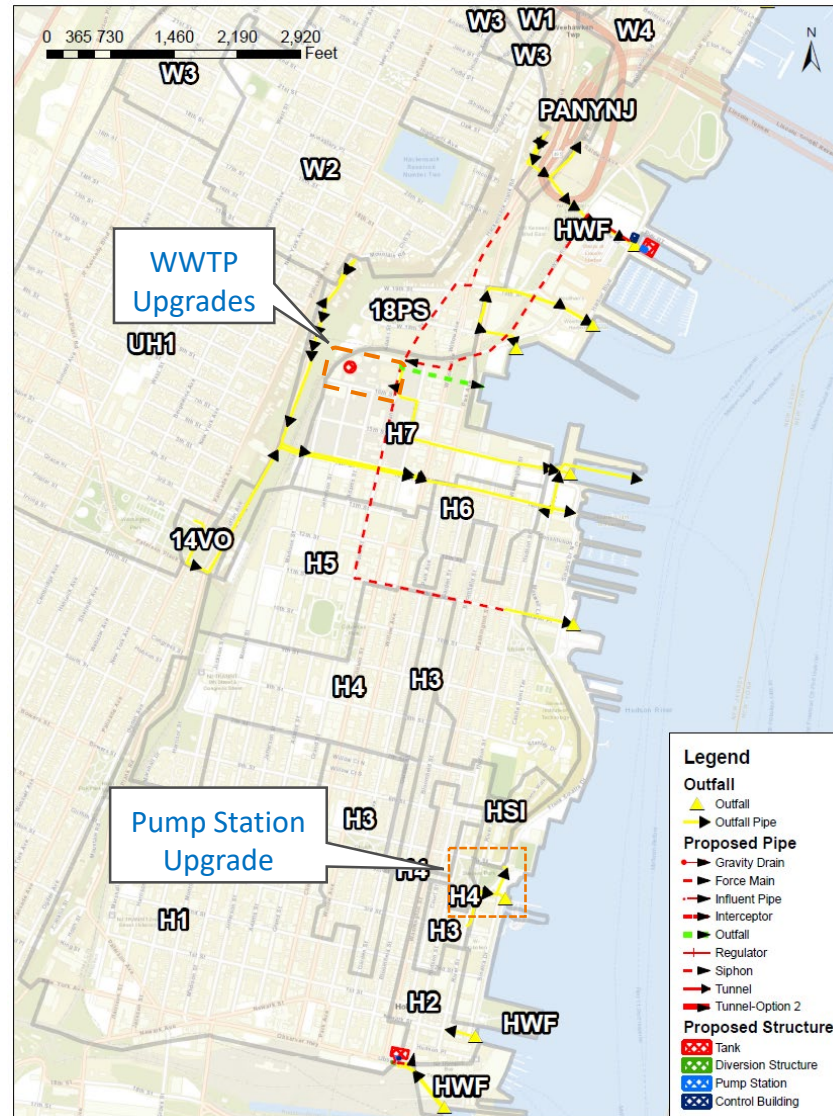
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Bldv East High Level Storm Sewer
0.5% Capture

Analysis

Percent Capture – Adams Street



Analysis

Percent Capture – Adams Street

Scenario 3:

Collection System Controls

Bldv East High Level Storm Sewer
0.5% Capture

H1 Storage-7 MG
4% Capture

H5 Storage-4 MG
2% Capture

72" Park Ave Siphon
19.5% Capture

WWTP Controls*

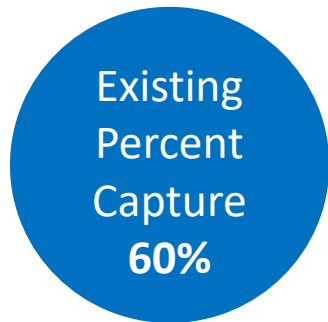
Increase Capacity of WWTP by 20 MGD through Side Stream Treatment

10 MG Storage Tank

Larger Diameter WWTP Outfall

TOTAL

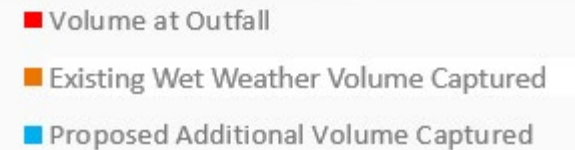
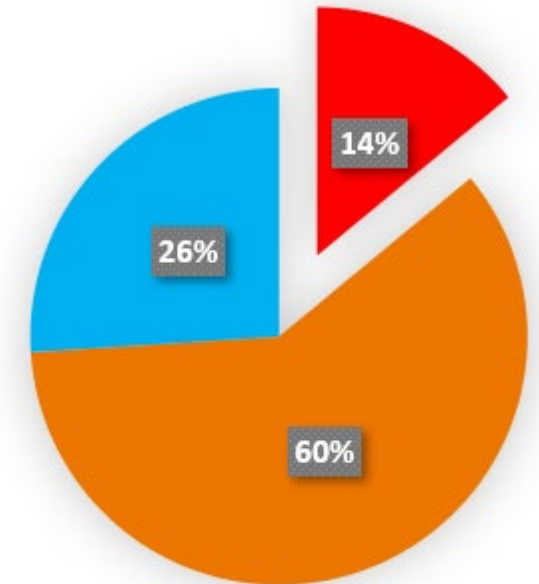
86% Capture



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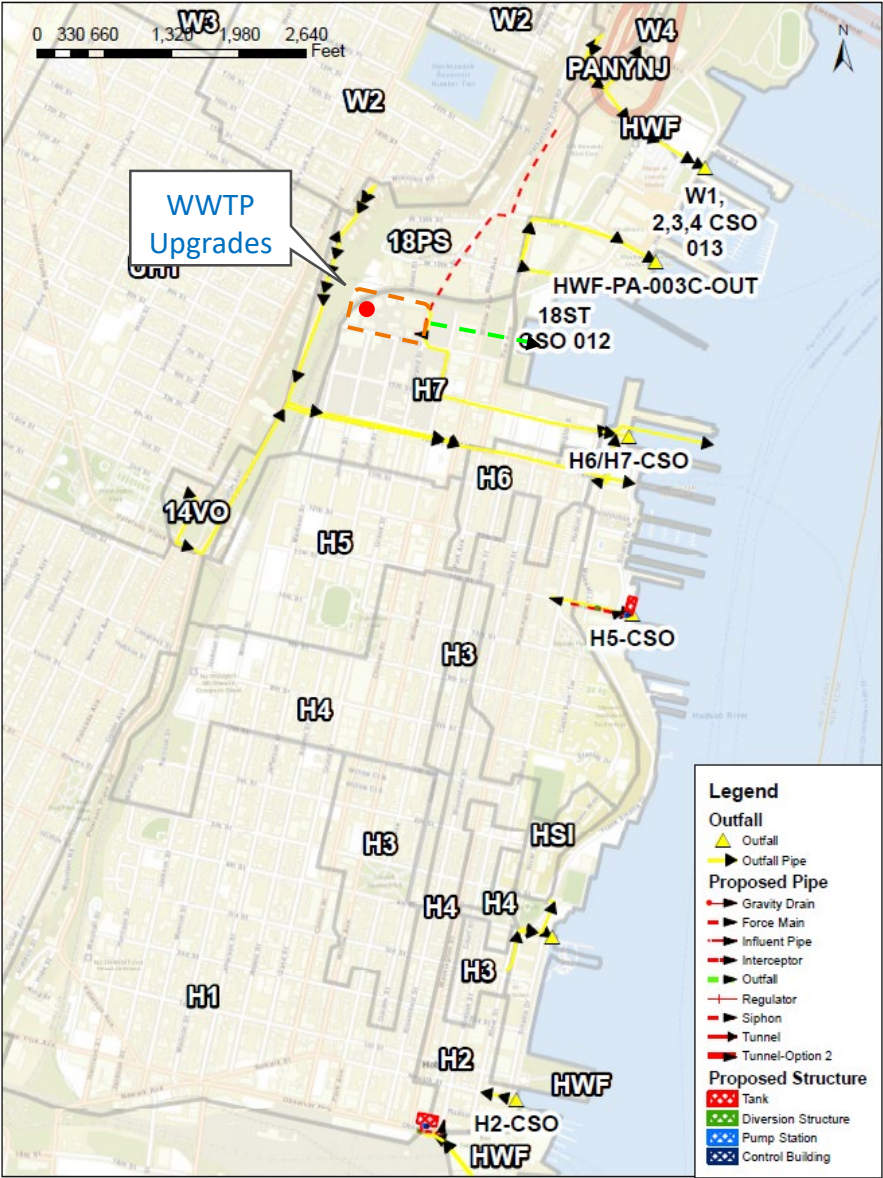
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*Pending updates to infrastructure in headworks at plant

Methodology

Percent Capture Analysis – Adams Street



Summary

Drainage Basin	Outfall	Scenario 1	Scenario 2	Scenario 3
H1	002A	Divert partial volume from H1	Divert partial volume from H1 and 1.5 MG Underground Storage Tank	7 MG Underground Storage Tank
H3/H4/HS I	005A	Divert all volume from H3/H4/HSI with additional Siphon after 11 th Street Pump Station and upgrade 5 th Street Pump Station to 47 mgd	Divert all volume from H3/H4/HSI with Additional Siphon after 11 th Street Pump Station and upgrade 5 th Street Pump Station to 47 mgd	
H5	006A	Increase Capacity of 11th Street Pump Station to 20 mgd	Increase Capacity of 11th Street Pump Station to 20 mgd	4 MG Underground Storage Tank
18PS	012A	-	-	-
W1234	013A	Construct Parallel 48" Park Ave Siphon back to Adams Street WWTP	Construct Parallel 42" Park Ave Siphon back to Adams Street WWTP and 1.3 MG In Water Storage Tank	Construct Parallel 72" Park Ave Siphon back to Adams Street WWTP
W5	015A	Construct High Level Storm Sewer along Boulevard East	Construct High Level Storm Sewer along Boulevard East	Construct High Level Storm Sewer along Boulevard East
Adams Street WWTP	001A	Construct Larger Outfall Increase capacity by 20 MGD with side stream treatment Replace trickling filter with 8 MG storage tank and 2 MG storage tank	Construct Larger Outfall Increase capacity by 20 MGD with side stream treatment Replace trickling filter with 8 MG storage tank	Construct Larger Outfall Increase capacity by 20 MGD with side stream treatment Replace trickling filter with 10 MG storage tank

Analysis in River Road WWTP Service Area

Percent Capture

Analysis

Percent Capture – River Road WWTP

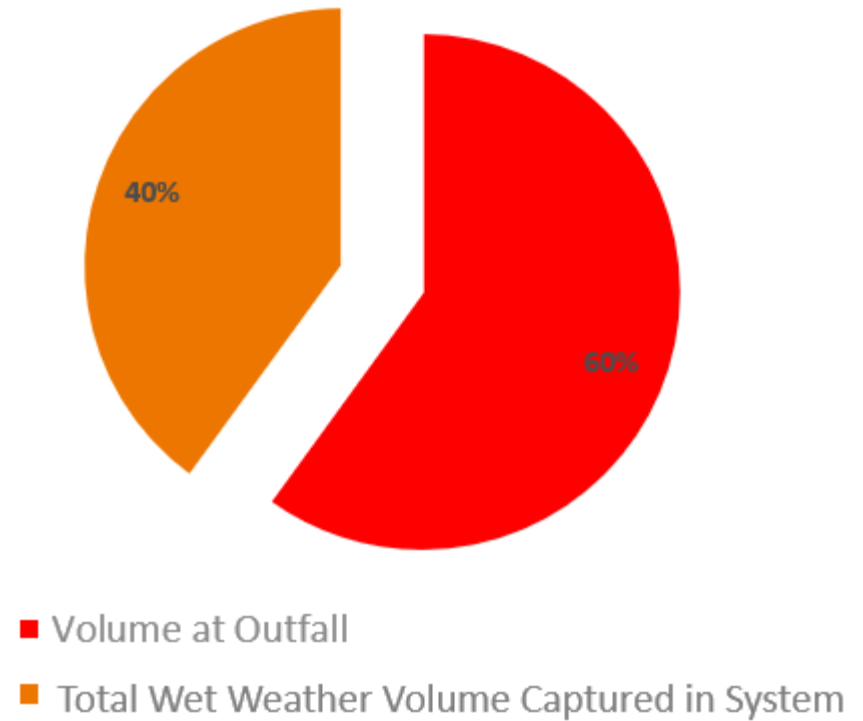
- Two main elements to maximizing the percent capture of the River Road service area:
 - Maximize the capacity of the River Road WWTP either through treatment processes or storage
 - Maximize the amount of conveying volume away from outfalls and to the WWTP to the extent feasible

Analysis

Percent Capture – River Road

Existing Percent Capture is **40%**

	Existing Overflow Volume in Typical Year, MG
WNY1 Outfall	192
JOSO Outfall	94

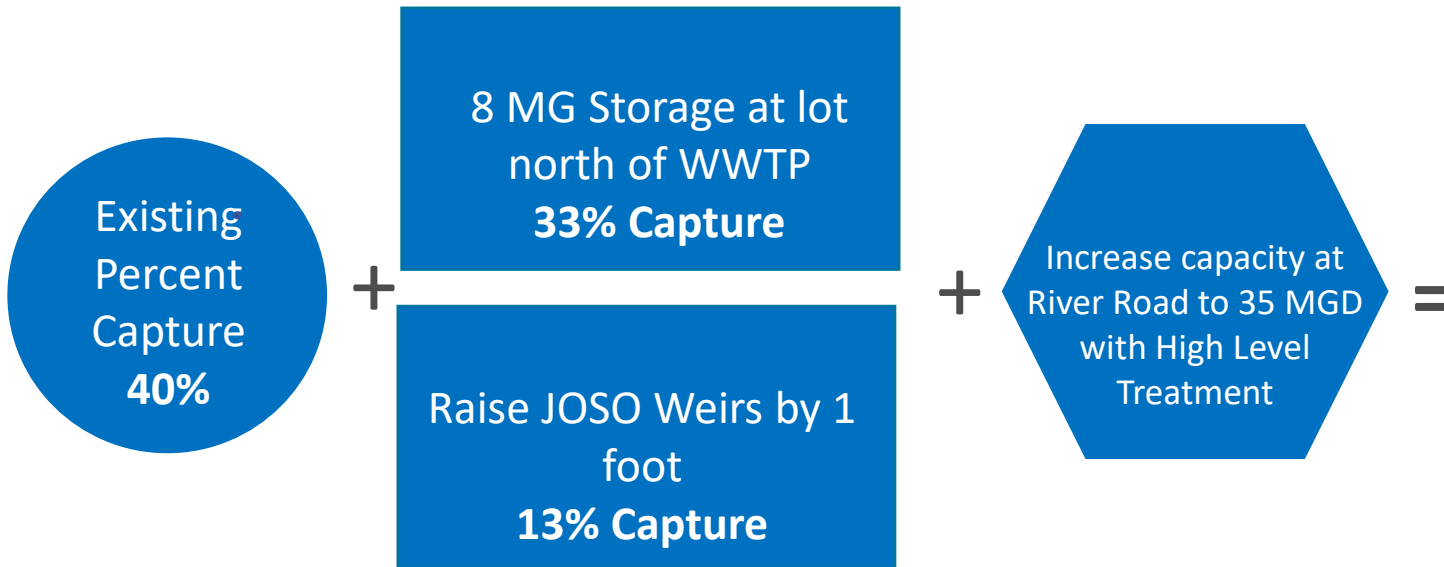


Analysis

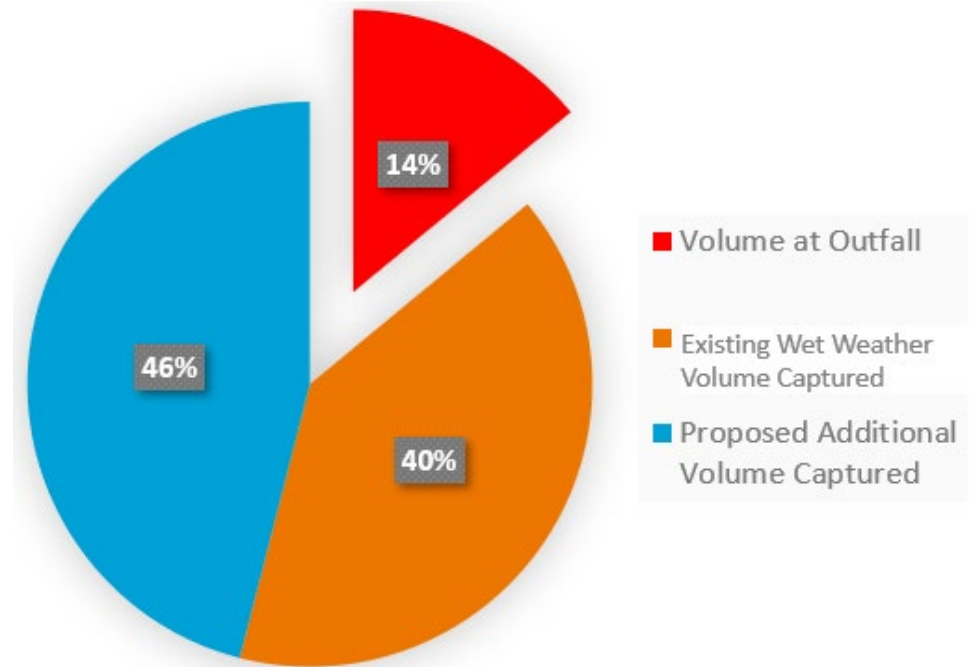
Percent Capture – River Road

Scenario 1:

Controls



TOTAL
86% Capture

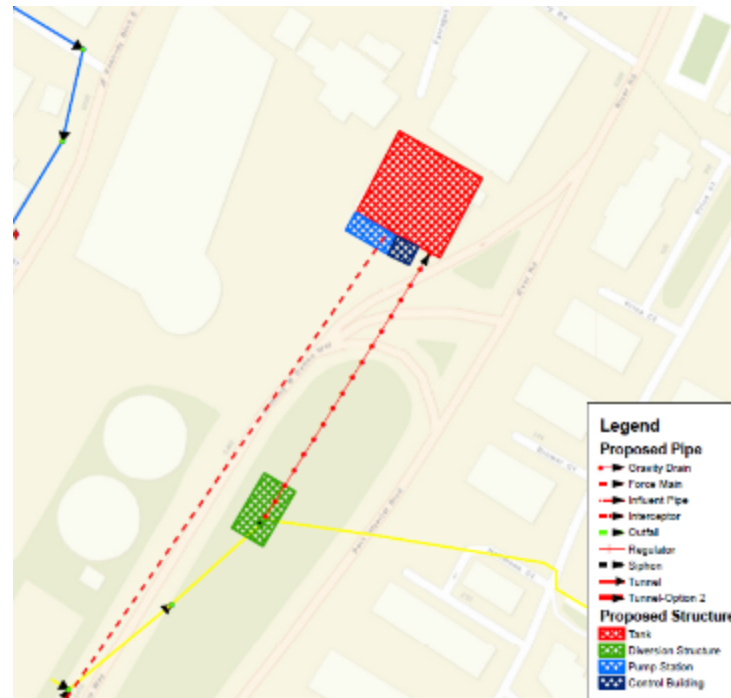


Analysis

Percent Capture – River Road

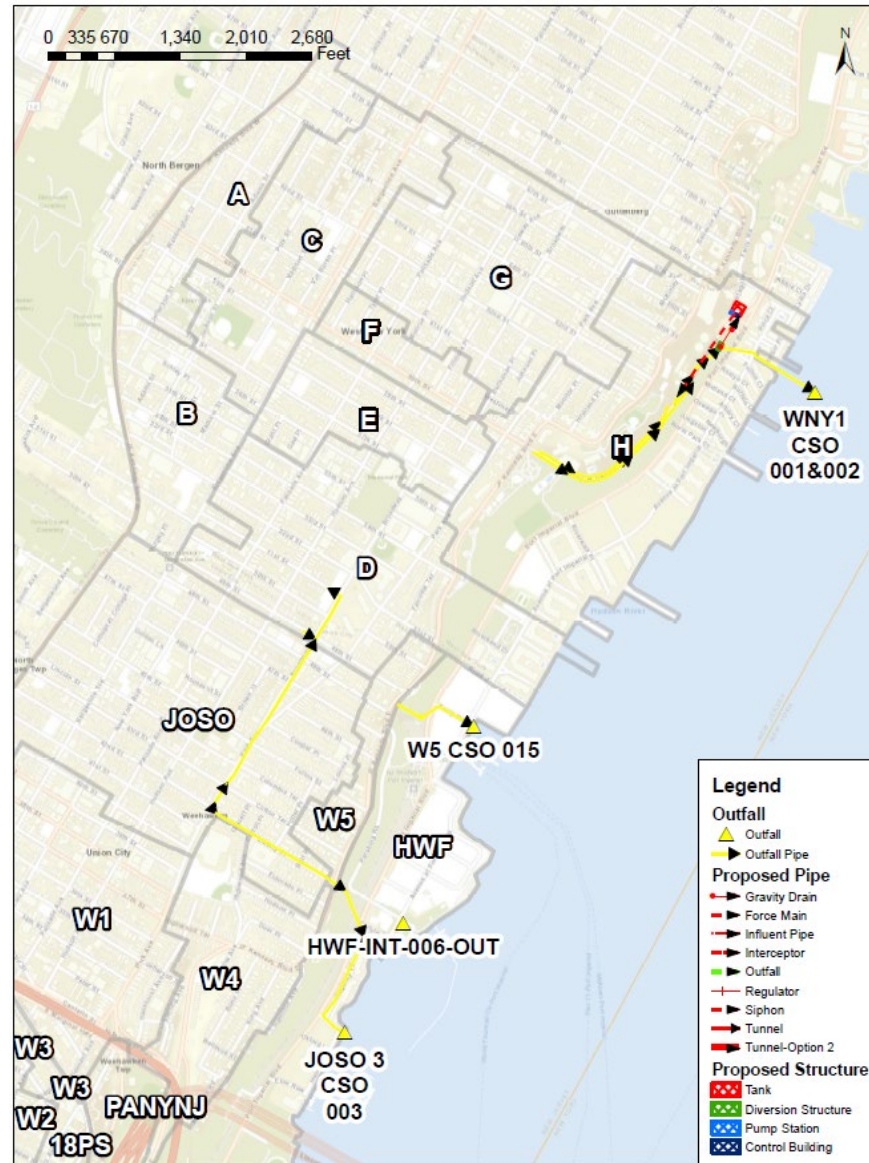
CSO Storage Tank North of River Road Treatment Plant

- The existing footprint of the River Road WWTP is extremely constrained and identifying any storage nearby is imperative
- Feasibility of a CSO Storage Tank at vacant lot north of plant is currently being analyzed
- Similar area to Adams Street, tank would be 50% above and 50% below ground dependent on volume



Analysis

Percent Capture – River Road

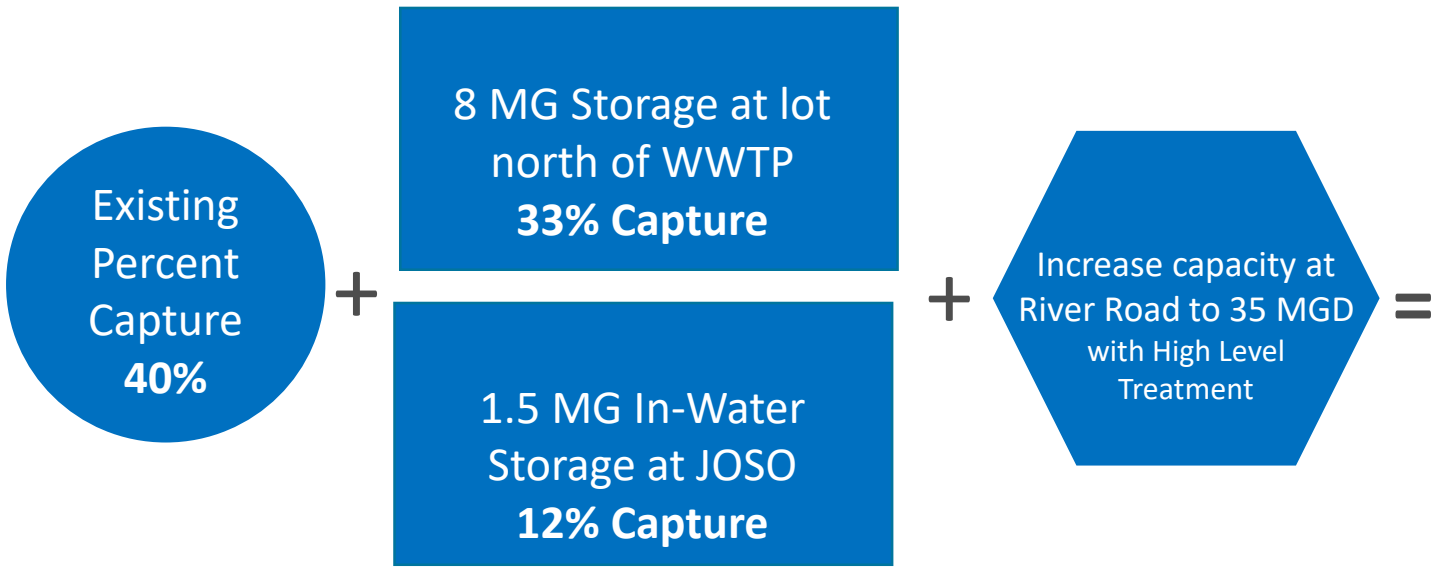


Analysis

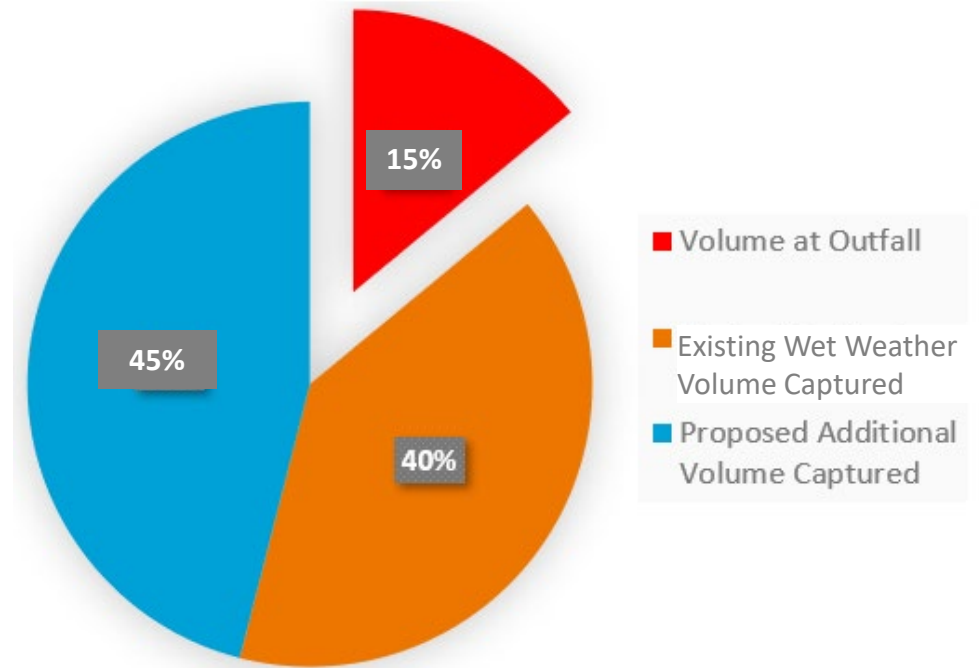
Percent Capture – River Road

Scenario 2:

Controls

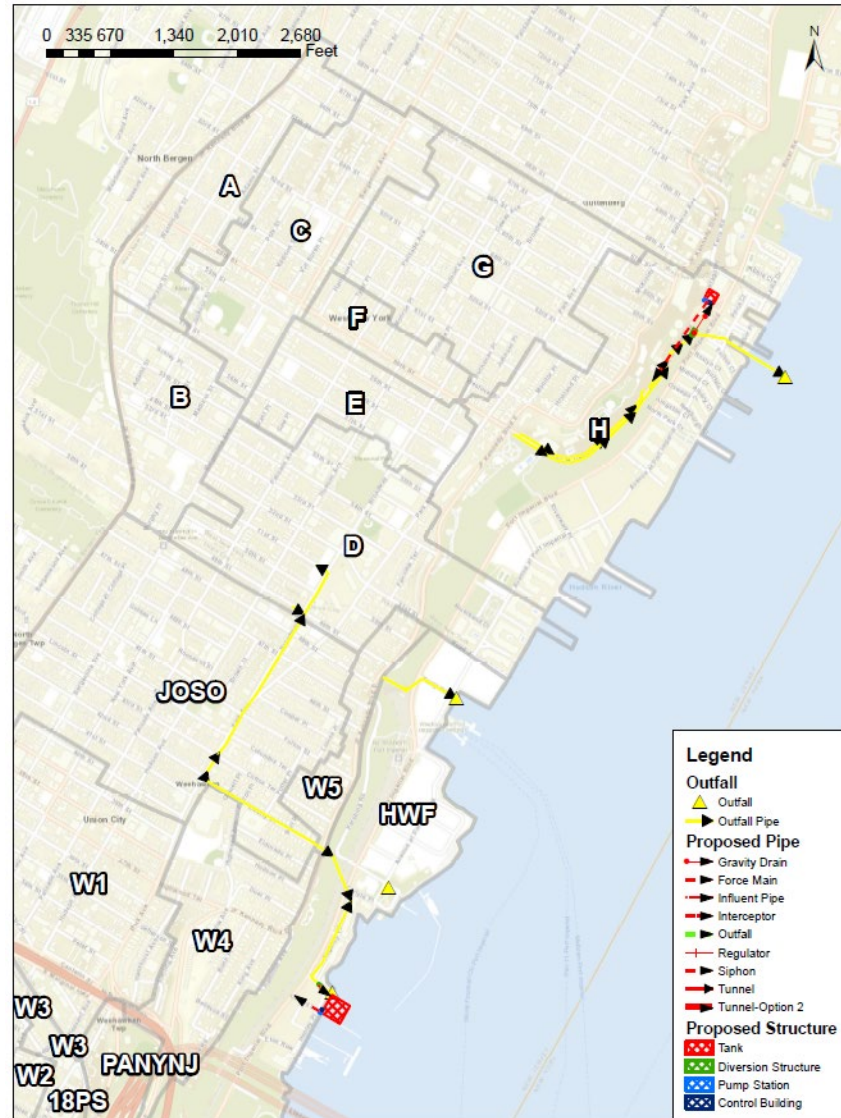


TOTAL
85% Capture



Analysis

Percent Capture – River Road

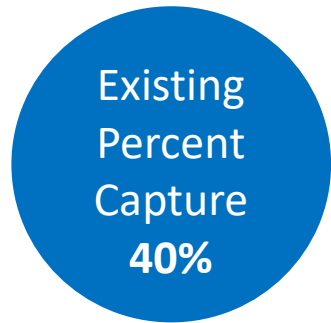


Analysis

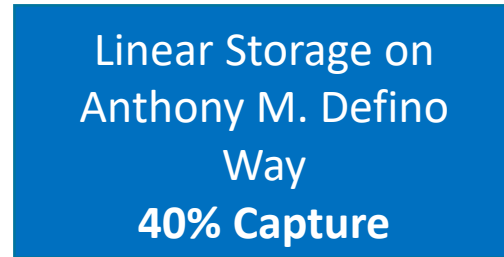
Percent Capture – River Road

Scenario 3:

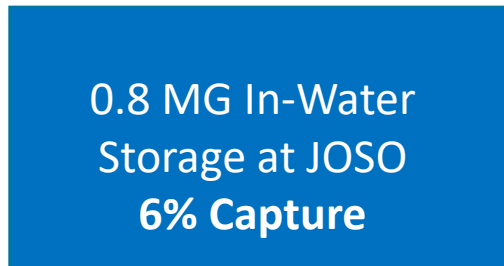
Controls



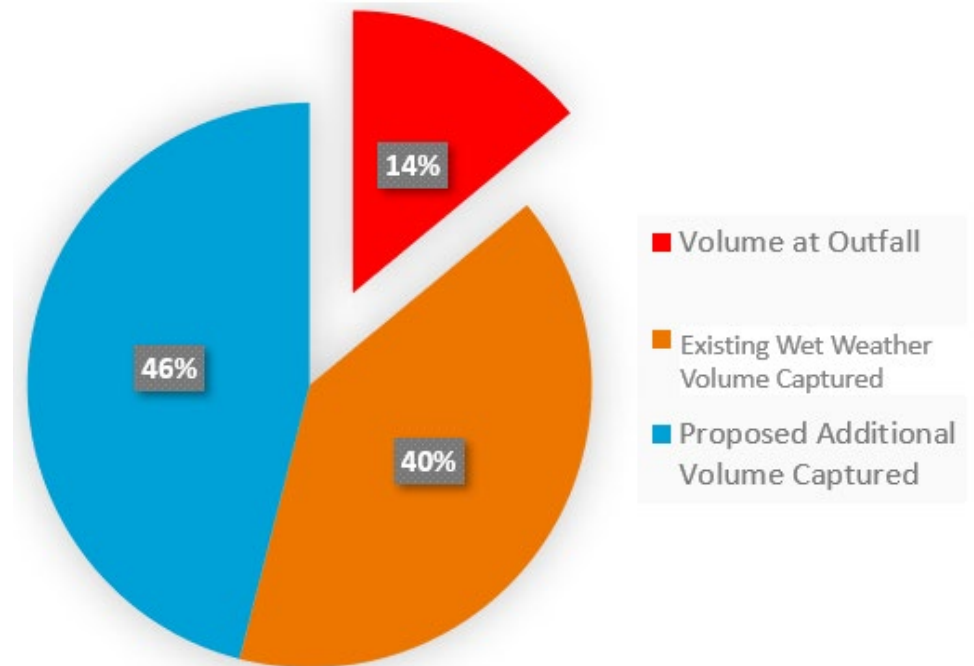
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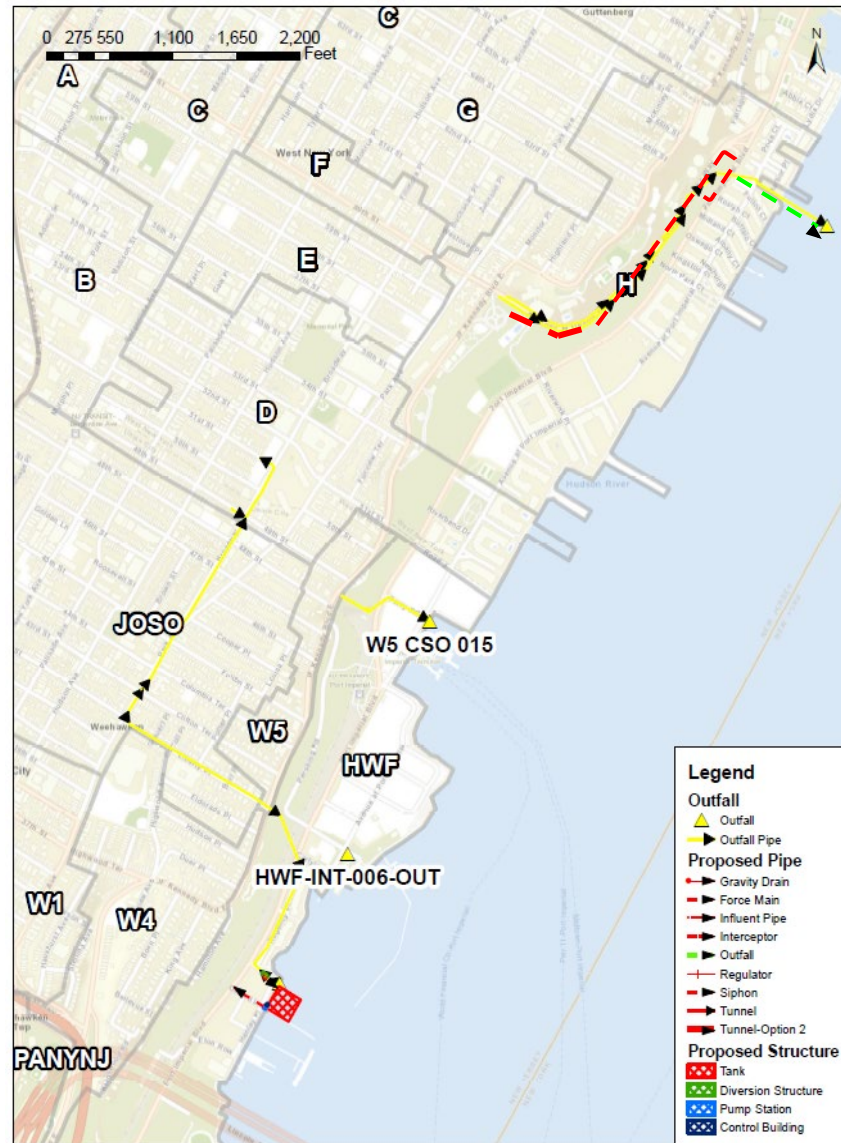


TOTAL
86% Capture



Analysis

Percent Capture – River Road



Comparison

➤ To achieve no more than 4 overflows in the system annually or reach 85% Total Wet Weather flow capture, the following may be required:

Drainage Basin	Outfall	Scenario 1	Scenario 2	Scenario 3
JOSO	001A	Raise weirs on JOSO interceptor	1.5 MG In Water Storage Tank	0.8 MG In Water Storage Tank
WNY1	002A	Construct 8 MG storage tank north of treatment plant	Construct 8 MG storage tank north of treatment plant	-Construct 8.3 MG Tunnel and Treatment on Anthony M. Defino Way -Construct Parallel Outfall
River Road WWTP	001A	Increase treatment capacity from 8 MGD to 35 MGD with new high level treatment processes	Increase treatment capacity from 8 MGD to 35 MGD with new high level treatment processes	

Summary

Comparison

➤ To achieve no more than 4 overflows in the system annually or reach 85% Total Wet Weather flow capture, the following may be required:

Drainage Basin	Outfall	Requirements for 4 overflows/year	Requirements for 85% Capture Systemwide
H1	002A	3.65 MG Underground Storage Tank at Observer Highway and Hudson Street	Divert partial volume from H1
H3/H4/HSI	005A	4.67 MG In-Water Tank either in water at 5 th Street	Divert all volume from H3/H4/HSI with Additional Siphon after 11 th Street Pump Station and upgrade 5 th Street Pump Station to 47 mgd
H5	006A	2.35 MG In-Water Tank at Maxwell Place	Increase Capacity of 11th Street Pump Station to 20 mgd
18PS	012A	Increase Capacity of Pump Station at 18 th Street	-
W1234	013A	<ul style="list-style-type: none"> 2 MG In-Water Storage Tank at W1234 Outfall Construct 72" Parallel Siphon Along Park Avenue back to Adams Street WWTP 	Construct Parallel 48" Park Ave Siphon back to Adams Street WWTP
W5	015A	Construct High Level Storm Sewer along Boulevard East	Construct High Level Storm Sewer along Boulevard East
Adams Street WWTP	001A	Construct Larger Outfall Increase capacity by 20 MGD with blending Replace trickling filter with 20 MG storage tank	Construct Larger Outfall Increase capacity by 20 MGD with side stream treatment Replace trickling filter with 8 MG storage tank and 2 MG storage tank

Comparison

➤ To achieve no more than 4 overflows in the system annually or reach 85% Total Wet Weather flow capture, the following may be required:

Drainage Basin	Outfall	Requirements for 4 overflows/year	Requirements for 85% Capture Systemwide
JOSO	001A	Construct 4.57 MG In-Water CSO Storage Tank at outfall	Raise weirs on JOSO interceptor
WNY1	002A	-Construct 8.3 MG Tunnel and Treatment on Anthony M. Defino Way -Construct Parallel Outfall	Construct 8 MG storage tank north of treatment plant
River Road WWTP	001A	-	Increase treatment capacity from 8 MGD to 35 MGD with new treatment processes