

# Managing 'One Water' – What Role Will Stormwater Play?



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Sewer System Improvement Program (SSIP)**

*Presentation for: National Association of Clean Water Agencies (NACWA)*



# Agenda

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- 💧 Overview of San Francisco's Sewer System
- 💧 Drivers for San Francisco's Capital Program
- 💧 Sewer System Improvement Program
- 💧 Urban Watershed Approach



# Wastewater System

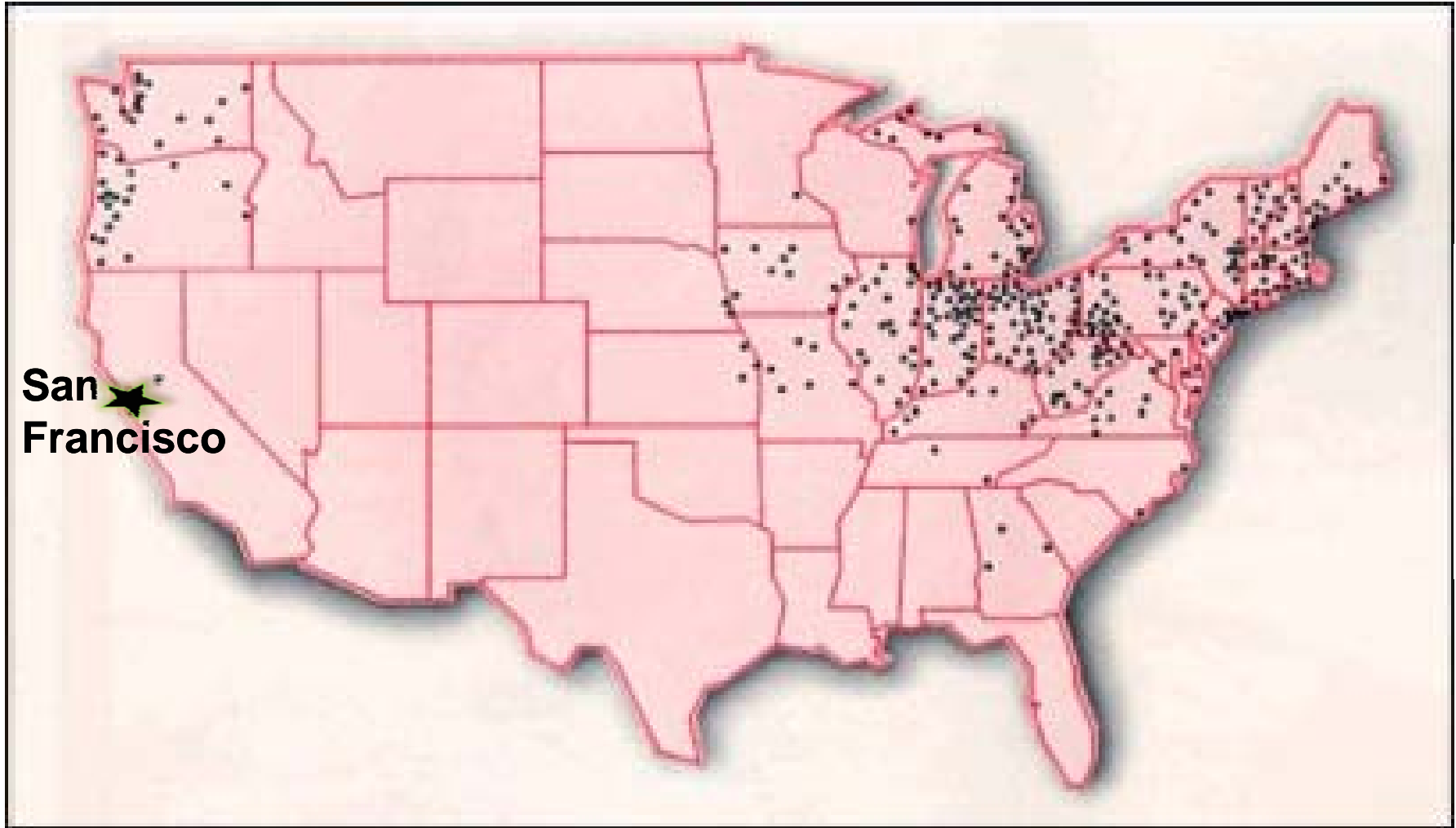
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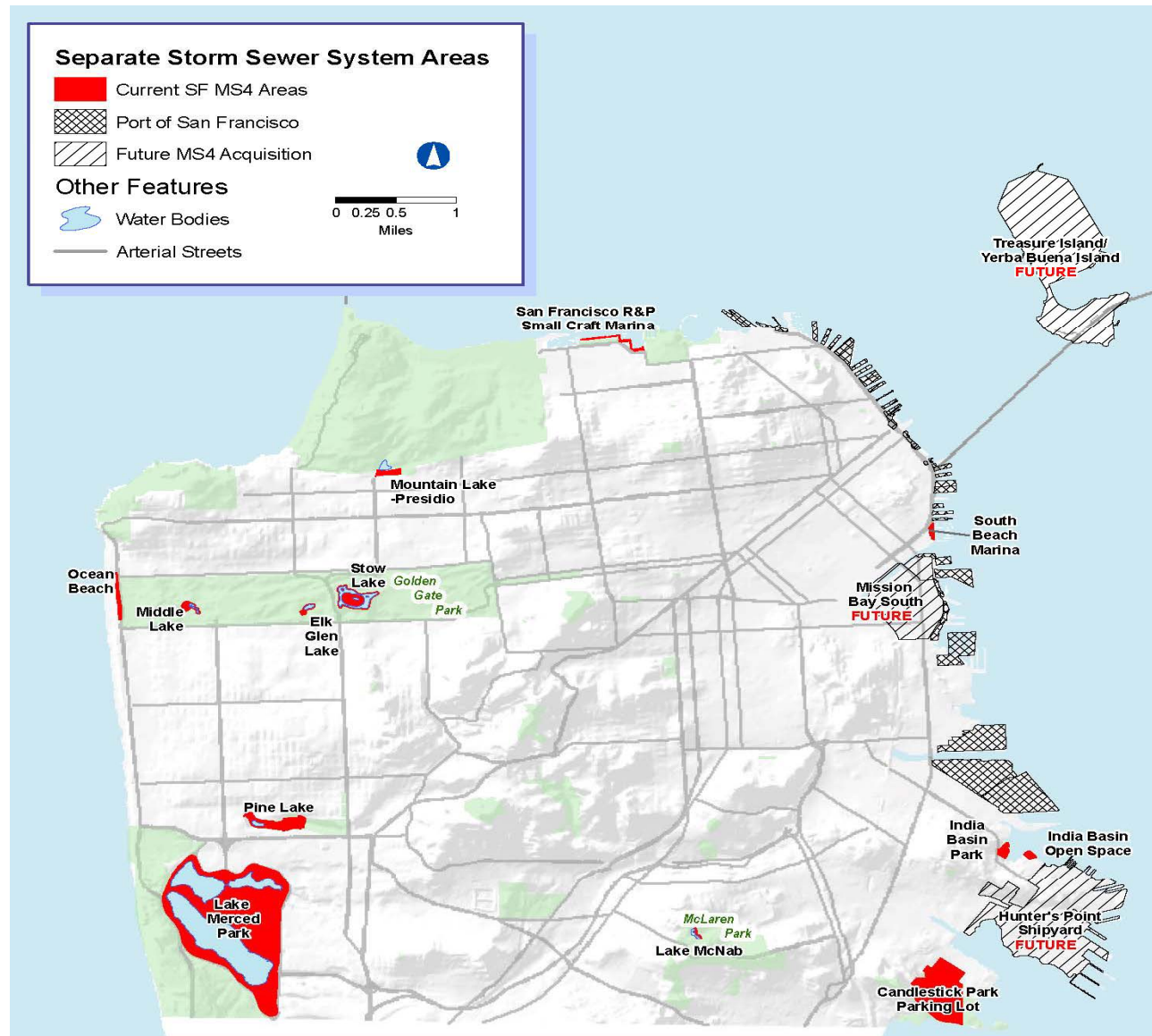
# Combined Sewer Systems

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# Separate Storm Sewer System Areas





# Miles of Sewer

## Sewer Categories

Local sewers ( $\leq 36$ inches)	793
Major sewers ( $> 36$ inches)	166
Transport storage boxes	17
Discharge locations	2
Tunnels	17
Force mains	11
Effluent outfalls	5

<b>Total miles</b>	<b>1,011</b>
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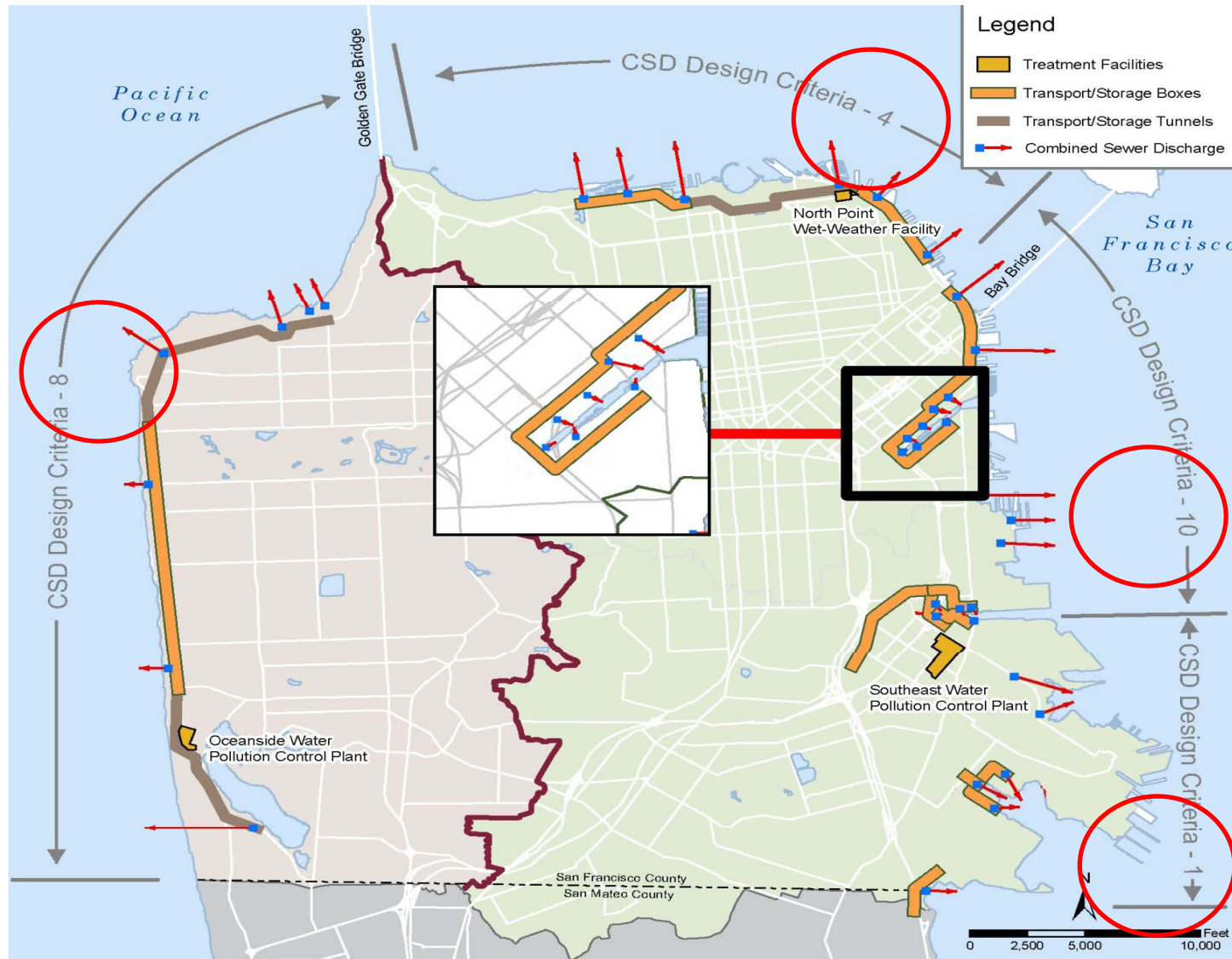
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# Wastewater Treatment



# Combined Sewer Discharge Points







# Drivers for San Francisco's Capital Program





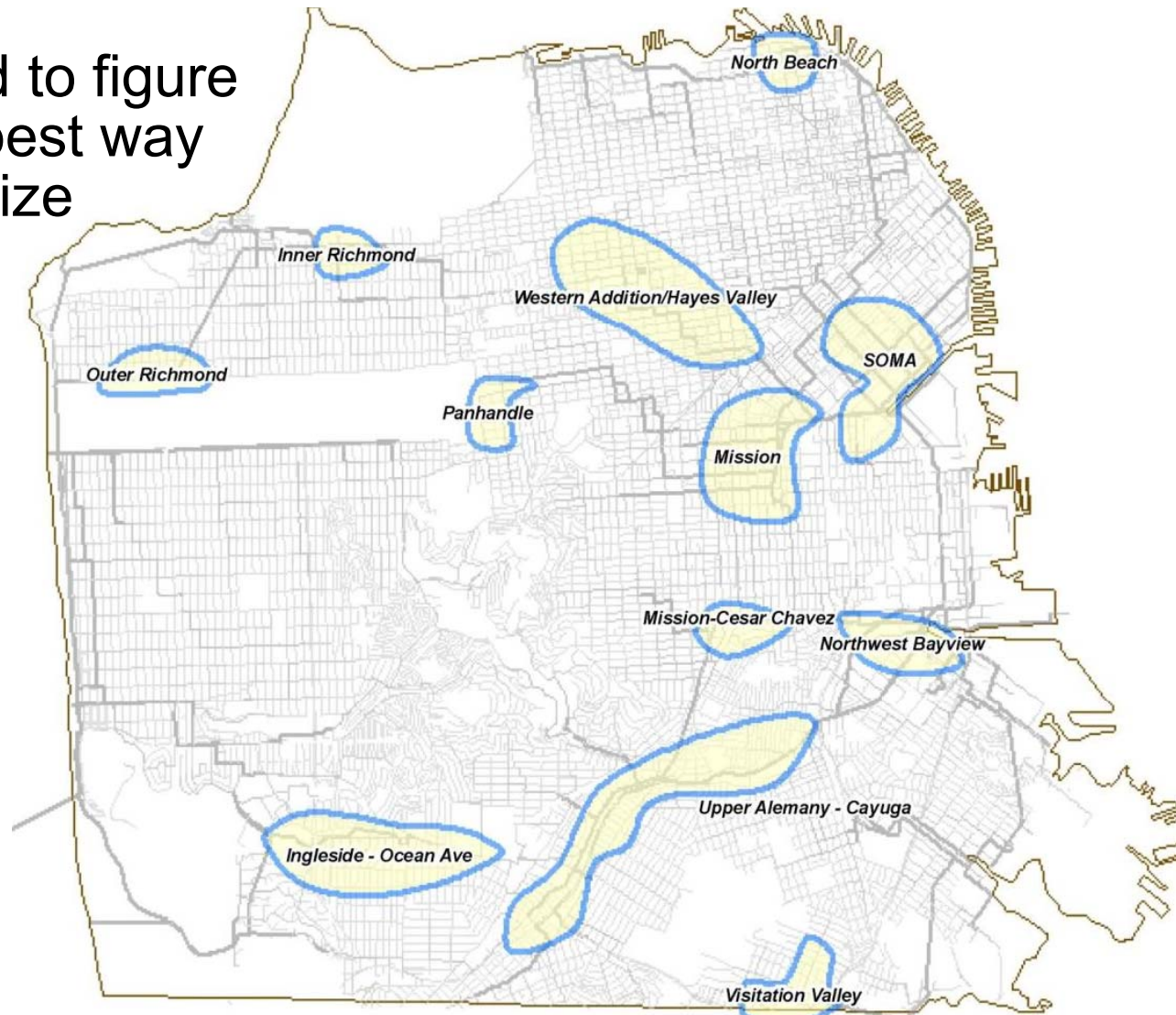
# San Francisco's Priority Issues

- ◆ Aging Infrastructure
- ◆ Seismic Reliability
- ◆ Combined Sewer Discharges to the Bay and Ocean
- ◆ Rising Sea Level
- ◆ Environmental Justice
- ◆ Flooding
- ◆ Odors, Noise, and Visual
- ◆ Future Regulatory Changes
- ◆ Environmental Stewardship
- ◆ Operational Reliability



# Flooding Areas

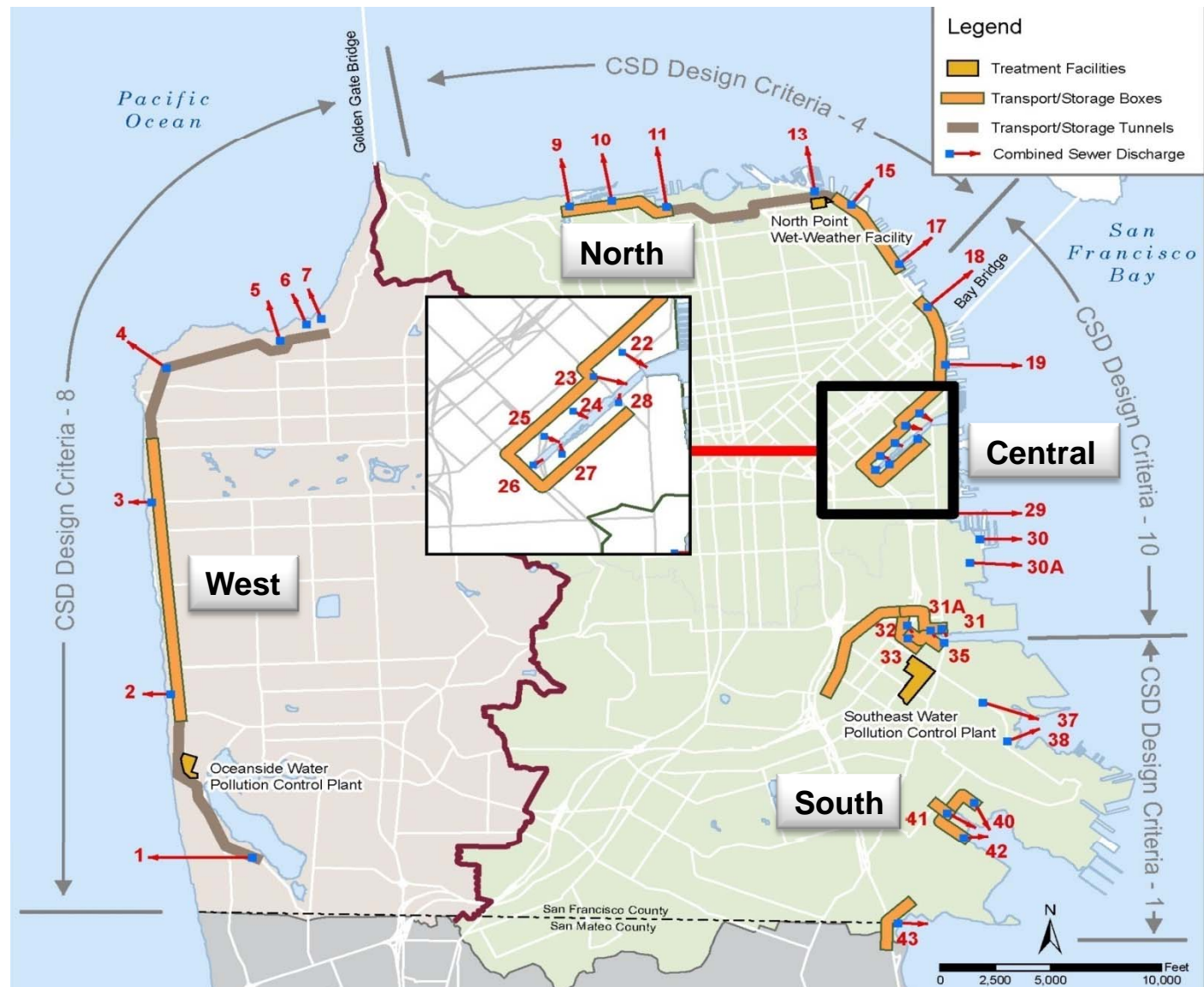
We need to figure out the best way to minimize flooding.





# Combined Sewer Discharge Locations

Permit Compliance requires us to assess *Low Impact Design* and *Green* techniques to control stormwater.









# Sewer System Improvement Program (SSIP)

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# Commission Endorsed Levels of Service

July 27, 2010

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1. Provide a Compliant, Reliable, Resilient, and Flexible System that can Respond to Catastrophic Events
2. Minimize Flooding
3. Provide Benefits to Impacted Communities
4. Modify the System to Adapt to Climate Change
5. Achieve Economic and Environmental Sustainability



# SSIP Program Cost

SSIP <i>Proposed</i> Projects \$6.9B (Program Cost)	Project Cost Estimate (\$ Millions)	Compliant, Reliable, Resilient, Flexible System	Minimize Flooding	Provide Benefits to Impacted Communities	Modify the System to Adapt to Climate Change	Achieve Economic and Environmental Sustainability
<b>Treatment</b>						
Biosolids Digester Project	\$2,291	X		X	X	X
Treatment Plant Improvements	\$579	X		X	X	X
Southeast Treatment Plant Improvements	\$1,069	X		X	X	X
<b><i>Treatment subtotal</i></b>	<b>\$3,939</b>					
<b>Collection System</b>						
Collection System Improvements	\$519	X	X	X	X	X
Flood Control Improvements	\$1,119	X	X	X	X	X
Central Bayside System Improvements	\$1,093	X	X	X	X	X
<b><i>Collection System subtotal</i></b>	<b>\$2,731</b>					
City Program Management & Asset Management Planning	\$170					
Program Management Contract	\$150					
<b>TOTAL <i>PROPOSED</i> SSIP</b>	<b>\$6,990</b>					



# Urban Watershed Approach

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# Urban Watershed Assessments

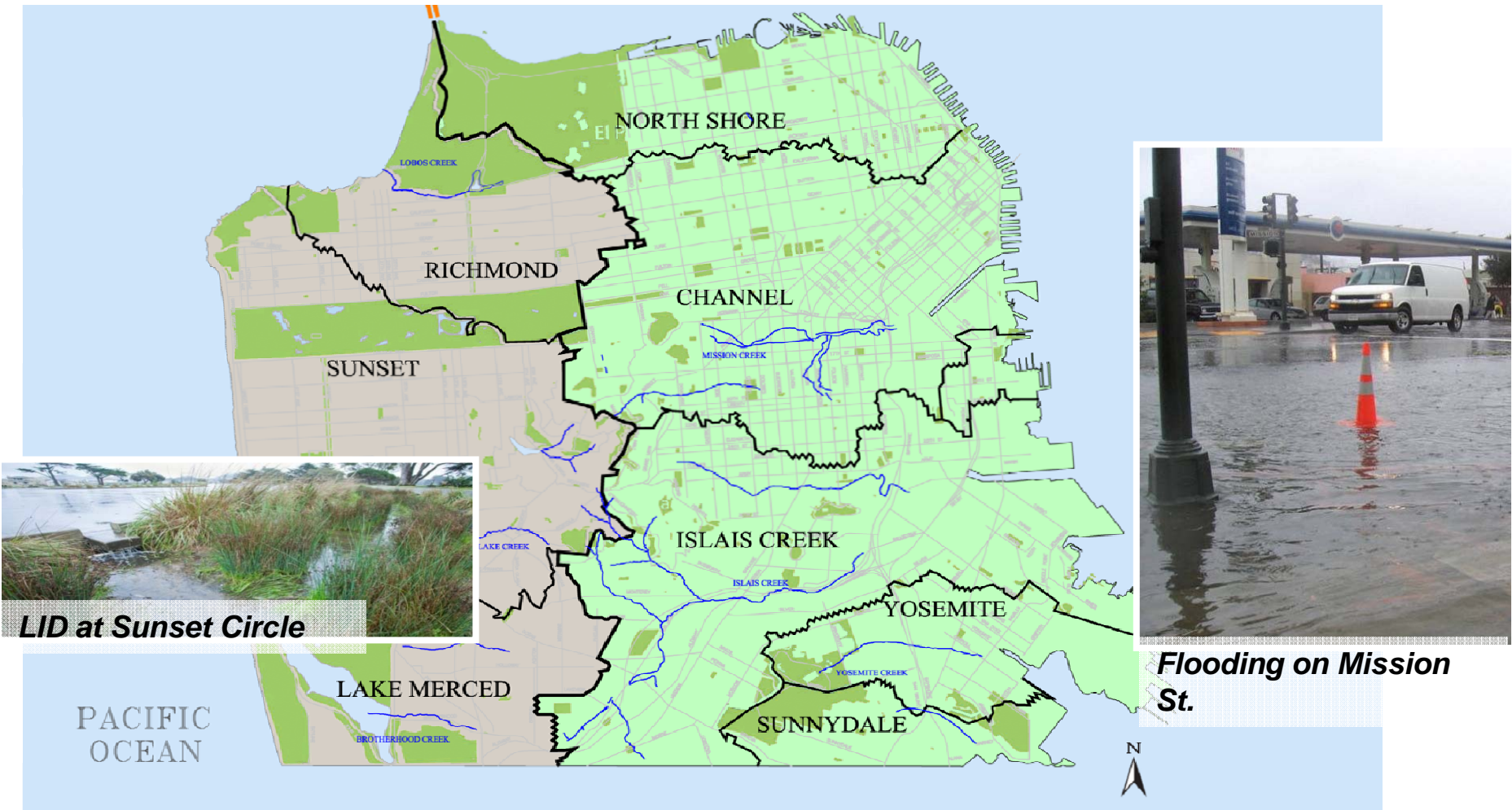
Managing stormwater runoff generated by rainfall with ***constructed elements to capture rainwater*** thereby reducing the peak flow volume that can overwhelm the collection system.

- Automate stormwater data
- Refine the Hydraulic Model
- Storm Surge Modeling
- Survey of Combined Sewer Discharge (CSD) structures
- Low Impact Design (LID) evaluation
- Interdepartmental Coordination Meetings
- Identify Triple-Bottom Line Decision-Making Tools
- Identify watershed prioritization





# Flood Control, Collection System, and Low Impact Design Improvements



**LID at Sunset Circle**

**Flooding on Mission St.**



# Balancing Issues Related to LID in San Francisco

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## 💧 Physical Limitations

- 💧 Limited infiltration
- 💧 Liquefaction zones
- 💧 Steep hills
- 💧 Rainfall patterns
- 💧 Dense lot line development

## 💧 Financial

- 💧 Rate structure
- 💧 O&M costs
- 💧 Bond limitations

## 💧 Social

- 💧 70% rental/parking impact
- 💧 Neighborhood stewardship

## 💧 Organizational Coordination











## Example of Improvements that have been completed in San Francisco



**Leland Avenue Streetscape Project**  
Permeable paving parking zones and bio-infiltration planters within curb extension.





# Stormwater Management Improvements can provide multiple benefits

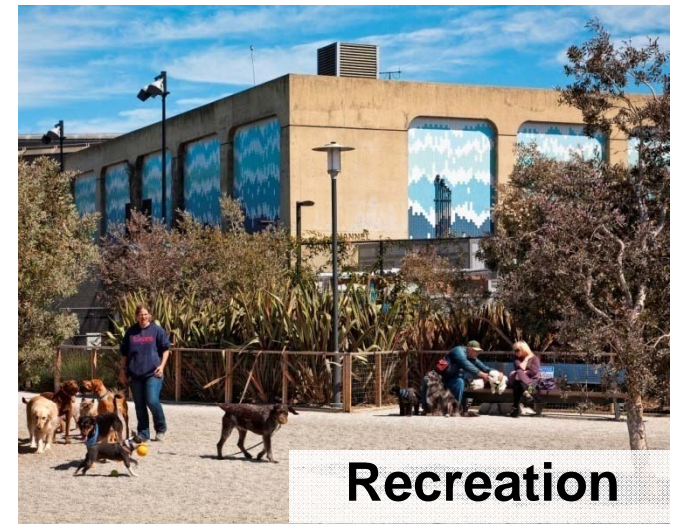
- Flood Control
- Stormwater, Graywater and Recycled Water Use
- Groundwater Recharge



- Improved Receiving Water Quality
- Neighborhood Enhancement
- Improved Watershed Function



- Optimization of Collection System Capacity
- Pollution Prevention
- Water Resource Conservation





# Thank You



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