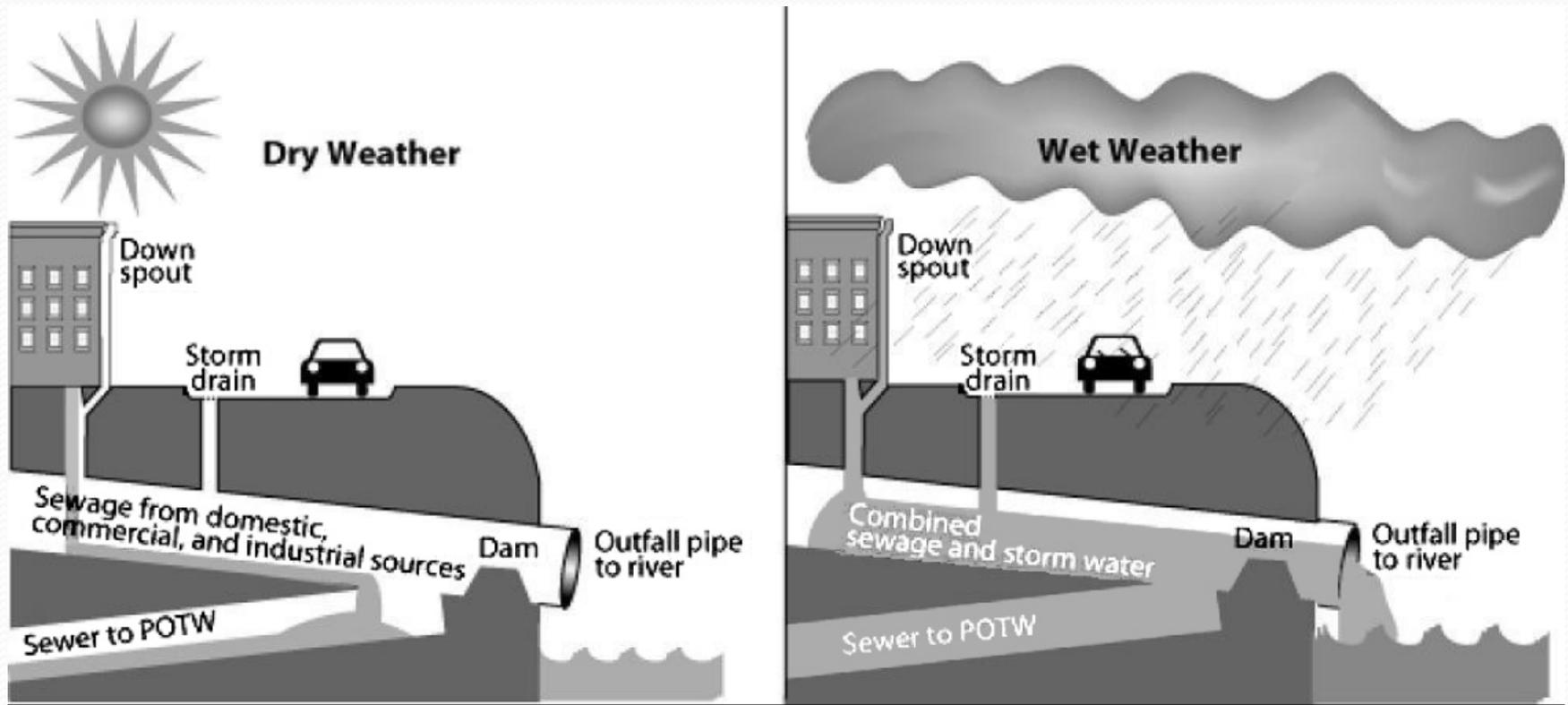


Combined Sewer Overflow Permitting in New Jersey

Pilar Patterson, Bureau Chief
New Jersey Department of Environmental Protection
Division of Water Quality

CSO Diagram



How Many CSO Does NJ Have?

- Combined sewer systems serve roughly 1,100 communities nationwide. Most communities with combined sewer systems are located in the Northeast, Great Lakes regions and the Pacific Northwest.
- For comparison purposes, the number of CSOs in NJ, NY and PA are listed below:
 - **NJ has 217 CSOs** within 21 communities
 - **NYC has 937 CSOs**
 - **PA has 1,569 CSOs** within 152 communities

Permits have 2 Major Components:

- **Nine Minimum Controls** – 9 “low” cost measures to improve flows getting to the treatment plant, improve public notification, and update Operation and Maintenance procedures
- **Long Term Control Plans** - LTCPs are a complex engineering, hydraulic analysis of wastewater collection systems, pumping stations, combined sewer overflows, regulators and sewage treatment facilities, to provide the most cost effective manner to regulate CSO's so that the CSO National Policy can be met.

Nine Minimum Control Measures

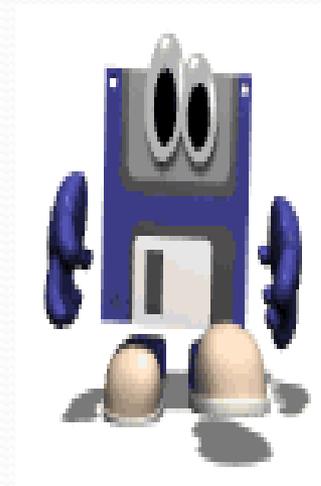
- Proper operation and maintenance
- Maximum use of collection system for storage
- Review of pretreatment requirements
- Maximization of flow to POTW for treatment
- Prohibition of CSOs during dry weather
- Control of solids and floatables
- Pollution prevention
- Public notification – new signs, website, public notices
- Monitoring of CSO impacts and efficacy of controls

Nine Elements of an LTCP

- System Characterization, monitoring and modeling
- Public participation
- Consideration of sensitive areas
- Evaluation of CSO control alternatives
- Cost/performance considerations
- Operational plan
- Maximization of treatment at the POTW
- Implementation schedule
- Post-construction compliance monitoring

Three Components of System Characterization

1. **Physical characterization:**
 - What are the components of the CSS?
 - How does the CSS respond to rainfall?
2. **Characterization of combined sewage and CSO**
 - Characterization of precipitation
 - What significant pollutants are present in CSO?
3. **Characterization of receiving waters**
 - Are CSOs likely to cause WQ standards violations?

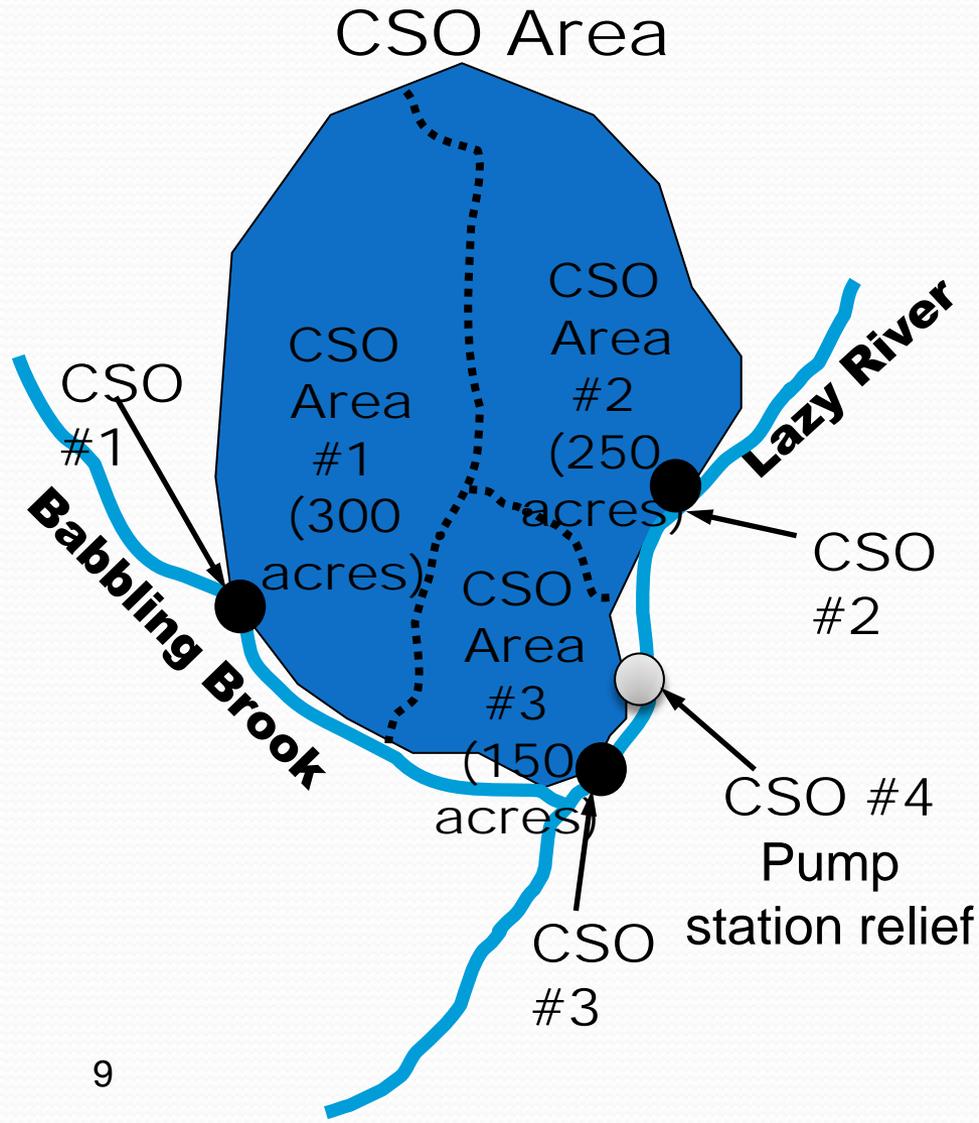


Physical Characterization



- Typically includes:
 - Delineation of CSS area and sewersheds
 - Locating CSO outfalls, regulator structures, the WWTP, and pump stations
 - Estimating land use and impervious cover, by sewershed
 - Showing layout of major interceptors
 - Identifying hydraulic capacities for the WWTP, CSO regulators, and pump stations
 - Identifying CSO receiving waters

Defining Sub-Sewershed Areas



Characterizing Land Use

- General land use and estimated impervious cover
 - Some data available from USGS

<http://edc.usgs.gov/products/landcover/lulc.html#description>

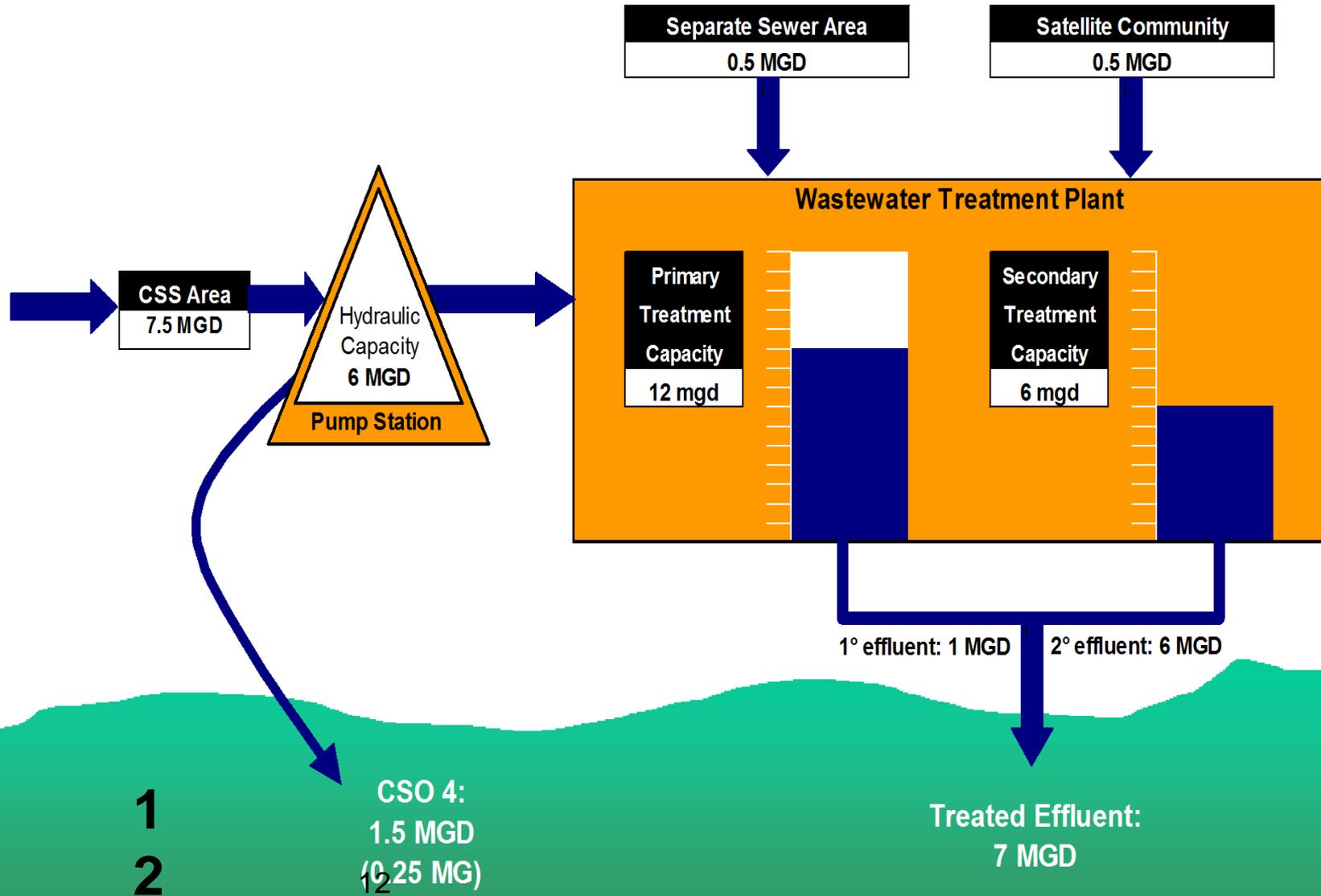
- Land use categories include:
 - Parkland or open space (<5% impervious)
 - Low density development (5-35% impervious)
 - Medium density development (35-70% impervious)
 - High density development (>70% impervious)



Pipe, Capacity, & Flow Information

- Hydraulic analysis should be sufficient to:
 - Establish capacities for WWTP, pump stations and CSO regulators
 - Quantify dry weather and wet weather flows, including flows to CSS from neighboring communities
 - Describe any existing flow metering
 - Permanent system meters and monitors such as SCADA (Supervisory Control And Data Acquisition)
 - Metering/flow monitoring from previous studies
 - Identify problem areas and bottlenecks

Flow Balance Diagram



Characterization of Receiving Waters

- **LTCP shall document:**
 - Water quality standards
 - Available water quality, sediment, and biological data
 - Flow conditions in the CSO receiving water(s)
 - Known impairments
 - Location of sensitive areas
 - Planned or ongoing TMDL studies



Nine Elements of an LTCP

- **Characterization, monitoring and modeling**
- Public participation
- Consideration of sensitive areas
- Evaluation of CSO control alternatives (Year 2)
- Cost/performance considerations
- Operational plan
- Maximization of treatment at the POTW
- Implementation schedule
- Post-construction compliance monitoring

Evaluation of Alternatives

- The analysis of alternatives should be sufficient to make a reasonable assessment of cost and performance
- Selected controls should be sufficient to meet CWA requirements
 - Green Infrastructure
 - Sewer Separate
 - Inflow/Infiltration Reduction
 - End-of-pipe Treatment
 - Storage
 - Expansion of the treatment facility (primary/secondary)

CSO Controls: Collection System

- Maximizing flow/treatment
- Monitoring & real-time control
- Inflow reduction
- Sewer separation
- Sewer rehabilitation
- Service lateral rehabilitation
- Manhole rehabilitation



CSO Controls: Storage

- In-line storage—oversized conduits and regulators; in-line tanks; parallel relief sewers
- Off-line storage—retention basins/tunnels to store wet weather flow for subsequent treatment
- On-site storage / flow equalization—storage at WWTP to manage excess wet weather flow



CSO Controls: Treatment Technologies

- Screening
- Supplemental treatment
- Plant modifications
- Disinfection
- Floatables control
- Satellite treatment



CSO Controls – Green Infrastructures

- Runoff Control
- Retention



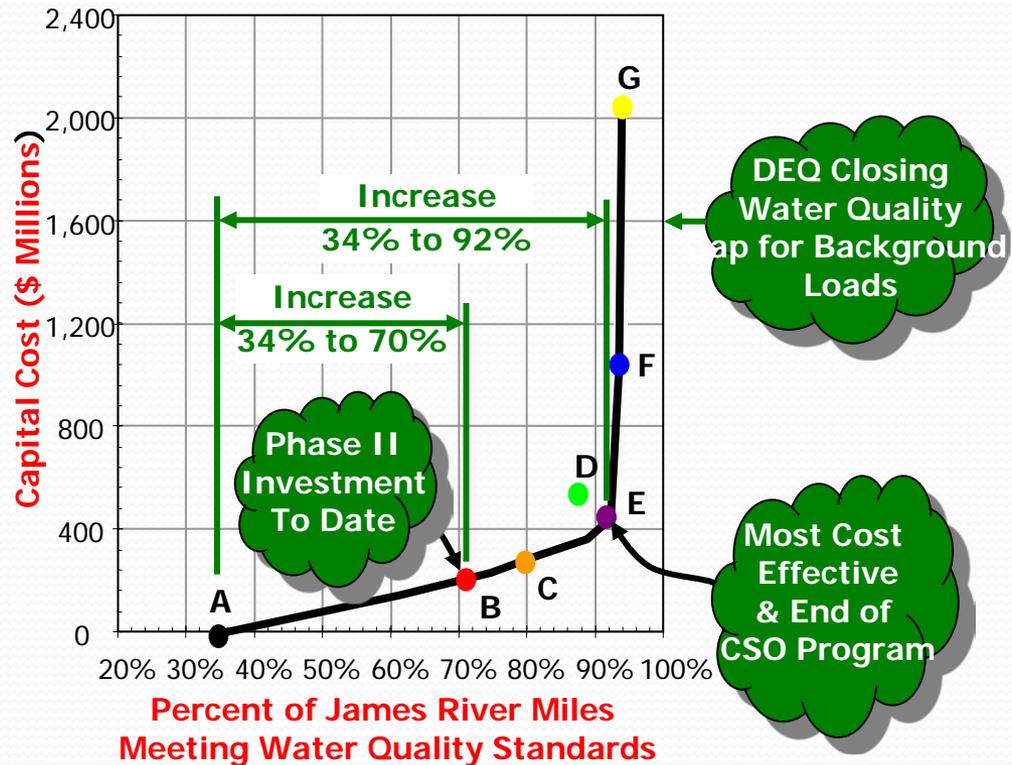
Cost/Performance Considerations

cont.

- The permittee should develop appropriate cost/performance curves to demonstrate the relationships among a comprehensive set of reasonable control alternatives
- This should include an analysis to determine where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs
- This analysis, often known as “**Knee of the Curve**” should be among the considerations used to help guide selection of CSO controls



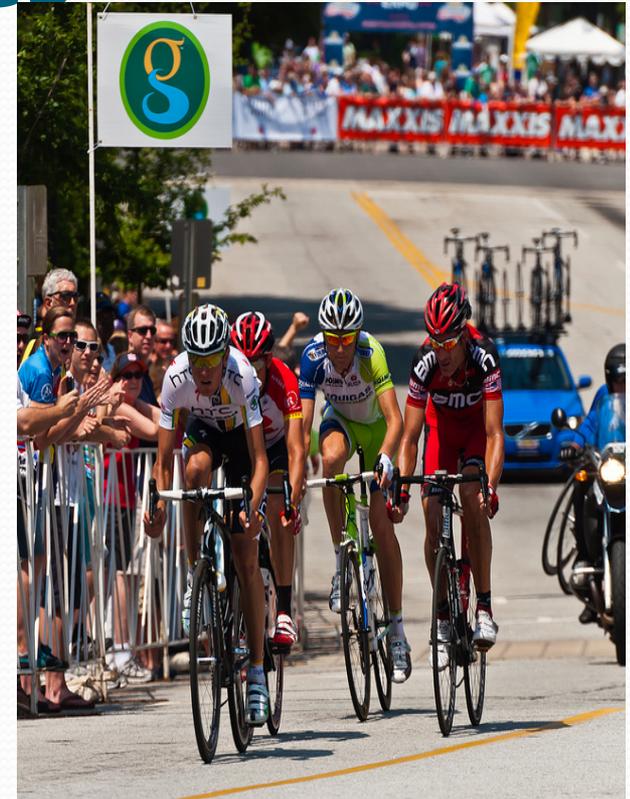
Cost Performance: Percent of James River Miles Meeting WQS



Final Selection of CSO Control Alternatives

Shall be based on:

- Control priorities
- Site specific conditions
- Protection of WQS
- Designated uses
- Public input
- Cost-effectiveness of controls
- Financial capability
- Other considerations



Characteristics of a Quality LTCP

- Show how your proposal will meet water quality standards
- Appropriate monitoring
- Choosing presumptive or demonstrative
- Include “knee of the curve”
- Address changing pathogen criteria
- Coordinate LTCP across multiple agencies/municipalities (own and/or operate)
- Bringing non-CSO communities into the process
- Timeline for upgrades-measurable milestones

Year One Requirements – NMC

Nine Minimum Controls:

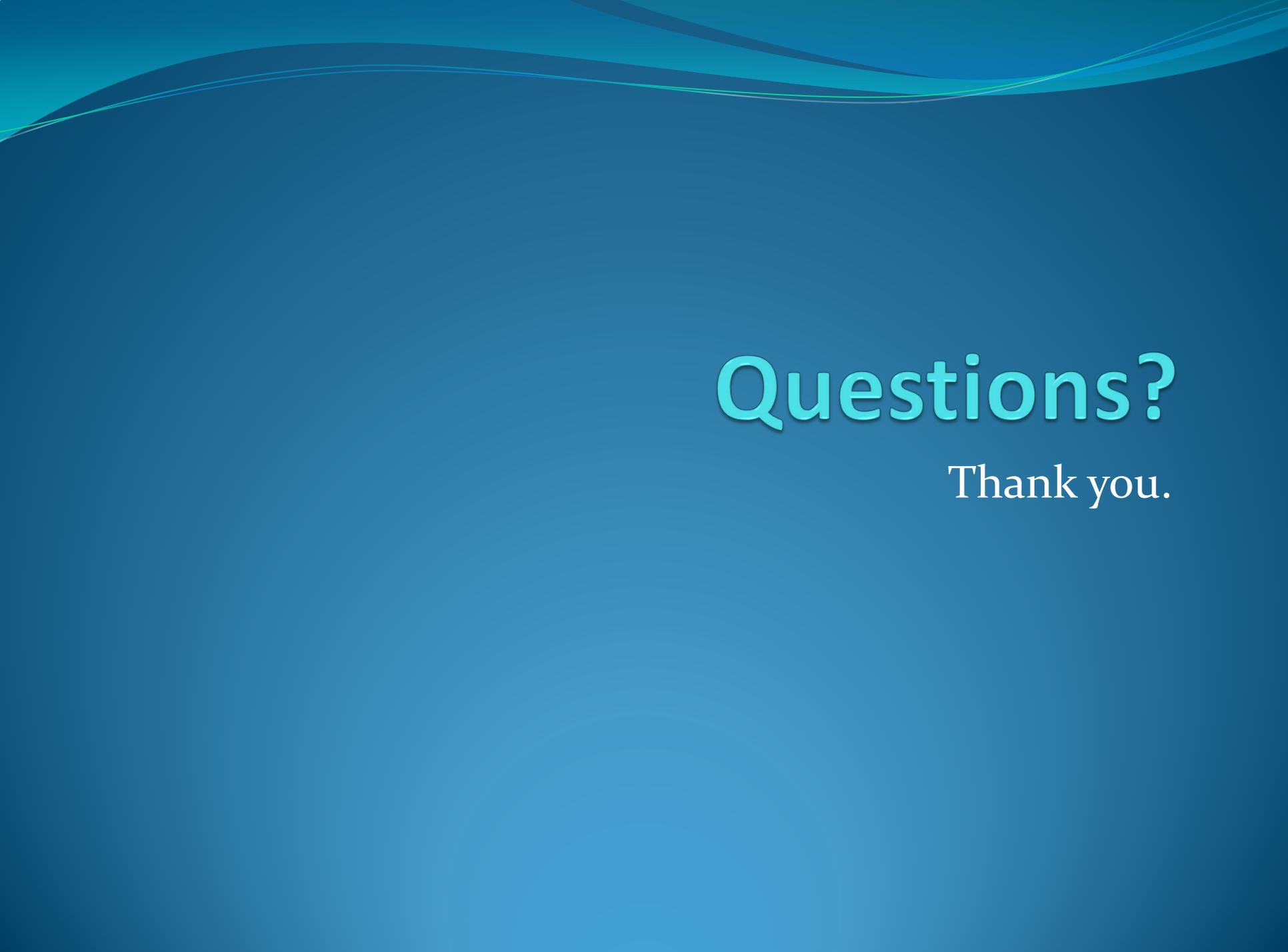
- Update O&M Manuals with Emergency Plans, CSO SOPs, Asset Management Plans
- Submit DMR's for monthly solids/floatables, Precipitation, and duration of discharge
- System Characterization including GPS location of all pump stations, regulators and outfalls
- Review all Rules/Ordinances/Sewer Use Agreements to require I/I removal, submit schedule for revisions
- Delineate all combined sewer and separate sewer areas in the system
- Install new signs at all outfalls
- Create telephone hot line or website to inform public of when CSO's are discharging

Year One Requirements – LTCP

- **Long Term Control Plans:**
 - System Characterization (detailed engineering hydraulic analysis of all aspects of the sewer system study area)
 - Compliance Monitoring Report (ambient water monitoring data upstream, downstream and near CSO of selected parameters)
 - Choose demonstrative or presumptive approach
 - Coordinate with other members of hydraulically connected system

Proposed Schedule Changes

Description	Draft Permit	3 Yr LTCP	5 Year LTCP
Emergency Plan	EDP	EDP + 6	EDP + 6
DMR Submittal (req. change on flow to 6 months)	EDP	EDP	EDP
System Characterization List (PS, CSO, WWTP)	EDP+3	nc	EDP+6
Asset Management	EDP+3	EDP+6	EDP+12
GPS system components	EDP+4	nc	EDP+6
Delineate combined and separate areas on GIS (not pdf)	EDP+4	EDP+12	EDP+12
Install Proof of Outfall Signs	EDP+6	n/a	n/a
Compliance Monitoring Work plan	EDP+3	nc	EDP+6
System Characterization detailed Workplan	EDP+3	nc	EDP+6
System Characterization detailed Report	EDP+12	nc	EDP+18
Compliance Monitoring Report	EDP+12	nc	EDP+18
LTCP Step 2 – Alternatives Evaluations	EDP+24	nc	EDP+36
LTCP Step 3 – Selection, Implementation, Schedule	EDP+36	nc	EDP+60



Questions?

Thank you.