OWEA Annual Conference 2010

Options for Solids and Floatables Control

June 15, 2010

HAZEN AND SAWYER
Environmental Engineers & Scientists

Why Solids and Floatables Control?

- Nine Minimum Controls
  - Control of Solids & Floatables Materials in CSOs
  - Pollution Prevention to Reduce Contaminants in CSOs
- Narrative Water Quality Standards
  - Waters shall be free from floating materials entering as result of human activity in amounts to be unsightly or cause degredation – OAC 3745-1-04B
- Pollution Discharge Elimination Permits
  - None as a result of discharge in unnatural quantities injurious to designated use - MI0022802
- Consent Orders
  - Engineering study of past , current and future measures to control solids and floatables materials – Cincinnati MSD
  - Assess construction of facilities for removing floatables from CSOs as an element of LTCP – Toledo

Why Solids and Floatables Control?

- Because it just makes sense.

Introduction

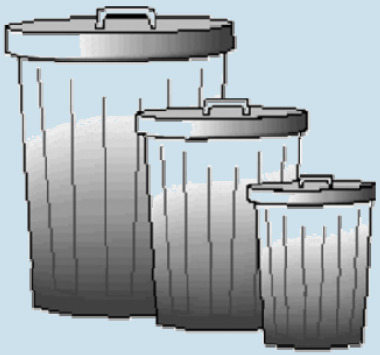
- Source Controls
- In-System Controls
- End-of-Pipe Controls
  - Technology Description
  - Design Considerations
  - Effectiveness
  - Cost
  - O&M Requirements
- SD1 Approach

Source Controls

- **Source Controls – Pollution Prevention**

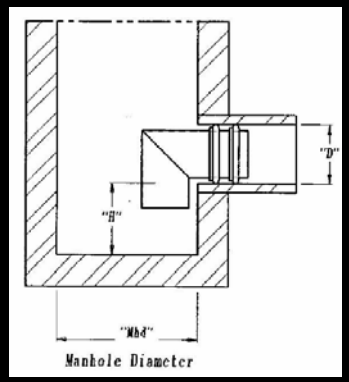
Town of Wrightsville Beach

Trash it,
don't flush it!



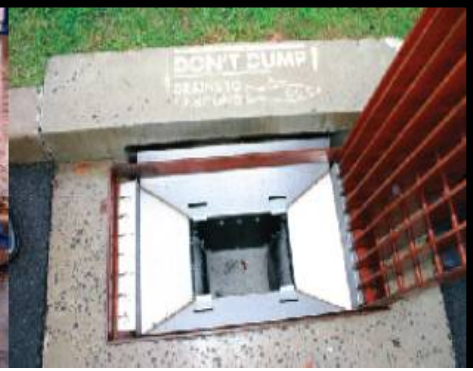
Source Controls

- Source Controls – CB Modifications



Source Controls

- Source Controls – Filters



In-System Controls

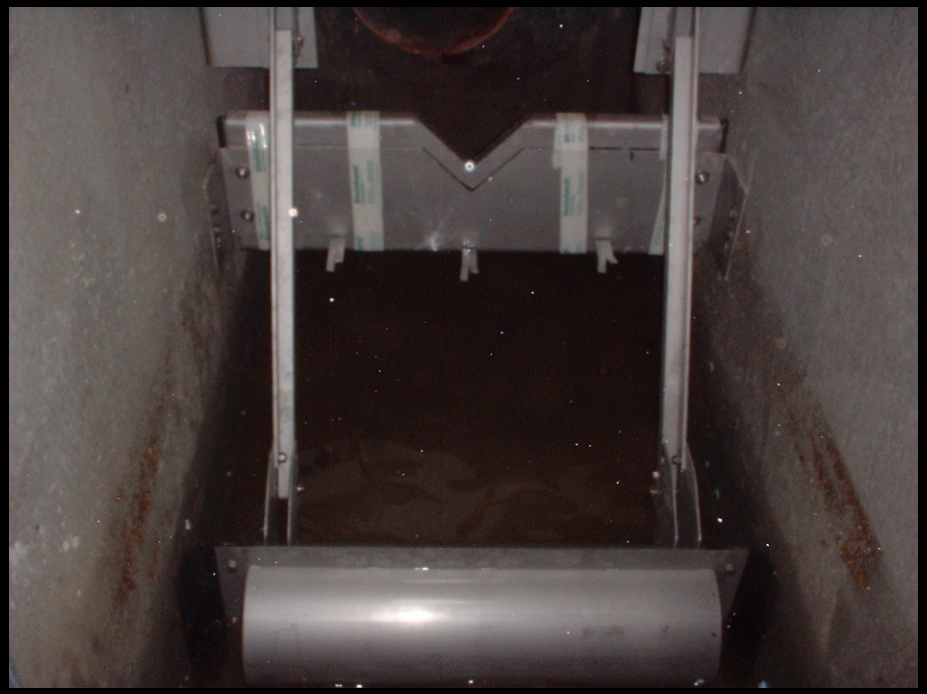
- In-System Controls – Simple Bar Racks

In-System Controls

- In-System Controls – Static Baffles

In-System Controls

- **In-System Controls – Dynamic Skimmers/Baffles**



In-System Controls

- In-System Controls – Mechanically Cleaned Screens

In-System Controls

- In-System Controls – Proprietary Controls
  - Hydrodynamic Separators
  - Nutrient Separating Baffle Box
  - Others

End-of-Pipe Controls

- End-of-Pipe Controls - Nets

End-of-Pipe Controls

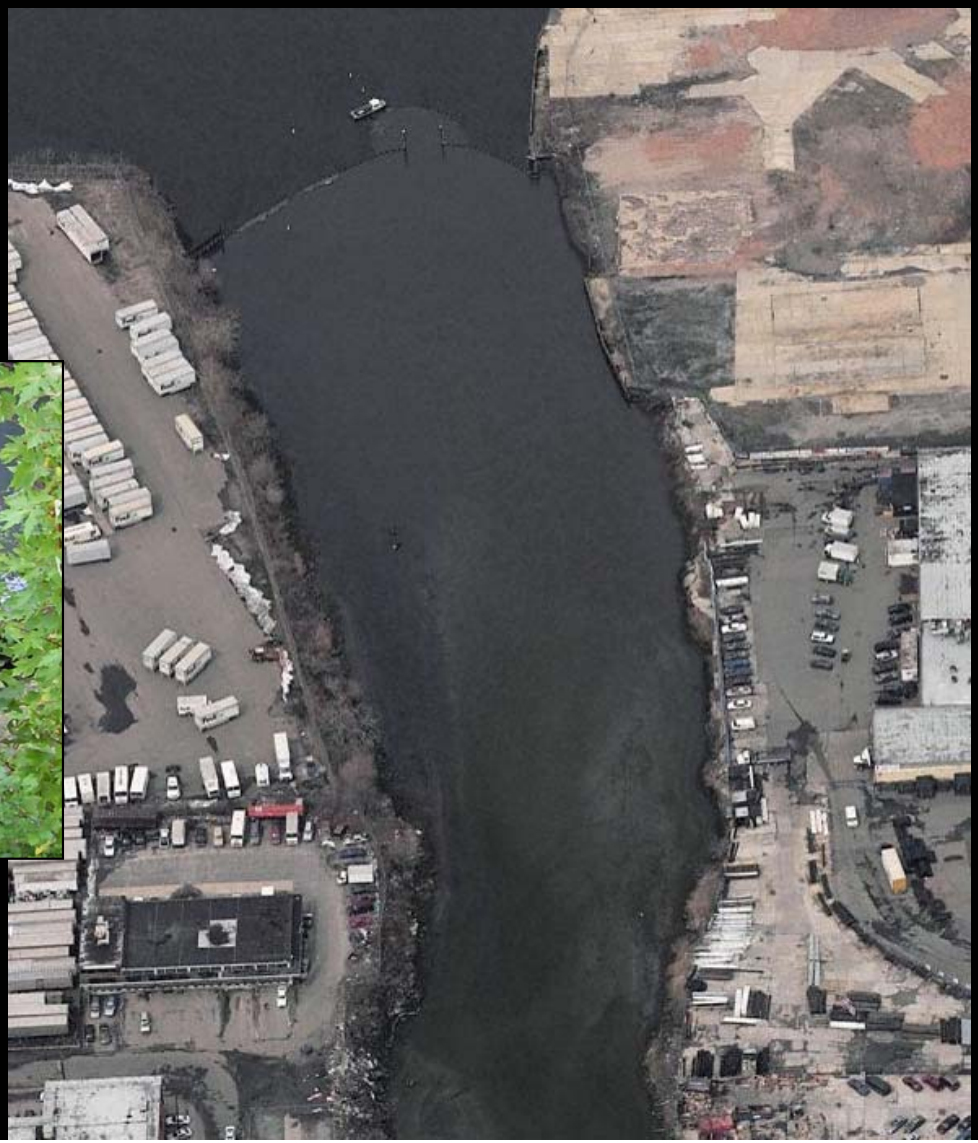
- In Receiving Water - Nets

End-of-Pipe Controls

- End-of-Pipe Controls - Nets

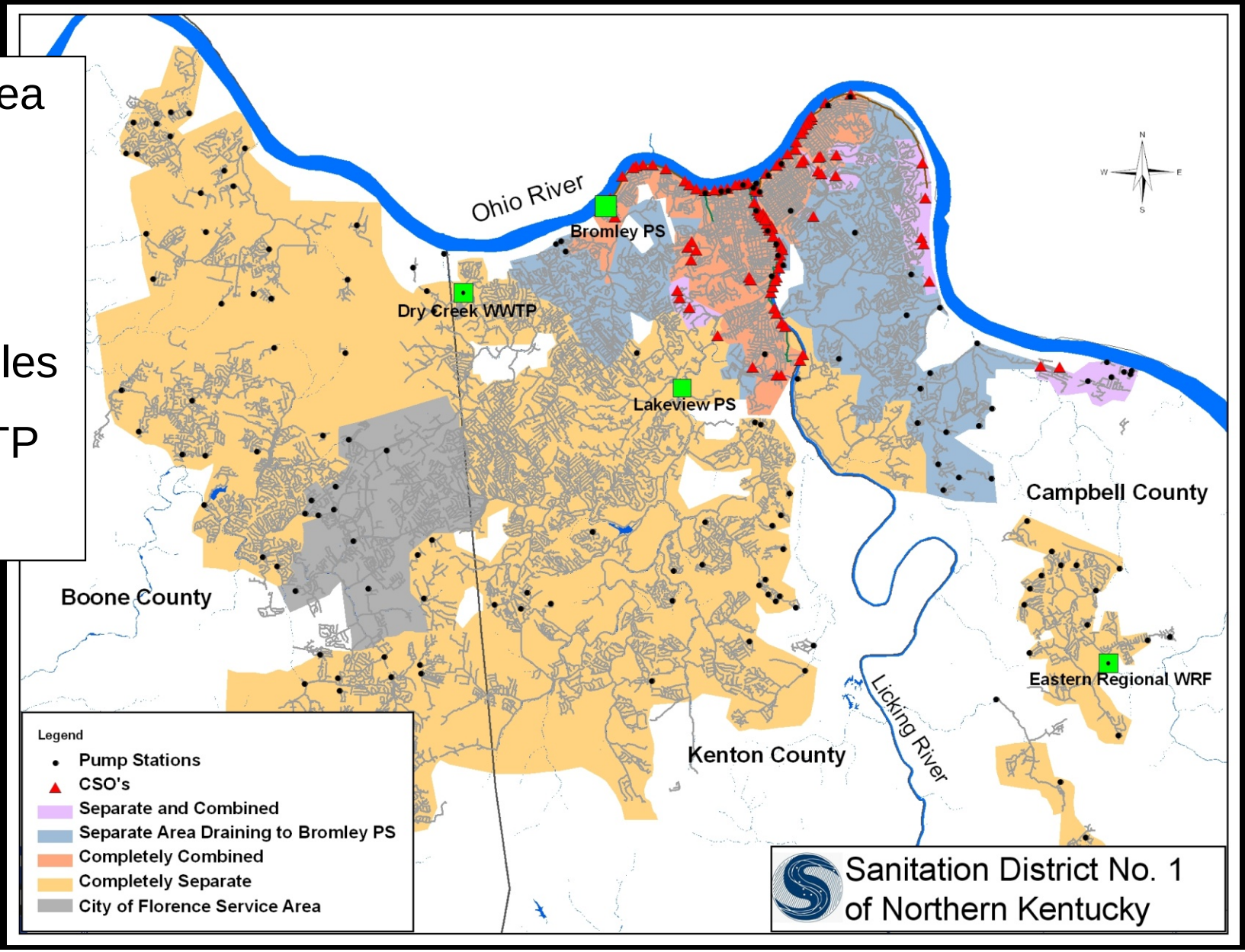
End-of-Pipe Controls

- In Receiving Water - Booms



Sanitation District No. 1 Approach

- Total service area ~ 200 sq miles
- >1,600 miles of sewers
- >42,000 manholes
- 2 regional WWTP
- 96 CSOs



Sanitation District No. 1 Approach

- Final S&F Program Options
  - Nets on elevated outfalls an element of any approach
  - Source Controls an element of any approach
    - Public education program (sanitary trash)
    - Street cleaning (street trash)
    - Catch basin modifications and cleaning (street trash)
    - Grit pits (grit and other settleable solids)
  - Option 1: Simple S&F Controls everywhere
  - Option 2: Simple S&F w/ engineered controls
  - Option 3: No simple only engineered controls

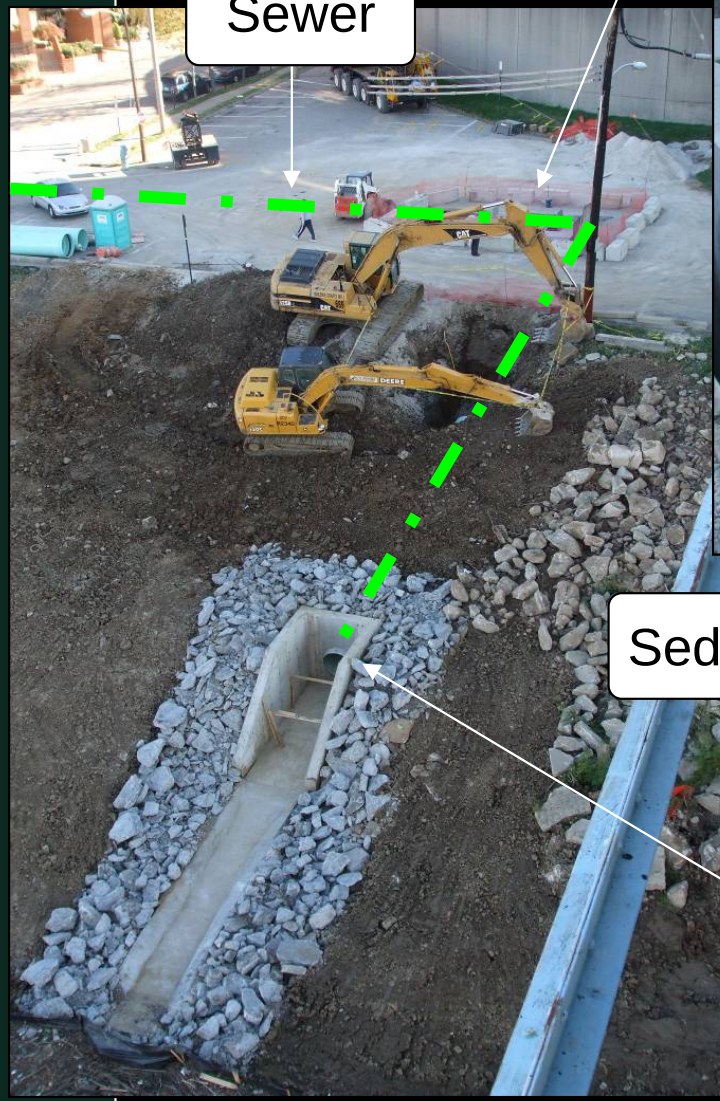
Simple S&F Controls – Bar Racks & Baffles

Simple S&F Controls – Net Bags

Net Bags

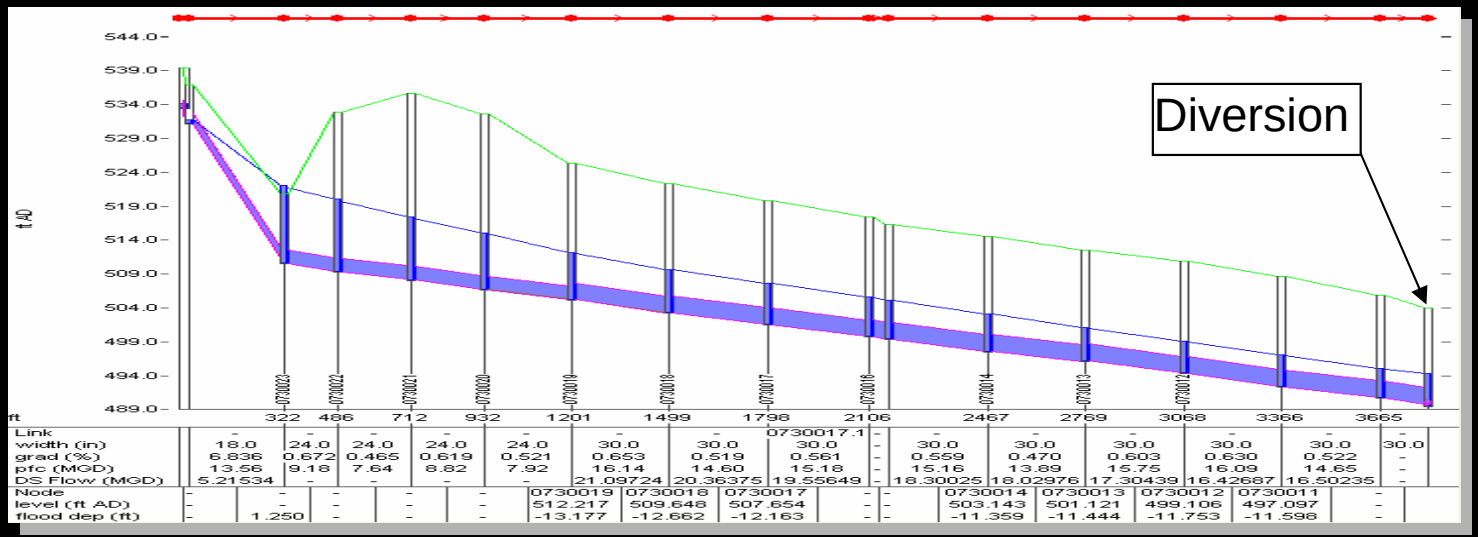
Elevated Outfall Pipe

Engineered S&F Control

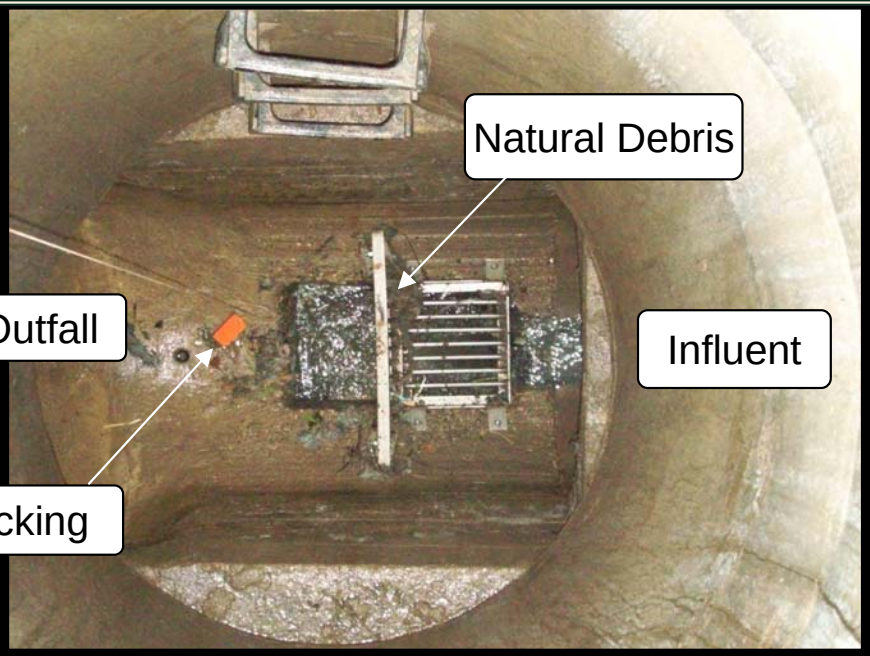


Simple S&F Controls Design Criteria

- Selected nets, bar racks, weirs, and baffles
- Hydraulic criteria
  - Screen (assumed blinded) and weir heights set to avoid basement backups (HGL >8’ below grade with control installed)
  - 25 yr, 1 hr & 30 min storms with no river influence
  - 2 yr, 1 hr & 30 min storms with Ohio River at stage 40’

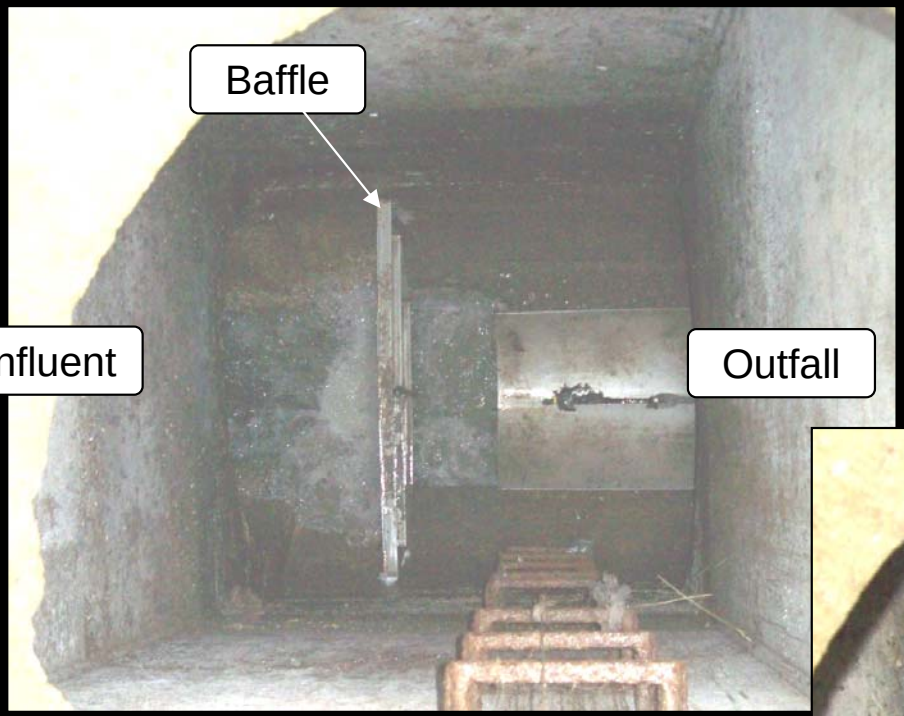


Select Observations – Bar Racks

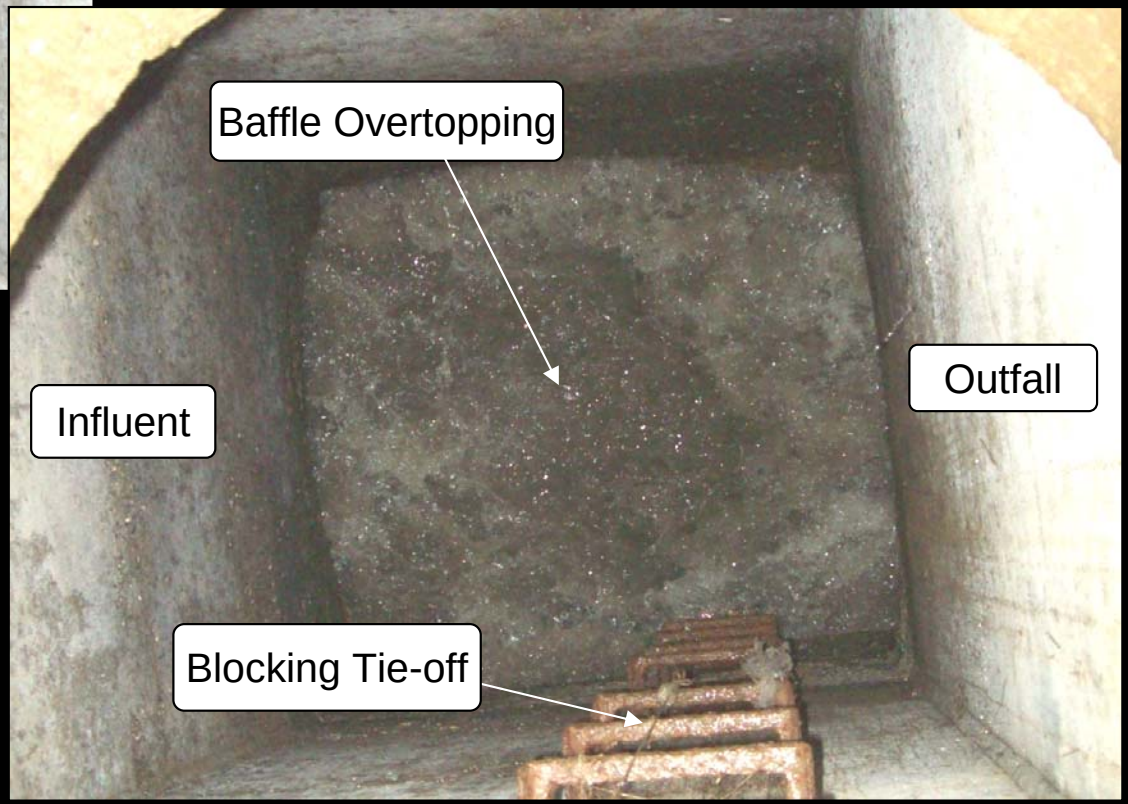


Overtopping ~ 6 month storm event

Select Observations – Baffles



Overtopping ~ 6 month storm event



Select Observations – Nets (Logged Changes)

- Mary Ingles
  - 5 lbs (12/4/07)
  - 6 lbs (12/5/07)
  - 1½ lbs (12/11/07)
  - 8 lbs (12/26/07)
  - 5 lbs (6/19/08)

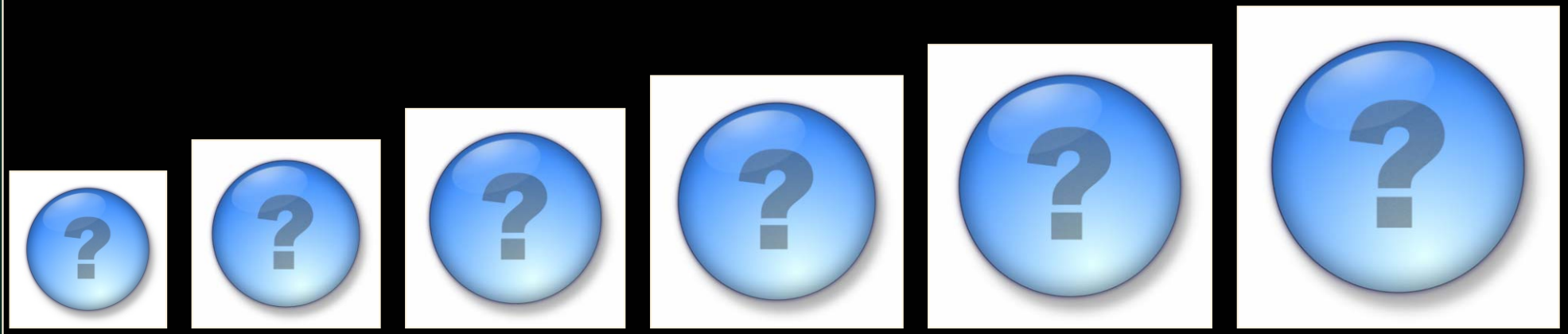
Pilot S&F Control Pilot Program

- Summary of findings:
  - Bar racks ineffective due to blinding and height limitations due to hydraulic restrictions.
  - Weirs and baffles marginally effective – need good hydraulics at CSO diversion (check underflow velocity).
  - Nets on elevated overflow outfall pipes highly effective as long as velocities are not high (damage nets).

Final S&F Control Program

- Option 2
  - Install simple controls (weirs/baffles and nets) where configuration and hydraulics allow, and necessary effectiveness anticipated
  - Engineered controls would be through watershed planning (further pilot studies)
  - Source controls – public education, street cleaning, catch basin modifications & cleaning, grit pits, regulate construction site runoff
  - Other NMC implementation to benefit

Questions?



For more information:

"Skimming the Surface – Options for Solids and Floatables Control" *Water Environment & Technology*, Vol. 21, No. 5, May 2009: 61-68. Print.

Acknowledgements

- **Sanitation District No. 1**
- **Louisville MSD**
- **NEORSD**