

NJWEA - Fall Tech Transfer 2024 – Infiltration and Inflow

Assessing How N.J. Combined & Sanitary Sewer Needs Will Be Met



NJWEA Fall Technology Transfer Seminar
October 23, 2024 Collection System O&M
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Forensics & Training LLC, Rutgers CE Instructor

1

Presentation Objectives - Cont'd.

- Extraneous flows difficult to locate
- NJWEA Sewer Inventory as of 2022
- Sewer Rehabilitation & Replacement
- New Jersey Infrastructure Bank

4

Even A Few Rectangular Manhole Covers



2



NEW JERSEY
EFFLUENTS
New Jersey Water Environment Association
Vol. 18, No. 4, February 2020
NEW JERSEY STATEWIDE SANITARY/
COMBINED SEWER INVENTORY STATUS
See Article on Page 5

5

Presentation Objectives

- Sewer ages 1854 to 2024 (170 year)
- Earliest sewers were combined
- Combined / separated sanitary
- 1972 WPCA CCTV Inspections
- Show some sewer problem findings

3

Some New Jersey Facts

- 5th Smallest state in USA
- Most Densely Populated State
- Population density is still growing
- Has some of the oldest combined & vitrified clay sanitary sewers in USA
- Today, new sanitary sewers are still being constructed

6

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Recent NJ ASCE Report Card Wastewater Grades

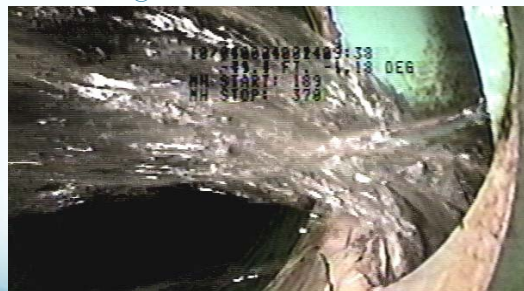
2016 Report card grade D

2020 Report card grade D+

2024 Report card grade ?
(\$17.5 Billion Needs Grade)

7

Infiltration @ PVC lateral connection to sewer main



10

N.J. Combined Sewer Construction Began Late in the 1870's

- Early wastewater flows were discharged to the Hudson, Passaic & Delaware Rivers
- 32 older NJ communities have 1 or more CSOs totaling 221 CSOs in NJ
- Most NJ combined sewers discharge to the Hudson River
- Sewage plants followed (early 1900's) to stop the dry weather discharge of sewage into the rivers

8

Obstructed 8" & 15" Dia. Siphon Pipes



11

History of Infiltration/Inflow

- 1972 Clean Water Act -restore & maintain the integrity of the nation's waters
- Mid 1970's sewer cleaning & TV inspection began to locate some sources of Infiltration/Inflow (I/I)
- EPA objective – reduce I/I to lower the cost of sewerage treatment plant upgrades
- Engineering firms have performed NJ I/I sewer investigations from mid 1970's to present day
- 2024, many NJ sani. sewers still have I/I problems

9

Obstructed Siphon Inlet Pipes



12

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Typical Combined Sewer Cleaning
Program Results



13

20 ft long by 7 ft. wide Void // to
deteriorating brick sewer



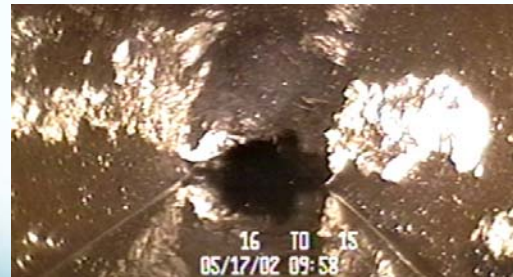
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Free flowing egg shaped brick sewer



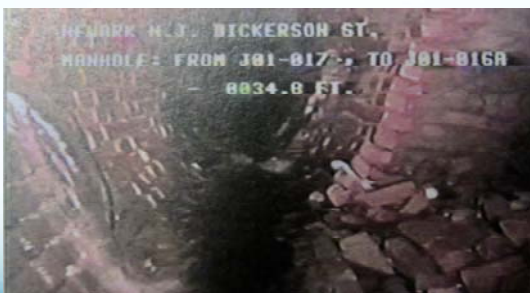
14

Grease & Root Obstructed 8" Dia. VCP



17

Junction MH for Two Egg-shaped Combined Sewers



15

Obstructed 12" Dia. VCP



18

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12" Dia. VCP Parallel Relief Sewer Obstructed by
Intruding Utility
Pole, Rocks & Sediment



19

Operators, WTPs, Sanitary Sewers & Septic Systems

2022 NJDEP collection system listing had 733 systems
with licensed operator names

NJWEA's Sanitary/Combined Sewer Inventory identified:

116 WWTs ranging - PVSC 500 MGD to Mendham Boro 0.35 MGD

487 municipalities with combo or sanitary sewers

102 municipalities with some septic systems

76 municipalities with 100% septic systems

22

18 " Dia. RCP Sanitary Interceptor
With Wall Deterioration



20

Inventoried or Projected Components for 487 NJ Municipal Sewer Systems

- 25,218 miles Municipal Sewer Piping
- 1,444 plus miles Force Mains
- 583,419 Manholes - Covers Visible
- 2,541 Pump Stations – Visible
- 26,773 miles Ser. Conn. Sewer Piping
- 24,901 miles *Earth's circumference*
- *Cursory Cost Estimate \$ 33.56 billion*
- *209 sewer systems not included*

Over 254,261 Septic Systems

23

18 " Dia. RCP Sanitary Interceptor With
Wall Deterioration



21

Reported Mapping & Equipment

*Answers to these topics indicate a sewer dept.'s
effectiveness & maintenance needs*

- 211 had only paper maps
- 88 GIS/GPS mapping
- 3 working on Asset Mangmt. Program
- 32 mini cameras for PBSC inspections
- 38 mainline CCTV
- 4 mainline CCTV with a lateral launcher mini camera
- 1 PBSC inspection/repair program
(now suspended)

24

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Influence of Population Growth

- NJ densely populated - close to full build out? NO.
- Growth potential exists throughout N.J.
- Some municipalities are replacing old buildings with buildings that produce more sewage.
- Vacant lots are becoming multi level apartment complexes
- An abandoned RR row, a single story house lot & a small company lot became a 90 unit apartment complex.

25

90 Unit Apartment Complex @ site previously with one house & a small business



28

More Sanitary Sewer & Housing Construction are Ongoing in NJ



26

Effectiveness of I/I Removal from Sanitary Sewer Systems

Reducing I/I From Municipal Sewers

- Investigate to identify **actual** sources
- Eliminate water main leaks & I/I sources
- May reduce sewer system I/I by 20 to 40 %

NJ EPA & DEP Oversight Inspections

- Typically 1 day municipal sewer inspection
- Check for compliance with required record keeping, manuals, mapping & reporting
- Inspect pump stations
- Look into a few MHs

29

90 Unit Apartment Complex @ site previously with one house & a small business



27

Who Influences Sanitary Sewer System Management ?

- Politicians
- Developers
- State & Federal Regulatory Agencies
- Wastewater Dischargers
(Residential, Commercial & Industrial)
- Sewer Authorities & Departments

30

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Private Building Sewer Laterals

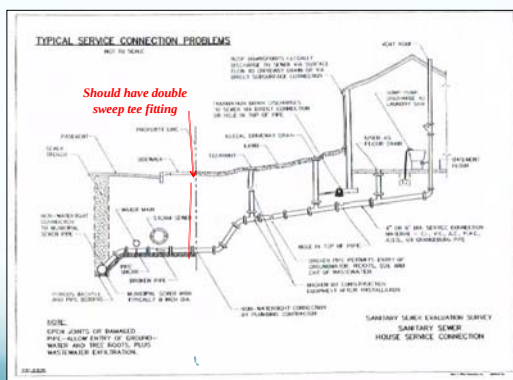


31

The New Jersey Infrastructure Bank

- Formed in 1985
- Provides low cost funding to protect public health, water quality, NJ natural resources & supports *economic growth*.
- Leverages NJ & Federal Funds with tax-exempt bonds to maximize annual projects.
- Wastewater systems, combo sewer overflows, safe drinking water supplies, open space acquisition, & storm sewer systems.

34



32

NJ Infrastructure Bank (Sewers)

2020 \$484.4 million for 80 sewer projects

- 2021 \$1.228 billion for 175 sewer projects
- 2024/5 \$5.61 billion for comb./sani. 553 projects
 - \$ 4.472 billion for sewer rehabilitation
 - \$ 898.9 million for new sewers
 - \$ 239.2 million for CSOs

35

Private Building Sewer Laterals

N.J.A.C. 7:9A Every building has a separate pipe called a sewer lateral that connects to the sewer main. Property owners are responsible for maintaining, repairing and replacing their sewer lateral from the building to the point where it discharges to the sewer main.

*Some municipalities repair damaged sewer laterals below the roadway as *part of a roadway restoration contract*.

*Some municipalities require a CCTV inspection of PBSC when house is being sold & check for roof drains & sump pump connections.

****One municipality required a CCTV inspection of PBSC & inspected for illegal discharges when a house is for sale. All problems must be fixed before sale was approved.***

- Some Sewerage Utilities add a small fee to all sewer bills for a sewer lateral fund to assist in paying for lateral repairs.

33

CSO Locations Listed for Infrastructure Bank Funding

- | | |
|-----------------|------------|
| • Atlantic City | Newark |
| • Bayonne | Paterson |
| • Berkley Twp. | Pennsauken |
| • Camden | PVSC |
| • Hoboken | Rahway |
| • Jersey City | Secaucus |

36

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Can We Improve NJ's Combined/ Sanitary Sewer Report Card Grade?

- Will Regulatory agencies require implementation of effective Sewer Asset Management Programs?
- Will municipal sanitary sewer staffs be adequately manned, trained, equipped and funded?
- How can private building sewer owners be motivated to eliminate their I/I ?
- What Future Report Card grade can we strive for ?
- How much annual future funding is needed?

37

End of Presentation



Any questions or comments?

38