

Removal of Ocean I-I and Restoration of Sewer Capacity Replacement of the Gravity Sewer at Cedar Point Scituate, MA

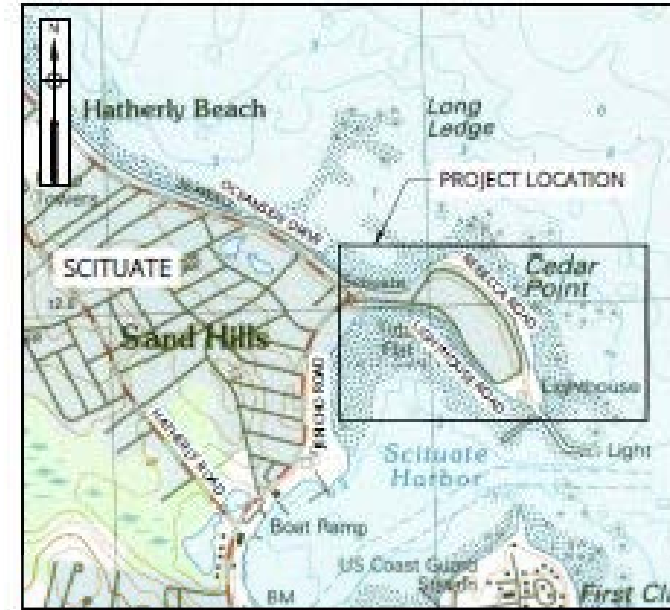
William Branton, Sewer Superintendent
Paul Millett, EP

January 2022

ENVIRONMENTAL
 PARTNERS

Background

- Excessive Inflow/Infiltration (I-I) Problem
- Ocean/Storm I-I impacts
- Major Coastal Flooding History
- Town Sewer System at Capacity
 - No new connections allowed
- Pressure Sewer Alternative Rejected
- Neighborhood wanted a gravity system



VICINITY MAP
1" = 1000'



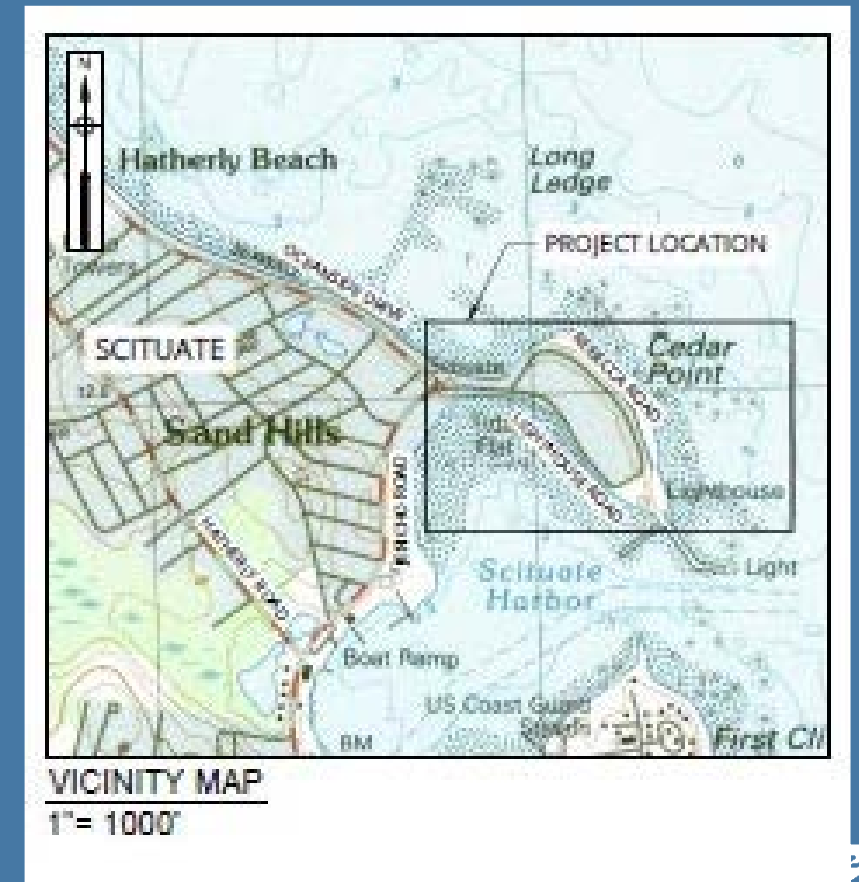
Town Perspective

- Technical and Political Drivers
- Technical:
 - Restore Capacity/Watertightness
- Political Aspects:
 - Satisfy Residents desire to replace the gravity system
 - Reasonable betterment cost
- General: Minimize complaints during construction



Design Summary

- Remove and Replace approx. 4350 ft of 8" and 10" Sewer
- Remove and Replace 127 laterals – new 6" PVC
- Replace 30 Manholes
- Maintain Sewer service
- Highly visible Environmental location



Design Phase

- Goals
 - Water-tight system – Manholes, pipe joints
 - Laterals: Unknown conditions; Some were lined
 - Maintain flow during construction
 - Neighborhood Expectations were high; Minimize summer season impacts
 - Costs: \$6.7M Engineer's Estimate

Schedule:

Design Jan-April 2020...Survey; Soil Borings; Basis of Design Report

Permits: Con Comm – virtual hearing.

Bid – June 2020 during Covid.

7 bids

Award – Albanese D&S Construction. \$6.33M bid

Start Construction: Sept. 2021



Design and Construction Challenges

- Challenges
 - Peninsula; One way traffic pattern
 - Maintain “live” sewer while installing new pipe
 - Bypass system
 - Tidal fluctuations and GroundWater Impacts
 - Environmental Compliance – Con Comm
 - Neighborhood Expectations were High.
- Covid!. During Final Design, Bidding and Construction



Construction Progress

- Setup bypass
- Lead time on Fiberglass Manholes – key issue
- Started on house services first – replace section of lateral from road
- Mainline work: Started November 2022
- Install Mainline (deep, wet, support of excavation)
- Slow production: 1-2 pipes per day
- Weekly –Friday meeting with Town, EP, AD&S and Neighborhood



Construction Progress (continued)

- Mid-Sept 2020 to end of May 2021
- No summer impacts
- Permanent paving: Fall 2021
- Contractor very cooperative;
 - Resident Engineer and Neighborhood reps frequent communication
- One piece Fiberglass Manholes – concrete base needed;
- Inverts need to be right on – no room for adjustment – no boot
- All pipe joints (main and laterals) double wrapped.
- Town Hall – very few complaints!!



Construction Photos

- Bypass
- Staging Area
- Mainline
- New One-piece Manholes
- Double wrapped pipe joints
- House Foundations and tie-ins
- Paving and Restoration



Construction Photos

- Staging Area
- Dewatering – Wellpoints
- High tide on Road!
- Laterals Replaced first



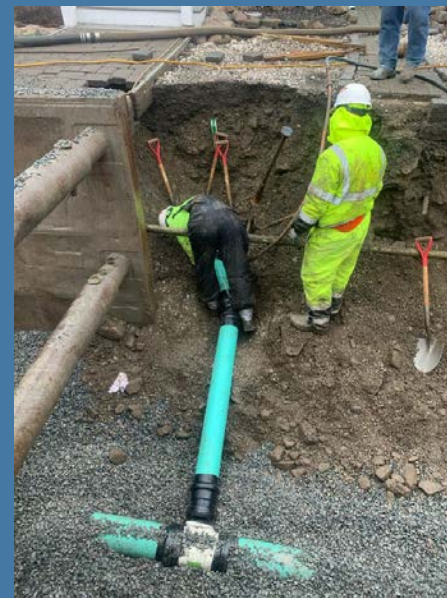
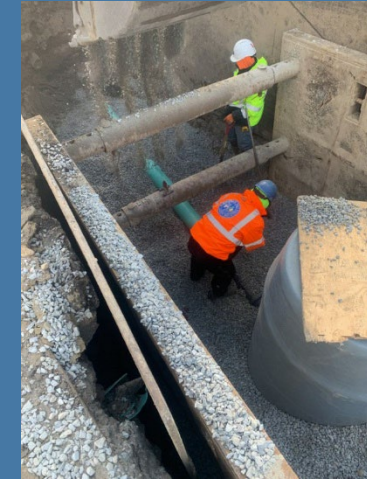
Construction Progress (continued)

- Findings:
 - Old pipe and especially laterals in poor condition
 - Many laterals severely corroded (photo)
 - Previous lining work on laterals – poor seal of liner to old pipe
 - Manholes: Poor condition; punctured for connections; frames not tight
 - Old Wood sheeting on first 450 feet of sewer: Left in place by prior contractor
 - Needed to be removed
 - Costs: Minor change orders: \$150k on \$6.33M.



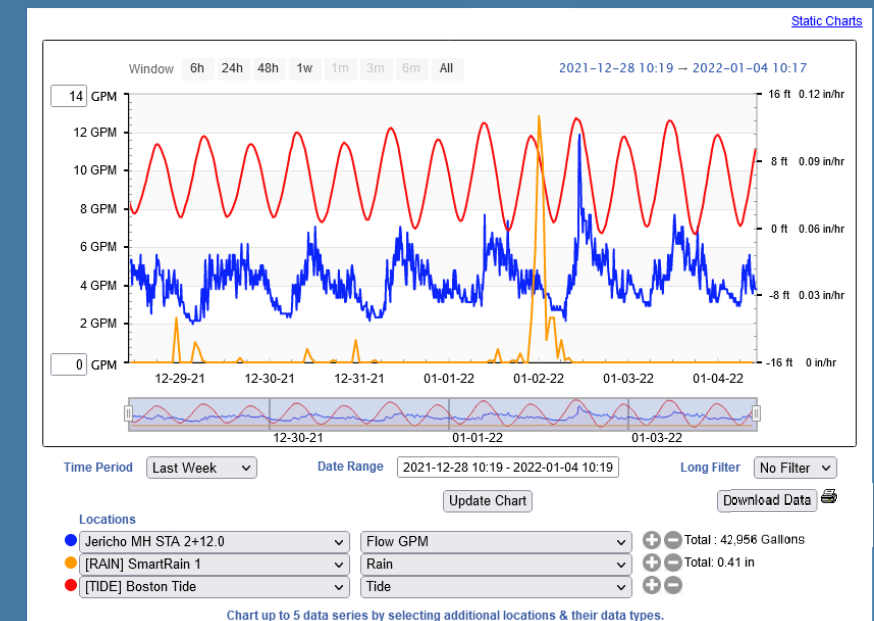
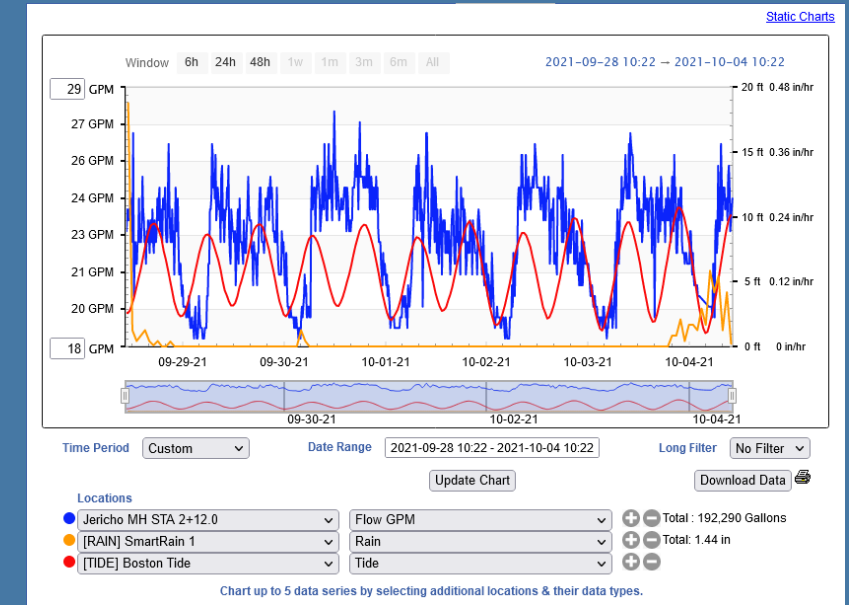
Construction Photos

- Deep Sewer Excavation
- Narrow roads/utilities/poles/
- Unsuitable materials/old wood sheeting
- Slow Production: 20-35ft/day
- Dewatering



Construction Progress (continued)

- Did it Work?
- Flow reduction is real: 25-40 gpm is now 4-8 gpm
- Estimated 80-90,000 gpd is now 15-20,000 gpd.
- Visibly less flow in manholes
- Downstream Meter: Trend has changed.
- Less direct reaction to tide cycles.
- Downstream sewer pump station – running less



Sewer System Benefit

- Local and Town-wide benefit
- Restored Capacity for other new connections
- Major reduction in I-I
- New Town standard for mainline and laterals – double wrapped pipe joints
- On-going Town-wide I-I work in similar “coastal” areas



Restoration – Fall 2021

- Final Restoration
- Roadwork
- Driveways
- Island



Conclusion

- Challenging and Successful Project
- Flow Reduction is Real.
- Construction went well with a cooperative Contractor.
- Minor change orders. \$170k.
- Neighborhood issues minimized through frequent communication
- Betterment cost – Net project cost after \$2.2M grant and \$2.5M Town contribution
- Average \$17.8k per property.



