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Pearl Street Pump Station Conceptual Design Update

Brad Weeks, Director of Water Resource Protection

Megan McDevitt, PE, Woodard & Curran

July 16, 2024

Pearl Street Pump Station

- ✓ Originally constructed in 1972
- ✓ Receives flow from western portion of the City's collection system
- ✓ Pumps flow to the WWTP via a 24-inch force main located beneath the Fore River
- ✓ Maximum pumping rate of 14.8 MGD

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Pearl Street Pump Station - Observed Deficiencies

- ✓ Pumps beyond useful life
- ✓ Electrical systems beyond useful life
- ✓ Mechanical systems beyond repair
- ✓ Undersized wet wells that can't be isolated
  - ✓ Recently unable to shutdown wet well to repair failed pipe
- ✓ Grit system undersized for larger storm events
- ✓ Station located within floodplain
- ✓ Original generator backing up the standby generator due to age and questionable reliability
- ✓ Safety hazards throughout
  - ✓ Inadequate fall protection at floor openings
  - ✓ Insufficient lighting

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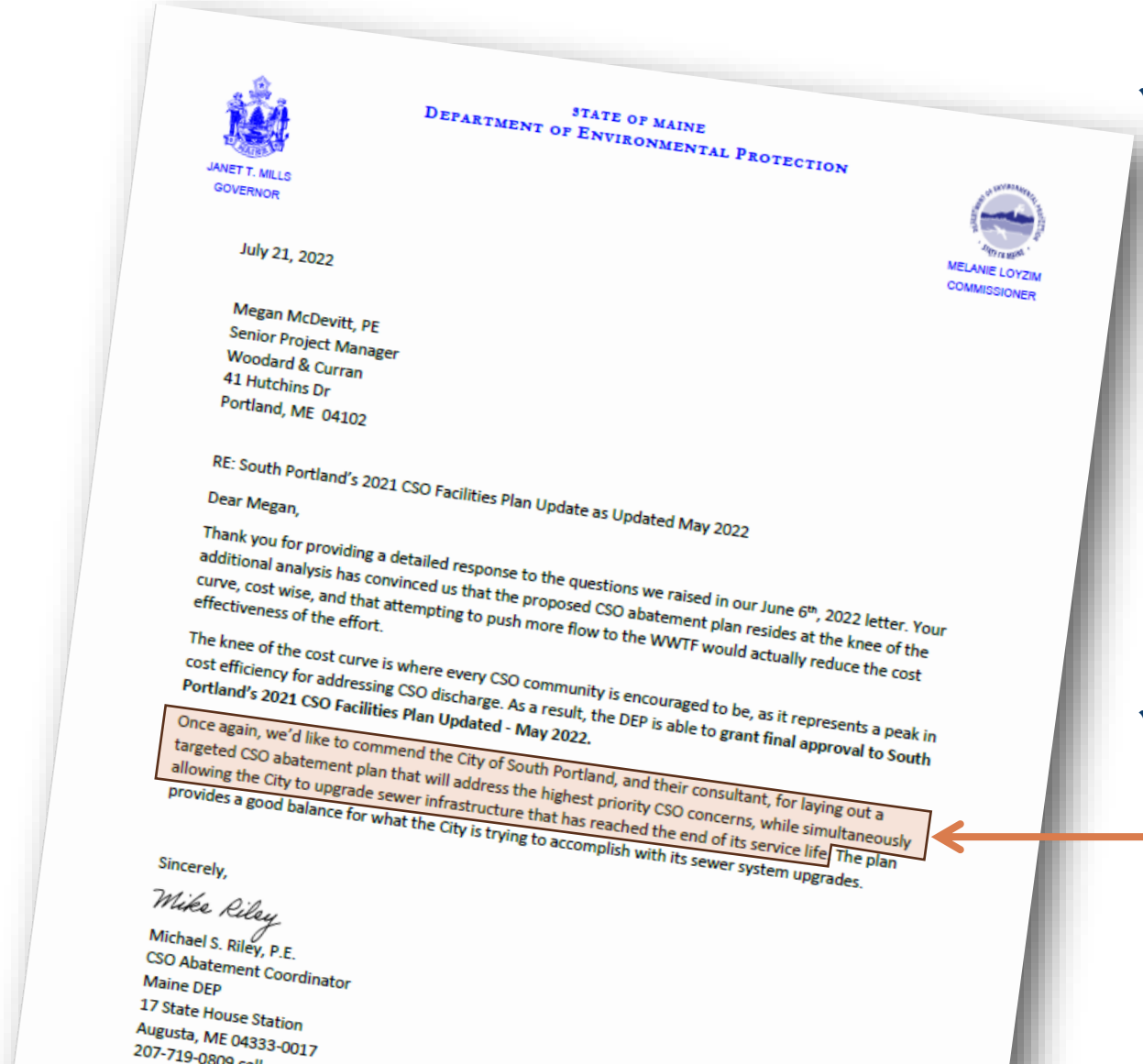
South Portland CSO Progress - DEP Permit Approval



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNOR

MELANIE LOYZIM
COMMISSIONER

July 21, 2022

Megan McDevitt, PE
Senior Project Manager
Woodard & Curran
41 Hutchins Dr
Portland, ME 04102

RE: South Portland's 2021 CSO Facilities Plan Update as Updated May 2022

Dear Megan,

Thank you for providing a detailed response to the questions we raised in our June 6th, 2022 letter. Your additional analysis has convinced us that the proposed CSO abatement plan resides at the knee of the curve, cost wise, and that attempting to push more flow to the WWTF would actually reduce the cost effectiveness of the effort.

The knee of the cost curve is where every CSO community is encouraged to be, as it represents a peak in cost efficiency for addressing CSO discharge. As a result, the DEP is able to **grant final approval to South Portland's 2021 CSO Facilities Plan Updated - May 2022.**

Once again, we'd like to commend the City of South Portland, and their consultant, for laying out a targeted CSO abatement plan that will address the highest priority CSO concerns, while simultaneously allowing the City to upgrade sewer infrastructure that has reached the end of its service life. The plan provides a good balance for what the City is trying to accomplish with its sewer system upgrades.

Sincerely,

Mike Riley

Michael S. Riley, P.E.
CSO Abatement Coordinator
Maine DEP
17 State House Station
Augusta, ME 04333-0017
207-719-0809

- ✓ MaineDEP approved the CSO Facility Plan Update on July 21, 2022. Approval includes:
  - ✓ Implementation of the 4 recommended significant infrastructure improvement projects over 10 years.
  - ✓ Continued targeted infiltration renewal annually
  - ✓ Approval of an Emergency Overflow on both the east and west collection systems at the appropriate future time.
- ✓ MaineDEP commended the City for developing a plan that abated CSOs while simultaneously upgrading sewer infrastructure at the end of its service life

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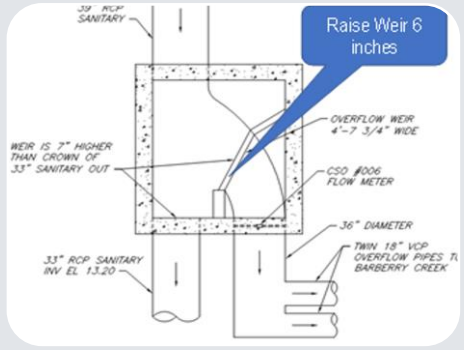
CSO Progress – DEP Approved Recommendations



Alternative 7

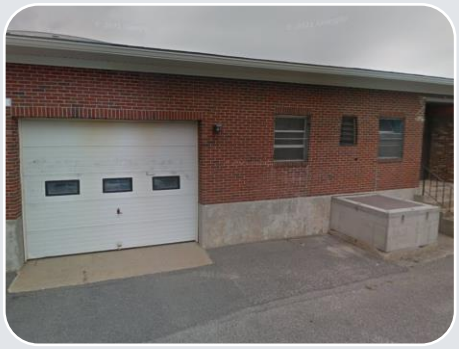
Raise CSO #006 Weir

- 6" to reduce overflows at CSO #006. (DEP Primary Directive)

Alternative 9

Increase Conveyance Capacity from CSO #006 to Pearl St Pump Station

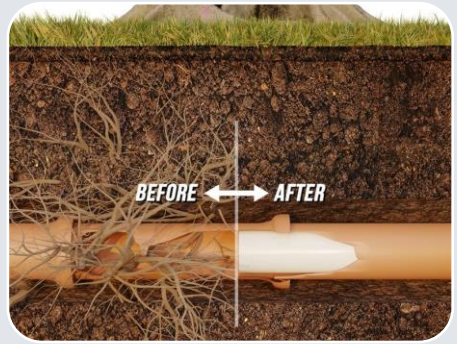
- Replacing approximately 2,900 linear feet of piping along Greenbelt Walkway; North Kelsey Street; Pearl Street
- Piping sized to eliminate overflow at CSO #005 and CSO #006 during the 5-year design storm. (DEP Primary Directive)



Alternative 10

Increase Pearl Street Pump Station Capacity

- Upgrading pump station from a peak capacity of 16 MGD to 18 MGD



Alternative 15

Targeted Infiltration Study & Renewal Program

- Implementation of an annual sewer lining program to reduce infiltration into the collection system

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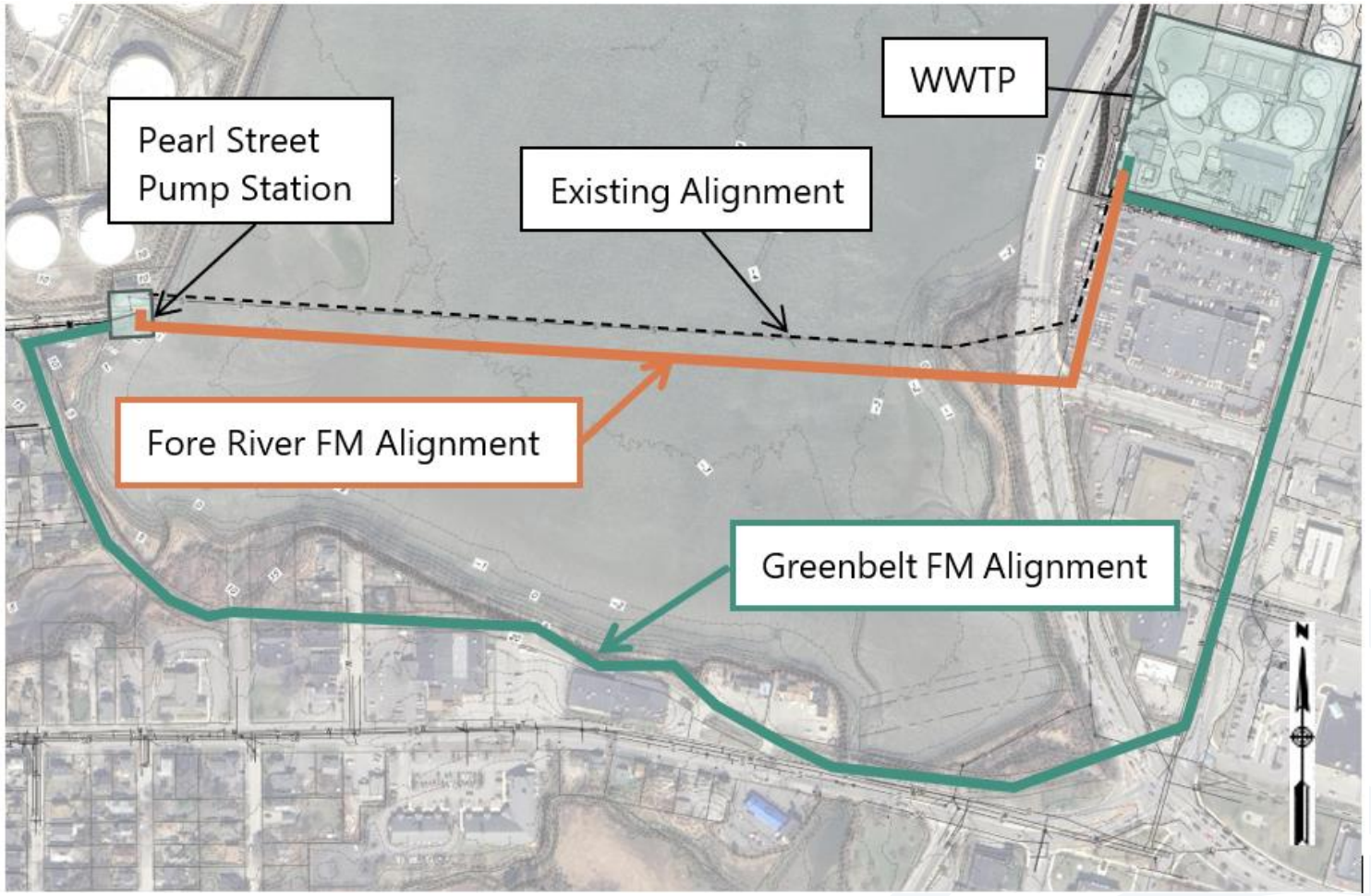
Pearl Street Upgrades – Project Objectives

1. **Increase pump station capacity to 18 MGD** Peak Wet Weather Flow in accordance with the recommendation of the City's permitted 2022 CSO Facilities Plan update;
2. **Improve the pump station's headworks performance** for screening and grit removal up to and including the Peak Wet Weather Flow;
3. Replace the force main with **multiple new force mains to increase capacity, redundancy, and ability to handle wide range of flows**; and
4. Incorporate **climate change considerations**, such as sea level rise, in accordance with the City's implemented climate adaptation requirements and measures.

Pearl Street Upgrades – FM Alternatives Identified

- ✓ Two force main alternative alignments were identified:
  - ✓ Across Fore River (2,500 LF)
  - ✓ Along Greenbelt Walkway (5,100 LF)



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Pearl Street Upgrades – PS Alternatives Identified

- ✓ 10 pump station alternatives were identified consisting of:
  - ✓ Send gravity flow directly to the WWTP
  - ✓ Rehabilitate existing pump station
  - ✓ Build at an alternative site

#	Alternative
1. Gravity to WWTP	
1A.	To Existing Main Pump Station
1B.	To New Combined Headworks & Main Pump Station
1C.	New Headworks at 6 Pearl Street to New Main Pump Station
2. Pump Station at Existing Site Only	
2A.	Rehab Existing – No Reconfiguration
2B.	Rehab Existing – Reconfigure
2C.	Demolish and Rebuild
3. Pump Station at Alternate Site (6 Pearl Street)	
3A.	New Pump Station/Headworks
3B.	New Pump Station & New Headworks at Existing Site
3C.	New Pump Station with Screening & New Grit Removal at WWTP
3D.	New Pump Station, New Screening at Existing Site, & New Grit Removal at WWTP

Pearl Street Upgrades – Evaluation of PS Alternatives

- ✓ Utilized a green, yellow, red color-coding screening system to depict evaluation criteria including:
  - ✓ Technical Feasibility
  - ✓ Project Objectives
  - ✓ Regulatory Feasibility
  - ✓ Constructability
    - ✓ (Geotechnical & Bypass Pumping)
  - ✓ Long-Term Operations & Maintenance
  - ✓ Cost Considerations
    - ✓ (Construction + O&M)

#	Alternative	Technical Feasibility	Project Objectives	Regulatory Feasibility	Constructability		Long-Term Operations & Maintenance	Cost Considerations (Construction + O&M)	Feasible
					Geotech	Bypass Pumping			
1. Gravity to WWTP									
1A.	To Existing Main Pump Station at WWTP	Y	Y	Y	R	R	R	R	x
1B.	To New Combined Headworks & Main Pump Station at WWTP	Y	Y	Y	Y	R	R	R	x
1C.	New Headworks at 6 Pearl St. to New Pump Station at WWTP	Y	G	Y	Y	G	R	R	x
2. Pump Station at Existing Site									
2A.	Rehab Existing – No Reconfiguration	Y	R	Y	G	R	R	Y	x
2B.	Rehab Existing – Reconfigure	G	Y	Y	G	R	Y	Y	✓
2C.	Demolish and Rebuild	Y	G	R	Y	R	G	R	x
3. Pump Station at Alternate Site (6 Pearl St.)									
3A.	New Pump Station /Headworks	G	G	Y	Y	G	G	Y	✓
3B.	New Pump Station & New Headworks at Existing Site	G	G	Y	Y	G	G	Y	✓
3C.	New Pump Station with Screening & New Grit Removal at WWTP	G	Y	Y	Y	Y	Y	R	x
3D.	New Pump Station, New Screening at Existing Site, & New Grit Removal at WWTP	G	Y	Y	Y	Y	Y	R	x

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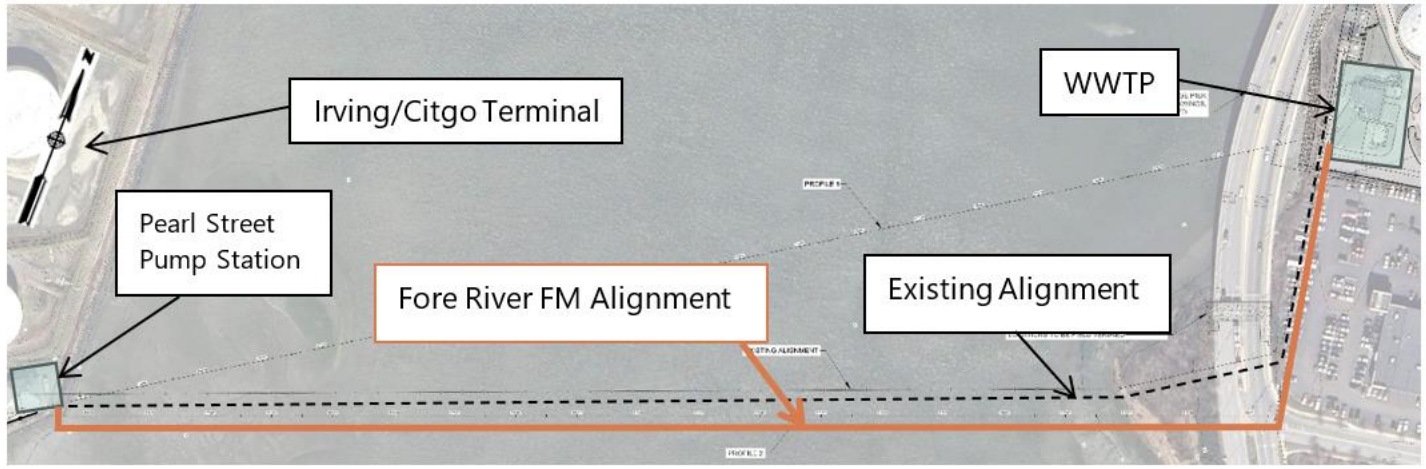
Pearl Street Upgrades – Recommended FM Plan

Fore River Alignment Alternative - Two 20" Diameter Force Mains

- Fore River alignment has lower estimated project cost due to its shorter proposed alignment.
  - Greenbelt Walkway Alignment additional length requires larger pumps, increasing the size and O&M requirements of the pump station.
- Two force mains provide redundancy for most of the anticipated daily flows and increased capacity for larger wet weather events.



Additional Recommendation: Investigate potential reuse of the existing force main as an emergency force main for the new pump station.

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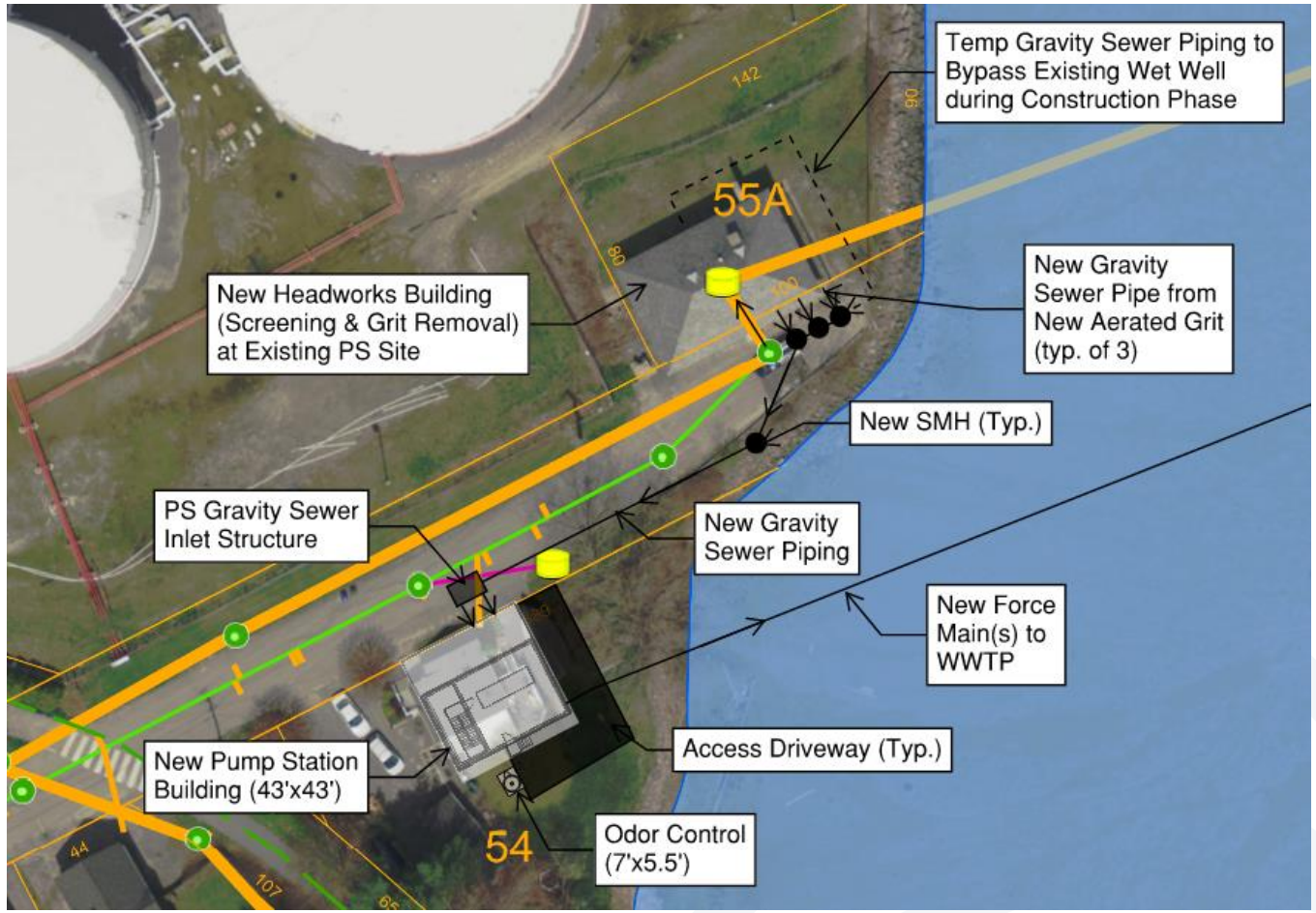
Pearl Street Upgrades – Recommended PS Plan

- Alternative 3B - New Pump Station at 6 Pearl Street and a New Headworks at the Existing Site

- Achieves all project objectives without compromising long-term operations and maintenance
- Reutilizes existing pump station to minimize construction of new below grade structures
- Proposed Headworks located at the existing pump station site reduces nuisance odors at Greenbelt Walkway and residential houses
- Lower estimated project cost compared to other feasible alternatives



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Pearl Street Upgrades – Opinion of Probable Project Cost

Item	Description	Opinion of Probable Cost
Construction Costs		
1	Force Main (Fore River Alignment)	$7,840,000
2	Pump Station Upgrades (Alternative 3B)	$23,450,000
	Construction Subtotal (2026)	**$31,290,000**
Project Costs		
	Land Acquisition (6 Pearl Street)	$1,000,000
	Engineering Fee - Permitting, Design & Construction Administration Services (15%)	$4,700,000
	Other Administrative and Permitting Fees (1%)	$320,000
	Indirect Project Costs Subtotal	**$6,020,000**
Total Indirect Project + Construction Cost Range (AACE Level 4)		
	Total Indirect Project + Construction Costs	**$37,310,000**
	Low End (-20%)	$29,850,000
	High End (+30%)	$48,510,000

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Pearl Street Upgrades – Proposed Project Schedule

Project Phase	Projected Schedule
Force Main Permitting & Preliminary Site Investigations	August 2024 – December 2024
Final Design & Permitting	January 2025 – November 2025
Bid Phase	December 2025 – February 2026
Bond for Public Referendum	June 2026
Award Construction Contract[1]	July 2026
Notice to Proceed with Construction	August 2026
Substantial Completion	June 2028
Final Completion	September 2028

[1] *Assumes Bond Passage with Bond for Public Referendum*

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Thank You

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