

Willard Beach Water Quality Monitoring & Piped Infrastructure Improvements

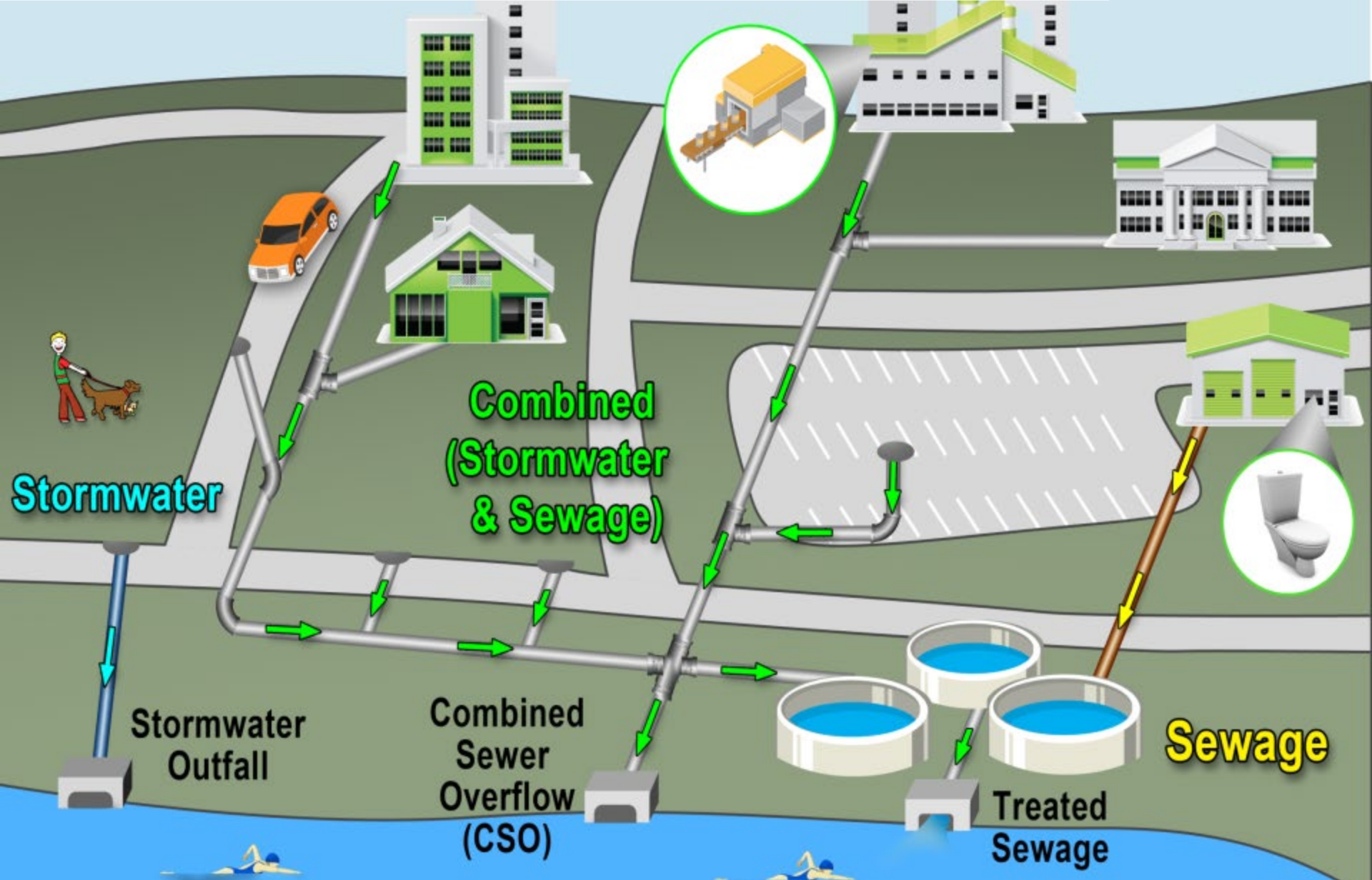


Fred Dillon - Stormwater Program Coordinator



CITY OF
**SOUTH
PORTLAND**
Water Resource
Protection

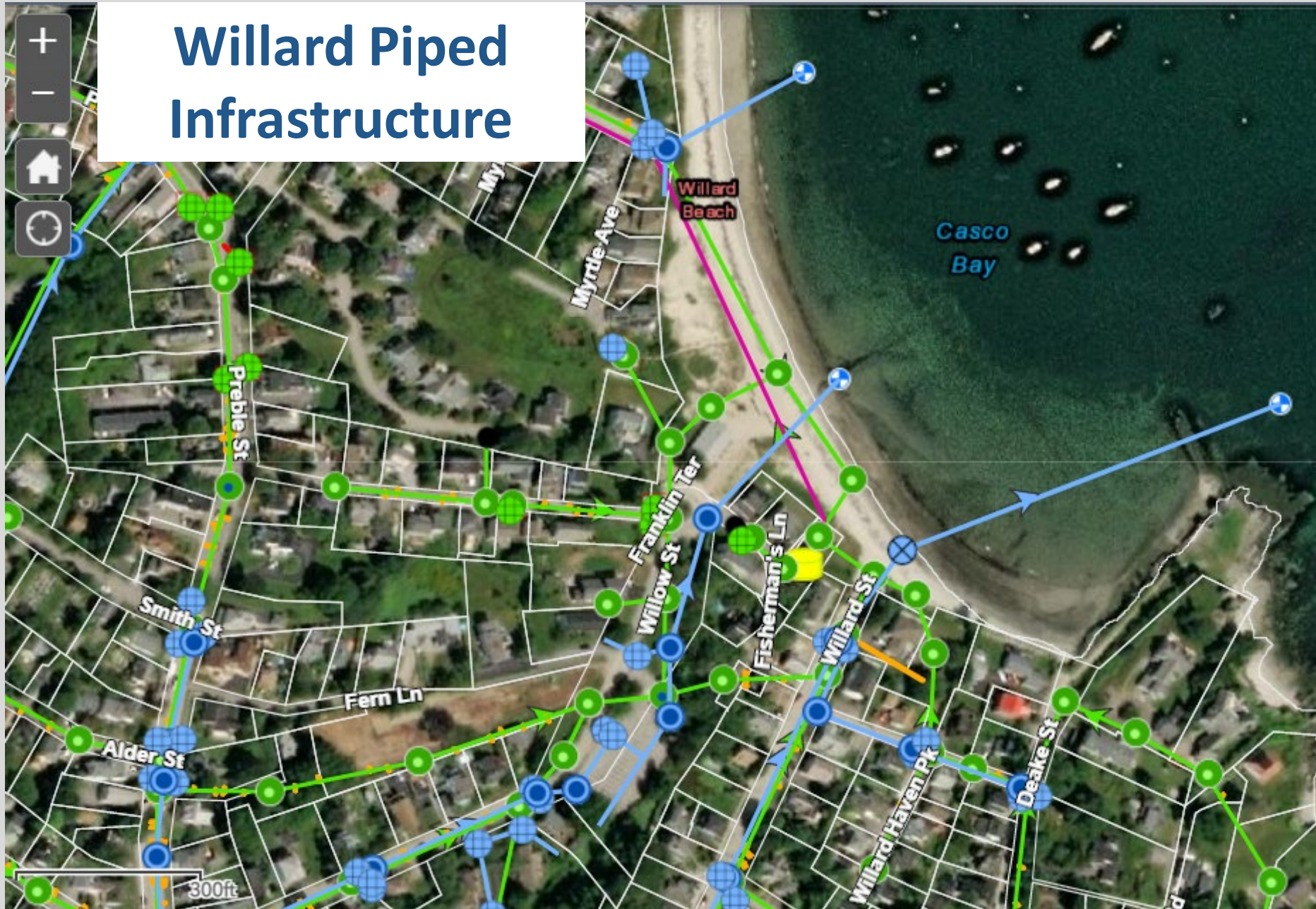
Municipal Piped Infrastructure



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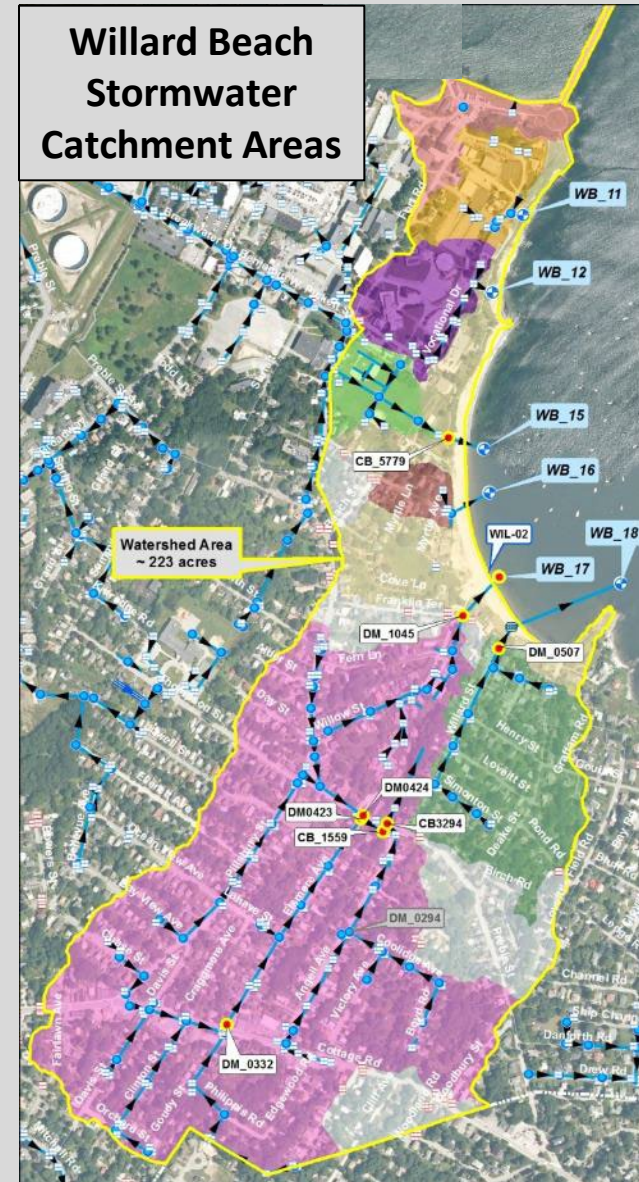


Willard Piped Infrastructure



Willard Beach Watershed

- ~223 acre watershed
- ~2,000' sandy beach
- 7 public access points
- Used year-round
- WQ monitoring since 1997
- MHB participant since 2003



Willard Beach Watershed

- ~223 acre watershed
(41% Impervious Cover)
- ~2,000' sandy beach
- 7 public access points
- Used year-round
- WQ monitoring since 1997
- MHB participant since 2003
- ***History of elevated bacteria levels w/ numerous advisories***





Willard Beach Water Quality



Bathhouse Flag
Indicates Daily
Swimming Conditions



OPEN – no advisory or closure.

ELEVATED BACTERIA ADVISORY
Bacteria levels may be unsafe.
Water contact not advised.

PRECAUTIONARY RAINFALL ADVISORY
Rainfall can increase bacteria levels.
Water contact not advised.

CLOSED – no swimming or
water contact activities.



Water quality can change unexpectedly and rainfall can increase bacteria levels. Swim at your own risk. FMI please use QR code links.



NOTICE

South Portland Stormwater Outfall

May have elevated bacteria levels

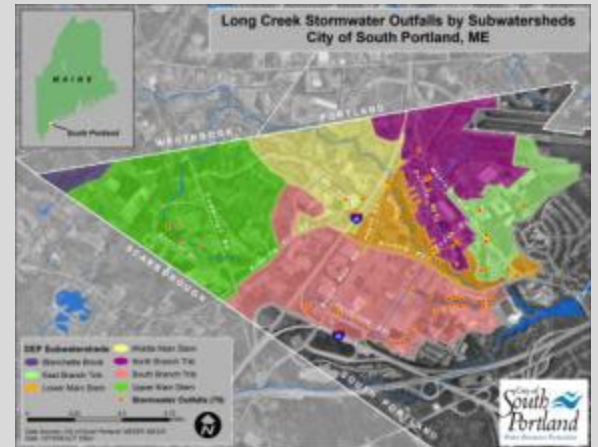
Please avoid contact with pipe discharge



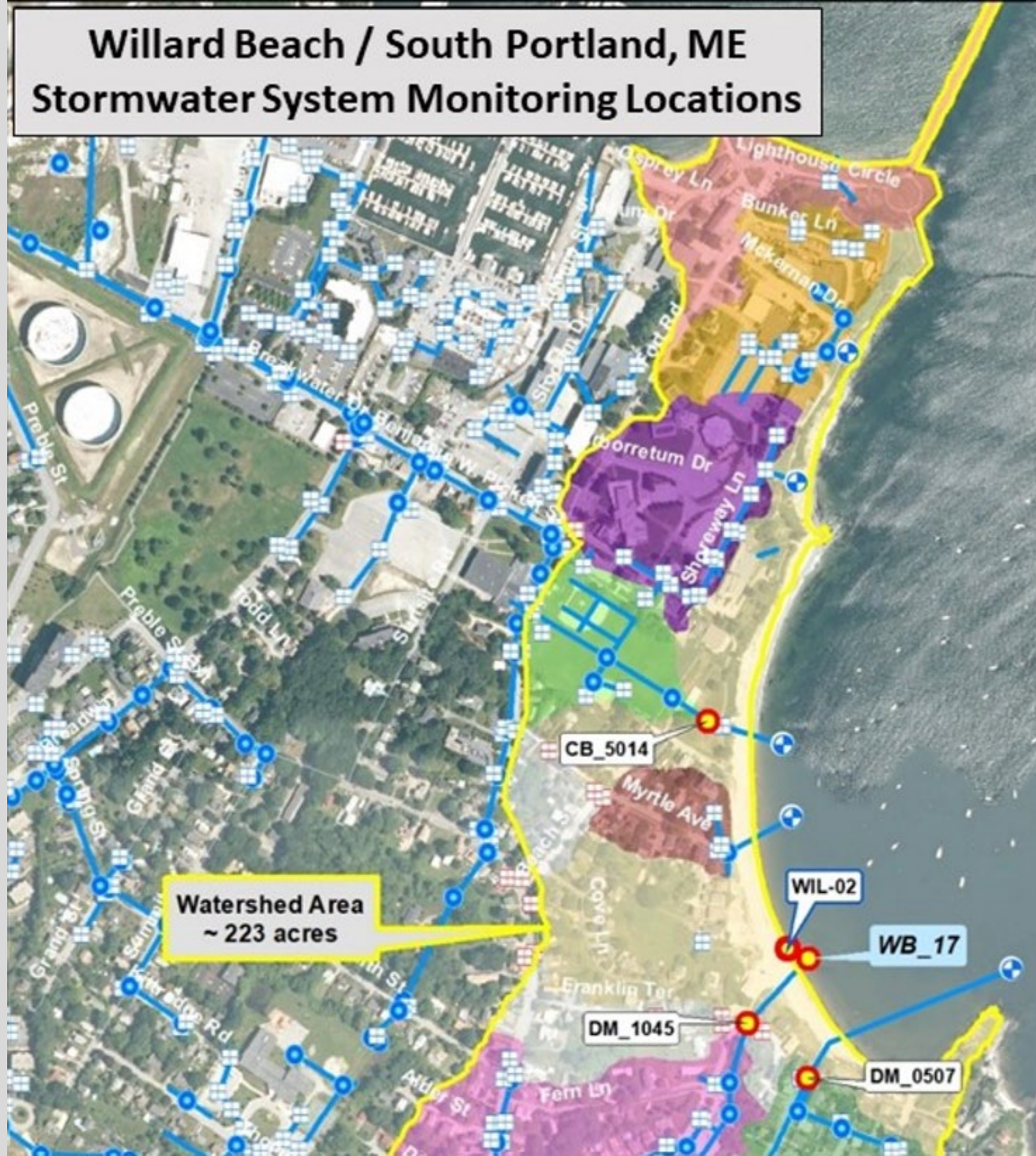
MS4 Permit Requirements

Illicit Discharge Detection & Elimination (MCM3)

- Identify & **eliminate pollution sources ASAP**
- Maintain & update stormwater infrastructure mapping



Willard Beach / South Portland, ME Stormwater System Monitoring Locations



Willard Beach Water Quality Sampling Locations

Beach water quality sample location varies depending on tidal conditions and is collected roughly along this transect

Wil-02

WB_17

When WB_17 is submerged by high tide, stormwater sample is collected at next upstream structure (DM_1045)

- Wastewater Structures
 - SMH
- Wastewater Mains
 - Force Main
 - Gravity
- Drainage Pipes
 - Gravity
- Drainage Outfalls
 -

LOW ST

Willard Beach

Playground

Beach House

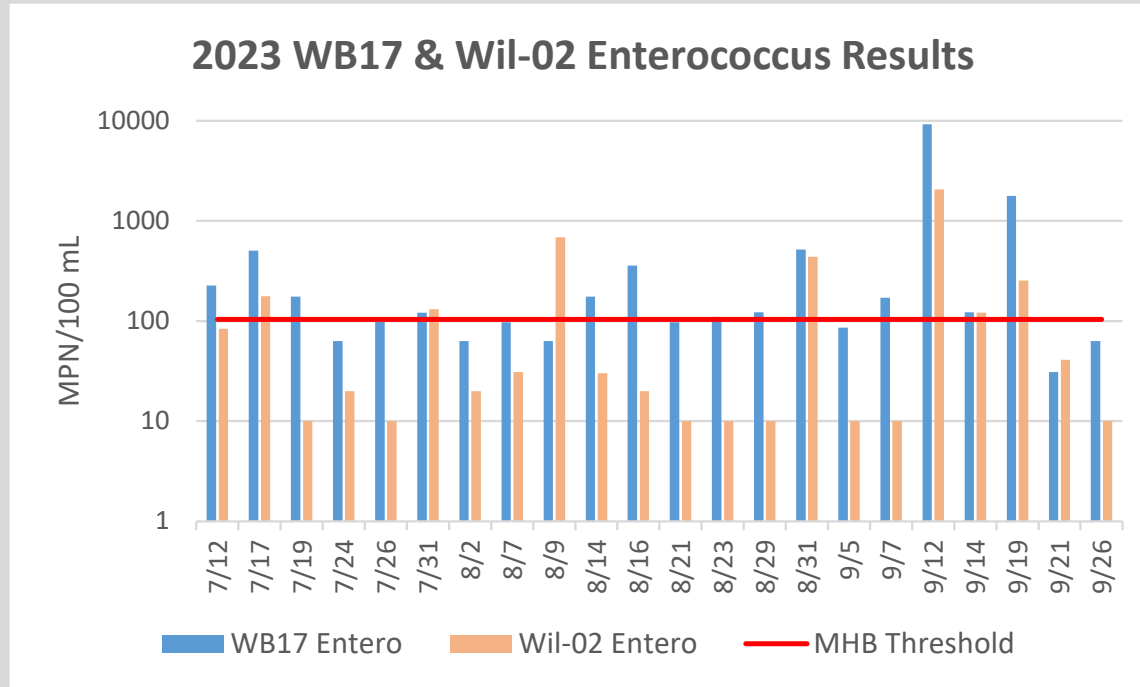
40ft







2023 Beach & WB17 Entero Results



WB17>Wil02 19

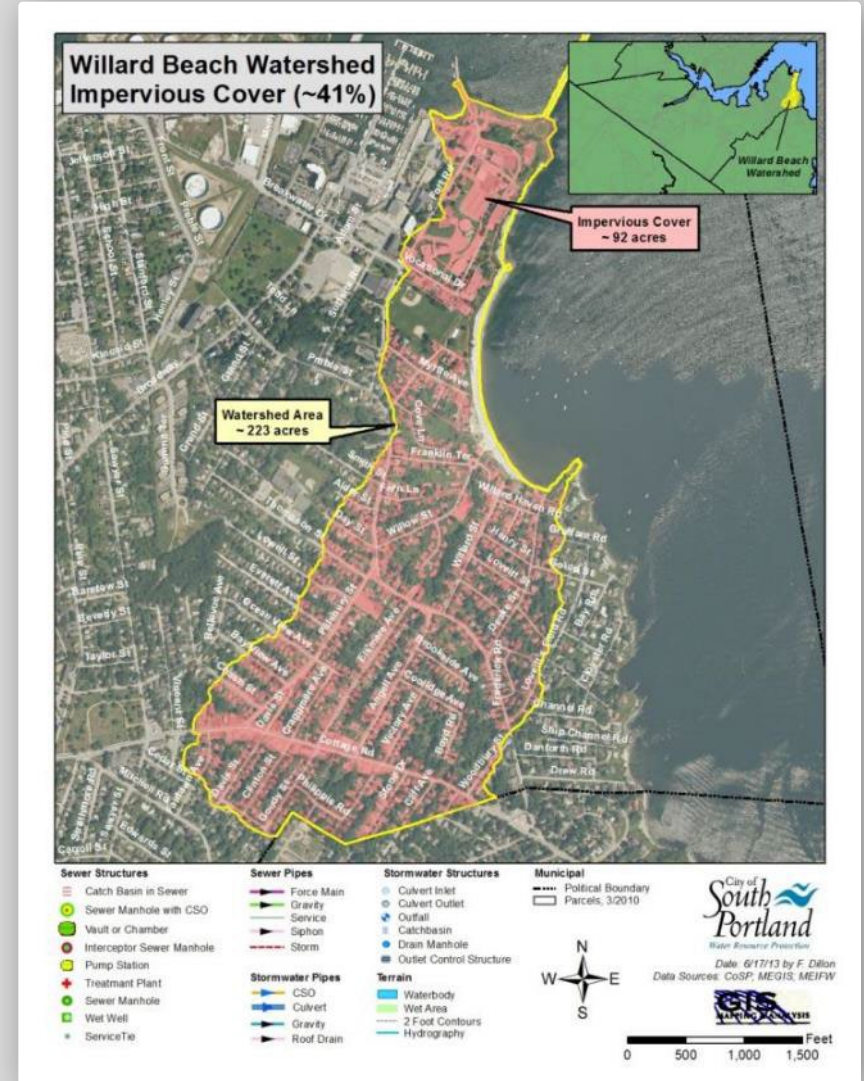
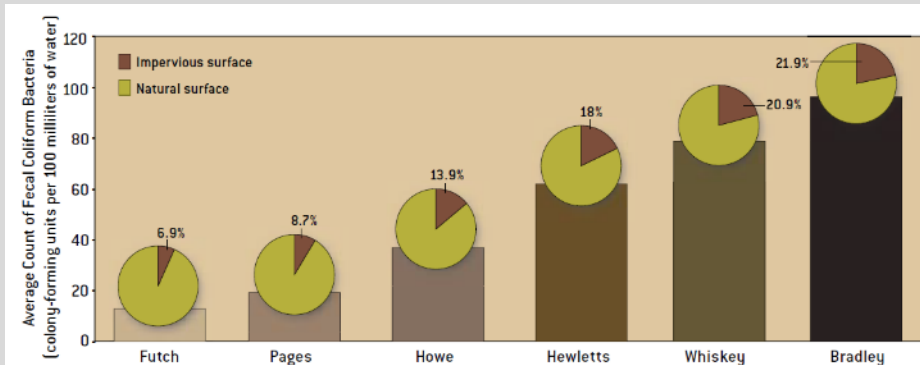
Wil02>WB17 3

WB17>MHB 13

Wil02>MHB 7

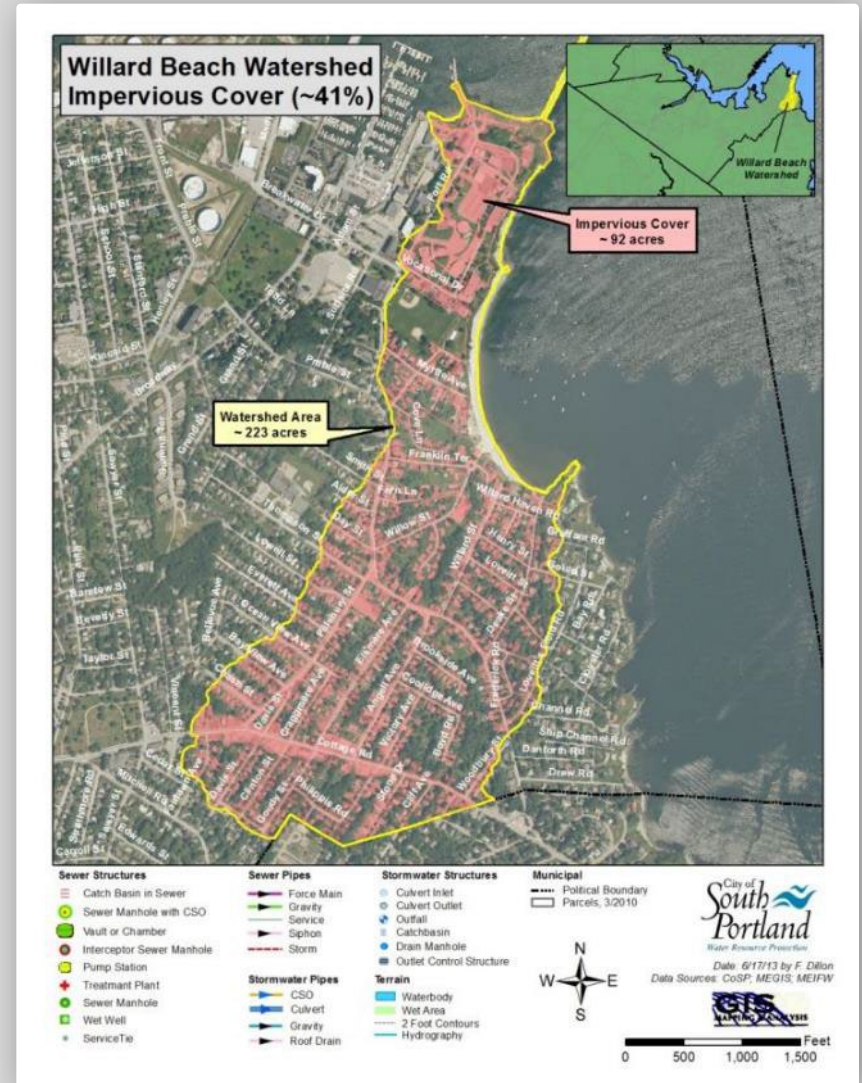
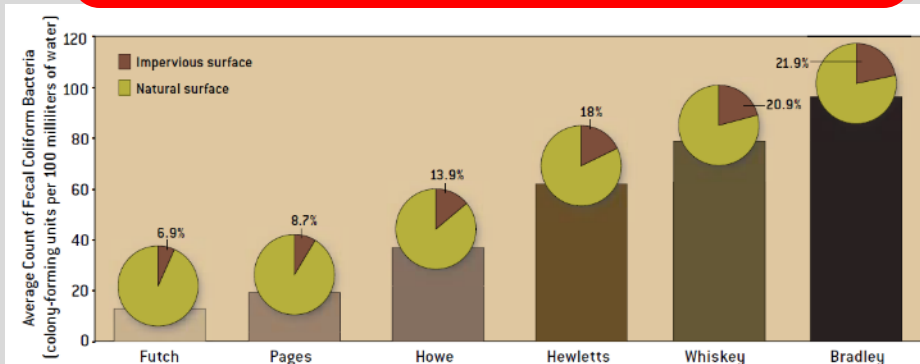
Potential Bacteria Sources

- Watershed activities
- Beach activities
- Storm drain re-growth
- “Out there” (Casco Bay)
- Wrack (sea weed, etc.)
- Sewers to storm drains



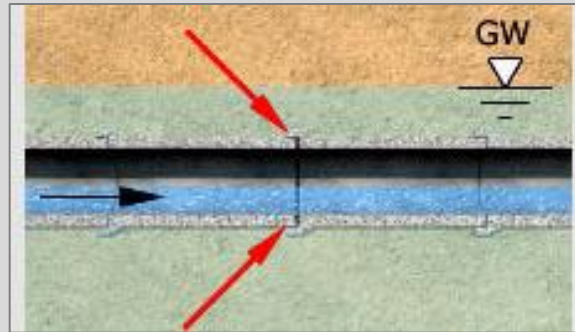
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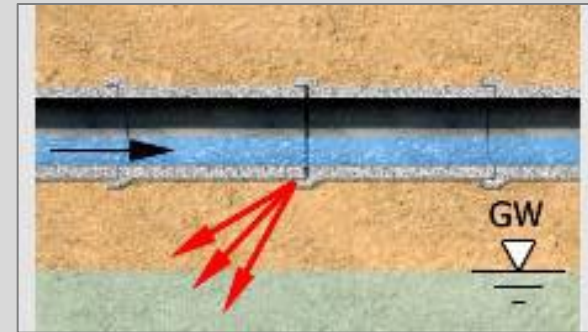
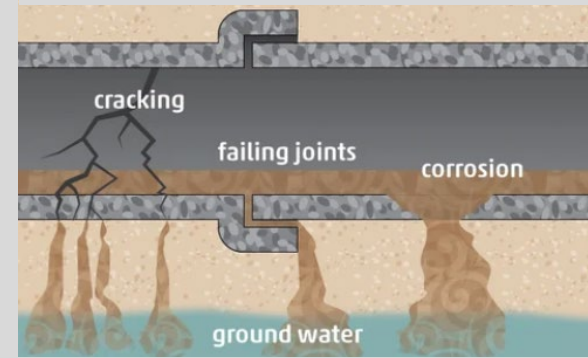


Co-Located Sewers & Storm Drains

INFILTRATION

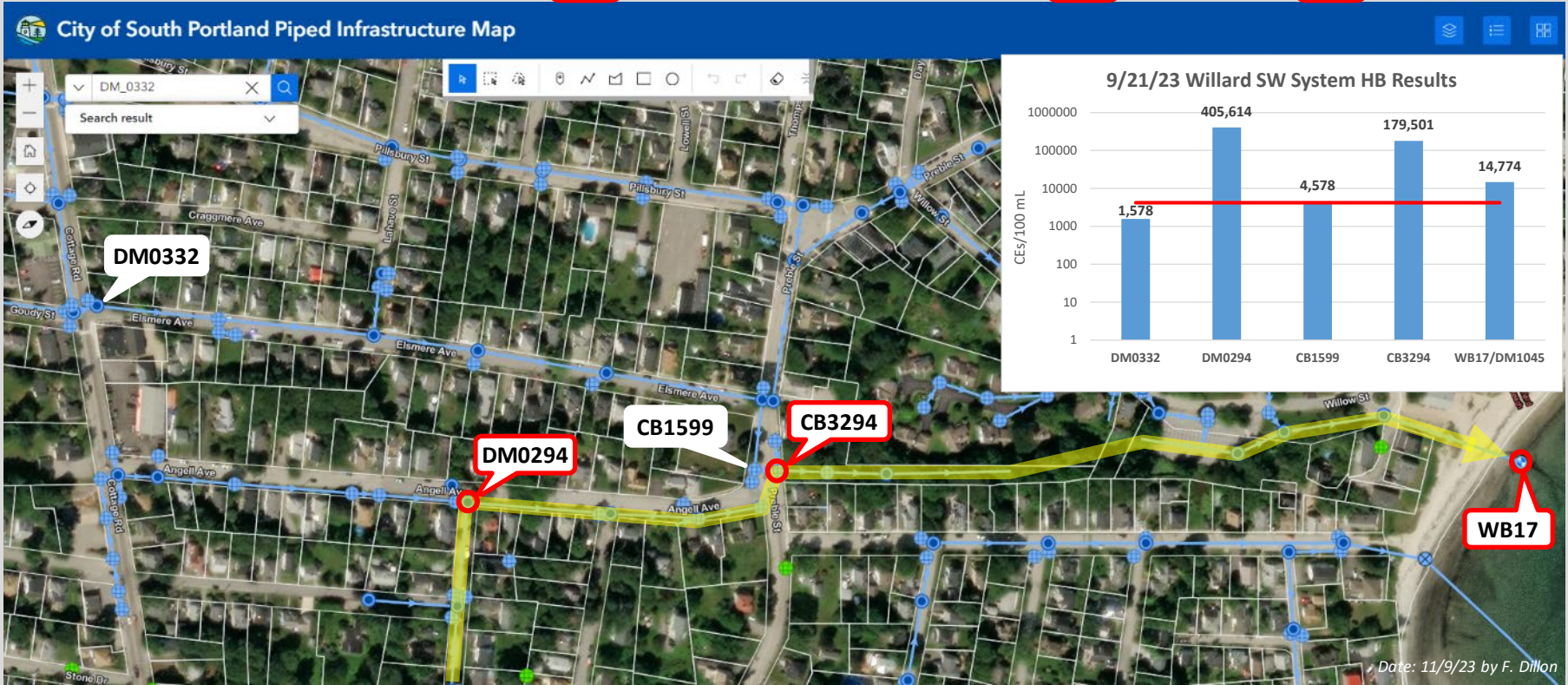


EXFILTRATION



2023 SW System WQ Results (9/21)

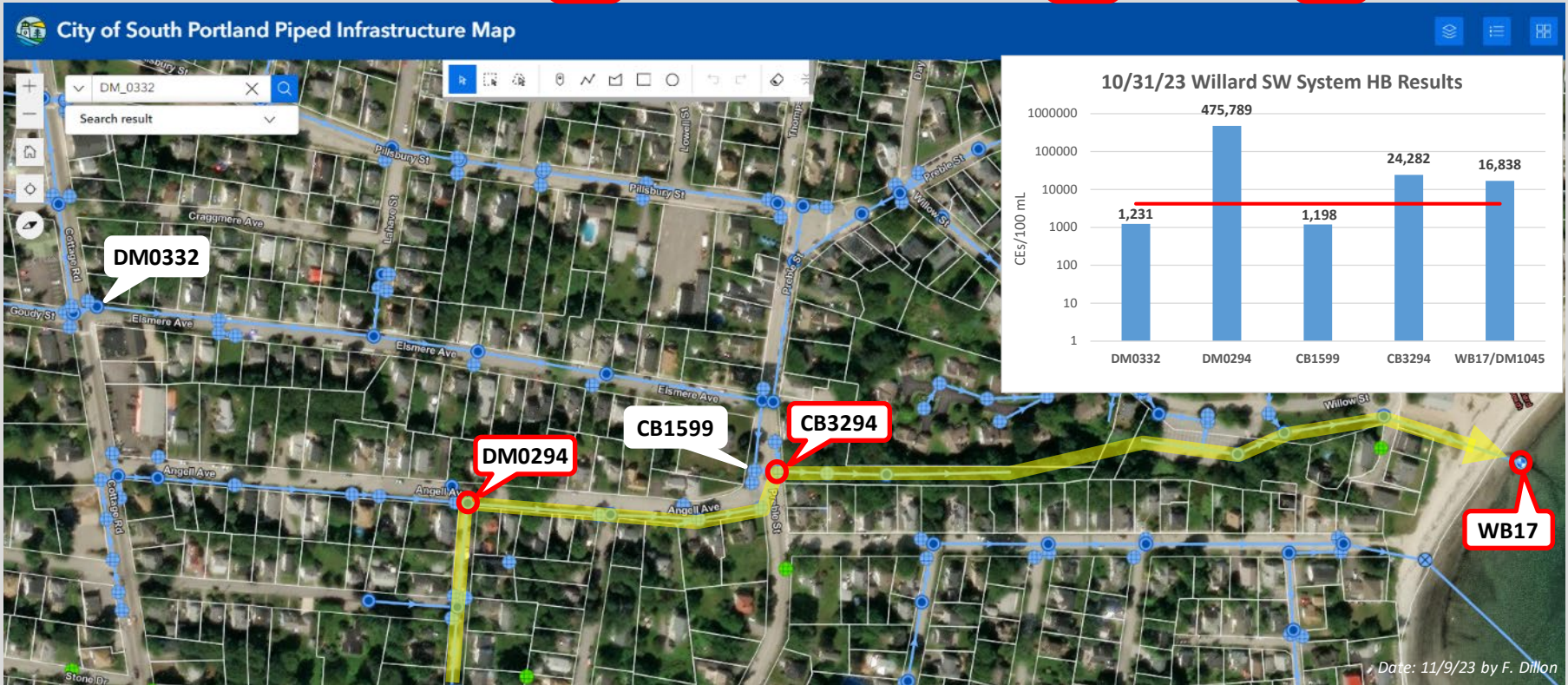
| Sample Date | DM0332 | | | DM0294 | | | CB1599 | | | CB3294 | | | WB17 (DM1045) | | | Precip | |
|-------------|------------------|-----------|------------------|------------------|-----------|------------------|---------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------------------------|-------------------------------------|
| | Entero MPN/100mL | OB (ug/L) | HB (CEs / 100mL) | Entero MPN/100mL | OB (ug/L) | HB (CEs / 100mL) | Entero (ug/L) | OB (ug/L) | HB (CEs / 100mL) | Entero MPN/100mL | OB (ug/L) | HB (CEs / 100mL) | Entero MPN/100mL | OB (ug/L) | HB (CEs / 100mL) | Precip 1 day prior | Precip 2 days prior |
| 9/21/23 | 86 | 110 | 1,578 | 158 | 98 | 405,614 | 63 | 99 | 4,578 | 171 | 75 | 179,501 | 31 | 37 | 14,774 | 0 | 0.95 |



Human Bacteroides is specific for fecal contamination from human sources

2023 SW System WQ Results (10/31)

| Sample Date | DM0332 | | | DM0294 | | | CB1599 | | | CB3294 | | | WB17 (DM1045) | | | Precip | |
|-------------|-------------------------|-----------|----------------|-------------------------|-----------|----------------|--------------------|-----------|----------------|-------------------------|-----------|----------------|-------------------------|-----------|----------------|------------------------------------|-------------------------------------|
| | Enterococci (MPN/100mL) | OB (ug/L) | HB (CEs/100mL) | Enterococci (MPN/100mL) | OB (ug/L) | HB (CEs/100mL) | Enterococci (ug/L) | OB (ug/L) | HB (CEs/100mL) | Enterococci (MPN/100mL) | OB (ug/L) | HB (CEs/100mL) | Enterococci (MPN/100mL) | OB (ug/L) | HB (CEs/100mL) | Precip 1 | Precip 2 |
| 10/31/23 | 345 | 120 | 1,231 | 657 | 94 | 475,789 | 373 | 136 | 1,198 | 798 | 76 | 24,282 | 171 | 27 | 16,838 | Precip 1 day prior | Precip 2 days prior |

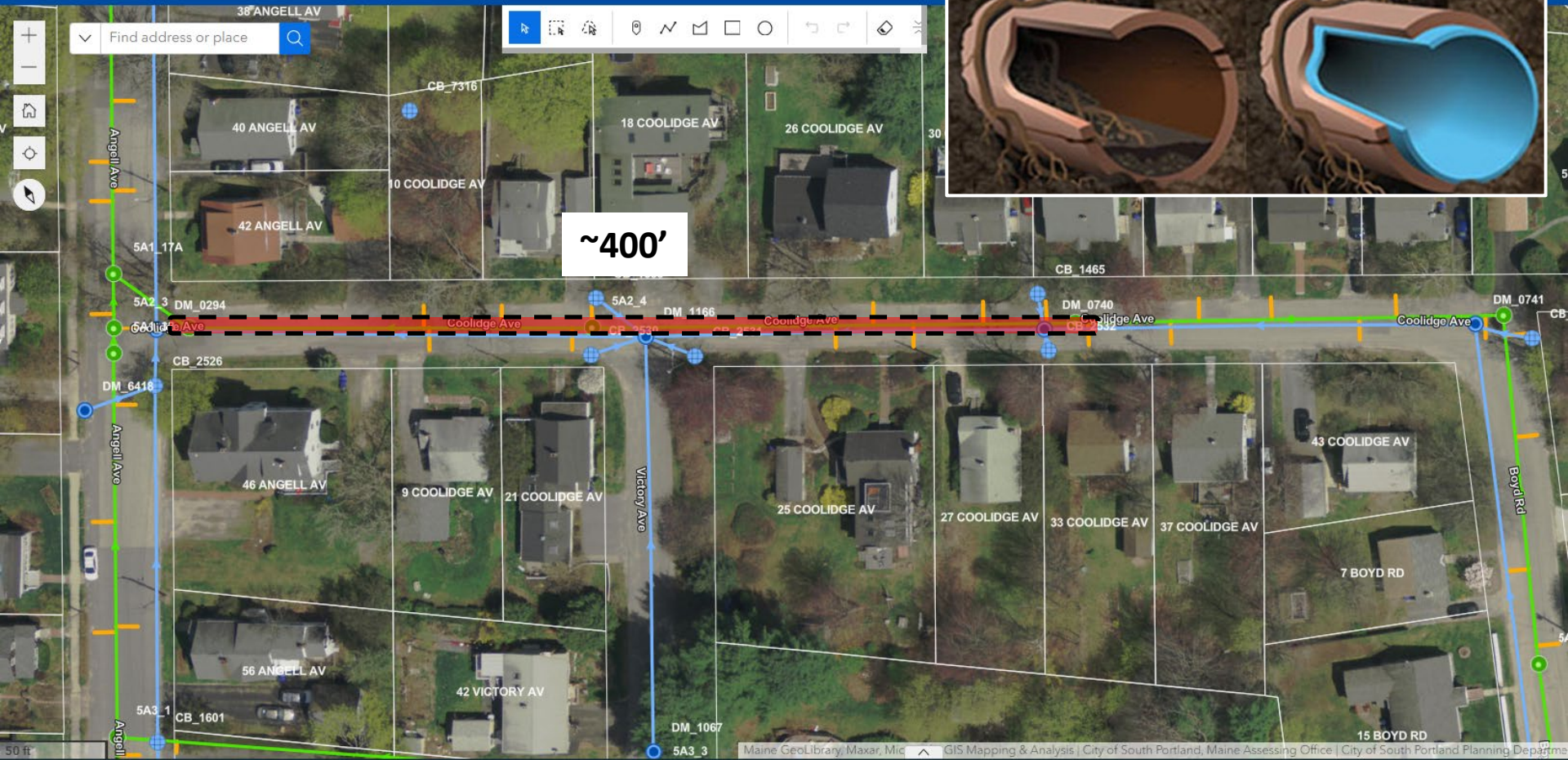


Human Bacteroides is specific for fecal contamination from human sources

March 2024 Sewer Lining

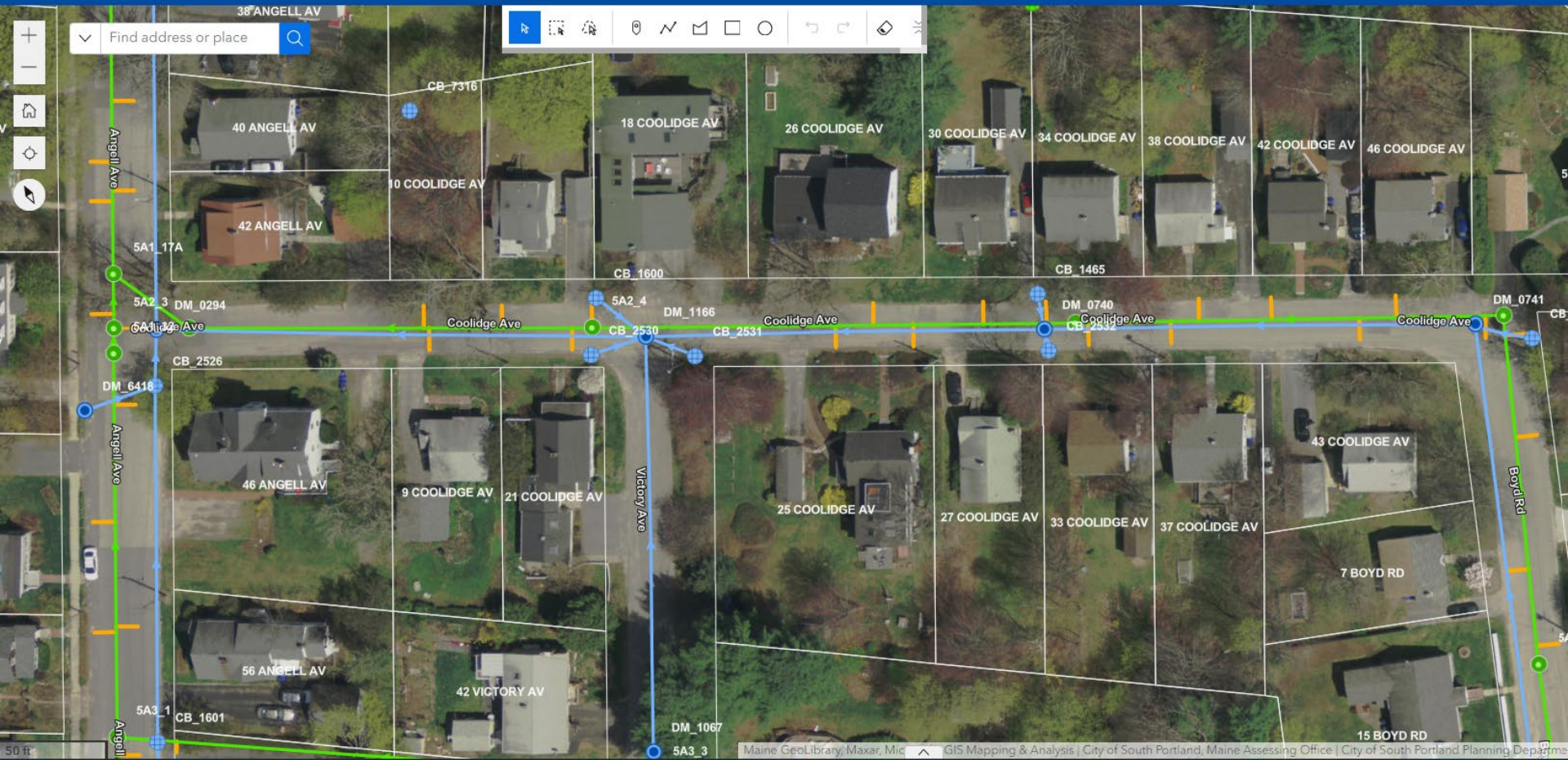


City of South Portland Piped Infrastructure Map



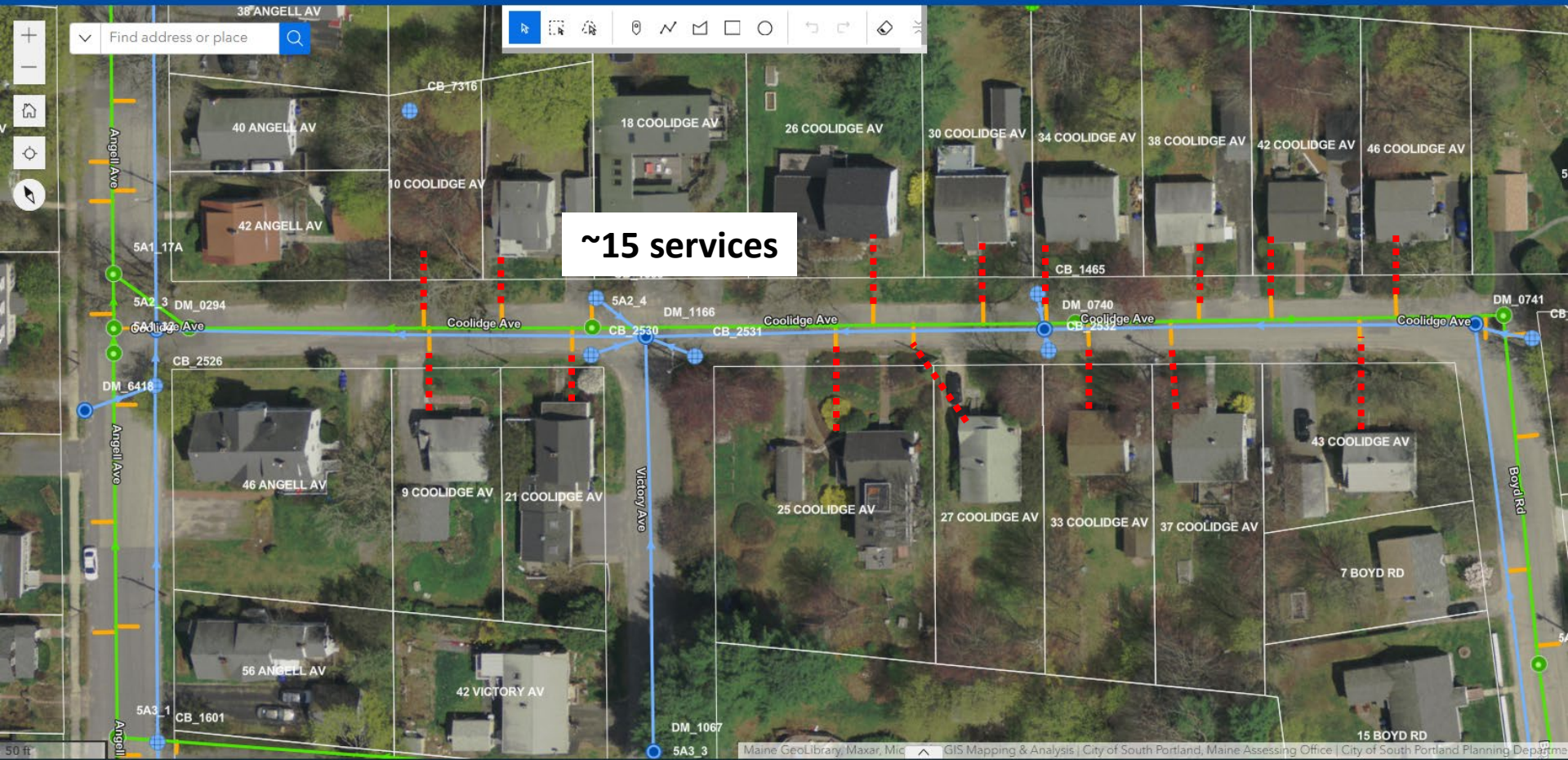
Private Sewer Service Lines

City of South Portland Piped Infrastructure Map



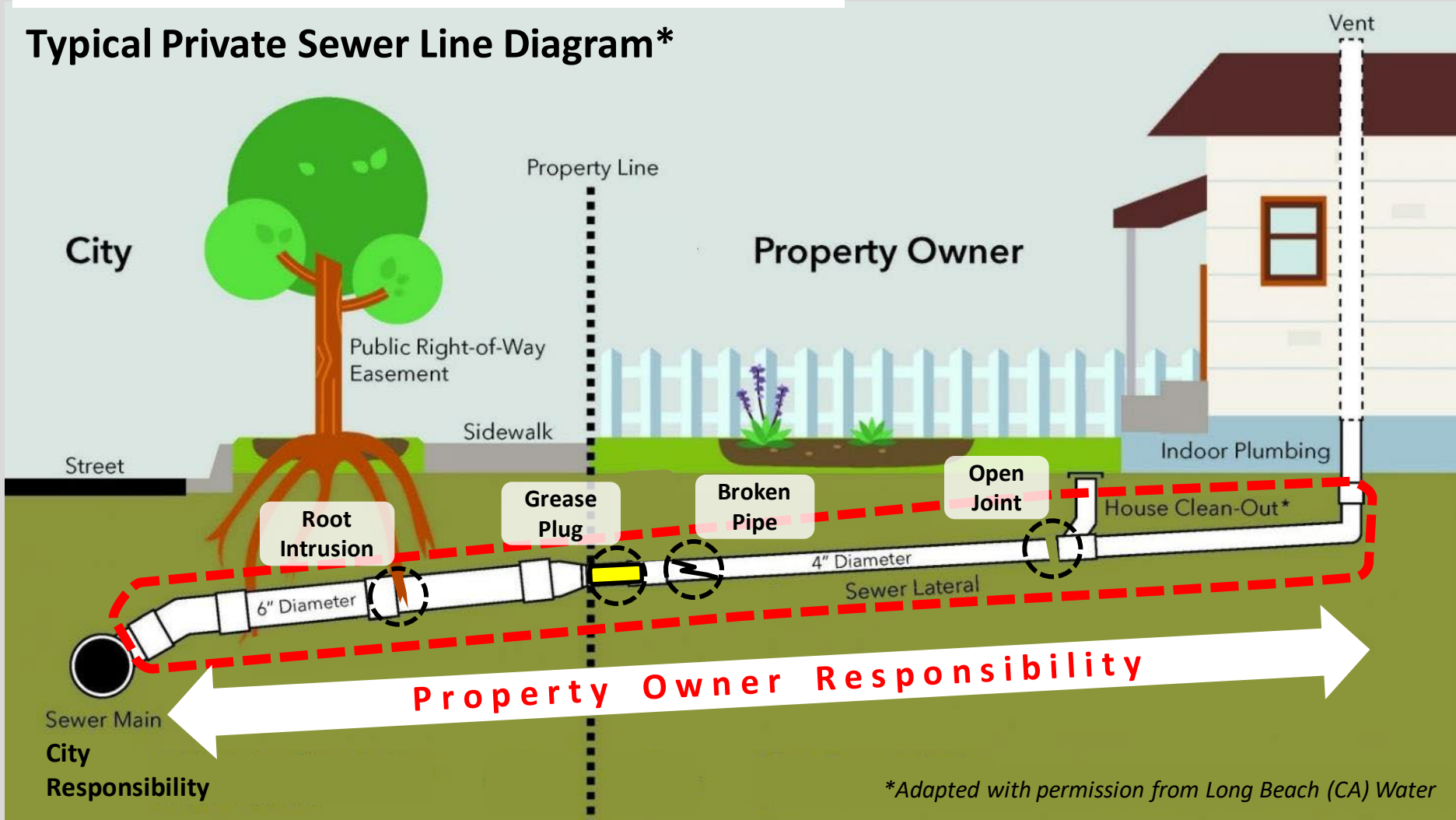
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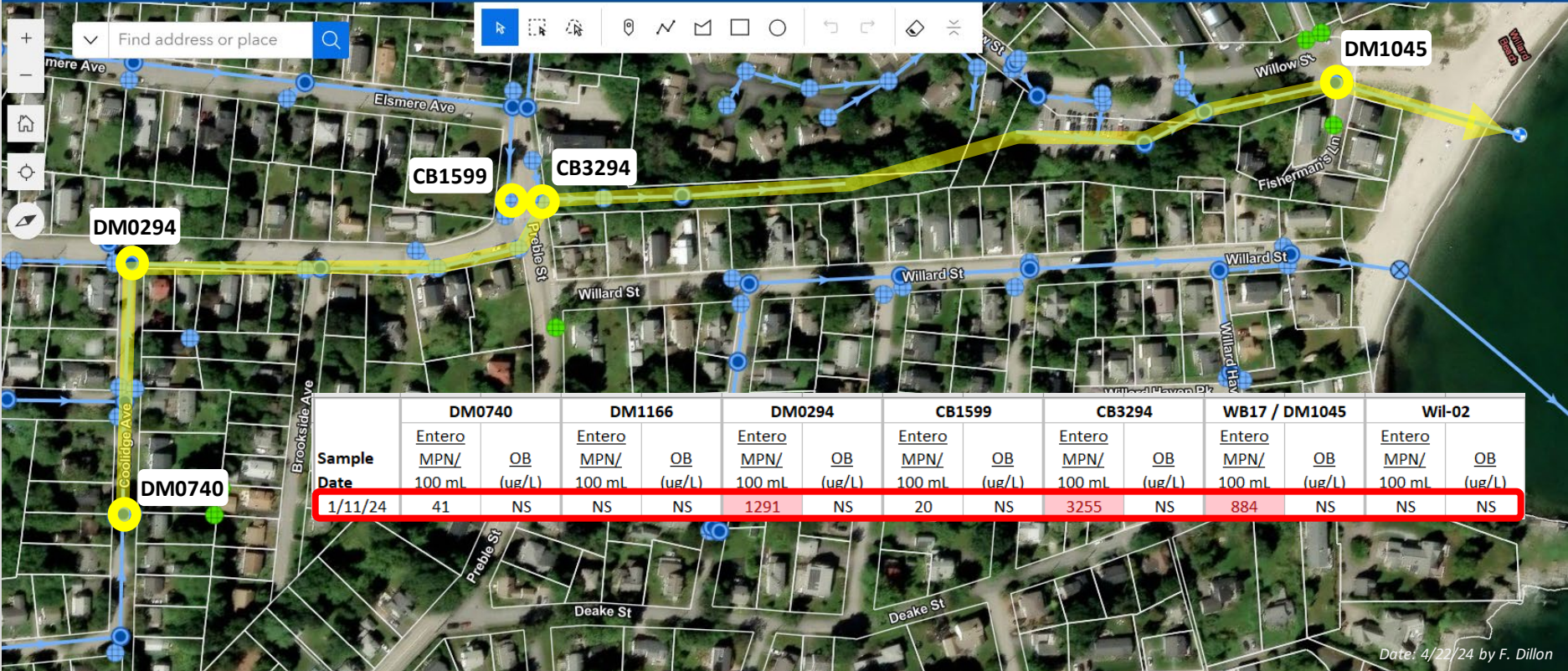


Private Sewer Service Lines

Typical Private Sewer Line Diagram*



City of South Portland Piped Infrastructure Map - Willard Stormwater System Entero & OB Results – 1/11/24 (2.25" rain)

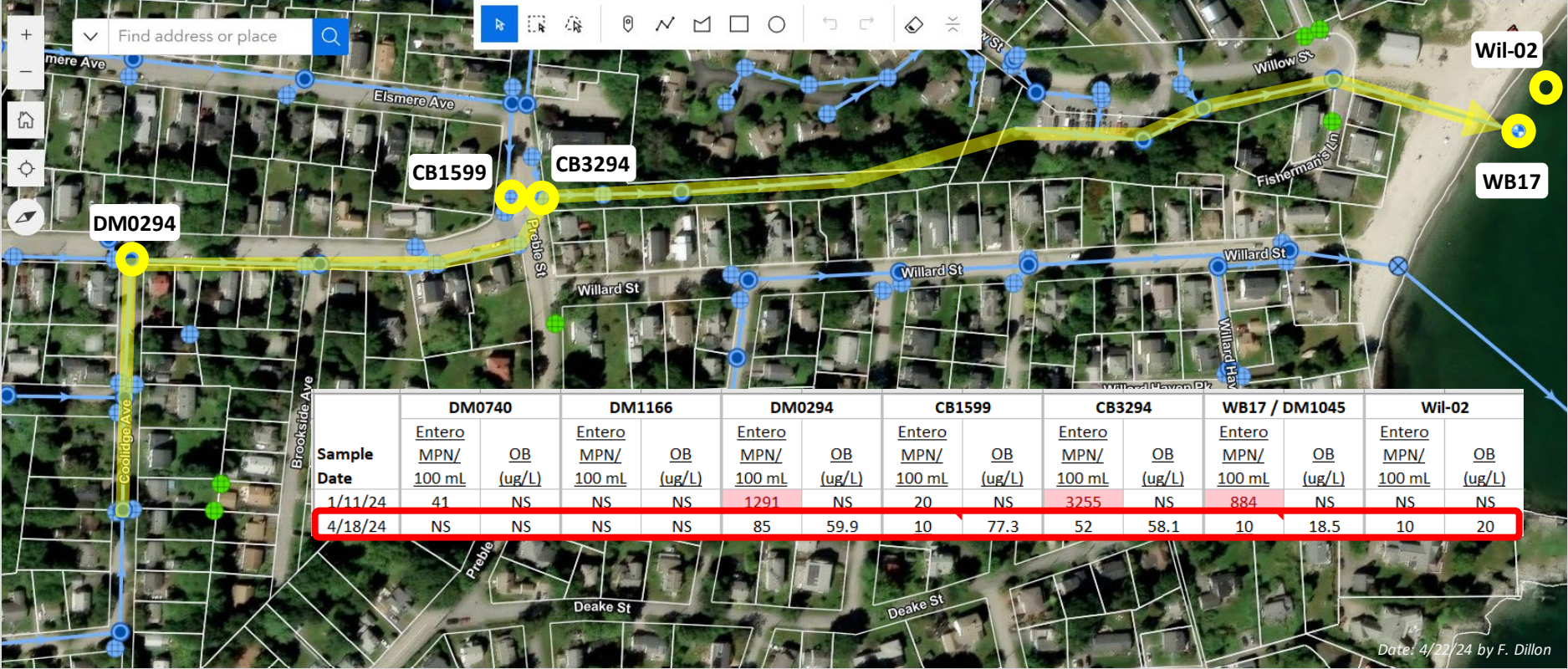


NOTES: rain for prior 48 hr; entero threshold = 104; OB threshold = 100; NS = not sampled; WB17 submerged on 1/11/24

Date: 4/22/24 by F. Dillon



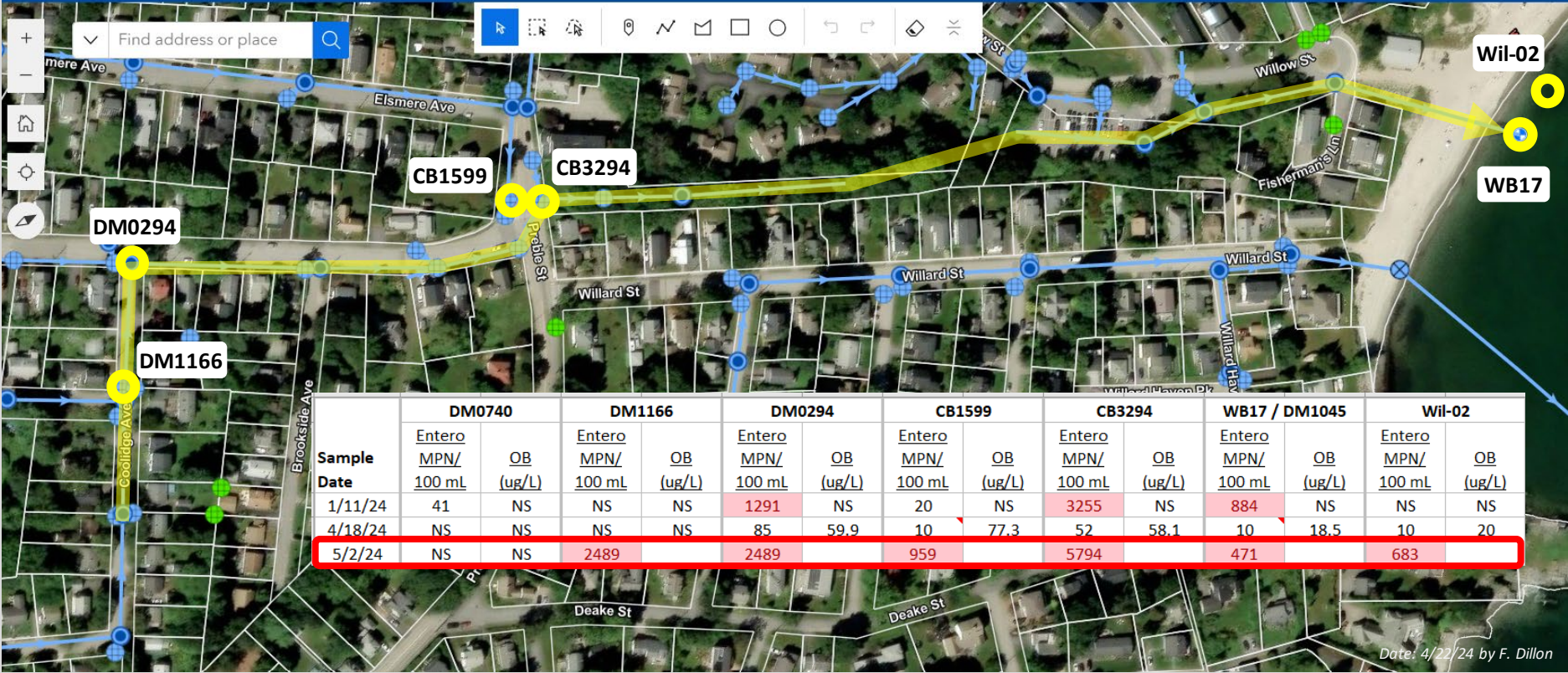
City of South Portland Piped Infrastructure Map - Willard Stormwater System Entero & OB Results – 4/18/24 (0" rain)



Date: 4/22/24 by F. Dillon

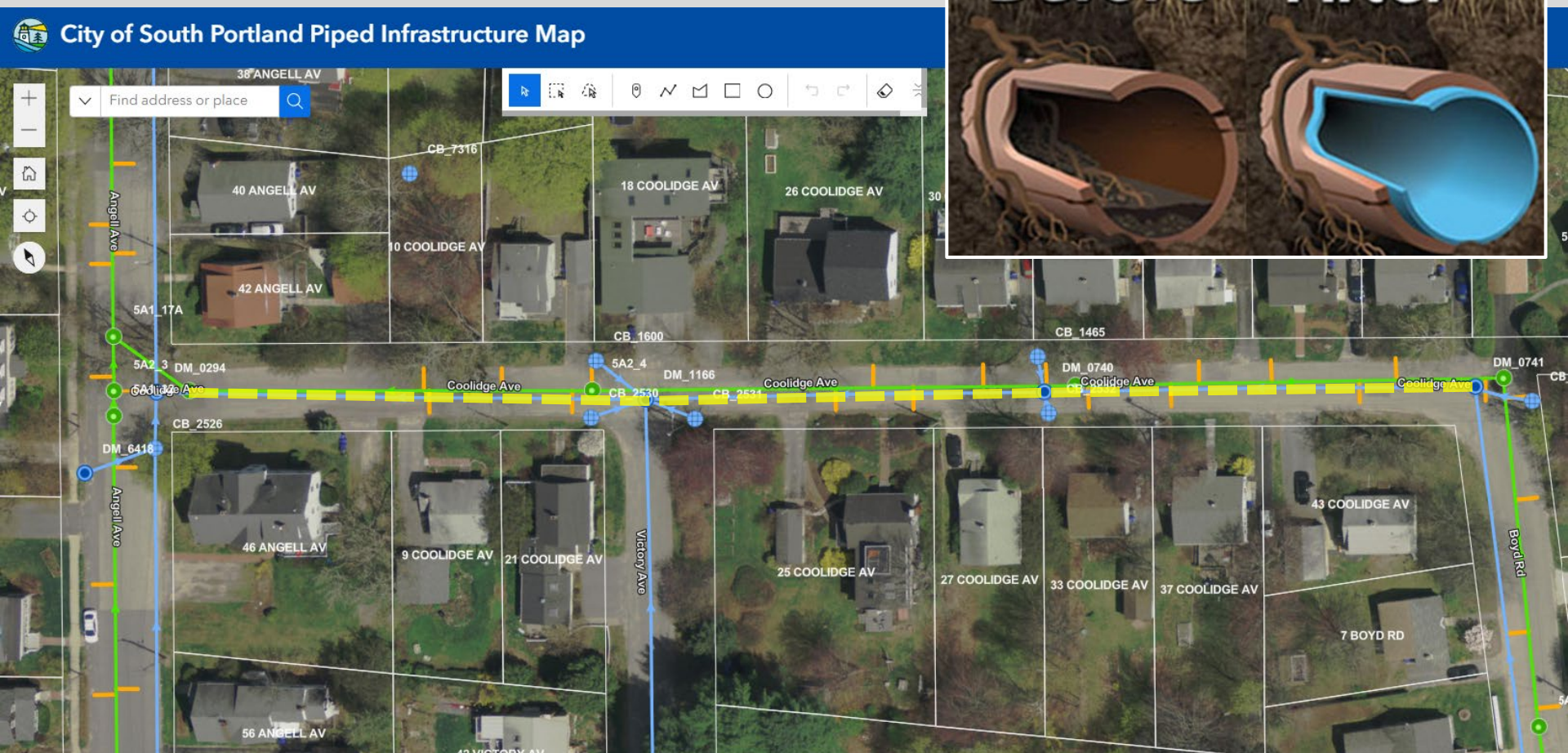
NOTES: rain for prior 48 hr; entero threshold = 104; OB threshold = 100; NS = not sampled; **2 Coolidge sewer segments lined in March 2024**

City of South Portland Piped Infrastructure Map - Willard Stormwater System Entero & OB Results – 5/2/24 (0.18" rain)



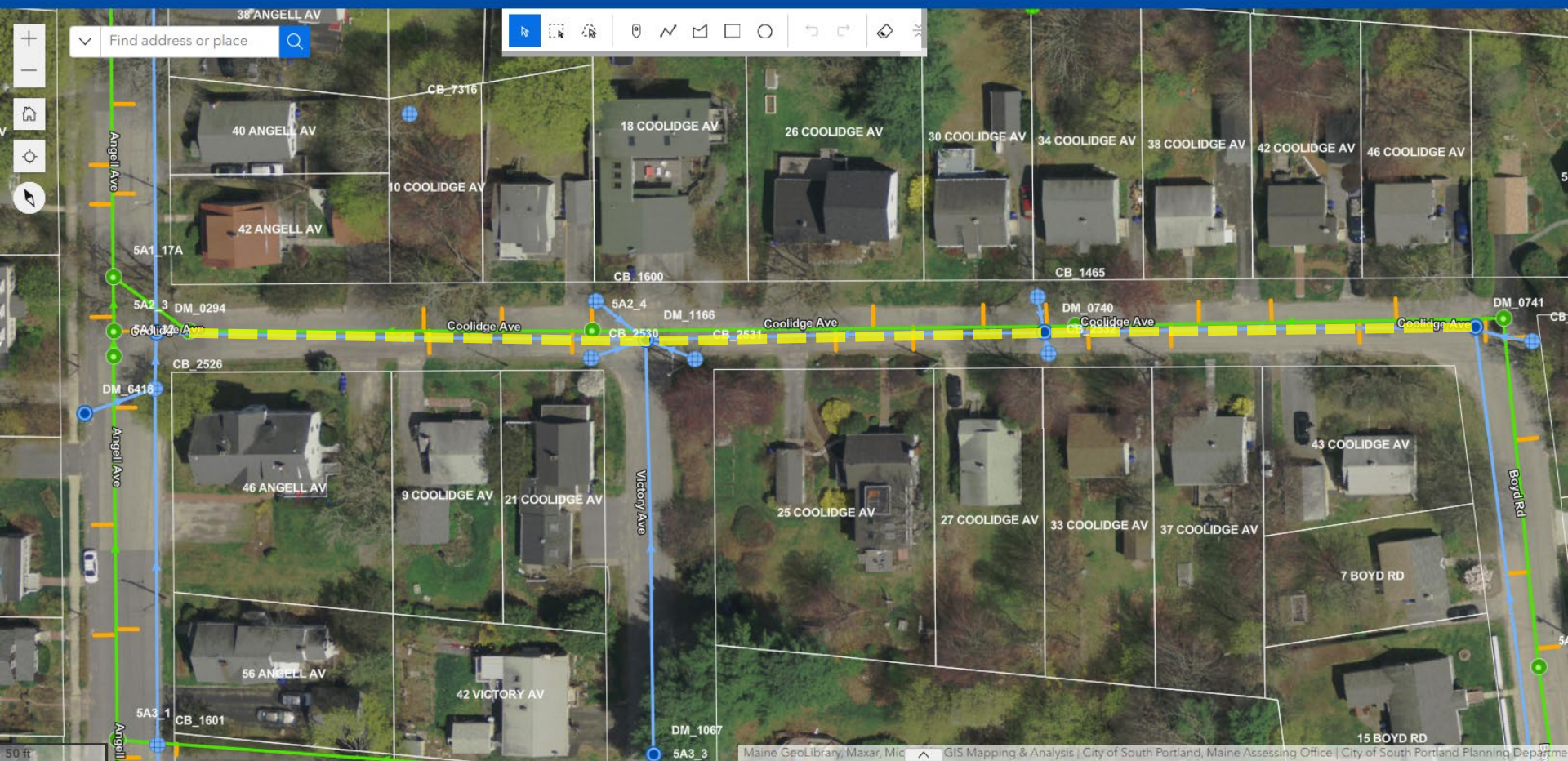
NOTES: rain for prior 48 hr; entero threshold = 104; OB threshold = 100; NS = not sampled; tide nearly completely low when Wil-02 sample collected

Storm Drain Lining (CWSRF)



Storm Drain Lining (CWSRF) – Fall 2024

City of South Portland Piped Infrastructure Map



ENVIRONMENTAL POLICY
INNOVATION
CENTER

