Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

# REPORT

October 2022

TOWN OF
# DEDHAM
MASSACHUSETTS

## 2022 Sewer Manhole Investigation Report

55 Walkers Brook Drive, Suite 100, Reading, MA 01867 (HQ)
Tel: 978.532.1900

Town of Dedham, Massachusetts
Weston & Sampson Project No. 2220030

October 14, 2022

Jason L. Mammone, PE
Director of Engineering
Public Works Facility
55 River Street
Dedham, Massachusetts 02026

Re: 2022 Sewer Manhole Investigation

Dear Mr. Mammone:

In accordance with our January 19, 2022 agreement, Weston & Sampson is pleased to submit our report for the 2022 Sewer Manhole Investigation conducted in spring 2022. This project included topside manhole inspections in subareas AA, CC, FF, HH, PP and ZZ as delineated in the attached Figure 1.

This report presents our analysis of the manhole inspection results, a cost-effectiveness analysis, and recommendations for sewer system improvements. The Department of Environmental Protection (DEP) *Guidelines for Performing I/I Analyses and Sewer System Evaluation Survey* (DEP Guidelines), updated May 2017, were used as a guide for the analysis.

## *Area Description and Project Objectives*

The Town of Dedham, Massachusetts is a residential community located southwest of Boston. Wastewater collected in the town drains east towards Boston where it enters Massachusetts Water Resources Authority (MWRA) interceptors at multiple locations. The flow is ultimately treated at the Deer Island Wastewater Treatment Plant. The town's wastewater collection system consists of approximately 89 miles of gravity sewer. A summary of the gravity sanitary sewer pipes and manholes is shown in Table 1, *Sewer System Summary*.

The 2022 Sewer Manhole Investigation goal was to identify sources of infiltration and inflow (I/I) in the sewer system. This aligns with one of the Town of Dedham's primary goals of reducing wastewater flow to the MWRA to limit user charges. By removing unnecessary and excessive I/I the sewer system flows will be reduced, leading to increased sewer capacities for future development. Additionally, the manhole inspections would identify and record the location and severity of defects. This is a results-driven approach which seeks to maximize the effectiveness of the investigation through total system maintenance along with I/I removal.

## *Topside Manhole Inspections*

Manhole inspections consist of topside visual inspection of sanitary sewer manholes. Location, diameter, depth, material, casting and cover size, and source of any observed infiltration are recorded for each manhole. The inspections are ideally completed during high groundwater periods in order to identify I/I sources. The inspection also provides data on structural defects in manholes that should be repaired as part of the town's regular maintenance activities.

Weston & Sampson performed the inspection of 579 manholes from February 28 to March 31, 2022. An estimated 62,784 gpd of infiltration was identified in 112 manholes, and an estimated 11,000 gpd of peak design storm inflow was identified in 11 manholes. Manholes identified as sources of inflow are

generally subject to ponding or can otherwise collect runoff during wet weather. The results of the manhole inspections are summarized in Table 2, *Manhole Summary* and Table 3, *Manhole Inflow Summary*.

Non-infiltration related structural defects were found in 14 manholes such as loose or missing bricks in bench and invert sections or defective frames and covers. Recommendations for rehabilitation and estimated costs are listed in Table 4, *Manhole Structural Defects.*

Inspections were not performed at 13 locations where the manholes either could not be opened or located. These manholes are listed in Table 5, *Manhole Inspection Status*. Uninspected manholes should be located, opened, and inspected. An electronic copy of manhole inspection logs and photos are included on the attached external hard drive.

### *Database Development*

Weston & Sampson updated the Microsoft Access database designed specifically for the management of sewer manhole data. The database was developed for the 2018 Sewer Manhole Investigations project and updated during subsequent investigation phases. Allowing for a single, comprehensive sewer manhole database to be created over time. The database contains data fields for sewer system information such as manhole location, diameter, depth, material, casting and cover size, condition of manhole components, and source of any observed infiltration. The incoming and outgoing sewer pipe diameter, material, and position within the manhole are also included. An electronic copy of the database is included on the attached external hard drive.

### *Cost-Effectiveness Analysis*

A cost-effectiveness analysis (CEA) was performed for all manhole defects to determine the merit of performing a given rehabilitation. The CEA compares the estimated cost for removing I/I to the estimated savings in transportation and treatment (T&T) costs resulting from I/I removal. T&T costs consist of capital expenditures required to expand and upgrade the wastewater system, plus annual operation and maintenance (O&M) costs. O&M costs are directly related to the quantity of flow being discharged to pump stations and treatment facilities.

The present worth of the T&T cost for the Town of Dedham was calculated using MWRA charges and O&M and capital costs provided by the town. The T&T costs have been extended throughout the projected life-cycle of the rehabilitation of 20 years. Using the DEP FY23 rate of 2.5%, extended over 20 years, the present worth of the Town of Dedham's T&T costs is $19.88. A memorandum detailing the methodology and the calculation of T&T costs may be found in Appendix A, *MWRA T&T Cost Calculation*. The MWRA portion of the T&T costs are generated using the MWRA's annual Customer Service Report. This Customer Service Report is also attached Appendix A, for your records.

T&T costs can change annually. Therefore, if the recommended rehabilitation program included in this report is not conducted within one year, Weston & Sampson recommends a re-calculation of the T&T costs to assure the design continues to be based on a valid CEA. Typically, when T&T costs increase, the scope of recommended rehabilitation will also increase. The T&T cost for the past five years is listed in the table on the next page. Please note that the 2021 Manhole Investigation reported used the FY21 information and this report uses the FY23 information.

| Financial Year | MWRA Charges ($/GPD) | Town of Dedham Costs ($/GPD) | DEP Discount Rate | T&T Cost ($/GPD) |
|---|---|---|---|---|
| 2023 | $0.8204 | $0.4545 | 2.50% | $19.88 |
| 2022 | - | - | 2.25% | - |
| 2021 | $0.7526 | $0.6902 | 2.50% | $22.49 |
| 2020 | $0.7385 | $0.4027 | 2.75% | $17.38 |
| 2019 | $0.7813 | $0.4580 | 2.875% | $18.65 |
| 2018 | $0.7557 | $0.6176 | 2.75% | $20.92 |

The calculation of T&T costs for a particular I/I source considers only the portion of I/I that can be reduced through rehabilitation. The percentage of I/I that can be reduced depends greatly upon both the individual source and the specified repair method. Due to the potential for infiltration to migrate from a repaired defect to a nearby defect that may not have warranted rehabilitation or could not be identified during the inspection, the percentage of removable I/I is typically estimated to be 50 percent. This percentage of I/I reduction is identified in the CEA as "removable" infiltration. The rehabilitation costs used in the CEA for each rehabilitation method are actual as-bid construction unit costs from the Town of Dedham's 2021 Sewer On-Call Services Contract with National Water Main Cleaning Company. For all rehabilitations not listed on the On-Call Services, estimated rehabilitation costs were based on prices from recent contracts awarded in this region. The rehabilitation costs listed in this report do not include the cost of additional investigative work or engineering services during design and construction. A list of rehabilitation unit costs used in the CEA is included in Appendix A, *Unit Costs for Rehabilitations*.

The CEA table shows the T&T cost associated with the observed infiltration as well as recommended rehabilitation methods and costs. The analysis produces one of four conclusions:

- *Excessive* indicates the cost to rehabilitate the manhole is less than the associated T&T cost and that rehabilitation is recommended.
- *Value-Effective* indicates the rehabilitation cost is more than the T&T cost, but the rehabilitation is still recommended because of the relative value of the repair.
- *Non-Excessive* indicates the cost to rehabilitate the manhole is more than the T&T cost and rehabilitation is not recommended at this time.
- *Non-Excessive Recommended* indicates the rehabilitation cost is more than the T&T cost, but rehabilitation is recommended due to the severity of the defect. Non-Excessive Recommended rehabilitations include defects that are in need of structural repairs and could become sources of infiltration or result in emergency repairs as the condition of the defect continues to degrade.

The CEA results for manhole infiltration and a summary of the recommended rehabilitation costs are provided in Table 6, *MWRA CEA for Infiltration.* The CEA results for manhole inflow with recommended rehabilitation costs are included in Table 7, *MWRA CEA for Inflow.* A summary of the results of the CEA are as follows:

- 29,664 gpd of excessive removable infiltration at an estimated rehabilitation cost of $143,430. The associated T&T cost is $603,662.
- 720 gpd of value-effective removable infiltration at an estimated rehabilitation cost of $16,543. The associated T&T cost is $14,652.
- 11,000 gpd of peak design storm inflow at an estimated rehabilitation cost of $1,650.

In addition, the following structural manhole repairs are not cost-effective but are recommended and included in the Recommended Rehabilitation Program:

- $19,500 to replace frame and/or cover of 13 manholes
- $500 to repair the bench and invert of one manhole

*Miscellaneous Findings*

Based on the observations made during the 2022 Sewer Manhole Investigation, the following conditions were not recommended for rehabilitations, but are worth noting for potential follow up:

- External drop connections entering AA-10, FF-660, and PP-910 appear blocked
- Internal drop structure blocked in manhole HH-70

Manholes with roots present are included in Table 8, *Manhole Roots.*

*Conclusions & Recommendations*

Based on the observations made during the 2022 Sewer Manhole Investigation, Weston & Sampson has developed a Recommended Rehabilitation Program for identified defects and sources of I/I within the inspected manholes. The recommended rehabilitations are provided in Tables 6 and 7, with a summary provided below.

*Recommended Rehabilitation Program:*

| | | |
|---|---|---|
| Chemical root treatment of eighteen manholes: | $ | 4,500 |
| Cementitious lining of 93 manholes: | $ | 155,473 |
| Replace 13 manhole frames and covers: | $ | 19,500 |
| Repair one manhole bench and inverts: | $ | 500 |
| Installation of 11 inflow dishes: | $ | 1,650 |
| **Total Construction Cost:** | **$** | **181,623** |

It is important to note that manhole structures may degrade between the time of inspection and the time of rehabilitation. Generally, the more time that elapses the greater the chance of material and structural degradation.

*Future Work*

Weston & Sampson recommends that the town continue with its proactive approach towards inspection and rehabilitation of its sewer system. Annual sewer system inspection ensures that necessary rehabilitation work is identified and performed on a regular and timely basis to reduce I/I and prevent serious problems requiring costly emergency repairs. The 2022 manhole inspections end the current 5-year program, but it is recommended to create a new re-prioritized program after the results from the 2022 flow metering project are available. We are available to provide a scope and cost for this work at your request.

We wish to thank you and the members of the Engineering Department staff for their assistance while completing this project. We are available to meet with you at your earliest convenience to discuss this report. Please do not hesitate to contact me at (978) 532-1900 with any questions or comments you may have.

Sincerely,

WESTON & SAMPSON

Nathan E. Michael, PE
Team Leader

cc: Nathan S. Buttermore, PE, Infrastructure Engineer
Ronald I. Lawrence, Project Engineer

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# FIGURES

FIGURE 1 – SEWER SYSTEM

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850 0 850

Scale in Feet

## Sewer Subarea Summary

| Subarea | Linear Feet | Inch Miles | Estimated Manholes |
|---|---|---|---|
| AA | 17,348 | 28.43 | 91 |
| BB | 8,881 | 13.9 | 46 |
| CC | 12,724 | 20.86 | 64 |
| DD | 12,702 | 19.58 | 78 |
| EE | 14,696 | 24.63 | 80 |
| FF | 21,448 | 33.85 | 112 |
| GG | 26,932 | 45.56 | 152 |
| HH | 26,594 | 43.54 | 174 |
| II | 24,797 | 37.76 | 154 |
| JJ | 26,831 | 64.04 | 137 |
| KK | 17,602 | 26.59 | 95 |
| LL | 17,253 | 25.54 | 105 |
| MM | 18,278 | 29.03 | 108 |
| NN | 11,481 | 18.07 | 59 |
| OO | 25,764 | 51.66 | 143 |
| PP | 11,896 | 22.75 | 85 |
| QQ | 12,471 | 21.85 | 62 |
| RR | 19,820 | 30.32 | 86 |
| SS | 31,356 | 51.93 | 151 |
| TT | 19,470 | 31.78 | 105 |
| UU | 18,702 | 31.44 | 109 |
| VV | 13,643 | 23.08 | 73 |
| WW | 21,090 | 36.78 | 115 |
| XX | 16,381 | 25.19 | 110 |
| YY | 15,940 | 25.83 | 85 |
| ZZ | 8,048 | 12.14 | 48 |
| **TOTAL** | **472,148** | **796.14** | **2,627** |

**Legend**

- AA
- BB
- CC
- DD
- EE
- FF
- GG
- HH
- II
- JJ
- KK
- LL
- MM
- NN
- OO
- PP
- QQ
- RR
- SS
- TT
- UU
- VV
- WW
- XX
- YY
- ZZ
- MWRASewerPipes

**FIGURE 1**

**TOWN OF DEDHAM, MASSACHUSETTS**
**2022 SEWER MANHOLE INVESTIGATION**

# SEWER SYSTEM

JULY, 2022 SCALE: NOTED

Weston & Sampson SM

**TABLES**

TABLE 1
SEWER SYSTEM SUMMARY
DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | Estimated Linear Footage (ft) | Inch*Miles | Estimated Manholes |
|---|---|---|---|
| AA | 17,348 | 28.4 | 91 |
| BB | 8,881 | 13.9 | 46 |
| CC | 12,724 | 20.9 | 64 |
| DD | 12,702 | 19.6 | 78 |
| EE | 14,696 | 24.6 | 80 |
| FF | 21,448 | 33.9 | 112 |
| GG | 26,932 | 45.6 | 152 |
| HH | 26,594 | 43.5 | 174 |
| II | 24,797 | 37.7 | 154 |
| JJ | 26,831 | 64.0 | 137 |
| KK | 17,602 | 26.6 | 95 |
| LL | 17,253 | 25.5 | 105 |
| MM | 18,278 | 29.0 | 108 |
| NN | 11,481 | 18.1 | 59 |
| OO | 25,764 | 51.7 | 143 |
| PP | 11,896 | 22.8 | 85 |
| QQ | 12,471 | 21.9 | 62 |
| RR | 19,820 | 30.3 | 86 |
| SS | 31,356 | 51.9 | 151 |
| TT | 19,470 | 31.8 | 105 |
| UU | 18,702 | 31.4 | 109 |
| VV | 13,643 | 23.1 | 73 |
| WW | 21,090 | 36.8 | 115 |
| XX | 16,381 | 25.2 | 110 |
| YY | 15,940 | 25.8 | 85 |
| ZZ | 8,048 | 12.1 | 48 |
| TOTAL | 472,148 | 796.1 | 2,627 |

# TABLE 2
# MANHOLE SUMMARY
DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| AA | 005 | VINE ROCK STREET ESMT | BRICK | 15.3 | 0 | 0 |
| AA | 010 | RIVERSIDE DRIVE ESMT | LINED | 13 | 0 | 0 |
| AA | 020 | RIVERSIDE DRIVE | BRICK | 16.1 | 720 | 0 |
| AA | 030 | VINE ROCK STREET | BRICK | 8.7 | 0 | 0 |
| AA | 040 | VINE ROCK STREET | BRICK | 8.9 | 0 | 0 |
| AA | 050 | WOODLAWN STREET | BRICK | 8.6 | 0 | 0 |
| AA | 060 | GRANDFIELD STREET | BRICK | 11.1 | 0 | 0 |
| AA | 070 | RIVERSIDE DRIVE | BRICK | 12.4 | 0 | 0 |
| AA | 075 | EAST RIVERSIDE DRIVE | BRICK | 6.4 | 0 | 0 |
| AA | 080 | EAST RIVERSIDE DRIVE | LINED | 12 | 0 | 0 |
| AA | 090 | EAST RIVERSIDE DRIVE | BRICK | 12.9 | 0 | 0 |
| AA | 100 | EAST RIVERSIDE DRIVE | BRICK | 6.1 | 0 | 1,000 |
| AA | 110 | EAST RIVERSIDE DRIVE | BRICK | 7.6 | 0 | 0 |
| AA | 120 | RIVERSIDE DRIVE | BRICK | 10.6 | 288 | 0 |
| AA | 130 | RIVERSIDE DRIVE | BRICK | 9.5 | 0 | 0 |
| AA | 140 | RIVERSIDE DRIVE | BRICK | 11.9 | 0 | 0 |
| AA | 150 | RIVERSIDE DRIVE | BRICK | 9.1 | 0 | 0 |
| AA | 160 | RIVERSIDE DRIVE | BRICK | 8.4 | 0 | 0 |
| AA | 170 | RIVERSIDE DRIVE | BRICK | 9 | 0 | 0 |
| AA | 180 | RIVERSIDE DRIVE | BRICK | 8.9 | 0 | 0 |
| AA | 190 | RIVERSIDE DRIVE | BRICK | 9.1 | 144 | 0 |
| AA | 200 | HILLSIDE ROAD | BRICK | 10.1 | 0 | 0 |
| AA | 210 | RIVERSIDE DRIVE | BRICK | 10.3 | 0 | 0 |
| AA | 220 | RIVERSIDE DRIVE | BRICK | 10.5 | 0 | 0 |
| AA | 230 | RIVERSIDE DRIVE | BRICK | 10.1 | 0 | 0 |
| AA | 240 | RIVERSIDE DRIVE | BRICK | 10 | 0 | 0 |
| AA | 250 | BAYARD STREET | BRICK | 9.7 | 0 | 0 |
| AA | 260 | BAYARD STREET | BRICK | 10.3 | 0 | 0 |
| AA | 270 | BAYARD STREET | BRICK | 8.5 | 0 | 0 |
| AA | 280 | TRIMOUNT STREET | BRICK | 9.8 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| AA | 290 | TRIMOUNT STREET | BRICK | 10.1 | 0 | 0 |
| AA | 300 | WOODLAWN STREET | BRICK | 11.2 | 0 | 0 |
| AA | 310 | WOODLAWN STREET | BRICK | 11.1 | 0 | 0 |
| AA | 320 | WOODLAWN STREET | BRICK | 6.1 | 0 | 0 |
| AA | 330 | GRANDFIELD STREET | BRICK | 11.6 | 0 | 0 |
| AA | 340 | GRANDFIELD STREET | BRICK | 11.3 | 0 | 0 |
| AA | 350 | GRANDFIELD STREET | BRICK | 7.8 | 0 | 0 |
| AA | 360 | RIVERSIDE DRIVE | BRICK | 13.9 | 144 | 0 |
| AA | 370 | RIVERSIDE DRIVE | LINED | 11.5 | 0 | 0 |
| AA | 380 | RIVERSIDE DRIVE | LINED | 9.7 | 288 | 0 |
| AA | 390 | RIVERSIDE DRIVE | BRICK | 10.3 | 2,592 | 0 |
| AA | 400 | RIVERSIDE DRIVE | LINED | 11.4 | 0 | 0 |
| AA | 410 | RIVERSIDE DRIVE | LINED | 12.4 | 0 | 0 |
| AA | 420 | RIVERSIDE DRIVE | BRICK | 11.4 | 0 | 0 |
| AA | 430 | NEEDHAM STREET | BRICK | 11.2 | 288 | 0 |
| AA | 440 | BRIDGE STREET | BRICK | 7.4 | 0 | 0 |
| AA | 450 | PINE HILL ROAD | BRICK | 7.9 | 0 | 0 |
| AA | 460 | PINE HILL ROAD | BRICK | 8 | 0 | 0 |
| AA | 465 | PINE HILL ROAD | BRICK | 10.7 | 0 | 0 |
| AA | 470 | PINE HILL ROAD | BRICK | 8.9 | 0 | 0 |
| AA | 480 | SAMOSET ROAD | BRICK | 8 | 0 | 0 |
| AA | 490 | SAMOSET ROAD | BRICK | 8.5 | 0 | 0 |
| AA | 500 | VALLEY ROAD | LINED | 8.6 | 0 | 0 |
| AA | 510 | VALLEY ROAD | BRICK | 8.2 | 0 | 0 |
| AA | 520 | CHARLESBANK ROAD | LINED | 7.3 | 0 | 0 |
| AA | 530 | CHARLESBANK ROAD | BRICK | 7 | 0 | 0 |
| AA | 540 | CHARLESBANK ROAD | BRICK | 7.9 | 0 | 0 |
| AA | 550 | CHARLESBANK ROAD | BRICK | 7.1 | 0 | 0 |
| AA | 560 | PINE HILL ROAD | BRICK | 8.5 | 0 | 0 |
| AA | 570 | PINE HILL ROAD | BRICK | 6.5 | 144 | 0 |
| AA | 580 | PINE HILL ROAD | BRICK | 5.4 | 0 | 0 |
| AA | 590 | PINE HILL ROAD | LINED | 6.8 | 0 | 0 |
| AA | 600 | NEEDHAM STREET | BRICK | 11.1 | 0 | 0 |
| AA | 610 | NEEDHAM STREET | BRICK | 10 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| AA | 620 | NEEDHAM STREET | BRICK | 10.3 | 0 | 0 |
| AA | 630 | NEEDHAM STREET | BRICK | 9.3 | 0 | 0 |
| AA | 640 | NEEDHAM STREET | BRICK | 9.9 | 0 | 0 |
| AA | 650 | NEEDHAM STREET | BRICK | 10 | 0 | 0 |
| AA | 660 | NEEDHAM STREET | BRICK | 9.8 | 0 | 0 |
| AA | 670 | NEEDHAM STREET | BRICK | 9 | 0 | 0 |
| AA | 680 | NEEDHAM STREET | BRICK | 7.5 | 0 | 0 |
| AA | 686 | NEEDHAM STREET | LINED | 10.4 | 0 | 0 |
| AA | 690 | NEEDHAM STREET | BRICK | 7 | 0 | 0 |
| AA | 700 | OAK STREET | BRICK | 7.9 | 0 | 0 |
| AA | 710 | OAK STREET | BRICK | 13.3 | 0 | 0 |
| AA | 720 | OAK TREE ROAD | BRICK | 5.3 | 0 | 0 |
| AA | 730 | JUNIPER TERRACE | BRICK | 6.7 | 0 | 0 |
| AA | 740 | NEEDHAM STREET | PRECAST | 6.6 | 0 | 0 |
| AA | 750 | HILLSIDE ROAD | BRICK | 10 | 0 | 0 |
| AA | 755 | HILLSIDE ROAD | CNL | | | 0 |
| AA | 760 | RIVERDALE ROAD | BRICK | 10.2 | 0 | 0 |
| AA | 770 | HILLSIDE ROAD | BRICK | 8.1 | 0 | 0 |
| AA | 780 | HILLSIDE ROAD | BRICK | 7.9 | 0 | 0 |
| AA | 790 | HILLSIDE ROAD | BRICK | 7.7 | 0 | 0 |
| AA | 795 | HILLSIDE ROAD | BRICK | 7 | 0 | 0 |
| AA | 800 | RIVERDALE ROAD | BRICK | 9.2 | 0 | 0 |
| AA | 810 | RIVERDALE ROAD | BRICK | 8.3 | 0 | 0 |
| AA | 820 | PARKER STAPLES ROAD | BRICK | 6.9 | 0 | 0 |
| AA | 830 | PARKER STAPLES ROAD | BRICK | 5.6 | 0 | 0 |
| AA | 836 | PARKER STAPLES ROAD ESMT | BRICK | 4.2 | 0 | 0 |
| CC | 010 | BRIDGE STREET ESMT | LINED | 14 | 0 | 0 |
| CC | 020 | BRIDGE STREET | LINED | 16 | 432 | 0 |
| CC | 030 | KIELY ROAD | LINED | 16.5 | 432 | 0 |
| CC | 040 | DOGGETT CIRCLE ESMT | LINED | 10.5 | 432 | 0 |
| CC | 050 | DOGGETT CIRCLE ESMT | LINED | 7.5 | 144 | 0 |
| CC | 060 | DOGGETT CIRCLE ESMT | PRECAST | 4.8 | 576 | 0 |
| CC | 070 | DOGGETT CIRCLE ESMT | BLOCK | 4.5 | 144 | 0 |
| CC | 075 | DOGGETT CIRCLE ESMT | PRECAST | 3.9 | 576 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| CC | 080 | DOGGETT CIRCLE ESMT | BLOCK | 4.5 | 144 | 0 |
| CC | 090 | DOGGETT CIRCLE ESMT | BLOCK | 4 | 0 | 0 |
| CC | 100 | DOGGETT CIRCLE ESMT | LINED | 3.9 | 288 | 0 |
| CC | 110 | BRIDGE STREET | CNL | | | 0 |
| CC | 120 | BRIDGE STREET | LINED | 13.1 | 144 | 0 |
| CC | 130 | BRIDGE STREET | BRICK | 11 | 1,584 | 0 |
| CC | 140 | BRIDGE STREET | LINED | 9.6 | 0 | 0 |
| CC | 150 | BRIDGE STREET | BRICK | 9.2 | 1,728 | 0 |
| CC | 155 | BRIDGE STREET | BRICK | 5.8 | 864 | 0 |
| CC | 160 | BRIDGE STREET | BRICK | 6.6 | 0 | 0 |
| CC | 170 | BRIDGE STREET | BRICK | 7.5 | 720 | 0 |
| CC | 180 | BRIDGE STREET | LINED | 7.9 | 0 | 0 |
| CC | 190 | BRIDGE STREET | LINED | 9.8 | 288 | 0 |
| CC | 200 | BRIDGE STREET | BRICK | 12.2 | 288 | 0 |
| CC | 208 | COMMONWEALTH AVENUE | LINED | 11 | 0 | 0 |
| CC | 210 | COMMONWEALTH AVENUE | BRICK | 10.9 | 576 | 0 |
| CC | 220 | COMMONWEALTH AVENUE | BRICK | 8.5 | 0 | 0 |
| CC | 230 | COMMONWEALTH AVENUE | BRICK | 9.8 | 0 | 0 |
| CC | 240 | COMMONWEALTH AVENUE | BRICK | 10.1 | 144 | 0 |
| CC | 250 | COMMONWEALTH AVENUE | LINED | 11.2 | 0 | 0 |
| CC | 260 | COMMONWEALTH AVENUE | BRICK | 10.6 | 0 | 0 |
| CC | 270 | COMMONWEALTH AVENUE | BRICK | 12 | 0 | 0 |
| CC | 280 | MARLBORO STREET | BRICK | 11.2 | 0 | 0 |
| CC | 290 | BEACON STREET | LINED | 8.5 | 0 | 0 |
| CC | 300 | BEACON STREET | LINED | 11 | 0 | 0 |
| CC | 310 | BEACON STREET | LINED | 6.5 | 0 | 0 |
| CC | 320 | FAIRFIELD STREET | LINED | 11.3 | 0 | 0 |
| CC | 330 | FAIRFIELD STREET | BRICK | 10 | 0 | 0 |
| CC | 340 | FAIRFIELD STREET | BRICK | 8.1 | 0 | 0 |
| CC | 350 | RIVERVIEW STREET | LINED | 11.7 | 144 | 0 |
| CC | 360 | RIVERVIEW STREET | LINED | 10.5 | 0 | 0 |
| CC | 370 | RIVERVIEW STREET | BRICK | 8.7 | 0 | 0 |
| CC | 380 | RIVERVIEW STREET | BRICK | 8.4 | 0 | 0 |
| CC | 390 | MASSACHUSETTS AVENUE | BRICK | 9.4 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| CC | 400 | MASSACHUSETTS AVENUE | BRICK | 11.8 | 0 | 0 |
| CC | 410 | MARLBORO STREET | BRICK | 9.1 | 288 | 0 |
| CC | 420 | MARLBORO STREET | BRICK | 9.4 | 432 | 0 |
| CC | 430 | MARLBORO STREET | BRICK | 8.1 | 0 | 0 |
| CC | 440 | MASSACHUSETTS AVENUE | BRICK | 11.7 | 0 | 0 |
| CC | 450 | MASSACHUSETTS AVENUE | BRICK | 10.7 | 0 | 0 |
| CC | 460 | LINDALE AVENUE | BRICK | 11.3 | 0 | 0 |
| CC | 470 | LINDALE AVENUE | BRICK | 8.2 | 0 | 0 |
| CC | 480 | LINDALE AVENUE | BRICK | 7.8 | 0 | 0 |
| CC | 490 | ARBOR LANE | BRICK | 9.4 | 0 | 0 |
| CC | 500 | ARBOR LANE | BRICK | 9.2 | 0 | 0 |
| CC | 510 | ARBOR LANE | BRICK | 9.4 | 0 | 0 |
| CC | 520 | BREEDE TERRACE | BRICK | 9.8 | 0 | 0 |
| CC | 530 | BREEDE TERRACE | BRICK | 13.1 | 1,296 | 0 |
| CC | 540 | DIXON AVENUE | BRICK | 10.6 | 288 | 0 |
| CC | 550 | DIXON AVENUE | BRICK | 8.9 | 0 | 0 |
| CC | 560 | DIXON AVENUE | BRICK | 8.2 | 0 | 0 |
| CC | 570 | DIXON AVENUE | BRICK | 9.8 | 576 | 0 |
| CC | 580 | DIXON AVENUE | BRICK | 6.3 | 576 | 0 |
| CC | 590 | DIXON AVENUE | BRICK | 9.7 | 0 | 0 |
| CC | 600 | ALCOTT LANE | BRICK | 9.5 | 0 | 0 |
| CC | 610 | BRIDGE STREET ESMT | PRECAST | 4.2 | 1,152 | 0 |
| CC | 611 | BRIDGE STREET ESMT | LINED | 4.1 | 0 | 0 |
| FF | 010 | HIGH STREET | LINED | 12.4 | 0 | 0 |
| FF | 020 | HIGH STREET | LINED | 12.1 | 0 | 0 |
| FF | 030 | HIGH STREET | LINED | 12 | 0 | 0 |
| FF | 040 | HARRIS STREET | LINED | 10.6 | 1,152 | 0 |
| FF | 050 | WASHINGTON STREET | LINED | 16.1 | 576 | 0 |
| FF | 060 | HIGH STREET | BRICK | 8.9 | 0 | 0 |
| FF | 070 | HIGH STREET | BRICK | 8.7 | 0 | 0 |
| FF | 080 | WASHINGTON STREET | LINED | 14.8 | 0 | 0 |
| FF | 090 | WASHINGTON STREET | LINED | 13.1 | 0 | 0 |
| FF | 100 | WASHINGTON STREET | LINED | 12.8 | 144 | 0 |
| FF | 110 | WASHINGTON STREET | LINED | 11.7 | 432 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| FF | 120 | WASHINGTON STREET | BRICK | 10.7 | 432 | 0 |
| FF | 130 | WASHINGTON STREET | PRECAST | 11 | 288 | 0 |
| FF | 140 | WASHINGTON STREET | LINED | 9.6 | 144 | 0 |
| FF | 150 | WASHINGTON STREET | BRICK | 11.3 | 0 | 0 |
| FF | 160 | WASHINGTON STREET | BRICK | 11.5 | 144 | 0 |
| FF | 170 | WASHINGTON STREET | BRICK | 9 | 1,152 | 0 |
| FF | 175 | WASHINGTON STREET ESMT | PRECAST | 4.5 | 0 | 0 |
| FF | 180 | WASHINGTON STREET ESMT | BRICK | 8.4 | 0 | 0 |
| FF | 190 | HIGH STREET | LINED | 8.7 | 144 | 1,000 |
| FF | 200 | EAST STREET ESMT | PRECAST | 7.2 | 0 | 0 |
| FF | 210 | EAST STREET | PRECAST | 6 | 0 | 0 |
| FF | 215 | COCCI WAY ESMT | PRECAST | 16.3 | 288 | 0 |
| FF | 230 | EAST STREET | BRICK | 10.9 | 0 | 0 |
| FF | 240 | EAST STREET | LINED | 10 | 288 | 0 |
| FF | 250 | EAST STREET | LINED | 9.1 | 0 | 0 |
| FF | 255 | EAST STREET | PRECAST | 6.5 | 0 | 0 |
| FF | 260 | WASHINGTON STREET ESMT | LINED | 14 | 0 | 0 |
| FF | 270 | MAPLE PLACE | BRICK | 9.9 | 1,440 | 0 |
| FF | 280 | MAPLE PLACE | LINED | 9 | 0 | 0 |
| FF | 290 | MAPLE PLACE ESMT | LINED | 7.8 | 288 | 0 |
| FF | 300 | MAPLE PLACE | LINED | 7.6 | 0 | 0 |
| FF | 303 | MAPLE PLACE | LINED | 7.6 | 0 | 0 |
| FF | 310 | OLD RIVER PLACE | BRICK | 17.2 | 864 | 0 |
| FF | 320 | OLD RIVER PLACE | LINED | 6.2 | 0 | 0 |
| FF | 330 | OLD RIVER PLACE | BRICK | 15.2 | 288 | 0 |
| FF | 340 | OLD RIVER PLACE | LINED | 7.3 | 0 | 0 |
| FF | 350 | AMES STREET OUTLET ESMT | CNO | | | 0 |
| FF | 360 | AMES STREET OUTLET ESMT | LINED | 12.5 | 0 | 0 |
| FF | 365 | AMES STREET OUTLET | LINED | 12 | 0 | 0 |
| FF | 370 | AMES STREET OUTLET | LINED | 14.6 | 0 | 0 |
| FF | 380 | AMES STREET OUTLET | LINED | 13.5 | 0 | 0 |
| FF | 383 | AMES STREET OUTLET | LINED | 11.2 | 0 | 0 |
| FF | 385 | AMES STREET OUTLET | LINED | 7.7 | 0 | 0 |
| FF | 387 | AMES STREET OUTLET | CNL | | | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| FF | 390 | AMES STREET CROSSING ESMT | BRICK | 3.9 | 288 | 0 |
| FF | 395 | BULLARD STREET ESMT | PRECAST | 10.7 | 288 | 0 |
| FF | 400 | BULLARD STREET ESMT | LINED | 4.7 | 0 | 0 |
| FF | 402 | HIGH STREET | BRICK | 10.7 | 1,440 | 0 |
| FF | 406 | HIGH STREET | BRICK | 8.7 | 0 | 0 |
| FF | 410 | HIGH STREET | BRICK | 12.4 | 0 | 0 |
| FF | 420 | EASTERN AVENUE | BRICK | 11.4 | 0 | 0 |
| FF | 430 | EASTERN AVENUE | BRICK | 9.8 | 0 | 0 |
| FF | 440 | BRYANT STREET | BRICK | 10.1 | 0 | 0 |
| FF | 460 | FULLER STREET | PRECAST | 5 | 0 | 0 |
| FF | 470 | BRYANT STREET | BRICK | 8.4 | 0 | 0 |
| FF | 480 | WASHINGTON STREET | BRICK | 15.7 | 0 | 0 |
| FF | 490 | WASHINGTON STREET | BRICK | 14.4 | 0 | 0 |
| FF | 500 | WASHINGTON STREET | BRICK | 11.5 | 0 | 0 |
| FF | 510 | WASHINGTON STREET | LINED | 11.1 | 144 | 0 |
| FF | 520 | WASHINGTON STREET | LINED | 11.6 | 288 | 0 |
| FF | 530 | WASHINGTON STREET | CNO | | | 0 |
| FF | 540 | WASHINGTON STREET | BRICK | 10.9 | 0 | 0 |
| FF | 550 | WASHINGTON STREET | BRICK | 9.9 | 0 | 0 |
| FF | 560 | SCHOOL STREET | LINED | 13.2 | 0 | 0 |
| FF | 570 | SCHOOL STREET | BRICK | 9.3 | 0 | 0 |
| FF | 580 | SCHOOL STREET | BRICK | 8.3 | 0 | 0 |
| FF | 585 | SCHOOL STREET | BRICK | 7.3 | 0 | 0 |
| FF | 590 | WORTHINGTON STREET | LINED | 7.7 | 0 | 0 |
| FF | 600 | WORTHINGTON STREET | LINED | 8.3 | 0 | 0 |
| FF | 610 | MARSH STREET | BRICK | 9.3 | 0 | 0 |
| FF | 620 | MARSH STREET | BRICK | 9 | 0 | 0 |
| FF | 630 | HIGH STREET | BRICK | 12.7 | 0 | 0 |
| FF | 640 | HIGH STREET | BRICK | 11 | 0 | 0 |
| FF | 650 | HIGH STREET | BRICK | 11.3 | 0 | 0 |
| FF | 660 | COURT STREET | BRICK | 12.8 | 0 | 0 |
| FF | 670 | COMMON STREET | BRICK | 13.2 | 288 | 0 |
| FF | 680 | HIGH STREET | LINED | 12.6 | 0 | 0 |
| FF | 690 | HIGH STREET | LINED | 12.2 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| FF | 700 | HIGH STREET | LINED | 11.7 | 0 | 0 |
| FF | 710 | HIGH STREET | BRICK | 11.5 | 0 | 0 |
| FF | 720 | HIGH STREET | LINED | 11.5 | 0 | 0 |
| FF | 730 | HIGH STREET | LINED | 9.7 | 0 | 0 |
| FF | 735 | HIGH STREET | CNO | | | 0 |
| FF | 740 | CHURCH STREET | BRICK | 10.7 | 144 | 0 |
| FF | 750 | CHURCH STREET | LINED | 10.6 | 0 | 0 |
| FF | 751 | FRANKLIN SQUARE | BRICK | 9.5 | 0 | 0 |
| FF | 760 | NORFOLK STREET | LINED | 8 | 0 | 0 |
| FF | 770 | CHURCH STREET | LINED | 10.8 | 0 | 0 |
| FF | 771 | FRANKLIN SQUARE | BRICK | 9.4 | 0 | 0 |
| FF | 780 | CHURCH STREET | CNO | | | 0 |
| FF | 790 | CHURCH STREET | BRICK | 12.5 | 0 | 0 |
| FF | 800 | COURT STREET | LINED | 13 | 0 | 0 |
| FF | 810 | VILLAGE AVENUE | LINED | 13.6 | 144 | 0 |
| FF | 820 | VILLAGE AVENUE | LINED | 12.8 | 0 | 0 |
| FF | 830 | VILLAGE AVENUE | LINED | 11.7 | 0 | 0 |
| FF | 840 | VILLAGE AVENUE | LINED | 9.9 | 0 | 0 |
| FF | 850 | CHESTNUT STREET | LINED | 10 | 0 | 0 |
| FF | 860 | CHESTNUT STREET | LINED | 9.1 | 0 | 0 |
| FF | 870 | COURT STREET | CNO | | | 0 |
| FF | 880 | COURT STREET | BRICK | 8.5 | 0 | 0 |
| FF | 890 | COURT STREET | BRICK | 8 | 0 | 0 |
| FF | 900 | COURT STREET | BRICK | 8.8 | 0 | 0 |
| FF | 905 | BATES COURT | BRICK | 7.3 | 0 | 1,000 |
| FF | 910 | COURT STREET | CNO | | | 0 |
| FF | 920 | BULLARD STREET | LINED | 11.5 | 0 | 0 |
| FF | 930 | BULLARD STREET | LINED | 10.7 | 288 | 0 |
| FF | 940 | BULLARD STREET | LINED | 7.8 | 0 | 0 |
| FF | 950 | COUNTY STREET | LINED | 9.7 | 576 | 0 |
| FF | 960 | COUNTY STREET | LINED | 9.5 | 0 | 0 |
| FF | 970 | COUNTY STREET | LINED | 7.8 | 0 | 0 |
| FF | 980 | PEARL STREET | LINED | 6.9 | 0 | 0 |
| FF | 1010 | WASHINGTON STREET ESMT | PRECAST | 4.7 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| FF | 1015 | WASHINGTON STREET ESMT | PRECAST | 5.1 | 0 | 0 |
| FF | 1020 | WASHINGTON STREET ESMT | PRECAST | 4.2 | 0 | 1,000 |
| HH | 010 | ORCHARD STREET ESMT | PRECAST | 7.9 | 0 | 0 |
| HH | 015 | BOSTON-PROVIDENCE HIGHWAY ESMT | LINED | 12.2 | 288 | 0 |
| HH | 020 | BOSTON-PROVIDENCE HIGHWAY ESMT | PRECAST | 11.4 | 0 | 0 |
| HH | 030 | WILSON AVENUE | PRECAST | 17.1 | 0 | 0 |
| HH | 040 | WILSON AVENUE | PRECAST | 12.8 | 0 | 0 |
| HH | 060 | WILSON AVENUE | PRECAST | 7 | 0 | 0 |
| HH | 070 | WASHINGTON STREET | PRECAST | 18.9 | 0 | 0 |
| HH | 080 | LEE TERRACE ESMT | BRICK | 6.3 | 0 | 0 |
| HH | 090 | LEE TERRACE | BRICK | 6.1 | 0 | 0 |
| HH | 100 | LEE TERRACE | BRICK | 6.4 | 0 | 0 |
| HH | 102 | ORCHARD STREET | PRECAST | 3.4 | 288 | 0 |
| HH | 110 | WILSON AVENUE ESMT | LINED | 15.7 | 0 | 0 |
| HH | 120 | BOSTON-PROVIDENCE HIGHWAY ESMT | LINED | 5.4 | 0 | 0 |
| HH | 125 | BOSTON-PROVIDENCE HIGHWAY | PRECAST | 5.4 | 0 | 0 |
| HH | 130 | BOSTON-PROVIDENCE HIGHWAY | PRECAST | 13.1 | 0 | 0 |
| HH | 160 | BOSTON-PROVIDENCE HIGHWAY ESMT | BRICK | 8.2 | 0 | 0 |
| HH | 180 | ELM STREET ESMT | BRICK | 8.3 | 0 | 0 |
| HH | 190 | ELM STREET | PRECAST | 8.9 | 0 | 0 |
| HH | 200 | ELM STREET | BRICK | 9.7 | 0 | 0 |
| HH | 210 | ELM STREET | BRICK | 6.9 | 0 | 0 |
| HH | 220 | ELM STREET | BRICK | 3 | 0 | 0 |
| HH | 230 | BOSTON-PROVIDENCE HIGHWAY ESMT | LINED | 10 | 0 | 0 |
| HH | 235 | ENTERPRISE DRIVE | LINED | 9 | 0 | 1,000 |
| HH | 240 | LEGACY BOULEVARD | LINED | 10.1 | 0 | 0 |
| HH | 250 | LEGACY BOULEVARD | LINED | 8.4 | 0 | 0 |
| HH | 260 | ENTERPRISE DRIVE | PRECAST | 8 | 0 | 0 |
| HH | 262 | STERGIS WAY ESMT | PRECAST | 4.3 | 0 | 0 |
| HH | 264 | STERGIS WAY ESMT | LINED | 3.4 | 432 | 0 |
| HH | 266 | STERGIS WAY ESMT | LINED | 3 | 144 | 0 |
| HH | 267 | STERGIS WAY ESMT | BRICK | 2.1 | 0 | 0 |
| HH | 268 | STERGIS WAY ESMT | PRECAST | 1.9 | 0 | 0 |
| HH | 270 | STERGIS WAY ESMT | BRICK | 3.7 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| HH | 280 | WASHINGTON STREET | BRICK | 11.3 | 144 | 0 |
| HH | 290 | WASHINGTON STREET | BRICK | 17.7 | 1,152 | 0 |
| HH | 300 | WASHINGTON STREET | CNL | | | 0 |
| HH | 310 | WASHINGTON STREET | BRICK | 9.4 | 144 | 0 |
| HH | 320 | WASHINGTON STREET | BRICK | 7.5 | 288 | 0 |
| HH | 330 | WASHINGTON STREET | BRICK | 7.3 | 0 | 0 |
| HH | 340 | WASHINGTON STREET | BRICK | 7.2 | 0 | 0 |
| HH | 360 | WASHINGTON STREET | LINED | 10.4 | 0 | 0 |
| HH | 365 | WASHINGTON STREET | PRECAST | 4.8 | 0 | 0 |
| HH | 370 | WASHINGTON STREET | PRECAST | 3.5 | 0 | 0 |
| HH | 380 | WASHINGTON STREET | PRECAST | 6.7 | 0 | 0 |
| HH | 390 | WASHINGTON STREET | BRICK | 5.7 | 0 | 0 |
| HH | 400 | WASHINGTON STREET | PRECAST | 5.5 | 0 | 0 |
| HH | 410 | WASHINGTON STREET | BRICK | 5.6 | 0 | 0 |
| HH | 415 | WASHINGTON STREET ESMT | BRICK | 2.8 | 0 | 0 |
| HH | 416 | WASHINGTON STREET ESMT | LINED | 5 | 0 | 0 |
| HH | 420 | WASHINGTON STREET | BRICK | 6.2 | 0 | 0 |
| HH | 430 | WASHINGTON STREET | BRICK | 4.8 | 0 | 0 |
| HH | 440 | WASHINGTON STREET | BRICK | 4.4 | 0 | 0 |
| HH | 470 | WASHINGTON STREET ESMT | BRICK | 5.7 | 0 | 0 |
| HH | 480 | CHICKERING ROAD | LINED | 7.5 | 0 | 0 |
| HH | 490 | CHICKERING ROAD | BRICK | 9.5 | 0 | 0 |
| HH | 500 | CHICKERING ROAD | BRICK | 9.2 | 0 | 0 |
| HH | 510 | CHICKERING ROAD | BRICK | 8.7 | 0 | 0 |
| HH | 520 | CHICKERING ROAD | BRICK | 5.4 | 0 | 0 |
| HH | 530 | CARMICHAEL CIRCLE | PRECAST | 6.4 | 0 | 0 |
| HH | 540 | POND FARM ROAD ESMT | LINED | 5.6 | 0 | 0 |
| HH | 541 | POND FARM ROAD ESMT | LINED | 5.2 | 0 | 0 |
| HH | 550 | POND FARM ROAD | LINED | 6.8 | 0 | 0 |
| HH | 560 | POND FARM ROAD | PRECAST | 8.6 | 0 | 0 |
| HH | 570 | POND FARM ROAD | LINED | 4.2 | 0 | 0 |
| HH | 580 | POND FARM ROAD | LINED | 6.6 | 0 | 0 |
| HH | 590 | POND FARM ROAD | LINED | 6.9 | 0 | 0 |
| HH | 600 | FAIR OAK ROAD ESMT | LINED | 3.6 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| HH | 610 | FAIR OAK ROAD | LINED | 2.7 | 0 | 0 |
| HH | 620 | FAIR OAK ROAD | LINED | 3.8 | 0 | 0 |
| HH | 630 | CHICKERING ROAD | LINED | 6.7 | 0 | 0 |
| HH | 633 | CHICKERING ROAD | BRICK | 6.3 | 0 | 0 |
| HH | 640 | CHICKERING ROAD | LINED | 4.5 | 0 | 0 |
| HH | 650 | CHICKERING ROAD | LINED | 7.9 | 0 | 0 |
| HH | 653 | CHICKERING ROAD | LINED | 5.5 | 0 | 0 |
| HH | 656 | CHICKERING ROAD | PRECAST | 7.2 | 0 | 0 |
| HH | 660 | WASHINGTON STREET | LINED | 7.4 | 0 | 0 |
| HH | 670 | FAY ROAD | PRECAST | 6.6 | 0 | 0 |
| HH | 680 | FAY ROAD | BRICK | 8.4 | 0 | 0 |
| HH | 690 | FAY ROAD | BRICK | 5.4 | 0 | 0 |
| HH | 700 | FAY ROAD | BRICK | 8.7 | 0 | 0 |
| HH | 710 | FAY ROAD | BRICK | 10.7 | 0 | 0 |
| HH | 720 | MANNING ROAD | BRICK | 6 | 0 | 0 |
| HH | 730 | MANNING ROAD | BRICK | 5.9 | 0 | 0 |
| HH | 740 | MANNING ROAD | BRICK | 9.6 | 0 | 0 |
| HH | 750 | MANNING ROAD | BRICK | 10.7 | 0 | 0 |
| HH | 760 | MANNING ROAD | BRICK | 12.6 | 288 | 0 |
| HH | 770 | MANNING ROAD | BRICK | 9 | 0 | 1,000 |
| HH | 780 | WASHINGTON STREET | PRECAST | 3.5 | 0 | 0 |
| HH | 790 | WASHINGTON STREET | PRECAST | 4 | 0 | 0 |
| HH | 800 | ANTHONY LANE | PRECAST | 6.2 | 0 | 0 |
| HH | 810 | ANTHONY LANE | PRECAST | 6.3 | 0 | 0 |
| HH | 820 | ANTHONY LANE | PRECAST | 6.3 | 0 | 0 |
| HH | 830 | ANTHONY LANE | PRECAST | 6.1 | 144 | 0 |
| HH | 832 | ANTHONY LANE | PRECAST | 5.9 | 144 | 0 |
| HH | 834 | PACELLA DRIVE | LINED | 7.8 | 0 | 0 |
| HH | 840 | WASHINGTON STREET | BRICK | 10.7 | 0 | 0 |
| HH | 850 | WASHINGTON STREET ESMT | PRECAST | 11.1 | 0 | 0 |
| HH | 855 | WASHINGTON STREET ESMT | PRECAST | 4.5 | 0 | 0 |
| HH | 870 | HIGHLAND STREET ESMT | BRICK | 2.3 | 0 | 1,000 |
| HH | 890 | HIGHLAND STREET | BRICK | 9.8 | 0 | 0 |
| HH | 900 | HIGHLAND STREET | LINED | 9.6 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| HH | 910 | PACELLA DRIVE ESMT | LINED | 5.3 | 0 | 0 |
| HH | 920 | PACELLA DRIVE ESMT | LINED | 4.7 | 0 | 0 |
| HH | 940 | PACELLA DRIVE | LINED | 3.7 | 0 | 0 |
| HH | 950 | PACELLA DRIVE | LINED | 3.4 | 0 | 0 |
| HH | 970 | PACELLA DRIVE ESMT | BRICK | 4.3 | 288 | 0 |
| HH | 980 | PACELLA DRIVE ESMT | PRECAST | 11.1 | 0 | 0 |
| HH | 990 | PACELLA DRIVE ESMT | PRECAST | 6.9 | 0 | 0 |
| HH | 1000 | GARDEN WAY | LINED | 14.3 | 0 | 0 |
| HH | 1010 | GARDEN WAY | BRICK | 10.6 | 0 | 0 |
| HH | 1030 | PACELLA DRIVE ESMT | CNL | | | 0 |
| HH | 1040 | PACELLA DRIVE ESMT | LINED | 8.4 | 0 | 0 |
| HH | 1050 | PACELLA DRIVE | PRECAST | 9.3 | 0 | 0 |
| HH | 1060 | PACELLA DRIVE | PRECAST | 5.5 | 0 | 0 |
| HH | 1070 | PACELLA DRIVE | PRECAST | 7.7 | 144 | 0 |
| HH | 1080 | PACELLA DRIVE | BLOCK | 6 | 0 | 0 |
| HH | 1090 | PACELLA DRIVE | LINED | 6.8 | 144 | 0 |
| HH | 1110 | CHUTE ROAD | BLOCK | 6.6 | 0 | 0 |
| HH | 1120 | CHUTE ROAD | LINED | 6.3 | 0 | 0 |
| HH | 1130 | CHUTE ROAD | LINED | 7.2 | 720 | 0 |
| HH | 1140 | CHUTE ROAD | BRICK | 2.4 | 0 | 0 |
| HH | 1150 | PACELLA DRIVE | BRICK | 7.5 | 0 | 0 |
| HH | 1160 | PACELLA DRIVE | BRICK | 6.2 | 0 | 0 |
| HH | 1170 | CHUTE ROAD | PRECAST | 7.7 | 0 | 0 |
| HH | 1180 | KAREN PINES ESMT | PRECAST | 5.1 | 0 | 0 |
| HH | 1200 | KAREN PINES | LINED | 6.4 | 0 | 0 |
| HH | 1210 | KAREN PINES | PRECAST | 6.1 | 576 | 0 |
| HH | 1220 | SANDY VALLEY ROAD | LINED | 11.4 | 0 | 0 |
| HH | 1230 | SANDY VALLEY ROAD | LINED | 10.4 | 1,440 | 0 |
| HH | 1240 | SANDY VALLEY ROAD | LINED | 4.4 | 144 | 0 |
| HH | 1250 | SANDY VALLEY ROAD | LINED | 12.7 | 0 | 0 |
| HH | 1260 | SANDY VALLEY ROAD | PRECAST | 5.5 | 0 | 1,000 |
| HH | 1280 | SANDY VALLEY ROAD ESMT | PRECAST | 13.1 | 0 | 0 |
| HH | 1290 | SANDY VALLEY ROAD | PRECAST | 3.4 | 0 | 0 |
| HH | 1300 | ERIN WAY | PRECAST | 5.4 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| HH | 1310 | ERIN WAY | PRECAST | 9.3 | 0 | 0 |
| HH | 1320 | ERIN WAY | PRECAST | 8.2 | 0 | 0 |
| HH | 1330 | HIGHLAND STREET | BRICK | 9.7 | 0 | 0 |
| HH | 1340 | HIGHLAND STREET | BRICK | 9.8 | 0 | 0 |
| HH | 1350 | HIGHLAND STREET | BRICK | 11.5 | 288 | 0 |
| HH | 1360 | HIGHLAND STREET | BRICK | 6.3 | 0 | 0 |
| HH | 1370 | HIGHLAND STREET | BRICK | 6.5 | 0 | 0 |
| HH | 1380 | HIGHLAND STREET | LINED | 11.5 | 0 | 0 |
| HH | 1390 | HIGHLAND STREET | PRECAST | 11.6 | 0 | 0 |
| HH | 1400 | HIGHLAND STREET | BRICK | 6.7 | 0 | 0 |
| HH | 1410 | HIGHLAND STREET | BRICK | 7 | 0 | 0 |
| HH | 1420 | CHUTE ROAD | BRICK | 7.2 | 1,584 | 0 |
| HH | 1430 | CHUTE ROAD | BRICK | 7 | 0 | 0 |
| HH | 1440 | CHUTE ROAD | BRICK | 7.1 | 0 | 0 |
| HH | 1450 | CHUTE ROAD | BRICK | 6.5 | 0 | 0 |
| HH | 1460 | CHUTE ROAD | BRICK | 4.4 | 0 | 0 |
| HH | 1470 | BEAR HILL | BRICK | 3.6 | 0 | 0 |
| HH | 1480 | HIGHLAND STREET | BRICK | 5.9 | 0 | 0 |
| HH | 1490 | HIGHLAND STREET | BRICK | 7.3 | 0 | 0 |
| HH | 1500 | HIGHLAND STREET | BRICK | 8 | 864 | 0 |
| HH | 1510 | HIGHLAND STREET | BRICK | 7.7 | 0 | 0 |
| HH | 1520 | HIGHLAND STREET | BRICK | 3.4 | 0 | 0 |
| HH | 1525 | HARMONY HILL | CNO | | | 0 |
| HH | 1530 | HARMONY HILL | LINED | 7.7 | 144 | 0 |
| HH | 1540 | HARMONY HILL | BRICK | 6.4 | 0 | 0 |
| HH | 1550 | HARMONY HILL ESMT | BRICK | 7.4 | 864 | 0 |
| HH | 1560 | HARMONY HILL | BRICK | 6.8 | 0 | 0 |
| HH | 1570 | HARMONY HILL | PRECAST | 8 | 0 | 0 |
| HH | 1580 | HARMONY HILL ESMT | PRECAST | 6.7 | 0 | 0 |
| HH | 1585 | HARMONY HILL ESMT | PRECAST | 8.5 | 0 | 0 |
| HH | 1590 | KINGSBURY LANE ESMT | PRECAST | 7.2 | 0 | 0 |
| HH | 1600 | ELM STREET | BRICK | 10.4 | 0 | 0 |
| HH | 1610 | ELM STREET | BRICK | 11.3 | 144 | 0 |
| HH | 1620 | ELM STREET | LINED | 9.8 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| HH | 1630 | ELM STREET | LINED | 7.9 | 0 | 0 |
| HH | 1640 | ORCHARD STREET | LINED | 6 | 144 | 0 |
| HH | 1655 | ELM STREET | PRECAST | 5.8 | 0 | 0 |
| HH | 1660 | ARIADNE ROAD | PRECAST | 5.3 | 0 | 0 |
| HH | 1680 | ARIADNE ROAD | PRECAST | 5.8 | 0 | 0 |
| HH | 1690 | ARIADNE ROAD | BRICK | 4.9 | 0 | 0 |
| HH | 1700 | ARIADNE ROAD | PRECAST | 5.4 | 0 | 0 |
| HH | 1710 | ARIADNE ROAD | BRICK | 4.7 | 0 | 0 |
| HH | 1720 | ARIADNE ROAD | PRECAST | 4.7 | 0 | 0 |
| HH | 1740 | ARIADNE ROAD | PRECAST | 4.3 | 0 | 0 |
| HH | 1760 | LEGACY PLACE | PRECAST | 7.5 | 0 | 0 |
| HH | 1765 | LEGACY PLACE | PRECAST | 7.6 | 0 | 0 |
| HH | 1766 | LEGACY PLACE | PRECAST | 7 | 0 | 0 |
| HH | 1767 | LEGACY PLACE | PRECAST | 7.7 | 0 | 0 |
| HH | 1770 | LEGACY PLACE | PRECAST | 8.8 | 0 | 0 |
| HH | 1780 | LEGACY PLACE | PRECAST | 5.8 | 0 | 0 |
| HH | 1782 | LEGACY PLACE | PRECAST | 5 | 0 | 0 |
| HH | 1784 | LEGACY BOULEVARD | PRECAST | 4.1 | 0 | 0 |
| HH | 1786 | LEGACY BOULEVARD | PRECAST | 4.4 | 0 | 0 |
| HH | 1788 | LEGACY BOULEVARD | PRECAST | 4 | 0 | 0 |
| PP | 010 | RUSTCRAFT ROAD | LINED | 15.9 | 0 | 0 |
| PP | 020 | RUSTCRAFT ROAD | LINED | 14.4 | 0 | 0 |
| PP | 030 | RUSTCRAFT ROAD | LINED | 12.5 | 0 | 0 |
| PP | 040 | RUSTCRAFT ROAD | LINED | 12.1 | 0 | 0 |
| PP | 050 | RUSTCRAFT ROAD | LINED | 9.5 | 0 | 0 |
| PP | 060 | RUSTCRAFT ROAD | LINED | 7.9 | 0 | 0 |
| PP | 070 | RUSTCRAFT ROAD | LINED | 7.1 | 0 | 0 |
| PP | 190 | RUSTCRAFT ROAD ESMT | BRICK | 5.4 | 0 | 0 |
| PP | 200 | RUSTCRAFT ROAD ESMT | BRICK | 4.5 | 0 | 0 |
| PP | 210 | RUSTCRAFT ROAD ESMT | BRICK | 4.7 | 0 | 0 |
| PP | 260 | ELM STREET ESMT | PRECAST | 4.6 | 0 | 0 |
| PP | 280 | ELM STREET | BRICK | 11 | 0 | 0 |
| PP | 290 | ELM STREET | BRICK | 11.1 | 0 | 0 |
| PP | 293 | ELM STREET | PRECAST | 13.7 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| PP | 297 | ELM STREET | PRECAST | 5.7 | 0 | 0 |
| PP | 300 | ELM STREET | BRICK | 15.6 | 0 | 0 |
| PP | 305 | ELM STREET ESMT | BRICK | 13.3 | 0 | 0 |
| PP | 310 | ELM STREET | BRICK | 10.1 | 0 | 0 |
| PP | 320 | ELM STREET | PRECAST | 10.6 | 0 | 0 |
| PP | 330 | ELM STREET | BRICK | 7.6 | 0 | 0 |
| PP | 340 | ELM STREET | BRICK | 8.4 | 288 | 0 |
| PP | 350 | ELM STREET | BRICK | 8.1 | 0 | 0 |
| PP | 360 | ELM STREET | BRICK | 8 | 576 | 0 |
| PP | 370 | ELM STREET | BRICK | 8.6 | 720 | 0 |
| PP | 380 | ROBINWOOD ROAD | BRICK | 8.8 | 0 | 0 |
| PP | 390 | ROBINWOOD ROAD | BRICK | 8.2 | 0 | 0 |
| PP | 400 | ROBINWOOD ROAD | BRICK | 8.4 | 0 | 0 |
| PP | 410 | ROBINWOOD ROAD | BRICK | 8.9 | 144 | 0 |
| PP | 420 | ROBINWOOD ROAD | BRICK | 6.8 | 0 | 0 |
| PP | 430 | RUSTCRAFT ROAD ESMT | PRECAST | 6.4 | 0 | 0 |
| PP | 435 | RUSTCRAFT ROAD | PRECAST | 4.5 | 0 | 0 |
| PP | 440 | CAREMATRIX DRIVE | PRECAST | 5.7 | 0 | 0 |
| PP | 450 | CAREMATRIX DRIVE ESMT | LINED | 11.3 | 0 | 0 |
| PP | 460 | ALLIED DRIVE | LINED | 5.6 | 288 | 0 |
| PP | 471 | ALLIED DRIVE | BRICK | 2 | 576 | 1,000 |
| PP | 472 | ALLIED DRIVE | PRECAST | 2.8 | 0 | 1,000 |
| PP | 480 | ALLIED DRIVE | BRICK | 8.3 | 288 | 0 |
| PP | 487 | ALLIED DRIVE ESMT | BRICK | 5 | 3,024 | 0 |
| PP | 488 | ALLIED DRIVE ESMT | PRECAST | 5.9 | 288 | 0 |
| PP | 489 | ALLIED DRIVE | PRECAST | 6 | 0 | 0 |
| PP | 490 | ALLIED DRIVE | PRECAST | 6.2 | 0 | 0 |
| PP | 510 | ALLIED DRIVE | LINED | 5.7 | 288 | 0 |
| PP | 530 | ALLIED DRIVE | LINED | 12.6 | 0 | 0 |
| PP | 540 | ALLIED DRIVE ESMT | LINED | 14.8 | 0 | 0 |
| PP | 545 | ALLIED DRIVE | PRECAST | 13.2 | 144 | 0 |
| PP | 550 | ALLIED DRIVE | PRECAST | 11.3 | 0 | 0 |
| PP | 560 | WILLARD STREET ESMT | PRECAST | 13.5 | 288 | 0 |
| PP | 570 | WILLARD STREET ESMT | PRECAST | 3.8 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| PP | 580 | WILLARD STREET ESMT | PRECAST | 3.3 | 0 | 0 |
| PP | 590 | WILLARD STREET ESMT | PRECAST | 7.4 | 0 | 0 |
| PP | 595 | WILLARD STREET ESMT | PRECAST | 4.9 | 288 | 0 |
| PP | 600 | WILLARD STREET | PRECAST | 8.1 | 0 | 0 |
| PP | 610 | WILLARD STREET | PRECAST | 7.9 | 0 | 0 |
| PP | 620 | WILLARD STREET | PRECAST | 8.4 | 0 | 0 |
| PP | 630 | WILLARD STREET | PRECAST | 7.9 | 0 | 0 |
| PP | 640 | WILLARD STREET | PRECAST | 6.9 | 0 | 0 |
| PP | 650 | WILLARD STREET | PRECAST | 5.7 | 288 | 0 |
| PP | 660 | WILLARD STREET | PRECAST | 5.8 | 0 | 0 |
| PP | 670 | WILLARD STREET | PRECAST | 5.9 | 144 | 0 |
| PP | 680 | WILLARD STREET | LINED | 6.2 | 0 | 0 |
| PP | 690 | WILLARD STREET | PRECAST | 8 | 0 | 0 |
| PP | 700 | WILLARD STREET | LINED | 8.2 | 0 | 0 |
| PP | 710 | WILLARD STREET | PRECAST | 7.4 | 0 | 0 |
| PP | 720 | WILLARD STREET ESMT | BRICK | 4.5 | 432 | 0 |
| PP | 800 | RUSTCRAFT ROAD ESMT | PRECAST | 16.7 | 0 | 0 |
| PP | 810 | RUSTCRAFT ROAD ESMT | PRECAST | 17.1 | 0 | 0 |
| PP | 820 | RUSTCRAFT ROAD | PRECAST | 20.5 | 0 | 0 |
| PP | 830 | RUSTCRAFT ROAD | PRECAST | 19.6 | 288 | 0 |
| PP | 840 | RUSTCRAFT ROAD | PRECAST | 19.6 | 0 | 0 |
| PP | 850 | RUSTCRAFT ROAD | PRECAST | 18 | 144 | 0 |
| PP | 860 | RUSTCRAFT ROAD | PRECAST | 17.3 | 0 | 0 |
| PP | 870 | RUSTCRAFT ROAD | PRECAST | 16.7 | 0 | 0 |
| PP | 890 | RUSTCRAFT ROAD | PRECAST | 15.4 | 288 | 0 |
| PP | 900 | RUSTCRAFT ROAD | PRECAST | 14.1 | 0 | 0 |
| PP | 910 | RUSTCRAFT ROAD | PRECAST | 11.3 | 0 | 0 |
| PP | 920 | RUSTCRAFT ROAD | LINED | 9.4 | 2,304 | 0 |
| PP | 930 | RUSTCRAFT ROAD | LINED | 7.6 | 0 | 0 |
| PP | 1000 | PRESIDENTS WAY | PRECAST | 16.3 | 8,640 | 0 |
| PP | 1010 | PRESIDENTS WAY | PRECAST | 18 | 0 | 0 |
| PP | 1020 | PRESIDENTS WAY | PRECAST | 17.7 | 144 | 0 |
| PP | 1030 | PRESIDENTS WAY | PRECAST | 17.3 | 0 | 0 |
| PP | 1040 | PRESIDENTS WAY | CNO | | | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| PP | 1050 | PRESIDENTS WAY | PRECAST | 16.5 | 288 | 0 |
| PP | 1060 | PRESIDENTS WAY | PRECAST | 16.1 | 288 | 0 |
| PP | 1070 | PRESIDENTS WAY | PRECAST | 12 | 0 | 0 |
| PP | 1080 | PRESIDENTS WAY | PRECAST | 11.5 | 0 | 0 |
| PP | 1090 | LEGACY BOULEVARD ESMT | PRECAST | 8.3 | 0 | 0 |
| PP | 1110 | LEGACY BOULEVARD | PRECAST | 5.6 | 0 | 0 |
| PP | 1120 | LEGACY BOULEVARD | PRECAST | 6.6 | 0 | 0 |
| PP | 1130 | LEGACY BOULEVARD | PRECAST | 5.9 | 0 | 0 |
| ZZ | 050 | COMMON STREET ESMT | PRECAST | 7.1 | 0 | 0 |
| ZZ | 055 | COMMON STREET ESMT | PRECAST | 14.1 | 0 | 0 |
| ZZ | 060 | COMMON STREET ESMT | PRECAST | 5.4 | 0 | 0 |
| ZZ | 070 | COMMON STREET ESMT | PRECAST | 7.5 | 0 | 0 |
| ZZ | 080 | COMMON STREET ESMT | PRECAST | 8.2 | 0 | 0 |
| ZZ | 090 | COMMON STREET ESMT | PRECAST | 8.7 | 0 | 0 |
| ZZ | 100 | COMMON STREET | PRECAST | 10.1 | 0 | 0 |
| ZZ | 110 | COMMON STREET | PRECAST | 10.3 | 0 | 0 |
| ZZ | 120 | COMMON STREET | PRECAST | 9.6 | 0 | 0 |
| ZZ | 130 | COMMON STREET | PRECAST | 8 | 0 | 0 |
| ZZ | 133 | WHITCOMB ROAD | PRECAST | 3.6 | 0 | 0 |
| ZZ | 137 | WEST STREET ESMT | PRECAST | 9.5 | 0 | 0 |
| ZZ | 138 | WEST STREET ESMT | PRECAST | 7.2 | 0 | 0 |
| ZZ | 139 | WEST STREET ESMT | PRECAST | 9.1 | 0 | 0 |
| ZZ | 140 | WEST STREET ESMT | LINED | 11.5 | 0 | 0 |
| ZZ | 150 | WEST STREET | LINED | 7.1 | 0 | 0 |
| ZZ | 155 | WEST STREET ESMT | LINED | 3.5 | 288 | 0 |
| ZZ | 160 | WEST STREET ESMT | PRECAST | 5.8 | 0 | 0 |
| ZZ | 170 | WEST STREET ESMT | PRECAST | 6 | 0 | 0 |
| ZZ | 190 | WEST STREET ESMT | PRECAST | 9.1 | 0 | 0 |
| ZZ | 200 | WEST STREET ESMT | PRECAST | 7.9 | 0 | 0 |
| ZZ | 210 | WEST STREET ESMT | PRECAST | 12.7 | 0 | 0 |
| ZZ | 220 | HALE DRIVE | PRECAST | 7.6 | 0 | 0 |
| ZZ | 230 | HALE DRIVE | PRECAST | 9 | 0 | 0 |
| ZZ | 1000 | BURGESS LANE | PRECAST | 12.8 | 0 | 0 |
| ZZ | 1005 | BURGESS LANE ESMT | PRECAST | 7 | 0 | 0 |

| Subarea | MH # | Street Name | Material | Manhole Depth (ft) | Infiltration (gpd) | Inflow (gpd) |
|---|---|---|---|---|---|---|
| ZZ | 1010 | BURGESS LANE | PRECAST | 6.3 | 0 | 0 |
| ZZ | 1015 | BURGESS LANE | PRECAST | 7 | 0 | 0 |
| ZZ | 1020 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 7.3 | 0 | 0 |
| ZZ | 1025 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 7.8 | 0 | 0 |
| ZZ | 1030 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 10.2 | 144 | 0 |
| ZZ | 1035 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 9 | 0 | 0 |
| ZZ | 1040 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 7 | 0 | 0 |
| ZZ | 1045 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 6 | 0 | 0 |
| ZZ | 1050 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 5.6 | 0 | 0 |
| ZZ | 1055 | SCHOOLMASTER/BURGESS ESMT | PRECAST | 7.9 | 0 | 0 |
| ZZ | 1060 | SCHOOLMASTER LANE | PRECAST | 15.2 | 144 | 0 |
| ZZ | 1065 | SCHOOLMASTER LANE | PRECAST | 7.7 | 0 | 0 |
| ZZ | 1070 | SCHOOLMASTER LANE ESMT | PRECAST | 7.5 | 0 | 0 |
| ZZ | 1075 | SCHOOLMASTER LANE | PRECAST | 6.8 | 0 | 0 |
| ZZ | 1080 | SCHOOLMASTER LANE | PRECAST | 8.3 | 0 | 0 |
| ZZ | 1085 | SCHOOLMASTER LANE ESMT | PRECAST | 5.7 | 0 | 0 |
| ZZ | 1090 | SCHOOLMASTER LANE ESMT | PRECAST | 7 | 0 | 0 |
| ZZ | 1095 | SCHOOLMASTER LANE | PRECAST | 7 | 0 | 1,000 |
| TOTAL MANHOLE INFILTRATION | | | | | 62,784 | 11,000 |
| TOTAL NUMBER OF MANHOLES | | | | | 592 | |
| TOTAL NUMBER OF MANHOLES INSPECTED | | | | | 579 | |

# TABLE 3
# MANHOLE INFLOW SUMMARY
DEDHAM, MASSACHUSETTS
2022 MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Inflow Type | Vent Holes | Diam. (in) | Number | Inflow (gpd) |
|---|---|---|---|---|---|---|---|
| AA | 100 | EAST RIVERSIDE DRIVE | PONDING | NO | | | 1,000 |
| FF | 190 | HIGH STREET | PONDING | NO | | | 1,000 |
| FF | 905 | BATES COURT | PONDING | NO | | | 1,000 |
| FF | 1020 | WASHINGTON STREET ESMT | PONDING | NO | | | 1,000 |
| HH | 235 | ENTERPRISE DRIVE | PONDING | NO | | | 1,000 |
| HH | 770 | MANNING ROAD | PONDING | NO | | | 1,000 |
| HH | 870 | HIGHLAND STREET ESMT | PONDING | NO | | | 1,000 |
| HH | 1260 | SANDY VALLEY ROAD | PONDING | NO | | | 1,000 |
| PP | 471 | ALLIED DRIVE | PONDING | NO | | | 1,000 |
| PP | 472 | ALLIED DRIVE | PONDING | NO | | | 1,000 |
| ZZ | 1095 | SCHOOLMASTER LANE | PONDING | NO | | | 1,000 |
| TOTAL | | | | | | | 11,000 |
| TOTAL NUMBER OF MANHOLES | | | | | | | 11 |

NOTES:
1. Manholes located in an easement will have a "Street Name" designation of an adjacent street

# TABLE 4
# MANHOLE STRUCTURAL DEFECTS
DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | Manhole # | Street Name | Rehabilitation | Rehabilitation Cost |
|---|---|---|---|---|
| AA | 686 | NEEDHAM STREET | REPLACE FRAME AND COVER | $1,500 |
| FF | 530 | WASHINGTON STREET | REPLACE FRAME AND COVER | $1,500 |
| FF | 735 | HIGH STREET | REPLACE FRAME AND COVER | $1,500 |
| FF | 780 | CHURCH STREET | REPLACE FRAME AND COVER | $1,500 |
| FF | 840 | VILLAGE AVENUE | REPLACE FRAME AND COVER | $1,500 |
| FF | 910 | COURT STREET | REPLACE FRAME AND COVER | $1,500 |
| FF | 1010 | WASHINGTON STREET ESMT | REPAIR BENCH/INVERT | $500 |
| HH | 190 | ELM STREET | REPLACE FRAME AND COVER | $1,500 |
| HH | 240 | LEGACY BOULEVARD | REPLACE FRAME AND COVER | $1,500 |
| HH | 830 | ANTHONY LANE | REPLACE FRAME AND COVER | $1,500 |

| Subarea | Manhole # | Street Name | Rehabilitation | Rehabilitation Cost |
|---|---|---|---|---|
| HH | 1320 | ERIN WAY | REPLACE FRAME AND COVER | $1,500 |
| HH | 1525 | HARMONY HILL | REPLACE FRAME AND COVER | $1,500 |
| PP | 489 | ALLIED DRIVE | REPLACE FRAME AND COVER | $1,500 |
| PP | 1010 | PRESIDENTS WAY | REPLACE FRAME AND COVER | $1,500 |
| TOTAL REHABILITATION COST | | | | $20,000 |
| TOTAL NUMBER OF MANHOLES | | | | 14 |

# TABLE 5
# MANHOLE INSPECTION STATUS

DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Inspection Status |
|---|---|---|---|
| AA | 755 | HILLSIDE ROAD | CNL |
| CC | 110 | BRIDGE STREET | CNL |
| FF | 350 | AMES STREET OUTLET ESMT | CNO |
| FF | 387 | AMES STREET OUTLET | CNL |
| FF | 530 | WASHINGTON STREET | CNO |
| FF | 735 | HIGH STREET | CNO |
| FF | 780 | CHURCH STREET | CNO |
| FF | 870 | COURT STREET | CNO |
| FF | 910 | COURT STREET | CNO |
| HH | 300 | WASHINGTON STREET | CNL |
| HH | 1030 | PACELLA DRIVE ESMT | CNL |
| HH | 1525 | HARMONY HILL | CNO |
| PP | 1040 | PRESIDENTS WAY | CNO |
| TOTAL NUMBER OF MANHOLES | | | 13 |

# TABLE 6
# MWRA COST EFFECTIVE ANALYSIS FOR INFILTRATION MANHOLES - RECOMMENDED MANHOLES
DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| AA | 020 | RIVERSIDE DRIVE | 16.1 | 720 | 360 | $7,157 | Cementitious Lining | $2,818 | EXCESSIVE RECOMMENDED |
| AA | 120 | RIVERSIDE DRIVE | 10.6 | 288 | 144 | $2,863 | Cementitious Lining | $1,855 | EXCESSIVE RECOMMENDED |
| AA | 190 | RIVERSIDE DRIVE | 9.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,593 | VALUE-EFFECTIVE RECOMMENDED |
| AA | 380 | RIVERSIDE DRIVE | 9.7 | 288 | 144 | $2,863 | Cementitious Lining | $1,698 | EXCESSIVE RECOMMENDED |
| AA | 390 | RIVERSIDE DRIVE | 10.3 | 2,592 | 1,296 | $25,764 | Cementitious Lining | $1,803 | EXCESSIVE RECOMMENDED |
| AA | 430 | NEEDHAM STREET | 11.2 | 288 | 144 | $2,863 | Cementitious Lining | $1,960 | EXCESSIVE RECOMMENDED |
| AA | 570 | PINE HILL ROAD | 6.5 | 144 | 72 | $1,431 | Cementitious Lining | $1,138 | EXCESSIVE RECOMMENDED |
| CC | 020 | BRIDGE STREET | 16 | 432 | 216 | $4,294 | Cementitious Lining | $2,800 | EXCESSIVE RECOMMENDED |
| CC | 030 | KIELY ROAD | 16.5 | 432 | 216 | $4,294 | Cementitious Lining | $2,888 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| CC | 040 | DOGGETT CIRCLE ESMT | 10.5 | 432 | 216 | $4,294 | Cementitious Lining | $1,838 | EXCESSIVE RECOMMENDED |
| CC | 050 | DOGGETT CIRCLE ESMT | 7.5 | 144 | 72 | $1,431 | Root Treatment, Cementitious Lining | $1,563 | VALUE-EFFECTIVE RECOMMENDED |
| CC | 060 | DOGGETT CIRCLE ESMT | 4.8 | 576 | 288 | $5,725 | Root Treatment, Cementitious Lining | $1,090 | EXCESSIVE RECOMMENDED |
| CC | 070 | DOGGETT CIRCLE ESMT | 4.5 | 144 | 72 | $1,431 | Cementitious Lining | $788 | EXCESSIVE RECOMMENDED |
| CC | 075 | DOGGETT CIRCLE ESMT | 3.9 | 576 | 288 | $5,725 | Cementitious Lining | $683 | EXCESSIVE RECOMMENDED |
| CC | 080 | DOGGETT CIRCLE ESMT | 4.5 | 144 | 72 | $1,431 | Cementitious Lining | $788 | EXCESSIVE RECOMMENDED |
| CC | 100 | DOGGETT CIRCLE ESMT | 3.9 | 288 | 144 | $2,863 | Cementitious Lining | $683 | EXCESSIVE RECOMMENDED |
| CC | 130 | BRIDGE STREET | 11 | 1,584 | 792 | $15,745 | Cementitious Lining | $1,925 | EXCESSIVE RECOMMENDED |
| CC | 150 | BRIDGE STREET | 9.2 | 1,728 | 864 | $17,176 | Cementitious Lining | $1,610 | EXCESSIVE RECOMMENDED |
| CC | 155 | BRIDGE STREET | 5.8 | 864 | 432 | $8,588 | Cementitious Lining | $1,015 | EXCESSIVE RECOMMENDED |
| CC | 170 | BRIDGE STREET | 7.5 | 720 | 360 | $7,157 | Cementitious Lining | $1,313 | EXCESSIVE RECOMMENDED |
| CC | 190 | BRIDGE STREET | 9.8 | 288 | 144 | $2,863 | Cementitious Lining | $1,715 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| CC | 200 | BRIDGE STREET | 12.2 | 288 | 144 | $2,863 | Cementitious Lining | $2,135 | EXCESSIVE RECOMMENDED |
| CC | 210 | COMMONWEALTH AVENUE | 10.9 | 576 | 288 | $5,725 | Cementitious Lining | $1,908 | EXCESSIVE RECOMMENDED |
| CC | 240 | COMMONWEALTH AVENUE | 10.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,768 | VALUE-EFFECTIVE RECOMMENDED |
| CC | 410 | MARLBORO STREET | 9.1 | 288 | 144 | $2,863 | Cementitious Lining | $1,593 | EXCESSIVE RECOMMENDED |
| CC | 420 | MARLBORO STREET | 9.4 | 432 | 216 | $4,294 | Cementitious Lining | $1,645 | EXCESSIVE RECOMMENDED |
| CC | 530 | BREEDE TERRACE | 13.1 | 1,296 | 648 | $12,882 | Cementitious Lining | $2,293 | EXCESSIVE RECOMMENDED |
| CC | 540 | DIXON AVENUE | 10.6 | 288 | 144 | $2,863 | Cementitious Lining | $1,855 | EXCESSIVE RECOMMENDED |
| CC | 570 | DIXON AVENUE | 9.8 | 576 | 288 | $5,725 | Cementitious Lining | $1,715 | EXCESSIVE RECOMMENDED |
| CC | 580 | DIXON AVENUE | 6.3 | 576 | 288 | $5,725 | Root Treatment, Cementitious Lining | $1,353 | EXCESSIVE RECOMMENDED |
| CC | 610 | BRIDGE STREET ESMT | 4.2 | 1,152 | 576 | $11,451 | Cementitious Lining | $735 | EXCESSIVE RECOMMENDED |
| FF | 040 | HARRIS STREET | 10.6 | 1,152 | 576 | $11,451 | Cementitious Lining | $1,855 | EXCESSIVE RECOMMENDED |
| FF | 050 | WASHINGTON STREET | 16.1 | 576 | 288 | $5,725 | Cementitious Lining | $2,818 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| FF | 110 | WASHINGTON STREET | 11.7 | 432 | 216 | $4,294 | Cementitious Lining | $2,048 | EXCESSIVE RECOMMENDED |
| FF | 120 | WASHINGTON STREET | 10.7 | 432 | 216 | $4,294 | Cementitious Lining | $1,873 | EXCESSIVE RECOMMENDED |
| FF | 130 | WASHINGTON STREET | 11 | 288 | 144 | $2,863 | Cementitious Lining | $1,925 | EXCESSIVE RECOMMENDED |
| FF | 140 | WASHINGTON STREET | 9.6 | 144 | 72 | $1,431 | Cementitious Lining | $1,680 | VALUE-EFFECTIVE RECOMMENDED |
| FF | 170 | WASHINGTON STREET | 9 | 1,152 | 576 | $11,451 | Cementitious Lining | $1,575 | EXCESSIVE RECOMMENDED |
| FF | 190 | HIGH STREET | 8.7 | 144 | 72 | $1,431 | Cementitious Lining | $1,523 | VALUE-EFFECTIVE RECOMMENDED |
| FF | 215 | COCCI WAY ESMT | 16.3 | 288 | 144 | $2,863 | Cementitious Lining | $2,853 | EXCESSIVE RECOMMENDED |
| FF | 240 | EAST STREET | 10 | 288 | 144 | $2,863 | Cementitious Lining | $1,750 | EXCESSIVE RECOMMENDED |
| FF | 270 | MAPLE PLACE | 9.9 | 1,440 | 720 | $14,314 | Cementitious Lining | $1,733 | EXCESSIVE RECOMMENDED |
| FF | 290 | MAPLE PLACE ESMT | 7.8 | 288 | 144 | $2,863 | Cementitious Lining | $1,365 | EXCESSIVE RECOMMENDED |
| FF | 310 | OLD RIVER PLACE | 17.2 | 864 | 432 | $8,588 | Cementitious Lining | $3,010 | EXCESSIVE RECOMMENDED |
| FF | 330 | OLD RIVER PLACE | 15.2 | 288 | 144 | $2,863 | Cementitious Lining | $2,660 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| FF | 390 | AMES STREET CROSSING ESMT | 3.9 | 288 | 144 | $2,863 | Root Treatment, Cementitious Lining | $933 | EXCESSIVE RECOMMENDED |
| FF | 395 | BULLARD STREET ESMT | 10.7 | 288 | 144 | $2,863 | Cementitious Lining | $1,873 | EXCESSIVE RECOMMENDED |
| FF | 402 | HIGH STREET | 10.7 | 1,440 | 720 | $14,314 | Cementitious Lining | $1,873 | EXCESSIVE RECOMMENDED |
| FF | 520 | WASHINGTON STREET | 11.6 | 288 | 144 | $2,863 | Cementitious Lining | $2,030 | EXCESSIVE RECOMMENDED |
| FF | 670 | COMMON STREET | 13.2 | 288 | 144 | $2,863 | Cementitious Lining | $2,310 | EXCESSIVE RECOMMENDED |
| FF | 930 | BULLARD STREET | 10.7 | 288 | 144 | $2,863 | Cementitious Lining | $1,873 | EXCESSIVE RECOMMENDED |
| FF | 950 | COUNTY STREET | 9.7 | 576 | 288 | $5,725 | Cementitious Lining | $1,698 | EXCESSIVE RECOMMENDED |
| HH | 015 | BOSTON-PROVIDENCE HIGHWAY ESMT | 12.2 | 288 | 144 | $2,863 | Cementitious Lining | $2,135 | EXCESSIVE RECOMMENDED |
| HH | 102 | ORCHARD STREET | 3.4 | 288 | 144 | $2,863 | Cementitious Lining | $595 | EXCESSIVE RECOMMENDED |
| HH | 264 | STERGIS WAY ESMT | 3.4 | 432 | 216 | $4,294 | Cementitious Lining | $595 | EXCESSIVE RECOMMENDED |
| HH | 266 | STERGIS WAY ESMT | 3 | 144 | 72 | $1,431 | Cementitious Lining | $525 | EXCESSIVE RECOMMENDED |
| HH | 290 | WASHINGTON STREET | 17.7 | 1,152 | 576 | $11,451 | Cementitious Lining | $3,098 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| HH | 310 | WASHINGTON STREET | 9.4 | 144 | 72 | $1,431 | Cementitious Lining | $1,645 | VALUE-EFFECTIVE RECOMMENDED |
| HH | 320 | WASHINGTON STREET | 7.5 | 288 | 144 | $2,863 | Cementitious Lining | $1,313 | EXCESSIVE RECOMMENDED |
| HH | 760 | MANNING ROAD | 12.6 | 288 | 144 | $2,863 | Cementitious Lining | $2,205 | EXCESSIVE RECOMMENDED |
| HH | 830 | ANTHONY LANE | 6.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,068 | EXCESSIVE RECOMMENDED |
| HH | 832 | ANTHONY LANE | 5.9 | 144 | 72 | $1,431 | Cementitious Lining | $1,033 | EXCESSIVE RECOMMENDED |
| HH | 970 | PACELLA DRIVE ESMT | 4.3 | 288 | 144 | $2,863 | Cementitious Lining | $753 | EXCESSIVE RECOMMENDED |
| HH | 1070 | PACELLA DRIVE | 7.7 | 144 | 72 | $1,431 | Cementitious Lining | $1,348 | EXCESSIVE RECOMMENDED |
| HH | 1090 | PACELLA DRIVE | 6.8 | 144 | 72 | $1,431 | Cementitious Lining | $1,190 | EXCESSIVE RECOMMENDED |
| HH | 1130 | CHUTE ROAD | 7.2 | 720 | 360 | $7,157 | Cementitious Lining | $1,260 | EXCESSIVE RECOMMENDED |
| HH | 1210 | KAREN PINES | 6.1 | 576 | 288 | $5,725 | Cementitious Lining | $1,068 | EXCESSIVE RECOMMENDED |
| HH | 1230 | SANDY VALLEY ROAD | 10.4 | 1,440 | 720 | $14,314 | Cementitious Lining | $1,820 | EXCESSIVE RECOMMENDED |
| HH | 1240 | SANDY VALLEY ROAD | 4.4 | 144 | 72 | $1,431 | Cementitious Lining | $770 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| HH | 1350 | HIGHLAND STREET | 11.5 | 288 | 144 | $2,863 | Cementitious Lining | $2,013 | EXCESSIVE RECOMMENDED |
| HH | 1420 | CHUTE ROAD | 7.2 | 1,584 | 792 | $15,745 | Cementitious Lining | $1,260 | EXCESSIVE RECOMMENDED |
| HH | 1500 | HIGHLAND STREET | 8 | 864 | 432 | $8,588 | Cementitious Lining | $1,400 | EXCESSIVE RECOMMENDED |
| HH | 1530 | HARMONY HILL | 7.7 | 144 | 72 | $1,431 | Cementitious Lining | $1,348 | EXCESSIVE RECOMMENDED |
| HH | 1550 | HARMONY HILL ESMT | 7.4 | 864 | 432 | $8,588 | Root Treatment, Cementitious Lining | $1,545 | EXCESSIVE RECOMMENDED |
| HH | 1640 | ORCHARD STREET | 6 | 144 | 72 | $1,431 | Cementitious Lining | $1,050 | EXCESSIVE RECOMMENDED |
| PP | 340 | ELM STREET | 8.4 | 288 | 144 | $2,863 | Cementitious Lining | $1,470 | EXCESSIVE RECOMMENDED |
| PP | 360 | ELM STREET | 8 | 576 | 288 | $5,725 | Cementitious Lining | $1,400 | EXCESSIVE RECOMMENDED |
| PP | 370 | ELM STREET | 8.6 | 720 | 360 | $7,157 | Cementitious Lining | $1,505 | EXCESSIVE RECOMMENDED |
| PP | 410 | ROBINWOOD ROAD | 8.9 | 144 | 72 | $1,431 | Cementitious Lining | $1,558 | VALUE-EFFECTIVE RECOMMENDED |
| PP | 460 | ALLIED DRIVE | 5.6 | 288 | 144 | $2,863 | Cementitious Lining | $980 | EXCESSIVE RECOMMENDED |
| PP | 471 | ALLIED DRIVE | 2 | 576 | 288 | $5,725 | Cementitious Lining | $350 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| PP | 480 | ALLIED DRIVE | 8.3 | 288 | 144 | $2,863 | Cementitious Lining | $1,453 | EXCESSIVE RECOMMENDED |
| PP | 487 | ALLIED DRIVE ESMT | 5 | 3,024 | 1,512 | $30,059 | Root Treatment, Cementitious Lining | $1,125 | EXCESSIVE RECOMMENDED |
| PP | 488 | ALLIED DRIVE ESMT | 5.9 | 288 | 144 | $2,863 | Cementitious Lining | $1,033 | EXCESSIVE RECOMMENDED |
| PP | 510 | ALLIED DRIVE | 5.7 | 288 | 144 | $2,863 | Cementitious Lining | $998 | EXCESSIVE RECOMMENDED |
| PP | 560 | WILLARD STREET ESMT | 13.5 | 288 | 144 | $2,863 | Cementitious Lining | $2,363 | EXCESSIVE RECOMMENDED |
| PP | 595 | WILLARD STREET ESMT | 4.9 | 288 | 144 | $2,863 | Root Treatment, Cementitious Lining | $1,108 | EXCESSIVE RECOMMENDED |
| PP | 650 | WILLARD STREET | 5.7 | 288 | 144 | $2,863 | Cementitious Lining | $998 | EXCESSIVE RECOMMENDED |
| PP | 670 | WILLARD STREET | 5.9 | 144 | 72 | $1,431 | Cementitious Lining | $1,033 | EXCESSIVE RECOMMENDED |
| PP | 720 | WILLARD STREET ESMT | 4.5 | 432 | 216 | $4,294 | Root Treatment, Cementitious Lining | $1,038 | EXCESSIVE RECOMMENDED |
| PP | 830 | RUSTCRAFT ROAD | 19.6 | 288 | 144 | $2,863 | Cementitious Lining | $3,430 | VALUE-EFFECTIVE RECOMMENDED |
| PP | 890 | RUSTCRAFT ROAD | 15.4 | 288 | 144 | $2,863 | Cementitious Lining | $2,695 | EXCESSIVE RECOMMENDED |
| PP | 920 | RUSTCRAFT ROAD | 9.4 | 2,304 | 1,152 | $22,902 | Cementitious Lining | $1,645 | EXCESSIVE RECOMMENDED |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| PP | 1000 | PRESIDENTS WAY | 16.3 | 8,640 | 4,320 | $85,882 | Cementitious Lining | $2,853 | EXCESSIVE RECOMMENDED |
| PP | 1050 | PRESIDENTS WAY | 16.5 | 288 | 144 | $2,863 | Cementitious Lining | $2,888 | VALUE-EFFECTIVE RECOMMENDED |
| PP | 1060 | PRESIDENTS WAY | 16.1 | 288 | 144 | $2,863 | Cementitious Lining | $2,818 | EXCESSIVE RECOMMENDED |
| ZZ | 155 | WEST STREET ESMT | 3.5 | 288 | 144 | $2,863 | Cementitious Lining | $613 | EXCESSIVE RECOMMENDED |
| ZZ | 1030 | SCHOOLMASTER/BURGESS ESMT | 10.2 | 144 | 72 | $1,431 | Cementitious Lining | $1,785 | VALUE-EFFECTIVE RECOMMENDED |
| TOTAL | | | | 60,768 | 30,384 | $604,034 | | $159,973 | |
| TOTAL EXCESSIVE RECOMMENDED | | | | 59,040 | 29,520 | $586,858 | | $140,543 | |
| TOTAL VALUE-EFFECTIVE RECOMMENDED | | | | 1,728 | 864 | $17,176 | | $19,430 | |
| TOTAL NON-EXCESSIVE RECOMMENDED | | | | 0 | 0 | $0 | | $0 | |
| TOTAL RECOMMENDED | | | | 60,768 | 30,384 | $604,034 | | $159,973 | |
| TOTAL RECOMMENDED MANHOLES | | | | | | | | 98 | |

# TABLE 7
# MWRA COST EFFECTIVE ANALYSIS FOR INFILTRATION
# MANHOLES - NON-EXCESSIVE MANHOLES

DEDHAM, MASSACHUSETTS

2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| AA | 010 | RIVERSIDE DRIVE ESMT | 13 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $2,525 | NON-EXCESSIVE |
| AA | 190 | RIVERSIDE DRIVE | 9.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,593 | NON-EXCESSIVE |
| AA | 360 | RIVERSIDE DRIVE | 13.9 | 144 | 72 | $1,431 | Cementitious Lining | $2,433 | NON-EXCESSIVE |
| CC | 050 | DOGGETT CIRCLE ESMT | 7.5 | 144 | 72 | $1,431 | Root Treatment, Cementitious Lining | $1,563 | NON-EXCESSIVE |
| CC | 120 | BRIDGE STREET | 13.1 | 144 | 72 | $1,431 | Cementitious Lining | $2,293 | NON-EXCESSIVE |
| CC | 240 | COMMONWEALTH AVENUE | 10.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,768 | NON-EXCESSIVE |
| CC | 350 | RIVERVIEW STREET | 11.7 | 144 | 72 | $1,431 | Cementitious Lining | $2,048 | NON-EXCESSIVE |
| FF | 020 | HIGH STREET | 12.1 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $2,368 | NON-EXCESSIVE |
| FF | 100 | WASHINGTON STREET | 12.8 | 144 | 72 | $1,431 | Cementitious Lining | $2,240 | NON-EXCESSIVE |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| FF | 140 | WASHINGTON STREET | 9.6 | 144 | 72 | $1,431 | Cementitious Lining | $1,680 | NON-EXCESSIVE |
| FF | 160 | WASHINGTON STREET | 11.5 | 144 | 72 | $1,431 | Cementitious Lining | $2,013 | NON-EXCESSIVE |
| FF | 190 | HIGH STREET | 8.7 | 144 | 72 | $1,431 | Cementitious Lining | $1,523 | NON-EXCESSIVE |
| FF | 510 | WASHINGTON STREET | 11.1 | 144 | 72 | $1,431 | Cementitious Lining | $1,943 | NON-EXCESSIVE |
| FF | 740 | CHURCH STREET | 10.7 | 144 | 72 | $1,431 | Cementitious Lining | $1,873 | NON-EXCESSIVE |
| FF | 810 | VILLAGE AVENUE | 13.6 | 144 | 72 | $1,431 | Cementitious Lining | $2,380 | NON-EXCESSIVE |
| HH | 280 | WASHINGTON STREET | 11.3 | 144 | 72 | $1,431 | Cementitious Lining | $1,978 | NON-EXCESSIVE |
| HH | 310 | WASHINGTON STREET | 9.4 | 144 | 72 | $1,431 | Cementitious Lining | $1,645 | NON-EXCESSIVE |
| HH | 470 | WASHINGTON STREET ESMT | 5.7 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $1,248 | NON-EXCESSIVE |
| HH | 540 | POND FARM ROAD ESMT | 5.6 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $1,230 | NON-EXCESSIVE |
| HH | 541 | POND FARM ROAD ESMT | 5.2 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $1,160 | NON-EXCESSIVE |
| HH | 870 | HIGHLAND STREET ESMT | 2.3 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $653 | NON-EXCESSIVE |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| HH | 920 | PACELLA DRIVE ESMT | 4.7 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $1,073 | NON-EXCESSIVE |
| HH | 1610 | ELM STREET | 11.3 | 144 | 72 | $1,431 | Cementitious Lining | $1,978 | NON-EXCESSIVE |
| PP | 190 | RUSTCRAFT ROAD ESMT | 5.4 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $1,195 | NON-EXCESSIVE |
| PP | 410 | ROBINWOOD ROAD | 8.9 | 144 | 72 | $1,431 | Cementitious Lining | $1,558 | NON-EXCESSIVE |
| PP | 540 | ALLIED DRIVE ESMT | 14.8 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $2,840 | NON-EXCESSIVE |
| PP | 545 | ALLIED DRIVE | 13.2 | 144 | 72 | $1,431 | Cementitious Lining | $2,310 | NON-EXCESSIVE |
| PP | 830 | RUSTCRAFT ROAD | 19.6 | 288 | 144 | $2,863 | Cementitious Lining | $3,430 | NON-EXCESSIVE |
| PP | 850 | RUSTCRAFT ROAD | 18 | 144 | 72 | $1,431 | Cementitious Lining | $3,150 | NON-EXCESSIVE |
| PP | 1020 | PRESIDENTS WAY | 17.7 | 144 | 72 | $1,431 | Cementitious Lining | $3,098 | NON-EXCESSIVE |
| PP | 1050 | PRESIDENTS WAY | 16.5 | 288 | 144 | $2,863 | Cementitious Lining | $2,888 | NON-EXCESSIVE |
| ZZ | 055 | COMMON STREET ESMT | 14.1 | 0 | 0 | $0 | Root Treatment, Cementitious Lining | $2,718 | NON-EXCESSIVE |
| ZZ | 1030 | SCHOOLMASTER/BURGESS ESMT | 10.2 | 144 | 72 | $1,431 | Cementitious Lining | $1,785 | NON-EXCESSIVE |

| Subarea | MH # | Street Name | Manhole Depth (ft) | Infiltration (gpd) | Removable Infiltration (gpd) | MWRA T+T Cost | Rehabilitation | Rehab. Cost | Cost-Effectiveness |
|---|---|---|---|---|---|---|---|---|---|
| ZZ | 1060 | SCHOOLMASTER LANE | 15.2 | 144 | 72 | $1,431 | Cementitious Lining | $2,660 | NON-EXCESSIVE |
| TOTAL | | | | 3,744 | 1,872 | $37,215 | | $68,830 | |
| TOTAL NON-EXCESSIVE | | | | 3,744 | 1,872 | $37,215 | | $68,830 | |

# TABLE 8

# MWRA COST EFFECTIVE ANALYSIS FOR INFLOW MANHOLES

DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Inflow (gpd) | Rehabilitation |
|---|---|---|---|---|
| AA | 100 | EAST RIVERSIDE DRIVE | 1,000 | Install Inflow Dish |
| FF | 190 | HIGH STREET | 1,000 | Install Inflow Dish |
| FF | 905 | BATES COURT | 1,000 | Install Inflow Dish |
| FF | 1020 | WASHINGTON STREET ESMT | 1,000 | Install Inflow Dish |
| HH | 235 | ENTERPRISE DRIVE | 1,000 | Install Inflow Dish |
| HH | 770 | MANNING ROAD | 1,000 | Install Inflow Dish |
| HH | 870 | HIGHLAND STREET ESMT | 1,000 | Install Inflow Dish |
| HH | 1260 | SANDY VALLEY ROAD | 1,000 | Install Inflow Dish |
| PP | 471 | ALLIED DRIVE | 1,000 | Install Inflow Dish |
| PP | 472 | ALLIED DRIVE | 1,000 | Install Inflow Dish |
| ZZ | 1095 | SCHOOLMASTER LANE | 1,000 | Install Inflow Dish |
| TOTAL | | | 11,000 | |
| TOTAL NUMBER OF MANHOLES | | | 11 | |
| TOTAL ESTIMATED COST | | | $1,650 | |

NOTES:
1. Manholes located in an easement will have a "Street Name" designation of an adjacent street.

# TABLE 9
# MANHOLE ROOTS

DEDHAM, MASSACHUSETTS
2022 SEWER MANHOLE INVESTIGATION

| Subarea | MH # | Street Name | Roots Observed in Manhole |
|---|---|---|---|
| AA | 010 | RIVERSIDE DRIVE ESMT | YES |
| CC | 050 | DOGGETT CIRCLE ESMT | YES |
| CC | 060 | DOGGETT CIRCLE ESMT | YES |
| CC | 580 | DIXON AVENUE | YES |
| FF | 020 | HIGH STREET | YES |
| FF | 390 | AMES STREET CROSSING ESMT | YES |
| HH | 470 | WASHINGTON STREET ESMT | YES |
| HH | 540 | POND FARM ROAD ESMT | YES |
| HH | 541 | POND FARM ROAD ESMT | YES |
| HH | 870 | HIGHLAND STREET ESMT | YES |
| HH | 920 | PACELLA DRIVE ESMT | YES |
| HH | 1550 | HARMONY HILL ESMT | YES |
| PP | 190 | RUSTCRAFT ROAD ESMT | YES |
| PP | 487 | ALLIED DRIVE ESMT | YES |
| PP | 540 | ALLIED DRIVE ESMT | YES |
| PP | 595 | WILLARD STREET ESMT | YES |
| PP | 720 | WILLARD STREET ESMT | YES |
| ZZ | 055 | COMMON STREET ESMT | YES |
| TOTAL NUMBER OF MANHOLES | | | 18 |

**APPENDIX A**

ON-CALL SERVICES AS-BID UNIT COSTS

UNIT COSTS FOR REHABILITION

MWRA CUSTOMER SERVICE REPORT

MWRA T&T COST CALCULATION

**Town of Dedham**
**Engineering Department**
**55 River Street**
**Dedham, MA**

# Bid Comparison
## 2021 Sewer On-Call Services
## Dedham, Massachusetts
## February 4, 2021

| ITEM NO. | QUANTITY | UNIT | ITEM DESCRIPTION | National Water Main UNIT COST | National Water Main TOTAL | Green Mountain UNIT COST | Green Mountain TOTAL |
|---|---|---|---|---|---|---|---|
| 1 | | | *Hourly Rate for Emergency Cleaning* | | | | |
| 1a | 20 | wo | Emergency Cleaning of Sewers | $ 800.00 | $ 16,000.00 | $ 800.00 | $ 16,000.00 |
| 1b | 20 | hr | Emergency Cleaning of Sewers | $ 400.00 | $ 8,000.00 | $ 200.00 | $ 4,000.00 |
| 1c | 30 | tn | Storage, Testing, and Disposal of Sewer Debris | $ 0.01 | $ 0.30 | $ 1.00 | $ 30.00 |
| 2 | | | *Hourly Rate for Cleaning & Inspection* | | | | |
| 2a | 30 | wo | Cleaning & Inspection of Sewers | $ 2,600.00 | $ 78,000.00 | $ 1,600.00 | $ 48,000.00 |
| 2b | 40 | hr | Cleaning & Inspection of Sewers | $ 0.01 | $ 0.40 | $ 215.00 | $ 8,600.00 |
| 2c | 30 | tn | Storage, Testing, and Disposal of Sewer Debris | $ 100.00 | $ 3,000.00 | $ 1.00 | $ 30.00 |
| 3 | | | *Heavy Cleaning of Sewers* | | | | |
| 3a | 50 | lf | Heavy Cleaning of 4-inch sewers | $ 0.01 | $ 0.50 | $ 0.10 | $ 5.00 |
| 3b | 250 | lf | Heavy Cleaning of 6-inch sewers | $ 0.01 | $ 2.50 | $ 0.10 | $ 25.00 |
| 3c | 5000 | lf | Heavy Cleaning of 8-inch sewers | $ 0.50 | $ 2,500.00 | $ 0.10 | $ 500.00 |
| 3d | 1000 | lf | Heavy Cleaning of 10-inch sewers | $ 0.25 | $ 250.00 | $ 0.10 | $ 100.00 |
| 3e | 2000 | lf | Heavy Cleaning of 12-inch sewers | $ 5.00 | $ 10,000.00 | $ 0.10 | $ 200.00 |
| 3f | 1000 | lf | Heavy Cleaning of 15-inch sewers | $ 5.00 | $ 5,000.00 | $ 3.00 | $ 3,000.00 |
| 3g | 250 | lf | Heavy Cleaning of 18-inch sewers | $ 0.50 | $ 125.00 | $ 4.00 | $ 1,000.00 |
| 3h | 50 | lf | Heavy Cleaning of 20-inch sewers | $ 0.50 | $ 25.00 | $ 5.00 | $ 250.00 |
| 3i | 250 | lf | Heavy Cleaning of 21-inch sewers | $ 0.50 | $ 125.00 | $ 5.00 | $ 1,250.00 |
| 3j | 50 | lf | Heavy Cleaning of 22-inch sewers | $ 0.50 | $ 25.00 | $ 5.00 | $ 250.00 |
| 3k | 1000 | lf | Heavy Cleaning of 24-inch sewers | $ 5.00 | $ 5,000.00 | $ 6.00 | $ 6,000.00 |
| 4 | | | *Inspection of Sewers* | | | | |
| 4a | 200 | lf | Inspection of 4-inch sewers | $ 5.00 | $ 1,000.00 | $ 2.00 | $ 400.00 |
| 4b | 1750 | lf | Inspection of 6-inch sewers | $ 1.50 | $ 2,625.00 | $ 2.00 | $ 3,500.00 |
| 4c | 70000 | lf | Inspection of 8-inch sewers | $ 1.50 | $ 105,000.00 | $ 3.00 | $ 210,000.00 |
| 4d | 7250 | lf | Inspection of 10-inch sewers | $ 1.50 | $ 10,875.00 | $ 3.00 | $ 21,750.00 |
| 4e | 18000 | lf | Inspection of 12-inch sewers | $ 1.50 | $ 27,000.00 | $ 3.00 | $ 54,000.00 |
| 4f | 8250 | lf | Inspection of 15-inch sewers | $ 1.50 | $ 12,375.00 | $ 3.00 | $ 24,750.00 |
| 4g | 3500 | lf | Inspection of 18-inch sewers | $ 1.50 | $ 5,250.00 | $ 4.00 | $ 14,000.00 |
| 4h | 500 | lf | Inspection of 20-inch sewers | $ 1.50 | $ 750.00 | $ 4.00 | $ 2,000.00 |
| 4i | 2250 | lf | Inspection of 21-inch sewers | $ 1.50 | $ 3,375.00 | $ 4.00 | $ 9,000.00 |
| 4j | 500 | lf | Inspection of 22-inch sewers | $ 1.50 | $ 750.00 | $ 6.00 | $ 3,000.00 |
| 4k | 7250 | lf | Inspection of 24-inch sewers | $ 1.50 | $ 10,875.00 | $ 6.00 | $ 43,500.00 |
| 5 | | | *Mobilization* | | | | |
| 5a | 1 | ls | Mobilization for Items 3-4, lump sum (not to exceed 5% of total) | $ 5,000.00 | $ 5,000.00 | $ 8,000.00 | $ 8,000.00 |
| 6 | | | *On-Call Sewer Repair* | | | | |
| 6a | 10 | lf | Structural short liners of 6-inch sewers | $ 300.00 | $ 3,000.00 | $ 410.00 | $ 4,100.00 |
| 6b | 25 | lf | Structural short liners of 8-inch sewers | $ 400.00 | $ 10,000.00 | $ 445.00 | $ 11,125.00 |
| 6c | 10 | lf | Structural short liners of 10-inch sewers | $ 400.00 | $ 4,000.00 | $ 445.00 | $ 4,450.00 |
| 6d | 25 | lf | Structural short liners of 12-inch sewers | $ 400.00 | $ 10,000.00 | $ 490.00 | $ 12,250.00 |
| 6e | 10 | lf | Structural short liners of 15-inch sewers | $ 450.00 | $ 4,500.00 | $ 550.00 | $ 5,500.00 |
| 6f | 10 | lf | Structural short liners of 18-inch sewers | $ 800.00 | $ 8,000.00 | $ 700.00 | $ 7,000.00 |
| 6g | 250 | lf | Structural line pipe (cured-in-place) of 6-inch sewers | $ 75.00 | $ 18,750.00 | $ 32.00 | $ 8,000.00 |
| 6h | 4000 | lf | Structural line pipe (cured-in-place) of 8-inch sewers | $ 50.00 | $ 200,000.00 | $ 31.00 | $ 124,000.00 |
| 6i | 250 | lf | Structural line pipe (cured-in-place) of 10-inch sewers | $ 75.00 | $ 18,750.00 | $ 31.00 | $ 7,750.00 |
| 6j | 1000 | lf | Structural line pipe (cured-in-place) of 12-inch sewers | $ 50.00 | $ 50,000.00 | $ 33.00 | $ 33,000.00 |
| 6k | 250 | lf | Structural line pipe (cured-in-place) of 15-inch sewers | $ 55.00 | $ 13,750.00 | $ 47.00 | $ 11,750.00 |
| 6l | 250 | lf | Structural line pipe (cured-in-place) of 18-inch sewers | $ 75.00 | $ 18,750.00 | $ 49.00 | $ 12,250.00 |
| 6m | 250 | lf | Structural line pipe (cured-in-place) of 20-inch sewers | $ 75.00 | $ 18,750.00 | $ 70.00 | $ 17,500.00 |
| 6n | 250 | lf | Structural line pipe (cured-in-place) of 24-inch sewers | $ 120.00 | $ 30,000.00 | $ 86.00 | $ 21,500.00 |
| 7 | | | *Manhole Rehabilitation* | | | | |
| 7a | 650 | vf | Exterior chemical grouting and interior cementitous | $ 165.00 | $ 107,250.00 | $ 165.00 | $ 107,250.00 |
| 8 | | | *Mobilization* | | | | |
| 8a | 1 | ls | Mobilization for Items 6-7, (not to exceed 5% of total) | $ 15,000.00 | $ 15,000.00 | $ 5,000.00 | $ 5,000.00 |
| 12 | | | *Chemical Root Treatment* | | | | |
| 12a | 500 | lf | Chemical root treatment of 6-inch sewers | $ 1.75 | $ 875.00 | $ 2.35 | $ 1,175.00 |
| 12b | 25000 | lf | Chemical root treatment of 8-inch sewers | $ 1.75 | $ 43,750.00 | $ 2.35 | $ 58,750.00 |
| 12c | 1000 | lf | Chemical root treatment of 10-inch sewers | $ 1.90 | $ 1,900.00 | $ 2.45 | $ 2,450.00 |
| 12d | 1000 | lf | Chemical root treatment of 12-inch sewers | $ 2.00 | $ 2,000.00 | $ 2.65 | $ 2,650.00 |
| 12e | 300 | lf | Chemical root treatment of 15-inch sewers | $ 2.85 | $ 855.00 | $ 3.50 | $ 1,050.00 |
| 12f | 300 | lf | Chemical root treatment of 18-inch sewers | $ 4.10 | $ 1,230.00 | $ 4.50 | $ 1,350.00 |
| 12g | 300 | lf | Chemical root treatment of 20-inch sewers | $ 6.95 | $ 2,085.00 | $ 5.00 | $ 1,500.00 |
| 12h | 10 | ea | Chemical root treatment of manholes | $ 200.00 | $ 2,000.00 | $ 400.00 | $ 4,000.00 |

**Town of Dedham**
**Engineering Department**
**55 River Street**
**Dedham, MA**

# Bid Comparison
## 2021 Sewer On-Call Services
## Dedham, Massachusetts
## February 4, 2021

| ITEM NO. | QUANTITY | UNIT | ITEM DESCRIPTION | National Water Main UNIT COST | National Water Main TOTAL | Green Mountain UNIT COST | Green Mountain TOTAL |
|---|---|---|---|---|---|---|---|
| 12 | | | *Mobilization* | | | | |
| 12a | 1 | ea | Mobilization for Item 12, (not to exceed 5% of total) | $ 1,000.00 | $ 1,000.00 | $ 1,000.00 | $ 1,000.00 |
| | | | **Total Contract** | | **$ 899,123.70** | | **$ 949,490.00** |
| | | | | | | | |

# ESTIMATED UNIT COSTS FOR REHABILITATION

2022 Sewer Manhole Investigation

| RECOMMENDED REHABILITATION METHOD | ESTIMATED COST |
|---|---|
| MANHOLE REHABILITATION | |
| Cementitious Lining | $175.00 /v.f |
| Root Treamtent | $250.00 /mh |
| Repair manhole bench and invert | $500.00 /mh |
| Replace frame & cover | $1,500.00 / mh |
| Install inflow dish | $150.00 / mh |

\\wse03.local\WSE\Projects\MA\Dedham\2220030 - 2022 Sewer Manhole Investigation\Report\Appendix\[Dedham - 2022 MH - App A - Unit Costs for Rehabilitation.xlsx]Appendix A

Massachusetts Water Resources Authority
Sewer Utility Assessment Model
Community Customer Service Report

Run Version: FY23 #1.0
Budget Status: Final
Budget Year: FY2023

CEB Model No: FY23 #2.0

Run Date: 1-Jun-22
Print Date: 30-Jun-22
Print Time: 10:38 AM

## MWRA SYSTEM

| | Annual Wastewater Volume | | | Total Suspended Solids (TSS) | | Biochemical Oxygen Demand (BOD) | | Maximum Month Flow | | | Population | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rate Basis MG per year | Rate Basis % share of System | Total Volume Charge | Rate Basis 1000 Lbs. per year | Total TSS Charge | Rate Basis 1000 Lbs. per year | Total BOD Charge | Rate Basis Volume MGD | Rate Basis % share of System | Total Max. Month Charge | Rate Basis Population | Rate Basis % share of System | Total Population Charge | Total Assessment |
| ***Operation & Maintenance (O&M) Charges*** | | | | | | | | | | | | | | |
| Average Strength Flow | 113,474.482 | 100% | $127,233,607 | 179,124.689 | $35,001,514 | 160,170.268 | $28,971,103 | | | $0 | | | $0 | $191,206,224 |
| High Strength Flow | 221.870 | 100% | 248,772 | 72.026 | 14,074 | 3,703.306 | 669,843 | | | 0 | | | 0 | 932,689 |
| Septage Contributions | 5.697 | 100% | 6,388 | 611.137 | 119,418 | 307.897 | 55,691 | | | 0 | | | 0 | 181,497 |
| Sub-total | 113,702.049 | 100% | $127,488,768 | 179,807.851 | $35,135,006 | 164,181.470 | $29,696,637 | | | $0 | | | $0 | $192,320,410 |
| **Basis of O&M Charges** | | **$1,121.25** | per MG. | | **$195.40** | per 1000 Lbs. | | **$180.88** | per 1000 Lbs. | | | | | |
| ***Capital (Debt Service) Charges*** | | | | | | | | | | | | | | |
| Average Strength Flow | | | $0 | 179,124.689 | $5,835,290 | 160,170.268 | $3,952,790 | | | $0 | | | $0 | $9,788,080 |
| High Strength Flow | | | 0 | 72.026 | 2,346 | 3,703.306 | 91,393 | | | 0 | | | 0 | 93,739 |
| Septage | | | 0 | 611.137 | 19,909 | 307.897 | 7,598 | | | 0 | | | 0 | 27,507 |
| Maximum Month Flow | | | 0 | | 0 | | 0 | 423.403 | 100% | 73,596,354 | | | 0 | 73,596,354 |
| Sewered Population | | | 0 | | 0 | | 0 | | | 0 | 2,325,337 | 100% | 125,258,522 | 125,258,522 |
| Census Population | | | 0 | | 0 | | 0 | | | 0 | 2,391,639 | 100% | 125,258,522 | 125,258,522 |
| Sub-total | | | $0 | 179,807.851 | $5,857,545 | 164,181.470 | $4,051,781 | 423.403 | 100% | $73,596,354 | | 100% | $250,517,044 | $334,022,725 |
| **Basis of Capital Charges** | | | | | **$32.58** | per 1000 Lbs. | | **$24.68** | per 1000 Lbs. | | **Proportional Share** | | | **Proportional Share** | |
| ***Total Rate Revenue*** | | | | | | | | | | | | | | |
| Average Strength Flow | | | $127,233,607 | | $40,836,804 | | $32,923,893 | | | $0 | | | $0 | $200,994,304 |
| High Strength Flow | | | 248,772 | | 16,420 | | 761,235 | | | 0 | | | 0 | 1,026,428.11 |
| Septage Contributions | | | 6,388 | | 139,327 | | 63,290 | | | 0 | | | 0 | 209,005 |
| Maximum Month Flow | | | 0 | | 0 | | 0 | | | 73,596,354 | | | 0 | 73,596,354 |
| Sewered Population | | | 0 | | 0 | | 0 | | | 0 | | | 125,258,522 | 125,258,522 |
| Census Population | | | 0 | | 0 | | 0 | | | 0 | | | 125,258,522 | 125,258,522 |
| Total | | | $127,488,768 | | $40,992,551 | | $33,748,418 | | | $73,596,354 | | | $250,517,044 | **$526,343,135** |

## DEDHAM

| | Annual Wastewater Volume | | | Total Suspended Solids (TSS) | | Biochemical Oxygen Demand (BOD) | | Maximum Month Flow | | | Population | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Rate Basis MG per year | Rate Basis % share of System | Total Volume Charge | Rate Basis 1000 Lbs. per year | Total TSS Charge | Rate Basis 1000 Lbs. per year | Total BOD Charge | Rate Basis Volume MGD | Rate Basis % share of System | Total Max. Month Charge | Rate Basis Population | Rate Basis % share of System | Total Population Charge | Total Assessment |
| ***Operation & Maintenance (O&M) Charges*** | | | | | | | | | | | | | | |
| Average Strength Flow | 1,425.507 | 1.26% | $1,598,354 | 2,250.228 | $439,701 | 2,012.115 | $363,945 | | | $0 | | | $0 | $2,402,000 |
| High Strength Flow | 0.000 | 0.00% | 0 | 0.000 | 0 | 0.000 | 0 | | | 0 | | | 0 | 0 |
| Septage Contributions | 0.000 | 0.00% | 0 | 0.000 | 0 | 0.000 | 0 | | | 0 | | | 0 | 0 |
| Sub-total | 1,425.507 | 1.25% | $1,598,354 | 2,250.228 | $439,701 | 2,012.115 | $363,945 | | | $0 | | | $0 | $2,402,000 |
| ***Capital (Debt Service) Charges*** | | | | | | | | | | | | | | |
| Average Strength Flow | | | $0 | 2,250.228 | $73,305 | 2,012.115 | $49,656 | | | $0 | | | $0 | $122,961 |
| High Strength Flow | | | 0 | 0.000 | 0 | 0.000 | 0 | | | 0 | | | 0 | 0 |
| Septage | | | 0 | 0.000 | 0 | 0.000 | 0 | | | 0 | | | 0 | 0 |
| Maximum Month Flow | | | 0 | | 0 | | 0 | 5.636 | 1.33% | 979,579 | | | 0 | 979,579 |
| Sewered Population | | | 0 | | 0 | | 0 | | | 0 | 24,507 | 1.05% | 1,320,121 | 1,320,121 |
| Census Population | | | 0 | | 0 | | 0 | | | 0 | 25,364 | 1.06% | 1,328,402 | 1,328,402 |
| Sub-total | | | $0 | 2,250.228 | $73,305 | 2,012.115 | $49,656 | 5.636 | 1.33% | $979,579 | | 1.06% | $2,648,523 | $3,751,063 |
| ***Total Rate Revenue*** | | | | | | | | | | | | | | |
| Average Strength Flow | | | $1,598,354 | | $513,006 | | $413,602 | | | $0 | | | $0 | $2,524,961 |
| High Strength Flow | | | 0 | | 0 | | 0 | | | 0 | | | 0 | 0 |
| Septage Contributions | | | 0 | | 0 | | 0 | | | 0 | | | 0 | 0 |
| Maximum Month Flow | | | 0 | | 0 | | 0 | | | 979,579 | | | 0 | 979,579 |
| Sewered Population | | | 0 | | 0 | | 0 | | | 0 | | | 1,320,121 | 1,320,121 |
| Census Population | | | 0 | | 0 | | 0 | | | 0 | | | 1,328,402 | 1,328,402 |
| Total | | | $1,598,354 | | $513,006 | | $413,602 | | | $979,579 | | | $2,648,523 | **$6,153,063** |

* Does not include prior fiscal year assessment adjustments.

# MEMORANDUM

DATE: October 14, 2022

FROM: Kyle Piantek, EIT

TO: File

SUBJECT: T&T costs for Dedham, Massachusetts using MWRA methodology

Fiscal year 2023 Transportation & Treatment (T&T) costs for sewerage in the Town of Dedham can be calculated using both the MWRA Operation & Maintenance (O & M) and Capital charges, and the town's O & M and Capital costs. Therefore, MWRA charges are based mainly on sewage flow exiting the Town of Dedham. MWRA's FY23 sewerage charges to the Town of Dedham are shown in Table A, and Table B shows Dedham's FY23 O & M and Capital costs.

**TABLE A - MWRA CHARGES TO THE TOWN OF DEDHAM**

| ITEM | FLOW (gallons/year) | FLOW (gallons/day) | MWRA CHARGE | COST ($/GPD) |
|---|---|---|---|---|
| **Average Strength Flow*** | | | | |
| Annual Wastewater Volume | 1,425,507,000 | 3,905,499 | $1,598,354 | $0.4093 |
| Total Suspended Solids (O & M and Capital) | 1,425,507,000 | 3,905,499 | $513,006 | $0.1314 |
| Biochemical Oxygen Demand (O & M and Capital) | 1,425,507,000 | 3,905,499 | $413,602 | $0.1059 |
| Maximum Monthly Flow | N/A | 5,636,000 | $979,579 | $0.1738 |
| Population ** | 1,425,507,000 | 3,905,499 | $2,648,523 | N/A |
| **TOTAL** | | | **$6,153,064** | **$0.8204** |

NOTE:
*MWRA's charges only apply to average strength flow.
**MWRA's population charges are not flow based, so it is not to be included in T & T cost.

**TABLE B – TOWN OF DEDHAM SEWERAGE COSTS**

| ITEM | FLOW (gallons/year) | FLOW (gallons/day) | DEDHAM COST | COST ($/GPD) |
|---|---|---|---|---|
| Debt Service (Capital Costs) | 1,476,172,000 | 4,044,307 | $362,719 | $0.0897 |
| O & M | 1,476,172,000 | 4,044,307 | $1,475,317 | $0.3648 |
| **TOTAL** | | | **$2,762,727** | **$0.4545** |

Therefore, the total FY23 T&T cost for both the MWRA charges and the Town of Dedham's costs are $1.2749/GPD ($0.8204 + $0.4545).

According to the Department of Environmental Protection's (DEP) Guidelines for Performing I/I Analyses and SSES this cost of $1.2749/GPD needs to be extended throughout the life of a rehabilitative measure. The life cycle for a rehabilitative measure can be set by good engineering judgement as well as backup documentation, depending on the type of rehabilitation. For this study, Weston & Sampson will use a life cycle of twenty years.

To find the present worth of a rehabilitative measure over a twenty-year period, a discount rate, or annual percentage rate, is required. According to the DEP, the discount rate for FY23 is 2.5%. To calculate the T&T cost in order to account for this twenty-year period, a present worth analysis must be done. The following formula will calculate the present worth of the T&T cost for the next twenty years:

PRESENT WORTH ANALYSIS:

Discount Rate = 2.5% (DEP FY23 Information)

Present Worth Factor:

$$\frac{(1+i)^n - 1}{i\,(1+i)^n}$$ where: i = discount rate, or interest rate
n = number of years

$$\frac{(1 + 0.025)^{20} - 1}{0.025\,(1 + 0.025)^{20}} = 15.59$$

Present Worth T&T Cost:

(Present Worth Factor) x (FY23 T & T cost)

15.59 x $1.2749/GPD = $19.88/GPD

Therefore, the T&T cost for the Town of Dedham, utilizing a present worth of the rehabilitation for a twenty-year period, with a discount rate of 2.5%, is $19.88/GPD.

Town of Dedham T&T costs were derived using MWRA sewerage costs.