



MASSACHUSETTS WATER RESOURCES AUTHORITY

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Ms. Susan Studlien, Director
Office of Environmental Stewardship
US EPA, Region 1
OES04-5
5 Post Office Square, Suite 100
Boston, MA 02109-3912

August 26, 2016

Mr. David Ferris, Program Director
Watershed Permitting
Department of Environmental Protection
1 Winter Street
Boston, MA 02108

RE: Massachusetts Water Resources Authority NPDES Permit Number MA0103284 – MWRA Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2016

Dear Ms. Studlien and Mr. Ferris:

In compliance with the requirements of MWRA's NPDES Permit MA0103284 - Part I, Item 18.bb (ii) "Infiltration/Inflow" (page 28 of 32), the Authority submits this cover letter and the six Attachments listed below that together comprise the MWRA Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2016.

- Attachment 1 – Overview of MWRA Regional I/I Reduction Plan
- Attachment 2 – MWRA Regional I/I Reduction Plan – FY16 Progress Update and Detailed Implementation Schedule for FY17 Activities
- Attachment 3 – MWRA Actions Taken to Reduce I/I During FY16
- Attachment 4 – Status Update on MWRA's I/I Local Financial Assistance Program
- Attachment 5 – I/I Reduction Status Update for Member Communities
- Attachment 6 – CY15 Community Wastewater Flow Data

Should you require additional information, please contact Carl H. Leone, Senior Program Manager, Community Support Program at (617) 788-4356.

Sincerely,

Michael J. Hornbrook
Chief Operating Officer

cc: MassDEP - Regulatory Branch, Boston
MassDEP - SERO
MassDEP - NERO
Kevin Brander, MassDEP, NERO
David Butler, MassDEP, NERO

Betsy Reilley, MWRA, Environmental Quality
Wendy Leo, MWRA, Environmental Quality
Carl H. Leone, MWRA, Planning

ATTACHMENT 1
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period – July 2015 Through June 2016

OVERVIEW OF MWRA REGIONAL I/I REDUCTION PLAN

The MWRA Board of Directors approved the Regional Infiltration/Inflow (I/I) Reduction Plan on May 23, 2001 and authorized staff to submit the Plan to EPA and DEP as required under MWRA's NPDES Permit. The plan was submitted to EPA and DEP in June 2001 and DEP approved the plan in a letter dated November 19, 2002. A full copy of the Regional I/I Reduction Plan (dated September 2002) was included as Attachment 2 to the August 29, 2003 MWRA Annual I/I Reduction Report for FY03. The Regional I/I Reduction Plan is available at <http://www.mwra.com/comsupport/communitysupportmain.html>.

The Regional I/I Reduction Plan combines recommendations from the I/I Task Force Report (March 2001) with ongoing MWRA I/I reduction initiatives. The updated plan replaces the Authority's 1990 I/I Reduction Policy. Implementation of the Regional I/I Reduction Plan focuses on the cooperative efforts of member communities, DEP, EPA and MWRA to develop and implement I/I reduction and sewer system rehabilitation projects.

Under the plan, MWRA has full legal and fiscal responsibility for implementation of operation, maintenance, and I/I reduction programs for the MWRA-owned interceptor system. Each member community retains full legal and fiscal responsibility for implementation of operation, maintenance and I/I reduction programs for community-owned sewers. MWRA will provide technical and financial assistance to member communities and work cooperatively with DEP, EPA and other stakeholders to help solve local and regional sewer problems. MWRA's Regional I/I Reduction Plan is organized into five major goals:

1. MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization and rehabilitation of structural and I/I problems.
2. MWRA will work cooperatively with member communities, DEP and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.
3. MWRA will work cooperatively with member communities, DEP and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents.
4. MWRA will work cooperatively with member communities, DEP and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO and I/I reduction issues.
5. MWRA will provide technical assistance and work cooperatively with member communities, DEP and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.

ATTACHMENT 2
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period – July 2015 Through June 2016

**MWRA REGIONAL I/I REDUCTION PLAN -
FY16 PROGRESS UPDATE AND DETAILED
IMPLEMENTATION SCHEDULE FOR FY17 ACTIVITIES**

This document provides a progress update for FY16 accomplishments and a description of the activities to be accomplished during FY17 for each of the I/I reduction strategies in the MWRA Regional I/I Reduction Plan. The update appears in bold type directly below each I/I reduction strategy. This document is intended to satisfy condition 5 of DEP's November 19, 2002 letter approving the MWRA Regional I/I Reduction Plan.

Goal 1 under MWRA's Regional I/I Reduction Plan is:

MWRA will continue its current operation and maintenance program for the MWRA-owned interceptor system leading to the identification, prioritization, and rehabilitation of structural and I/I problems.

Strategy A: Utilize MWRA's internal TV inspection equipment that currently includes one fully outfitted internal TV inspection vehicles equipped with 6000 feet of multi-conductor cable. MWRA also utilizes an OZ-camera that has a 200X zoom capability. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

Strategy B: Utilize MWRA's sonar camera to inspect siphons and force mains. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

Strategy C: Physical inspection of collection system manholes and structures by Operations Division field crews. Annual inspection schedules are outlined in MWRA's Collection System O&M Manual. This strategy has an ongoing schedule that has been initiated.

Work by MWRA under these three Strategies is ongoing.

During FY16, MWRA properly operated and maintained the MWRA-owned interceptor system. Annual performance targets and ongoing accomplishments are tracked as part of the Authority's MAXIMO maintenance database and are reported monthly to MWRA senior management. Specific activities undertaken by MWRA for FY16 are detailed in Attachment 3. Additional information on MWRA's FY16 maintenance activities is provided under separate submittal - NPDES Part I.18.g Annual Maintenance Status Sheets.

During FY17, MWRA will continue to properly operate and maintain the MWRA-owned interceptor system.

Goal 2 under MWRA's Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to eliminate sewer system backups into homes and other buildings and to minimize health and environmental impacts of SSOs related to I/I.

Strategy A: MWRA will provide technical assistance to DEP to develop a uniform format for use by communities for reporting wastewater backup and sewer system overflow information. A representative group of communities should be consulted for review. MWRA will provide technical assistance to DEP to develop a system to record the information reported by communities into a usable database format. This database may have the capability to be linked to GIS mapping and the information may be made available to communities, MWRA, DEP, EPA, watershed groups, the general public, etc. upon appropriate request. This strategy has an ongoing schedule that should be initiated in the short-term. Completion of this strategy requires a significant resource commitment by DEP. Collection and recording of sewer backup and SSO information from member community sewer systems is the responsibility of DEP. DEP will be responsible for management of collection and distribution of these records. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.1 Strategy A-2 and 5.2 Strategy B-2)

Work by MWRA under this Strategy is complete as noted below.

During spring 2001 MWRA provided MassDEP a draft SSO reporting/record keeping electronic database format that was developed by Malcolm-Pirnie, Inc. under contract to MWRA. This work was completed by MWRA as technical assistance to MassDEP. A follow-up letter dated June 20, 2001 requested MassDEP identify the format for finalizing the SSO reporting/record keeping electronic database.

During FY04, MassDEP (in conjunction with staff in the Massachusetts Information Technology Division), developed a revised format SSO electronic database package. This project was part of statewide efforts to upgrade computerized resources and electronic access. The system was demonstrated at an April 8, 2004 MassDEP/MWRA joint community workshop.

In May 2005, MassDEP developed a revised Reporting Form "Sanitary Sewer Overflow/Bypass/Backup Notification Form (rev 05/2005)." This form was made available on the MassDEP web site and reporting was via FAX or by mail. Following development of the web based reporting form by MassDEP, roll-out of the SSO reporting/record keeping electronic database was not completed.

In January 2013, MassDEP developed the most recent revised Reporting Form "Sanitary Sewer Overflow (SSO)/Bypass Notification Form (rev 01/2013)." As of July 2016, this form is available on the MassDEP web site and reporting using the form is via FAX or by mail. As of July 2016, an SSO reporting/record keeping electronic database is not included among the searchable databases available on the MassDEP web site.

As requested by MassDEP, on August 22, 2011 MWRA provided MassDEP specific SSO site location information for SSO's on MWRA-owned northern system sewers (for events during the period January 2000 through June 2011), including street location, longitude and latitude location, and GIS site maps.

During FY16, MWRA has added more specific information on SSO on the MWRA web site at: <http://www.mwra.com/03sewer/html/sso.html>. This information includes information on what an SSO is, public health impacts, how SSOs can be prevented, and what MWRA does when an SSO occurs. The web site also includes an interactive GIS site map for SSOs that have been reported by MWRA for the following the following SSO event display selections: currently active, past 2 days, past 30 days, and past 12 months.

Strategy B: Once a central information database is established (see Strategy A), MWRA will periodically delineate areas which may be “at risk” for backups and SSOs that may be impacted by the MWRA-owned collection system. MWRA will evaluate potential improvements to the MWRA-owned collection system that may reduce the risk of sewer backups and SSOs. This strategy should be completed in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-2 and 5.5 Strategy E-2)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted.

MWRA utilizes MassDEP’s Sanitary Sewer Overflow (SSO)/Bypass Notification Form (rev 01/2013) to report SSOs from MWRA’s collection system.

MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended design storm having a one year recurrence interval and a duration of six hours (see MassDEP’s Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised January 1993). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area. During extreme storm events that exceed the MassDEP recommended design storm, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system.

During FY16, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY17. In FY16, MWRA completed the North System Hydraulic Study which evaluated potential improvements to the MWRA-owned collection system.

Strategy C: Once a central information database is established (see Strategy A) and member communities have delineated areas which may be “at risk” for backups and SSOs, MWRA - jointly with DEP - will provide technical assistance to member communities to evaluate potential improvements to local infrastructure that may reduce the risk of sewer backups and SSOs. MWRA will assist communities to determine if impacts from the regional collection system are an issue. The schedule for this strategy is dependent on prior actions by DEP and member communities. (Cross-reference this strategy to the I/I Task Force Report recommendations 4.3 Strategy C-1 and 5.5 Strategy E-1)

MassDEP's roll-out of the SSO reporting/record keeping electronic database was not completed (see Strategy A above).

As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and regional SSO problems. MWRA also offers member communities financial assistance for I/I reduction projects. During FY17, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects.

Strategy D: For the MWRA-owned interceptor system, MWRA will review and analyze the health and environmental impacts of existing SSO sites. SSO sites will be prioritized based on the frequency and duration of activations and the resulting health and environmental impacts, including: potential for human contact, impact to water supply, impact to shellfish beds or other economic resources, impact to animal or aquatic habitat, etc. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-1)

Work by MWRA under this Strategy is complete. As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended design storm having a one year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised January 1993). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard, additional work under this strategy is not necessary.

Strategy E: Utilizing the priority ranking to be completed in Strategy D above, as well as system hydraulic analyses, MWRA (for the MWRA-owned interceptor system) - in conjunction with DEP and EPA - will evaluate the potential to eliminate each overflow. Appropriate I/I reduction and/or relief sewer projects that may eliminate (or minimize) SSOs from MWRA-owned interceptors will be evaluated. This strategy will be initiated in the short to mid-term; however, implementation of projects developed from the evaluation may span beyond the long-term time frame as defined within the Regional I/I Reduction Plan. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-2)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work that is associated with this Strategy is also noted.

As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended design storm having a one year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised January 1993). Since prior SSOs have been eliminated for sewer capacity issues at or below the collection system design standard, additional work under this strategy is not necessary.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions include a requirement for all public entities that

own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

As part of its ongoing program to support member community I/I reduction and sewer system rehabilitation programs, MWRA offers technical assistance to communities to review local I/I reduction plans and regional SSO problems. MWRA also offers member communities financial assistance for I/I reduction projects. During FY17, at the request of member communities, MWRA will continue to provide technical and financial assistance on local sewer system projects. MWRA will also continue to work on projects in the MWRA Capital Improvement Program, as summarized in Attachment 3.

Strategy F: For those overflows that are unlikely to be eliminated in the short to mid-term (based on the evaluation from Strategy E, above), MWRA (for the MWRA-owned interceptor system) will consider developing interim measures to relocate or otherwise mitigate the impact of existing overflows on human and natural resources. The priority ranking (from Strategy D, above) will be utilized in development of interim mitigation measures. This strategy has an ongoing schedule that should be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.3 Strategy C-3)

Work by MWRA under this Strategy is ongoing.

As previously stated, MWRA does not have SSOs related to dry weather sewer system capacity issues. MWRA also does not have SSOs related to wet weather sewer capacity issues for rainfall events at or below the MassDEP recommended design storm having a one year recurrence interval and a duration of six hours (see MassDEP's Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys – Revised January 1993). The one-year, six-hour storm produces approximately 1.72 inches of rainfall in the Boston area.

During FY16, MWRA continued its ongoing priority program to clean and inspect all inverted siphons in the MWRA-owned collection system. This program is intended to minimize potential SSOs upstream of siphons and reduce the risk of hydraulic limitations and/or blockage from debris buildup in siphon barrels. The cleaning and inspection program will continue in FY17.

During extreme storm events that exceed the MassDEP recommended design storm, I/I entering the upstream community-owned collection systems may cause an occasional SSO in the MWRA regional interceptor system. Continued coordination with member communities to reduce I/I from local collection systems will help to minimize SSOs that may occur during extreme storm events. Most recently (beginning in FY15), an additional \$160 million in 75% grants and 25% interest-free loans was added as Phases 9 and 10 (\$80 million for each Phase) of the I/I Local Financial Assistance Program to help fund community I/I reduction projects. Note that MWRA has enhanced the Phase 9 and 10 Phases of its grant/loan community funding program by increasing the grant portion from 45% to 75%. MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals \$460.75 million. Through FY16, \$310 million in grants and interest-free loans has been distributed to member sewer communities.

Strategy G: MWRA will assist DEP, member communities, and other regional stakeholders to inform local plumbing inspectors of the regional priority of eliminating sewer system backups. Plumbing inspectors will be requested to work more closely with local DPW staff to identify sewer system backup problem areas and locations where backflow prevention devices may be required. MWRA expects to meet this strategy by distributing a letter to the plumbing inspector in each member community that discusses sewer backups, potential public health impacts, backflow prevention, and coordination with the local DPW to identify problem areas. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 4.2 Strategy B-4)

Work by MWRA under this Strategy is complete as noted below.

On September 26, 2005, MWRA distributed an informational package on Sewer Backups and Sanitary Sewer Overflows to all service area community plumbing inspectors, Health Departments (Boards of Health), DPW Directors, Engineering Departments, and collection system operators. The package included information from fourteen separate sources and provided many web links for additional information. On September 29, 2005, MWRA sent a copy of the informational package to EPA, MassDEP, all MWRA water-only member communities, and local watershed associations. Currently this type of information is widely available via the internet.

Goal 3 under MWRA's Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to reduce I/I in the regional collection system with emphasis on the following: (1) inflow reduction in areas tributary to sewer backups and SSOs, (2) private source inflow reduction, (3) infiltration that may impact groundwater or surface water resources, and (4) excessive infiltration as defined in DEP regulations or guidance documents.

Strategy A: MWRA will continue to analyze available MWRA wastewater metering data to estimate community infiltration and inflow rates. MWRA will provide this information along with technical assistance to help interpret the information to member communities. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1).

Work by MWRA under this Strategy is ongoing.

During FY16, MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY15 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis. \$22.6 million in funds for the next phases of the wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY17-28.

During FY17, MWRA will continue to estimate community infiltration and inflow rates on a bimonthly basis and make this information available to MWRA member communities. MWRA will provide the information to EPA and MassDEP as part of the annual summary report on actions taken to reduce I/I (submitted annually by September 1 per the NPDES Permit).

Strategy B: MWRA, in cooperation with member communities, will evaluate the feasibility of developing and operating an expanded emergency notification system (ENS). Currently, the MWRA remotely monitors wastewater flow at key locations within the regional collection system before and during wet weather events. Interested communities are notified when sewer system depths reach critical levels. The Authority and member communities use this information to forecast problem areas, predict potential sewer system overflows and deploy work crews. The MWRA's wastewater metering system will be upgraded over the next few years. This upgrade may impact the ENS. MWRA is also investigating, over the next three to five years, the benefits of adding SCADA-type meters at some key locations in the collection system. After completion of the two ongoing projects, MWRA will evaluate whether an ENS system can be used efficiently to provide information at the local level. This strategy will be completed in the long-term or more extended time frame subject to the schedule of the ongoing projects noted above. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-1)

Work by MWRA under this Strategy is complete as noted below.

MWRA's Wastewater Meter Replacement project was completed in FY06. The system continues to be used to monitor wastewater flow at key locations within the regional collection system before and during wet weather events. Interested communities are notified when sewer system depths reach critical levels.

Strategy C: MWRA will provide technical assistance to member communities to establish written infiltration and inflow identification and removal programs as outlined in the I/I Task Force Report. This strategy has an ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 6.1 Strategy A-1, and 7.1 Strategy A-1)

Work by MWRA under this Strategy is ongoing.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers. The revisions include a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

During FY16, MWRA staff continued to meet with community representatives to provide technical assistance and discuss local programs. Communities are often interested in utilizing MWRA wastewater meter data and flow component analyses for local I/I and SSES studies. Communities also discuss what sewer system rehabilitation actions other communities are pursuing. MWRA's Advisory Board Operation Committee meetings are used as a platform for member communities to share information on projects and lessons learned. All member sewer communities are actively participating in MWRA's \$460.75 million I/I Local Financial Assistance Program (see Attachment 4). Community I/I reduction programs are generally being conducted by local engineering consultants under contract to the communities. These projects generally utilize standards established in MassDEP's January 1993 I/I Guidelines. This work will continue in FY17.

Strategy D: MWRA will provide technical assistance to member communities that seek to emphasize infiltration removal that may impact groundwater and surface water resource areas. MWRA will provide GIS mapping information to member communities that identifies water resource areas, provides an overlay of local and regional sewers, and delineates watersheds. The I/I Task Force Report recommends communities target areas where infiltration reduction will provide the most meaningful benefit for aquifer recharge, stream flow, wetlands and water levels in lakes and ponds. The Task Force also recommends communities coordinate their infiltration reduction efforts with appropriate EOEAs Watershed Teams, local watershed groups and the local conservation commission. Distribution of MWRA mapping information is intended to assist member communities in fulfilling this I/I Task Force recommendation. This strategy has an ongoing schedule that will be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 7.1 Strategy A-5)

Work by MWRA under this Strategy is complete as noted below. Some ongoing work performed by MWRA that is associated with this Strategy is also noted. Additional community technical assistance is provided upon request as noted under Strategy C, above.

During FY05, MWRA completed a major upgrade to its electronic sewer database and GIS mapping system. Also during FY05, MWRA completed coordination with local communities to more accurately map connection points of local sewers to the MWRA interceptor system and GPS located all wastewater meter sites located in community-owned sewers. Significant GIS mapping upgrades were rolled-out in FY06. In July 2006, MWRA provided GIS maps with detailed water resource information overlaid with the local sewer system to each MWRA member sewer community. In addition, land use mapping was also distributed to the communities. The distribution of this GIS mapping information fulfilled MWRA's work under Strategy D.

During FY14 and continuing through FY16, MWRA updated prior (or developed new) GIS mapping information partnership agreements with most MWRA member water and sewer communities to share MWRA/community GIS mapping data. Under the partnership agreements, MWRA and member communities have signed nondisclosure agreements that detail security protocols necessary to safeguard water and sewer system data. MWRA continues to coordinate with member communities to add GIS partners and update existing data. This work will continue in FY17.

Strategy E: MWRA, in coordination with the MWRA Advisory Board, will continue to fund the I/I Local Financial Assistance Program to provide grants and loans to member sewer communities to fund local I/I reduction projects. Through September 2002, MWRA has authorized a total budget of \$140.75 million to fund this program. Financial assistance is provided through 45 percent grants and 55 percent interest-free loans for eligible projects. The MWRA Board of Directors has approved the program through FY2010. The I/I Local Financial Assistance Program is fully detailed in the "Program Guidelines" document available from the MWRA Community Support Program. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendation 10.2 Strategy B-1)

Work by MWRA under this Strategy is ongoing.

In June 2004, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$180.75 million and extended program distribution through FY13. The additional \$40 million (Phase 5) in financial assistance funds became available to the communities in FY05.

In June 2006, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$220.75 million and extended program distributions through FY15. The additional \$40 million (Phase 6) in financial assistance funds became available to the communities in FY07.

In June 2009, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$260.75 million and extended program distributions through FY18. The additional \$40 million (Phase 7) in financial assistance funds became available to the communities in FY10.

In June 2012, the MWRA Board of Directors approved an additional \$40 million (\$18 million in grants and \$22 million in interest-free loans) to increase the total I/I Local Financial Assistance Program budget to \$300.75 million and extended program distributions through FY21. The additional \$40 million (Phase 8) in financial assistance funds became available to the communities in FY13.

In June 2014, the MWRA Board of Directors approved an additional \$160 million (\$120 million in 75% grants and \$40 million in 25% interest-free 10-year loans) to increase the total I/I Local Financial Assistance Program budget to \$460.75 million and extended program distributions through FY25. The additional \$160 million (\$80 million each for Phases 9 and 10) in financial assistance funds became available to the communities in FY15. Note that MWRA has enhanced the Phase 9 and 10 Phases of its grant/loan community funding program by increasing the grant portion from 45% to 75%. Also, the loan portion repayment period has been extended from 5 to 10 years. As of FY15, MWRA's commitment to fund local sewer rehabilitation projects under the I/I Local Financial Assistance Program totals \$460.75 million.

During FY16, MWRA continued to provide grants and loans to member sewer communities to fund local I/I reduction and sewer system rehabilitation projects. A total of \$22.4 million was distributed during FY16. Since program inception in May 1993, \$310 million has been distributed to fund 508 local projects. The program Guidelines, Financial Assistance Application, and summary of available funds by community are posted on the MWRA Community Support Program web page at <http://www.mwra.com/comsupport/communitysupportmain.html>. A status update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4.

During FY17, MWRA will continue to distribute funds and assist communities in the management of projects under the I/I Local Financial Assistance Program. MWRA's remaining financial assistance funds are authorized for distribution through FY25.

Strategy F: MWRA, in coordination with the MWRA Advisory Board, will continue to provide emergency assistance to member communities for sewer services on local collection systems that are routinely performed by MWRA staff for the MWRA-owned interceptor system. Examples of past community assistance provided by MWRA staff include: emergency response assistance, bypass pumping, internal TV inspection, sewer cleaning, flow metering, engineering technical assistance, etc. This strategy has an ongoing schedule that has been initiated. (Cross-reference this strategy to the I/I Task Force Report recommendations 9.6 Strategy F-2, and 10.2 Strategy B-2)

Work by MWRA under this Strategy is ongoing.

During FY16, MWRA continued to provide emergency assistance to member communities, as requested. These efforts typically included internal TV inspection of local sewers and associated sewer cleaning, as well as, other emergency assistance. During FY17, MWRA will continue to provide emergency assistance to member communities.

Goal 4 under MWRA's Regional I/I Reduction Plan is:

MWRA will work cooperatively with member communities, DEP, and EPA to expand existing efforts to educate and involve the public regarding regional sewer backup, SSO, and I/I reduction issues.

Strategy A: MWRA will act as a "clearinghouse" to collect and distribute information on I/I and SSO issues. Other groups, agencies, associations, community representatives, and local citizens wishing to disseminate information on I/I and SSO issues within the region can provide a copy to MWRA that will be copied and distributed. MWRA staff will maintain a database of contacts with Federal, State and community officials, as well as, local associations and individuals that wish to stay informed on I/I and SSO issues. Summary mailings will be made periodically. MWRA, in coordination with the MWRA Advisory Board, will also act as a clearinghouse to inform regional stakeholders about the progress of efforts to increase state and federal funding for I/I reduction and SSO projects. Regional stakeholders will be advised on the most appropriate time to provide input and lobbying efforts. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-1, 10.4 Strategy C-5, and 10.4 Strategy D-2)

Work by MWRA under this Strategy is ongoing.

During FY16, MWRA distributed technical information to member community Public Works Directors, local wastewater/water system operators, and local watershed groups, including:

- **MWRA continued to estimate community infiltration and inflow rates on a bimonthly basis. Community wastewater flow data for CY15 is included as Attachment 6. These flow data tables are available to all users on MWRA's web site. Community wastewater flow rate basis data is distributed to member communities throughout the year on a bimonthly basis. \$22.6 million in funds for the next phase of wastewater meter replacement/upgrade project are programmed in MWRA's Capital Improvement Program during FY17-28.**
- **January 21, 2016, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program, MassDEP's update on Regulations 314 CMR 12.00, and an update on the Local Water System Assistance Program to the MWRA Advisory Board and local community representatives.**
- **February 2, 2016, MWRA staff distributed an announcement letter on water conservation educational materials and low-flow device retrofit kits available from MWRA at no cost to member communities, local customers, watershed associations, environmental groups, housing authorities, condo associations, etc.**
- **February 16, 2016, MWRA staff provided a presentation on MWRA reservoir withdrawals versus regional wastewater flows to the MWRA Water Supply Citizens Advisory Committee and the MWRA Wastewater Advisory Committee.**
- **February 26, 2016, I/I Local Financial Program update e-mails were distributed to each member community. This update included a link to MassDEP's update on Regulations 314 CMR 12.00 and a copy of the MassDEP presentation *Sanitary Sewer Overflows and Infiltration and Inflow Regulatory Framework***

presented at the February 2016 New England Water Environment Association (NEWEA) conference.

- February 26, 2016, Local Water System Assistance Program funding (interest-free 10-year loans) update e-mails were distributed to each member community.
- March 16, 2016, MWRA staff provided an update presentation on the I/I Local Financial Assistance Program and the Local Water System Assistance Program to the MWRA Board of Directors. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at www.mwra.com.
- March 16, 2016, MWRA's Board of Directors approved a \$100 million expansion of the community Local Water System Assistance Program specifically to provide 10-year interest-free loans to communities for lead water service line replacement. All Staff Summaries to the MWRA Board of Directors are posted on MWRA web site at www.mwra.com.
- May 6, 2016, MWRA staff sent an e-mail to each member community with a copy of MassDEP's recently distributed *Notice To All Sewer System Authorities* regarding revisions to 314 CMR 12.00. This update included a web link to the Regulations.
- May 19, 2016, MWRA staff distributed letters to all water communities announcing the MWRA's Lead Service Line Replacement Loan Program with a link to the MWRA Community Support Web page for more information.
- Mid-June 2016, annual community I/I questionnaire were distributed to member communities to acquire information on FY16 local I/I reduction programs for development of MWRA's Annual I/I Reduction Report (see Attachment 5).
- July 6, 2016, MWRA staff distributed letters to the five sewer communities that had not yet applied for their Phase 6 I/I Local Financial Assistance Program grant/loan funds. The letters notified the communities that the grant portion of the financial assistance "sunset" at the end of FY18.
- July 7, 2016, MWRA staff sent an e-mail to all water communities with a pdf copy of the new *Lead In Tap Water* educational brochure that is available in bulk quantities for member communities for distribution to local customers.

During FY17, MWRA will continue to distribute information on I/I and SSO issues, as appropriate.

Strategy B: MWRA will develop and distribute a summary of previous information/technology distributions regarding I/I reduction and SSOs. The summary will be organized by topic and distributed to all regional stakeholders in MWRA's database of contacts. This summary can be used as a tool to help reference previously distributed information. This strategy will be completed in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.1 Strategy A-2)

Work by MWRA under this Strategy is complete as noted below.

On August 8, 2007, MWRA distributed a Technical Transfer Summary package that included lists of previously distributed information under five separate topic headings: (1) Reports, Handbooks, and Guidelines; (2) Sewer Back-ups, SSOs, and Flooding; (3) Public Source I/I Reduction; (4) Private Source I/I Reduction; and (5) Brochures and Bill Stuffers. Additional information/technology distributions will continue under Strategy A, above.

Strategy C: MWRA, jointly with DEP (and possibly other regional organizations), will organize periodic demonstration projects and/or workshops to bring together regulators, community representatives, vendors, environmental groups, consultants, contractors, etc. Workshops may cover topics such as: new or revised regulations, I/I reduction technologies, updates/progress on Task Force Report recommendations, etc. MWRA and DEP conducted a joint workshop on private source inflow reduction during November 2001. Lessons learned from this workshop will help shape future efforts under this strategy. Completion of this strategy requires a significant resource commitment by DEP. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.1 Strategy A-3 and 8.2 Strategy B-6)

Work by MWRA under this Strategy is ongoing. Following-up on the joint workshop in 2001, additional joint workshops were held in 2002 and 2004.

On April 27, 2011, representatives from MassDEP, EPA, and MWRA met to discuss I/I reduction in the region. The potential for future workshops was noted, but no specific plans have been developed for organizing additional joint workshops.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*. The revisions included a requirement for all public entities that own a sewer system to complete an I/I analysis by December 31, 2017. The analysis also must specifically include an assessment of the risk of sewer system overflows.

On an annual basis, MWRA staff provided an update presentation to the MWRA Board of Directors on both I/I Local Financial Assistance and Local Water System Assistance Programs.

Periodically, MWRA staff provided update presentations to the MWRA Advisory Board and member community representatives, as well as the Wastewater Advisory Committee and Water Supply Citizens Advisory Committee, on a variety of related topics including: I/I Local Financial Assistance Program, Local Water System Assistance Program, Lead Service Line Replacement Loan Program, water and wastewater metering, water and wastewater flow data, rate assessment methodologies, water and wastewater permitting and regulations, etc. See the list of technical information noted in Strategy A, above.

During FY17, MWRA will continue to work cooperatively with MassDEP on this strategy.

Strategy D: MWRA will develop a summary of available public education material such as local/regional billing inserts, Water Environment Federation (WEF) brochures, “How-To” pamphlets, etc. The summary will provide information on where to obtain the material. A listing of available public education materials will be posted on the MWRA Internet site. MWRA will also make copies of public education material available to communities and local associations. MWRA will pilot this strategy by distributing to member communities sample copies of the “Fat-Free Sewers” brochure developed cooperatively by the Water Environment Federation (WEF) and EPA. MWRA will recommend use of the brochures for public education. This strategy has an ongoing schedule that will be initiated in the short-term. (Cross-reference this strategy to the I/I Task Force Report recommendations 8.2 Strategy B-1, and 8.2 Strategy B-4)

Work by MWRA under this Strategy is complete as noted below.

MWRA distributed the Fat-Free Sewers brochure to wastewater system operators in July 2003. In conjunction with the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading for “Brochures and Bill Stuffers” that can be used by local communities as educational materials. Links to educational materials are provided on www.mwra.com.

Strategy E: Depending on the outcome of the summary of available information being developed under Strategy D, MWRA (jointly with DEP, and possibly other regional organizations) may develop informational materials that will educate the public on I/I and SSO issues. This effort may include “how-to” pamphlets that detail a step-by-step process for disconnecting private inflow sources or similar information. The development of new materials under this strategy will be targeted to fill gaps that are not covered by existing/available public education material. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-2)

Work by MWRA under this Strategy is complete as noted below.

As part of the Technical Transfer Summary package distributed on August 8, 2007 (see Strategy B, above), MWRA included a separate topic heading specifically for “Brochures and Bill Stuffers” that can be used by local communities as educational materials. There are sufficient example brochures available so that no additional work is needed under this strategy. Communities actively involved with private inflow removal programs have generally been using available sample brochures and other public education materials to develop public education information related to their specific project. Information already available via local engineering consultants is also utilized.

Strategy F: Upon request from member communities, MWRA will assist member communities in providing a link from the local DPW or community Internet site to the MWRA Internet site. The possibility of a link or reference to other regional bodies that are involved in sewer system issues (such as DEP, EPA, New England Water Environment Association, New England Interstate Water Pollution Control Commission, watershed associations, etc) will also be investigated. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-3)

Work by MWRA under this Strategy is complete as noted below.

Local communities, state agencies, regional associations, etc. all maintain their own web pages with numerous information links. MWRA's web site contains links to the communities' web sites and links to other organizations. Based on current broad use of the web, additional work under this strategy is not needed. MWRA continues to revise and upgraded its web site www.mwra.com and the Community Support Program page: <http://www.mwra.com/comsupport/communitysupportmain.html>.

Strategy G: MWRA will integrate information on I/I and SSO issues into existing MWRA school education materials. MWRA's School Education staff will identify what types of materials are appropriate for their programs. This strategy has an ongoing schedule that will be initiated in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.3 Strategy C-1)

Work by MWRA under this Strategy is ongoing.

The focus of MWRA's School Education Program is to provide a general understanding of water and wastewater transport and treatment systems with emphasis on water conservation and environmental awareness issues. Educational materials are designed for students from elementary to high school levels.

Strategy H: Upon request from DEP, MWRA will provide technical assistance to DEP to develop and issue DEP press releases prior to and during extreme wet weather events to notify the public of possible sewer system backups and overflow problems. The I/I Task Force Report recommends DEP develop a standardized format that includes a request that system users minimize non-essential water consumption activities and includes a standardized high sewer flow warning. Completion of this strategy is dependent on DEP actions. This strategy has an ongoing schedule that should be initiated in the short to mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 5.4 Strategy D-2)

Work by MWRA under this Strategy is ongoing. During FY16, no assistance from MWRA was requested by MassDEP. Any future action under this strategy will be initiated jointly with MassDEP.

Strategy I: Upon request from member communities, MWRA will provide technical assistance to communities to provide residents with information on I/I reduction, SSOs and backups using local cable stations or other media outlets. This strategy has an ongoing schedule that will be initiated in the mid to long-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 8.2 Strategy B-7)

Work by MWRA under this Strategy is ongoing. During FY16, no assistance from MWRA was requested under this strategy.

Goal 5 under MWRA's Regional I/I Reduction Plan is:

MWRA will provide technical assistance and work cooperatively with member communities, DEP, and EPA regarding guidance on local operation and maintenance and capital improvement programs intended to provide a reasonable level of sewer service to local sewer users/ratepayers.

Strategy A: MWRA will provide all member communities a copy of the I/I Task Force Report (which includes recommendations for sewer system operation and maintenance). MWRA will maintain a supply of I/I Task Force Reports and will provide additional copies to MWRA member communities and regional stakeholders, as requested. This strategy has an ongoing schedule that has been initiated.

Work by MWRA under this Strategy is complete as noted below.

MWRA provided all member communities and all interested parties copies of the I/I Task Force Report in April 2001, shortly after the Report was completed. MWRA continues to maintain a supply of I/I Task Force Reports and provides additional copies to MWRA member communities and regional stakeholders, as requested. In July 2003, all member communities were provided a copy of the MWRA Regional I/I Reduction Plan. Both the I/I Task Force Report and MWRA Regional I/I Reduction plan are posted on MWRA's Community Support Program web page at: <http://www.mwra.com/comsupport/communitysupportmain.html>.

Strategy B: MWRA will request member communities provide a copy of their existing local Sewer Use Regulations to MWRA, will review those local Regulations that are submitted, and will make recommendations for improvements. MWRA may utilize a committee representing a cross-section of sewer system stakeholders to assist in accomplishing this strategy. This strategy will be completed in the mid-term. (Cross-reference this strategy to the I/I Task Force Report recommendation 9.1 Strategy A-2)

Work by MWRA under this Strategy is complete as noted below.

MWRA did not proceed with work under this strategy pending issuance of EPA's SSO Rule, including CMOM Regulations, that were likely to impact local sewer use regulations. EPA's draft SSO Rule was not promulgated. During FY04, MassDEP distributed a new guideline document – "Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems" dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. The Guideline Document was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at www.neiwpcc.org. Chapter 4 of the manual "Optimizing Legal Authority" includes sections on Sewer Use Ordinances; therefore, additional work by MWRA under this strategy is not necessary. Web links to information provided by MassDEP, USEPA, and NEIWPCC are posted on MWRA's Community Support Program web page at: <http://www.mwra.com/comsupport/communitysupportmain.html>.

Strategy C: MWRA will develop a Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan. This guidance document will be provided to all member communities. This strategy will be completed in the short-term.

Work by MWRA under this Strategy is complete as noted below.

A Member Community Collection System Operation and Maintenance Manual Guidance Document and Overflow Response Plan was developed and submitted to EPA and MassDEP for review in June 2001. This guidance document was made available to member communities. During FY04, MassDEP distributed a new guideline document – “*Optimizing Operation, Maintenance and Rehabilitation of Sanitary Sewer Collection Systems*” dated August 2003. This manual was developed by New England Interstate Water Pollution Control Commission (NEIWPCC) under a grant from EPA. It was written by a committee consisting of NEIWPCC member state environmental agencies, EPA, and wastewater consultants. The manual is available at www.neiwpcc.org. MWRA provided its collection system O&M manual and the community collection system guidance document to the NEIWPCC committee for review. With the publication of the NEIWPCC manual, further efforts on the Member Community Collection System Operation and Maintenance Manual Guidance Document are not required.

During FY14 (as of April 25, 2014), MassDEP revised its Regulation 314 CMR 12.00 *Operation, Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Dischargers*.

ATTACHMENT 3
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period – July 2015 Through June 2016

MWRA ACTIONS TAKEN TO REDUCE I/I DURING FY16

The MWRA Field Operations Department's Technical Inspection program staff have internally inspected approximately 35.5 miles of Authority-owned interceptors and 3.0 miles of community-owned sewers, internally inspected 48 inverted siphon barrels with sonar inspection equipment, and physically inspected 818 sewer manholes and other structures (diversion chambers, siphon headhouses, tide gates, etc.) during FY16. During the internal inspection process, problems such as physical defects, manhole frame and cover defects, infiltration/inflow, sediment, grease deposits, etc. are noted and stored in MWRA's electronic maintenance (MAXIMO) database. Maintenance work is then scheduled based on the identified problems.

During FY16, MWRA's maintenance work included hydraulic/mechanical cleaning of 39 miles of Authority-owned sewers, 0.5 miles of community-owned sewers, cleaning of 72 siphon barrels, and replacement of 105 manhole frames and covers. In addition, 55 sewer manholes were rehabilitated via cement mortar lining under MWRA's annual manhole rehabilitation contract. Potential structural problems and infiltration sources identified during the inspection process are referred to engineering staff for follow-up review and analysis of cost-effective repairs.

The MWRA is undertaking a number of significant capital projects to provide additional hydraulic capacity and rehabilitate portions of Authority-owned interceptors. Updates on these projects are included below:

1. During FY16, MWRA continued rehabilitation of sewer interceptors under the Interceptor Renewal/Asset Protection Program. Evaluation and design of interceptor rehabilitation began in FY09. The program includes a series of twelve interceptor renewal projects to be phased over multiple years at a cost of up to \$100 million. Each of these projects will provide structural repairs for existing pipelines and reduce I/I entering the MWRA interceptor system. MWRA's Interceptor Renewal/Asset Protection Projects #1 through #7 for rehabilitation construction of a variety of Sewer Sections are programmed in the FY17 CIP at a cost of \$54.3 million in FY16-30. Interceptor Renewal/Asset Protection Projects #1 through #7 include:
 - Interceptor Renewal/Asset Protection Project #1: Rehabilitation design and construction of 12,400 linear feet of the Reading Extension Sewer Sections 75, 74, 73, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of Metropolitan Sewer Section 46 in Stoneham.
 - Interceptor Renewal/Asset Protection Project #2: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge.

- Interceptor Renewal/Asset Protection Project #3: Rehabilitation design and construction of the Dorchester Interceptor Sewer Sections 240, 241, and 242.
 - Interceptor Renewal/Asset Protection Project #4: Rehabilitation design and construction of the Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown. Rehabilitation of Sections 25 and 25.5 will also be evaluated.
 - Interceptor Renewal/Asset Protection Project #5: Rehabilitation design and construction of portions of Sections 607, 609, and 610 in Milton.
 - Interceptor Renewal/Asset Protection Project #6: Rehabilitation design and construction of portions of Sections 12, 14, 15, and 62 in Chelsea.
 - Interceptor Renewal/Asset Protection Project #7: Rehabilitation design and construction of portions of Sections 41, 42, 49, 54 and 65 in Melrose and Malden.
2. Sewer asset protection rehabilitation design and construction of Section 4, 5, 6 and 186 on the North Metropolitan Sewer in Winthrop and just upstream of the Deer Island Treatment Plant is programmed in the FY17 CIP at a cost of \$20.5 million in FY17-24. The project will include rehabilitation of about 5,300 feet of 108-inch brick sewer; some of this sewer was previously rehabilitated using a shotcrete process in the 1990s.
 3. A multi-phase corrosion and odor control project is programmed in the FY17 CIP at a cost of \$23.1 million in FY16-22. Project phases include:
 - Design and construction of three biofilter air treatment systems to remove hydrogen sulfide from the Framingham Extension Sewer/Framingham Extension Relief Sewers and Wellesley Extension Sewer Replacement/Wellesley Extension Relief Sewers;
 - Design and construction for rehabilitation of the Framingham Extension Sewer/Framingham Extension Relief Sewers;
 - A System-wide Corrosion and Odor Control Study to evaluate needs and identify solutions for hydrogen sulfide corrosion and odor problems; and,
 - Design and construction of additional corrosion and odor control measures.
 4. Siphon Structure Rehabilitation (Phase 1) for design and construction of the most critical recommended improvements to a portion of MWRA's siphons and siphon headhouses is programmed in the FY17 CIP at a cost of \$5.7 million during FY19-23. This project will include hydraulic capacity review, structural repairs of deteriorated conditions, stop plank construction, installation of new covers and/or appropriate access to structures, and procurement of legal access easements to allow for proper maintenance. Planning should consider potential increases in flood elevations and tidal surge due to impacts from climate change.

ATTACHMENT 4
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period: July 2015 Through June 2016

**STATUS UPDATE ON MWRA'S
I/I LOCAL FINANCIAL ASSISTANCE PROGRAM**

Financial Assistance Update

All 43 member sewer communities are participating in MWRA's \$460.75 million Infiltration/Inflow (I/I) Local Financial Assistance (grant/loan) Program. The program began in May 1993 and, through FY16, \$310 million has been distributed to fund local I/I reduction and sewer system rehabilitation projects. The program budget of \$460.75 million includes the most recent addition of \$160 million in new Phase 9 (\$80 million) and Phase 10 (\$80 million) funds approved by the MWRA Board of Directors for distribution beginning in FY15. In addition, the grant component and loan repayment terms have been enhanced for the additional Phase 9 and 10 funds. The table on page 2 provides a summary of funding allocations, distributions, and funds remaining for each MWRA sewer community. Distribution of grant and loan financial assistance to member communities has been approved through FY25. The table on page 3 provides a summary of funding distributions by fiscal quarter since Program inception.

Program Background

MWRA's I/I Local Financial Assistance Program was initiated to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Following recommendations from the MWRA Advisory Board, the MWRA Board of Directors has approved a total program budget of \$460.75 million. The funds have been allocated among the 43 MWRA sewer communities based on respective share of MWRA's wholesale sewer charge. Financial assistance for Phases 1 and 2 (total of \$63.75 million) was distributed for approved projects as a 25 percent grant and a 75 percent interest-free loan. The grant/loan split was revised for distribution of the Phase 3 through 8 funds (total of \$237 million) to a 45 percent grant and a 55 percent interest-free loan. The interest-free loan portion for Program Phases 1 through 8 has been repaid to MWRA over a five year period beginning one year after the date the funds are distributed. The grant/loan split was again revised for distribution of Phases 9 and 10 funds (total of \$160 million) to a 75 percent grant and a 25 percent interest-free loan. The interest-free loan repayment period for Program Phases 9 and 10 has been extended to ten years from the previous five (again beginning one year after the date the funds are distributed).

MWRA funding is provided to a community following execution of a standard agreement that stipulates the project scope, schedule, and loan repayment requirements. Communities are required to provide periodic schedule and expenditure progress reports to MWRA. For planning and design projects, the work products (reports, plans, specifications, and bidding documents) are reviewed and approved by MWRA. During construction, MWRA staff perform site visits to document progress.

**MWRA I/ LOCAL FINANCIAL ASSISTANCE PROGRAM
FUNDING SUMMARY AS OF JULY 2016**

Community	Total Allocations (Phases 1 - 10)	Total Distributions (Phases 1 - 10)	Percent Distributed	Funds Remaining
Arlington	\$8,423,000	\$7,413,000	88%	\$1,010,000
Ashland	\$2,168,500	\$1,328,500	61%	\$840,000
Bedford	\$3,404,600	\$1,999,600	59%	\$1,405,000
Belmont	\$5,135,100	\$2,992,100	58%	\$2,143,000
Boston	\$132,171,200	\$83,711,976	63%	\$48,459,224
Braintree	\$8,359,000	\$5,915,800	71%	\$2,443,200
Brookline	\$13,165,200	\$7,666,200	58%	\$5,499,000
Burlington	\$5,102,800	\$4,203,800	82%	\$899,000
Cambridge	\$23,620,100	\$11,077,055	47%	\$12,543,045
Canton	\$3,965,900	\$2,675,900	67%	\$1,290,000
Chelsea	\$6,870,100	\$5,551,100	81%	\$1,319,000
Dedham	\$5,740,000	\$5,740,000	100%	\$0
Everett	\$8,071,500	\$5,229,500	65%	\$2,842,000
Framingham	\$12,125,000	\$5,874,650	48%	\$6,250,350
Hingham	\$1,632,500	\$1,632,500	100%	\$0
Holbrook	\$1,639,600	\$896,562	55%	\$743,038
Lexington	\$7,445,300	\$7,445,300	100%	\$0
Malden	\$12,283,900	\$4,593,900	37%	\$7,690,000
Medford	\$11,987,600	\$6,914,600	58%	\$5,073,000
Melrose	\$6,076,300	\$3,914,300	64%	\$2,162,000
Milton	\$5,564,500	\$3,736,500	67%	\$1,828,000
Natick	\$5,582,600	\$4,452,800	80%	\$1,129,800
Needham	\$6,257,600	\$2,892,150	46%	\$3,365,450
Newton	\$21,197,400	\$21,197,400	100%	\$0
Norwood	\$6,879,400	\$4,233,499	62%	\$2,645,901
Quincy	\$19,790,000	\$13,637,000	69%	\$6,153,000
Randolph	\$6,050,800	\$3,894,800	64%	\$2,156,000
Reading	\$4,629,100	\$2,941,100	64%	\$1,688,000
Revere	\$10,130,900	\$5,502,900	54%	\$4,628,000
Somerville	\$15,515,800	\$10,117,800	65%	\$5,398,000
Stoneham	\$4,919,900	\$4,919,900	100%	\$0
Stoughton	\$4,722,900	\$4,440,100	94%	\$282,800
Wakefield	\$5,966,900	\$4,659,800	78%	\$1,307,100
Walpole	\$3,680,000	\$3,042,000	83%	\$638,000
Waltham	\$13,732,400	\$11,377,400	83%	\$2,355,000
Watertown	\$6,285,800	\$3,111,800	50%	\$3,174,000
Wellesley	\$5,709,700	\$3,256,224	57%	\$2,453,476
Westwood	\$2,532,300	\$2,091,300	83%	\$441,000
Weymouth	\$11,480,900	\$7,490,900	65%	\$3,990,000
Wilmington	\$2,462,000	\$1,388,000	56%	\$1,074,000
Winchester	\$4,183,000	\$3,448,000	82%	\$735,000
Winthrop	\$3,393,400	\$2,807,400	83%	\$586,000
Woburn	\$10,695,500	\$8,962,500	84%	\$1,733,000
Totals	\$460,750,000	\$310,377,616	67%	\$150,372,384

MWRA I/I Local Financial Assistance Program - Fiscal Year Breakdown

FY	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	Distribution Cycle	Distribution Amount	FY Total
FY93	Aug 1992	\$0	Nov 1992	\$0	Feb 1993	\$0	May 1993	\$2,714,883	\$2,714,883
FY94	Aug 1993	\$3,096,468	Nov 1993	\$4,096,133	Feb 1994	\$3,191,032	May 1994	\$251,494	\$10,635,127
FY95	Aug 1994	\$354,126	Nov 1994	\$976,700	Feb 1995	\$1,894,030	May 1995	\$6,489,891	\$9,714,747
FY96	Aug 1995	\$0	Nov 1995	\$504,100	Feb 1996	\$2,921,600	May 1996	\$3,902,426	\$7,328,126
FY97	Aug 1996	\$1,682,061	Nov 1996	\$1,581,266	Feb 1997	\$395,100	May 1997	\$3,530,758	\$7,189,185
FY98	Aug 1997	\$1,066,300	Nov 1997	\$1,157,260	Feb 1998	\$909,350	May 1998	\$2,001,608	\$5,134,518
FY99	Aug 1998	\$1,521,100	Nov 1998	\$2,464,263	Feb 1999	\$1,481,700	May 1999	\$5,758,077	\$11,225,140
FY00	Aug 1999	\$1,315,767	Nov 1999	\$1,847,900	Feb 2000	\$1,679,000	May 2000	\$1,070,100	\$5,912,767
FY01	Aug 2000	\$1,148,400	Nov 2000	\$388,000	Feb 2001	\$1,640,931	May 2001	\$804,800	\$3,982,131
FY02	Aug 2001	\$4,480,735	Nov 2001	\$704,040	Feb 2002	\$1,804,200	May 2002	\$5,002,691	\$11,991,666
FY03	Aug 2002	\$1,962,600	Nov 2002	\$4,461,768	Feb 2003	\$7,955,752	May 2003	\$1,836,600	\$16,216,720
FY04	Aug 2003	\$2,021,940	Nov 2003	\$1,306,200	Feb 2004	\$1,770,760	May 2004	\$3,295,400	\$8,394,300
FY05	Aug 2004	\$2,756,659	Nov 2004	\$6,013,436	Feb 2005	\$4,054,060	May 2005	\$2,636,700	\$15,460,855
FY06	Aug 2005	\$5,377,487	Nov 2005	\$4,589,600	Feb 2006	\$1,519,463	May 2006	\$6,489,676	\$17,976,226
FY07	Aug 2006	\$0	Nov 2006	\$4,947,414	Feb 2007	\$8,789,300	May 2007	\$8,121,023	\$21,857,737
FY08	Aug 2007	\$3,915,500	Nov 2007	\$4,355,750	Feb 2008	\$1,392,400	May 2008	\$4,436,600	\$14,100,250
FY09	Aug 2008	\$4,196,399	Nov 2008	\$352,000	Feb 2009	\$1,990,300	May 2009	\$4,872,400	\$11,411,099
FY10	Aug 2009	\$5,462,736	Nov 2009	\$616,600	Feb 2010	\$2,679,600	May 2010	\$4,845,000	\$13,603,936
FY11	Aug 2010	\$723,700	Nov 2010	\$3,183,250	Feb 2011	\$4,123,100	May 2011	\$4,258,900	\$12,288,950
FY12	Aug 2011	\$3,695,100	Nov 2011	\$2,417,378	Feb 2012	\$848,300	May 2012	\$7,010,324	\$13,971,102
FY13	Aug 2012	\$21,299,965	Nov 2012	\$1,004,610	Feb 2013	\$2,460,000	May 2013	\$2,675,000	\$27,439,575
FY14	Aug 2013	\$7,550,310	Nov 2013	\$0	Feb 2014	\$2,929,700	May 2014	\$2,271,852	\$12,751,862
FY15	Aug 2014	\$4,053,000	Nov 2014	\$7,647,400	Feb 2015	\$10,128,648	May 2015	\$4,803,450	\$26,632,498
FY16	Aug 2015	\$3,983,100	Nov 2015	\$5,783,000	Feb 2016	\$7,195,116	May 2016	\$5,483,000	\$22,444,216
Total		\$81,663,453		\$60,398,068		\$73,753,442		\$94,562,653	\$310,377,616

Program Goals

The I/I Local Financial Assistance Program is a critical component of MWRA's Regional I/I Reduction Plan. Specifically, local sewer system rehabilitation projects are intended to at least offset ongoing collection system deterioration to prevent a net increase in regional I/I. In the long-term, system rehabilitation should result in lower I/I, which will allow for future increases in sanitary (residential, commercial, industrial, and institutional) flow without a net increase in total wastewater flow to the Deer Island Treatment Plant.

A second goal of the program is to assist member communities in implementing effective annual local collection system maintenance programs to assure efficient operation and ongoing collection system repair/replacement.

Type of Local Projects Receiving Funding

Funding has been provided to local communities for eligible I/I reduction projects including planning, design, construction, and engineering services during construction. These projects generally take one to three years to complete. Seventy-six percent of funds distributed to date have financed local construction projects. The table below details funds distributed by project phase for both completed and ongoing projects.

<u>PROJECT PHASE</u>	<u>COMPLETE PROJECTS</u> <u>(\$ millions)</u>	<u>ONGOING PROJECTS</u> <u>(\$ millions)</u>	<u>TOTAL</u> <u>(\$ millions)</u>
Planning/Study:	\$ 37.2	\$ 6.0	\$ 43.2 (14%)
Design:	11.9	2.5	14.4 (5%)
Construction:	172.4	64.2	236.6 (76%)
Eng. Services During Const.:	11.5	4.7	16.2 (5%)
TOTAL	\$ 233.0 (75%)	\$ 77.4 (25%)	\$ 310.4 (100%)

Program Results

The I/I Local Financial Assistance Program began in May 1993. Through FY16, a total of 508 local I/I reduction and sewer system rehabilitation projects have been funded through the MWRA's grant/loan program. Cumulative results for the program are summarized below.

Results for all projects (FY93 through FY16) for planning/inspection include the following:

- 1,788 miles of sewer TV inspected
- 1,252 miles of sewer flow isolated
- 1,273 miles of sewer smoke tested
- 51,466 sewer manholes inspected
- 77,894 buildings inspected

Results for all projects (FY93 through FY16) targeting infiltration reduction include the following:

- 57 miles sewer replaced
- 151 miles sewer CIP lined
- 144 miles sewer tested/chemically sealed
- 2,398 sewer spot repairs
- 11,376 service connection repairs
- 4.8 miles underdrains sealed

Results for all projects (FY93 through FY16) targeting inflow reduction include the following:

- 1,019 catch basins disconnected
- 43 miles of new or replaced storm drains
- 15,152 manholes rehabilitated/sealed
- 2,485 manhole covers replaced or inflow seals installed
- 433 sump pumps redirected
- 5,209 downspouts/area drains disconnected

Stormwater and I/I Impacts to the Collection System

The system annual average daily flow is approximately 357 mgd (last 27 years); minimum dry weather flows drop to 230 mgd; peak wet weather flow during significant rainfall exceed the 1270 mgd capacity at the Deer Island Treatment Plant (more than 3.5 times the average flow), and significant additional system capacity is available at combined sewer overflow (CSO) outfalls and storage facilities. Few problems exist within local and regional sewer systems during dry weather or as a result of small and medium storm events. However, stormwater entering combined sewers as well as I/I throughout the system reduce pipeline capacity in the collection system that would otherwise be available to transport sanitary flow. The result, during extreme storm events, may be sewer system surcharging and sanitary sewer overflows (SSOs). I/I also results in the transport of groundwater and surface water out of the natural watershed.

Estimated Flow Reduction

The estimated average daily flow reduction associated with completed local I/I reduction projects that have received MWRA financial assistance is about 88 million gallons per day (mgd). This flow reduction “ballpark” figure is based on the communities’ (or their consultants’) peak I/I reduction estimates, which have been prorated by MWRA staff to estimate an annual average I/I reduction. Some additional I/I reduction may be expected from projects not funded by MWRA. The estimated I/I reduction represents groundwater and stormwater that no longer enter the collection system at the point of repair. Regional wastewater flow reductions resulting from specific local I/I reduction projects are difficult to substantiate through end-of-the-collection-system meter data due to factors noted below:

- Wastewater flows within the collection system vary dramatically due to changes in precipitation. For example, annual average daily flow for MWRA’s system varies up to 100 mgd from year to year (from a low of less than 300 mgd to a high of more than 400 mgd). Small flow reductions for individual projects (typically less than one mgd) are dwarfed by regional flow fluctuations;
- Sewer capacity gained by elimination of I/I in one subsystem may, in some cases, allow for other I/I to enter the collection system at a different location, resulting in less net flow reduction at the end of the collection system;
- MWRA’s numerous pumping and interceptor upgrades, as well as combined sewer overflow and system optimization projects, have resulted in an increase in the capture and treatment of wastewater flow and the reduction of raw sewage discharges. When reviewing end-of-the-collection system meter data, these increased flows to the Deer Island Treatment Plant offset upstream I/I reductions; and,

- In the MWRA service area, the increase in wastewater flow from an increase in sewered population is likely offset by the decline in per capita indoor water use. Over the last 20 years, sewered population in the service area has increased by about 270,000 people leading to an increase in sanitary sewage of about 17.5 mgd (based on 65 gpcd water use returned to the sewer system). During the same 20 year period, per capita indoor water use returned to the sewer system has decreased due to conservation measures such as installation of low-flow plumbing fixtures and appliances. Reduced indoor water use produces a decrease in sanitary sewage. A 20 mgd decrease in sanitary sewage would be produced by an across-the-region 10 gpcd reduction in water use from all of the approximately 2 million customers. The estimates noted above are generally offsetting.

Taking these factors into account, long-term metering records will continue to be analyzed to monitor regional wastewater flow trends. The graph shown on page 7 presents long-term (27 years from 1989 through 2015) regional flow data for the Deer Island Treatment Plant collection system and annual rainfall. The 27-year average daily flow for the total system is 357 mgd and the average annual rainfall over those 27 years is 43.5 inches (local NOAA site at Boston Logan Airport). The same 27-year (1989 through 2015) long-term regional flow and annual rainfall data are presented again on page 8, both recalculated as 5-year running averages. The 5-year running average smoothes the extreme highs and lows within the annual data. The 5-year running average data over the last 27-years clearly shows the regional wastewater flow trend is declining while the annual rainfall trend is only slightly higher than the 140 year annual rainfall average of 41.9 inches. The 5-year running average data displays an approximate 75 mgd reduction (from about 390 mgd to about 315 mgd) in wastewater flow tributary to the Deer Island Treatment Plant over the long-term (approximately a 20 percent flow reduction).

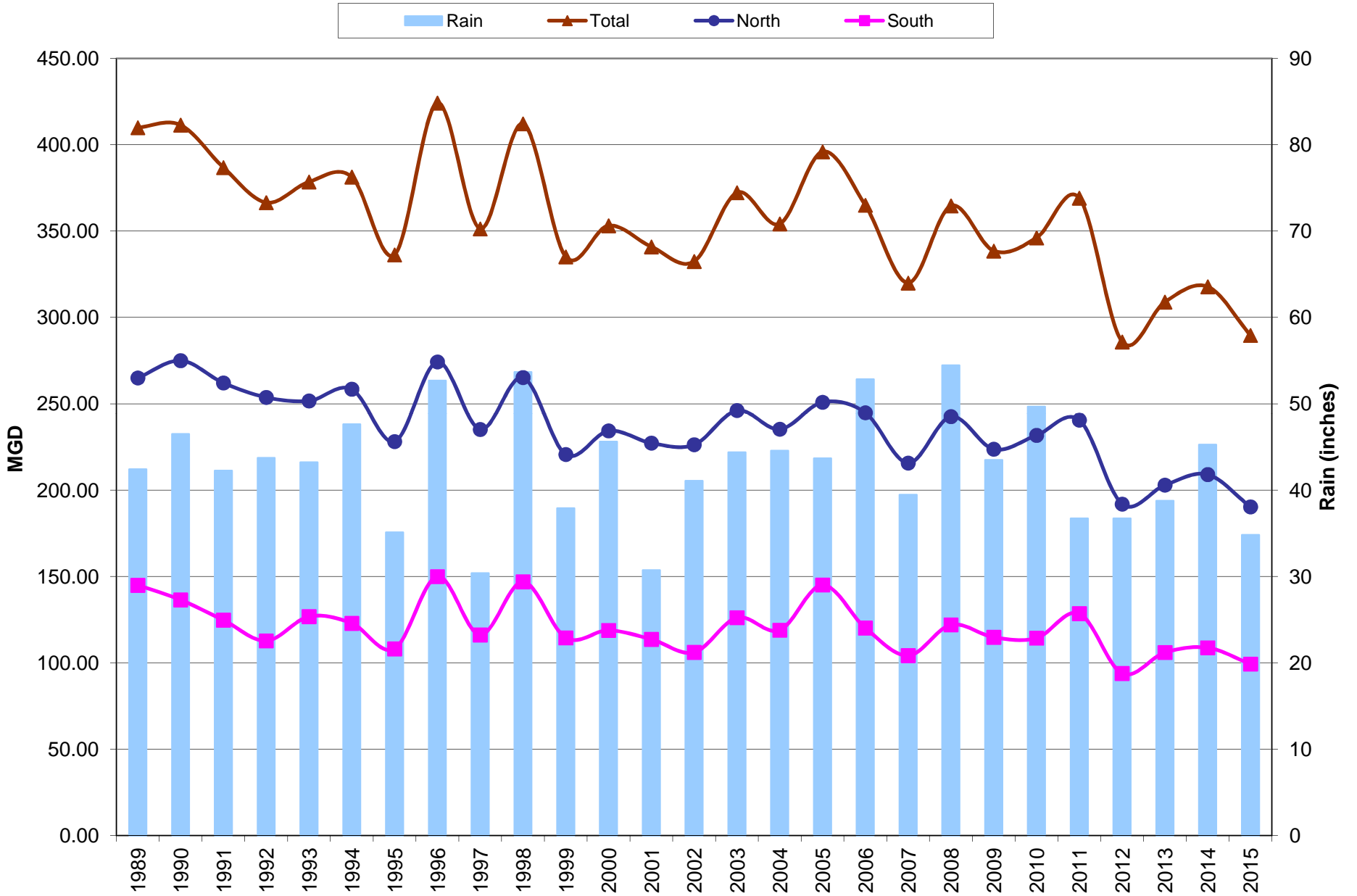
Over the last four years (2012-2015), MWRA's average daily flow of 300 mgd is 57 mgd (16%) below the 27-year long-term average; while the four-year rainfall has also been below average at 39 inches.

Community Projects Funded During FY16

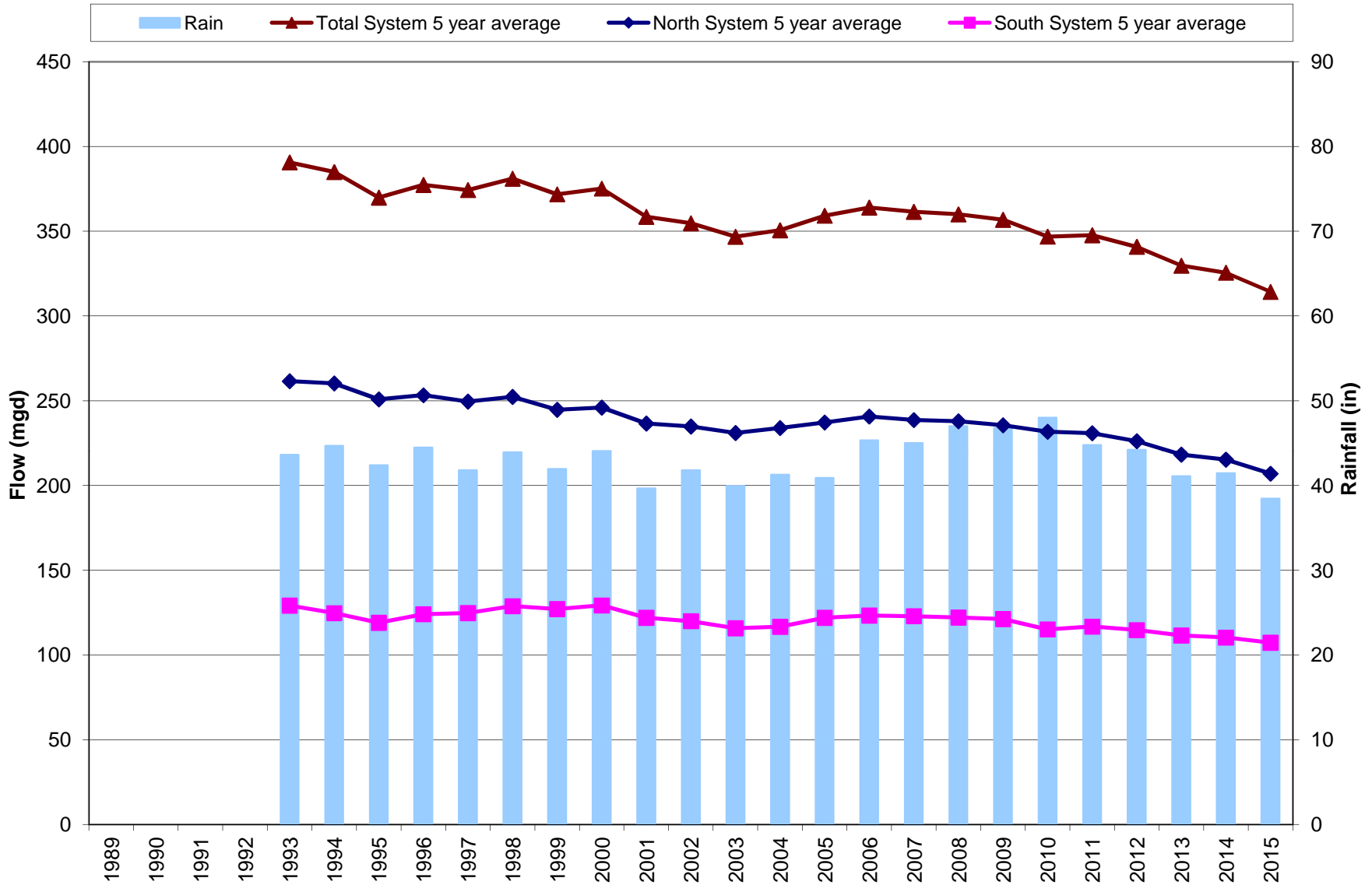
During FY16, MWRA distributed \$22.4 million in grants and loans to member communities to help fund local I/I reduction projects. Local community projects are funded quarterly under the MWRA I/I Local Financial Assistance Program. Attached (after page 8) are funding summaries for the four quarterly funding distributions during FY16:

- August 2015 (\$3,983,100 distributed) with five communities funded: Bedford, Lexington, Medford, Wakefield, and Winthrop;
- November 2015 (\$5,783,000 distributed) with five communities funded: Everett, Newton, Reading, Stoneham, and Watertown;
- February 2016 (\$7,195,116 distributed) with ten communities funded: Arlington, Braintree, Everett, Hingham, Lexington, Stoughton, Wakefield, Wellesley, Weymouth, and Woburn; and,
- May 2016 (\$5,483,000 distributed) with seven communities funded: Burlington, Chelsea, Dedham, Milton, Quincy, Westwood, and Winthrop.

MWRA Long-Term Regional Flow Data NOAA Annual Rainfall at Logan Airport



**MWRA Long-Term Regional Flow Data
5-year Running Averages
5 year running average NOAA Rainfall at Logan Airport**



MWRA I/I Local Financial Assistance Program Funding Summary

August 2015 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Bedford	\$ 308,000
Lexington	\$ 979,000
Medford	\$ 2,120,000
Wakefield	\$ 122,100
Winthrop	\$ 454,000
Total	\$ 3,983,100

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-03-3-926

TOWN OF BEDFORD

**PHASE 3# SEWER MANHOLE REHABILITATIONS DESIGN, BID/AWARD AND
CONSTRUCTION
AND
PHASE #4 SEWER SYSTEM INVESTIGATIONS**

SCOPE OF SERVICES

Phase #3 Sewer Manhole Rehabilitations Design, Bid & Award and Construction This project consists of the design, bid & award and construction associated with the recommended sewer manhole rehabilitations. The approximate scope of work includes but is not necessarily limited to: grouting & cement lining of approximately 135 sewer manholes; raising of 2 sewer manhole frames & covers above grade; external wrapping (Canusa Wrap) of sewer manholes above grade to stop flood inundation; installation of 20 Inflow dishes; root treatment of 7 sewer manholes; other related tasks and appurtenances. The sewer manholes to be rehabilitated are located in various areas throughout the Town.

Phase #4 Sewer System Investigations This Study will identify and quantify sources of Infiltration and Inflow (I/I) in the sanitary sewer system in the Phase #4 Area. The expected field investigations will include, but not be limited to: conducting top side physical survey of as many as 450 sewer manholes for sources of I/I in Sewer Subareas 2, 3, 4, 5, 7, 8, 9 & 21; cleaning and internal TV inspection of as many as 20,000 l.f. of sewer in Sewer Subareas 3, 6, 8 & 9; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field investigations which will include data analysis, cost-effectiveness analysis and recommendations for sewer rehabilitation along with preliminary design concepts.

PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Estimated Cost</u>
Phase #3 Sewer Manhole Rehabilitation	
Design	\$ 19,800
Engineering During Construction	\$ 49,200
Construction	\$ 153,000
 Phase #4 Sewer System Investigations	 \$ 86,000
 Total Project Cost	 ----- \$ 308,000

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-03-3-926

TOWN OF BEDFORD

**PHASE 3# SEWER MANHOLE REHABILITATIONS DESIGN, BID/AWARD AND CONSTRUCTION
AND
PHASE #4 SEWER SYSTEM INVESTIGATIONS**

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Phase #3 Sewer Manhole Rehabilitations		
Design and Preparations of Documents	May 2015	July 2015
Bid & Award	July 2015	August 2015
Construction of Sewer Rehabilitations	August 2015	December 2015
Re-Test and Warranty Inspection		Spring 2016
Phase #4 Sewer System Investigations		
Manhole Inspections	May 2015	July 2015
Cleaning & TV Inspection	May 2015	August 2015
Review & Analysis of Data	September 2015	December 2015
Final Report Submittal		February 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-17-3-928

TOWN OF LEXINGTON

**ADDITIONAL COST FOR CONSTRUCTION OF SEWER & MANHOLE
REHABILITATIONS IN PHASE 5 AREA (SEWER BASINS 4, 5 & 14)
AND ENGINEERING SERVICES DURING CONSTRUCTION**

SCOPE OF SERVICES

The Scope of Work for the Construction of Sewer & Manhole Rehabilitations in Phase 5 Area (Sewer Basins 4, 5 & 14) has been significantly expanded from that presented under MWRA Project #WRA-P9-17-916. The expanded Scope of Work includes a Base Bid and an Alternate Bid.

The Base Bid is as follows: replacement of 470 linear feet of gravity sewer; 2,890 linear feet of heavy cleaning and television inspection; 5,811 linear feet of cleaning, inspection, testing, and sealing; 313 vertical feet of cementitious manhole lining; raise 4 manholes to grade; raise 2 manholes two-feet above grade; 45 linear feet of cured-in-place short liner; 48 linear feet of structural cured-in-place short liner; 7,277 linear feet of cured-in-place pipe; 199 linear feet of structural cured-in-place pipe; testing and sealing of 20 service connections; cutting of 20 protruding service connections; 67 linear feet of open cut point repair; and other related tasks and appurtenances.

The Alternate Bid is as follows: 640 linear feet of heavy cleaning and television inspection; 4,201 linear feet of cleaning, inspection, testing, and sealing; 466 vertical feet of cementitious manhole lining; 48 linear feet of cured-in-place short liner; 18 linear feet of structural cured-in-place short liner; 2,072 linear feet of cured-in-place pipe; testing and sealing of 25 service connections; cutting of 3 protruding service connections; installing 1 lateral liner; and other related tasks and appurtenances.

The cost of the Engineering Services During Construction has also been included for funding.

PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Total Cost</u>	<u>Eligible Cost</u>
Sewer & Manhole Rehabilitations in Phase 5 Area Construction	\$ 1,500,000	\$ 1,500,000
Engineering Services During Construction	\$ 65,000	\$ 65,000
Total Project Cost	\$ 1,565,000	\$ 1,565,000

The funding sources for the Eligible Cost are as follows:

Total Eligible Project Cost:	\$ 1,565,000.00
Portion of Phase 9 Allotment: (WRA-P9-17-3-916)	\$ 586,000.00
Phase 10 Funding Allotment:	\$ 979,000.00

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-17-3-928

TOWN OF LEXINGTON

**ADDITIONAL COST FOR CONSTRUCTION OF SEWER & MANHOLE
REHABILITATIONS IN PHASE 5 AREA (SEWER BASINS 4, 5 & 14)
AND ENGINEERING SERVICES DURING CONSTRUCTION**

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer & Manhole Rehabilitations in Phase 5 Area		
Design and Preparations of Documents	February 2015	July 2015
Bid & Award	July 2015	August 2015
Construction of Sewer Rehabilitations	September 2015	December 2015
Re-Test and Warranty Inspection		Spring 2016

ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-19-3-927
CITY OF MEDFORD

PROJECT #1: SEWER SYSTEM REHABILITATION PROGRAM ONGOING 3 YEAR CONTRACT

PROJECT #2: NORTH MEDFORD SEWER SYSTEM EVALUATION SURVEY (SSES) – PHASE 2

PROJECT #3: REMOVAL OF CATCH BASIN INFLOW IN NORTH MEDFORD

PROJECT #4: MINI-SYSTEM P SSES – PHASE 2 STUDY, DESIGN, BIDDING OF SEWER REHABILITATIONS

PROJECT #5: ENGINEER INTERN SERVICES DURING STUDY DESIGN AND CONSTRUCTION INSPECTION

SCOPE OF SERVICES

Project #1: Sewer System Rehabilitation Program Ongoing 3 Year Contract The City currently has a 3 Year Task Order Contract with D'Allessandro Corp. for performing sewer rehabilitations throughout the City. The first year of this contract is ending with Year 2 starting in August 2015 and Year 3 in August 2016. Funds are being allotted for the completion of Year 1 (\$180,006), all of Year 2 (\$616,000) & Year 3 (\$646,584) and engineering services during construction for Year 2 & 3. The rehabilitation will include the sewer and manhole rehabilitation work as shown in Tables 1 & 2 of Section 01010 Summary of Work of the Contract Specifications. This work will include: installation of cured-in-place manhole-to-manhole pipe liners; dig & replace sewer pipes; replacing of manholes; cementitious lining of manholes; various manholes repairs (corbel, bench & trough); replacing manhole frames & covers; all other related tasks and appurtenances

Project #2: North Medford SSES – Phase 2 This Project will identify defects in the sewer system that contribute to infiltration and inflow (I/I). Under this Phase 2 the following investigations will be performed: smoke/dyed-water testing (50,000 lf) in those sub-basins not tested during the Phase 1 SSES which are sub-basins A2, C, E, F, G & H; manhole inspections (208) in sub-basins A1, A2, B, D, E, F, G & H; nighttime flow isolation (120,000 lf) in sub-basins A1, A2, D, E, F, G & H; TV inspection (20,000 lf) in sub-basins with high infiltration rate from the flow isolation; preparing draft and final report on the results of the field work which will include cost-effectiveness analysis and recommendations for sewer rehabilitation.

Project #3: Removal of Catch Basin Inflow in North Medford This Project involves the design and construction for the removal of Inflow from six (6) catch basins that currently discharge to the sewer system in the Heights area of North Medford. For 3 catch basins located in the Mangles St area, approx. 600 l.f. of storm drain will be constructed to an existing drain manhole on Wilson St. For 2 catch basins in the Taft/Guild St area, a new storm drain will be constructed. The catch basin located over an open sewer pipe in Morrison St will be removed; the sewer pipe repaired and a new catch basin with storm drain connected to a new manhole in Clematis Rd. will be installed

Project #4: Mini-System P SSES-Phase 2 Study, Design, Bidding of Sewer Rehabilitations For the SSES Phase 2, flow isolation (40,000 lf), manhole inspections (104) and television inspection (16,000 lf) will be conducted in sub basins P-3 & P-4. A draft and final report will be prepared on the results of the field work which will include cost-effectiveness analysis and recommendations for sewer rehabilitation. For the sewer rehabilitations design & bidding, contract documents will be prepared based on the recommendations from the "Sewer System Evaluation Survey of Mini-System P" Report dated June 2014.

Project #5 Engineering Intern As has been the practice in the past, the City employs an Engineering Intern during the summer months to assist in the ongoing sewer rehabilitation program. This work will include but not be limited to: overseeing sewer construction and rehabilitation; review of ongoing study reports; project design for sewer rehabilitations and overall sewer rehabilitation project status reports.

SUMMARY OF PROJECT COSTS

	Total Cost	Eligible Cost
Sewer System Rehabilitation Program Ongoing 3 year Contract	\$ 1,467,590	\$ 1,409,892
North Medford SSES – Phase 2	\$ 199,764	\$ 191,910
Removal of Catch Basin Inflow in North Medford	\$ 715,625	\$ 687,490
Subsystem P SSES – Phase 2 Study, Design, Bidding of Sewer Rehabilitations	\$ 140,764	\$ 135,230
Engineering Intern	\$ 16,000	\$ 15,371
TOTAL PROJECT COST	\$ 2,539,743	\$ 2,439,893

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-19-3-927

CITY OF MEDFORD

PROJECT #1: SEWER SYSTEM REHABILITATION PROGRAM ONGOING 3 YEAR CONTRACT

PROJECT #2: NORTH MEDFORD SEWER SYSTEM EVALUATION SURVEY (SSES) – PHASE 2

PROJECT #3: REMOVAL OF CATCH BASIN INFLOW IN NORTH MEDFORD

PROJECT #4: MINI-SYSTEM P SSES – PHASE 2 STUDY, DESIGN, BIDDING OF SEWER REHABILITATIONS

PROJECT #5: ENGINEER INTERN SERVICES DURING STUDY DESIGN AND CONSTRUCTION INSPECTION

PROJECT SCHEDULE

<u>Description of Project</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer System Rehabilitation Program Ongoing 3 Year Contract		
Year 1	August 2014	July 2015
Year 2	August 2015	July 2016
Year 3	August 2016	July 2017
North Medford Sewer System Evaluation Survey – Phase 2	September 2015	June 2016
Removal of Catch Basin Inflow in North Medford		
Design	August 2015	October 2015
Bid & Award	October 2015	November 2015
Construction	December 2015	October 2016
Mini-System P SSES-Phase 2 Study, Design & Bidding of Sewer Rehabilitations	September 2015	May 2016
Engineering Intern	Summer 2015	Summer 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-33-3-925

TOWN OF WAKEFIELD

**LAKEVIEW AVENUE, PLAZA ROAD & SPAULDING STREET PUMP STATIONS
REPLACEMENT CONTRACT #2015-07**

SCOPE OF SERVICES

Under this Contract the two (2) sewage pump stations located at Lakeview Avenue and Plaza Road will be completely replaced and the sewage pump station at Spaulding Street will be rehabilitated. These three (3) pump stations are currently pneumatic ejector stations. Each of these pump stations has long experienced Infiltration into the pumping chamber and have sump pumps that discharge directly to the sewer system.

The rehabilitation work associated with the I/I removal will eliminate the sump pump connections and mitigate the Infiltration entering the sewer system. For the Lakeview Avenue and Plaza Road pump stations, a new wet well will be installed and the old station removed. For the Spaulding Street pump station, the existing pumping chamber will be rehabilitated using an internal liner and will be converted to a wet well.

The eligible cost associated with the installation of the two (2) wet wells is \$150,000 each. The eligible cost associated with the rehabilitation of the existing pumping chamber is \$50,000. The Total Eligible Cost is \$350,000.

At this time, the Town is only utilizing the remaining funding from the Town's Phase 8 Funding Allotment.

The Town intends to apply for the remaining eligible cost of \$227,900 under the Town's Phase 9 Allotment once the required Town Meeting Article is approved and the Town submits a Financial Assistance Application.

ESTIMATED PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Cost (As-Bid)</u>	<u>Eligible Cost</u>
Pump Station Replacements Contract #2015-07	\$1,172,000	\$350,000

Note: Only \$122,100 is being funded at this time.

**MWRA I/ LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-33-1-922

TOWN OF WAKEFIELD

**LAKEVIEW AVENUE, PLAZA ROAD & SPAULDING STREET PUMP STATIONS
REPLACEMENT CONTRACT #2015-07**

PROJECT SCHEDULE

<u>General Description of Work Performed</u>	<u>Start Date</u>	<u>Completion Date</u>
Contract Bidding & Award	May 2015	July 2015
Contract Construction	August 2015	February 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-42-3-929

TOWN OF WINTHROP

**DESIGN & CONSTRUCTION OF SEWER REPLACEMENT & SPOT REPAIRS
ASSOCIATED WITH CONTRACT 4 – WATER MAIN IMPROVEMENTS**

SCOPE OF SERVICES

As part of the recently bid “Contract 4 – Water Main Improvements (May 2015)” Project, the Town will be replacing or performing spot repairs in the existing sewer in portions of Beacon Street, Crystal Avenue, Faunbar Avenue, Harbor View Avenue, Plummer Avenue, Prospect Avenue, Sunnyside Avenue & Terrace Avenue. This work includes the replacement of approximately 1,160 linear feet of 8-inch diameter sewer and associated manholes and 12 spot repairs in 8-inch diameter sewers ranging in length from 10 to 50 linear feet. Sewer service laterals in the area where sewer main replacement and spot repair is performed will be replaced from the sewer main to the property line to maximize the reduction of I/I. Final curb-to-curb reclaiming and paving along with concrete sidewalk replacement will be performed in the area where sewer replacement and spot repairs are made. This work will be conducted as part of Contract 4 – Final Paving and Sidewalk Improvements Project.

The cost of the design, bid & award services and engineering services during construction of the sewer replacement and spot repairs is also included for funding.

Since this sewer replacement project is located on busy thoroughfares, a significant amount of Police Details will also be required.

SUMMARY OF ESTIMATED PROJECT COST

<u>Description of Task</u>	<u>Total Cost</u>	<u>Eligible Cost</u>
Design, Bid & Award of Contract 4	\$ 193,000	\$ 46,000
Construction Administration Services/Inspection	\$ 69,062	\$ 10,862
Construction of Sewer, Water & Drain Improvements	\$ 3,789,484	\$ 499,820
Force Account (including Police)	\$ 125,300	\$ 13,500
TOTAL ESTIMATED PROJECT COST	<u>\$ 4,176,846</u>	<u>\$ 570,182</u>

**MWRA I/ LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-42-3-929

TOWN OF WINTHROP

**DESIGN & CONSTRUCTION OF SEWER REPLACEMENT & SPOT REPAIRS
ASSOCIATED WITH CONTRACT 4 – WATER MAIN IMPROVEMENTS**

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Design of Sewer Replacement & Spot Repairs	April 2015	May 2015
Bid & Award of Contract 4 - Water Main Improvements	May 2015	June 2015
Construction of Contract 4 - Water Main Improvements	July 2015	February 2016
Bid & Award of Contract 4 - Final Paving & Sidewalk	July 2015	August 2015
Construction of Contract 4 – Final Paving & Sidewalk	August 2015	June 2016

MWRA I/I Local Financial Assistance Program Funding Summary

November 2015 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Everett	\$ 700,000
Newton	\$ 3,668,000
Reading	\$ 71,000
Stoneham	\$ 814,000
Watertown	\$ 530,000
Total	\$ 5,783,000

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9

ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-13-3-932
CITY OF EVERETT

DESIGN & CONSTRUCTION OF SEWER REPLACEMENT IN HENDERSON, OTIS & BOW ST;
FREMONT AVENUE DRAINAGE SEPARATION;
DESIGN & CONSTRUCTION OF SEWER & DRAIN REPLACEMENT IN ORIENT AVENUE

SCOPE OF SERVICES

Design & Construction of Sewer Replacement in Henderson, Otis & Bow St. Internal TV Inspection performed in these sewers indicated numerous areas of fractured, broken, crushed pipe and significant sags such that the only method of rehabilitation was complete replacement. This project involves the design and construction for the replacement of approximately 1,100 linear feet (l.f.) of 8" pipe and manholes. The specific locations and approximate lengths are: Henderson St – 370 l.f.; Otis St – 330 l.f.; Bow St. – 400 l.f. The close proximity of the existing 18" storm drain in Henderson St to the existing sewer also requires its replacement which involves 275 l.f. of 18" pipe, 4 manholes, 4 catch basins and all appurtenances.

Fremont Avenue Drainage Separation During the roadway reconstruction contract which involved the reconstruction of Fremont Avenue, two (2) catch basins (one at the Chelsea City line & one at the intersection of Lincoln St & Fremont Ave) were found to be connected to the sewer system. The City directed the contractor to install a 10" PVC pipe along Fremont Ave from the catch basin at the Chelsea Line to Lincoln St to the existing storm drain on Harvard St (a length of 626 l.f.). This work also involved the replacement of 1 catch basin and the installation of 2 manholes and all appurtenances.

Design & Construction of Sewer Replacement in Orient Avenue Internal TV Inspection performed in the sewer segments on this street indicated numerous areas of fractured, broken, crushed pipe and significant sags such that the only method of rehabilitation was complete replacement. This project involves the design and construction for the replacement of approximately 590 (l.f.) of 8" pipe and manholes. The close proximity of the existing 12" storm drain in Orient Avenue to the existing sewer also requires its replacement which involves 550 l.f. of 12" pipe, manholes, catch basins and all appurtenances.

This project will also include engineering services for the construction phase including field and office services.

PROJECT COST SUMMARY

<u>DESCRIPTION OF WORK</u>	<u>TOTAL COST</u>
Design & Construction of Sewer Replacement in Henderson, Otis & Bow St.	
Design, Prepare Bid Documents & Bidding	\$ 34,500
Construction of Sewer Replacement	\$ 356,375
Engineering Services During Construction	\$ 56,800
Construction of Fremont Avenue Drainage Separation	\$ 91,000
Design & Construction of Sewer & Drain Replacement in Orient Ave.	
Design, Prepare Bid Documents & Bidding	\$ 10,200
Construction of Sewer Replacement	\$ 350,000
Engineering Services During Construction	\$ 68,900
Estimated Project Cost	<u>\$ 967,775</u>

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P9-13-3-932
CITY OF EVERETT**

**DESIGN & CONSTRUCTION OF SEWER REPLACEMENT IN HENDERSON, OTIS & BOW ST;
FREMONT AVENUE DRAINAGE SEPARATION;
DESIGN & CONSTRUCTION OF SEWER & DRAIN REPLACEMENT IN ORIENT AVE**

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer Replacement in Henderson, Otis & Bow St		
Design	September 2014	February 2016
Bid & Award	February 2016	April 2016
Construction	April 2016	December 2016
Construction of Fremont Ave Drainage Separation	October 2014	December 2014
Sewer & Drain Replacement in Orient Avenue		
Design	May 2014	November 2014
Bid & Award	November 2014	July 2015
Construction	July 2015	December 2015

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-24-3-924

CITY OF NEWTON

CONSTRUCTION OF THE CIP PROJECTS 3 & 4 SEWER REHABILITATIONS

SCOPE OF SERVICES

This sewer rehabilitation project is a result of previous sewer investigation work performed under the "CIP – Project 3 Inspection and Assessment" Final Report dated January 6, 2015 and the "CIP – Project 4 Inspection and Assessment" Final Report dated February 19, 2015.

The design for this project was funded under MWRA Project #WRA-P9-24-3-904.

This construction project will include the rehabilitation/repair of the defects found in the sanitary sewer subareas B001, B002, B003, B004, B011, B012, B013, B027, B044, B045, B046, B047, B048, B049, B050, B051, B052 and B074. This sewer rehabilitation project includes a Base Bid and an Alternate Bid.

The approximate scope of the work of the Base Bid includes but is not necessarily limited to: open cut repair of sewers at 39 locations; chemical root treatment of 23,419 linear feet (lf) of sewer and 66 manholes; installation of 33 lf of cured-in-place short liners; installation of 12 lf of structural cured-in-place short liners; 51,938 lf of cured-in-place pipe and reinstatement of 514 service connections; 15,375 lf of structural cured-in-place pipe and reinstatement of 187 service connections; installation of 9 cured-in-place lateral liners; cutting of 35 protruding service connection; inspecting, testing, and grouting of 20 service connections; cementitious lining of 4,740 vertical feet (vf) of manholes; installation of 38 manhole frames and covers; building eight (8) manhole benches and inverts; installation of 144 manhole inflow dishes; installation of 47 vf of internal drop connections; grouting to stop leaks at 69 manholes; installing one (1) plug in storm drain pipe in sewer manhole B001-13; installing two (2) plugs in manhole B001-5 to abandon upstream sewer; redirecting of two (2) underdrain access ports; sealing of 27 underdrain access ports; sealing of four (4) underdrain inverts; sealing cavern and redirecting access port at five (5) locations; cleaning and inspection of 9,785 lf of sewer; and post construction flow evaluation of 67,313 lf of sewer.

The approximate scope of the work of Alternate Bid No. 1 includes but is not necessarily limited to: installation of 110 cured-in-place lateral liners and cutting of two (2) protruding service connections.

SUMMARY OF PROJECT COSTS

<u>Description of Task</u>	<u>Total Cost</u>	<u>Eligible Cost</u>
CIP Projects 3 & 4 Sewer Rehabilitations	\$6,812,500	\$3,220,504
Engineering Services During Construction	\$ 950,000	\$ 447,496
TOTAL PROJECT COST	\$7,762,500	\$3,668,000

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-24-3-924

CITY OF NEWTON

CONSTRUCTION OF THE CIP PROJECT 3 & 4 SEWER REHABILITATIONS

PROJECT SCHEDULE

<u>Description of Task</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid & Award	November 2016	January 2016
Construction of Sewer Rehabilitations	January 2016	January 2017
Re-test Warranty Inspection	October 2017	November 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9

ATTACHMENT A

FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-28-3-930

TOWN OF READING

**INTERNAL TV INSPECTION OF APPROXIMATELY 5,000 LF OF SEWER; DESIGN &
CONTRACT DOCUMENT PREPARATION FOR RECOMMENDED SEWER
REHABILITATIONS; INFLOW ELIMINATION AT VARIOUS LOCATIONS USING TOWN'S
ANNUAL ON-CALL CONTRACTOR**

SCOPE OF SERVICES

This project continues the Town of Reading's Infiltration/Inflow (I/I) identification and elimination program. The proposed work is primarily based on the recommendations from the August 2010 & November 2012 "Infiltration & Inflow Investigations" Report

The internal TV inspection of the approximately 5,000 lf of sewer includes those sewers which were not inspected under the subject reports. These sewers are located in the following streets: Scotland Rd (2,300 lf); Sigby Ave (320 lf); Countryside Lane (215 lf); Louganis Drive (204 lf); Indian Tree Lane (587 lf); Curtis St (461 lf); Sturges Rd (1,052 lf).

The design & preparation of Contract Documents for the recommended sewer rehabilitations primarily involves the cured-in-place pipelining (CIPPL) of approximately 24,500 lf of sewer as shown in Table 3 of the April 2, 2015 Memorandum from CDM Smith to the Town and Tables 6-3 & 6-4 of the November 2012 Report. The design will potentially include any of those Inflow sources not removed under this funding distribution. See below for further details.

Also included under this funding distribution will be the engineering services to be provided during the bidding & award of the sewer rehabilitation contract that will be utilizing the Town's Phase 9 Funding Allotment.

In the August 2010 Report (Table 5-4) and November 2012 Report (Table 6-2), there were various Inflow sources identified. These Inflow sources consisted of 19 manhole frame seals, 4 catch basins, 3 roof leaders, 1 sump pump, 2 driveway drains, 1 yard drain & 1 floor drain. Under this funding distribution, the Town's annual on-call Contractor will be removing as many of these sources within the designated amount of \$53,000. The elimination of the remaining Inflow sources will be included in the design work previously stated.

PROJECT COST SUMMARY

<u>Task</u>	<u>Estimated Cost</u>
Internal TV Inspection	\$ 18,500
Design, Preparing of Contract Documents & Bidding	\$ 149,500
Elimination of Inflow Sources	\$ 53,000
Total Estimated Cost	<u>\$ 221,000</u>

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-28-3-930

TOWN OF READING

**INTERNAL TV INSPECTION OF APPROXIMATELY 5,000 LF OF SEWER; DESIGN
& CONTRACT DOCUMENT PREPARATION FOR RECOMMENDED SEWER
REHABILITATIONS; INFLOW ELIMINATION AT VARIOUS LOCATIONS USING
TOWN'S ANNUAL ON-CALL CONTRACTOR**

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Internal TV Inspections	November 2015	December 2015
Design, Preparing of Contract Documents & Bidding	November 2015	February 2016
Elimination of Inflow Sources	November 2015	May 2016

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-31-3-931

TOWN OF STONEHAM

PLANNING & DESIGN OF PHASE 6 SEWER SYSTEM I/I REHABILITATIONS
&
CONSTRUCTION OF PARK STREET AREA SEWER REPLACEMENT & REHABILITATION

SCOPE OF SERVICES

Planning & Design of Phase 6 Sewer System I/I Rehabilitations Under the planning phase, investigations will be conducted which will consist of cleaning & CCTV inspection of approximately 40,000 lf of 6-inch to 15-inch diameter sewers and inspection of approximately 250 sewer manholes. Also, prior studies, reports and inspection data performed throughout the Town's sewer system will be reviewed with Town officials and evaluated to determine the sewer rehabilitations to be included under Phase 6 Sewer System I/I Rehabilitations Project. Consequently, the sewer rehabilitation work will be located in multiple areas throughout the Town.

During final planning & design, recommendations from previous investigations and current inspection will be reviewed holistically and final rehabilitation recommendations will be made based on the severity of defects, their associated I/I contribution, and the cost effectiveness of rehabilitation for I/I removal. Rehabilitation methods will consist primarily of cured-in-place pipe lining, but may also include: testing and sealing of pipe joints and service connections, cured-in-place spot repairs, and open cut excavation repairs. Manhole rehabilitation methods may include lining manhole chimneys; chemical sealing of walls and joints, pipe connections, and bench and invert; as well as mono-lining and epoxy lining of manholes.

Construction of Park Street Sewer Replacement & Rehabilitation This project consists of the replacement and rehabilitation of 10-inch to 12-inch diameter sewer in the area of Park Street which includes the cured-in-place pipe lining (CIPPL) of approximately 1,540 l.f. of sewer in Katherine Road and a portion of Park Street and the replacement of approximately 1,760 l.f. of sewer in easements parallel to Park Street between Marble Street and Maple Street.

PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Estimated Cost</u>
Phase 6 Sewer System I/I Rehabilitations	
Investigations	\$ 189,300
Final Planning & Design	\$ 55,100
Park St Area Sewer Replacement & Rehabilitation	
Construction	\$ 950,000
TOTAL ESTIMATED PROJECT COST	<u>\$ 1,194,400</u>

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-31-3-931

TOWN OF STONEHAM

PLANNING & DESIGN OF PHASE 6 SEWER SYSTEM I/I REHABILITATIONS
&
CONSTRUCTION OF PARK STREET AREA SEWER REPLACEMENT &
REHABILITATION

PROJECT SCHEDULE

<u>Milestone</u>	<u>Start Date</u>	<u>Completion Date</u>
Phase 6 Sewer System I/I Rehabilitations		
Investigations	November 2015	March 2016
Final Planning & Design	March 2016	July 2016
Park St Area Sewer Replacement & Rehabilitation	March 2016	October 2016

**MWRA /I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**PROJECT NO. WRA-P9-36-3-923
TOWN OF WATERTOWN**

**TV INSPECTION, DESIGN & CONSTRUCTION OF SEWER REHABILITATIONS IN:
1.) NICHOLS AVENUE & BOYLSTON STREET AREA; 2.) PORTIONS OF SUBSYSTEMS 7 & 8**

SCOPE OF SERVICES

The TV Inspection, design & construction of sewer rehabilitations in the Nichols Avenue & Boylston Street Area involves the sewer inspection and installation of approximately 2,800 linear feet of a cured-in-place pipe (CIPP) liner at various locations. The specific locations and approximate liner lengths are: Boylston St – 436 linear feet (l.f.) of 10-inch diameter; Nichols St – 101 l.f. of 10-inch diameter, 220 l.f. of 12-inch diameter & 1,178 l.f. of 15-inch diameter; Arlington St – 146 l.f. of 15-inch diameter; Dartmouth St – 145 l.f. of 8-inch diameter; easement (Nichols St to Dartmouth St) – 284 l.f. of 8-inch diameter; easement (Boylston St to School St) – 290 l.f. of 6-inch diameter.

The TV Inspection, design & construction of sewer rehabilitations in Subsystems #7 & 8 involves the sewer inspection and installation of approximately 3,345 l.f. of a CIPP liner and associated manhole rehabilitations at various locations. The specific locations and approximate liner lengths are: Edward Rd. – 616 l.f. of 8-inch diameter; Evans St. – 975 l.f. of 8-inch diameter; Gilbert St. – 595 l.f. of 8-inch diameter; Prescott St. – 604 l.f. of 8-inch diameter; Rutland St. – 555 l.f. of 8-inch diameter.

This funding distribution will also include engineering services for the construction phase including bid & award, field and office services.

PROJECT COST SUMMARY

<u>DESCRIPTION OF WORK</u>	<u>TOTAL COST</u>
Nichols Ave & Boylston St Area	
Engineering Study (internal TV Inspection, analysis & recommendations)	\$ 38,800
Design, Prepare Bid Documents & Bidding	\$ 21,200
Engineering Services During Construction of Rehabilitations	\$ 40,000
Construction of Nichols Ave & Boylston St Area CIPP	\$ 275,000
Portions of Subsystems 7 & 8	
Engineering Study (internal TV Inspection, analysis & recommendations)	\$ 45,000
Design, Prepare Bid Documents & Bidding	\$ 25,000
Engineering Services During Construction of Rehabilitations	\$ 45,000
Construction of Subsystems 7 & 8 Area CIPP	\$ 348,034
Estimated Project Cost	<u>\$ 838,034</u>

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-36-3-923
TOWN OF WATERTOWN

TV INSPECTION, DESIGN & CONSTRUCTION OF SEWER REHABILITATIONS IN:
1.) NICHOLS AVENUE & BOYLSTON STREET AREA; 2.) PORTIONS OF SUBSYSTEMS 7 & 8

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
TV Inspection of Sewers	November 2015	April 2016
Design of Sewer Rehabilitations	May 2016	July 2016
Bid & Award	July 2016	August 2016
Construction of Sewer Rehabilitations	September 2016	December 2016

MWRA I/I Local Financial Assistance Program Funding Summary

February 2016 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Arlington	\$ 1,000,000
Braintree	\$ 740,000
Everett	\$ 1,388,000
Hingham	\$ 300,000
Lexington	\$ 326,000
Stoughton	\$ 768,900
Wakefield	\$ 726,900
Wellesley	\$ 507,416
Weymouth	\$ 1,169,600
Woburn	\$ 268,300
Total	\$ 7,195,116

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9 & 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-01-3-937

TOWN OF ARLINGTON

TASK 1 – SEWER SYSTEM INVESTIGATION IN AREA #10

TASK 2 - CONSTRUCTION OF PHASE #8 SANITARY SEWER REHABILITATIONS

SCOPE OF SERVICES

Task 1 – Sewer System Investigation in Area #10. This Study will identify sources of Infiltration and Inflow (I/I) in Sewer Subareas D, AA, AX, AY & 37 but additional Subareas may be added prior to execution of the Draft Agreement.

The expected field work associated with this project will include, but not be limited to: conducting top side physical survey of approximately 300 sewer manholes for sources of I/I; conducting flow isolation of approximately 40,000 l.f. of sewer; cleaning and internal TV inspection of approximately 40,000 l.f. of sewer; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field work which will include a cost-effectiveness analysis and recommendations for sewer rehabilitation.

Task 2 – Construction of Phase #8 Sanitary Sewer Rehabilitations. This sewer rehabilitation project is a result of the I/I sources identified during previous Sewer System Investigation Planning Program (SSIPP) Studies. The sewer rehabilitation work is located in various portions of SSIPP Areas #1 through #9.

The sewer rehabilitation work will be based upon the limit of \$650,000. It is expected this scope of work will include but not be limited to: installing 10,000 linear feet (l.f.) of cured-in-place pipelining (CIPP); installing 1,000 l.f. of structural CIPP; root treatment of 3,829 l.f. of sewer and 2 manholes; cementitious lining of 600 vertical feet of manholes; testing & grouting of 43 service connections; reinstating & grouting service connections in cured-in-place pipe; open cut point repair at 5 locations with replacement of 3 service connections; installing 50 l.f. of short liners; installing 5 manhole inflow dishes; and other related tasks.

Engineering services provided during the construction of the sewer rehabilitations are also included.

SUMMARY OF PROJECT COSTS

Sewer System Investigation in Area #10	\$ 210,000
Construction of Phase #8 Sanitary Sewer Rehabilitations	\$ 650,000
Engineering Services During Construction of Phase #7 Sewer Rehabilitations	\$ 140,000
TOTAL ESTIMATED PROJECT COST	\$1,000,000

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9 & 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-01-3-937

TOWN OF ARLINGTON

TASK 1 – SEWER SYSTEM INVESTIGATION IN AREA #10

TASK 2 - CONSTRUCTION OF PHASE #8 SANITARY SEWER REHABILITATIONS

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer System Investigation in Area #10	March 2016	December 2016
Phase #8 Sanitary Sewer Rehabilitations	June 2016	May 2017
Re-testing & Warranty Inspection	March 2018	May 2018

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF BRAINTREE, MASSACHUSETTS
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 5
MWRA PROJECT NO. WRA-P9-06-3-941**

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community sewer subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Year 5 I/I Investigation - Study / Design / Bid & Award (Est. Cost = \$ 200,000)

1. Flow isolate as much as 47,000 LF of sewer in Braintree Sewer Subareas FR1 / MA1 / T2 to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum.
2. Clean, TV inspect, videotape and record as much as 47,000 LF of sewer in Braintree Sewer Subareas FR1 / MA1 / T2 . The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer. The inspection will be conducted in Spring 2016 when groundwater levels are typically at their highest.
3. Conduct a topside physical survey of as many as 300 sewer manholes in Braintree Sewer Subareas FR1 / MA1 / T2 to identify defects and I/I sources. A written log will be furnished for each manhole inspected.
4. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. [Study = \$145,000 / Design (with Bid & Award) = \$55,000]

Year 5 I/I Investigation - Construction / Construction Services (Est. Cost = \$ 540,000)

Construction plans and specifications (to remove excessive I/I identified during the above Year 5 I/I Investigation) will be developed and submitted, followed by rehabilitation construction. [Construction = \$450,000 / Construction Services = \$90,000]

Total project cost is estimated at \$740,000. Eligible MWRA I/I Local Financial Assistance is \$740,000. As a result of the above work, an estimated 0.40 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF BRAINTREE, MASSACHUSETTS
I/I INVESTIGATION AND REHABILITATION PROGRAM - YEAR 5
MWRA PROJECT NO. WRA-P9-06-3-941**

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Year 5 I/I Investigation / Rehabilitation:		
I/I Investigation and Reporting	March 2016	November 2016
Design	February 2017	April 2017
Bid and Award	May 2017	June 2017
Construction	July 2017	November 2017
Warranty Retesting	March 2018	March 2018

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-13-3-939

CITY OF EVERETT

TASK 1 – CATCH BASIN REDIRECTION PROJECT

TASK 2 – SEWER SYSTEM METERING PROJECT

SCOPE OF SERVICES

Task 1 – Catch Basin Redirection Project. This project involves the design, development of Contract Documents, assistance during bidding and construction for the redirection of 46 catch basins throughout the City which are presently discharging to the sewer system. This project will include the installation of approximately 7,000 l.f. of 12” – 36” diameter storm drain pipes. Catch basins and manholes as well as potential Best Management Practice design such as leaching catch basins, pervious pavement etc. will also be included. The work will also include TV inspection of approximately 10,000 lf. of 8” – 18” diameter sewers and inspection of approximately 60 manholes in the vicinity of the proposed storm drainage work. The specific location of the work is outlined in yellow in Table A-1 of the draft Engineering Agreement (a copy of which is attached).

Task 2 – Sewer System Metering Project. Under this project, continuous reading flowmeters will be installed at 10 locations throughout the City for a period of 12 weeks during the months of March, April & May 2016. The flow data from these flow meters along with the flow data from the MWRA Flowmeters located within the City will be collected and analyzed. Two (2) rain gages are also being installed. A draft and Final Report will be prepared on the analysis of the results of this Flowmetering Program.

SUMMARY OF PROJECT COSTS

<u>Description of Work</u>	<u>Estimated Cost</u>	<u>Eligible Cost</u>
Catch Basin Redirection Project		
Design & Bid/Award Services	\$ 355,200	\$ 355,200
Construction	\$ 3,359,000	\$ 946,650
Sewer System Metering Program	\$ 86,150	\$ 86,150
TOTAL ESTIMATED PROJECT COST	\$ 3,800,350	\$ 1,388,000

Table A-1 - Summary of Proposed Catch Basin Disconnections Program

Priority Level	Num.	Catch Basins Locations	Number of Cbs Disconnected	Connect to Existing Drain System		Estimated Inflow		Estimated Construction Cost	Potential BMP/LID
				Length (ft)	Pipe Size (in)	(cfs)	(MGD)		
Now	1	Hillside at Hillside and Hill Ave.	1	210	12	1,490.2	0.155	\$ 101,000	\$ -
	2	Webster St.	2	380	12	361.88	0.361	\$ 154,000	\$ 60,000
	3	Nichols at Baker Rd and Chatham Rd.	3	440	12	537.847	0.538	\$ 172,000	\$ -
	4	Harris St.	4	310	12	602.62	0.610	\$ 297,000	\$ -
	5	Adams Ave. (at Hwy Ave)	1	350	12	238.170	0.258	\$ 146,000	\$ -
	6	Estes St. (at Broadway)	2	370	12	288.170	0.293	\$ 143,000	\$ -
	7	Beacon St. at Main	2	120	12	722.676	0.723	\$ 46,000	\$ -
	8	Beaumont Court	2	N/A	N/A	206.556	0.207	\$ -	\$ 150,000
	9	Palm St. Area Sewer Separation	2	2,400	12-24	1807.190	1.807	\$ 1,145,000	\$ 100,000
	10	West St.	1	60	12	51.634	0.052	\$ 34,000	\$ -
	11	Winton St. at Harris St. and Oakes	3	970	12	414.072	0.413	\$ 366,000	\$ -
Subtotal:			33	6,100	5,431.896	5.432	\$ 2,606,000	\$ 510,000	
Soon	12	Paris St. Area Sewer Separation	12	3,600	12-36	4,337,256	4.337	\$ 2,550,000	\$ -
	13	Lewis St.	4	550	12	237,516	0.238	\$ 227,000	\$ -
	14	Hancock Pk.	1	N/A	N/A	165,229	0.165	\$ -	\$ 62,000
	15	Lynde St. (at Bow St.)	2	700	12	299,477	0.299	\$ 263,000	\$ -
	16	Revere St. (at Hillside)	2	20	12	277.190	0.277	\$ 29,000	\$ 125,000
	Subtotal:			21	14,400	5,266,668	5.267	\$ 3,059,000	\$ 190,000
Later	17	Chestnut St. (at Hillside and Hill Ave.)	2	460	12	196,209	0.196	\$ 191,000	\$ 50,000
	18	Winthrop St. at Tufts Ave.	1	220	12	134,248	0.134	\$ 90,000	\$ 50,000
	19	Linden St.	2	380	12	309,804	0.310	\$ 146,000	\$ 50,000
	21	Kenilworth St.	3	560	12	216,863	0.217	\$ 471,000	\$ -
	22	Clinton St. at Harris Ave.	2	430	12	413,072	0.413	\$ 362,000	\$ -
	23	Partridge Terrace	2	60	12	278.824	0.279	\$ 51,000	\$ -
	24	Webster St.	2	250	12	206,536	0.207	\$ 210,000	\$ -
	25	Ellsworth St.	1	400	12	82,614	0.083	\$ 336,000	\$ -
	26	Harris St.	2	30	12	216.863	0.217	\$ 42,000	\$ -
	27	Hampshire St.	4	360	12	473.032	0.473	\$ 303,000	\$ -
	28	Revere St.	1	270	12	175.556	0.176	\$ 185,000	\$ -
29	Hosier St. (at Campbell)	2	170	12	124.962	0.125	\$ 143,000	\$ -	
Subtotal:			24	3,100	2,860,523	2.861	\$ 2,530,000	\$ 150,000	
TOTAL:								\$ 8,205,000	\$ 650,000

- Included in the scope

¹Estimated inflow rate determined using Rational Method and DEP recommended (1-year 6 hour storm peak) rainfall intensity of 0.87 in/hr.

²Included construction cost with trench pavement

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-13-3-939

CITY OF EVERETT

TASK 1 – CATCH BASIN REDIRECTION PROJECT

TASK 2 – SEWER SYSTEM METERING PROJECT

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Design of Catch Basin Redirection Project	February 2016	August 2016
Construction of Catch Basin Redirection Project	September 2016	June 2017
Sewer System Metering Program	March 2016	December 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF HINGHAM, MASSACHUSETTS
FY16 I/I INVESTIGATION & REHABILITATION PROGRAM
MWRA PROJECT NO. WRA-P9-15-3-934**

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule as detailed in the FY16 Annual Town-Wide Sewer Investigation & Rehabilitation Report (MWRA Project No. WRA-P9-15-3-913). Project work will include, but not be limited to, the following:

1. Cleaning and inspecting of approximately 935 LF of sewer main;
2. Chemical root treatment of approximately 2357 LF of sewer main;
3. Cleaning, inspecting, testing and sealing of joints in approximately 8862 LF of sewer main;
4. Installing structural CIP pipe in approximately 1470 LF of sewer main;
5. Installing structural short liners at four (4) locations (Lincoln and North Streets);
6. Testing and grouting 29 service connections at their connection to the main sewer line;
7. Cutting protruding services at three (3) locations;
8. Installing lateral liners at four (4) locations;
9. Installing inflow dishes at five (5) locations;
10. Rehabilitating fifteen (15) sanitary manholes;
11. Repairing two (2) sanitary manhole chimneys; and
12. Replacing one (1) sanitary manhole frame & cover.

Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received January 15, 2016 and the Agreement For Engineering Services By And Between The Town of Hingham, MA And Weston & Sampson Engineers. Peak I/I reduction is estimated to be 0.05 mgd. Total project cost is estimated at \$331,000 (Rehabilitation Construction = \$281,000 / Construction Services = \$50,000). Eligible MWRA I/I Local Financial Assistance is \$300,000 (Rehabilitation Construction = \$281,000 / Construction Services = \$19,000).

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF HINGHAM, MASSACHUSETTS
FY16 I/I INVESTIGATION & REHABILITATION PROGRAM
MWRA PROJECT NO. WRA-P9-15-3-934**

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>FY16 Annual Sewer Program</u>		
Rehabilitation Construction	Winter 2016	Spring 2016
Rehabilitation Construction Retest	Spring 2017	Spring 2017

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-17-1-938

TOWN OF LEXINGTON

I/I INVESTIGATIONS IN PHASE 7 AREA (SEWER BASINS 8 & 12)

SCOPE OF SERVICES

I/I Investigations in Phase 7 Area This Study will identify and quantify sources of Infiltration and Inflow (I/I) in the sanitary sewer system in the Phase 7 Area (Sewer Basins 8 & 12). The expected field investigations will include, but not be limited to: conducting top side physical survey as many as 900 sewer manholes for sources of I/I; conducting flow isolation of as many as 130,750 l.f. of sanitary sewer; cleaning and internal TV inspection of as many as 152,300 l.f. of sewer; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field investigations which will include data analysis, cost-effectiveness analysis and recommendations for sewer rehabilitation along with preliminary design concepts.

PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Estimated Cost</u>
I/I Investigations in Phase 7 Area	\$ 485,000

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 10
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-17-1-938

TOWN OF LEXINGTON

I/I INVESTIGATIONS IN PHASE 7 AREA (SEWER BASINS 8 & 12)

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
I/I Investigations in Phase 6 Area		
Manhole Inspections	March 2016	May 2016
Flow Isolation	March 2016	May 2016
Cleaning & TV Inspection	March 2016	May 2016
Review & Analysis of Data	June 2016	August 2016
Report Preparation	September 2016	December 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**YEARS 1 / 2 I/I REHABILITATION - DESIGN / CONSTRUCTION
YEARS 3 / 4 I/I INVESTIGATION AND REPORTING - STUDY**

MWRA PROJECT NO. WRA-P9-32-3-935 *Stoughton*

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. This project begins a second round of a ten year annual I/I identification and removal program. The project area includes Stoughton Subareas 4 / 5 / 6 / 7 / 8 / 9 / 11. Project work will include, but not be limited to, the following:

1. **Years 1 / 2 I/I Rehabilitation Design:** Design cost-effective and value-effective sewer rehabilitations in Stoughton Subareas 5 / 6 / 8; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Estimated Design Services Cost = \$70,000). (Task Order No. 18)

2. **Years 1 / 2 I/I Rehabilitation Construction:** Construction of cost-effective and value-effective sewer rehabilitations in Subareas 5 / 6 / 8 and the performance of construction public bid/award/resident project representative services. Sewer rehabilitation work includes approximately: 12,700 LF of cleaning and television inspection; 4000 LF of heavy cleaning; 2900 LF of testing and sealing of joints; performing 1600 LF of chemical root treatment; installing 6800 LF of CIP pipe; installing short liners at 15 locations; installing structural CIP short liners at 3 locations; cutting 17 protruding service connections; grouting 19 service connections; inspecting 21 manholes; rehabilitating 91 manholes; and replacing/resetting 3 manhole frames and covers. (Estimated Construction Cost = \$741,000 / Estimated Construction Services Cost = \$110,000). (Task Order No. 18)

3. **Years 3 / 4 I/I Investigation and Reporting:** Review TV inspection videotapes of 76,000 LF of sewer and perform topside manhole inspections of 520 sanitary manholes in Stoughton Subareas 4 / 7 / 9 / 11. (Estimated Investigation Services Cost = \$87,700). (Task Order No. 16)

The above work will be performed pursuant to the terms and conditions detailed within Task Order Nos. 16 & 18 under the January 7, 2016 General Engineering Services Agreement By and Between the Town of Stoughton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received January 15, 2016.

Total project cost is estimated at \$1,008,700. (Design = \$70,000 / Construction = \$741,000 / Construction Services = \$110,000 / Investigation Services = \$87,700). Eligible MWRA I/I Local Financial Assistance is \$768,900 [unspent MWRA I/I financial assistance (\$239,800) from Stoughton Contract 15-1 (MWRA Project No. WRA-P9-32-3-902) will also be applied to this project]. As a result of the above work, an estimated 0.06 mgd of peak I/I will be removed from the collection system upon contract completion.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT

YEARS 1 / 2 I/I REHABILITATION - DESIGN / CONSTRUCTION
YEARS 3 / 4 I/I INVESTIGATION AND REPORTING - STUDY

MWRA PROJECT NO. WRA-P9-32-3-935

Stoughton

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Years 1 / 2 I/I Rehabilitation</u>		
Design	January 2016	April 2016
Design Review	April 2016	May 2016
Advertise	May 2016	May 2016
Bid Opening	June 2016	June 2016
Contract Award	June 2016	June 2016
Rehabilitation Construction	August 2016	December 2016
Warranty Retesting	April 2017	May 2017
<u>Years 3 / 4 I/I Investigation and Reporting</u>		
Manhole Inspections	March 2016	May 2016
TV Inspection Videotape Review	January 2016	July 2016
Data Review/Report Preparation	August 2016	October 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT
PROJECT NO. WRA-P9-33-3-933
TOWN OF WAKEFIELD**

LAKEVIEW AVE, PLAZA RD & SPAULDING ST PUMP STATION REPLACEMENTS (CONTRACT #2015-07); DEVELOPMENT OF A 15-YEAR ANNUAL SEWER INSPECTION & REHABILITATION PROGRAM; CONDUCT A YEAR 1 SEWER INVESTIGATION (TV INSPECTION OF SEWERS & MANHOLE INSPECTIONS); DESIGN & CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS FROM THE CY2014 & CY2015 SMOKE & DYE TESTING PROGRAMS

SCOPE OF SERVICES

Lakeview Ave, Plaza Rd & Spaulding St Pump Station Replacements (Contract #2015-07) The Scope of services for this project is the same as for MWRA Project #WRA-P9-33-3-925. The Town is receiving the additional funds not received under that project for the replacement/rehabilitation of the pump station wet wells.

Development of a 15-year Annual Sewer Inspection & Rehabilitation Program This task involves coordinating with the Town in developing an annual internal TV inspection program for the entire Town sewer system with the goal of inspecting approximately 60,000 linear feet of the sewer system annually taking into consideration the Town's paving program and proposed utility work. A brief Letter Report will present the recommended program.

Conduct a Year 1 Sewer Investigation This project includes cleaning & internally inspecting approximately 60,000 lf of sewer and manhole inspections of up to 300 manholes. A Letter Report will be prepared which will present the results of the field work; identify those sewer segments and manholes which appear to contribute excessive I/I; present specific conclusions and recommendations for sewer rehabilitations and associated cost that includes a cost-effectiveness analysis. The location of this work is throughout the Town as listed in the Table and shown on the Maps in Attachment 1 of the Application.

Design & Construction of Recommended Sewer Rehabilitations from the CY2014 & CY2015 Smoke Testing & Dye Testing Programs This project consists of the design, bid & award and construction associated with the recommended sewer rehabilitations. The approximate scope of work includes but is not necessarily limited to: cleaning & TV inspection of 300 l.f. of sewer; install 500 l.f. of cured-in-place pipe; install 4 l.f. of short liners; install 8 lateral liners; install 9 cleanout caps; install 1 manhole frame & cover; cementitious lining of 1 sewer manhole; redirect 1 catch basin, 4 driveway drains and 2 sump pumps; other related tasks and appurtenances.

ESTIMATED PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Total Cost</u>	<u>Eligible Cost</u>
Pump Station Replacements Contract #2015-07	\$1,169,000	\$336,900
Annual Sewer Inspection & Rehabilitation Program	\$ 10,500	\$ 10,500
Year 1 Sewer Investigation	\$ 141,000	\$141,000
Design of Recommended Sewer Rehabilitations	\$ 50,000	\$ 50,000
Construction of Recommended Sewer Rehabilitations	\$ 175,000	\$175,000
Police Details for Year 1 Sewer Investigations	\$ 13,500	\$ 13,500
Total Estimated Project Cost	\$1,559,000	\$726,900

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-33-3-933

TOWN OF WAKEFIELD

LAKEVIEW AVE, PLAZA RD & SPAULDING ST PUMP STATION REPLACEMENTS (CONTRACT #2015-07); DEVELOPMENT OF A 15-YEAR ANNUAL SEWER INSPECTION & REHABILITATION PROGRAM; CONDUCT A YEAR 1 SEWER INVESTIGATION (TV INSPECTION OF SEWERS & MANHOLE INSPECTIONS); DESIGN & CONSTRUCTION OF RECOMMENDED SEWER REHABILITATIONS FROM THE CY2014 & CY2015 SMOKE & DYE TESTING PROGRAMS

PROJECT SCHEDULE

<u>General Description of Work Performed</u>	<u>Start Date</u>	<u>Completion Date</u>
Pump Station Replacements (Contract #2015-07)	May 2016	May 2017
Annual Sewer Inspection & Rehabilitation Program	February 2016	February 2017
Year 1 Sewer Investigation	February 2016	May 2016
Design of Recommended Sewer Rehabilitations	February 2016	April 2016
Bid & Award of Recommended Sewer Rehabilitations	April 2016	June 2016
Construction of Recommended Sewer Rehabilitations	June 2016	June 2017

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

TOWN OF WELLESLEY, MASSACHUSETTS

**SEWER SYSTEM INSPECTION AND REHABILITATION
(CONTRACT NO. 13C-460-1482)**

**MARTIN ROAD SEWER MAIN REPLACEMENT
(CONTRACT NO. 15C-460-1523)**

MWRA PROJECT NO. WRA-P9-37-3-942

SCOPE OF SERVICES

Sewer System Inspection and Rehabilitation (Contract No. 13C-460-1482): Project rehabilitation consisted of cleaning and TV inspection of 33,975 linear feet (LF) of sewer; chemical root treatment of 18,132 LF of 8 to 12-inch sewer; testing 6775 joints and sealing/retesting 2655 joints; installing 50 LF of CIP short liners; and sealing 1002 vertical feet of manholes. Total project cost = \$462,052. An estimated 0.03 mgd of peak infiltration was removed from the community collection system.

Martin Road Sewer Main Replacement (Contract No. 15C-460-1523): Project rehabilitation work consisted of the replacement of 235 LF of existing 12-inch VC pipe with 12-inch PVC pipe. Additional work included removing and replacing all sewer chimney services connected to this sewer main. Work on Martin Road was located between Brookfield Circle and Cleveland Road. Total project cost = \$45,364. An estimated 0.01 mgd of peak infiltration was removed from the community collection system.

The above work was performed pursuant to the terms and conditions detailed within the approved MWRA I/I Local Financial Assistance Project Application received January 28, 2016. Total combined cost for both projects is \$507,416. Eligible MWRA I/I Local Financial Assistance is \$507,416. An estimated 0.04 mgd of peak infiltration was removed from the community collection system.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

TOWN OF WELLESLEY, MASSACHUSETTS

**SEWER SYSTEM INSPECTION AND REHABILITATION
(CONTRACT NO. 13C-460-1482)**

**MARTIN ROAD SEWER MAIN REPLACEMENT
(CONTRACT NO. 15C-460-1523)**

MWRA PROJECT NO. WRA-P9-37-3-942

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Sewer System Inspection and Rehabilitation</u> (Contract No. 13C-460-1482)		
Sewer Inspection/Rehabilitation	August 2012	August 2015
<u>Martin Road Sewer Main Replacement</u> (Contract No. 15C-460-1523)		
Sewer Rehabilitation	August 2015	October 2015

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WEYMOUTH, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION PROGRAM
MWRA PROJECT NO. WRA-P9-39-3-940**

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Town-Wide Sewer Investigation & Rehabilitation Program - Year 5: (Est. Cost = \$185,000)

1. Flow isolate as much as 50,000 LF of sewer in Subareas B-1 and B-4 to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum.
2. Light clean, TV inspect, videotape and record as much as 50,000 LF of sewer in Subareas B-1 and B-4. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer. The inspection will be conducted in Spring 2016 when groundwater levels are typically at their highest.
3. Conduct topside physical survey of as many as 250 sewer manholes in Subareas B-1 and B-4 for defects and I/I sources. A written log will be furnished for each manhole inspected.
4. Prepare a letter report that details areas in which work was performed, summarizes work completed to date and includes recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. Estimated construction costs will also be provided.

2016 Sewer System Infiltration Rehabilitation - Design/Construction: (Est. Cost = \$987,200)

Project rehabilitation work [as identified in the Town's Year 4 I/I Investigation Report (MWRA Project No. WRA-P9-39-3-903)] will include, but not be limited to, the following: Clean/inspect/test and seal 21,200 LF of sewer; perform 2900 LF of heavy cleaning; perform 5200 LF of root treatment; install short liners at 61 locations; install 3300 LF of CIP pipe; rehabilitate 61 manholes; grout 60 service connections; install 2 lateral liners; install 4 manhole inflow dishes; and TV inspect 2300 LF of sewer. Project work will be performed in Subareas C-3 / D-1-1.

Total project cost is estimated at \$1,172,200. Eligible MWRA I/I Local Financial Assistance is \$1,169,600. Project work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application (received January 22, 2016) and the Agreements For Engineering Services By And Between The Town of Weymouth, MA And Weston & Sampson Engineers, Inc. As a result of the above work, an estimated 0.18 mgd of peak I/I will be removed from the collection system upon contract completion.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WEYMOUTH, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION PROGRAM
MWRA PROJECT NO. WRA-P9-39-3-940**

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Town-Wide Sewer Investigation & Rehabilitation Program - Year 5:		
Flow Isolation	March 2016	May 2016
TV Inspection	March 2016	May 2016
Manhole Inspection	March 2016	May 2016
Data Review / Letter Report	June 2016	November 2016
2016 Sewer System Infiltration Rehabilitation:		
Design	February 2016	April 2016
Bid and Award	May 2016	May 2016
Construction	July 2016	October 2016
Warranty Retesting	May 2017	May 2017

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-43-1-936

CITY OF WOBURN

SEWER INVESTIGATION & EVALUATION IN CIP PROJECT 4 AREA

SCOPE OF SERVICES

This Project will identify sources of infiltration and inflow (I/I) in Sewer Mini-systems ES-07, ES-10, ES-11 and ES-12. The field work associated with this project will include, but not be limited to: conducting top side physical survey of approximately 252 sewer manholes for sources of I/I; conducting flow isolation in as much as 38,328 l.f. of sewer; cleaning and internal TV inspection of approximately 56,610 l.f. of sewer; providing as many as 60 hours of heavy cleaning; updating of sewer mapping/GIS database; preparing draft and final report on the results of the field work which will include preliminary design recommendations; design cost and preliminary construction cost estimates and schedule; cost-effectiveness analysis and recommendations for sewer rehabilitation.

PROJECT COST SUMMARY

<u>Description of Task</u>	<u>Estimated Cost</u>
Sewer Investigation & Evaluation in CIP Project 4 Area	\$ 268,998

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM – PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-43-1-936

CITY OF WOBURN

SEWER INVESTIGATION & EVALUATION IN CIP PROJECT 4 AREA

PROJECT SCHEDULE

<u>Milestone Description</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer Investigation & Evaluation in CIP Project 4 Area	January 2016	March 2017

MWRA I/I Local Financial Assistance Program Funding Summary

May 2016 Funding Cycle

<u>Community</u>	<u>Funding Allocation</u>
Burlington	\$ 918,000
Chelsea	\$ 1,319,000
Dedham	\$ 913,000
Milton	\$ 485,000
Quincy	\$ 755,000
Westwood	\$ 666,000
Winthrop	\$ 427,000
Total	\$ 5,483,000

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-08-3-947

TOWN OF BURLINGTON

**CONSTRUCTION OF SEWER REHABILITATIONS DOWNSTREAM OF TERRACE
HALL FORCE MAIN DISCHARGE**

SCOPE OF SERVICES

The objective of this project is to rehabilitate sewer infrastructure (sewer pipes & manholes) that have been severely damaged by hydrogen sulfide corrosion compromising its integrity and allowing infiltration into the gravity sewer and manholes downstream of the Terrace Hall Pumping Station Force Main discharge.

The expected sewer rehabilitation work will consist of the following: cement & epoxy-line 11 manholes on South Bedford St; replace 11 manholes on Wayside Road; installing approximately 2,600 l.f. of cured-in-place 24" diameter manhole-to-manhole pipe liner in the easement between Cambridge Street and Heritage Way; cement & epoxy-line the 10 manholes in the same area. This sewer rehabilitation work will require the installation of an extensive temporary bypass system to handle the Terrace Hall Pumping Station wastewater flow. This cost is also included.

SUMMARY OF ESTIMATED PROJECT COST

<u>Description of Task</u>	<u>Total Cost</u>	<u>Eligible Cost</u>
Construction Administration Services/Inspection	\$ 176,900	\$ 92,088
Construction of Sewer Rehabilitations	\$ 1,623,100	\$ 844,925
TOTAL ESTIMATED PROJECT COST	<u>\$ 1,800,000</u>	<u>\$ 937,013</u>

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-08-3-947

TOWN OF BURLINGTON

**CONSTRUCTION OF SEWER REHABILITATIONS DOWNSTREAM OF TERRACE
HALL FORCE MAIN DISCHARGE**

PROJECT SCHEDULE

<u>Description of Task</u>	<u>Start Date</u>	<u>Completion Date</u>
Bid & Award	July 2016	August 2016
Construction of Rehabilitations	September 2016	November 2016
Re-test & Warranty Inspection	November 2017	November 2017

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-11-3-945

CITY OF CHELSEA

SHURTLEFF STREET UTILITY IMPROVEMENTS PROJECT

SCOPE OF SERVICES

This project is a construction project that involves the reconstruction/replacement of the water, sewer and storm drain infrastructure in Shurtleff Street between Broadway and Congress Avenue.

The eligible part of the larger project involves the replacement of the existing combined sewer, which is badly deteriorated, with a new sewer. A separate storm drain will also be constructed but it will be discharging to the existing downstream combined sewer until such time as a new storm drain can be constructed to replace the downstream combined sewer. Approximately 1,700 linear feet of sewer ranging in size from 8-inch to 18-inch will be installed. New sewer manholes along with the disconnection of all sewer services from the combined sewer and reconnection to the new sewer will also be included in this project.

The specific items of work that are eligible and their associated cost are detailed in the Project Cost Estimate dated April 27, 2016.

PROJECT COST SUMMARY

<u>DESCRIPTION OF WORK</u>	<u>TOTAL COST</u>	<u>ELIGIBLE COST</u>
Design Cost	\$ 19,000	\$ 19,000
Construction Services/Inspection	\$ 312,500	\$ 312,500
Construction	\$ 2,062,165	\$ 987,500
TOTAL PROJECT COST	<u>\$ 2,393,665</u>	<u>\$ 1,319,000</u>

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-11-3-945

CITY OF CHELSEA

SHURTLEFF STREET UTILITY IMPROVEMENTS PROJECT

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Design	December 2015	April 2016
Bid & Award	May 2016	July 2016
Construction	July 2016	June 2017

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

TOWN OF DEDHAM, MASSACHUSETTS

I/I REHABILITATION PROJECT

MWRA PROJECT NO. WRA-P9-12-3-943

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

Sewer rehabilitation work includes the installation of approximately 20,868 linear feet (LF) of cured-in-place (CIP) pipe within 8 to 24-inch sewer main; installation of 28 short liners (89 LF) within 8 to 24-inch sewer main; lining 1826 vertical feet of manholes; and CIP lining of 151 service connections. (Estimated Rehabilitation Construction Cost = \$1,572,150)

The above work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received April 15, 2016.

Total project cost is estimated at \$1,572,150. (Rehabilitation Construction Cost = \$1,572,150) Eligible MWRA I/I Local Financial Assistance is \$913,000 (Phase 10 Funding Allocation Limit). As a result of the above work, an estimated 0.80 mgd of peak infiltration will be removed from the collection system upon contract completion.

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Construction	March 2016	October 2016
Retesting	March 2017	April 2017

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT
TOWN OF MILTON, MASSACHUSETTS
YEAR 11 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION
YEAR 12 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-21-3-948

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. The project area includes Milton Subareas G-02A / G-03B / G-03D / G-08C / G-08D / G-09 / G-10B / G-11D / G-13B / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A / S-14. Project work will include, but not be limited to, the following:

1. **Year 11 Infiltration Rehabilitation Design:** Design cost-effective and value-effective sewer rehabilitations in Subareas G-08C / G-08D / G-10B / G-11D / G-13B / S-14; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. (Eligible Design Services Cost = \$70,000)

2. **Year 11 Infiltration Rehabilitation Construction (Milton Contract No. S16-1):** Construction of cost-effective and value-effective sewer rehabilitations in Subareas G-08C / G-08D / G-10B / G-11D / G-13B / S-14 and the performance of construction public bid/award/resident project representative services. Sewer rehabilitation work includes approximately: 10,758 LF of cleaning and television inspection; 9309 LF of testing and sealing of joints; performing 3401 LF of chemical root treatment; installing 5168 LF of CIP pipe; installing 112 LF of CIP short liners; installing lateral liners at 7 locations; cutting one protruding service connection; testing and grouting 47 service connections; rehabilitating 34 manholes; installing 13 manhole inflow dishes and replacing 6 manhole frames and covers. (Eligible Construction Cost = \$167,000 / Eligible Construction Services Cost = \$100,000)

3. **Year 12 I/I Investigation and Reporting:** Clean, TV inspect, videotape and record as many as 52,000 LF of sewer and perform topside manhole inspections of as many as 300 sewer manholes in Subareas G-02A / G-03B / G-03D / G-09 / G-16 / G-17 / G-19 / G-20 / S-01 / S-01A. (Eligible Investigation Services Cost = \$148,000)

The above work will be performed pursuant to the terms and conditions detailed within the March 7, 2016 Agreement(s) For Engineering Services By and Between the Town of Milton and Weston & Sampson Engineers, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received April 19, 2016.

Total project cost is estimated at \$997,000 (Design = \$70,000 / Construction = \$679,000 / Construction Services = \$100,000 / Investigation Services = \$148,000). Eligible MWRA I/I Local Financial Assistance is \$485,000 (Design = \$70,000 / Construction = \$167,000 / Construction Services = \$100,000 / Investigation Services = \$148,000). As a result of the above work, an estimated 0.04 mgd of peak infiltration will be removed from the collection system.

MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT
TOWN OF MILTON, MASSACHUSETTS
YEAR 11 INFILTRATION REHABILITATION - DESIGN / CONSTRUCTION
YEAR 12 I/I INVESTIGATION AND REPORTING - STUDY
MWRA PROJECT NO. WRA-P9-21-3-948

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Year 11 Infiltration Rehabilitation</u>		
Design	March 2016	May 2016
Design Review	May 2016	May 2016
Advertise	June 2016	June 2016
Bid Opening	June 2016	June 2016
Contract Award	July 2016	July 2016
Rehabilitation Construction	August 2016	December 2016
Warranty Retesting	March 2017	April 2017
<u>Year 12 I/I Investigation and Reporting</u>		
Investigation	March 2016	May 2016
Data Review/Report Preparation	July 2016	December 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF QUINCY, MASSACHUSETTS
I/I IDENTIFICATION PLAN / SEWER SYSTEM EVALUATION SURVEY**

MWRA PROJECT NO. WRA-P9-26-1-944

SCOPE OF SERVICES

Phase I - I/I Identification Plan: Develop an updated I/I Identification and Control Plan in accordance with MassDEP 314 CMR 12.04 (2). The Plan will detail ongoing, short- and long-term activities to identify and eliminate I/I sources. Specifically, the Plan will include a proactive inflow identification and control plan that will focus on the identification, disconnection and redirection of illegal private inflow sources. Additionally, the Plan will outline a phased plan to evaluate portions of the public sewer system, on a recurring basis, to document existing structural and O&M conditions and quantify I/I into the system.

Phase II / III - Sanitary Sewer Evaluation Survey (SSES) / Hydraulic Model:

1. Smoke Testing will be performed in up to 40,000 LF of sewer to identify segments of pipe with direct/indirect inflow sources. Smoke Testing will be conducted during periods of low groundwater and after sufficient time has elapsed from previous rainfall events.
2. Flow isolate up to 70,000 LF of sewer to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum.
3. Clean, TV inspect, videotape and record up to 75,000 LF of sewer. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer.
4. Conduct topside physical survey of up to 500 sewer manholes for defects and I/I sources. A written log will be furnished for each manhole inspected.
5. Prepare a SSES Summary Report that details areas in which the above work was performed, summarizes work completed to date and include recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. Estimated rehabilitation costs will also be provided. Also, develop a City-wide sewer system hydraulic model for critical lateral and interceptor sewers.

The above work will be performed pursuant to the terms and conditions detailed within the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received April 19, 2016. Total project cost is estimated at \$755,000 (I/I Identification Plan = \$75,000 / SSES = \$590,000 / Hydraulic Model = \$90,000). Eligible MWRA I/I Local Financial Assistance is \$755,000.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**CITY OF QUINCY, MASSACHUSETTS
I/I IDENTIFICATION PLAN / SEWER SYSTEM EVALUATION SURVEY**

MWRA PROJECT NO. WRA-P9-26-1-944

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
Phase I - I/I Identification Plan		
Identification Plan	Spring 2016	Winter 2016
Phase II / III - Sanitary Sewer Evaluation Survey (SSES) / Hydraulic Model		
Smoke Testing	Spring 2016	Spring 2016
Flow Isolation	Spring 2016	Summer 2016
TV Inspection	Spring 2016	Summer 2016
Manhole Inspection	Spring 2016	Summer 2016
SSES Summary Report	Summer 2016	Winter 2016
Hydraulic Model	Spring 2016	Winter 2016

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WESTWOOD, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION**

MWRA PROJECT NO. WRA-P9-38-3-949

SCOPE OF SERVICES

The purpose of this project is to identify and rehabilitate community subareas that contribute excessive I/I, evaluate rehabilitation options and rehabilitate the sewer system on a continuous set schedule. Project work will include, but not be limited to, the following:

1. Phase 1 - I/I Rehabilitation Design/Construction: Design cost-effective and value-effective sewer rehabilitations; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. Construct cost-effective and value-effective sewer rehabilitations and perform construction public bid/award/resident project representative services. Sewer rehabilitation work includes approximately: cleaning and television inspection of 20,000 LF of sewer main; installing 6332 LF of CIP pipe; and rehabilitating 15 sewer manholes (via cementitious sealing). Project work will be performed in the following areas: Pond Plain Road to Oak Street / Pond Street Fill-in Area / High Street to Oriole Road / Stanford Road to Sunrise Road. (Eligible Phase 1 Design/Construction Cost = \$575,750)

2. Phase 2 - I/I Investigation: Cleaning, TV inspection, videotaping and recording as many as 15,000 LF of sewer main and performing topside manhole inspections of as many as 75 sewer manholes. Project work will be performed in the following areas: School Street Area / Hartford Street Fill-in Area / Lake Shore Drive to High Street / Lake Shore Drive to Arcadia Road / Sycamore Drive to Arcadia Road. (Eligible Phase 2 Investigation Services Cost = \$90,250)

The above work will be performed pursuant to the terms and conditions detailed within the Agreement For The FY17 Infiltration Rehabilitation Program By and Between the Town of Westwood and Environmental Partners Group, Inc. and the approved MWRA Phase 9 I/I Local Financial Assistance Project Application received April 21, 2016.

Total project cost is estimated at \$666,000 (Phase 1 Design/Construction Cost = \$575,750 / Phase 2 Investigation Services Cost = \$90,250). Eligible MWRA I/I Local Financial Assistance is \$666,000. As a result of the above work, an estimated 0.04 mgd of peak infiltration will be removed from the collection system.

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

**TOWN OF WESTWOOD, MASSACHUSETTS
I/I INVESTIGATION & REHABILITATION**

MWRA PROJECT NO. WRA-P9-38-3-949

PROJECT SCHEDULE

<u>Item</u>	<u>Start Date</u>	<u>Completion Date</u>
<u>Phase 1 - I/I Rehabilitation Design/Construction</u>		
CCTV and Manhole Inspection	June 2016	August 2016
Rehabilitation Design	September 2016	October 2016
Rehabilitation Construction	October 2016	November 2016
<u>Phase 2 - I/I Investigation</u>		
Investigation	March 2017	May 2017

MWRA I/ LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT A
FINANCIAL ASSISTANCE AGREEMENT

PROJECT NO. WRA-P9-42-3-946

TOWN OF WINTHROP

DESIGN & CONSTRUCTION OF SEWER REPLACEMENT ON HARVARD & FRANKLIN STREETS
&
DESIGN OF SEWER IMPROVEMENTS IN TOWN CENTER AREA

SCOPE OF SERVICES

Design & Construction of Sewer Replacement on Harvard & Franklin Streets Two (2) catch basins were recently discovered on Franklin Street to be connected to the sewer. The adjacent vitrified clay sewer on Franklin Street and downstream on Harvard Street was inspected and was recommended to be replaced. The sewer replacement work involves removing the existing connections to the sewer from the catch basins, replacing the existing sewer with approximately 965 l.f. of 10" diameter sewer, 7 manholes and 16 sewer service laterals. This work is to be completed under the existing Contract #4 – Water Main Improvements Project of which the sewer portion was funded under MWRA Project #WRA-P9-42-3-929. The original Bid Items for that Contract are being used for the additional sewer replacement work.

Design of Sewer Improvements In Town Center Area The actual location of this design work will be on Jefferson St, Hagman Rd, French Sq., Woodside Ave, Bartlett Rd, Williams St & Somerset Ave. This design work includes improvements to the sewer system as recommended from the video inspections conducted as part of the Sanitary Sewer Evaluation Report of April 2007. The design work involves conducting survey, boring, flow monitoring, permitting & preparing Contract Documents for the replacement of approximately 2,400 l.f. of sewer, manholes and service laterals (to the property line).

Construction of these sewer improvements is being planned within the next 2 years and will be coordinated with the Town Center Redevelopment Project which is currently being finalized.

SUMMARY OF ESTIMATED PROJECT COST

<i>Description of Task</i>	<i>Total Cost</i>	<i>Eligible Cost</i>
Sewer Replacement on Harvard & Franklin Streets		
Design Services	\$ 6,500	\$ 6,500
Construction (including paving)	\$ 328,800	\$ 328,800
Force Account (Police Details)	\$ 7,200	\$ 7,200
Design of Sewer Improvements in Town Center Area	\$ 84,500	\$ 84,500
TOTAL ESTIMATED PROJECT COST	<u>\$ 427,000</u>	<u>\$ 427,000</u>

**MWRA I/I LOCAL FINANCIAL ASSISTANCE PROGRAM - PHASE 9
ATTACHMENT B
FINANCIAL ASSISTANCE AGREEMENT**

PROJECT NO. WRA-P9-42-3-946

TOWN OF WINTHROP

**DESIGN & CONSTRUCTION OF SEWER REPLACEMENT ON HARVARD & FRANKLIN STREETS
&
DESIGN OF SEWER IMPROVEMENTS IN TOWN CENTER AREA**

PROJECT SCHEDULE

<u>Description of Work</u>	<u>Start Date</u>	<u>Completion Date</u>
Sewer Replacement on Harvard & Franklin Streets		
Design Services	April 2016	May 2016
Construction (including paving)	May 2016	May 2016
Force Account (Police Details)	May 2016	May 2016
Design of Sewer Improvements in Town Center Area	June 2016	September 2016

ATTACHMENT 5
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period: July 2015 Through June 2016

**I/I REDUCTION STATUS UPDATE
FOR MEMBER COMMUNITIES**

The MWRA is working cooperatively with member communities to develop phased I/I reduction programs throughout the service area. The Authority will encourage continuing community efforts in I/I reduction as detailed in the MWRA Regional I/I Reduction Plan. Many community I/I projects are funded through MWRA's I/I Local Financial Assistance Program. This \$460.75 million grant/loan program was established to provide funding to member sewer communities to perform I/I reduction and sewer system rehabilitation projects within their locally-owned collection systems. Through FY16, MWRA has distributed \$310 million to fund local projects. A detailed update on MWRA's I/I Local Financial Assistance Program is included as Attachment 4 to this report.

The Authority has instituted a computer-based questionnaire format for communities to submit annual status reports on their I/I reduction programs. All 43 member sewer communities have submitted information to MWRA for FY16. Community information is summarized below:

1. ARLINGTON: North System

Background Information:

- Miles of Sewer: 106
- Sewered Population: 43,993
- Three Year (CY13 - CY15) Annual Average I/I: 1.71 mgd
- MassDEP Administrative Actions: ACOP-NE-10-1N006 (August, 2010)
NON-NE-09-1N003 (July 2009)
NON-NE-07-1N004 (June 2007)

Latest I/I or SSES Reports:

- “Sewer System Investigation Area #6” Final Report (November 2011)
- “Kimball Road/MWRA Millbrook Valley Relief Sewer Evaluation” Final Report (November 2011)
- “Area #6 Smoke Testing, Dye Testing and Dye Flooding” Final Report (December 2011)
- “Town-wide I/I Analysis” Final Report (April 2012)
- “Additional Inspection of Sewer on Pond Lane, Academy St & Mystic Lake Drive” Letter Report (May 2012)
- “Area #6 (Kimball Road) Building Inspections” Report (January 2013)
- “Sewer system Investigation Area #7” Report (August 2013)
- “Area #4, 5 & 7 Smoke Testing” Report (December 2013)
- “Area #8 Sewer System Investigation” Report (August 2014)
- “Area #9 Sewer System Investigation” Report (August 2015)
- “Area #10 Sewer System Investigation” Report (expected completion August 2016)

Private Source Inflow Removal Program: The Arlington Department of Public Works is currently implementing a water meter replacement program. At the time of the water meter replacement, a building inspection is performed by the town employee while they are still in the home. The building inspections are ongoing and anticipated to be completed town-wide by the end of 2019.

I/I Rehabilitation Projects in Design or Construction: The Construction of the Phase #7 Sanitary Sewer Rehabilitations – Bid No. 15-25 was substantially completed in April 2016. The following work was completed: performed 7,044 LF of chemical root treatment; CIPP lining of 13,737 LF of 8” to 12” sewer; structural CIPP lining of 8” & 12” sewer;

cementitious lining of 695 vf of manholes; grouting & patching of 8 manholes; building 4 manhole benches & inverts; replacing 3 manhole frames & covers; raising 2 manhole frames & covers; installing 6 Inflow dishes; installing 33 vf of internal drop connections; sealing a manhole Access Port; grouting of 206 services; cutting 14 protruding service connections.

The Phase #8 Sanitary Sewer Rehabilitations – Bid No. 16-26 was opened on June 16, 2016. The apparent low bidder was National Water Main Co. The Town expects to award the Base Bid and Alternate #1 of the Contract. Work is expected to begin in August 2016. The project is expected to be substantially complete by January 2017 with warranty inspections expected by October 2017.

Reporting Period Activity: The Town is continuing with the 12-year Sewer System Investigation and Planning Program which was initiated in September 2006.

The Area #9 Sewer System Investigation Report, which included sewer investigations in mini-systems 13, 16, 25, 29, 43, 46, A, AK & M3, was completed in August 2015.

The Area #10 Sewer System Investigation Report, which includes sewer investigations in mini-systems C, D, E, Q, R, Z, 14, 16, 18, 19, 32, 36, 37, 38, 44, AA, AF, AG, AH, AI, AL, AM, AX & AY, will be completed in August 2016.

In February 2016, funds were distributed to fund the following 2 projects: 1) Sewer System Investigation in Area #10. This Study will identify sources of Infiltration and Inflow (I/I) in various Sewer Subareas. The expected field work associated with this project will include, but not be limited to: conducting top side physical survey of approximately 300 sewer manholes for sources of I/I; conducting flow isolation of approximately 40,000 LF of sewer; cleaning and internal TV inspection of approximately 40,000 LF of sewer; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field work which will include a cost-effectiveness analysis and recommendations for sewer rehabilitation; 2) Construction of Phase #8 Sanitary Sewer Rehabilitations. This sewer rehabilitation project is a result of the I/I sources identified during previous Sewer System Investigation Planning Program (SSIPP) Studies. The sewer rehabilitation work is located in various portions of SSIPP Areas #1 through #9. The sewer rehabilitation work will be based upon the limit of \$650,000. It is expected this scope of work will include but not be limited to: installing 10,000 LF of cured-in-place pipelining (CIPP); installing 1,000 LF of structural CIPP; root treatment of 3,829 LF of sewer and 2 manholes; cementitious lining of 600 vf of manholes; testing & grouting of 43 service connections; reinstating & grouting service connections in cured-in-place pipe; open cut point repair at 5 locations with replacement of 3 service connections; installing 50 LF of short liners; installing 5 manhole inflow dishes; and other related tasks. The estimated Peak Inflow removal is 0.009 mgd and the estimated Peak Infiltration removal is 0.136 mgd. (MWRA Project No. WRA-P9-01-3-937).

MWRA I/I Local Financial Assistance Program: The community has financed twenty-one (21) I/I reduction projects through the Authority's funding assistance program. Of the \$8,423,000 allotted through the Program's Phases 1 - 10, the community has \$1,010,000 remaining in funding assistance.

2. ASHLAND: South System

Background Information:

- Miles of Sewer: 66
- Sewered Population: 13,549
- Three Year (CY13 - CY15) Annual Average I/I: 0.38 mgd
- MassDEP Administrative Actions: No. 594 (November 1985)

Latest I/I or SSES Report: I/I Investigation/Repair (Summary Report): March 2012
I/I Investigation/Repair Status Reports: CY13/14
I/I Investigation: TV Inspection (2014 Summary Report): April 2015

Private Source Inflow Removal Program: Sump pump/roof leader investigations (via DPW personnel)
by Sub-Basin during FY15/16:

Sub-Basin 1: 76 inspections	Sub-Basin 2: 138 inspections
Sub-Basin 3: 17 inspections	Sub-Basin 4: 80 inspections

I/I Rehabilitation Projects in Design or Construction: The Town has contracted Truax Corp. to perform internal TV inspection of 199,500 LF of sewer main in Ashland Sewer System Sub-Basins 1 / 2 (MWRA Project No. WRA-P8-02-1-827). As of August 2016, the majority of the sewer main investigation work has been completed. A 2015 Investigations Summary Report is currently being prepared. The Report will address sewer main rehabilitation options. Also, the Town contracted National Water Main to line approximately 1760 LF of 14-inch sewer main and nine sewer service connections on Pleasant Street (MWRA Project No. WRA-P8-02-3-822). Approximately 80,000 gpd of identified peak I/I was removed.

Reporting Period Activity: The West Union Street Transmission Sewer Replacement Project is complete. This project will provide additional capacity for proposed development.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$2,168,500 allotted through the Program's Phases 1 - 10, the community has \$840,000 remaining in funding assistance.

3. BEDFORD: North System

Background Information:

- Miles of Sewer: 78
- Sewered Population: 13,394
- Three Year (CY13 - CY15) Annual Average I/I: 1.16 mgd
- MassDEP Administrative Actions: None
- Latest I/I or SSES Report: Entegris Sewer Evaluation Final Report (January 2012)
Phase #3 Sewer System Investigation (expected September 2016)
Phase #4 Sewer System Investigation (expected September 2016)

Private Source Inflow Removal Program: No additional inspections were reported this period. Smoke testing which was conducted as part of the Sewer System Investigation Project #3 identified several private Inflow sources. These sources are expected to be removed in an upcoming sewer rehabilitation project.

In March 2010, Town Meeting voted to amend the Town's General Bylaws for Article 52 – Sewer System. This amendment includes a new Section 52.19 which allows authorized Town personnel to enter private properties to inspect internal plumbing. Under this bylaw amendment, the Town's Sewer System Bylaw now includes a 4:1 Inflow/Infiltration removal requirement for new developments that will generate greater than 50,000 gpd of new sanitary flows.

I/I Rehabilitation Projects in Design or Construction: The Design of the Phase #3 Sewer Rehabilitations was completed in March 2016 with Bid Opening taking place on April 14, 2016. Heitkamp was the low bidder and will be performing the work. The work on this Project is ongoing. Substantial completion is expected in August 2016.

Reporting Period Activity: The Phase #3 and Phase #4 Sewer System Investigation Projects are on-going. Summary reports for these projects are expected to be finalized in summer 2016.

In August 2015, funds were distributed for the following 2 projects: 1.) Phase #3 Sewer Manhole Rehabilitations Design, Bid & Award and Construction This project consists of the design, bid & award and construction associated with the recommended sewer manhole rehabilitations. The approximate scope of work includes but is not necessarily limited to: grouting & cement lining of approximately 135 sewer manholes; raising of 2 sewer manhole frames & covers above grade; external wrapping (Canusa Wrap) of sewer manholes above grade to stop flood inundation; installation of 20 Inflow dishes; root treatment of 7 sewer manholes; other related tasks and appurtenances. The sewer manholes to be rehabilitated are located in various areas throughout the Town; 2.) Phase #4 Sewer System Investigations This Study will identify and quantify sources of Infiltration and Inflow (I/I) in the sanitary sewer system in the Phase #4 Area. The expected field investigations will include, but not be limited to: conducting top side physical survey of as many as 450 sewer manholes for sources of I/I in Sewer Subareas 2, 3, 4, 5, 7, 8, 9 & 21; cleaning and internal TV inspection of as many as 20,000 LF of sewer in Sewer Subareas 3, 6, 8 & 9; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field investigations which will include data analysis, cost-effectiveness analysis and recommendations for sewer rehabilitation along with preliminary design concepts. The estimated peak Infiltration to be removed is 0.16 mgd and the estimated peak Inflow to be removed is 0.06 mgd (MWRA Project No. WRA-P9-03-3-926).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$3,404,600 allotted through the Program's Phases 1 - 10, the community has \$1,405,000 remaining in funding assistance.

4. BELMONT: North System

Background Information:

- Miles of Sewer: 78
- Sewered Population: 24,927
- Three Year (CY13 - CY15) Annual Average I/I: 1.14 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:

I/I and Comprehensive Flow Monitoring Project Final Report (July 2009)
Sewer System Evaluation Survey Final Report (October 2009)
Preliminary Design Report – Investigations of Sewers to Identify I/I Report (January 2013)

Private Source Inflow Removal Program: The Town continues to work with potential developers in implementing a program that either removes I/I at rate of 5 to 1 or makes a one time payment to the Town to fund community I/I removal work.

No building inspections were performed during the past year.

I/I Rehabilitation Projects in Design or Construction: CWSRF funded illicit connection mitigation project (CWSRF No. 3711) – Sewer and Storm Drain Rehabilitation was completed and closed out in October 2015. An estimated 27,300 gpd of infiltration was removed.

Reporting Period Activity: The Contract for the Sewer and Storm Drain Rehabilitation Inflow and Infiltration Removal – (MWRA Project No. WRA-P7-04-3-756) was completed in February 2015. An estimated 215,000 gpd of inflow/infiltration was removed.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the \$5,135,100 allotted through the Program's Phases 1 - 10, the community has \$2,143,000 remaining in funding assistance.

5. BOSTON: North and South Systems

Background Information:

- Miles of Sewer: 858
- Sewered Population: 645,320
- Three Year (CY13 - CY15) Annual Average I/I: 28.71 mgd
- MassDEP Administrative Actions: None (Cooperative Agreement Exists)

Boston North is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Boston North are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports: City-Wide I/I Analysis (ongoing); West Roxbury Low Level Sewer I/I Study; Roxbury Canal Sewer Separation Study; Upper Neponset Valley Sewer Inflow Survey; Granite Avenue I/I Survey; Dorchester High Level Sewer I/I Survey; Lower Dorchester Brook Sewer Study; and Longwood Medical Area I/I Survey.

Private Source Inflow Removal Program: Since 1994, the Downspout Disconnection Program has conducted approximately 38,000 building surveys and 10,500 dye water tests. Approximately 25,141 downspouts have been disconnected. During CY05-CY16, a total of seventy-five (75) large impervious areas were surveyed to identify inflow sources. All seventy-five (75) areas have been dye tested.

I/I Rehabilitation Projects in Design or Construction: BWSC has both completed and is currently working on a wide variety of separation and I/I identification/rehabilitation projects. To date, seventy-nine (79) projects have received funding through the MWRA I/I Local Financial Assistance Program. During FY07-FY16, BWSC completed the following rehabilitation projects: A Street Area Sewer Separation (South Boston Gillette Headquarters); Mass Ave - Dorchester Separation (New Market Square Area); East Boston (Border/Meridian Street Area) Sewer Separation; Sewer Rehabilitation in Back Bay/ Kenmore/Hyde Park/Mattapan; Albany Street Sewer Separation; Sewer Rehabilitation in Dorchester/Mattapan/West Roxbury/Brighton; Talbot Avenue High Level Sewer Area Sewer Replacement/Manhole Rehabilitation; South End Sewer Rehabilitation; Marginal Street Sewer Separation; St. Botolph Street Sewer Separation; Maverick Street Sewer Separation; West Side Interceptor and Public Garden Lining; Back Street Sewer Separation and Chester Park Area Sewer Separation.

On-going rehabilitation projects include: Mass Ave - Roxbury Separation (New Market Square); Dudley Square Sewer Separation; Rehabilitation of Sewers in the Fenway (Audubon Circle / St. Mary's Street Area); Hampden Street Area Separation and Upper Roxbury Area Sewer Separation (Phase I).

BWSC is also working with the Boston University Medical Center Facilities Management Group on I/I mitigation projects to offset sanitary discharges from Boston University's National Emerging Infectious Diseases BioSquare Phase II Project (620 Albany Street).

BWSC also works cooperatively with Massport to identify impacts from the sewer system to the Logan Airport area stormwater drainage system. Between 2006 and 2008, Massport conducted inspections of the sanitary sewer and stormwater drainage systems to locate sanitary system leaks/breaks and direct/illegal cross-connections to the drainage system. As a result of these surveys, BWSC completed sanitary sewer section replacement during 2009/10. The sanitary sewer inspections also identified deficiencies in the sewer maintained by Massport at several locations throughout the Airport property. In 2012, sewer cleaning and internal TV inspection identified additional sewer sections requiring repair. Rehabilitation design was completed in July 2013. Rehabilitation construction was completed in November 2013. Work included CIP pipe lining of 1525 LF of sewer main and replacing 240 LF of sewer main. In 2012/3, Massport Facilities Department conducted inspections and cleaning of manholes/catch basins at locations throughout the Airport property. A total of 371 structures were inspected.

BWSC entered into an I/I reduction agreement with the Massachusetts DEP in January 1986. As provided in the agreement, BWSC has performed a Phase II SSES on separated sewer areas within the City. BWSC also has an ongoing tide gate/regulator inspection and repair program and performs separation projects on pockets of combined sewers tributary to separated sewer areas.

Reporting Period Activity: BWSC is required to report to the EPA on I/I reduction measures under their NPDES permit. This reporting requirement coincides with the MWRA's required submittal dates; therefore, please refer to the BWSC NPDES report for a summary of activities during this period.

MWRA I/I Local Financial Assistance Program: The Commission has financed seventy-nine (79) I/I identification/reduction projects through the Authority's funding assistance program. Of the \$132,171,200 allotted through the Program's Phases 1 - 10, the Commission has \$48,459,224 remaining in funding assistance.

6. BRAINTREE: South System

Background Information:

- Miles of Sewer: 140
- Sewered Population: 36,573
- Three Year (CY13 - CY15) Annual Average I/I: 3.49 mgd
- MassDEP Administrative Actions:
 - ACO-NE-01-1001 (April 2001)
 - ACO-NE-99-1001 (March 1999)
 - NON (May 1997)
 - NON (October 1986)
 - Amended AO Docket No. 546 (February 1985)

Latest I/I or SSES Report: Annual Town-Wide Sewer Investigation & Rehabilitation Program –
Prioritization Evaluation Report (July 2011)
Annual Town-Wide Sewer Program – Yr 1 Investigation (July 2012)
Annual Town-Wide Sewer Program – Yr 2 Investigation (January 2014)
Annual Flow Monitoring Project – Phase I (January 2015)
Annual Town-Wide Sewer Program – Yr 3 Investigation (March 2015)
Annual Town-Wide Sewer Program – Yr 4 Investigation (February 2016)
Annual Town-Wide Sewer Program – Yr 5 Investigation (Ongoing)

Private Source Inflow Removal Program: Sump pump removal program is ongoing. Ten (10) private source sump pump removal contracts have redirected 295 sump pumps to date. Developer Flow Reduction Program is now 6 to 1 per DEP ACO. During CY13/14, a sump pump amnesty letter was sent out with the Town's annual water report to all users. The letter resulted in 31 customer calls to have their connections checked. To date, 27 inspections have taken place, and nine (9) sump pumps have been identified for removal. Actual removal/rerouting of the sump pumps has not yet taken place.

I/I Rehabilitation Projects in Design or Construction: Year 5 Investigation (MWRA Project No. WRA-P9-06-3-941) was completed Spring 2016. Data review/report preparation is ongoing.

Annual I/I Removal Program (Year 4) investigation in Subareas PS1 / T3 / T4 / T5 (MWRA Project No. WRA-P9-06-3-915) was complete Spring 2015. Data review/report preparation completed February 2016. Flow isolation and television inspection revealed an estimated 66,384 gpd of peak infiltration. Topside manhole inspection of 257 manholes revealed an estimated 8,441 gpd of peak infiltration.

Annual I/I Removal Program (Year 3) performed flow isolation, TV inspection and topside manhole inspections during Spring 2014 (MWRA Project No. WRA-P9-06-3-915). Data review/report preparation complete March 2015. Flow isolation and TV inspection of 43,489 lf of sewers in Subareas U1 / W5 / W6 revealed an estimated 94,176 gpd of peak infiltration. Topside manhole inspection of 236 manholes in Subareas U1 / W5 / W6 revealed an estimated 31,104 gpd of peak infiltration and 1969 gpd of peak inflow.

Annual I/I Removal Program (Year 2) investigation (MWRA Project No. WRA-P8-06-3-812) performed flow isolation, TV inspection and topside manhole inspection during Spring 2013. Data review/report preparation complete January 2014.

Annual I/I Removal Program (Year 1) investigation (MWRA Project No. WRA-P7-06-3-748) performed TV inspection of 49,538 LF of sewer pipe in Subareas S1 / W2 / HC2 / M2 and revealed an estimated 43,632 gpd of peak infiltration. Topside manhole inspection of 230 manholes in Subareas S1 / W2 revealed an estimated 35,795 gpd of peak infiltration.

Reporting Period Activity: Town-Wide Annual Wastewater Flow Monitoring began September 2015 and is scheduled to be complete December 2016. Summary Letter Report to be complete Winter 2017.

Annual I/I Removal Program (Year 4) design (MWRA Project No. WRA-P9-06-3-915) was completed June 2016. Year 4 Rehabilitation Construction (Braintree Contract S16-1) to be bid August 2016 with construction beginning in Fall 2016. The Year 4 project is estimated to remove 27,929 gpd of infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 3) design (MWRA Project No. WRA-P9-06-3-915) was completed June 2014. Year 3 Rehabilitation Construction (Braintree Contract S15-1) was bid July 2015 and is substantially complete. Warranty Retesting work is scheduled for Fall 2016. The Year 3 project is estimated to remove 55,765 gpd of infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 2) design (MWRA Project No. WRA-P8-06-3-812) was completed May 2014. Year 2 Rehabilitation Construction (Braintree Contract S14-1) was bid July 2014 and is substantially complete. Warranty Retesting work is complete. The Year 2 project is estimated to have removed 32,947 gpd of infiltration from the Town's sewer system.

Annual I/I Removal Program (Year 1) design (MWRA Project No. WRA-P7-06-3-748) was completed May 2013. Year 1 Rehabilitation Construction (Braintree Contract S13-1) was bid June 2013 and completed (warranty retesting) Summer 2014.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$8,359,000 allotted through the Program's Phases 1 - 10, the community has \$2,443,200 remaining in funding assistance.

7. BROOKLINE: North and South Systems

Background Information:

- Miles of Sewer: 111
- Sewered Population: 59,069
- Three Year (CY13 - CY15) Annual Average I/I: 4.07 mgd
- Mass DEP Administrative Actions: None

Brookline is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Brookline are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report:

Sewer Evaluation Survey in Subareas NI-7, 8 & 12 Final Report (May 2012)
Results for Condition Survey – Subareas NI-7, NI-8 & NI-12 Technical Memo (August 2012)
Eliot Street Smoke Testing Technical Memo (January 2013)
Englewood Ave/Kilsyth Rd Sewer Alternative Evaluation Technical Memo (February 2013)
Wastewater Master Plan Update (December 2013)
Results for Sewer Condition Survey in Subareas NI-9, NI-10 & NI-11 Technical Memo (September 2014)

Private Source Inflow Removal Program: Town is in the process of developing a Private Flow Source Identification and Removal Program. A 4:1 Flow Reduction is enforced for large residential and commercial projects. The community is continuing its public outreach for private inflow identification/removal. Engineering Division personnel are on the lookout for illicit sump pumps during inspections.

During construction of PW/15-10 the Brookline Engineering Division observed through CCTV approx. 15 sewer service laterals suspected of sump pumps discharging to the sanitary sewer service laterals. The observation of clear water flow may indicate a sump pump connection or a leak in the domestic plumbing. At project completion and upon review of pre and post lining videos the town will list and investigate these possible sump pump connections.

I/I Rehabilitation Projects in Design or Construction: Contract #PW/15-10 Recommended Sewer Rehabilitation in Subareas NI-8, NI-9, NI-10 & NI-11 was awarded to D'Allessandro Corp. on September 17, 2015. Construction is expected to be completed by September 2016. As of June 30, 2016 this contract is approximately 75% complete. The specific rehabilitation consists of: cured-in-place lining of approx. 17,000 LF of 8-inch to 20-inch sewers; open-cut point repairs at 7 locations; lining of approx. 1300 vf of manholes; reconstruction of 5 manholes.

Reporting Period Activity: In December 2013, the Town executed an engineering agreement for a Master Plan Summary Update, I/I Investigation and Sewer System Rehabilitation Design in Subareas NI-9, NI-10 & NI-11. The purpose of this project is to update the Master Plan to include the sewer separation and rehabilitation work that has been completed in recent years including CCTV inspection data. Recommendations for the next phase of rehabilitation will be made along with additional investigations which are expected to include flow isolation and additional CCTV inspections of sewers and manhole inspections. The design of the recommendations from this update is also included under this project. In September 2014, the Draft Report "Technical Memorandum – Results for Sewer Condition Survey in Subareas NI-9, NI-10 & NI-11" was submitted to MWRA. The final report is complete.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$13,165,200 allotted through the Program's Phases 1 - 10, the community has \$5,499,000 remaining in funding assistance.

8. BURLINGTON: North System

Background Information:

- Miles of Sewer: 115
- Sewered Population: 24,826
- Three Year (CY13 - CY15) Annual Average I/I: 1.21 mgd
- MassDEP Administrative Actions: ACO-NE-06-1N001 (March 2006)
 ACO-NE-01-1004 (July 2001)
 Amended AO Docket No. 618 (October 1986)

Latest I/I or SSES Reports:

Easement Manhole Inspections & Flood Plain Manhole Inflow Investigations Final Report (August 2011)
Phase 5 Smoke Testing, Dye Testing & Dye Flooding Final Report (January 2012)
Phase 5 Sanitary Sewer Flow Evaluation and Recommendations Final Report (January 2012)
Phase 6 Sewer System Evaluation Survey Final Report (January 2012)
Building Inspections in the Phase 6 Area Final Report (June 2012)
Project 7 – Evaluate Sewer Flows Based on Water Use & SCADA Pump Station Data Report (Fall 2013)
Project 7 – Evaluation of Localized Flooding Areas Final Report (February 2014)
Project 7 – Building Inspections Final Report (March 2014)
Project 7 – Sewer System Evaluation Survey Final Report (March 2014)
Evaluation of Sewer Flows Based Upon SCADA Pump Station Data & Water Use Data – Project 7 (December 2014)

Private Source Inflow Removal Program: In the past year, developers have redirected 32 private illicit sewer connections and received a sewer bank credit from Mass DEP in the amount of 38,400 gpd. There is an additional 11 properties with illicit connections under construction for redirection.

The Town's sewer bank fund balance is approximately \$290,000. In addition, \$1,556,504.68 from the sewer bank fund has been set aside or used for I/I related projects. A total of \$1,900,000 has been allocated from the Town's sewer enterprise fund for sewer system rehabilitations.

I/I Rehabilitation Projects in Design or Construction: Bid & award for the Construction of Sewer Rehabilitations Downstream of Terrace Hall Force Main Discharge is expected by the end of July or August 2016 with completion expected by the end of CY2016.

The design of the "Lucaya Circle Pump Station and Force Main Rehabilitation" project was completed in June 2016. The project is in the process of being awarded to a contractor. Completion of this project is expected by March 2017.

Reporting Period Activity: "Project 6 and 7 Design" was submitted to MassDEP for review and approval in accordance with the Town's Administrative Consent Order.

In May 2016, funds were distributed for Construction of Sewer Rehabilitations Downstream of Terrace Hall Force Main Discharge. The objective of this project is to rehabilitate sewer infrastructure (sewer pipes & manholes) that have been severely damaged by hydrogen sulfide corrosion compromising its integrity and allowing Infiltration into the gravity sewer and manholes downstream of the Terrace Hall Pumping Station Force Main discharge. The expected sewer rehabilitation work will consist of the following: cement & epoxy-line 11 manholes on South Bedford St; replace 11 manholes on Wayside Road; installing approximately 2,600 LF of cured-in-place 24" diameter manhole-to-manhole pipeliner in the easement between Cambridge Street and Heritage Way; cement & epoxy-line the 10 manholes in the same area. This sewer rehabilitation work will require the installation of an extensive temporary bypass system to handle the Terrace Hall Pumping Station wastewater flow. This cost is also included. The estimated annual Infiltration to be removed is 0.01 mgd. (MWRA Project No. WRA-P9-08-3-947).

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$5,102,800 allotted through the Program's Phases 1 - 10, the community has \$899,000 remaining in funding assistance.

9. CAMBRIDGE: North System

Background Information:

- Miles of Sewer: 148
- Sewered Population: 107,278
- Three Year (CY13 - CY15) Annual Average I/I: 6.05 mgd
- Mass DEP Administrative Actions: NON-NE-00-1012 (May 2000)
 NON-NE-00-1004 (January 2000)
 ACOP-NE-96-1004

Cambridge is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Cambridge are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Reports:

Phase II: Analysis and Fast Track Design of I/I Rehabilitation Projects (December 2007)
East Cambridge Sewer Capacity Program (January 2013)
Area 4 Infrastructure Improvements and Kendall Square Sewer Assessment (July 2015)

Private Source Inflow Removal Program: As part of the Contract 8A Huron Avenue Project, the contractor has removed inflow from 39 buildings with 32 buildings remaining.

As part of the Concord Avenue Contract 9 Project, the contractor has removed inflow from 17 buildings with 13 buildings remaining.

In 2013, DPW instituted a dedicated budget code within the Capital Budget for I/I offset fees. Per DEP Bureau of Resources Protection 2009 I/I Policy, new development projects that cannot remove 4 gallons of I/I per gallon of new sewer flow are charged a mitigation fee which goes to the fund. The fees collected are used by the DPW to remove I/I at other City projects. This program is continuing.

I/I Rehabilitation Projects in Design or Construction: For the Western Avenue Reconstruction Project, the new Storm Water Quality Sampling Station (SWQSS) has been installed. Remaining work includes programming and startup which is expected to be completed by the end of September 2016. All other work for Western Ave Reconstruction Project is complete.

Reporting Period Activity: Remedial Sewer Repair: In the past year, the City's contractor replaced 802 LF of existing sewer on Arlington St.

CAM004 Contract 8B Huron Avenue: Construction for this project began in 2013. In the past year, the contractor has installed 22 LF of new sewer and 330 LF of new storm drain. The contractor has removed 16 illicit connections and separated 9 common manholes. The underground portion is completed with surface restoration continuing in CY 2016.

CAM 004 Contract 9 Concord Avenue: As part of Contract 9, the Concord Ave project, the Contractor has installed 108 LF of new storm drain and 1,964 LF of new sewer pipe replacing existing. The contractor also removed 4 illicit connections and separated 10 common manholes.

The Contractor rehabilitated 3,645 LF of sewer pipe with CIPP lining in the Concord Ave project area.

Under Contract 9, sewer and storm drains in the entire Concord Ave Project area were cleaned. The storm drains on New Street, the lower ends of Vassal Lane and Lakeview Ave, Fresh Pond Parkway between Lexington Ave and Concord Ave, and Concord Ave between Birch St and Alewife Brook Parkway were cleaned in the 4th quarter 2015.

The last section of these lines was separated from the combined sewer system in December 2015 as required under the court order and the Long Term Combined Sewer Overflow Control Plan (LTCP) for the Alewife Brook. The storm water from the areas in Huron Ave Contracts 8A and 8B and Concord Ave, Contract 9, has been separated from the combined sewer system and now flows to the constructed wetland (Contract 12) and the Alewife Brook. The CSO outfall, CAM004, is closed.

Concord Lane New Street: As part of the New Street Concord Lane project, the Contractor has installed 552 LF of new storm drain and 1,288 LF of new sewer replacing existing. They removed 2 illicit connections and separated 5 common manholes. The Contractor has installed 2 new sewer pumps and 2 groundwater pumps on New St. The storm water from New Street and Concord Lane has been separated from the combined sewer system and now flows to the constructed wetland (Contract 12) and the Alewife Brook.

I/I Mitigation: The Developer of 130 Cambridgepark Drive mitigated 120,560 gpd of I/I removal with the installation of several leaching catch basins on Clay Street.

Mitigation for Private Development: As part of mitigation for the Novartis private development project at 181 Mass Ave, the City's Remedial Repair contractor separated a common manhole at Windsor and State St. A private contractor installed 390 LF of new 12-inch sewer on State St between Windsor St and Osborne St. The private contractor also separated a common manhole on Osborne St and installed 260 LF of new 18-inch storm drain on Osborne St.

Akron Street: A new storm drain was constructed on Akron St in the last year. The Contractor installed 230 LF of 12-inch storm drain.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$23,620,100 allotted through the Program's Phases 1 - 10, the community has \$12,543,045 remaining in funding assistance.

10. CANTON: South System

Background Information:

- Miles of Sewer: 62
- Sewered Population: 15,088
- Three Year (CY13 - CY15) Annual Average I/I: 1.45 mgd
- MassDEP Administrative Actions: AO Docket No. 537 (April 1984)

Latest I/I or SSES Report: Comprehensive Water Resources Management Plan (February 2009)
I/I Five Year Management Plan (November 2011)
I/I Five Year Management Plan Update (Ongoing)

Private Source Inflow Removal Program: No additional inspections were reported during this period. Town has established an I/I Mitigation Fee for all new connections. Fee is paid based upon DEP flow rates at a 4 to 1 ratio.

I/I Rehabilitation Projects in Design or Construction: Sewer System Rehabilitation (Canton Contract No. 12-01S / MWRA Project No. WRA-P8-10-3-817) began July 2013. Project work was performed within Sewer Subsections 1-12 / 17 and included sewer manhole sealing/restoration, sewer pipe testing and sealing, CIPP lining and joint testing/sealing. Project work is complete.

Reporting Period Activity: The Town performed sewer main cleaning and TV inspection in Sewer Subsection 14 and repaired one broken pipe section. The Town also sealed 25 manholes in various locations (ten cross country manholes were sealed along Route 138). Estimated average I/I removal is 44,000 gpd.

The Town conducted a 12 week flow metering program within Subsystems 7/9/12/14/16/18/19/24 to identify areas with extraneous flows. Town-wide CCTV inspection program is complete.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the \$3,965,900 allotted through the Program's Phases 1 - 10, the community has \$1,290,000 remaining in funding assistance.

11. CHELSEA: North System

Background Information:

- Miles of Sewer: 41
- Sewered Population: 37,670
- Three Year (CY13 - CY15) Annual Average I/I: 2.17 mgd
- MassDEP Administrative Actions: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-008 (March 2009)

Chelsea is one of MWRA's five combined sewer service communities (Boston North, Brookline, Cambridge, Chelsea, Somerville). Portions of Chelsea are impacted by projects under MWRA's CSO Control Plan.

Latest I/I or SSES Report: Investigation into Excessive Infiltration/Inflow & Exfiltration (November 2009)
Everett, Spruce & Second St Sewer & Drain Evaluation (October 2012)

Private Source Inflow Removal Program: The City began collecting Sewer Bank fees for redevelopment projects in CY 2013. The City has also begun a move toward the implementation of Green vs. Gray infrastructure to reduce the amount of stormwater discharged to combined sewers. Efforts to date have included requiring all redevelopment projects to utilize Low Impact Development and retain/infiltrate stormwater onsite, and incorporating green infrastructure into municipal projects (e.g., rain garden at Mace Housing Complex).

I/I Rehabilitation Projects in Design or Construction:

Construction of the Spruce, Beech & Carter St Infrastructure Improvement Project is complete.

Design of the Broadway Infrastructure Project is ongoing. This project is being funded in part under the MassDOT Transportation Improvement Program (TIP). The 25% design submittal package for MassDOT is almost complete. Due to the long waiting list for TIP funding, final design and construction of the project is not expected to begin for several years.

Construction of the Spruce, Beech & Carter St Infrastructure Improvement Project is complete.

Construction of the [Lower] Broadway, Clyde Street, & Garfield Avenue Utility Improvements Project is complete.

Construction of the Phase IV Gateway Center Infrastructure Improvements Project is substantially complete, with only surface restoration remaining. Final completion is anticipated fall 2016.

Construction of the Gardner Street and Forsyth Street Utility and Roadway Improvements Project is substantially complete. Minor punchlist items remain. Final completion is anticipated summer 2016.

Design of the Carter Street Drainage Pump Station Force Main Relocation Project is ongoing. This project will include installation of a new force main from the pump station to an alternative discharge point at the existing Spruce Street drain, as well as abandonment of the existing force main currently discharging to the Market Street culvert. The project also includes construction of a perimeter wall and other flood-proofing improvements at the pump station as part of the City's coastal resiliency efforts.

Design of the Clark Avenue, Crescent Avenue, Tudor Street, and Lawrence Street Utility & Roadway Improvements Project is ongoing. This project consists of installing approximately 1,900 LF feet of new sanitary sewer and 1,300 LF of new storm drain to separate the existing combined sewer. It also includes replacing 1,600 LF of existing water main, as well as roadway and sidewalk improvements. Construction is anticipated to begin fall 2016.

Conceptual design and submission of grant application has been completed for Phase V of the Gateway Center Infrastructure Improvements. This next phase of urban renewal will include comprehensive utility and surface improvements (including sewer separation where applicable) on Everett Avenue from Carter Street to the city limit, Vale Street from Carter Street to Locust Street, Carter Street from Everett Avenue to the Railroad Right-of-Way, Spruce Street from Everett Avenue to Williams Street, and Second Street from Spruce Street to the city limit.

Design of Everett, Walnut, and Fourth Street Infrastructure Improvements is scheduled to begin fall 2016. This project is being undertaken to address problems with aging sewers on Everett Avenue between Chestnut Street and Walnut Street, and Walnut Street between Everett Avenue and Fourth Street, and will include sewer separation, as well as other municipal infrastructure improvements.

Reporting Period Activity: During the past year, point repairs to the sewer and drain systems were completed at 20 locations throughout the City; cleaning of 31,284 LF of sewer and 428 LF of drain was completed; cleaning and television inspection of 2,085 LF of sewer and 270 LF of drain was completed; ZoomCAM inspection of sewers from 10 manholes and drains from 17 manholes was also completed.

In May 2016, funds were distributed for the construction for the sewer improvement portion of the Shurtleff St Utility Improvements Project. The eligible portion of the larger project involves the replacement of the existing combined sewer, which is badly deteriorated, with a new sewer. A separate storm drain will also be constructed but it will be discharging to the existing downstream combined sewer until such time as a new storm drain can be constructed to replace the downstream combined sewer. Approximately 1,700 LF of sewer ranging in size from 8-inch to 18-inch will be installed. New sewer manholes along with the disconnection of all sewer services from the combined sewer and reconnection to the new sewer will also be included in this project. The estimated annual Infiltration to be removed is 0.05 mgd (MWRA Project No. WRA-P9-11-3-945).

MWRA I/I Local Financial Assistance Program: The community has financed thirteen (13) I/I reduction projects through the Authority's funding assistance program. Of the \$6,870,100 allotted through the Program's Phases 1 - 10, the community has \$1,319,000 remaining in funding assistance.

12. DEDHAM: South System

Background Information:

- Miles of Sewer: 95
- Sewered Population: 23,098
- Three Year (CY13 - CY15) Annual Average I/I: 1.67 mgd
- MassDEP Administrative Actions: AO Docket No. 547 (October 1985)

Latest I/I or SSES Report: Town-Wide Flow Monitoring (October 2011)
Municipal Building Inspections (October 2012)
2012 Inflow Investigation (February 2013)
I/I Investigation & Rehabilitation Annual Program (February 2013)
2013 Year One Inflow Investigation (March 2014)
2014 Smoke Testing Program (March 2015)

Private Source Inflow Removal Program: The Town adopted a sewer system enterprise fund at the May 2009 Town Meeting. A Municipal Buildings Inspection Program was undertaken to identify inflow sources. Inspections identified approximately 78,231 GPD of peak inflow. The Town removed the 78,231 GPD of peak inflow during CY15-16. The Town is also in the early stages of developing a private inflow removal policy.

Weston & Sampson was contracted to conduct smoke testing on approximately 140,000 LF of sewer to identify potential inflow sources. Testing results indicated 27 inflow sources contributing approximately 78,231 GPD of peak design storm inflow. Of the 27 defects identified, six were located within the Town's ROW. These six defects were rehabilitated by the Town's DPW in CY14-CY16.

Weston & Sampson was contracted to conduct additional smoke testing on approximately 195,000 LF of sewer to identify potential inflow sources. This round of smoke testing finished the remainder of the Town's sewer system. Testing results indicated 33 inflow sources contributing approximately 66,111 gpd of peak design storm inflow. Of the 33 defects identified, 12 were located within the Town's ROW. These 12 defects are scheduled for rehabilitation in Summer 2016.

Weston & Sampson was also contracted to conduct Private Building Inspections within three of the Town's seven precincts. This program was promoted throughout the community as voluntary. The Town provided penalty amnesty to all residents/commercial property owners who participated. There were 3581 locations within the three precincts. Only 1510 property owners (42%) permitted inspections. Of the 1510 inspections performed, fifty-seven (57) direct and one (1) indirect inflow sources were observed (contributing 418,951 gpd of estimated peak inflow). These sources consisted of thirty-seven (37) sump pumps, one (1) floor drain, nine (9) interior open cleanouts, four (4) exterior open cleanouts, five (5) direct driveway drains, one (1) indirect driveway drain and one (1) roof leader. Due to low program participation, the Town is not going to perform private building inspections within the remaining four (4) precincts at this time. The Town is

currently working on how best to revamp the program for better participation and reviewing the collected data for removal alternatives for the sources indentified. The Town is also in the early stages of developing a private inflow removal policy.

I/I Rehabilitation Projects in Design or Construction: The Town, as part of the 2015 Sewer Rehabilitation On-Call Services Project (MWRA Project Nos. WRA-P9-12-3-908 / 943), completed the installation of 37,155 LF of CIPP lining, 149 LF of short liners, 92 VF of cementitious manhole lining and 41 lateral liners. The Town anticipates the installation of an additional 16,000 LF of CIPP liners, 210 LF of short liners, 1850 VF of cementitious manhole lining and 191 lateral liners. The project will remove an estimated 0.80 mgd of peak infiltration.

The community also continued its annual sewer system inspection program. In March 2016, the Town began cleaning and TV inspecting 120,000 LF of sewer main and inspecting 500 sewer manholes. The Town plans to utilize this data, along with previous year's backlog work, to perform CY17 rehabilitation on the most cost-effective sewer lines/manholes utilizing an on-call rehabilitation contract.

Reporting Period Activity: Approximately 100 LF of sewer main extensions were installed throughout the Town by private developers. Upon completion of the extension projects, the Town took over ownership of the sewer mains.

MWRA I/I Local Financial Assistance Program: The community has financed sixteen (16) I/I reduction projects through the Authority's funding assistance program. The community has used its entire Phase 1 - 10 allocation of \$5,740,000.

13. EVERETT: North System

Background Information:

- Miles of Sewer: 57
- Sewered Population: 42,935
- Three Year (CY13 - CY15) Annual Average I/I: 1.76 mgd
- MassDEP Administrative Actions: ACOP-NE-08-1N006 (July 2008)
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-026 (August 2009)

Latest I/I or SSES Report:

Sanitary Sewer Overflow Abatement Plan – Behan & Beacham Street Area Final Report (December 2009)
I/I Investigation (July 2010)
Sanitary Sewer/Drain Investigation on Beacham Street (August 2012)
I/I Investigation (August-September 2013)

Private Source Inflow Removal Program: No additional inspections were reported during this period.

The developer for the Air Force Road expansion is being required to assume the cost of I/I mitigation (37,500 gpd) to offset the proposed wastewater flows associated with the project. The developer has been given specific areas to complete the required mitigation.

I/I Rehabilitation Projects in Design or Construction: Design of the Henderson Street & Otis Sewer Replacement was completed and bid. The work has not started because of the need to replace the gas main. The original bid has been cancelled and is being rebid due to contamination found in areas of the roadway during the gas main relocation.

The construction of the sewer & drain in Orient Ave, which was awarded in July 2015 to J. D'Amico & Sons was completed in November 2015.

Fremont Ave Drainage Separation is complete and closed out.

The design of the Catch Basin Redirection Project has been awarded to CDM Smith, who is currently performing investigations for the design phase.

Reporting Period Activity: In November 2015, funds were distributed for the following 3 projects: 1.) Design & Construction of Sewer Replacement in Henderson, Otis & Bow St. Internal TV Inspection performed in these sewers indicated numerous areas of fractured, broken, crushed pipe and significant sags such that the only method of rehabilitation

was complete replacement. This project involves the design and construction for the replacement of approximately 1,100 LF of 8" pipe and manholes. The specific locations and approximate lengths are: Henderson St – 370 LF; Otis St – 330 LF; Bow St. – 400 LF. The close proximity of the existing 18" storm drain in Henderson St to the existing sewer also requires its replacement which involves 275 LF of 18" pipe, 4 manholes, 4 catch basins and all appurtenances; 2.) Fremont Avenue Drainage Separation During the roadway reconstruction contract which involved the reconstruction of Fremont Avenue, two (2) catch basins (one at the Chelsea City line & one at the intersection of Lincoln St & Fremont Ave) were found to be connected to the sewer system. The City directed the contractor to install a 10" PVC pipe along Fremont Ave from the catch basin at the Chelsea Line to Lincoln St to the existing storm drain on Harvard St (a length of 626 LF. This work also involved the replacement of 1 catch basin and the installation of 2 manholes and all appurtenances; 3.) Design & Construction of Sewer Replacement in Orient Avenue Internal TV Inspection performed in the sewer segments on this street indicated numerous areas of fractured, broken, crushed pipe and significant sags such that the only method of rehabilitation was complete replacement. This project involves the design and construction for the replacement of approximately 590 LF of 8" pipe and manholes. The close proximity of the existing 12" storm drain in Orient Avenue to the existing sewer also requires its replacement which involves 550 LF of 12" pipe, manholes, catch basins and all appurtenances. It is anticipated that this project will remove an estimated 0.01 mgd of annual infiltration and 0.20 mgd of annual inflow. (MWRA Project No. WRA-P9-13-3-932)

In February 2016, funds were distributed for the following 2 projects: 1.) Catch Basin Redirection Project. This project involves the design, development of Contract Documents, assistance during bidding and construction for the redirection of 46 catch basins throughout the City which are presently discharging to the sewer system. This project will include the installation of approximately 7,000 LF of 12" – 36" diameter storm drain pipes. Catch basins and manholes as well as potential Best Management Practice design such as leaching catch basins, pervious pavement etc. will also be included. The work will also include TV inspection of approximately 10,000 LF of 8" – 18" diameter sewers and inspection of approximately 60 manholes in the vicinity of the proposed storm drainage work. The specific location of the work is outlined in yellow in Table A-1 of the draft Engineering Agreement; 2.) Sewer System Metering Project. Under this project, continuous reading flowmeters will be installed at 10 locations throughout the City for a period of 12 weeks during the months of March, April & May 2016. The flow data from these flow meters along with the flow data from the MWRA Flowmeters located within the City will be collected and analyzed. Two (2) rain gages are also being installed.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$8,071,500 allotted through the Program's Phases 1 - 10, the community has \$2,842,000 remaining in funding assistance.

14. FRAMINGHAM: South System

Background Information:

- Miles of Sewer: 275
- Sewered Population: 67,680
- Three Year (CY13 - CY15) Annual Average I/I: 2.85 mgd
- MassDEP Administrative Actions: ACO-NE-07-1N001 (March 2007)
AO Docket No. 592 (January 1986)

Latest I/I or SSES Report: Town-Wide I/I Study / SSES Phase 1 / CWMP (Complete)
SSES Phase 2 (Complete); SSES Phase 3 (Complete)
SSES Phase 4/5 (Complete); Blackberry Lane SSES (Complete)

Private Source Inflow Removal Program: The Town's ten year capital plan now includes three phases of inflow removal projects. The first phase is scheduled for funding in the FY17 budget cycle. The Town is currently developing capital projects that will incorporate the removal of the illicit connections identified during the field reconnaissance efforts of the SSES programs. The capital project program will include the redirection of illicit flows as well as the extension of storm drain systems to remove flow from the sewer system. During this year's capital project development cycle, the Town will determine the proposed rehabilitation areas and improvements required in order to further refine the costs and timing of the actual inflow removal projects. The Town has begun drafting the scope of work for this first phase of projects.

The Town conducted dye testing of roof leaders on three condominium buildings located at 1321-1325 Worcester Road and found them to be directly connected into the sanitary system. The roof's overall surface area is 43,125 sf. Inflow volume generated from these sources (from a one year, six hour design storm) is approximately 42,000 gpd. Removal of these inflow sources will be performed as part of the New England Center for Children expansion process.

I/I Rehabilitation Projects in Design or Construction: The Main Street Area Sewer Improvements Project (Contract PW 291 / MWRA Project No. WRA-P9-14-3-920) is substantially complete. Project work included the replacement of approximately 1460 LF of 8-inch sewer main; replacement of approximately 450 LF of sewer service laterals; CIPP lining of approximately 2750 LF of 8-inch sewer main and the replacement of approximately 24 sewer manholes. The project's work area includes: Main Street / Granite Street / Moulton Park Road / Maple Street.

The Central Street Siphon / Sudbury River Interceptor Project consisted of CIPP lining 4000 LF of 18-inch sewer in a wetland area of the Sudbury River and the replacement of 4000 LF of 8-inch sewer with an 18-inch interceptor. The new configuration eliminates two siphons under the Sudbury River and will eliminate a bottleneck that had generated a seasonal sanitary sewer overflow. Project work is complete.

Reporting Period Activity: The existing gravity sewer on Bethany Road was replaced with a PVC sewer between Waverly Street and Winthrop Street as part of a project to improve the water/sewer infrastructure in this area. The Town also completed the Winthrop/Waverly sewer re-alignment project. This project re-routed a portion of gravity sewer, which had run beneath a building on private property, to a new location in the right-of-way through formalized easements. A sewer main on Kendall Lane was also replaced utilizing Town forces. Town forces / on-call service providers performed 14 point repairs, installed 29 short liners (approximately 155 LF) and rehabilitated 40 sewer manholes.

MWRA I/I Local Financial Assistance Program: The community has financed twelve (12) I/I reduction projects through the Authority's funding assistance program. Of the \$12,125,000 allotted through the Program's Phases 1 - 10, the community has \$6,250,350 remaining in funding assistance.

15. HINGHAM: South System

Background Information:

- Miles of Sewer: 33
- Sewered Population: 6,809
- Three Year (CY13 - CY15) Annual Average I/I: 0.81 mgd
- MassDEP Administrative Actions: AO Docket No. 536 (November 1985)

Latest I/I or SSES Report: Comprehensive Wastewater Management Study (August 2010)
I/I Investigations Letter Report (June 2012)
FY14 I/I Evaluation (January 2014)
FY15 I/I Evaluation (April 2014)
FY15 Evaluation Amendment 1 (November 2014)
2015 Town-Wide Flow Metering (February 2015)
FY16 Evaluation (February 2016)
FY17 Evaluation (Ongoing)

Private Source Inflow Removal Program: The house-to-house sump pump inspection and roof leader disconnection programs in the Downtown area are ongoing. Lateral camera inspections were undertaken within the Bradley Woods area.

I/I Rehabilitation Projects in Design or Construction:

Beach Manhole Rehabilitation: Rehabilitation of nine manholes within the Kimball / Foley / Bel Air Beach area. Project work (MWRA Project No. WRA-P8-15-3-828) completed November 2014.

2013 I/I Rehabilitation: Replacement of 350 LF of sewer and 14 lateral connections. Project work (MWRA Project No. WRA-P8-15-3-828) is complete.

FY14 Annual Sewer Program: Review TV inspection videos of approximately 10,000 LF of sewer main. Conduct topside physical survey of 60 sewer manholes. Identified sewer main/manhole defects to be repaired as part of On-Call I/I Rehabilitation Services Contract. FY14 Sewer System I/I Investigation (MWRA Project No. WRA-P8-15-3-828) completed December 2013. FY14 Rehabilitation Construction (MWRA Project No. WRA-P8-15-3-828) completed August 2014.

FY15 Annual Sewer Program: Review TV inspection videos of approximately 11,500 LF of sewer main. Conduct topside physical survey of 65 sewer manholes. Identified sewer main/manhole defects to be repaired as part of On-Call I/I Rehabilitation Services Contract. FY15 Sewer System I/I Investigation (MWRA Project No. WRA-P8-15-3-828) completed Spring 2014. FY15 Rehabilitation Construction (MWRA Project No. WRA-P9-15-3-913) completed August 2015.

FY16 Annual Sewer Program: Review TV inspection videos of approximately 27,000 LF of sewer main. Conduct topside physical survey of 174 sewer manholes. Identified sewer main/manhole defects to be repaired as part of On-Call I/I Rehabilitation Services Contract. FY16 Sewer System I/I Investigation (MWRA Project No. WRA-P9-15-3-913) completed December 2015. FY16 Rehabilitation Construction (MWRA Project No. WRA-P9-15-3-934) is ongoing.

Town-Wide Wastewater Flow Monitoring Program: Flow monitoring work at eight pump stations and four manholes (MWRA Project No. WRA-P9-15-3-913) completed December 2015.

Reporting Period Activity: Ship Street and Street Sewer Extensions are ongoing (total length of extension is approximately 1800 LF of PVC sewer pipe). Eighty (80) LF of low pressure force main was installed on Alden Road.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. The community has used its entire Phase 1 - 10 allocation of \$1,632,500.

16. HOLBROOK: South System

Background Information:

- Miles of Sewer: 31
- Sewered Population: 9,671
- Three Year (CY13 - CY15) Annual Average I/I: 0.38 mgd
- MassDEP Administrative Actions: ACOP-NE-04-1001
(Signed January 2005; Amended July 2007)
(Amended ACO No. 2 May 2008)

Latest I/I or SSES Report: I/I Inspections Report (July 2006); DEP ACO Progress Report (June 2008); CWSRF No. 2919 Contract No. 1 (October 2009)

Private Source Inflow Removal Program: House-to-House inspections continue. All new home construction inspected by the DPW and Town Plumbing Inspector. The State has approved the Town's Sewer Bank Policy.

I/I Rehabilitation Projects in Design or Construction: Manholes inspections (300 total) were conducted primarily in Sub-areas A/F/G/H(8). TV inspection was conducted on 10,500 LF of sewer in Sub-areas H(7) and H(8).

Reporting Period Activity: The Town has completed its yearly check of all cross-country sewer manholes. Phase 3/4 properties associated with collection system expansion are now being connected at owner's request. Phase 5 System Extension (Spring Street Area) and Spring Street Pump Station work is complete. Plymouth Street System Extension has been completed. Abington Avenue sewer work has also been completed.

MWRA I/I Local Financial Assistance Program: The community has financed two (2) I/I reduction projects through the Authority's funding assistance program. Of the \$1,639,600 allotted through the Program's Phases 1 - 10, the community has \$743,038 remaining in funding assistance.

17. LEXINGTON: North System

Background Information:

- Miles of Sewer: 170
- Sewered Population: 33,030
- Three Year (CY13 - CY15) Annual Average I/I: 2.58 mgd
- MassDEP Administrative Actions: ACO-NE-11-015 (July 2011)

Latest I/I or SSES Reports:

Annual Town-wide Sewer Investigation & Implementation Program Final Report (October 2011)
Sewer Basins 3, 9 & 10 Smoke Testing, Dye Testing & Dye Flooding Program Final Report (January 2012)
Sewer Use Code Review Final Report (February 2012)
Private Inflow Removal Program Final Letter Report (February 2012)
Sewer System Evaluation Survey – Phase III Final Report (April 2012)
Surcharged Areas Evaluation Final Report (April 2012)
Sewer System Evaluation Survey Phase 4: Sewer Basins 3 & 9 (May 2013)
Sewer System Evaluation Survey – Manhole Inspections in Sewer Basin 14 (August 2013)
Sewer System Evaluation Survey – Phase 5: Sewer Basins 4, 5 & 14 (May 2015)
Sewer System Evaluation Survey – Phase 6: Sewer Basins 2, 11 & 13 (March 2016)

Private Source Inflow Removal Program: The Town is using the February 2012 *Lexington Sewer Use Code Review* to update their current regulations to incorporate a sewer bank or other funding options that may be adopted by the town. A private inflow program based on the February 2012 Private Inflow Removal Program Letter Report is currently on hold.

I/I Rehabilitation Projects in Design or Construction: Warranty inspection and retesting for the Phase 4 Study Area SSES and Mill Brook Area Sewer Rehabilitations (Contract #14-40) was completed in May 2016. The final paperwork for this project is being processed.

Bids for the “Phase 5 Sewer System Improvements for Sewer Basins 4, 5 & 14” (Contract #16-35) were accepted on September 28, 2015. The Contract was awarded to Green Mountain Pipeline Services. Construction was completed in June 2016 and retesting will be performed in the spring of 2017.

Reporting Period Activity: The draft Sewer System Evaluation Survey for Sewer Basins 2, 11 & 13 (Phase 6) was completed in March 2016. This project identified approximately 670,000 gpd of removable peak I/I that is associated with the approximately 195,000 LF of sewer in these three sewer basins. A design for a portion of this work will be performed in 2016.

At the Town's Main (North Lexington) Pump Station, major capital improvements are being designed to improve the function of the force main and to save energy. The force main produces hydraulic transients when pumps shut off. The transients cause major water hammer noise and vibration which may be damaging the force main and certainly adversely affect the quality of life for the abutting residents. Modifications to the station addressing the problem and other functional improvements have begun and will continue in 2015 and 2016.

In August 2015, funds were distributed for the additional cost for the Construction of Sewer & Manhole Rehabilitations in Phase 5 Area (Sewer Basins 4, 5 & 14) and associated Engineering Services during Construction. This project was originally funded under MWRA Project No. WRA-P9-17-3-916 (see above paragraph). (MWRA Project No. WRA-P9-17-3-928).

In February 2016, funds were distributed for the I/I Investigation in Phase 7 Area (Sewer Basins 8 & 12). This Study will identify and quantify sources of Infiltration and Inflow (I/I) in the sanitary sewer system in the Phase 7 Area (Sewer Basins 8 & 12). The expected field investigations will include, but not be limited to: conducting top side physical survey as many as 900 sewer manholes for sources of I/I; conducting flow isolation of as many as 130,750 LF of sanitary sewer; cleaning and internal TV inspection of as many as 152,300 LF of sewer; updating of sewer mapping/GIS database; preparing a draft and final report on the results of the field investigations which will include data analysis, cost-effectiveness analysis and recommendations for sewer rehabilitation along with preliminary design concepts. (MWRA Project No. WRA-P9-17-1-938).

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. The community has used its entire Phase 1 - 10 allocation of \$7,445,300.

18. MALDEN: North System

Background Information:

- Miles of Sewer: 100
- Sewered Population: 60,206
- Three Year (CY13 - CY15) Annual Average I/I: 3.47 mgd
- MassDEP Administrative Actions: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-002 (January 2009)

Latest I/I or SSES Report:

Malden Sewer System Evaluation Survey (Phase III) Final Report (December 2011)
Hydraulic Model and Capacity Assessment Draft Report (June 2012)
Hydraulic Model and Capacity Assessment Final Report (December 2012)

Private Source Inflow Removal Program: No additional inspections were reported. The City continues to monitor potential private Inflow sources.

I/I Rehabilitation Projects in Design or Construction: During the work conducted on 2014-S-1 two locations with extensive cracks and partial collapse were identified. The conditions did not allow for lining to be installed in the sewer main. Spot repairs are necessary. Construction documents are being prepared by Malden and CDM Smith with the work anticipated to take place in the fall of 2016. The two locations are: Mountain Ave. in the area of #107 replacing approx. 200 LF of 8" PVC sewer main, and Broadway @ Bayrd St replacing approx. 50 LF of 10" PVC sewer main.

Reporting Period Activity: No other activities.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the \$12,283,900 allotted through the Program's Phases 1 - 10, the community has \$7,690,000 remaining in funding assistance.

19. MEDFORD: North System

Background Information:

- Miles of Sewer: 113
- Sewered Population: 57,113
- Three Year (CY13 - CY15) Annual Average I/I: 3.15 mgd
- MassDEP Administrative Actions: NON-NE-00-1005
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-027 (August 2009)

Latest I/I or SSES Report:

Limited Sewer System Evaluation Survey of North Medford/Heights Area Final Report (July 2012)
Mini-System "P" Sewer System Evaluation Survey Study Final Report (June 2014)

Private Source Inflow Removal Program: The City is continuing to work with a property owner in mini-system D to remove inflow sources from their property into the sewer system.

I/I Rehabilitation Projects in Design or Construction: The sewer rehabilitation contract developed as a result of the "Limited Sewer System Evaluation Survey of North Medford/Heights Area" Final Report has been awarded and construction is ongoing. During the last year the following sewer rehabilitation work has been completed: replaced 1,176 LF of 8-inch sewer and 232 LF of 12-inch sewer at 5 locations; replaced 36 sewer service laterals; replaced 5 manholes.

A design contract is underway to disconnect six catch basins in Mini-system N as recommended in the SSES report. A preliminary design has been accepted and a task order is being executed to provide Contract Documents.

Reporting Period Activity: The City is currently reviewing a cost proposal to begin further study in the Medford Heights area. Work could start as early as fall 2016.

The City is currently reviewing a cost proposal to begin further study in the Mini-P area. Work could start as early as fall 2016, working concurrently with the Medford Heights study. A proposal is also being reviewed to prepare plans & specifications to address the necessary structural repairs and eliminate I/I sources found during the study. It is anticipated the construction documents will be ready for bid by January 2017 for a spring construction start.

In August 2015, funds were distributed for the following 4 projects: Project #1: Sewer System Rehabilitation Program Ongoing 3 Year Contract The City currently has a 3 Year Task Order Contract with D'Allessandro Corp. for performing sewer rehabilitations throughout the City. The first year of this contract is ending with Year 2 starting in August 2015 and Year 3 in August 2016. Funds are being allotted for the completion of Year 1 (\$180,006), all of Year 2 (\$616,000) & Year 3 (\$646,584) and engineering services during construction for Year 2 & 3. The rehabilitation will include the sewer and manhole rehabilitation work as shown in Tables 1 & 2 of Section 01010 Summary of Work of the Contract Specifications. This work will include: installation of cured-in-place manhole-to-manhole pipe liners; dig & replace sewer pipes; replacing of manholes; cementitious lining of manholes; various manholes repairs (corbel, bench & trough); replacing manhole frames & covers; all other related tasks and appurtenances; Project #2: North Medford SSES – Phase 2 This Project will identify defects in the sewer system that contribute to infiltration and inflow (I/I). Under this Phase 2 the following investigations will be performed: smoke/dyed-water testing (50,000 LF) in those sub-basins not tested during the Phase 1 SSES which are sub-basins A2, C, E, F, G & H; manhole inspections (208) in sub-basins A1, A2, B, D, E, F, G & H; nighttime flow isolation (120,000 LF) in sub-basins A1, A2, D, E, F, G & H; TV inspection (20,000 LF) in sub-basins with high infiltration rate from the flow isolation; preparing draft and final report on the results of the field work which will include cost-effectiveness analysis and recommendations for sewer rehabilitation; Project #3: Removal of Catch Basin Inflow in North Medford This Project involves the design and construction for the removal of Inflow from six (6) catch basins that currently discharge to the sewer system in the Heights area of North Medford. For 3 catch basins located in the Mangles St area, approx. 600 LF of storm drain will be constructed to an existing drain manhole on Wilson St. For 2 catch basins in the Taft/Guild St area, a new storm drain will be constructed. The catch basin located over an open sewer pipe in Morrison St will be removed; the sewer pipe repaired and a new catch basin with storm drain connected to a new manhole in Clematis Rd. will be installed; Project #4: Mini-System P SSES-Phase 2 Study, Design, Bidding of Sewer Rehabilitations For the SSES Phase 2, flow isolation (40,000 LF), manhole inspections (104) and television inspection (16,000 LF) will be conducted in sub basins P-3 & P-4. A draft and final report will be prepared on the results of the field work which will include cost-effectiveness analysis and recommendations for sewer rehabilitation. For the sewer rehabilitations design & bidding, contract documents will be prepared based on the recommendations from the "Sewer System Evaluation Survey of Mini-System P" Report dated June 2014. The estimated annual I/I removal for Project #1 is 0.70 mgd and the estimated annual Inflow removal for Project #3 is 0.01 mgd. (MWRA Project No. WRA-P9-19-3-927).

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$11,987,600 allotted through the Program's Phases 1 - 10, the community has \$5,073,000 remaining in funding assistance.

20. MELROSE: North System

Background Information:

- Miles of Sewer: 74
- Sewered Population: 27,662
- Three Year (CY13 - CY15) Annual Average I/I: 2.32 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:

I/I Rehabilitation Project Recommendations (November 2001)
Summary Letter Report for Sewer System Investigations - Subareas 21 & 22 (May 2014)
Summary Letter Report for Sewer System Investigations & Mapping (August 2014)
City-wide I/I Flow Metering (Spring 2016)

Private Source Inflow Removal Program: No inspections were reported during this period. Based upon the results of the Spring 2016 City-wide Flow Metering Project, the City intends to target areas for future private Inflow investigations. In June 2016, the Board of Aldermen voted in favor of an ordinance to increase the City's infiltration and inflow mitigation fee from \$2.14 per gallon per day (gpd) to \$6.89/gpd. This revised cost reflects the actual cost of the Subarea 21 and 22 project per gpd of I/I removal, accounting for design, construction, and construction administration costs.

I/I Rehabilitation Projects in Design or Construction: The construction of the "Subareas 21 & 22 – Sewer Rehabilitation Project" was completed in December 2015. All work listed below was completed as part of this project, which spanned from summer 2014 through December 2015:

- Approximately 10,100 linear feet of cast-in-place manhole-to-manhole liners installed in 8 to 12-inch pipe
- 50 service connections were tested and sealed
- Approximately 30,000 LF feet of pipe was cleaned and CCTV inspected
- Approximately 1,000 sewer main joints were tested and 640 were sealed
- Approximately 90 LF of short liners were installed in 8 and 10-inch pipe
- Three open-cut sewer main repairs were performed
- Approximately 5,400 LF of chemical root control treatment
- Approximately 22,000 LF of post-construction flow isolation was conducted to quantify results

The estimated I/I removal based on the post-construction flow isolation was 132,600 gpd, which comprised an estimated 55% of the I/I in the target subareas.

In addition, a short liner to seal an abandoned service connection at Melrose's Public Library was installed on October 21, 2015.

Reporting Period Activity: In spring 2016, the City retained the services of Raftelis/Woodcock and Associates to review the water and sewer rate structure and recommend improvements. The City's Board of Aldermen voted to modify the tiered rate structure to have only two tiers (rather than three) and to increase both water and sewer base fees for FY17.

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I reduction projects through the Authority's funding assistance program. Of the \$6,076,300 allotted through the Program's Phases 1 - 10, the community has \$2,162,000 remaining in funding assistance.

21. MILTON: South System (Small Portion Tributary to the North System)

Background Information:

- Miles of Sewer: 83
- Sewered Population: 26,534
- Three Year (CY13 - CY15) Annual Average I/I: 1.54 mgd (south system)
- Three Year (CY13 - CY15) Annual Average I/I: 1.68 mgd (south and north system total)
- MassDEP Administrative Actions: Amended AO Docket No. 580 (March 1986)

Latest I/I or SSES Report: I/I Town-Wide Sewer Evaluation – Year 8 (January 2013)
I/I Town-Wide Sewer Evaluation – Year 9 (September 2013)
I/I Town-Wide Sewer Evaluation – Year 10 (February 2015)
I/I Town-Wide Sewer Evaluation – Year 11 (February 2016)
I/I Town-Wide Sewer Evaluation – Year 12 (Ongoing)

Private Source Inflow Removal Program: The Town is continuing to pursue the removal of sump pumps and other private inflow sources identified through a previously completed building inspection program. All new connections to the municipal sanitary sewer system will be charged a one-time I/I mitigation fee. Connection applicants must remove four gallons of I/I from the sewer system for each one gallon of new wastewater flow requested in the connection permit. If there are not sources of I/I that, at the discretion of the DPW Director, are appropriate for removal at the time of the permit, a monetary fee may be required (at a cost of \$3.00 per gallon of flow per day to be removed). Also, a building inspection is performed during the final water meter reading when a house is being sold. If the building inspection

identifies an illegally connected sump pump, a fine is issued and the house cannot be sold until the sump pump has been rerouted and inspected.

A pilot inflow investigation program was conducted during Fall/Winter 2015 which included smoke testing and internal building inspections. Building inspections were performed at 354 properties and identified 13 positive sources and 9 suspect sources.

I/I Rehabilitation Projects in Design or Construction:

Year 10 Sewer System Infiltration Rehabilitation is substantially complete. Warranty retest work completed Spring 2016. Year 10 project is estimated to have removed 73,296 gpd of infiltration from the Town's sewer system. Year 10 I/I Rehabilitation Investigation completed February 2015. TV inspection of 41,449 LF of sewer in Subareas G-08B, G-13 and G-25 revealed an estimated 130,320 gpd of peak infiltration. Topside manhole inspection of 205 manholes in Subareas G-08B, G-13 and G-25 revealed an estimated 37,152 gpd of peak infiltration.

Year 9 Sewer System Infiltration Rehabilitation is substantially complete. Warranty retest work completed Fall 2015. The Year 9 project is estimated to have removed 50,760 gpd of infiltration from the Town's sewer system. Year 9 I/I Rehabilitation Investigation completed September 2013. TV inspection of 50,550 LF of sewer in Subareas G-11A, G-11C, G-12B, G-12E, G-18, G-21, G-23, G-24, NI-13, NI-21 and S-15 revealed an estimated 94,752 gpd of peak infiltration. Topside manhole inspection of 259 manholes in Subareas G-11A, G-11C, G-12B, G-12E, G-18, G-21, G-23, G-24, NI-13, NI-21 and S-15 revealed an estimated 25,056 gpd of peak infiltration.

Year 8 Sewer System Infiltration Rehabilitation completed April 2014. Year 8 I/I Rehabilitation Design completed April 2013. Year 8 I/I Rehabilitation Investigation completed January 2013.

Reporting Period Activity: Year 11 I/I Rehabilitation Investigation completed Spring 2015. Data review/report preparation completed February 2016. TV inspection of 42,737 LF of sewer in Subareas G-08C, G-08D, G-10B, G-11D, G-13B and S-14 revealed an estimated 66,960 gpd of peak infiltration. Topside manhole inspection of 259 manholes revealed an estimated 22,032 gpd of peak infiltration. Year 11 Sewer System Infiltration Rehabilitation [MWRA Project No. WRA-P9-21-3-948 / Milton Contract S16-1] has been awarded with construction set to begin Summer 2016. It is estimated that the Year 11 project will remove 36,504 gpd of infiltration from the Town's sewer system.

Year 12 I/I Investigation (MWRA Project No. WRA-P9-21-3-948) began March 2016 and was completed June 2016. Data review and report preparation is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed eighteen (18) I/I reduction projects through the Authority's funding assistance program. Of the \$5,564,500 allotted through the Program's Phases 1 - 10, the community has \$1,828,000 remaining in funding assistance.

22. NATICK: South System

Background Information:

- Miles of Sewer: 135
- Sewered Population: 31,351
- Three Year (CY13 - CY15) Annual Average I/I: 1.16 mgd
- MassDEP Administrative Actions: AO Docket No. 593 (November 1985)

Latest I/I or SSES Report: Town-Wide SSES (Ongoing)

Private Source Inflow Removal Program: The SSES (MWRA Project No. WRA-P5-22-1-523) includes a house-to-house inspection component. Home inspections also have been conducted in conjunction with a water meter replacement program. The Town prepared an informational handout on eliminating sump pump connections to the wastewater system, which was distributed to targeted/suspect areas of the community.

I/I Rehabilitation Projects in Design or Construction: The Three Year Sewer Rehabilitation Project (Natick Contract No. S-127 / MWRA Project Nos. WRA-P7-22-3-761/825) was bid June 2013. Rehabilitation Construction began October 2013 with completion of identified rehabilitation work estimated to be Winter 2015/6. The contractor is under contract

through November 2016 and will be available to rehabilitate any additional sewer defects found during that time frame. The peak infiltration estimated to be removed is 0.61 MGD.

Additional sewer rehabilitation work includes CCTV and chimney inspection program (MWRA Project No. WRA-P9-22-3-912). To date, 98,952 LF of CCTV inspection has been completed. The chimney inspection program evaluates pre-1980 chimneys. Approximately 335 services meeting this criterion have been identified and inspected. The data obtained from these investigations is currently being reviewed to identify rehabilitation needs.

Reporting Period Activity: Heavey Estates (4 homes): Two homes have tied in; Cider Mill Estates: A sewer extension of 1462 LF of 8-inch PVC gravity sewer has been constructed. Five new homes have been connected. Six stubs were left for existing homes on Rockland Street. Only two Rockland Street homes have connected to date; Mill Creek Development (82 North Main Street): This past year, 700 LF of 8-inch PVC gravity sewer was installed for seven building connections, consisting of three apartment buildings, three townhouse buildings (12 townhomes total) and the Clubhouse. There are approximately 150 units within these structures. All seven buildings have connected to the sewer, but only two building connections, equivalent to seven townhomes, are live and in use. Hunters Hill Subdivision (11 homes): All 11 homes in this phase have tied in; Hunters Hill Subdivision (Phase II): This is a new second phase (12 single family homes) connected to the previously submitted Hunters Hill Subdivision. A sewer extension of 1031 LF of 8-inch PVC gravity sewer was installed in 2014. All 12 homes in this phase have tied in.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I reduction projects through the Authority's funding assistance program. Of the \$5,582,600 allotted through the Program's Phases 1 - 10, the community has \$1,129,800 remaining in funding assistance.

23. NEEDHAM: South System

Background Information:

- Miles of Sewer: 132
- Sewered Population: 28,089
- Three Year (CY13 - CY15) Annual Average I/I: 1.38 mgd
- MassDEP Administrative Actions: AO Docket No. 549 (November 1984)

Latest I/I or SSES Report: Sewer Infiltration Investigation for Subareas 16 and Lower 22 - Phase 2 Report (August 2011)
I/I Investigation (October 2013)
I/I Sewer Rehabilitation Assessment Project (January 2013)
Town-Wide Infiltration/Inflow Report (October 2013)
Phase I I/I Investigation Report (June 2015)
Reservoir B Tributary Investigation (July 2015)
Phase II I/I Investigation Report (August 2016)

Private Source Inflow Removal Program: A private source identification program, using Town-owned CCTV equipment, is ongoing.

I/I Rehabilitation Projects in Design or Construction: The Infiltration Rehabilitation (Subareas 16 / Lower 22 and Others) Project (MWRA Project Nos. WRA-P7-23-3-751 / Needham Contract No. FY 12-14-01) included design and construction of sanitary sewer infiltration reduction measures. Project work is complete. Project work included cleaning and TV inspection of 14,500 LF of sewer main; chemical root treatment of 650 LF of gravity sewer; cleaning, testing and sealing 800 LF of gravity sewer; installing 2200 LF of CIP liner; renewing three sewer service laterals; sealing 35 wyes; point repairs at 20 sections of gravity sewer; removing and replacing seven 20 foot sections of gravity sewer; removing and replacing 14 sewer manholes; and cleaning, sealing and coating the interior of four sewer manholes. An estimated 0.04 mgd of peak infiltration was removed from the collection system.

The Infiltration Rehabilitation (Subareas 16 / Lower 22) Project (MWRA Project Nos. WRA-P7-23-3-716/723 / Needham Contract No. FY 11-40-01) included design and construction of sanitary sewer infiltration reduction measures. Project work is complete. Project work included chemical root treatment of 13,300 LF of gravity sewer; cleaning, testing and sealing 14,300 LF of gravity sewer; grouting 17 services at the sewer main; point repairs at 17 sections of gravity sewer; removing and replacing twenty-two 20 foot sections of gravity sewer; removing and replacing one 80 foot section of gravity sewer;

and cleaning, sealing and coating the interior of 24 sewer manholes. An estimated 0.14 mgd of peak infiltration was removed from the collection system.

Reporting Period Activity: Town-Wide TV inspection of 178,000 LF of sewer main was completed as part of the Phase II I/I Investigation Report (over 680,000 gpd of peak infiltration observed). Twelve meters (ten permanent and two portable area velocity flow module) have been installed for continued I/I monitoring. 2014 Sewer Rehabilitation in Various Areas construction contract bid January 2015 (an estimated 14,320 gpd of peak infiltration will be removed). Project work is substantially complete. I/I Removal 2016 - Various Areas construction contract bid July 2015 (an estimated 49,620 gpd of peak infiltration will be removed). Project work is ongoing. Reservoir A Submersible Pump Station replacement was bid in June 2016. Replacement construction to begin November 2016.

Sewer Extensions: 105 LF of sewer pipe at Greendale installed by private developer; 1514 LF of sewer pipe on Farley Pond Lane installed by private developer; 620 LF of sewer pipe on Second Avenue installed by private developer; 323 LF of sewer pipe on Greendale Avenue installed by private developer; 262 LF of sewer pipe on Armen Way installed by private developer; 371 LF of sewer pipe on Putnam Road installed by private developer; 627 LF of sewer pipe on South/Chestnut Street installed by private developer; 209 LF of sewer pipe on Country Way installed by private developer; 145 LF of sewer pipe on High Street installed by private developer.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$6,257,600 allotted through the Program's Phases 1 - 10, the community has \$3,365,450 remaining in funding assistance.

24. NEWTON: North and South Systems

Background Information:

- Miles of Sewer: 271
- Sewered Population: 87,003
- Three Year (CY13 - CY15) Annual Average I/I: 7.26 mgd
- MassDEP Administrative Actions: ACO-NE-00-1001
ACOP-NE-96-1005 (March 1997)

Latest I/I or SSES Reports:

Commonwealth Ave Sewer/Underdrain Investigation Final Report (May 2011)
Newton Commonwealth Golf Course Sewer & Drain Evaluation Report (November 2012)
CIP – Project 1 Inspection & Assessment Final Report (November 2012)
CIP – Project 1, 2 & 3 Smoke Testing Final Report (November 2012)
CIP – Project 2 Inspection & Assessment Final Report (January 2014)
CIP – Project 4, 5, 6 & 7 Smoke Testing Report (February 2014)
Smoke Testing in Subareas B016, B022 & B029 Final Report (February 2014)
CIP – Project 3 Inspection & Assessment Report (January 6, 2015)
CIP – Project 4 Inspection & Assessment Report (February 19, 2015)
CIP – Project 5 Inspection and Assessment Report (November 2015)
Smoke Testing in Subareas B066 & B071 (March 2016)
CIP Project 1 Post Construction Flow Evaluation (April 2016)
CIP – Project 6 Inspection and Assessment Report (Ongoing)

Private Source Inflow Removal Program: Private Inflow Source Removal post 8/15 includes: 21 sump pumps, 2 open sewer cleanouts, 1 driveway drain, 5 roof leaders and 2 area drains.

I/I Rehabilitation Projects in Design or Construction: Design of the "CIP Project 3 & 4 Rehabilitations (Invitation for Bid #16-14) was completed. Bids were accepted on March 17, 2016. Contract has been awarded to Green Mountain Pipeline Services. Notice to Proceed was set for July 5, 2016. The estimated I/I removal is 362,025 gpd of Peak Infiltration, 109,940 gpd of Peak Rain-induced Infiltration and 123,384 gpd of Peak Inflow

Reporting Period Activity: Completed CIP Project 5 Inspection & Assessment which included cleaning and inspection of 112,267 LF of sewer.

In November 2015, funds were distributed for the Construction of CIP Projects 3 & 4 Sewer Rehabilitation. This sewer rehabilitation project includes a Base Bid and an Alternate Bid. The approximate scope of the work of the Base Bid includes but is not necessarily limited to: open cut repair of sewers at 39 locations; chemical root treatment of 23,419 LF of sewer and 66 manholes; installation of 33 LF of cured-in-place short liners; installation of 12 LF of structural cured-in-place short liners; 51,938 LF of cured-in-place pipe and reinstatement of 514 service connections; 15,375 LF of structural cured-in-place pipe and reinstatement of 187 service connections; installation of 9 cured-in-place lateral liners; cutting of 35 protruding service connection; inspecting, testing, and grouting of 20 service connections; cementitious lining of 4,740 vf of manholes; installation of 38 manhole frames and covers; building eight (8) manhole benches and inverts; installation of 144 manhole inflow dishes; installation of 47 vf of internal drop connections; grouting to stop leaks at 69 manholes; installing one (1) plug in storm drain pipe in sewer manhole B001-13; installing two (2) plugs in manhole B001-5 to abandon upstream sewer; redirecting of two (2) underdrain access ports; sealing of 27 underdrain access ports; sealing of four (4) underdrain inverts; sealing cavern and redirecting access port at five (5) locations; cleaning and inspection of 9,785 LF of sewer; and post construction flow evaluation of 67,313 LF of sewer. The approximate scope of the work of Alternate Bid No. 1 includes but is not necessarily limited to: installation of 110 cured-in-place lateral liners and cutting of two (2) protruding service connections. The estimated Peak Infiltration removal is 0.362 mgd; The estimated Peak Rain-induced Infiltration removal is 0.110 mgd. The estimated Peak Inflow removal is 0.123 mgd. (MWRA Project No. WRA-P9-24-3-924).

MWRA I/I Local Financial Assistance Program: The community has financed twenty-seven (27) I/I reduction projects through the Authority's funding assistance program. The community has used its entire Phase 1 - 10 allocation of \$21,197,400.

25. NORWOOD: South System

Background Information:

- Miles of Sewer: 83
- Sewered Population: 28,795
- Three Year (CY13 - CY15) Annual Average I/I: 2.68 mgd
- MassDEP Administrative Actions: AO Docket No. 534 (July 1983)

Latest I/I or SSES Report: Hawes Brook Sewer Evaluation (July 2009)
Washington Street Sewer Evaluation (September 2009)

Private Source Inflow Removal Program: As part of the Meadowbrook Area Sewer Inspection, ten buildings were inspected for illicit connections. Eleven illegal connections removed to date. Within the Hawes Brook sewer tributary area, eight private property owners have been notified to redirect sump pumps.

I/I Rehabilitation Projects in Design or Construction: Hoyle Street Area (Hospital Area @ Meadowbrook) Sewer System Rehabilitation Project (MWRA Project No. WRA-P8-25-3-814) is substantially complete. Rehabilitation work under this project includes the installation of CIP liner in 2100 LF of sewer main, lining 10 sewer manholes and CIPP lining 45 house service connections. Underdrain Manhole Rehabilitation Project (MWRA Project No. WRA-P9-25-3-917) is substantially complete. Hawes Brook-Westover Parkway Area Sewer Rehabilitation Construction complete. Meadowbrook Area Sewer Rehabilitation Project is substantially complete. Rehabilitation work under this project includes the installation of CIPP liner in 8190 LF of sewer main, manhole rehabilitation and the CIPP lining of 299 service connections. Hospital and Florence Avenue Areas Sewer Rehabilitation (SRF Project) is complete. Project work included CIPP lining 7500 LF of 6 to 12-inch sewer main, manhole rehabilitation and CIPP lining 100 house service connections. Area 3 and Area 4 Sewer Rehabilitation Project is ongoing. Rehabilitation work under this project includes the installation of CIPP liner in 8245 LF of sewer main, CIPP lining of 217 service connections, manhole rehabilitation and installation of 605 LF of 8-inch PVC sewer main.

Reporting Period Activity: I/I Assessment and GIS Tracking Program (MWRA Project No. WRA-P9-25-1-919) work is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed nineteen (19) I/I reduction projects through the Authority's funding assistance program. Of the \$6,879,400 allotted through the Program's Phases 1 - 10, the community has \$2,645,901 remaining in funding assistance.

26. QUINCY: South System

Background Information:

- Miles of Sewer: 202
- Sewered Population: 93,494
- Three Year (CY13 - CY15) Annual Average I/I: 5.02 mgd
- MassDEP Administrative Actions: AO Docket No. 644 (October 1986)

Latest I/I or SSES Report: Tidal I/I Source Identification Study (July 2009)
Coastal Pipeline Inflow Investigation Study (January 2010)
Quincy SSES (May 2011)
Additional Coastal CCTV Investigations (July 2011)
Downtown I/I Mitigation - New Quincy Center FEIR (November 2012)
Adams Green CCTV Inspections (June 2014)
Coastal Structures I/I Evaluation (Ongoing)
Coastal I/I Evaluation: Salinity (August 2014)
Quincy Point Force Main Evaluation (October 2014)
Wollaston Beach Water Quality (September 2015)
Sea Street CCTV Assessment (January 2016)
NW Quincy Sewer Interceptor TV Inspection (February 2016)
SSES & I/I Identification Plan (Ongoing)

Private Source Inflow Removal Program: Storm Water Discharge Ordinance has been approved. The ordinance forbids non-sanitary connections. A new fee structure was made effective July 1, 2013 and outlines penalties for illegal connections/discharges to the sanitary sewer system (<http://www.quincyma.gov/government/pwd/watersewerfees.cfm>). The fee structure mentioned remains in effect and has resulted in improvements to the system.

Developers contribute one percent of total project value to the Sewer Rehabilitation Fund. Additionally, the City has begun to implement 310 CMR 12.04 and require those new connections whose flow exceeds 15,000 GPD to continue to the 4:1 removal required under the regulations. This regulation is enforced during the site plan review process.

The City owns a CCTV sewer inspection vehicle. The vehicle provided significant input towards the development of the Tidal I/I Source Identification Study. Also, many of the open cut and rehabilitation repairs on the Phase IIB I/I Reduction Project (detailed below) were identified via the City's CCTV truck during I/I investigative efforts in the Houghs Neck area.

I/I Rehabilitation Projects in Design or Construction: It is anticipated that the City will be completing a significant amount of I/I reduction work over the coming years based upon the results of the July 2009 Tidal I/I Source Identification Study.

Coastal manhole inspections were completed Summer 2009 with rehabilitation design completed Winter 2010. In March 2010, the City awarded a construction contract to Aqualine Industries to conduct sewer manhole rehabilitation in coastal areas. The Coastal Manhole Rehabilitation Construction Contract I was completed during Summer 2011. Work included the rehabilitation of 139 manholes and is estimated to have removed approximately 0.50 mgd of I/I. This work was partially funded through the MWRA I/I Local Financial Assistance Program.

Additional manhole inspections and sewer CCTV inspections were conducted during 2010/2011. Recommendations from this work resulted in the Coastal Structures I/I Reduction Project - Phase IIA (MWRA Project No. WRA-P7-26-3-737). This project was bid in August 2011. Rehabilitation construction is now complete. Warranty retesting work was performed in Spring/Summer 2013. Phase IIA work is estimated to have removed 0.85 mgd of peak I/I.

The Coastal Structures I/I Reduction Project - Phase IIB (MWRA Project No. WRA-P9-26-3-903) was bid in June 2015. Construction commenced in Spring 2016 and is scheduled for completion Fall 2016. Work proposed under this phase includes cleaning & TV inspection of 13,710 LF of sewer main and 103 service laterals and CIPP lining of 6870 LF of sewer main and 66 service laterals in the Houghs Neck / Sea Street / Black's Creek / Furnace Brook Parkway areas. Phase IIB work is estimated to remove 0.65 mgd of peak I/I. The project also includes the cleaning, CCTV inspection and condition assessment of 4600 LF of sewer main within areas of suspected high groundwater or coastal impact (Black's Creek and St. Moritz Pond).

Dysart Street I/I Rehabilitation was previously designed for repair within the above Phase IIB contract. However, this sewer completely collapsed in late April 2014 and was subsequently replaced. This repair work is estimated to have removed 0.04 mgd of peak infiltration.

Mallard/Post Island Road I/I Rehabilitation was an open cut repair of 70 LF of 24-inch sewer main that runs through an easement from Mallard Road to Post Island Road. Repair work was performed August 2013. This section of sewer was previously identified for CIPP structural liner installation but collapsed prior to lining. A repair of the upstream sewer main reach was completed Spring 2011 and a full length CIPP liner of the downstream sewer main reach was completed to Sea Street in 2012. To complete the work in this area, a final CIPP liner was installed in Summer 2014. This repair work is estimated to have removed 0.18 mgd of peak I/I. This sewer main abuts the Quincy Bay seawall and the infiltration is believed to be tidally induced.

Grafton Street Sewer Repair: The City replaced 100 LF of 12-inch sewer that had collapsed. The collapsed sewer was allowing a substantial amount of infiltration into the downstream system and causing an indirect illicit connection to the nearby separated storm drain system.

Underground Technologies Downtown CCTV: MassDOT is currently working on a traffic redesign/streetscape project at the Historic Adams Green area in Downtown Quincy. As part of this areas' work, the City investigated their sewer and drain infrastructure and found some collapsed pipes and many in need of repair within the next 5-10 years. To protect the investment in the Downtown area, the City is in the preliminary rehabilitation design process. This work is expected to improve drainage and water quality conditions in the area. Rehabilitation Construction is ongoing.

Downtown Redevelopment I/I Mitigation: Also part of the Downtown redevelopment, the City and developer reached an agreement where I/I would be removed from the City's system at a 4:1 ratio to the new proposed sewer flows. In order to satisfy this requirement, both metering and CCTV inspections were completed in the Hospital Hill and Block 4 (Merchants Row) areas to quantify I/I.

Block 4 Infrastructure Upgrades: As part of the Downtown redevelopment, the initial Block 4 phase included upgrades of the sewer/storm drain system around the Hancock Street, Chestnut Street and Cottage Avenue triangle. This project is currently under construction with an anticipated completion of Spring 2018.

Reporting Period Activity: Salinity samples were collected from strategically selected coastal manholes at 15 minute intervals for 24 hours. From this data the City was able to estimate the peak/average percentage of saltwater flow and the volume of saltwater and harbor stage when infiltration begins to occur. Project work was completed in FY16. Data review/report preparation is ongoing. The Wollaston Beach Area SSES revealed 186,000 GPD of I/I to the sanitary sewer system. Rehabilitation design is ongoing. Replacement design of a 15 inch, 600 LF sanitary sewer main along Newbury Avenue is complete. Inspection of 7000 LF of sanitary sewer along Sea Street was completed. Minimal I/I identified along Pipe Segment 13032-13033 (Asset ID). No remediation measures were recommended.

A Sanitary Sewer Evaluation Survey (SSES) is ongoing (MWRA Project No. WRA-P9-26-13-944). Project work includes: (1) Smoke Testing 40,000 LF of sewer to identify segments of pipe with direct/indirect inflow sources. Smoke Testing will be conducted during periods of low groundwater and after sufficient time has elapsed from previous rainfall events; (2) Flow isolating 70,000 LF of sewer to quantify infiltration amounts within manhole-to-manhole segments of sewer. The inspection will be conducted between the hours of 12AM and 6AM when groundwater levels are typically at their highest and sanitary flows are at a minimum; (3) Cleaning, TV inspecting, videotaping and recording 75,000 LF of sewer. The TV inspection will be performed to locate problem areas and I/I sources within manhole-to-manhole segments of sewer; (4) Conducting topside physical survey of 500 sewer manholes for defects and I/I sources. A written log will be furnished for each manhole inspected; and (5) Preparing a SSES Summary Report that details areas in which the above work was performed, summarizing work completed to date and including recommendations, a cost-effectiveness analysis and prioritization analysis for rehabilitation of pipeline/manhole defects and I/I sources identified during this investigation. Estimated rehabilitation costs will also be provided. Also, develop a City-wide sewer system hydraulic model for critical lateral and interceptor sewers.

The City also completed its evaluation of the Quincy Point Pump Station and associated force main. A preliminary update design package was completed Spring 2015. The Quincy Point Pump Station Renovation Project is ongoing. The project has a design capacity of seven million gallons per day. The objective of the project is to prevent a potential sanitary sewer overflow due to equipment or force main failure. Project work includes replacing the pumps and installing variable speed drives; upgrading the sluice gates; replacing the odor control unit; improving power distribution; removing the underground storage tank; replacing the standby generator, improved lighting and wiring; replacing the HVAC and plumbing system;

structural and architectural improvements to the roof, ceiling, walls, and wetwell; and miscellaneous site work. The force main rehabilitation will include replacing the air release valves and applying corrosion protection to the force main within the air release structure. The project also includes heavy cleaning and TV inspection of 546 LF of 18-inch sewer and 485 LF of 27-inch sewer located upstream of the pump station. The project is scheduled to be completed in Fall 2016.

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$19,790,000 allotted through the Program's Phases 1 - 10, the community has \$6,153,000 remaining in funding assistance.

27. RANDOLPH: South System

Background Information:

- Miles of Sewer: 101
- Sewered Population: 33,423
- Three Year (CY13 - CY15) Annual Average I/I: 1.49 mgd
- MassDEP Administrative Actions: AO Docket No. 548 (July 1985)

Latest I/I or SSES Report: Amelian Road SSES (January 2003)
Internal TV Inspection Report (August 2010)
I/I Investigation – March 2010 Storm Events (July 2013)

Private Source Inflow Removal Program: The Town developed a sump pump inspection and amnesty program. As a result of the program, the Town was contacted by two hundred and two (202) homeowners having sump pumps. Internal inspections were completed to determine sump pump locations. One hundred twenty-one homes (121) were determined to have sump pumps connected to the sewer system. Ninety-four (94) of these homes have drainage directly adjacent to the homes. Each of the 94 homes was inspected. Design was completed to redirect these sump pumps to the drainage system. Sump pump redirection construction is complete (Randolph Contract Nos. 08-SP1/2/3 / MWRA Project No. WRA-P6-27-3-655). Total peak flow inflow removed is estimated to be 0.61 mgd.

I/I Rehabilitation Projects in Design or Construction: An I/I Investigation Report (July 2013) was drafted for the community areas affected by the March 2010 storm events. As a result of that report, a rehabilitation contract (Randolph Contract 15-S1 / MWRA Project No. WRA-P8-27-3-820) was designed (March 2015) and bid (April 2015). Rehabilitation construction is substantially complete and included lining of the Vine Street Pump Station wet well, CIPP lining 1600 LF of sewer main, installing seven short liners, grouting of 24 service connections, installing nine manhole liners, digging and replacing two sewer mains, testing and sealing of 5500 LF of sewer main and root removal within 500 LF of sewer main.

Reporting Period Activity: The Michelle Lane Pump Station was upgraded to increase capacity to allow for the expansion of the Avalon Bay development.

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$6,050,800 allotted through the Program's Phases 1 - 10, the community has \$2,156,000 remaining in funding assistance.

28. READING: North System

Background Information:

- Miles of Sewer: 96
- Sewered Population: 24,719
- Three Year (CY13 - CY15) Annual Average I/I: 1.32 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:

Infiltration/Inflow Investigations – Spot Gauging & Flow Isolation Final Report (August 2010)

Infiltration and Inflow (I/I) Investigations Final Report (November 2012)
I/I Investigations Report – Section 2 Supplement (November 2014)

Private Source Inflow Removal Program: No additional sump pumps were removed during this period. The Town is continuing to work with property owners where illicit connections were found during the Building Inspection Program. The Town will be working to set up a program over the next year to utilize some of the collected funds.

I/I Rehabilitation Projects in Design or Construction: During the last year, the Town cleaned and TV inspected an additional 25,487 LF of sewer main; cement lined 14 manholes. Approximately 310 LF of sewer was also replaced on Stewart Street.

Reporting Period Activity: During the past year, the Town inspected 153 manholes.

In November 2015, funds were distributed for the following 3 projects: 1.) Internal Inspection of 5,000 LF of Sewer This internal TV inspection includes those sewers which were not inspected under the subject reports. These sewers are located in the following streets: Scotland Rd (2,300 LF); Sigby Ave (320 LF); Countryside Lane (215 LF); Louganis Drive (204 LF); Indian Tree Lane (587 LF); Curtis St (461 LF); Sturges Rd (1,052 LF); 2.) Design & Preparation of Contract Documents for the Recommended Sewer Rehabilitations primarily involves the cured-in-place pipelining (CIPPL) of approximately 24,500 LF of sewer as shown in Table 3 of the April 2, 2015 Memorandum from CDM Smith to the Town and Tables 6-3 & 6-4 of the November 2012 Report. The design will potentially include any of those Inflow sources not removed under this funding distribution; 3.) Inflow Elimination at Various Locations Using Town's Annual On-Call Contractor. In the August 2010 Report (Table 5-4) and November 2012 Report (Table 6-2), there were various Inflow sources identified. These Inflow sources consisted of 19 manhole frame seals, 4 catch basins, 3 roof leaders, 1 sump pump, 2 driveway drains, 1 yard drain & 1 floor drain. Under this funding distribution, the Town's annual on-call Contractor will be removing as many of these sources within the designated amount of \$53,000. The elimination of the remaining Inflow sources will be included in the design work previously stated. The estimated Average annual Inflow removal is 0.038 mgd (MWRA Project No. WRA-P9-28-3-930).

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$4,629,100 allotted through the Program's Phases 1 - 10, the community has \$1,688,000 remaining in funding assistance.

29. REVERE: North System

Background Information:

- Miles of Sewer: 98
- Sewered Population: 53,702
- Three Year (CY13 - CY15) Annual Average I/I: 2.91 mgd
- MassDEP Administrative Actions: No. 837 (April 1991)
- EPA Clean Water Act Administrative Order: CD 1:10-cv-11460 (November 16, 2010)

Latest I/I or SSES Reports:

Sewer System Evaluation Survey (SSES) Phase I Study Areas – CWSRF No. 3233 Final Report (July 2010)
Internal CCTV Inspection of Revere Trunk Sewer Technical Memorandum Report (October 2011)
Sewer System Evaluation Survey (SSES) – Phase II (CWSRF 3411) Final Report (July 2011)
Sewer System Evaluation Survey (SSES) – Phase III (CWSRF 3513) Final Report (July 2012)
Comprehensive Stormwater and Wastewater Management Plan (CWSRF 3513) Final Report (December 2013)
Sewer System Evaluation Survey (SSES) – Phase IV (CWSRF 3655) Final Report (December 2013)
SSES Phase V and Supplemental Field Investigations (CWSRF 3831) (December 31, 2014)
CMOM Program Development (CWSRF 3817) (March 2015)
SSES – Phase VI and IDDE Planning Investigations (CWSRF 3908) (December 31, 2015)
SSES – Phase VII Field Investigations (CWSRF 3956) (expected December 2016)
Illicit Connection Detection (CWSRF 3957) (expected December 2016)

Latest I/I or SSES Report: City-Wide Sewer Assessment Report (February 2009)
City-wide SSES/Capital Improvement Plan (CIP) (ongoing)

Private Source Inflow Removal Program: City continues to enforce a 4 to 1 I/I Reduction policy with potential developers if the proposed project increases sanitary flows by more than 2,000 gpd. The design engineer is required to show that the sewer system downstream of proposed project is capable of handling increased flow. City is anticipating the acceptance of a new policy sometime this year that eliminates the 2,000 gpd requirement to more fairly apply to the I/I Policy.

All new development or redevelopment projects are required to separate sewer and stormwater flows leaving the project site. If a separate stormwater system is available in the public right-of-way, stormwater systems from those projects are tied directly into that storm water system. As part of the permitting process for new construction, proposed designs are vetted to ensure that basements are placed above the seasonal high ground water table.

I/I Rehabilitation Projects in Design or Construction: The 15 year CIP for the sewer system has been completed. The design for the first year of the implementation of the CIP will commence this month. The value of the design and construction is expected to approach 2 million dollars annually and is expected focus on I&I removal.

In April 2016, approval was given by MWRA staff for the City to use leftover funds for a CIP Project 1 Manhole Inspection, Assessment & Design Project. This project involves the inspection of as many as 4,000 sewer, drain and combined manholes in the City. The objective of this project is to identify manhole defects that contribute Infiltration to the sanitary sewer and combined sewer system. This project will also involve mapping of the manholes, data analysis and a cost-effectiveness analysis. Design services will also be provided for the rehabilitation of those manholes observed with Infiltration and/or access to an underdrain system.

For the Cedar Street Sewer Separation Project, construction commenced in the spring 2016 to separate the combined sewer system in Cedar Street and is expect to be completed in 20 months.

For the Bike Path Sewer / Drain Repair, design for the repair of a 24" combined sewer pipe should be completed this fall.

Reporting Period Activity: The City has contracted with Weston & Sampson to develop a City-wide SSES/Capital Improvement Program (CIP) for the sewer, drain and combined systems. The CIP will create a plan to efficiently: inspect and assess sewer, drain and combined sewer systems city-wide (approximately 165 miles); design improvements for identified defects; construct the required infrastructure improvements. The focus will be on repairing existing infrastructure to improve system performance, reduce I/I, reduce IDDE and extend the systems useful life. Prior reports and available GIS information have been reviewed and assessed. To date, the Consultant has outlined a number of possible approaches to assist in prioritization of sewer work. Next steps will include City selection of approach, followed by further investigation of existing infrastructure, cleaning and TV work (as needed), design and construction.

MWRA I/I Local Financial Assistance Program: The community has financed nine (9) I/I reduction projects through the Authority's funding assistance program. Of the \$15,515,800 allotted through the Program's Phases 1 - 10, the community has \$5,398,000 remaining in funding assistance.

31. STONEHAM: North System

Background Information:

- Miles of Sewer: 63
- Sewered Population: 21,401
- Three Year (CY13 - CY15) Annual Average I/I: 1.31 mgd
- MassDEP Administrative Actions: None
- EPA Clean Water Act Administrative Order: EPA Docket No. 09-028 (August 2009)

Latest I/I or SSES Report: Manhole / CCTV Inspection in Marble / Main Streets Area Final Report (September 2007)

Private Source Inflow Removal Program: The Town is continuing to investigate and eliminate illicit cross-connections between the sanitary sewer and storm water systems as part of the Illicit Discharge Detection and Elimination Program (IDDE). Within the past couple of years the Town has eliminated several illegal sump pumps and 3 illegal driveway & roof leader connections from the sewer systems

I/I Rehabilitation Projects in Design or Construction: The Phase 5 Sanitary Sewer System Rehabilitation Project was completed except for warranty inspections which will be scheduled in the Fall of 2017.

Phase 6 Sanitary Sewer Rehabilitation is in design with potential contract bid in Fall of 2017.

Reporting Period Activity: In November 2015, funds were distributed for the following 2 projects: 1.) Planning & Design of Phase 6 Sewer System I/I Rehabilitations Under the planning phase, investigations will be conducted which will consist of cleaning & CCTV inspection of approximately 40,000 LF of 6-inch to 15-inch diameter sewers and inspection of approximately 250 sewer manholes. Also, prior studies, reports and inspection data performed throughout the Town's sewer system will be reviewed with Town officials and evaluated to determine the sewer rehabilitations to be included under Phase 6 Sewer System I/I Rehabilitations Project. Consequently, the sewer rehabilitation work will be located in multiple areas throughout the Town. During final planning & design, recommendations from previous investigations and current inspection will be reviewed holistically and final rehabilitation recommendations will be made based on the severity of defects, their associated I/I contribution, and the cost effectiveness of rehabilitation for I/I removal. Rehabilitation methods will consist primarily of cured-in-place pipe lining, but may also include: testing and sealing of pipe joints and service connections, cured-in-place spot repairs, and open cut excavation repairs. Manhole rehabilitation methods may include lining manhole chimneys; chemical sealing of walls and joints, pipe connections, and bench and invert; as well as mono-lining and epoxy lining of manholes; 2.) Construction of Park Street Sewer Replacement & Rehabilitation will consist of the replacement and rehabilitation of 10-inch to 12-inch diameter sewer in the area of Park Street which includes the cured-in-place pipe lining (CIPPL) of approximately 1,540 LF of sewer in Katherine Road and a portion of Park Street and the replacement of approximately 1,760 LF of sewer in easements parallel to Park Street between Marble Street and Maple Street. The estimated Infiltration removal by this project is 0.046 mgd annually. (MWRA Project No. WRA-P9-31-3-931).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. The community has used its entire Phase 1 - 10 allocation of the \$4,919,900.

32. STOUGHTON: South System

Background Information:

- Miles of Sewer: 88
- Sewered Population: 19,112
- Three Year (CY13 - CY15) Annual Average I/I: 1.45 mgd
- MassDEP Administrative Actions: AO Docket No. 538 (June 1984)

Latest I/I or SSES Report: Flow Metering Report (June 2009)
Sewer System Evaluation (September 2009)
Hydraulic Model Report (December 2009)
Year 5 Rehabilitation Evaluation (December 2009)
Year 6 Rehabilitation Evaluation (March 2011)
Year 7 Rehabilitation Evaluation (December 2011)
Year 8 Rehabilitation Evaluation (May 2013)
Years 9 & 10 Rehabilitation Evaluation (February 2014)
Years 1 & 2 (Round 2) Sewer System I/I Investigation (November 2015)
Years 3 & 4 (Round 2) Evaluation (July 2016)

Private Source Inflow Removal Program: The Town has adopted new sewer use regulations which address private inflow removal. TV inspection of service connections / house-to-house inspections is ongoing.

I/I Rehabilitation Projects in Design or Construction: Years 1 & 2 Infiltration Rehabilitation Construction (Stoughton Contract 16-1 / MWRA Project No. WRA-P9-32-3-935) to be bid August 2016. Years 8/9/10 Infiltration Rehabilitation Construction (Stoughton Contract 15-1 / MWRA Project No. WRA-P9-32-3-902) is substantially complete (estimated 0.19 mgd of peak I/I to be removed). Years 8/9/10 Infiltration Rehabilitation Design completed August 2014. Years 9 & 10 Sewer System Evaluation completed February 2014.

Reporting Period Activity: Years 3 & 4 (Round 2 of a Ten Year Annual I/I Identification Program) Sewer System I/I Investigation was completed July 2016 (MWRA Project No. WRA-P9-32-3-935). Estimated 0.038 mgd of removable infiltration and 0.073 mgd of removable inflow identified. Years 1 & 2 (Round 2 of a Ten Year Annual I/I Identification Program) Sewer System I/I Investigation was completed November 2015. Estimated 0.035 mgd of removable infiltration and 0.061 mgd of removable inflow identified. Sewer extension of approximately 9000 LF off Daly Drive by private developer is ongoing. Sewer extension of approximately 3000 LF at Forest Green by private developer is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority's funding assistance program. Of the \$4,722,900 allotted through the Program's Phases 1 - 10, the community has \$282,800 remaining in funding assistance.

33. WAKEFIELD: North System

Background Information:

- Miles of Sewer: 93
- Sewered Population: 26,007
- Three Year (CY13 - CY15) Annual Average I/I: 2.35 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report:

Sanitary Sewer Investigation Assistance – Subarea 3 Smoke Testing, Dye Testing & Dye Flooding Program Final Report (November 2011)

Sanitary Sewer Investigation Assistance – Municipal Building Inspections Final Report (November 2011)

Sanitary Sewer Investigation Assistance – Subarea 3 Television Inspection of Sewers and Manhole Investigations in Subarea 3 & Subarea 6 Low-lying Areas Final Report (April 2012)

2013 Infiltration & inflow Investigation – Gauging Areas 6 & 7 Final Report (January 2014)

2014 Smoke Testing Program – Gauging Areas 6 & 7 of Subarea 6 (January 2015)

2015 Smoke Testing Program – Sewer Subarea 2 (June 2016)

TV Inspection & Cleaning of areas to be paved (expected August 2016)

Private Source Inflow Removal Program: The On-Call Sewer System Repair Program which was originally to be bid in the summer 2014 has been delayed. The Town is now hoping to bid this project in 2016. The Town continues to require a 4 to 1 removal of flow from completed subdivisions/ developments.

I/I Rehabilitation Projects in Design or Construction: The construction and final inspection of the Sewer System I/I Rehabilitations in Subareas 3 & 6 (Contract #13-S1-1373) and Final Inspection have been completed.

The construction contract for the Lakeview Ave, Plaza Rd & Spaulding St pump station replacements was executed on February 4, 2016. Construction is ongoing and scheduled for completion before the end of 2016. Expected annual average infiltration removal will be 0.10 gpd annually by replacing station chambers or lining existing wet wells.

In early 2016 sewer short liners were installed to repair severe cracking and / or holes in vitrified clay sewers at 19 locations in Brook Street, Eustis Avenue, Hopkins Street, Meriam Street, North Avenue, Vernon Street, Pine Street, Meriam Street and Water Street removing an estimated daily average infiltration of 28,500 gpd. This work was performed after cleaning and TV inspecting the sewers on these streets in preparation for the Town Roadway pavement management work. As part of this sewer repair there were also sewer pipes that were excavated and a short section or broken sewer pipe (not able to be lined) replaced (Pine Street, Meriam Street, North Avenue, Lowell Street, and Main Street, removing an estimated daily average infiltration of 23,000 gpd.

Reporting Period Activity: Smoke testing and dye testing was performed in Sewer Subarea 2 in the summer of CY2015. The Final Report was submitted to MWRA in June 2016.

Flow isolation will be performed in Sewer Subarea 6, Gauging Areas 6 and 7 and Sewer Subarea 2 during high groundwater conditions. The tentative schedule is for Spring CY2017.

Television inspection was performed in approximately 60,000 LF (May 2016) where paving will be performed in 2016/2017. A draft report will be provided to the MWRA in August 2016; 77,000 gpd of peak removal I/I was identified during the investigation.

In August 2015, funds were distributed for Replacement of the Lakeview Ave, Plaza Rd & Spaulding St Pump Stations (Contract #2015-17). Under this Contract the two (2) sewage pump stations located at Lakeview Avenue and Plaza Road will be completely replaced and the sewage pump station at Spaulding Street will be rehabilitated. These three (3) pump stations are currently pneumatic ejector stations. Each of these pump stations has long experienced Infiltration into the pumping chamber and have sump pumps that discharge directly to the sewer system. The rehabilitation work associated with the I/I removal will eliminate the sump pump connections and mitigate the Infiltration entering the sewer system. For the Lakeview Avenue and Plaza Road pump stations, a new wet well will be installed and the old station removed. For the Spaulding Street pump station, the existing pumping chamber will be rehabilitated using an internal liner and will be converted to a wet well. The estimated Infiltration removal by this project is 0.01 mgd annually. (MWRA Project No. WRA-P9-33-3-925).

In February 2016, funds were distributed for the following 4 projects: 1.) Lakeview Ave, Plaza Rd & Spaulding St Pump Station Replacements (Contract #2015-07) The Scope of services for this project is the same as for MWRA Project #WRA-P9-33-3-925. The Town is receiving the additional funds not received under that project for the replacement/rehabilitation of the pump station wet wells; 2.) Development of a 15-year Annual Sewer Inspection & Rehabilitation Program This task involves coordinating with the Town in developing an annual internal TV inspection program for the entire Town sewer system with the goal of inspecting approximately 60,000 LF of the sewer system annually taking into consideration the Town's roadway paving program and proposed utility work. A brief Letter Report will present the recommended program; 3.) Conduct a Year 1 Sewer Investigation This project includes cleaning & internally inspecting approximately 60,000 LF of sewer and manhole inspections of up to 300 manholes. A Letter Report will be prepared which will present the results of the field work; identify those sewer segments and manholes which appear to contribute excessive I/I; present specific conclusions and recommendations for sewer rehabilitations and associated cost that includes a cost-effectiveness analysis. The location of this work is throughout the Town as listed in the Table and shown on the Maps in Attachment 1 of the Application; 4.) Design & Construction of Recommended Sewer Rehabilitations from the CY2014 & CY2015 Smoke Testing & Dye Testing Programs This project consists of the design, bid & award and construction associated with the recommended sewer rehabilitations. The approximate scope of work includes but is not necessarily limited to: cleaning & TV inspection of 300 LF of sewer; install 500 LF of cured-in-place pipe; install 4 LF of short liners; install 8 lateral liners; install 9 cleanout caps; install 1 manhole frame & cover; cementitious lining of 1 sewer manhole; redirect 1 catch basin, 4 driveway drains and 2 sump pumps; other related tasks and appurtenances. The estimated I/I removal by this project is 0.022 mgd annually. (MWRA Project No. WRA-P9-33-3-933).

MWRA I/I Local Financial Assistance Program: The community has financed twenty-four (24) I/I reduction projects through the Authority's funding assistance program. Of the \$5,966,900 allotted through the Program's Phases 1 - 10, the community has \$1,307,100 remaining in funding assistance.

34. WALPOLE: South System

Background Information:

- Miles of Sewer: 59
- Sewered Population: 17,993
- Three Year (CY13 - CY15) Annual Average I/I: 0.68 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: I/I Investigation Program: Year 3 (February 2009)
Flow Metering Report (April 2010)
I/I Investigation Program: Year 4 (June 2011)
I/I Investigation Program: Year 5 (November 2011)

I/I Investigation Program: Year 6 (December 2012)
I/I Investigation Program: Year 7 (January 2014)
I/I Investigation Program: Year 8 (February 2016)
I/I Investigation Program (Round 2): Year 1 (Ongoing)

Private Source Inflow Removal Program: The Town includes house-to-house private inflow inspection program as part of its water meter replacement program. For new connections greater than 15,000 gpd, a 4 to 1 reduction as per 314 CMR 12.04 is required. For new connections less than 15,000 gpd, developers are required to remove I/I at a ratio of 2.3 to 1. They may pay the town \$13.60 per gallon should they so choose.

I/I Rehabilitation Projects in Design or Construction: Years 4-7 I/I Rehabilitation Project (Walpole Contract 2015-30 / MWRA Project No. WRA-P9-34-3-914) bid May 2015. Construction began July 2015 and has reached substantial completion. It is estimated that the Years 4-7 project will have removed 0.08 mgd of peak infiltration from the Town's sewer system. Years 4-7 Infiltration Rehabilitation Design complete April 2015. Year 7 I/I Investigation was completed January 2014. Project work was undertaken in Subareas 10 / 11 and included TV inspection of 73,614 LF of sewer main and 349 topside manholes inspections.

Reporting Period Activity: Year 8 I/I Investigation (MWRA Project No. WRA-P9-34-3-914) work, targeting Walpole Sewer Subareas 4 / 6, completed Spring 2015. Summary Report completed February 2016. TV inspection revealed an estimated 17,136 gpd of peak infiltration. Topside manhole inspection revealed an estimated 15,696 gpd of peak infiltration. Year 1 I/I Investigation (Round 2) work completed Spring 2016. Data review and reporting is ongoing. There were a total of 45 new connections made to the sewer system over the past year.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$3,680,000 allotted through the Program's Phases 1 - 10, the community has \$638,000 remaining in funding assistance.

35. WALTHAM: North System

Background Information:

- Miles of Sewer: 138
- Sewered Population: 61,318
- Three Year (CY13 - CY15) Annual Average I/I: 2.87 mgd
- MassDEP Administrative Actions: ACOP-NE-10-1N001 (February 2010)
ACOP-NE-04-1N004 (January 2005)
ACOP-NE-02-1003 (May 2003)
NON-NE-01-1066 (April 2001)

Latest I/I or SSES Report:

Updated Wastewater Facilities Plan (including Operations and Maintenance Plan) (April 2011)
Rangley Acres – I/I Removal Project Report (Spring 2012)
Polaroid Redevelopment Project Report (Summer 2013)
Inflow & Infiltration Improvements Section 5C (Lexington St - Trapelo Rd to Town Line) (March 2014)
Inflow & Infiltration Analysis Sewer System Section 12A-2 Lakeview Area (July 2014)
Inflow & Infiltration Improvements Phase 5.1, Section 6B6 - Pond End Lane Area (August 2014)
Post Flow Metering Report – Area 13/14-A SSO Mitigation Project (June 2016)
Post Flow Metering Report - Area 12-A -2-3 Lakeview (June 2016)
Post Flow Metering Report - Area 6B6 – Pond End Lane (July 2016)
Post Flow Metering Report - Alderwood Road Area (July 2006)

Private Source Inflow Removal Program: 13 sump pumps were disconnected for a total of 15,600 gpd of Inflow removed.

I/I Rehabilitation Projects in Design or Construction: The Cedarwood Area 13/14A, SSO Mitigation Project has been completed. On June 2, 2016 the City received a post –Rehabilitation Flow Monitoring Report from Tighe & Bond, Engineers. This report indicates that the 13/14 A SSO Mitigation Project achieved a 40% reduction in infiltration.

A total of 48 sewer services were repaired between July 2015 and June 2016. An estimated 240 gpd of I/I was removed.

Reporting Period Activity: In the Beaver St. Area 5A a Sewer System Evaluation Study (SSES) project is taking place. To date, approximately 10,000 LF of sewer has been cleaned & TV inspected, 70 sewer manholes have been inspected and a temporary flow meter was installed on Beaver St on June 2 and will be active for about 6 weeks.

MWRA I/I Local Financial Assistance Program: The community has financed eight (8) I/I investigation projects through the Authority's funding assistance program. Of the \$13,732,400 allotted through the Program's Phases 1 - 10, the community has \$2,355,000 remaining in funding assistance.

36. WATERTOWN: North System

Background Information:

- Miles of Sewer: 75
- Sewered Population: 32,996
- Three Year (CY13 - CY15) Annual Average I/I: 0.98 mgd
- MassDEP Administrative Actions: ACOP-NE-97-5004

Latest I/I or SSES Report:

TV Inspection Report - Nichols Avenue & Boylston Street Sewers (June 2009)

TV Inspection - Lexington Street Sewer (December 2011)

TV Inspection Subsystem 7 (ongoing)

Additional TV Inspection Subsystem 7 (initiated)

Private Source Inflow Removal Program: Under the IDDE (Illicit Discharge Detection and Elimination) Plan, during the time period from 8/1/2015 – 8/1/2016, 308 buildings were inspected and dye tested by the Town's consultants. No direct illicit connections were located during this period. The town did find several locations with indirect connections to the storm drain system.

I/I Rehabilitation Projects in Design or Construction:

Replaced 60 LF of 12" sanitary sewer on Orchard Street at Lexington Street added one new sewer manhole.

Replaced 300 LF of 12" sanitary sewer and 270 LF of 12" storm drain on Orchard Street Extension at Common Street.

Replaced 600 LF of 8" sanitary sewer on Fifield Street between Irving and Perkins Institute.

Lined 110 LF of 15" sanitary sewer in Watertown Square on Main Street between Arsenal Street and Mount Auburn Street.

Cleaned the 15" Sanitary Sewer Siphon on Main Street at the Intersection of Spring Street.

Replaced 1,400 LF of 12" Sanitary Sewer and 1,300 LF of 30" Storm Drain through the utility easement from Birch Road to Irving Street in conjunction with the private development projects taking place on Arsenal Street.

Reporting Period Activity: Completed draft of Boylston St/Nichols Ave CCTV Inspection Sewer Evaluation Report including findings from TV inspections and recommendations for rehabilitation locations and methods. Reviewed supplemental CCTV videos of sewer segments not included in original CCTV work and updated Report to incorporate findings.

Three separate sewer flow evaluations took place by private developers:

Athena Health Care through their consultant, Stantec, conducted an I/I flow evaluation on N. Beacon Street Cross Country on Greenough Boulevard to the connection to the east siphon at the Charles River.

Boylston Properties through their consultants, R.J. O'Connell and Flow Assessment Services, conducted an I/I flow evaluation on Arsenal Street Along Greenough Boulevard to the connection to the east siphon at the Charles River.

Cappola Development through their consultant, V.T.P associates, did an I/I flow evaluation along Pleasant Street to Bacon Street for the development at 330 Pleasant Street.

In November 2015, funds were distributed for the TV Inspection, Design & Construction of Sewer Rehabilitations in: Nichols Ave & Boylston St Area; portions of Subsystems 7 & 8. The TV Inspection, design & construction of sewer rehabilitations in the Nichols Avenue & Boylston Street Area involves the sewer inspection and installation of approximately 2,800 LF of a cured-in-place pipe (CIPP) liner at various locations. The specific locations and approximate liner lengths are: Boylston St – 436 LF of 10-inch diameter; Nichols St – 101 LF of 10-inch diameter, 220 LF of 12-inch diameter & 1,178 LF of 15-inch diameter; Arlington St – 146 LF of 15-inch diameter; Dartmouth St – 145 LF of 8-inch diameter; easement (Nichols St to Dartmouth St) – 284 LF of 8-inch diameter; easement (Boylston St to School St) – 290 LF of 6-inch diameter. The TV Inspection, design & construction of sewer rehabilitations in Subsystems #7 & 8 involves the sewer inspection and installation of approximately 3,345 LF of a CIPP liner and associated manhole rehabilitations at various locations. The specific locations and approximate liner lengths are: Edward Rd. – 616 LF of 8-inch diameter; Evans St. – 975 LF of 8-inch diameter; Gilbert St. – 595 LF of 8-inch diameter; Prescott St. – 604 LF of 8-inch diameter; Rutland St. – 555 LF of 8-inch diameter. The annual Infiltration to be removed is estimated to be 0.01 mgd. (MWRA Project #WRA-P9-36-3-923).

MWRA I/I Local Financial Assistance Program: The community has financed six (6) I/I investigation projects through the Authority's funding assistance program. Of the \$6,285,800 allotted through the Program's Phases 1 - 10, the community has \$3,174,000 remaining in funding assistance.

In the spring of 2016, The Department of Public Works was given the authorization from Town Council to submit a MWRA funding application and has engaged Weston and Sampson to assist in the application, initial investigation and project initiation.

37. WELLESLEY: South System

Background Information:

- Miles of Sewer: 134
- Sewered Population: 28,334
- Three Year (CY13 - CY15) Annual Average I/I: 1.43 mgd
- MassDEP Administrative Actions: AO Docket No. 579 (May 1985)

Latest I/I or SSES Report: Phase 2 SSES (November 1994)

Private Source Inflow Removal Program: Based upon previous private source inflow studies, DPW is contacting the owners of identified illegal sump pumps. To date, 18 sump pumps have been removed from the sanitary system. Also, the Town continues to pursue illegal sump pump connections identified through the water meter ERT Battery Changeout Transaction Program.

I/I Rehabilitation Projects in Design or Construction: Sewer System Inspection and Rehabilitation (Wellesley Contract No. 13C-460-1482 / MWRA Project No. WRA-P9-37-3-942) work completed August 2015. Work consisted of cleaning and TV inspection of 33,975 LF of sewer; chemical root treatment of 18,132 LF of 8 to 12-inch sewer; testing 6775 joints and sealing/retesting 2655 joints; installing 50 LF of CIP short liners; and sealing 1002 VF of manholes.

Martin Road Sewer Main Replacement (Wellesley Contract No. 15C-460-1523 / MWRA Project No. WRA-P9-37-3-942) work completed October 2015. Work consisted of the replacement of 235 LF of existing 12-inch VC pipe with 12-inch PVC pipe. Additional work included removing and replacing all sewer chimney services connected to this sewer main. Work on Martin Road was located between Brookfield Circle and Cleveland Road.

Wellesley Contract No. 13C-460-1482 (Sewer Inspection and Rehabilitation) work for CY14/15: 19,795 LF of sewer main has been TV inspected, 3435 joints tested and 1912 joints sealed with grout. In addition, 6205 LF of VC sewer main was treated for root control and seven short liners were applied.

Reporting Period Activity: In FY15, the Town contracted for replacement design of the Sabrina Farm Road Sewer Lift Station. In FY16, the Town completed and put into service the new Sabrina Farm Road Sewer Lift Station. Also, the Pickerel Road Sewer Lift Station was reconstructed and placed back in service.

MWRA I/I Local Financial Assistance Program: The community has financed twelve (12) I/I reduction projects through the Authority's funding assistance program. Of the \$5,709,700 allotted through the Program's Phases 1 - 10, the community has \$2,453,476 remaining in funding assistance.

38. WESTWOOD: South System

Background Information:

- Miles of Sewer: 77
- Sewered Population: 14,564
- Three Year (CY13 - CY15) Annual Average I/I: 0.61 mgd
- MassDEP Administrative Actions: AO Docket No. 578 (May 1985)

Latest I/I or SSES Report: SSES Phases 1 and 2 (January 1991)
Town-Wide I/I Study (June 2009)
I/I Investigation Program (Ongoing)

Private Source Inflow Removal Program: A house-to-house inspection survey has been completed. The survey included inspection of 1880 residences and identified 135 suspect sump pumps. Sump pump removal notification letters forthcoming.

I/I Rehabilitation Projects in Design or Construction: Phase 1 - I/I Rehabilitation Design/Construction (MWRA Project No. WRA-P9-38-3-949): Design cost-effective and value-effective sewer rehabilitations; prepare construction rehabilitation drawings and specifications for public bidding; and prepare a final cost estimate for the designed rehabilitations. Construct cost-effective and value-effective sewer rehabilitations and perform construction public bid/award/resident project representative services. Sewer rehabilitation work includes approximately: cleaning and TV inspection of 20,000 LF of sewer main; installing 6332 LF of CIP pipe; and rehabilitating 15 sewer manholes (via cementitious sealing). Project work will be performed in the following areas: Pond Plain Road to Oak Street / Pond Street Fill-in Area / High Street to Oriole Road / Stanford Road to Sunrise Road. Phase 1 work began June 2016 and is scheduled for completion November 2016.

Phase 2 - I/I Investigation (MWRA Project No. WRA-P9-38-3-949): Cleaning, TV inspection, videotaping and recording 15,000 LF of sewer main and performing topside manhole inspections of 75 sewer manholes. Project work will be performed in the following areas: School Street Area / Hartford Street Fill-in Area / Lake Shore Drive to High Street / Lake Shore Drive to Arcadia Road / Sycamore Drive to Arcadia Road. Phase 2 work will begin in March 2017 and be complete May 2017.

Reporting Period Activity: Extension of an 8-inch PVC sewer line on Summer Street and Grove Street for approximately 1600 LF (will potentially add five additional services to the system). Construction of large retail/residential development on University Avenue is ongoing. Project involves installation of new 6 and 8-inch PVC sewer throughout the development.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$2,532,300 allotted through the Program's Phases 1 - 10, the community has \$441,000 remaining in funding assistance.

39. WEYMOUTH: South System

Background Information:

- Miles of Sewer: 238
- Sewered Population: 53,646
- Three Year (CY13 - CY15) Annual Average I/I: 3.84 mgd
- MassDEP Administrative Actions: ACO-NE-04-1N002 (September 2004)
NON-NE-00-1025 (August 2000)
AO Docket No. 543 (November 1984)

Latest I/I or SSES Report: Sewer System Hydraulic Model / Evaluation (November 2009)
Town-Wide Sewer Investigation - Year 2 (October 2010)
Union Street Area Sewer Investigation (October 2010)
Hinston Road Sewer Evaluation / Design (June 2011)
Fall 2013 Inflow Investigation (January 2014)
Town-Wide Sewer Investigation - Year 3 (December 2014)
Town-Wide Sewer Investigation - Year 4 (December 2015)
Town-Wide Sewer Investigation - Year 5 (Ongoing)

Private Source Inflow Removal Program: The Town has completed the redirection of 330 sump pumps (for an estimated 165,000 gpd of inflow removal). Six (6) sump pumps were redirected during FY13-16.

I/I Rehabilitation Projects in Design or Construction: The Year 3 Sewer System Infiltration Rehabilitation Design (Weymouth Contract PW-15-002-S / MWRA Project No. WRA-P9-39-3-909) was completed in June 2015. The Rehabilitation Project was bid July 2015. Rehabilitation Construction is substantially complete. Work included CIP lining of 3377 LF of 8 to 15-inch sewer main and 796 VF of cementitious interior manhole lining. Approximately 0.19 mgd of peak I/I will be removed through the project.

The Year 4 Sewer System Infiltration Rehabilitation Design (Weymouth Contract PW-16-001-S / MWRA Project No. WRA-P9-39-3-940) was completed in July 2016. The Rehabilitation Project to be bid August 2016. Work includes cleaning/inspecting/testing and sealing 21,200 LF of sewer; performing 2900 LF of heavy cleaning; performing 5200 LF of root treatment; installing short liners at 61 locations; installing 3300 LF of CIP pipe; rehabilitating 61 manholes; grouting 60 service connections; installing two lateral liners; installing four manhole inflow dishes; and TV inspecting 2300 LF of sewer. Project work will be performed in Subareas C-3 / D-1-1. Approximately 0.12 mgd of peak I/I will be removed through the project.

Reporting Period Activity: The Year 4 Town-Wide Investigation Program (MWRA Project No. WRA-P9-39-3-909) began March 2015 (Subareas C-3 / D-1-1 / N-1 / N-7) and was completed May 2015. Project Summary report completed December 2015. The investigation identified approximately 0.24 mgd of infiltration and 0.002 of peak inflow. The Year 5 Town-Wide Investigation Program (MWRA Project No. WRA-P9-39-3-940) began March 2016 (Subareas B-1 / B-4) and was completed May 2016. Data review and report preparation is ongoing.

MWRA I/I Local Financial Assistance Program: The community has financed fifteen (15) I/I reduction projects through the Authority's funding assistance program. Of the \$11,480,900 allotted through the Program's Phases 1 - 10, the community has \$3,990,000 remaining in funding assistance.

40. WILMINGTON: North System

Background Information:

- Miles of Sewer: 20
- Sewered Population: 4,833
- Three Year (CY13 - CY15) Annual Average I/I: 0.45 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Sewer System Inspection Report (June 2003)
Infrastructure Maintenance & Management Program (IMMP) Phase 1 Rpt (June 2003)

Infrastructure Maintenance & Management Program (IMMP) Phase 2 Rpt (March 2005)

Private Source Inflow Removal Program: Town continuing inspections on an as needed basis.

I/I Rehabilitation Projects in Design or Construction: No I/I Rehabilitation work was conducted over the past year.

Reporting Period Activity: Funding for an I/I Analysis Study was approved at Annual Town Meeting on April 30, 2016. The Town is currently drafting a contract with Arcadis for the I/I Analysis Study, which is scheduled to begin in the Fall of 2016.

MWRA I/I Local Financial Assistance Program: The community has financed five (5) I/I reduction projects through the Authority's funding assistance program. Of the \$2,462,000 allotted through the Program's Phases 1 - 10, the community has \$1,074,000 remaining in funding assistance.

41. WINCHESTER: North System

Background Information:

- Miles of Sewer: 83
- Sewered Population: 22,064
- Three Year (CY13 - CY15) Annual Average I/I: 1.04 mgd
- MassDEP Administrative Actions: None (Draft ACO in 2001 was not finalized).

Latest I/I or SSES Report:

West Side Building Inspection Report (May 2009)
Squire Road & Meter #4 Area Sewer System Evaluation Survey Final Report (June 2013)
Stowell & Marshall Road Sewer System Evaluation (January 2014)
Sewer System Evaluation Survey (SSES) Phase II (ongoing)

Private Source Inflow Removal Program: The Town's Private Inflow Source Removal Program is ongoing. The Town removed two (2) sump pumps from the sewer system during this period.

I/I Rehabilitation Projects in Design or Construction: The Construction of the Squire Road Sanitary Sewer Rehabilitation Project has been completed along with final inspection and testing. The work completed consisted of: 8,148 LF of root treatment; 3,727 LF of cured-in-place pipe lining; 161 LF of cured-in-place short lining; sealing of 255 sewer service connections; and cementitious lining of 757 vf of manholes.

Final inspection and testing of the Stowell & Marshall Road Sewer Rehabilitations Project was completed in May 2016. Awaiting submission of the Final Contractor Pay Requisition.

Reporting Period Activity: A Draft of the "Phase II SSES in Meter Areas #1, 2, 6 & Leslie/ Lawson Subareas" Report was submitted to MWRA in April 2016. MWRA Staff comments were presented to the Town's consultant in May 2016.

MWRA I/I Local Financial Assistance Program: The community has financed seven (7) I/I reduction projects through the Authority's funding assistance program. Of the \$4,183,000 allotted through the Program's Phases 1 - 10, the community has \$735,000 remaining in funding assistance.

42. WINTHROP: North System

Background Information:

- Miles of Sewer: 36
- Sewered Population: 18,111
- Three Year (CY13 - CY15) Annual Average I/I: 0.80 mgd
- MassDEP Administrative Actions: None

Latest I/I or SSES Report: Sanitary Sewer Evaluation Report (April 2007)
Sewer System I/I Assessment (April 2014)

Private Source Inflow Removal Program: The DPW, in partnership with the Building & Plumbing Inspectors, continues to actively seek out illegal sump pump connections to the Town's sewer system.

I/I Rehabilitation Projects in Design or Construction: Contract 4 – Sewer, Water and Drain Improvements Project which includes reducing Infiltration and Inflow in the Cottage Hill Area and Pico Beach Area has been completed except for the paving and sidewalk replacement. The sewer rehabilitation portion of this project included replacing or performing spot repairs in the existing sewer in portions of Beacon Street, Crystal Avenue, Faunbar Avenue, Harbor View Avenue, Plummer Avenue, Prospect Avenue, Sunnyside Avenue & Terrace Avenue. This work included the replacement of approximately 1,160 LF of 8-inch diameter sewer and associated manholes and 12 spot repairs in 8-inch diameter sewers ranging in length from 10 to 50 LF. Sewer service laterals in the area where sewer main replacement and spot repair were performed were replaced from the sewer main to the property line to maximize the reduction of I/I. This project is expected to remove 25,000 gpd of annual I/I from the sewer system.

The Town also completed replacement of sewer mains on Franklin Street and Harvard Street, including associated manholes to remove a storm drain connection recently discovered from the sewer system and replace aging vitrified clay sewer.

Reporting Period Activity: In August 2015, funds were distributed for the Design & Construction of Sewer Replacement & Spot Repairs associated with Contract #4 – Water Main Improvements Project. As part of the recently bid “Contract 4 – Water Main Improvements (May 2015)” Project, the Town will be replacing or performing spot repairs in the existing sewer in portions of Beacon Street, Crystal Avenue, Faunbar Avenue, Harbor View Avenue, Plummer Avenue, Prospect Avenue, Sunnyside Avenue & Terrace Avenue. This work includes the replacement of approximately 1,160 LF of 8-inch diameter sewer and associated manholes and 12 spot repairs in 8-inch diameter sewers ranging in length from 10 to 50 LF. Sewer service laterals in the area where sewer main replacement and spot repair is performed will be replaced from the sewer main to the property line to maximize the reduction of I/I. Final curb-to-curb reclaiming and paving along with concrete sidewalk replacement will be performed in the area where sewer replacement and spot repairs are made. Since this sewer replacement project is located on busy thoroughfares, a significant amount of Police Details will also be required. The estimated annual I/I reduction is 0.025 mgd (MWRA Project No. WRA-P9-42-3-929).

In May 2016, funds were distributed for the following 2 projects: 1.) Design & Construction of Sewer Replacement on Harvard & Franklin Streets Two (2) catch basins were recently discovered on Franklin Street to be connected to the sewer. The adjacent vitrified clay sewer on Franklin Street and downstream on Harvard Street was inspected and was recommended to be replaced. The sewer replacement work involves removing the existing connections to the sewer from the catch basins, replacing the existing sewer with approximately 965 LF of 10” diameter sewer, 7 manholes and 16 sewer service laterals. This work is to be completed under the existing Contract #4 – Water Main Improvements Project of which the sewer portion was funded under MWRA Project #WRA-P9-42-3-929. The original Bid Items for that Contract are being used for the additional sewer replacement work; 2.) Design of Sewer Improvements In Town Center Area The actual location of this design work will be on Jefferson St, Hagman Rd, French Sq., Woodside Ave, Bartlett Rd, Williams St & Somerset Ave. This design work includes improvements to the sewer system as recommended from the video inspections conducted as part of the Sanitary Sewer Evaluation Report of April 2007. The design work involves conducting survey, boring, flow monitoring, permitting & preparing Contract Documents for the replacement of approximately 2,400 LF of sewer, manholes and service laterals (to the property line). Construction of this sewer improvement is being planned within the next 2 years and will be coordinated with the Town Center Redevelopment Project which is currently being finalized. The estimated annual I/I reduction is 0.02 mgd (MWRA Project No. WRA-P9-42-3-946).

MWRA I/I Local Financial Assistance Program: The community has financed ten (10) I/I reduction projects through the Authority's funding assistance program. Of the \$3,393,400 allotted through the Program's Phases 1 - 10, the community has \$586,000 remaining in funding assistance.

43. WOBURN: North System

Background Information:

- Miles of Sewer: 141
- Sewered Population: 38,262
- Three Year (CY13 - CY15) Annual Average I/I: 2.43 mgd
- MassDEP Administrative Actions: ACO 2005 (September 2005)
ACO-NE-01-1005 (August 2001)
Revised AO Docket No. 619 (November 1984)

Latest I/I or SSES Report:

Area #3 Sanitary Sewer Rehabilitation – Post Rehabilitation Flow Evaluation Report (May 2011)
Arlington Road Area Sanitary Sewer Rehabilitation – Post Rehabilitation Flow Evaluation Report (May 2011)
East Woburn Sewer Collection System Capital Improvement Plan (October 2011)
CIP Smoke Testing – Project 1 Final Report (February 2014)
CIP Project 1 – Sewer Investigation and Evaluation Final Report (March 2014)
CIP Project 2 - Sewer Investigation and Evaluation Final Report (February 2015)
CIP Project 3 - Sewer Investigation and Evaluation Final Report (April 2016)
CIP Project 4 - Sewer Investigation and Evaluation Final Report (ongoing)

Private Source Inflow Removal Program: Under the current ACO, a 10:1 flow reduction is required. No activity occurred during this period.

I/I Rehabilitation Projects in Design or Construction: Bids for the CIP Project 1 Rehabilitations (Contract No. 16-IFB-010) were accepted on October 8, 2015. The Contract was awarded to Umbro & Sons. Construction has been substantially completed which included: installation of 7,469 LF of cured-in-place manhole-to-manhole pipe liners; lining of 326 vf (50 manholes) of manholes; and sealing of underdrain access ports at four (4) locations. The estimated I/I removal is 96,397 gpd of peak infiltration, 28,800 of peak rain-induced infiltration, and 5,270 gpd of peak inflow.

CIP Project 2 Rehabilitations are currently being designed. The project is anticipated to be bid fall 2016.

Reporting Period Activity:

Sewer blockages were repaired/cleared at 50 separate locations.

The Report on the “Sewer Investigations and Evaluation for CIP Project 3” was completed in April 2016. One of the major components of this project was the cleaning & TV inspection of 48,662 LF of sewer. Design for CIP Project 3 Rehabilitations is anticipated to begin winter 2016.

In February 2016, funds were distributed for the Sewer Investigations & Evaluations in CIP Project #4 Area. This Project will identify sources of infiltration and inflow (I/I) in Sewer Mini-systems ES-07, ES-10, ES-11 and ES-12. The field work associated with this project will include, but not be limited to: conducting top side physical survey of approximately 252 sewer manholes for sources of I/I; conducting flow isolation in as much as 38,328 LF of sewer; cleaning and internal TV inspection of approximately 56,610 LF of sewer; providing as many as 60 hours of heavy cleaning; updating of sewer mapping/GIS database; preparing draft and final report on the results of the field work which will include preliminary design recommendations; design cost and preliminary construction cost estimates and schedule; cost-effectiveness analysis and recommendations for sewer rehabilitation. (MWRA Project No. WRA-P9-43-1-936).

MWRA I/I Local Financial Assistance Program: The community has financed eleven (11) I/I reduction projects through the Authority’s funding assistance program. Of the \$10,695,500 allotted through the Program’s Phases 1 - 10, the community has \$1,733,000 remaining in funding assistance.

ATTACHMENT 6
TO
MWRA ANNUAL I/I REDUCTION REPORT FOR FY16
Reporting Period – July 2015 Through June 2016

CY15 COMMUNITY WASTEWATER FLOW DATA

This attachment contains calendar year 2015 wastewater flow data for the 43 MWRA member sewer communities. There are four separate data tables as detailed below.

TABLE 1 (one page - page number 2) presents the CY15 MWRA Wastewater Metering System Community Flow Estimates. This data is monthly total wastewater flow estimates for each of the 43 member sewer communities derived from MWRA's wastewater metering system. Each community's percent share average daily flow and percent share maximum month flow are used as components of MWRA's annual wholesale sewer charge.

TABLE 2 (one page - page number 3) presents the CY15 MWRA Community Wastewater Flow Component Estimates. This data is developed through an engineering analysis by MWRA staff to estimate wastewater flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data in TABLE 2 is annual data. The percent share for each estimated flow component is also presented. The data presented in TABLE 2 is a summary of the more detailed monthly flow component analysis presented in TABLE 4. The estimated average daily sanitary flow (non-I/I flows) includes: residential, commercial, industrial, and institutional flows.

TABLE 3 (one page - page number 4) presents the CY15 Community Wastewater Flow Component Estimates with additional information based on estimated community inch-diameter-miles of sewer.

TABLE 4 (13 pages - page numbers 5 through 17) presents the Estimated Community Wastewater Flow Components for CY15. This data is developed through an engineering analysis by MWRA staff of each community's monthly wastewater flow (derived from MWRA's wastewater metering system) to estimate flow components, including: dry day average daily flow, average daily infiltration, average daily sanitary flow, and average daily inflow. The data listed as MWRA Estimated Infiltration is a calculated estimate of the infiltration entering MWRA-owned sewers that are upstream of wastewater flow meters within a community. The calculation is a weighted allocation of the Raw Estimated Infiltration to the portion of the sewer system that is MWRA-owned versus community-owned. The weighted allocation is based on inch-diameter-miles of MWRA-owned and community-owned sewer. The data presented in TABLE 4 is also presented in TABLE 2 as an annual summary.

TABLE 1 - CY15 MWRA WASTEWATER METERING SYSTEM COMMUNITY FLOW ESTIMATES

Community	Total Population	Sewered Population	CY15 Average Daily Flow (ADF) By Calendar Month (MGD)												12 Month Average Daily Flow (MGD)	Percent Average Daily Flow	Max. Month ADF (MGD)	Percent Max. Month ADF
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
			Arlington	44,028	43,993	4.94	3.79	6.39	7.12	4.09	3.77	3.23	2.63	2.62				
Ashland	17,150	13,549	1.22	1.09	1.44	1.67	1.15	1.10	1.02	0.93	0.94	0.99	1.00	1.08	1.14	0.4%	1.67	0.4%
Bedford	13,975	13,394	2.71	2.41	3.32	4.02	2.59	2.44	2.16	1.88	1.83	1.89	1.87	2.06	2.43	0.9%	4.02	0.9%
Belmont	25,332	24,927	3.05	2.14	4.36	4.48	2.23	2.33	2.00	1.52	1.50	1.72	1.83	2.25	2.45	0.9%	4.48	1.0%
BWSC	645,966	645,320	85.33	75.10	108.41	103.35	76.63	86.69	79.41	72.08	71.93	72.36	70.80	79.21	81.81	29.0%	108.41	25.0%
Braintree	36,727	36,573	7.21	5.66	10.82	12.32	6.66	6.00	5.73	4.68	4.38	4.96	5.54	6.36	6.70	2.4%	12.32	2.8%
Brookline	59,128	59,069	8.40	7.02	12.45	12.72	7.37	7.59	6.57	5.02	5.60	5.87	5.91	6.84	7.61	2.7%	12.72	2.9%
Burlington	25,463	24,826	3.62	2.89	4.07	4.85	3.23	3.12	2.74	2.40	2.31	2.37	2.40	2.81	3.07	1.1%	4.85	1.1%
Cambridge	107,289	107,278	16.24	14.45	20.62	19.07	14.79	17.67	16.08	14.35	15.41	16.37	15.03	16.46	16.39	5.8%	20.62	4.8%
Canton	22,221	15,088	2.72	2.22	3.59	4.26	2.55	2.43	2.38	2.12	2.20	2.19	2.22	2.35	2.60	0.9%	4.26	1.0%
Chelsea	37,670	37,670	4.75	4.28	6.85	5.67	4.45	5.79	4.63	4.13	4.43	4.35	4.18	5.17	4.89	1.7%	6.85	1.6%
Dedham	25,299	23,098	3.59	2.59	5.12	6.01	3.26	2.64	2.70	2.25	2.09	2.19	2.38	2.57	3.12	1.1%	6.01	1.4%
Everett	42,935	42,935	5.19	4.17	6.61	5.93	4.41	4.80	4.45	3.94	4.06	4.08	3.85	4.50	4.67	1.7%	6.61	1.5%
Framingham	70,441	67,680	8.58	7.51	9.84	11.27	7.82	7.85	7.03	6.39	6.29	6.63	6.71	7.44	7.78	2.8%	11.27	2.6%
Hingham	7,350	6,809	1.44	1.03	2.30	2.33	1.16	1.05	1.03	0.81	0.81	0.88	0.98	1.18	1.25	0.4%	2.33	0.5%
Holbrook	10,952	9,671	0.97	0.79	1.20	1.28	0.80	0.76	0.77	0.68	0.66	0.67	0.69	0.80	0.84	0.3%	1.28	0.3%
Lexington	32,650	32,030	5.72	3.89	5.70	8.35	5.01	4.39	3.87	2.94	3.05	3.41	3.40	3.83	4.46	1.6%	8.35	1.9%
Malden	60,509	60,206	9.43	7.91	12.56	11.57	7.75	8.27	7.72	6.60	6.54	7.50	7.40	8.25	8.46	3.0%	12.56	2.9%
Medford	57,170	57,113	8.58	6.72	10.92	11.78	7.88	7.95	7.17	5.67	5.52	5.81	5.82	6.20	7.51	2.7%	11.78	2.7%
Melrose	27,690	27,662	4.75	3.14	6.30	6.57	3.75	3.51	3.36	2.66	2.53	2.81	2.92	3.53	3.82	1.4%	6.57	1.5%
Milton	27,270	26,534	3.47	2.42	5.37	6.18	2.59	2.28	2.31	1.60	1.50	1.62	1.79	2.22	2.78	1.0%	6.18	1.4%
Natick	35,214	31,351	3.10	2.55	3.83	4.07	2.85	2.68	2.48	2.51	2.28	2.37	2.27	2.57	2.80	1.0%	4.07	0.9%
Needham	29,736	28,089	3.53	2.69	5.03	6.01	3.15	2.70	2.32	1.98	2.00	2.42	2.69	3.03	3.13	1.1%	6.01	1.4%
Newton	87,971	87,003	15.89	12.71	21.61	26.39	15.32	13.50	12.05	9.99	9.73	11.22	11.42	12.34	14.35	5.1%	26.39	6.1%
Norwood	28,951	28,795	5.61	3.85	6.91	8.96	4.95	4.29	3.58	3.29	2.97	3.33	3.64	4.34	4.65	1.6%	8.96	2.1%
Quincy	93,494	93,494	13.77	11.12	18.11	18.69	12.10	11.62	11.88	10.06	9.56	10.02	10.19	11.04	12.35	4.4%	18.69	4.3%
Randolph	33,456	33,423	3.77	2.69	5.30	6.20	3.03	2.73	2.85	2.38	2.17	1.95	2.06	2.37	3.13	1.1%	6.20	1.4%
Reading	25,327	24,719	3.10	2.22	3.65	4.50	2.52	2.44	2.03	1.61	1.52	1.76	1.93	2.23	2.46	0.9%	4.50	1.0%
Revere	53,756	53,702	6.25	4.82	9.66	8.06	5.46	6.54	5.69	4.86	5.07	5.52	5.11	6.22	6.11	2.2%	9.66	2.2%
Somerville	78,804	78,804	9.98	8.07	13.77	12.04	8.21	11.92	9.04	7.78	9.72	8.57	8.43	11.19	9.90	3.5%	13.77	3.2%
Stoneham	21,734	21,401	3.41	2.28	3.91	4.75	2.53	2.45	2.05	1.75	1.67	1.94	1.92	2.21	2.57	0.9%	4.75	1.1%
Stoughton	28,106	19,112	3.52	2.78	4.61	5.40	2.92	2.49	2.29	1.92	1.65	1.91	2.06	2.43	2.83	1.0%	5.40	1.2%
Wakefield	26,080	26,007	4.72	3.22	5.52	6.78	3.73	3.60	2.99	2.43	2.21	2.54	2.61	3.08	3.62	1.3%	6.78	1.6%
Walpole	24,818	17,993	2.05	1.71	2.28	2.97	1.91	1.67	1.55	1.31	1.34	1.42	1.46	1.55	1.77	0.6%	2.97	0.7%
Waltham	62,227	61,318	9.58	7.89	11.61	12.82	8.16	8.54	7.34	6.58	6.70	7.37	6.89	7.44	8.41	3.0%	12.82	3.0%
Watertown	32,996	32,996	3.51	2.74	4.35	4.51	3.19	3.10	2.88	2.51	2.53	2.56	2.66	2.98	3.13	1.1%	4.51	1.0%
Wellesley	29,090	28,334	3.30	2.57	4.27	5.38	2.92	2.63	2.32	2.09	2.16	2.42	2.35	2.57	2.92	1.0%	5.38	1.2%
Westwood	14,876	14,564	1.52	1.22	2.22	2.64	1.59	1.38	1.26	1.10	1.08	1.14	1.18	1.30	1.47	0.5%	2.64	0.6%
Weymouth	55,419	53,646	7.87	6.65	13.03	13.54	7.36	6.62	6.60	5.23	4.88	5.52	6.22	6.77	7.53	2.7%	13.54	3.1%
Wilmington	23,147	4,833	1.34	1.23	1.52	1.63	1.27	1.28	1.24	1.22	1.14	1.17	1.18	1.13	1.28	0.5%	1.63	0.4%
Winchester	22,079	22,064	2.57	1.76	2.97	3.72	2.02	1.81	1.57	1.32	1.27	1.45	1.49	1.69	1.97	0.7%	3.72	0.9%
Winthrop	18,111	18,111	1.88	1.58	2.50	2.25	1.68	1.88	1.72	1.60	1.65	1.64	1.64	1.91	1.83	0.6%	2.50	0.6%
Woburn	39,083	38,262	7.61	6.31	8.47	8.78	6.54	6.26	5.24	4.74	4.81	5.28	5.05	5.44	6.21	2.2%	8.78	2.0%
Total/Average	2,261,690	2,193,444	309.79	253.88	403.37	420.89	273.58	284.56	257.33	223.54	224.31	235.27	234.34	264.70	282.26	100%	433.93	100%
Logan Airport Monthly Rainfall (in)			3.57	3.37	3.05	2.28	1.22	5.01	2.09	2.19	3.93	1.74	2.07	4.28				

TABLE 2 - 2015 MWRA COMMUNITY WASTEWATER FLOW COMPONENT ESTIMATES (CY15-12 MONTHS)

COMMUNITY	2015 Averages (1)					Components of Average Daily Flow (Estimated) (2)						O		P		
	Community Demographics		No. of Connects to MWRA System	Miles of Local Sewers (3)	No. of Meters for Permanent System	Average Daily Flow ADF (MGD)	Percent Average Daily Flow (6)	Selected Dry Day ADF (MGD)	Average Daily Infiltration (MGD)	Infiltration As a % of Average Daily Flow	Average Sanitary Flow (MGD)	Sanitary As a % of Average Daily Flow	Average Daily Inflow (4) (MGD)	Inflow As a % of Average Daily Flow	Peak Month ADF (MGD)	Percent Peak Month ADF (6)
	Total Population	Sewered Population														
Arlington	44,028	43,993	327	106	7	4.05	1.43%	3.67	1.08	26.7%	2.59	64.0%	0.38	9.4%	7.12	1.64%
Ashland	17,150	13,549	2	66	2	1.14	0.40%	1.07	0.27	23.7%	0.80	70.2%	0.06	5.3%	1.67	0.38%
Bedford	13,975	13,394	1	78	4	2.43	0.86%	2.30	1.00	41.2%	1.30	53.5%	0.14	5.8%	4.02	0.93%
Belmont	25,332	24,927	2	78	2	2.45	0.87%	2.17	0.68	27.8%	1.49	60.8%	0.28	11.4%	4.48	1.03%
BWSC (5)	645,966	645,320	255	858	33	81.81	28.98%	72.84	14.84	18.1%	58.00	70.9%	8.97	11.0%	108.41	24.97%
Braintree	36,727	36,573	21	140	8	6.70	2.37%	6.04	2.84	42.4%	3.20	47.8%	0.65	9.7%	12.32	2.84%
Brookline (5)	59,128	59,069	10	111	14	7.61	2.70%	6.71	2.21	29.0%	4.50	59.1%	0.90	11.8%	12.72	2.93%
Burlington	25,463	24,826	1	115	1	3.07	1.09%	2.86	0.86	28.0%	2.00	65.1%	0.21	6.8%	4.85	1.12%
Cambridge (5)	107,289	107,278	127	148	9	16.39	5.81%	14.32	3.32	20.3%	11.00	67.1%	2.07	12.6%	20.62	4.75%
Canton	22,221	15,088	65	62	6	2.60	0.92%	2.38	0.98	37.7%	1.40	53.8%	0.22	8.5%	4.26	0.98%
Chelsea (5)	37,670	37,670	47	41	8	4.89	1.73%	4.16	1.36	27.8%	2.80	57.3%	0.73	14.9%	6.85	1.58%
Dedham	25,299	23,098	30	95	8	3.12	1.11%	2.84	1.04	33.3%	1.80	57.7%	0.28	9.0%	6.01	1.38%
Everett	42,935	42,935	21	57	6	4.67	1.65%	4.26	0.76	16.3%	3.50	74.9%	0.41	8.8%	6.61	1.52%
Framingham	70,441	67,680	2	275	4	7.78	2.76%	7.42	2.62	33.7%	4.80	61.7%	0.36	4.6%	11.27	2.60%
Hingham	7,350	6,809	1	33	1	1.25	0.44%	1.12	0.62	49.6%	0.50	40.0%	0.14	11.2%	2.33	0.54%
Holbrook	10,952	9,671	2	31	2	0.84	0.30%	0.78	0.28	33.3%	0.50	59.5%	0.06	7.1%	1.28	0.29%
Lexington	32,650	32,030	17	170	6	4.46	1.58%	4.10	1.90	42.6%	2.20	49.3%	0.36	8.1%	8.35	1.92%
Malden	60,509	60,206	242	100	6	8.46	3.00%	7.96	2.76	32.6%	5.20	61.5%	0.50	5.9%	12.56	2.89%
Medford	57,170	57,113	74	113	6	7.51	2.66%	6.80	2.30	30.6%	4.50	59.9%	0.70	9.3%	11.78	2.71%
Melrose	27,690	27,662	188	74	5	3.82	1.35%	3.37	1.47	38.5%	1.90	49.7%	0.45	11.8%	6.57	1.51%
Milton	27,270	26,534	56	83	13	2.78	0.98%	2.45	1.05	37.8%	1.40	50.4%	0.33	11.9%	6.18	1.42%
Natick	35,214	31,351	30	135	4	2.80	0.99%	2.65	0.85	30.4%	1.80	64.3%	0.15	5.4%	4.07	0.94%
Needham	29,736	28,089	21	132	2	3.13	1.11%	2.85	0.95	30.4%	1.90	60.7%	0.28	8.9%	6.01	1.38%
Newton	87,971	87,003	52	271	7	14.35	5.08%	13.15	5.65	39.4%	7.50	52.3%	1.20	8.4%	26.39	6.08%
Norwood	28,951	28,795	31	108	6	4.72	1.67%	4.16	1.76	37.3%	2.40	50.8%	0.57	12.1%	9.18	2.11%
Quincy	93,494	93,494	56	202	6	12.35	4.37%	11.46	3.26	26.4%	8.20	66.4%	0.89	7.2%	18.69	4.30%
Randolph	33,456	33,423	2	101	2	3.13	1.11%	2.83	0.94	30.0%	1.89	60.4%	0.29	9.3%	6.20	1.43%
Reading	25,327	24,719	2	96	2	2.46	0.87%	2.25	0.85	34.6%	1.40	56.9%	0.21	8.5%	4.50	1.04%
Revere	53,756	53,702	3	98	2	6.11	2.16%	5.48	1.88	30.8%	3.60	58.9%	0.63	10.3%	9.66	2.23%
Somerville (5)	78,804	78,804	43	128	8	9.90	3.51%	8.03	2.73	27.6%	5.30	53.5%	1.87	18.9%	13.77	3.17%
Stoneham	21,734	21,401	27	63	7	2.57	0.91%	2.28	0.68	26.5%	1.60	62.3%	0.29	11.3%	4.75	1.09%
Stoughton	28,106	19,112	1	88	2	2.83	1.00%	2.61	1.21	42.8%	1.40	49.5%	0.22	7.8%	5.40	1.24%
Wakefield	26,080	26,007	11	93	2	3.62	1.28%	3.29	1.79	49.4%	1.50	41.4%	0.33	9.1%	6.78	1.56%
Walpole	24,818	17,993	1	59	2	1.77	0.63%	1.65	0.45	25.4%	1.20	67.8%	0.11	6.2%	2.97	0.68%
Waltham	62,227	61,318	5	138	4	8.41	2.98%	7.87	2.07	24.6%	5.80	69.0%	0.54	6.4%	12.82	2.95%
Watertown	32,996	32,996	14	75	3	3.13	1.11%	2.94	0.64	20.4%	2.30	73.5%	0.19	6.1%	4.51	1.04%
Wellesley	29,090	28,334	2	134	3	2.92	1.03%	2.67	0.97	33.2%	1.70	58.2%	0.24	8.2%	5.38	1.24%
Westwood	14,876	14,564	3	77	3	1.47	0.52%	1.36	0.56	38.1%	0.80	54.4%	0.11	7.5%	2.64	0.61%
Weymouth	55,419	53,646	19	238	4	7.53	2.67%	6.86	3.16	42.0%	3.70	49.1%	0.67	8.9%	13.54	3.12%
Wilmington	23,147	4,833	2	20	1	1.28	0.45%	1.23	0.43	33.6%	0.80	62.5%	0.05	3.9%	1.63	0.38%
Winchester	22,079	22,064	102	83	7	1.97	0.70%	1.79	0.69	35.0%	1.10	55.8%	0.18	9.1%	3.72	0.86%
Winthrop	18,111	18,111	22	36	4	1.83	0.65%	1.66	0.56	30.6%	1.10	60.1%	0.17	9.3%	2.50	0.58%
Woburn	39,083	38,262	18	141	13	6.21	2.20%	5.89	1.39	22.4%	4.50	72.5%	0.32	5.2%	8.78	2.02%
Totals/Averages	2,261,690	2,193,444	1,958	5,350		282.34	100.00%	254.58	77.71	27.5%	176.87	62.6%	27.71	9.8%	434.15	100.00%

FOOTNOTES:

- (1) Figures tabulated using data from the MWRA Wastewater Metering System for Calendar Year 2015.
- (2) Wastewater flow components are estimated through engineering analysis by MWRA staff.
- (3) Miles of Local Sewers are from MWRA's regional collection system database or as reported by the Community and do not include service laterals.
- (4) Average Daily Inflow is calculated as a total inflow over the period of January through December 2015 divided by 365 days. Actual inflow during a specific storm event must be calculated separately.
- (5) Community with combined sewers. Inflow figures include combined flow during storm events tributary to MWRA's WWTP.
- (6) Percent average Daily Flow and Percent Peak Month ADF are the two flow-based components of MWRA's Wholesale Sewer Rate Methodology.

Column Summations: Average Daily Flow (ADF) Column F = I+K+M Average Dry Day Flow Column H = I+K

TABLE 3 - 2015 Final Community Wastewater Flow Component Estimates

Community	Sewered Population	Miles of Local Sewers	IDM of Local Sewers	Average Daily Flow ADF (MGD)	Average Annual Infiltration (MGD)	Average Annual Inflow (MGD)	Average Sanitary Flow (MGD)	ADF (GPD Per IDM)	VI (GPD Per IDM)	Infiltration (GPD Per IDM)	Inflow (GPD Per IDM)	Inflow (GPD Per Sewer Mile)	Average Sanitary (GPD Per Sew. Pop.)
Arlington	43,993	106	954	4.05	1.08	0.38	2.59	4,245	1,530	1,132	398	3,585	59
Ashland	13,549	66	594	1.14	0.27	0.06	0.80	1,919	556	455	101	909	59
Bedford	13,394	78	738	2.43	1.00	0.14	1.30	3,293	1,545	1,355	190	1,795	97
Belmont	24,927	78	708	2.45	0.68	0.28	1.49	3,460	1,356	960	395	3,590	60
BWSC	645,320	858	14,024	81.81	14.84	8.97	58.00	5,834	1,698	1,058	640	10,455	90
Braintree	36,573	140	1,300	6.70	2.84	0.65	3.20	5,154	2,685	2,185	500	4,643	87
Brookline	59,069	111	1,332	7.61	2.21	0.90	4.50	5,713	2,335	1,659	676	8,108	76
Burlington	24,826	115	1,150	3.07	0.86	0.21	2.00	2,670	930	748	183	1,826	81
Cambridge	107,278	148	2,368	16.39	3.32	2.07	11.00	6,921	2,276	1,402	874	13,986	103
Canton	15,088	62	567	2.60	0.98	0.22	1.40	4,586	2,116	1,728	388	3,548	93
Chelsea	37,670	41	618	4.89	1.36	0.73	2.80	7,913	3,382	2,201	1,181	17,805	74
Dedham	23,098	95	832	3.12	1.04	0.28	1.80	3,750	1,587	1,250	337	2,947	78
Everett	42,935	57	686	4.67	0.76	0.41	3.50	6,808	1,706	1,108	598	7,193	82
Frammingham	67,680	275	2,750	7.78	2.62	0.36	4.80	2,829	1,084	953	131	1,309	71
Hingham	6,809	33	297	1.25	0.62	0.14	0.50	4,209	2,559	2,088	471	4,242	73
Holbrook	9,671	31	312	0.84	0.28	0.06	0.50	2,692	1,090	897	192	1,935	52
Lexington	32,030	170	1,763	4.46	1.90	0.36	2.20	2,530	1,282	1,078	204	2,118	69
Malden	60,206	100	1,000	8.46	2.76	0.50	5.20	8,460	3,260	2,760	500	5,000	86
Medford	57,113	113	1,130	7.51	2.30	0.70	4.50	6,646	2,655	2,035	619	6,195	79
Melrose	27,662	74	641	3.82	1.47	0.45	1.90	5,959	2,995	2,293	702	6,118	69
Milton	26,534	83	747	2.78	1.05	0.33	1.40	3,722	1,847	1,406	442	3,976	53
Natick	31,351	135	1,180	2.80	0.85	0.15	1.80	2,373	847	720	127	1,111	57
Needham	28,089	132	1,232	3.13	0.95	0.28	1.90	2,541	998	771	227	2,121	68
Newton	87,003	271	2,710	14.35	5.65	1.20	7.50	5,295	2,528	2,085	443	4,428	86
Norwood	28,795	108	1,091	4.65	1.68	0.57	2.40	4,262	2,062	1,540	522	5,278	83
Quincy	93,494	202	2,020	12.35	3.26	0.89	8.20	6,114	2,054	1,614	441	4,406	88
Randolph	33,423	101	1,138	3.13	0.94	0.29	1.89	2,750	1,081	826	255	2,871	57
Reading	24,719	96	864	2.46	0.85	0.21	1.40	2,847	1,227	984	243	2,187	57
Revere	53,702	98	1,434	6.11	1.88	0.63	3.60	4,261	1,750	1,311	439	6,429	67
Somerville	78,804	128	1,920	9.90	2.73	1.87	5.30	5,156	2,396	1,422	974	14,609	67
Stoneham	21,401	63	567	2.57	0.68	0.29	1.60	4,533	1,711	1,199	511	4,603	75
Stoughton	19,112	88	888	2.83	1.21	0.22	1.40	3,187	1,610	1,363	248	2,500	73
Wakefield	26,007	93	888	3.62	1.79	0.33	1.50	4,077	2,387	2,016	372	3,548	58
Walpole	17,993	59	577	1.77	0.45	0.11	1.20	3,068	971	780	191	1,864	67
Waltham	61,318	138	1,380	8.41	2.07	0.54	5.80	6,094	1,891	1,500	391	3,913	95
Watertown	32,996	75	675	3.13	0.64	0.19	2.30	4,637	1,230	948	281	2,533	70
Wellesley	28,334	134	1,340	2.92	0.97	0.24	1.70	2,179	903	724	179	1,791	60
Westwood	14,564	77	693	1.47	0.56	0.11	0.80	2,121	967	808	159	1,429	55
Weymouth	53,646	238	2,380	7.53	3.16	0.67	3.70	3,164	1,609	1,328	282	2,815	69
Wilmington	4,833	20	280	1.28	0.43	0.05	0.80	4,571	1,714	1,536	179	2,500	166
Winchester	22,064	83	747	1.97	0.69	0.18	1.10	2,637	1,165	924	241	2,169	50
Winthrop	18,111	36	324	1.83	0.56	0.17	1.10	5,648	2,253	1,728	525	4,722	61
Woburn	38,262	141	1,410	6.21	1.39	0.32	4.50	4,404	1,213	986	227	2,270	118
Total	2,193,444	5,350	60,249	282.2	77.6	27.7	176.9						
Average	51,010	124	1,401	6.6	1.8	0.6	4.1	4,308	1,745	1,346	399	4,451	75

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	10-May-16												Annual Average (MGD)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ashland	Average Daily Flow	1.22	1.09	1.44	1.67	1.15	1.10	1.02	0.93	0.94	0.99	1.00	1.08	1.14
	Dry Day Average Daily Flow	1.18	1.08	1.24	1.47	1.09	1.05	0.99	0.89	0.92	0.96	0.99	1.01	1.07
	Estimated Infiltration	0.38	0.28	0.44	0.67	0.29	0.25	0.19	0.09	0.12	0.16	0.19	0.21	0.27
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Estimated Inflow	0.04	0.01	0.20	0.20	0.06	0.05	0.03	0.04	0.02	0.03	0.01	0.07	0.06
Boston (South Only)	Raw Average Daily Flow	21.56	15.46	30.75	33.11	18.44	17.62	14.76	11.64	8.37	11.28	10.57	14.14	17.32
	Raw Dry Day Average Daily Flow	19.81	14.88	28.00	28.69	17.00	14.45	13.44	11.09	8.11	9.55	9.41	11.20	15.48
	Raw Estimated Infiltration	11.81	6.88	20.00	20.69	9.00	6.45	5.44	3.09	0.11	1.55	1.41	3.20	7.48
	MWRA Estimated Infiltration	4.60	2.68	7.78	8.05	3.50	2.51	2.12	1.20	0.04	0.60	0.55	1.25	2.91
	Final Average Daily Flow	16.96	12.78	22.97	25.06	14.94	15.11	12.64	10.44	8.33	10.68	10.02	12.89	14.41
	Final Dry Day Average Daily Flow	15.21	12.20	20.22	20.64	13.50	11.94	11.32	9.89	8.07	8.95	8.86	9.95	12.57
	Final Estimated Infiltration	7.21	4.20	12.22	12.64	5.50	3.94	3.32	1.89	0.07	0.95	0.86	1.95	4.57
	Estimated Sanitary Flow	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
	Estimated Inflow	1.75	0.58	2.75	4.42	1.44	3.17	1.32	0.55	0.26	1.73	1.16	2.94	1.84
Braintree	Raw Average Daily Flow	7.76	6.06	11.88	13.50	7.16	6.42	6.11	4.91	4.56	5.25	5.86	6.75	7.19
	Raw Dry Day Average Daily Flow	6.90	5.89	10.41	11.22	6.62	6.04	5.79	4.76	4.43	5.14	5.35	5.85	6.54
	Raw Estimated Infiltration	3.70	2.69	7.21	8.02	3.42	2.84	2.59	1.56	1.23	1.94	2.15	2.65	3.34
	MWRA Estimated Infiltration	0.55	0.40	1.06	1.18	0.50	0.42	0.38	0.23	0.18	0.29	0.32	0.39	0.49
	Final Average Daily Flow	7.21	5.66	10.82	12.32	6.66	6.00	5.73	4.68	4.38	4.96	5.54	6.36	6.70
	Final Dry Day Average Daily Flow	6.35	5.49	9.35	10.04	6.12	5.62	5.41	4.53	4.25	4.85	5.03	5.46	6.04
	Final Estimated Infiltration	3.15	2.29	6.15	6.84	2.92	2.42	2.21	1.33	1.05	1.65	1.83	2.26	2.84
	Estimated Sanitary Flow	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
	Estimated Inflow	0.86	0.17	1.47	2.28	0.54	0.38	0.32	0.15	0.13	0.11	0.51	0.90	0.65
Brookline (South Only)	Raw Average Daily Flow	5.28	3.99	8.69	8.82	4.08	4.18	3.55	2.42	2.80	3.19	3.24	4.09	4.53
	Raw Dry Day Average Daily Flow	4.59	3.74	6.96	6.93	3.67	3.44	3.05	2.32	2.40	2.79	2.76	3.32	3.83
	Raw Estimated Infiltration	2.39	1.54	4.76	4.73	1.47	1.24	0.85	0.12	0.20	0.59	0.56	1.12	1.63
	MWRA Estimated Infiltration	0.02	0.01	0.03	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01
	Final Average Daily Flow	5.26	3.98	8.66	8.79	4.07	4.17	3.54	2.42	2.80	3.19	3.24	4.08	4.52
	Final Dry Day Average Daily Flow	4.57	3.73	6.93	6.90	3.66	3.43	3.04	2.32	2.40	2.79	2.76	3.31	3.82
	Final Estimated Infiltration	2.37	1.53	4.73	4.70	1.46	1.23	0.84	0.12	0.20	0.59	0.56	1.11	1.62
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	Estimated Inflow	0.69	0.25	1.73	1.89	0.41	0.74	0.50	0.10	0.40	0.40	0.48	0.77	0.70
Canton	Raw Average Daily Flow	2.88	2.33	3.84	4.61	2.70	2.56	2.52	2.21	2.31	2.30	2.33	2.45	2.75
	Raw Dry Day Average Daily Flow	2.64	2.24	3.26	4.00	2.55	2.40	2.45	2.11	2.19	2.19	2.19	2.17	2.53
	Raw Estimated Infiltration	1.24	0.84	1.86	2.60	1.15	1.00	1.05	0.71	0.79	0.79	0.79	0.77	1.13
	MWRA Estimated Infiltration	0.16	0.11	0.25	0.35	0.15	0.13	0.14	0.09	0.11	0.11	0.11	0.10	0.15
	Final Average Daily Flow	2.72	2.22	3.59	4.26	2.55	2.43	2.38	2.12	2.20	2.19	2.22	2.35	2.60
	Final Dry Day Average Daily Flow	2.48	2.13	3.01	3.65	2.40	2.27	2.31	2.02	2.08	2.08	2.08	2.07	2.38
	Final Estimated Infiltration	1.08	0.73	1.61	2.25	1.00	0.87	0.91	0.62	0.68	0.68	0.68	0.67	0.98
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.24	0.09	0.58	0.61	0.15	0.16	0.07	0.10	0.12	0.11	0.14	0.28	0.22
Dedham	Average Daily Flow	3.59	2.59	5.12	6.01	3.26	2.64	2.70	2.25	2.09	2.19	2.38	2.57	3.12
	Dry Day Average Daily Flow	3.21	2.53	4.21	5.12	2.96	2.47	2.63	2.16	2.03	2.12	2.28	2.30	2.84
	Estimated Infiltration	1.41	0.73	2.41	3.32	1.16	0.67	0.83	0.36	0.23	0.32	0.48	0.50	1.04
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	0.38	0.06	0.91	0.89	0.30	0.17	0.07	0.09	0.06	0.07	0.10	0.27	0.28

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Framingham	Average Daily Flow	8.58	7.51	9.84	11.27	7.82	7.85	7.03	6.39	6.29	6.63	6.71	7.44	7.78
	Dry Day Average Daily Flow	8.31	7.41	9.17	10.19	7.53	7.49	6.78	6.32	5.99	6.45	6.60	6.83	7.42
	Estimated Infiltration	3.51	2.61	4.37	5.39	2.73	2.69	1.98	1.52	1.19	1.65	1.80	2.03	2.62
	Estimated Sanitary Flow	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
	Estimated Inflow	0.27	0.10	0.67	1.08	0.29	0.36	0.25	0.07	0.30	0.18	0.11	0.61	0.36
Hingham	Average Daily Flow	1.44	1.03	2.30	2.33	1.16	1.05	1.03	0.81	0.81	0.88	0.98	1.18	1.25
	Dry Day Average Daily Flow	1.27	0.97	1.95	1.89	1.08	0.98	0.97	0.77	0.78	0.85	0.87	0.99	1.12
	Estimated Infiltration	0.77	0.47	1.45	1.39	0.58	0.48	0.47	0.27	0.28	0.35	0.37	0.49	0.62
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Estimated Inflow	0.17	0.06	0.35	0.44	0.08	0.07	0.06	0.04	0.03	0.03	0.11	0.19	0.14
Holbrook	Average Daily Flow	0.97	0.79	1.20	1.28	0.80	0.76	0.77	0.68	0.66	0.67	0.69	0.80	0.84
	Dry Day Average Daily Flow	0.91	0.76	1.05	1.09	0.77	0.73	0.76	0.68	0.65	0.64	0.64	0.72	0.78
	Estimated Infiltration	0.41	0.26	0.55	0.59	0.27	0.23	0.26	0.18	0.15	0.14	0.14	0.22	0.28
	Estimated Sanitary Flow	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	Estimated Inflow	0.06	0.03	0.15	0.19	0.03	0.03	0.01	0.00	0.01	0.03	0.05	0.08	0.06
Milton (South Only)	Average Daily Flow	3.20	2.21	5.04	5.75	2.37	2.10	2.14	1.44	1.34	1.46	1.61	2.02	2.56
	Dry Day Average Daily Flow	2.79	2.14	4.10	4.61	2.11	1.92	1.96	1.39	1.31	1.44	1.59	1.64	2.25
	Estimated Infiltration	1.54	0.89	2.85	3.36	0.86	0.67	0.71	0.14	0.06	0.19	0.34	0.39	1.00
	Estimated Sanitary Flow	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
	Estimated Inflow	0.41	0.07	0.94	1.14	0.26	0.18	0.18	0.05	0.03	0.02	0.02	0.38	0.31
Natick	Average Daily Flow	3.10	2.55	3.83	4.07	2.85	2.68	2.48	2.51	2.28	2.37	2.27	2.57	2.80
	Dry Day Average Daily Flow	2.94	2.53	3.44	3.66	2.71	2.59	2.41	2.39	2.20	2.33	2.21	2.34	2.65
	Estimated Infiltration	1.14	0.73	1.64	1.86	0.91	0.79	0.61	0.59	0.40	0.53	0.41	0.54	0.85
	Estimated Sanitary Flow	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
	Estimated Inflow	0.16	0.02	0.39	0.41	0.14	0.09	0.07	0.12	0.08	0.04	0.06	0.23	0.15
Needham	Average Daily Flow	3.53	2.69	5.03	6.01	3.15	2.70	2.32	1.98	2.00	2.42	2.69	3.03	3.13
	Dry Day Average Daily Flow	3.22	2.61	4.08	5.22	2.88	2.37	2.22	1.96	1.97	2.29	2.63	2.74	2.85
	Estimated Infiltration	1.32	0.71	2.18	3.32	0.98	0.47	0.32	0.06	0.07	0.39	0.73	0.84	0.95
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
	Estimated Inflow	0.31	0.08	0.95	0.79	0.27	0.33	0.10	0.02	0.03	0.13	0.06	0.29	0.28
Newton (South Only)	Raw Average Daily Flow	8.82	7.04	13.12	16.17	8.58	7.63	6.60	4.44	4.22	6.16	5.81	6.94	7.96
	Raw Dry Day Average Daily Flow	8.23	6.84	11.01	14.51	7.62	6.97	6.20	4.32	3.77	5.83	5.00	6.12	7.20
	Raw Estimated Infiltration	4.93	3.54	7.71	11.21	4.32	3.67	2.90	1.02	0.47	2.53	1.70	2.82	3.90
	MWRA Estimated Infiltration	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.01
	Final Average Daily Flow	8.81	7.03	13.10	16.14	8.57	7.62	6.59	4.44	4.22	6.15	5.81	6.93	7.95
	Final Dry Day Average Daily Flow	8.22	6.83	10.99	14.48	7.61	6.96	6.19	4.32	3.77	5.82	5.00	6.11	7.19
	Final Estimated Infiltration	4.92	3.53	7.69	11.18	4.31	3.66	2.89	1.02	0.47	2.52	1.70	2.81	3.89
	Estimated Sanitary Flow	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
	Estimated Inflow	0.59	0.20	2.11	1.66	0.96	0.66	0.40	0.12	0.45	0.33	0.81	0.82	0.76

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)	
Norwood	Raw Average Daily Flow	6.04	3.99	7.33	9.78	5.30	4.58	3.72	3.41	3.05	3.46	3.81	4.57	4.92	
	Raw Dry Day Average Daily Flow	5.45	3.36	5.38	8.17	4.86	4.45	3.40	3.28	2.93	3.32	3.63	4.03	4.36	
	Raw Estimated Infiltration	3.05	0.96	2.98	5.77	2.46	2.05	1.00	0.88	0.53	0.92	1.23	1.63	1.96	
	MWRA Estimated Infiltration	0.43	0.14	0.42	0.82	0.35	0.29	0.14	0.12	0.08	0.13	0.17	0.23	0.28	
	Final Average Daily Flow	5.61	3.85	6.91	8.96	4.95	4.29	3.58	3.29	2.97	3.33	3.64	4.34	4.65	
	Final Dry Day Average Daily Flow	5.02	3.22	4.96	7.35	4.51	4.16	3.26	3.16	2.85	3.19	3.46	3.80	4.08	
	Final Estimated Infiltration	2.62	0.82	2.56	4.95	2.11	1.76	0.86	0.76	0.45	0.79	1.06	1.40	1.68	
	Estimated Sanitary Flow	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	Estimated Inflow	0.59	0.63	1.95	1.61	0.44	0.13	0.32	0.13	0.12	0.14	0.18	0.54	0.57	
Quincy	Average Daily Flow	13.77	11.12	18.11	18.69	12.10	11.62	11.88	10.06	9.56	10.02	10.19	11.04	12.35	
	Dry Day Average Daily Flow	12.64	10.66	16.38	16.73	11.44	10.90	11.20	9.82	9.11	9.47	9.33	9.81	11.46	
	Estimated Infiltration	4.44	2.46	8.18	8.53	3.24	2.70	3.00	1.62	0.91	1.27	1.13	1.61	3.26	
	Estimated Sanitary Flow	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	8.20	
	Estimated Inflow	1.13	0.46	1.73	1.96	0.66	0.72	0.68	0.24	0.45	0.55	0.86	1.23	0.89	
Randolph	Average Daily Flow	3.77	2.69	5.30	6.20	3.03	2.73	2.85	2.38	2.17	1.95	2.06	2.37	3.13	
	Dry Day Average Daily Flow	3.43	2.56	4.36	5.16	2.75	2.63	2.77	2.29	2.14	1.86	1.94	2.10	2.83	
	Estimated Infiltration	1.53	0.66	2.46	3.26	0.85	0.73	0.87	0.39	0.24	0.06	0.04	0.20	0.94	
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.80	1.90	1.90	1.89	
	Estimated Inflow	0.34	0.13	0.94	1.04	0.28	0.10	0.08	0.09	0.03	0.09	0.12	0.27	0.29	
Stoughton	Average Daily Flow	3.52	2.78	4.61	5.40	2.92	2.49	2.29	1.92	1.65	1.91	2.06	2.43	2.83	
	Dry Day Average Daily Flow	3.36	2.72	3.86	4.65	2.69	2.36	2.18	1.89	1.56	1.88	1.96	2.21	2.61	
	Estimated Infiltration	1.96	1.32	2.46	3.25	1.29	0.96	0.78	0.49	0.16	0.48	0.56	0.81	1.21	
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	
	Estimated Inflow	0.16	0.06	0.75	0.75	0.23	0.13	0.11	0.03	0.09	0.03	0.10	0.22	0.22	
Walpole	Average Daily Flow	2.05	1.71	2.28	2.97	1.91	1.67	1.55	1.31	1.34	1.42	1.46	1.55	1.77	
	Dry Day Average Daily Flow	1.97	1.65	1.95	2.74	1.78	1.57	1.48	1.28	1.28	1.29	1.41	1.45	1.65	
	Estimated Infiltration	0.77	0.45	0.75	1.54	0.58	0.37	0.28	0.08	0.08	0.09	0.21	0.25	0.45	
	Estimated Sanitary Flow	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	
	Estimated Inflow	0.08	0.06	0.33	0.23	0.13	0.10	0.07	0.03	0.06	0.13	0.05	0.10	0.11	
Wellesley	Average Daily Flow	3.30	2.57	4.27	5.38	2.92	2.63	2.32	2.09	2.16	2.42	2.35	2.57	2.92	
	Dry Day Average Daily Flow	3.00	2.46	3.56	4.63	2.71	2.45	2.23	2.04	2.01	2.35	2.27	2.34	2.67	
	Estimated Infiltration	1.30	0.76	1.86	2.93	1.01	0.75	0.53	0.34	0.31	0.65	0.57	0.64	0.97	
	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	Estimated Inflow	0.30	0.11	0.71	0.75	0.21	0.18	0.09	0.05	0.15	0.07	0.08	0.23	0.24	
Westwood	Average Daily Flow	1.52	1.22	2.22	2.64	1.59	1.38	1.26	1.10	1.08	1.14	1.18	1.30	1.47	
	Dry Day Average Daily Flow	1.46	1.18	1.84	2.26	1.52	1.32	1.20	1.08	1.05	1.12	1.13	1.19	1.36	
	Estimated Infiltration	0.66	0.38	1.04	1.46	0.72	0.52	0.40	0.28	0.25	0.33	0.33	0.39	0.56	
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
	Estimated Inflow	0.06	0.04	0.38	0.38	0.07	0.06	0.06	0.02	0.03	0.02	0.05	0.11	0.11	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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PAGE 4

Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average (MGD)
Weymouth	Average Daily Flow	7.87	6.65	13.03	13.54	7.36	6.62	6.60	5.23	4.88	5.52	6.22	6.77	7.53
	Dry Day Average Daily Flow	6.98	6.50	10.98	11.36	6.84	6.24	6.34	5.22	4.77	5.35	5.59	6.10	6.86
	Estimated Infiltration	3.28	2.80	7.28	7.66	3.14	2.54	2.64	1.52	1.07	1.65	1.89	2.40	3.16
	Estimated Sanitary Flow	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
	Estimated Inflow	0.89	0.15	2.05	2.18	0.52	0.38	0.26	0.01	0.11	0.17	0.63	0.67	0.67
Subtotal (Southern System)	Raw Average Daily Flow	113.77	88.07	159.23	179.20	100.65	93.01	85.50	70.11	64.56	73.63	75.47	87.66	99.29
	Raw Dry Day Average Daily Flow	104.29	84.71	137.19	154.30	93.18	84.82	80.45	68.06	61.60	69.22	69.78	76.46	90.36
	Raw Estimated Infiltration	51.54	31.96	84.44	101.55	40.43	32.07	27.70	15.31	8.85	16.57	17.03	23.71	37.62
	MWRA Estimated Infiltration	5.77	3.35	9.56	10.46	4.52	3.37	2.80	1.64	0.41	1.14	1.15	1.99	3.85
	Final Average Daily Flow	108.00	84.72	149.67	168.74	96.13	89.64	82.70	68.47	64.15	72.49	74.32	85.67	95.44
	Final Dry Day Average Daily Flow	98.52	81.36	127.63	143.84	88.66	81.45	77.65	66.42	61.19	68.08	68.63	74.47	86.51
	Final Estimated Infiltration	45.77	28.61	74.88	91.09	35.91	28.70	24.90	13.67	8.44	15.43	15.88	21.72	33.77
	Estimated Sanitary Flow	52.75	52.75	52.75	52.75	52.75	52.75	52.75	52.75	52.75	52.65	52.75	52.75	52.74
Estimated Inflow	9.48	3.36	22.04	24.90	7.47	8.19	5.05	2.05	2.96	4.41	5.69	11.20	8.93	
South System Pump Station as Reported by NPDES	Average Daily Flow	116.40	90.60	167.20	180.10	101.60	94.10	88.50	73.60	71.50	78.00	79.20	91.10	102.72

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Arlington	Raw Average Daily Flow	5.02	3.83	6.51	7.28	4.14	3.81	3.25	2.63	2.62	3.08	3.18	3.78	4.09
	Raw Dry Day Average Daily Flow	4.52	3.63	5.57	6.38	3.76	3.51	2.99	2.62	2.52	2.91	2.96	3.20	3.71
	Raw Estimated Infiltration	1.92	1.03	2.97	3.78	1.16	0.91	0.39	0.02	0.02	0.31	0.36	0.60	1.12
	MWRA Estimated Infiltration	0.08	0.04	0.12	0.16	0.05	0.04	0.02	0.00	0.00	0.01	0.01	0.02	0.05
	Final Average Daily Flow	4.94	3.79	6.39	7.12	4.09	3.77	3.23	2.63	2.62	3.07	3.17	3.76	4.05
	Final Dry Day Average Daily Flow	4.44	3.59	5.45	6.22	3.71	3.47	2.97	2.62	2.52	2.90	2.95	3.18	3.67
	Final Estimated Infiltration	1.84	0.99	2.85	3.62	1.11	0.87	0.37	0.02	0.02	0.30	0.35	0.58	1.08
	Estimated Sanitary Flow	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.50	2.60	2.60	2.60
Estimated Inflow	0.50	0.20	0.94	0.90	0.38	0.30	0.26	0.01	0.10	0.17	0.22	0.58	0.38	
Bedford	Average Daily Flow	2.71	2.41	3.32	4.02	2.59	2.44	2.16	1.88	1.83	1.89	1.87	2.06	2.43
	Dry Day Average Daily Flow	2.57	2.38	3.06	3.64	2.40	2.30	2.03	1.84	1.69	1.86	1.79	2.00	2.30
	Estimated Infiltration	1.27	1.08	1.76	2.34	1.10	1.00	0.73	0.54	0.39	0.56	0.49	0.70	1.00
	Estimated Sanitary Flow	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Estimated Inflow	0.14	0.03	0.26	0.38	0.19	0.14	0.13	0.04	0.14	0.03	0.08	0.06	0.14
Belmont	Average Daily Flow	3.05	2.14	4.36	4.48	2.23	2.33	2.00	1.52	1.50	1.72	1.83	2.25	2.45
	Dry Day Average Daily Flow	2.68	2.02	3.63	3.74	2.08	2.08	1.88	1.50	1.42	1.56	1.73	1.74	2.17
	Estimated Infiltration	1.18	0.52	2.13	2.24	0.58	0.58	0.38	0.00	0.02	0.06	0.23	0.24	0.68
	Estimated Sanitary Flow	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.40	1.50	1.50	1.50	1.49
	Estimated Inflow	0.37	0.12	0.73	0.74	0.15	0.25	0.12	0.02	0.08	0.16	0.10	0.51	0.28
Boston (North Only)														
Boston Charlestown	Raw Average Daily Flow	2.85	2.91	3.97	3.02	2.62	3.33	2.97	2.84	2.86	2.75	2.78	3.02	2.99
	Raw Dry Day Average Daily Flow	2.31	2.69	3.56	2.70	2.60	2.45	2.40	2.50	2.42	2.23	2.27	2.40	2.54
	Raw Estimated Infiltration	0.61	0.99	1.86	1.00	0.90	0.75	0.70	0.80	0.72	0.53	0.57	0.70	0.84
	MWRA Estimated Infiltration	0.08	0.13	0.25	0.13	0.12	0.10	0.09	0.11	0.10	0.07	0.08	0.09	0.11
	Final Average Daily Flow	2.77	2.78	3.72	2.89	2.50	3.23	2.88	2.73	2.76	2.68	2.70	2.93	2.88
	Final Dry Day Average Daily Flow	2.23	2.56	3.31	2.57	2.48	2.35	2.31	2.39	2.32	2.16	2.19	2.31	2.43
	Final Estimated Infiltration	0.53	0.86	1.61	0.87	0.78	0.65	0.61	0.69	0.62	0.46	0.49	0.61	0.73
	Estimated Sanitary Flow	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Estimated Inflow	0.54	0.22	0.41	0.32	0.02	0.88	0.57	0.34	0.44	0.52	0.51	0.62	0.45	
Boston Columbus Park	Raw Average Daily Flow	31.64	27.48	40.06	34.89	26.92	32.17	27.96	25.90	27.10	26.06	25.73	29.07	29.59
	Raw Dry Day Average Daily Flow	29.39	25.67	35.29	30.36	25.92	24.03	24.14	23.35	22.85	23.30	22.90	24.05	25.95
	Raw Estimated Infiltration	9.39	5.67	15.29	10.36	5.92	4.03	4.14	3.35	2.85	3.30	2.90	4.05	5.95
	MWRA Estimated Infiltration	0.26	0.16	0.43	0.29	0.17	0.11	0.12	0.09	0.08	0.09	0.08	0.11	0.17
	Final Average Daily Flow	31.38	27.32	39.63	34.60	26.75	32.06	27.84	25.81	27.02	25.97	25.65	28.96	29.43
	Final Dry Day Average Daily Flow	29.13	25.51	34.86	30.07	25.75	23.92	24.02	23.26	22.77	23.21	22.82	23.94	25.78
	Final Estimated Infiltration	9.13	5.51	14.86	10.07	5.75	3.92	4.02	3.26	2.77	3.21	2.82	3.94	5.78
	Estimated Sanitary Flow	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Estimated Inflow	2.25	1.81	4.77	4.53	1.00	8.14	3.82	2.55	4.25	2.76	2.83	5.02	3.65	
Boston East Boston	Raw Average Daily Flow	5.02	4.05	7.00	5.67	3.77	5.60	5.48	5.39	4.31	4.24	3.84	4.86	4.94
	Raw Dry Day Average Daily Flow	4.30	3.84	6.57	4.83	3.62	4.07	5.16	4.48	3.68	3.57	3.55	3.42	4.26
	Raw Estimated Infiltration	1.00	0.54	3.27	1.53	0.32	0.77	1.86	1.18	0.38	0.27	0.25	0.12	0.96
	MWRA Estimated Infiltration	0.15	0.08	0.49	0.23	0.05	0.12	0.28	0.18	0.06	0.04	0.04	0.02	0.15
	Final Average Daily Flow	4.87	3.97	6.51	5.44	3.72	5.48	5.20	5.21	4.25	4.20	3.80	4.84	4.80
	Final Dry Day Average Daily Flow	4.15	3.76	6.08	4.60	3.57	3.95	4.88	4.30	3.62	3.53	3.51	3.40	4.12
	Final Estimated Infiltration	0.85	0.46	2.78	1.30	0.27	0.65	1.58	1.00	0.32	0.23	0.21	0.10	0.82
	Estimated Sanitary Flow	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
Estimated Inflow	0.72	0.21	0.43	0.84	0.15	1.53	0.32	0.91	0.63	0.67	0.29	1.44	0.68	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Annual
Average
(MGD)

Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Boston Ward Street	Raw Average Daily Flow	29.84	28.71	37.54	36.88	29.08	31.09	30.96	28.04	29.96	29.38	28.85	30.36	30.90
	Raw Dry Day Average Daily Flow	27.85	27.72	36.46	33.91	27.08	26.63	25.66	25.88	27.30	28.20	26.27	29.52	28.55
	Raw Estimated Infiltration	2.85	2.72	11.46	8.91	2.08	1.63	0.66	0.88	2.30	3.20	1.27	4.52	3.55
	MWRA Estimated Infiltration	0.49	0.46	1.96	1.52	0.36	0.28	0.11	0.15	0.39	0.55	0.22	0.77	0.61
	Final Average Daily Flow	29.35	28.25	35.58	35.36	28.72	30.81	30.85	27.89	29.57	28.83	28.63	29.59	30.29
	Final Dry Day Average Daily Flow	27.36	27.26	34.50	32.39	26.72	26.35	25.55	25.73	26.91	27.65	26.05	28.75	27.94
	Final Estimated Infiltration	2.36	2.26	9.50	7.39	1.72	1.35	0.55	0.73	1.91	2.65	1.05	3.75	2.94
	Estimated Sanitary Flow	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Estimated Inflow	1.99	0.99	1.08	2.97	2.00	4.46	5.30	2.16	2.66	1.18	2.58	0.84	2.35	
Boston (North Total)	Raw Average Daily Flow	69.35	63.15	88.57	80.46	62.39	72.19	67.37	62.17	64.23	62.43	61.20	67.31	68.43
	Raw Dry Day Average Daily Flow	63.85	59.92	81.88	71.80	59.22	57.18	57.36	56.21	56.25	57.30	54.99	59.39	61.30
	Raw Estimated Infiltration	13.85	9.92	31.88	21.80	9.22	7.18	7.36	6.21	6.25	7.30	4.99	9.39	11.30
	MWRA Estimated Infiltration	0.98	0.83	3.13	2.17	0.70	0.61	0.60	0.53	0.63	0.75	0.42	0.99	1.03
	Final Average Daily Flow	68.37	62.32	85.44	78.29	61.69	71.58	66.77	61.64	63.60	61.68	60.78	66.32	67.40
	Final Dry Day Average Daily Flow	62.87	59.09	78.75	69.63	58.52	56.57	56.76	55.68	55.62	56.55	54.57	58.40	60.27
	Final Estimated Infiltration	12.87	9.09	28.75	19.63	8.52	6.57	6.76	5.68	5.62	6.55	4.57	8.40	10.27
	Estimated Sanitary Flow	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Estimated Inflow	5.50	3.23	6.69	8.66	3.17	15.01	10.01	5.96	7.98	5.13	6.21	7.92	7.13	
Brookline (North Only)	Average Daily Flow	3.14	3.04	3.79	3.93	3.30	3.42	3.03	2.60	2.80	2.68	2.67	2.76	3.10
	Dry Day Average Daily Flow	3.11	3.02	3.45	3.49	3.24	3.08	2.59	2.42	2.45	2.54	2.61	2.71	2.89
	Estimated Infiltration	0.81	0.72	1.15	1.19	0.94	0.78	0.29	0.12	0.15	0.24	0.31	0.41	0.59
	Estimated Sanitary Flow	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
	Estimated Inflow	0.03	0.02	0.34	0.44	0.06	0.34	0.44	0.18	0.35	0.14	0.06	0.05	0.20
Burlington	Average Daily Flow	3.62	2.89	4.07	4.85	3.23	3.12	2.74	2.40	2.31	2.37	2.40	2.81	3.07
	Dry Day Average Daily Flow	3.42	2.82	3.58	4.34	3.11	2.96	2.64	2.29	2.23	2.29	2.25	2.39	2.86
	Estimated Infiltration	1.42	0.82	1.58	2.34	1.11	0.96	0.64	0.29	0.23	0.29	0.25	0.39	0.86
	Estimated Sanitary Flow	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Estimated Inflow	0.20	0.07	0.49	0.51	0.12	0.16	0.10	0.11	0.08	0.08	0.15	0.42	0.21
Cambridge	Raw Average Daily Flow	16.86	14.89	21.67	19.93	15.29	18.07	16.60	14.70	15.67	16.98	15.46	16.92	16.93
	Raw Dry Day Average Daily Flow	15.43	14.13	18.47	17.10	14.59	13.84	14.73	13.46	12.85	15.36	14.06	14.25	14.87
	Raw Estimated Infiltration	4.43	3.13	7.47	6.10	3.59	2.84	3.73	2.46	1.85	4.36	3.06	3.25	3.87
	MWRA Estimated Infiltration	0.62	0.44	1.05	0.86	0.50	0.40	0.52	0.35	0.26	0.61	0.43	0.46	0.54
	Final Average Daily Flow	16.24	14.45	20.62	19.07	14.79	17.67	16.08	14.35	15.41	16.37	15.03	16.46	16.39
	Final Dry Day Average Daily Flow	14.81	13.69	17.42	16.24	14.09	13.44	14.21	13.11	12.59	14.75	13.63	13.79	14.32
	Final Estimated Infiltration	3.81	2.69	6.42	5.24	3.09	2.44	3.21	2.11	1.59	3.75	2.63	2.79	3.32
	Estimated Sanitary Flow	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Estimated Inflow	1.43	0.76	3.20	2.83	0.70	4.23	1.87	1.24	2.82	1.62	1.40	2.67	2.07	
Chelsea	Raw Average Daily Flow	4.92	4.47	7.31	5.93	4.64	5.98	4.81	4.26	4.55	4.49	4.28	5.30	5.08
	Raw Dry Day Average Daily Flow	4.23	4.38	6.59	4.95	4.36	4.35	4.31	3.90	3.75	3.91	3.62	3.86	4.35
	Raw Estimated Infiltration	1.43	1.58	3.79	2.15	1.56	1.55	1.51	1.10	0.95	1.11	0.82	1.06	1.55
	MWRA Estimated Infiltration	0.17	0.19	0.46	0.26	0.19	0.19	0.18	0.13	0.12	0.14	0.10	0.13	0.19
	Final Average Daily Flow	4.75	4.28	6.85	5.67	4.45	5.79	4.63	4.13	4.43	4.35	4.18	5.17	4.89
	Final Dry Day Average Daily Flow	4.06	4.19	6.13	4.69	4.17	4.16	4.13	3.77	3.63	3.77	3.52	3.73	4.16
	Final Estimated Infiltration	1.26	1.39	3.33	1.89	1.37	1.36	1.33	0.97	0.83	0.97	0.72	0.93	1.36
	Estimated Sanitary Flow	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Estimated Inflow	0.69	0.09	0.72	0.98	0.28	1.63	0.50	0.36	0.80	0.58	0.66	1.44	0.73	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average (MGD)	
Everett	Raw Average Daily Flow	5.20	4.17	6.62	5.94	4.41	4.80	4.45	3.94	4.06	4.08	3.85	4.50	4.67	
	Raw Dry Day Average Daily Flow	4.74	3.89	6.14	5.35	4.17	4.15	4.12	3.83	3.70	3.75	3.57	3.74	4.27	
	Raw Estimated Infiltration	1.24	0.39	2.64	1.85	0.67	0.65	0.62	0.33	0.20	0.25	0.07	0.24	0.77	
	MWRA Estimated Infiltration	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Final Average Daily Flow	5.19	4.17	6.61	5.93	4.41	4.80	4.45	3.94	4.06	4.08	3.85	4.50	4.67	
	Final Dry Day Average Daily Flow	4.73	3.89	6.13	5.34	4.17	4.15	4.12	3.83	3.70	3.75	3.57	3.74	4.26	
	Final Estimated Infiltration	1.23	0.39	2.63	1.84	0.67	0.65	0.62	0.33	0.20	0.25	0.07	0.24	0.76	
	Estimated Sanitary Flow	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
	Estimated Inflow	0.46	0.28	0.48	0.59	0.24	0.65	0.33	0.11	0.36	0.33	0.28	0.76	0.41	
Lexington	Raw Average Daily Flow	6.02	4.03	5.96	8.91	5.27	4.60	4.02	3.01	3.14	3.53	3.51	3.95	4.66	
	Raw Dry Day Average Daily Flow	5.39	3.72	4.91	8.17	4.96	4.39	3.77	2.93	3.12	3.44	3.35	3.49	4.30	
	Raw Estimated Infiltration	3.19	1.52	2.71	5.97	2.76	2.19	1.57	0.73	0.92	1.24	1.15	1.29	2.10	
	MWRA Estimated Infiltration	0.30	0.14	0.26	0.56	0.26	0.21	0.15	0.07	0.09	0.12	0.11	0.12	0.20	
	Final Average Daily Flow	5.72	3.89	5.70	8.35	5.01	4.39	3.87	2.94	3.05	3.41	3.40	3.83	4.46	
	Final Dry Day Average Daily Flow	5.09	3.58	4.65	7.61	4.70	4.18	3.62	2.86	3.03	3.32	3.24	3.37	4.10	
	Final Estimated Infiltration	2.89	1.38	2.45	5.41	2.50	1.98	1.42	0.66	0.83	1.12	1.04	1.17	1.90	
	Estimated Sanitary Flow	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
	Estimated Inflow	0.63	0.31	1.05	0.74	0.31	0.21	0.25	0.08	0.02	0.09	0.16	0.46	0.36	
Malden	Raw Average Daily Flow	9.78	8.19	13.25	12.13	7.98	8.54	7.93	6.73	6.66	7.72	7.59	8.45	8.75	
	Raw Dry Day Average Daily Flow	8.94	8.14	12.54	11.16	7.63	8.07	7.40	6.61	6.52	7.50	7.17	7.28	8.25	
	Raw Estimated Infiltration	3.74	2.94	7.34	5.96	2.43	2.87	2.20	1.41	1.32	2.30	1.97	2.08	3.05	
	MWRA Estimated Infiltration	0.35	0.28	0.69	0.56	0.23	0.27	0.21	0.13	0.12	0.22	0.19	0.20	0.29	
	Final Average Daily Flow	9.43	7.91	12.56	11.57	7.75	8.27	7.72	6.60	6.54	7.50	7.40	8.25	8.46	
	Final Dry Day Average Daily Flow	8.59	7.86	11.85	10.60	7.40	7.80	7.19	6.48	6.40	7.28	6.98	7.08	7.96	
	Final Estimated Infiltration	3.39	2.66	6.65	5.40	2.20	2.60	1.99	1.28	1.20	2.08	1.78	1.88	2.76	
	Estimated Sanitary Flow	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	
	Estimated Inflow	0.84	0.05	0.71	0.97	0.35	0.47	0.53	0.12	0.14	0.22	0.42	1.17	0.50	
Medford	Raw Average Daily Flow	8.99	6.99	11.56	12.58	8.27	8.30	7.41	5.76	5.64	5.92	5.94	6.29	7.81	
	Raw Dry Day Average Daily Flow	8.01	6.80	10.03	11.39	7.83	7.50	6.56	5.31	5.54	5.46	5.53	5.30	7.10	
	Raw Estimated Infiltration	3.51	2.30	5.53	6.89	3.33	3.00	2.06	0.81	1.04	0.96	1.03	0.80	2.60	
	MWRA Estimated Infiltration	0.41	0.27	0.64	0.80	0.39	0.35	0.24	0.09	0.12	0.11	0.12	0.09	0.30	
	Final Average Daily Flow	8.58	6.72	10.92	11.78	7.88	7.95	7.17	5.67	5.52	5.81	5.82	6.20	7.51	
	Final Dry Day Average Daily Flow	7.60	6.53	9.39	10.59	7.44	7.15	6.32	5.22	5.42	5.35	5.41	5.21	6.80	
	Final Estimated Infiltration	3.10	2.03	4.89	6.09	2.94	2.65	1.82	0.72	0.92	0.85	0.91	0.71	2.30	
	Estimated Sanitary Flow	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	
	Estimated Inflow	0.98	0.19	1.53	1.19	0.44	0.80	0.85	0.45	0.10	0.46	0.41	0.99	0.70	
Melrose	Raw Average Daily Flow	5.29	3.40	7.08	7.45	4.11	3.80	3.59	2.83	2.67	2.97	3.11	3.76	4.18	
	Raw Dry Day Average Daily Flow	4.70	3.22	5.91	6.46	3.74	3.41	3.11	2.79	2.61	2.73	2.89	3.09	3.72	
	Raw Estimated Infiltration	2.80	1.32	4.01	4.56	1.84	1.51	1.21	0.89	0.71	0.83	0.99	1.19	1.82	
	MWRA Estimated Infiltration	0.54	0.26	0.78	0.88	0.36	0.29	0.23	0.17	0.14	0.16	0.19	0.23	0.35	
	Final Average Daily Flow	4.75	3.14	6.30	6.57	3.75	3.51	3.36	2.66	2.53	2.81	2.92	3.53	3.82	
	Final Dry Day Average Daily Flow	4.16	2.96	5.13	5.58	3.38	3.12	2.88	2.62	2.47	2.57	2.70	2.86	3.37	
	Final Estimated Infiltration	2.26	1.06	3.23	3.68	1.48	1.22	0.98	0.72	0.57	0.67	0.80	0.96	1.47	
	Estimated Sanitary Flow	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	
	Estimated Inflow	0.59	0.18	1.17	0.99	0.37	0.39	0.48	0.04	0.06	0.24	0.22	0.67	0.45	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Annual
Average
(MGD)

Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Milton (North Only)	Average Daily Flow	0.27	0.21	0.33	0.43	0.22	0.18	0.17	0.16	0.16	0.16	0.18	0.20	0.22
	Dry Day Average Daily Flow	0.21	0.19	0.30	0.38	0.21	0.18	0.16	0.15	0.15	0.15	0.17	0.19	0.20
	Estimated Infiltration	0.06	0.04	0.15	0.23	0.06	0.03	0.01	0.00	0.00	0.00	0.02	0.04	0.05
	Estimated Sanitary Flow	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	Estimated Inflow	0.06	0.02	0.03	0.05	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Newton (North Only)	Average Daily Flow	7.08	5.68	8.51	10.25	6.75	5.88	5.46	5.55	5.51	5.07	5.61	5.41	6.40
	Dry Day Average Daily Flow	6.70	5.49	7.32	9.25	6.27	5.56	5.08	5.44	5.42	4.94	5.02	5.02	5.96
	Estimated Infiltration	2.50	1.29	3.12	5.05	2.07	1.36	0.88	1.24	1.22	0.74	0.82	0.82	1.76
	Estimated Sanitary Flow	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
	Estimated Inflow	0.38	0.19	1.19	1.00	0.48	0.32	0.38	0.11	0.09	0.13	0.59	0.39	0.44
Reading	Raw Average Daily Flow	3.11	2.23	3.67	4.52	2.53	2.45	2.03	1.61	1.52	1.76	1.93	2.24	2.47
	Raw Dry Day Average Daily Flow	2.80	2.13	3.18	3.96	2.32	2.32	1.78	1.59	1.51	1.73	1.82	1.96	2.26
	Raw Estimated Infiltration	1.40	0.73	1.78	2.56	0.92	0.92	0.38	0.19	0.11	0.33	0.42	0.56	0.86
	MWRA Estimated Infiltration	0.01	0.01	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01
	Final Average Daily Flow	3.10	2.22	3.65	4.50	2.52	2.44	2.03	1.61	1.52	1.76	1.93	2.23	2.46
	Final Dry Day Average Daily Flow	2.79	2.12	3.16	3.94	2.31	2.31	1.78	1.59	1.51	1.73	1.82	1.95	2.25
	Final Estimated Infiltration	1.39	0.72	1.76	2.54	0.91	0.91	0.38	0.19	0.11	0.33	0.42	0.55	0.85
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Estimated Inflow	0.31	0.10	0.49	0.56	0.21	0.13	0.25	0.02	0.01	0.03	0.11	0.28	0.21
Revere	Raw Average Daily Flow	6.26	4.83	9.70	8.09	5.47	6.55	5.70	4.87	5.08	5.53	5.12	6.23	6.13
	Raw Dry Day Average Daily Flow	5.29	4.70	9.25	6.91	5.23	5.49	5.43	4.55	4.68	4.91	4.73	4.70	5.50
	Raw Estimated Infiltration	1.69	1.10	5.65	3.31	1.63	1.89	1.83	0.95	1.08	1.31	1.13	1.10	1.90
	MWRA Estimated Infiltration	0.01	0.01	0.04	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Final Average Daily Flow	6.25	4.82	9.66	8.06	5.46	6.54	5.69	4.86	5.07	5.52	5.11	6.22	6.11
	Final Dry Day Average Daily Flow	5.28	4.69	9.21	6.88	5.22	5.48	5.42	4.54	4.67	4.90	4.72	4.69	5.48
	Final Estimated Infiltration	1.68	1.09	5.61	3.28	1.62	1.88	1.82	0.94	1.07	1.30	1.12	1.09	1.88
	Estimated Sanitary Flow	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
	Estimated Inflow	0.97	0.13	0.45	1.18	0.24	1.06	0.27	0.32	0.40	0.62	0.39	1.53	0.63
Somerville	Raw Average Daily Flow	10.05	8.13	13.93	12.15	8.26	11.97	9.10	7.82	9.76	8.60	8.47	11.25	9.97
	Raw Dry Day Average Daily Flow	8.38	7.85	12.20	10.03	7.58	7.45	7.92	6.86	7.13	6.80	7.12	7.76	8.09
	Raw Estimated Infiltration	3.08	2.55	6.90	4.73	2.28	2.15	2.62	1.56	1.83	1.50	1.82	2.46	2.79
	MWRA Estimated Infiltration	0.07	0.06	0.16	0.11	0.05	0.05	0.06	0.04	0.04	0.03	0.04	0.06	0.06
	Final Average Daily Flow	9.98	8.07	13.77	12.04	8.21	11.92	9.04	7.78	9.72	8.57	8.43	11.19	9.90
	Final Dry Day Average Daily Flow	8.31	7.79	12.04	9.92	7.53	7.40	7.86	6.82	7.09	6.77	7.08	7.70	8.03
	Final Estimated Infiltration	3.01	2.49	6.74	4.62	2.23	2.10	2.56	1.52	1.79	1.47	1.78	2.40	2.73
	Estimated Sanitary Flow	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30	5.30
	Estimated Inflow	1.67	0.28	1.73	2.12	0.68	4.52	1.18	0.96	2.63	1.80	1.35	3.49	1.87
Stoneham	Raw Average Daily Flow	3.67	2.39	4.25	5.21	2.67	2.56	2.12	1.76	1.68	1.97	1.96	2.25	2.71
	Raw Dry Day Average Daily Flow	3.20	2.26	3.65	4.36	2.45	2.28	2.02	1.65	1.64	1.81	1.83	1.85	2.42
	Raw Estimated Infiltration	1.60	0.66	2.05	2.76	0.85	0.68	0.42	0.05	0.04	0.21	0.23	0.25	0.82
	MWRA Estimated Infiltration	0.26	0.11	0.34	0.46	0.14	0.11	0.07	0.01	0.01	0.03	0.04	0.04	0.13
	Final Average Daily Flow	3.41	2.28	3.91	4.75	2.53	2.45	2.05	1.75	1.67	1.94	1.92	2.21	2.57
	Final Dry Day Average Daily Flow	2.94	2.15	3.31	3.90	2.31	2.17	1.95	1.64	1.63	1.78	1.79	1.81	2.28
	Final Estimated Infiltration	1.34	0.55	1.71	2.30	0.71	0.57	0.35	0.04	0.03	0.18	0.19	0.21	0.68
	Estimated Sanitary Flow	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
	Estimated Inflow	0.47	0.13	0.60	0.85	0.22	0.28	0.10	0.11	0.04	0.16	0.13	0.40	0.29

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)	
Wakefield	Raw Average Daily Flow	4.73	3.23	5.53	6.80	3.74	3.61	3.00	2.43	2.21	2.54	2.61	3.08	3.63	
	Raw Dry Day Average Daily Flow	4.24	3.07	4.67	6.03	3.40	3.33	2.81	2.37	2.14	2.44	2.46	2.57	3.29	
	Raw Estimated Infiltration	2.74	1.57	3.17	4.53	1.90	1.83	1.31	0.87	0.64	0.94	0.96	1.07	1.79	
	MWRA Estimated Infiltration	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	
	Final Average Daily Flow	4.72	3.22	5.52	6.78	3.73	3.60	2.99	2.43	2.21	2.54	2.61	3.08	3.62	
	Final Dry Day Average Daily Flow	4.23	3.06	4.66	6.01	3.39	3.32	2.80	2.37	2.14	2.44	2.46	2.57	3.29	
	Final Estimated Infiltration	2.73	1.56	3.16	4.51	1.89	1.82	1.30	0.87	0.64	0.94	0.96	1.07	1.79	
	Estimated Sanitary Flow	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
	Estimated Inflow	0.49	0.16	0.86	0.77	0.34	0.28	0.19	0.06	0.07	0.10	0.15	0.51	0.33	
Waltham	Raw Average Daily Flow	9.74	7.98	11.83	13.09	8.26	8.65	7.39	6.61	6.72	7.43	6.93	7.49	8.51	
	Raw Dry Day Average Daily Flow	9.26	7.74	10.64	11.82	7.92	8.14	6.91	6.42	6.24	7.09	6.61	6.89	7.97	
	Raw Estimated Infiltration	3.46	1.94	4.84	6.02	2.12	2.34	1.11	0.62	0.44	1.29	0.81	1.09	2.17	
	MWRA Estimated Infiltration	0.16	0.09	0.22	0.27	0.10	0.11	0.05	0.03	0.02	0.06	0.04	0.05	0.10	
	Final Average Daily Flow	9.58	7.89	11.61	12.82	8.16	8.54	7.34	6.58	6.70	7.37	6.89	7.44	8.41	
	Final Dry Day Average Daily Flow	9.10	7.65	10.42	11.55	7.82	8.03	6.86	6.39	6.22	7.03	6.57	6.84	7.87	
	Final Estimated Infiltration	3.30	1.85	4.62	5.75	2.02	2.23	1.06	0.59	0.42	1.23	0.77	1.04	2.07	
	Estimated Sanitary Flow	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	
	Estimated Inflow	0.48	0.24	1.19	1.27	0.34	0.51	0.48	0.19	0.48	0.34	0.32	0.60	0.54	
Watertown	Average Daily Flow	3.51	2.74	4.35	4.51	3.19	3.10	2.88	2.51	2.53	2.56	2.66	2.98	3.13	
	Dry Day Average Daily Flow	3.22	2.62	4.18	4.08	3.02	2.86	2.73	2.48	2.40	2.48	2.58	2.64	2.94	
	Estimated Infiltration	0.92	0.32	1.88	1.78	0.72	0.56	0.43	0.18	0.10	0.18	0.28	0.34	0.64	
	Estimated Sanitary Flow	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
	Estimated Inflow	0.29	0.12	0.17	0.43	0.17	0.24	0.15	0.03	0.13	0.08	0.08	0.34	0.19	
Wilmington	Raw Average Daily Flow	1.35	1.23	1.53	1.64	1.27	1.28	1.24	1.22	1.14	1.17	1.18	1.13	1.28	
	Raw Dry Day Average Daily Flow	1.32	1.22	1.43	1.49	1.24	1.22	1.22	1.18	1.03	1.15	1.15	1.11	1.23	
	Raw Estimated Infiltration	0.52	0.42	0.63	0.69	0.44	0.42	0.42	0.38	0.23	0.35	0.35	0.31	0.43	
	MWRA Estimated Infiltration	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Final Average Daily Flow	1.34	1.23	1.52	1.63	1.27	1.28	1.24	1.22	1.14	1.17	1.18	1.13	1.28	
	Final Dry Day Average Daily Flow	1.31	1.22	1.42	1.48	1.24	1.22	1.22	1.18	1.03	1.15	1.15	1.11	1.23	
	Final Estimated Infiltration	0.51	0.42	0.62	0.68	0.44	0.42	0.42	0.38	0.23	0.35	0.35	0.31	0.43	
	Estimated Sanitary Flow	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
	Estimated Inflow	0.03	0.01	0.10	0.15	0.03	0.06	0.02	0.04	0.11	0.02	0.03	0.02	0.05	
Winchester	Average Daily Flow	2.57	1.76	2.97	3.72	2.02	1.81	1.57	1.32	1.27	1.45	1.49	1.69	1.97	
	Dry Day Average Daily Flow	2.31	1.67	2.44	3.18	1.86	1.70	1.48	1.28	1.24	1.39	1.43	1.46	1.79	
	Estimated Infiltration	1.21	0.57	1.34	2.08	0.76	0.60	0.38	0.18	0.14	0.29	0.33	0.36	0.69	
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	Estimated Inflow	0.26	0.09	0.53	0.54	0.16	0.11	0.09	0.04	0.03	0.06	0.06	0.23	0.18	
Winthrop	Average Daily Flow	1.88	1.58	2.50	2.25	1.68	1.88	1.72	1.60	1.65	1.65	1.64	1.91	1.83	
	Dry Day Average Daily Flow	1.70	1.54	2.32	1.93	1.59	1.62	1.60	1.57	1.48	1.52	1.49	1.58	1.66	
	Estimated Infiltration	0.60	0.44	1.22	0.83	0.49	0.52	0.50	0.47	0.38	0.42	0.39	0.48	0.56	
	Estimated Sanitary Flow	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	Estimated Inflow	0.18	0.04	0.18	0.32	0.09	0.26	0.12	0.03	0.17	0.13	0.15	0.33	0.17	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Annual Average (MGD)

Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)	
Woburn	Raw Average Daily Flow	8.10	6.57	8.95	9.40	6.80	6.49	5.33	4.75	4.82	5.40	5.09	5.54	6.44	
	Raw Dry Day Average Daily Flow	7.96	6.37	7.93	8.86	6.37	6.16	5.16	4.58	4.54	5.38	4.80	5.24	6.11	
	Raw Estimated Infiltration	3.46	1.87	3.43	4.36	1.87	1.66	0.66	0.08	0.04	0.88	0.30	0.74	1.61	
	MWRA Estimated Infiltration	0.49	0.26	0.48	0.62	0.26	0.23	0.09	0.01	0.01	0.12	0.04	0.10	0.23	
	Final Average Daily Flow	7.61	6.31	8.47	8.78	6.54	6.26	5.24	4.74	4.81	5.28	5.05	5.44	6.21	
	Final Dry Day Average Daily Flow	7.47	6.11	7.45	8.24	6.11	5.93	5.07	4.57	4.53	5.26	4.76	5.14	5.89	
	Final Estimated Infiltration	2.97	1.61	2.95	3.74	1.61	1.43	0.57	0.07	0.03	0.76	0.26	0.64	1.39	
	Estimated Sanitary Flow	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
	Estimated Inflow	0.14	0.20	1.02	0.54	0.43	0.33	0.17	0.17	0.17	0.28	0.02	0.29	0.30	0.32
Subtotal (Northern System)	Raw Average Daily Flow	206.27	172.16	262.12	259.95	180.71	197.81	177.07	156.64	161.73	165.15	161.76	181.54	190.34	
	Raw Dry Day Average Daily Flow	188.18	164.92	235.27	230.25	170.55	165.13	157.79	145.83	144.25	152.40	147.73	155.41	171.53	
	Raw Estimated Infiltration	64.03	40.77	111.12	106.10	46.40	40.98	33.64	21.68	20.30	28.25	23.58	31.26	47.39	
	MWRA Estimated Infiltration	4.48	3.00	8.42	7.80	3.26	2.89	2.44	1.57	1.57	2.37	1.74	2.51	3.51	
	Final Average Daily Flow	201.79	169.16	253.70	252.15	177.45	194.92	174.63	155.07	160.16	162.78	160.02	179.03	186.83	
	Final Dry Day Average Daily Flow	183.70	161.92	226.85	222.45	167.29	162.24	155.35	144.26	142.68	150.03	145.99	152.90	168.02	
	Final Estimated Infiltration	59.55	37.77	102.70	98.30	43.14	38.09	31.20	20.11	18.73	25.88	21.84	28.75	43.88	
	Estimated Sanitary Flow	124.15	124.15	124.15	124.15	124.15	124.15	124.15	124.15	123.95	124.15	124.15	124.15	124.15	124.13
	Estimated Inflow	18.09	7.24	26.85	29.70	10.16	32.68	19.28	10.81	17.48	12.75	14.03	26.13	18.81	
Total (North and South)	Raw Average Daily Flow	320.04	260.23	421.35	439.15	281.36	290.82	262.57	226.75	226.29	238.78	237.23	269.20	289.62	
	Raw Dry Day Average Daily Flow	292.47	249.63	372.46	384.55	263.73	249.95	238.24	213.89	205.85	221.62	217.51	231.87	261.89	
	Raw Estimated Infiltration	115.57	72.73	195.56	207.65	86.83	73.05	61.34	36.99	29.15	44.82	40.61	54.97	85.01	
	MWRA Estimated Infiltration	10.25	6.35	17.98	18.26	7.78	6.26	5.24	3.21	1.98	3.51	2.89	4.50	7.36	
	Final Average Daily Flow	309.79	253.88	403.37	420.89	273.58	284.56	257.33	223.54	224.31	235.27	234.34	264.70	282.26	
	Final Dry Day Average Daily Flow	282.22	243.28	354.48	366.29	255.95	243.69	233.00	210.68	203.87	218.11	214.62	227.37	254.53	
	Final Estimated Infiltration	105.32	66.38	177.58	189.39	79.05	66.79	56.10	33.78	27.17	41.31	37.72	50.47	77.65	
	Estimated Sanitary Flow	176.90	176.90	176.90	176.90	176.90	176.90	176.90	176.90	176.70	176.80	176.90	176.90	176.88	
	Estimated Inflow	27.57	10.60	48.89	54.60	17.63	40.87	24.33	12.86	20.44	17.16	19.72	37.33	27.74	
North System as Reported by NPDES	Average Daily Flow	208.90	174.20	267.00	260.60	182.40	202.10	181.00	161.70	169.00	170.30	165.10	187.00	194.22	
Total System as Reported by NPDES	Average Daily Flow	325.30	264.80	434.20	440.70	284.00	296.20	269.50	235.30	240.50	248.30	244.30	278.10	296.93	

Table 4 - Estimated Community Wastewater Flow Components for 2015										10-May-16			PAGE 11	Annual Average (MGD)
Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Chelsea Creek	Average Daily Flow	96.77	76.37	126.56	131.27	83.97	92.54	80.16	67.66	68.77	73.14	71.40	82.85	87.68
	Dry Day Average Daily Flow	87.19	74.69	110.38	113.89	78.49	77.36	72.84	63.32	60.60	66.83	66.07	67.91	78.31
	Estimated Infiltration	38.59	26.09	61.78	65.29	29.89	28.76	24.24	14.72	12.10	18.23	17.47	19.31	29.72
	Estimated Sanitary Flow	48.60	48.60	48.60	48.60	48.60	48.60	48.60	48.60	48.50	48.60	48.60	48.60	48.59
	Estimated Inflow	9.58	1.68	16.18	17.38	5.48	15.18	7.32	4.34	8.17	6.31	5.33	14.94	9.36
Columbus Park	Average Daily Flow	32.20	27.83	41.11	35.77	27.29	32.79	28.45	26.31	27.45	26.62	26.11	29.65	30.15
	Dry Day Average Daily Flow	29.74	26.03	36.20	30.94	26.21	24.31	24.41	23.57	22.97	23.53	23.12	24.31	26.29
	Estimated Infiltration	9.59	5.88	16.05	10.79	6.06	4.16	4.26	3.42	2.82	3.38	2.97	4.16	6.14
	Estimated Sanitary Flow	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15	20.15
	Estimated Inflow	2.46	1.80	4.91	4.83	1.08	8.48	4.04	2.74	4.48	3.09	2.99	5.34	3.86
Ward Street	Average Daily Flow	63.07	56.80	77.18	78.61	59.19	61.60	58.95	53.91	56.67	56.99	55.17	58.14	61.38
	Dry Day Average Daily Flow	59.44	55.09	67.81	71.56	55.89	54.15	54.07	50.55	52.80	54.52	51.87	54.78	56.88
	Estimated Infiltration	13.54	9.19	21.91	25.66	9.99	8.25	8.17	4.65	6.90	8.62	5.97	8.88	10.98
	Estimated Sanitary Flow	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90	45.90
	Estimated Inflow	3.63	1.71	9.37	7.05	3.30	7.45	4.88	3.36	3.87	2.47	3.30	3.36	4.49
Winthrop Terminal	Average Daily Flow	17.71	13.95	21.58	17.08	12.59	16.04	14.42	14.59	15.56	15.49	13.04	16.65	15.74
	Dry Day Average Daily Flow	15.33	13.47	19.79	14.60	12.06	13.97	14.04	13.67	13.52	14.74	11.92	12.91	14.18
	Estimated Infiltration	5.83	3.97	10.29	5.10	2.56	4.47	4.54	4.17	4.02	5.24	2.42	3.41	4.68
	Estimated Sanitary Flow	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
	Estimated Inflow	2.38	0.48	1.79	2.48	0.53	2.07	0.38	0.92	2.04	0.75	1.12	3.74	1.56
Subtotal - Northern Headworks	Average Daily Flow	209.75	174.95	266.43	262.73	183.04	202.97	181.98	162.47	168.45	172.24	165.72	187.29	194.94
	Dry Day Average Daily Flow	191.70	169.28	234.18	230.99	172.65	169.79	165.36	151.11	149.89	159.62	152.98	159.91	175.67
	Estimated Infiltration	67.55	45.13	110.03	106.84	48.50	45.64	41.21	26.96	25.84	35.47	28.83	35.76	51.53
	Estimated Sanitary Flow	124.15	124.15	124.15	124.15	124.15	124.15	124.15	124.15	124.05	124.15	124.15	124.15	124.14
	Estimated Inflow	18.05	5.67	32.25	31.74	10.39	33.18	16.62	11.36	18.56	12.62	12.74	27.38	19.27
Headworks as Reported by NPDES	SUM of ADF's	208.90	174.20	267.00	260.60	182.40	202.10	181.00	161.70	169.00	170.30	165.10	187.00	194.22
Chelsea Creek	Average Daily Flow	96.00	75.80	126.60	129.70	83.20	91.90	79.40	67.00	68.70	72.10	70.80	82.50	87.03
Columbus Park	Average Daily Flow	32.40	28.00	41.40	35.80	27.70	32.80	28.60	26.50	27.90	26.50	26.30	29.90	30.33
Ward Street	Average Daily Flow	62.90	56.60	77.40	78.20	59.00	61.40	58.70	53.70	56.70	56.60	55.10	58.00	61.21
Winthrop Terminal	Average Daily Flow	17.60	13.80	21.60	16.90	12.50	16.00	14.30	14.50	15.70	15.10	12.90	16.60	15.64
Total System Flow (Southern Collection System Plus Northern Headworks)	Raw Average Daily Flow	323.52	263.02	425.66	441.93	283.69	295.98	267.48	232.58	233.01	245.87	241.19	274.95	294.23
	Raw Dry Day Average Daily Flow	295.99	253.99	371.37	385.29	265.83	254.61	245.81	219.17	211.49	228.84	222.76	236.37	266.03
	Raw Estimated Infiltration	119.09	77.09	194.47	208.39	88.93	77.71	68.91	42.27	34.69	52.04	45.86	59.47	89.15
	MWRA Estimated Infiltration	5.77	3.35	9.56	10.46	4.52	3.37	2.80	1.64	0.41	1.14	1.15	1.99	3.85
	Final Average Daily Flow	317.75	259.67	416.10	431.47	279.17	292.61	264.68	230.94	232.60	244.73	240.04	272.96	290.38
	Final Dry Day Average Daily Flow	290.22	250.64	361.81	374.83	261.31	251.24	243.01	217.53	211.08	227.70	221.61	234.38	262.18
	Final Estimated Infiltration	113.32	73.74	184.91	197.93	84.41	74.34	66.11	40.63	34.28	50.90	44.71	57.48	85.30
	Estimated Sanitary Flow	176.90	176.90	176.90	176.90	176.90	176.90	176.90	176.90	176.80	176.80	176.90	176.90	176.88
	Estimated Inflow	27.53	9.03	54.29	56.64	17.86	41.37	21.67	13.41	21.52	17.03	18.43	38.58	28.20

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)	
Boston (Total)	Raw Average Daily Flow	90.91	78.61	119.32	113.57	80.83	89.81	82.13	73.81	72.60	73.71	71.77	81.45	85.75	
	Raw Dry Day Average Daily Flow	83.66	74.80	109.88	100.49	76.22	71.63	70.80	67.30	64.36	66.85	64.40	70.59	76.78	
	Raw Estimated Infiltration	25.66	16.80	51.88	42.49	18.22	13.63	12.80	9.30	6.36	8.85	6.40	12.59	18.78	
	MWRA Estimated Infiltration	5.58	3.51	10.91	10.22	4.20	3.12	2.72	1.73	0.67	1.35	0.97	2.24	3.94	
	Final Average Daily Flow	85.33	75.10	108.41	103.35	76.63	86.69	79.41	72.08	71.93	72.36	70.80	79.21	81.81	
	Final Dry Day Average Daily Flow	78.08	71.29	98.97	90.27	72.02	68.51	68.08	65.57	63.69	65.50	63.43	68.35	72.84	
	Final Estimated Infiltration	20.08	13.29	40.97	32.27	14.02	10.51	10.08	7.57	5.69	7.50	5.43	10.35	14.84	
	Estimated Sanitary Flow	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00	58.00
	Estimated Inflow	7.25	3.81	9.44	13.08	4.61	18.18	11.33	6.51	8.24	6.86	7.37	10.86	8.97	
Brookline (Total)	Raw Average Daily Flow	8.42	7.03	12.48	12.75	7.38	7.60	6.58	5.02	5.60	5.87	5.91	6.85	7.63	
	Raw Dry Day Average Daily Flow	7.70	6.76	10.41	10.42	6.91	6.52	5.64	4.74	4.85	5.33	5.37	6.03	6.72	
	Raw Estimated Infiltration	3.20	2.26	5.91	5.92	2.41	2.02	1.14	0.24	0.35	0.83	0.87	1.53	2.22	
	MWRA Estimated Infiltration	0.02	0.01	0.03	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	
	Final Average Daily Flow	8.40	7.02	12.45	12.72	7.37	7.59	6.57	5.02	5.60	5.87	5.91	6.84	7.61	
	Final Dry Day Average Daily Flow	7.68	6.75	10.38	10.39	6.90	6.51	5.63	4.74	4.85	5.33	5.37	6.02	6.71	
	Final Estimated Infiltration	3.18	2.25	5.88	5.89	2.40	2.01	1.13	0.24	0.35	0.83	0.87	1.52	2.21	
	Estimated Sanitary Flow	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	
	Estimated Inflow	0.72	0.27	2.07	2.33	0.47	1.08	0.94	0.28	0.75	0.54	0.54	0.82	0.90	
Milton (Total)	Average Daily Flow	3.47	2.42	5.37	6.18	2.59	2.28	2.31	1.60	1.50	1.62	1.79	2.22	2.78	
	Dry Day Average Daily Flow	3.00	2.33	4.40	4.99	2.32	2.10	2.12	1.54	1.46	1.59	1.76	1.83	2.45	
	Estimated Infiltration	1.60	0.93	3.00	3.59	0.92	0.70	0.72	0.14	0.06	0.19	0.36	0.43	1.05	
	Estimated Sanitary Flow	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	
	Estimated Inflow	0.47	0.09	0.97	1.19	0.27	0.18	0.19	0.06	0.04	0.03	0.03	0.39	0.33	
Newton (Total)	Raw Average Daily Flow	15.90	12.72	21.63	26.42	15.33	13.51	12.06	9.99	9.73	11.23	11.42	12.35	14.36	
	Raw Dry Day Average Daily Flow	14.93	12.33	18.33	23.76	13.89	12.53	11.28	9.76	9.19	10.77	10.02	11.14	13.16	
	Raw Estimated Infiltration	7.43	4.83	10.83	16.26	6.39	5.03	3.78	2.26	1.69	3.27	2.52	3.64	5.66	
	MWRA Estimated Infiltration	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.01	
	Final Average Daily Flow	15.89	12.71	21.61	26.39	15.32	13.50	12.05	9.99	9.73	11.22	11.42	12.34	14.35	
	Final Dry Day Average Daily Flow	14.92	12.32	18.31	23.73	13.88	12.52	11.27	9.76	9.19	10.76	10.02	11.13	13.15	
	Final Estimated Infiltration	7.42	4.82	10.81	16.23	6.38	5.02	3.77	2.26	1.69	3.26	2.52	3.63	5.65	
	Estimated Sanitary Flow	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	
	Estimated Inflow	0.97	0.39	3.30	2.66	1.44	0.98	0.78	0.23	0.54	0.46	1.40	1.21	1.20	

Table 4 - Estimated Community Wastewater Flow Components for 2015

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Community	Flow Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (MGD)
Subtotal Northern System CSO Communities Only: [Sum of Boston (North), Cambridge, Chelsea, and Somerville]	Raw Average Daily Flow	101.18	90.64	131.48	118.47	90.58	108.21	97.88	88.95	94.21	92.50	89.41	100.78	100.41
	Raw Dry Day Average Daily Flow	91.89	86.28	119.14	103.88	85.75	82.82	84.32	80.43	79.98	83.37	79.79	85.26	88.62
	Raw Estimated Infiltration	22.79	17.18	50.04	34.78	16.65	13.72	15.22	11.33	10.88	14.27	10.69	16.16	19.52
	MWRA Estimated Infiltration	1.84	1.52	4.80	3.40	1.44	1.25	1.36	1.05	1.05	1.53	0.99	1.64	1.83
	Final Average Daily Flow	99.34	89.12	126.68	115.07	89.14	106.96	96.52	87.90	93.16	90.97	88.42	99.14	98.59
	Final Dry Day Average Daily Flow	90.05	84.76	114.34	100.48	84.31	81.57	82.96	79.38	78.93	81.84	78.80	83.62	86.79
	Final Estimated Infiltration	20.95	15.66	45.24	31.38	15.21	12.47	13.86	10.28	9.83	12.74	9.70	14.52	17.69
	Estimated Sanitary Flow	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10	69.10
Estimated Inflow	9.29	4.36	12.34	14.59	4.83	25.39	13.56	8.52	14.23	9.13	9.62	15.52	11.80	
Subtotal Northern System Without North CSO Communities:	Raw Average Daily Flow	105.09	81.52	130.64	141.48	90.13	89.60	79.19	67.69	67.52	72.65	72.35	80.76	89.92
	Raw Dry Day Average Daily Flow	96.29	78.64	116.13	126.37	84.80	82.31	73.47	65.40	64.27	69.03	67.94	70.15	82.91
	Raw Estimated Infiltration	41.24	23.59	61.08	71.32	29.75	27.26	18.42	10.35	9.42	13.98	12.89	15.10	27.88
	MWRA Estimated Infiltration	2.64	1.48	3.62	4.40	1.82	1.64	1.08	0.52	0.52	0.84	0.75	0.87	1.68
	Final Average Daily Flow	102.45	80.04	127.02	137.08	88.31	87.96	78.11	67.17	67.00	71.81	71.60	79.89	88.24
	Final Dry Day Average Daily Flow	93.65	77.16	112.51	121.97	82.98	80.67	72.39	64.88	63.75	68.19	67.19	69.28	81.23
	Final Estimated Infiltration	38.60	22.11	57.46	66.92	27.93	25.62	17.34	9.83	8.90	13.14	12.14	14.23	26.19
	Estimated Sanitary Flow	55.05	55.05	55.05	55.05	55.05	55.05	55.05	55.05	54.85	55.05	55.05	55.05	55.03
Estimated Inflow	8.80	2.88	14.51	15.11	5.33	7.29	5.72	2.29	3.25	3.62	4.41	10.61	7.01	
Subtotal North/South Systems Without North CSO Communities:	Raw Average Daily Flow	218.86	169.59	289.87	320.68	190.78	182.61	164.69	137.80	132.08	146.28	147.82	168.42	189.21
	Raw Dry Day Average Daily Flow	200.58	163.35	253.32	280.67	177.98	167.13	153.92	133.46	125.87	138.25	137.72	146.61	173.27
	Raw Estimated Infiltration	92.78	55.55	145.52	172.87	70.18	59.33	46.12	25.66	18.27	30.55	29.92	38.81	65.49
	MWRA Estimated Infiltration	8.41	4.83	13.18	14.86	6.34	5.01	3.88	2.16	0.93	1.98	1.90	2.86	5.53
	Final Average Daily Flow	210.45	164.76	276.69	305.82	184.44	177.60	160.81	135.64	131.15	144.30	145.92	165.56	183.68
	Final Dry Day Average Daily Flow	192.17	158.52	240.14	265.81	171.64	162.12	150.04	131.30	124.94	136.27	135.82	143.75	167.74
	Final Estimated Infiltration	84.37	50.72	132.34	158.01	63.84	54.32	42.24	23.50	17.34	28.57	28.02	35.95	59.96
	Estimated Sanitary Flow	107.80	107.80	107.80	107.80	107.80	107.80	107.80	107.80	107.60	107.70	107.80	107.80	107.78
Estimated Inflow	18.28	6.24	36.55	40.01	12.80	15.48	10.77	4.34	6.21	8.03	10.10	21.81	15.94	