



609 Winter Street
Framingham, MA 01702
Phone: 508-745-4077

September 30, 2019

Glenda Velez - CIP
U.S. Environmental Protection Agency - Region 1
5 Post Office Square – OEP06-01
Boston, MA 02109-3912

**Re: Annual Report - NPDES Phase II MS4 Permit
Permit Year 1 (May 1, 2018 – June 30, 2019)
City of Waltham, Massachusetts - NPDES Permit ID # MAR041066**

Dear Ms. Glenda:

Attached is a copy of the NPDES Phase II MS4 Permit Annual Report (report) for Permit Year 1 (May 1, 2018 - June 30, 2019). We are submitting this on behalf of the City of Waltham, Massachusetts.

An electronic version of this document in pdf format was also submitted earlier this afternoon via e-mail to: stormwater.reports@epa.gov

We are also submitting a hard copy of this report to:

Fred Civian
Massachusetts Department of Environmental Protection
One Winter Street - 5th Floor
Boston, MA 02108

Please feel free to contact me by phone at 508-745-4077 or via e-mail at sbade@ssv-eng.com if you have any questions or need any further information.

Very truly yours,

A handwritten signature in blue ink, appearing to read "Sam Bade", with a small flourish at the end.

Sam Bade
President

C: Fred Civian, MassDEP
Stephen Casazza, City Engineer - Waltham, MA



Enter your transmittal number

X284446
Transmittal Number

Your unique Transmittal Number can be accessed online:

<http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html>

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application.
Copy 2 must accompany your fee payment.
Copy 3 should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

MAR0410066

MS4 Stormwater

1. Permit Code: 4 to 7 character code from permit instructions

2. Name of Permit Category

NPDES Phase II Small MS4 General Permit Annual Report - Year 1

3. Type of Project or Activity

B. Applicant Information – Firm or Individual

City of Waltham, MA

1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. **Last Name** of Individual

3. **First Name** of Individual

4. MI

Engineering Department, 119 School Street

5. Street Address

Waltham

MA

02451

781-314-3830

6. City/Town

7. State

8. Zip Code

9. Telephone #

10. Ext. #

Stephen A. Casazza, PE City Engineer

scasazza@city.waltham.ma.us

11. Contact Person

12. e-mail address

C. Facility, Site or Individual Requiring Approval

City of Waltham, MA

1. Name of Facility, Site Or Individual

610 Main Street

2. Street Address

Waltham

MA

02452

781-314-3000

3. City/Town

4. State

5. Zip Code

6. Telephone #

7. Ext. #

8. DEP Facility Number (if Known)

9. Federal I.D. Number (if Known)

10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

SSV Engineering Inc.

1. Name of Firm Or Individual

609 Winter Street

2. Address

Framingham

MA

01702

508-745-4077

3. City/Town

4. State

5. Zip Code

6. Telephone #

7. Ext. #

Sam Bade

8. Contact Person

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no

If yes, enter the project's EOE file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

Special Provisions:

1. ☒ **Fee Exempt** (city, town or municipal housing authority)(state agency if fee is \$100 or less).

There are no fee exemptions for BWSC permits, regardless of applicant status.

2. ☐ **Hardship Request** - payment extensions according to 310 CMR 4.04(3)(c).

3. ☐ **Alternative Schedule Project** (according to 310 CMR 4.05 and 4.10).

4. ☐ **Homeowner** (according to 310 CMR 4.02).

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Check Number

Dollar Amount

Date

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

SEPTEMBER 30 2019

LIST OF ATTACHMENTS

APPENDIX A STORMWATER PUBLIC EDUCATION

APPENDIX B STORMWATER PUBLIC PARTICIPATION

APPENDIX C EPA IDDE PROGRAM PROGRESS REPORT NO. 22, JULY 2019

APPENDIX D PROPOSED STORMWATER MANAGEMENT RULES AND REGULATIONS

APPENDIX E 2018 HARDY POND TREATMENT

APPENDIX F GREEN INFRASTRUCTURE PARKING LOT GUIDANCE DOCUMENT

APPENDIX G SOP – STORMWATER TREATMENT SYSTEMS INSPECTIONS

Year 1 Annual Report

Massachusetts Small MS4 General Permit

Reporting Period: May 1, 2018-June 30, 2019

****Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form****

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed.

Part I: Contact Information

Name of Municipality or Organization: City of Waltham

EPA NPDES Permit Number: MAR041066

Primary MS4 Program Manager Contact Information

Name: Stephen A. Casazza

Title: City Engineer

Street Address Line 1: Arthur J Clark - Government Center

Street Address Line 2: 119 School Street, Room #10

City: Waltham

State: MA

Zip Code: 02451

Email: scasazza@city.waltham.ma.us

Phone Number: (781) 314-3830

Fax Number: na

Stormwater Management Program (SWMP) Information

SWMP Location (web address): <https://www.city.waltham.ma.us/clean-stormwater-initiative/pages/stormwater-management-plan>

Date SWMP was Last Updated: Sep 27, 2019

If the SWMP is not available on the web please provide the physical address and an explanation of why it is not posted on the web:

Part II: Self Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4.

Impairment(s)

- ☒ Bacteria/Pathogens
 ☐ Chloride
 ☐ Nitrogen
 ☐ Phosphorus
☒ Solids/ Oil/ Grease (Hydrocarbons)/ Metals

TMDL(s)

- In State: ☐ Assabet River Phosphorus
 ☒ Bacteria and Pathogen
 ☐ Cape Cod Nitrogen
☒ Charles River Watershed Phosphorus
 ☐ Lake and Pond Phosphorus

- Out of State: ☐ Bacteria/Pathogens
 ☐ Metals
 ☐ Nitrogen
 ☐ Phosphorus

Clear Impairments and TMDLs

Next, check off all requirements below that have been completed. **By checking each box you are certifying that you have completed that permit requirement fully.** If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.

Year 1 Requirements

- ☒ Develop and begin public education and outreach program
☒ Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
 - ☐ The SSO inventory is attached to the email submission
 - ☒ The SSO inventory can be found at the following website:
https://www.city.waltham.ma.us/sites/walthamma/files/uploads/waltham_idde_plan.pdf☒ Develop written IDDE plan including a procedure for screening and sampling outfalls
☒ IDDE ordinance complete
☒ Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation
 - ☐ The priority ranking of outfalls/interconnections is attached to the email submission
 - ☒ The priority ranking of outfalls/interconnections can be found at the following website:
https://www.city.waltham.ma.us/sites/walthamma/files/uploads/waltham_idde_plan.pdf☒ Construction/ Erosion and Sediment Control (ESC) ordinance complete
☒ Develop written procedures for site inspections and enforcement of sediment and erosion control measures
☐ Develop written procedures for site plan review
☐ Keep a log of catch basins cleaned or inspected
☒ Complete inspection of all stormwater treatment structures

Annual Requirements

- ☒ Annual opportunity for public participation in review and implementation of SWMP
- ☐ Comply with State Public Notice requirements
- ☒ Keep records relating to the permit available for 5 years and make available to the public
- ☒ Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- ☐ Annual training to employees involved in IDDE program
- ☒ All curbed roadways have been swept a minimum of one time per year

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☒ Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☒ Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☐ Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Solids, Oil and Grease (Hydrocarbons), or Metals

Annual Requirements

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

- ☒ Increase street sweeping frequency of all municipal owned streets and parking lots to a schedule to target areas with potential for high pollutant loads
- ☐ Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50 percent full; Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings

Charles River Watershed Phosphorus TMDL

- ☒ Begin Phase 1 Phosphorus Control Plan (PCP)

Use the box below to input additional details on any unchecked boxes above or any additional information you would like to share as part of your self assessment:

The City had planned to host a workshop to present draft SWMP and seek public comments and input; however, social media posts and announcements on the website as listed in Attachment B were used instead. The City has an internal Environmental Committee made up of representatives from various City departments and meets on a monthly basis to discuss various environmental issues related to City operations. The draft and final SWMP was developed with input from the Stormwater Management Program Team. A Stormwater Workshop was held on February 1, 2017 to summarize and prepare the City officials of the impending new NPDES MS4 Permit Requirements. The SWMP was posted to the City's Clean Stormwater Initiative website on June 30, 2019.

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

Yes ☐ No ☒

If yes, describe below, including any relevant impairments or TMDLs:

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed during the reporting period:

Below, report on the educational messages completed during the first year. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

BMP: Stormwater Management for Residents

Message Description and Distribution Method:

A detailed stormwater management for residents was posted on the City's Clean Stormwater Initiative Webpage. Information on recycling and proper household hazardous waste disposal was also provided.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

The City's Recycling Website received 16,249 hits and the Clean Stormwater Initiative received 200 hits.

Message Date(s):

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Pet Waste Brochure

Message Description and Distribution Method:

Copies of pet waste cleanup and disposal brochure was included in the water and sewer bill mailings to residential and commercial accounts. An updated flyer for pet waste disposal education was given to the City Clerk to distribute with issuance of dog licenses.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

Approximately 15,000 copies of pet waste cleanup and disposal brochures were included in the quarterly residential water and sewer bills and 513 commercial monthly water and sewer bills.

Message Date(s): September, October and November 2018

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) during the reporting period:

The Stormwater Management Program was posted to the City's Clean Stormwater Initiative website for input on June 30, 2019.

The City had planned to host a workshop to present draft SWMP and seek public comments and input; however, social media posts and announcements on the website as listed in Attachment B were used. See Page 3 above for additional detail.

Was this opportunity different than what was proposed in your NOI? Yes ☒ No ☐

Describe any other public involvement or participation opportunities conducted during the reporting period:

The City of Waltham performed several storm water-related activities in collaboration with residents. Numerous volunteer cleanup activities along surface water bodies and educational walks/tours have been organized by the Waltham Land Trust. The City of Waltham through the Public Works Department organized Earth Day volunteer City-Wide cleanup on April 20, 2019.

The City continued with the hazardous waste/used oil collection days for the residents throughout the reporting period. The City also continued to offer the Rain Barrel Purchase Program for residents.

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Below, report on the number of SSOs identified in the MS4 system and removed during this reporting period.

Number of SSOs identified: 10

Number of SSOs removed: 10

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified: 71

Total number of SSOs removed: 61

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period:

The City of Waltham has completed stormwater mapping and has made the following updates: ☐ Outfalls and receiving waters (updated 2018) ☐ Interconnections with other MS4s and other storm sewer systems ☐ Water bodies identified by name and indication of all use impairments initial catchment delineations.

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

- ☒ The outfall screening data is attached to the email submission
- ☐ The outfall screening data can be found at the following website:

See Attachment C

Below, report on the number of outfalls/interconnections screened during this reporting period.

Number of outfalls screened:

Below, report on the percent of total outfalls/ interconnections screened to date.

Percent of total outfalls screened:

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ☒ The catchment investigation data is attached to the email submission
- ☐ The catchment investigation data can be found at the following website:

See Attachment C for summary of dry and wet weather investigations conducted.

Below, report on the number of catchment investigations completed during this reporting period.

Number of catchment investigations completed this reporting period:

Below, report on the percent of catchments investigated to date.

Percent of total catchments investigated:

Optional: Provide any additional information for clarity regarding the catchment investigations below:

Sampling of outfalls discharging into Charles River along with municipal interconnections were conducted in 2008. See maps located at [https://www.city.waltham.ma.us/clean-stormwater-initiative/pages/initial outfall sampling](https://www.city.waltham.ma.us/clean-stormwater-initiative/pages/initial%20outfall%20sampling). The IDDE Plan is located at https://www.city.waltham.ma.us/sites/walthamma/files/uploads/waltham_idde_plan.pdf. Appendix C of this Plan shows the Stormwater Catchment Delineation, Stormwater Catchment Prioritization and Ranking.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ☒ The illicit discharge removal report is attached to the email submission
- ☐ The illicit discharge removal report can be found at the following website:

See Attachment C

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.

Number of illicit discharges identified:

Number of illicit discharges removed:

Estimated volume of sewage removed: [UNITS]

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed since the effective date of the permit.

Total number of illicit discharges identified:

Total number of illicit discharges removed:

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

As summarized in Attachment C, a total estimate of 13.53 MGY of illicit flow has been removed between April 1, 2010 and July 2013. Additional illicit flow has been removed since July 2013 to-date and the City is compiling the information and will present it in the next annual report.

Employee Training

Describe the frequency and type of employee training conducted during the reporting period:

Employee training for City of Waltham employees is managed, handled and generally provided at the departmental level by each respective department head. Each City department head is responsible for and determines what training is necessary and/or desirable for each of their departmental employees based on his/her job responsibilities and duties and makes training available to his/her employees as appropriate. During the reporting period, various City employees received training in OSHA HazCom and other OSHA training, asbestos and other training necessary and appropriate for their job duties.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed during this reporting period.

Number of site plan reviews completed: 18 NOIs

Number of inspections completed: 18 minimum

Number of enforcement actions taken: 1

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance Development

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

The Stormwater ordinance is complete and is located at <https://ecode360.com/26936149>. Initial draft Rules and Regulations were modified to only affect developments of one acre or more. The City will plan to have the Rules and Regulations approved by the City Council during Permit Year 2 period.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

The Stormwater Ordinance requires the submission of as-built drawings.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

A green infrastructure guidance document was prepared for the City's Embassy Parking Garage. This project was completed under the MassDEP 604 (b) Grant Program funding in association with the Charles River Watershed Association. Copy of the document is included in Attachment F.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

A green infrastructure guidance document was prepared for the City's Embassy Parking Garage. This project was completed under the MassDEP 604 (b) Grant Program funding in association with the Charles River Watershed Association. Copy of the document is included in Attachment F.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

The City owned parcels are compiled in the City's GIS database and are readily accessible. Vortex type particle separators with oil and grease and floatables traps have been installed at the City owned schools that are inspected and maintained on an annual basis. See Appendix G.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The City's plan involves cleaning catch basins based on the ward/precints approximately one fourth annually.

If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- ☐ The catch basin cleaning optimization plan or schedule is attached to the email submission
- ☐ The catch basin cleaning optimization plan or schedule can be found at the following website:

The City is developing a catch basin inspection and data collection plan using GIS in 2020.

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins during this reporting period.

Number of catch basins inspected:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

Below, report on the total number of catch basins in the MS4 system, if known.

Total number of catch basins:

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

This will be taken into account during the catch basin cleaning optimization plan. The City is also developing a GIS based field data collection system to log the inspections of catch basins and material removed.

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

The written procedures for Street Sweeping is located at https://www.city.waltham.ma.us/sites/walthamma/files/uploads/appendix_f_street_sweeping_procedures.pdf

Report on street sweeping completed during the reporting period using one of the three metrics below.

☒ Number of miles cleaned: 293.41 lane miles

☐ Volume of material removed: [] [UNITS]

☐ Weight of material removed: [] [UNITS]

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Not Applicable

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

The written procedures for the winter road maintenance is complete and is available at https://www.city.waltham.ma.us/sites/walthamma/files/uploads/appendix_g_deicing_procedures.pdf

Inventory of Permittee-Owned Properties

Describe the status of the inventory, due in year 2 of the permit term, of permittee-owned properties, including parks and open spaces, buildings and facilities, and vehicles and equipment, and include any updates:

This effort is significantly complete and will be finalized in year 2 of the permit term as planned.

O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

This effort is significantly complete and will be finalized in year 2 of the permit term as planned.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

The City implements the SWPPP for the Rhodes Municipal Center and Consolidated Public Works (CPW) Yard located at 55-175 Lexington Street, Waltham, MA. The Waltham CPW Yard is used by various departments which are responsible for the cleaning, repair and maintenance of the City of Waltham's vehicles, streets, parks and open spaces, cemeteries, water and sewer systems, and storm water catch basins. The City of Waltham has over 150 miles of roads and streets with 2,300 catch basins which discharge into the Charles River and its tributaries. The Chester Brook, a tributary of the Charles River, flows through the CPW Yard strengthening the need for a comprehensive Storm Water Pollution Prevention Plan (SWPPP).

Below, report on the number of site inspections for facilities that require a SWPPP completed during this reporting period.

Number of site inspections completed: 12

Describe any corrective actions taken at a facility with a SWPPP:

No corrective actions. Standard Operating Procedures established in the SWPPP were implemented as required.

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

The SOP for stormwater treatment structures located throughout the City are included in Attachment G.

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ☒ Not applicable
- ☐ The results from additional reports or studies are attached to the email submission
- ☐ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 2 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Complete system mapping Phase I
- Begin investigations of catchments associated with Problem Outfalls
- Develop or modify an ordinance or other regulatory mechanism for post-construction stormwater runoff from new development and redevelopment
- Establish and implement written procedures to require the submission of as-built drawings no later than two years after the completion of construction projects
- Develop, if not already developed, written operations and maintenance procedures
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; review annually and update as necessary
- Establish a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner
- Develop and implement a written SWPPP for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclose or cover storage piles of salt or piles containing salt used for deicing or other purposes
- Develop, if not already developed, written procedures for sweeping streets and municipal-owned lots
- Develop, if not already developed, written procedures for winter road maintenance including storage of salt and sand

- Develop, if not already developed, a schedule for catch basin cleaning
- Develop, if not already developed, a written procedure for stormwater treatment structure maintenance
- Develop a written catchment investigation procedure (*18 months*)

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually

Provide any additional details on activities planned for permit year 2 below:

Part V: Certification of Small MS4 Annual Report 2019**40 CFR 144.32(d) Certification**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

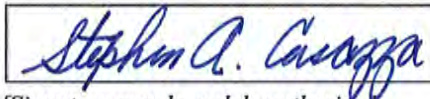
Name:

Stephen A. Casazza

Title:

City Engineer

Signature:



Date:

9.30.19

[Signatory may be a duly authorized representative]

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT A

STORMWATER PUBLIC EDUCATION



The City purchased a tabletop display board titled, "Stormwater Matters - Outreach and Participation" from SuAsCo in 2016. The City has displayed this board for a period of one month at each of its elementary schools and also at the Waltham Public Library for a period of 6 weeks in 2016. The City displayed the board at the Waltham Public Library for one month during the 2018 - 2019 permit year. The board is currently displayed in the main hallway at the Government Center Auditorium and the Engineering offices since June 2019.

Pet Waste Brochure
Residential and Commercial Water and Sewer Bill Inserts
Also Posted on City's Clean Stormwater Initiative Website

Pet Waste Doesn't Belong in the Drain

Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. Runoff is usually collected by catch basins and then is conveyed untreated into waterbodies that we use for recreational activities like swimming, fishing, or as a source of drinking water.

Any pet waste dumped into catch basins will be discharged untreated to the closest stream, pond, lake or river, causing health and environmental problems, as well as becoming a public nuisance.

Did You Know?

- Pet waste significantly contributes to pollutants (bacteria and organic matter) in Waltham's streams and ponds such as the Charles River, Chester and Beaver Brooks, Hardy Pond, and any receiving wetlands.
- Pet Waste dumped or washed into catch basins (stormwater drains) is carried directly to rivers through the stormwater drain system. Even waste left in the street, far from a catch basin, can be washed into the drains during storms.
- Pet waste often carries viruses and bacteria that are extremely harmful to humans.
- Pet waste contains nitrogen and phosphorus nutrients that accelerate growth of damaging algae and aquatic weeds and harm aquatic life.

What You Can Do

- Always clean up after your pet, and dispose of the waste in a sealed or tied bag in a trashcan, or into a toilet. Do not flush plastic bags into the toilet.
- Encourage your neighbors and other pet owners to be responsible; it is not hard, and it is part of the responsibility of owning a pet.

What You Should Not Do

- Do not dispose of pet waste in a catch basin (stormwater drain). These systems go directly to local rivers.
- Do not use pet waste as a fertilizer. Bacteria in pet waste does far more harm than good.
- Do not add pet waste to a compost pile. The pile will never get hot enough to kill disease-causing organisms.

How Much Will It Cost You?

- The City of Waltham performs a costly stormwater outfall-monitoring program. Pet waste that has been improperly disposed of can easily return positive results for contaminants.
- When severe contamination is identified in an outfall, an investigation process begins which will identify the source of contamination per EPA's requirements.

- However, when the source of contamination is pet waste, it is almost impossible to identify the origin of the contamination, due to its sporadic nature. The investigation efforts are very expensive and are paid **with your tax dollars.**

- You can help the City of Waltham save thousands of dollars every year by disposing of your pet waste properly.



Be Prepared

If you are prepared, picking up after your pet is easy. Simply carry a plastic bag with you on every walk with your pet, and you will have the equipment to remove your pet's waste. There are even compact, refillable bag dispensers that you can conveniently attach right to your dog's leash.

Many parks and recreational areas have courtesy bags and disposal boxes, designed specifically for pet waste.

Avoid letting your pet do his business within 200 feet of a water body.

In addition, of course, never throw pet waste into a storm drain. Dispose of the waste when you get home, and do not forget to wash your hands!

Do Not Feed the Fowl

Unfortunately, an activity many of us enjoyed as children actually has damaging impacts, not only for the waterfowl themselves, but also for local waters. While ducks, geese, and swans love to eat the bread we offer them, it lacks the nutrition of their natural diet and can cause long-term health problems. Feeding waterfowl also causes them to congregate in higher numbers than they would if they had to rely solely on their own natural food supplies. This results in large quantities and concentrations of waste for local waters!



For more information,
Contact:

City of Waltham
Engineering Department
119 School Street,
Waltham MA 02451
(781) 314-3830



HELP KEEP OUR WATERSHED CLEAN

PICK UP AFTER YOUR PET



City of Waltham
Engineering Department
(781) 314-3830



DO YOUR
DOODY
SCOOP MY
POOP





Do Your "Doody" for Clean Water

You hate stepping in it. And fish hate swimming in it, too! Dogs produce a lot of waste which, if not disposed of properly, can end up in our waterways. Do your part to keep our waters and public areas clean and healthy! Bag your pet's waste and throw it in a trashcan..

DO



DON'T



Did you know that the average dog can produce nearly a pound of waste each day?

- Pet waste left on lawns and in public spaces is not only gross. It can be quite harmful too.
- Pet waste contains twice as much bacteria as human waste!
- If left in your yard, pet waste can kill grass and other plants.
- Adults and children who come in contact with it can get sick.
- When pet waste washes into storm drains and waterways, it can make the water unhealthy for people and wildlife.
- Pet waste in waterways can even cause algae to grow, making the water turn an unpleasant green color.

Do your "doody" in both public areas and in your yard.

To learn more, visit the www.ThinkBlueMassachusetts.org

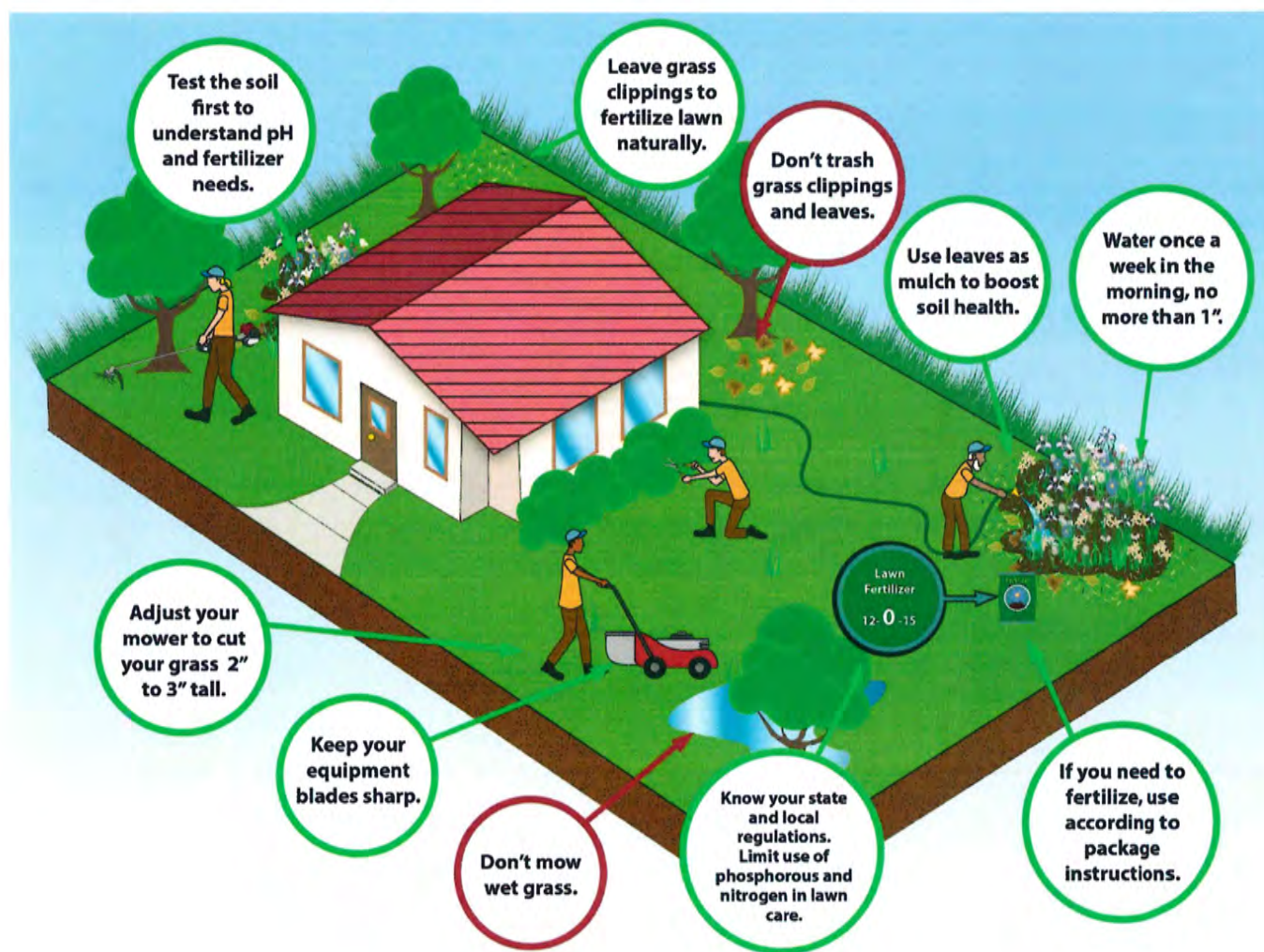


YOUR LOGO
HERE



THINK BLUE
MASSACHUSETTS

Lawn and Garden Tips to Help Curb Stormwater Pollution



Under Massachusetts law, only apply fertilizer with phosphorus if:

1. A soil test shows that phosphorus is needed; or
2. During the first growing season for a newly established lawn.

Contact the UMass Cooperative Extension Soil Nutrient Testing Laboratory to learn how to conduct a routine soil test: <https://ag.umass.edu/services/soil-plant-nutrient-testing-laboratory/ordering-information-forms>

Learn more at: www.ThinkBlueMassachusetts.org

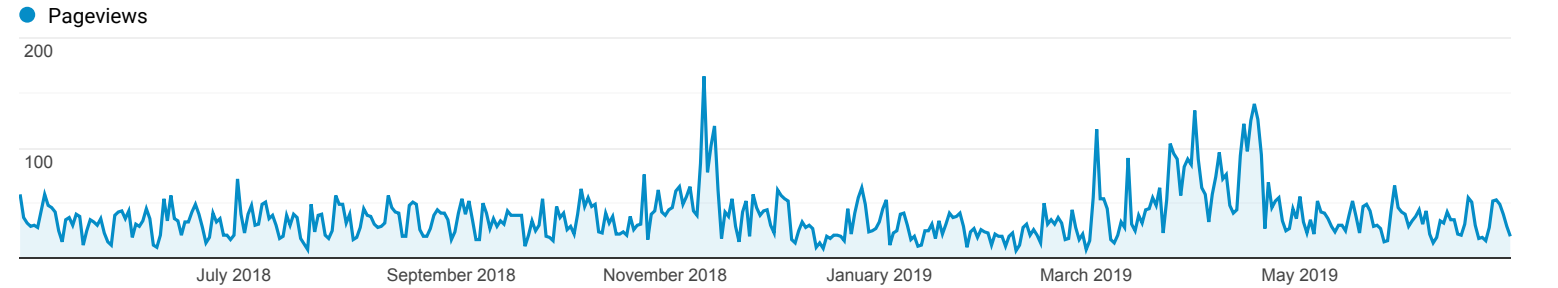


Pages

All Users
100.00% Pageviews

May 1, 2018 - Jun 30, 2019

Explorer




This data was filtered with the following filter expression: **Recycling Department**

Page Title	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	16,249 % of Total: 1.01% (1,604,214)	12,557 % of Total: 1.01% (1,241,864)	00:01:05 Avg for View: 00:01:27 (-25.64%)	4,277 % of Total: 0.66% (648,080)	30.20% Avg for View: 43.15% (-30.01%)	29.93% Avg for View: 40.40% (-25.92%)	\$0.00 % of Total: 0.00% (\$0.00)
1. Recycling Department Waltham MA	15,625 (96.16%)	12,100 (96.36%)	00:01:03	4,029 (94.20%)	28.75%	29.09%	\$0.00 (0.00%)
2. The Waltham Recycling Department will be hosting a Recycling & Collection Event on Saturday, April 20th Waltham MA	264 (1.62%)	157 (1.25%)	00:01:53	41 (0.96%)	26.19%	34.85%	\$0.00 (0.00%)
3. In celebration of Earth Day on April 22nd, 2019, the Waltham Public Works & Recycling Departments will be holding TWO citywide events on Saturday, April 20th: Waltham MA	173 (1.06%)	131 (1.04%)	00:02:40	100 (2.34%)	36.00%	60.69%	\$0.00 (0.00%)
4. Healthy Waltham is teaming up with the Waltham Recycling Department to collect hazardous button-cell batteries in the city through November 13th! Waltham MA	97 (0.60%)	92 (0.73%)	00:01:29	86 (2.01%)	82.56%	80.41%	\$0.00 (0.00%)
5. Spring Cleaning? Here's a look at some of the vendors who will be at the Recycling Department's free Recycling & Collection event on Saturday, April 20th! Waltham MA	77 (0.47%)	65 (0.52%)	00:01:53	14 (0.33%)	78.57%	42.86%	\$0.00 (0.00%)
6. Waltham Recycling Department Announces Button-Cell Battery Collection through November 13th! Waltham MA	10 (0.06%)	9 (0.07%)	00:00:31	7 (0.16%)	71.43%	80.00%	\$0.00 (0.00%)
7. Recycling Department 	2 (0.01%)	2 (0.02%)	00:00:22	0 (0.00%)	0.00%	50.00%	\$0.00 (0.00%)
8. Recycling Department	1 (0.01%)	1 (0.01%)	00:03:19	0 (0.00%)	0.00%	0.00%	\$0.00 (0.00%)

Rows 1 - 8 of 8

Pages

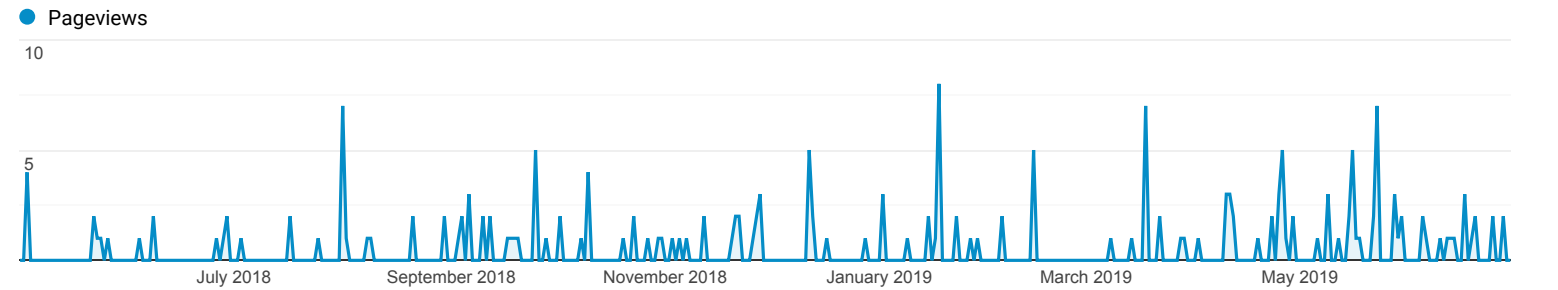


All Users

100.00% Pageviews

May 1, 2018 - Jun 30, 2019

Explorer



This data was filtered with the following filter expression: **Clean Stormwater Initiative**

Page Title	Pageviews	Unique Pageviews	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	200 % of Total: 0.01% (1,604,214)	139 % of Total: 0.01% (1,241,864)	00:01:59 Avg for View: 00:01:27 (37.08%)	37 % of Total: 0.01% (648,080)	72.97% Avg for View: 43.15% (69.10%)	32.00% Avg for View: 40.40% (-20.79%)	\$0.00 % of Total: 0.00% (\$0.00)
1. Clean Stormwater Initiative Waltham MA	200 (100.00%)	139 (100.00%)	00:01:59	37 (100.00%)	72.97%	32.00%	\$0.00 (0.00%)

Rows 1 - 1 of 1

Social Media Postings and Public Education



The City of Waltham ✓



Published by Abby Leigh [?] · May 21 · 🌐

It's that time of year again to start thinking about water conservation and saving rain water! Minimize storm-water runoff and start saving money by purchasing a discounted rain barrel! The deadline to purchase is **NEXT TUESDAY, MAY 28TH** by midnight!

REASONS TO PURCHASE A RAIN BARREL:

- 2 rain barrels can easily pay for themselves in one season
- Rainwater has no chemicals, chlorine or fluoride – great for plants and lawn
- Rain Barrels help towns/cities manage water supplies and storm water runoff
- At least \$200 of precious rain water splashes off a 1,000 sf roof in a season
- Help stressed trees and gardens during dry spells. In 2016, 48% of towns in MA had water bans

For more information and to participate in the Rain Barrel Program, please see: <https://www.city.waltham.ma.us/.../minimize-storm-water-runof...> Use the coupon code "waltham10" to get the full discount.



1,885
People Reached

117
Engagements

Boost Post



The City of Waltham

Published by Abby Leigh [?] · June 5 ·



Last night, Waltham Public Works distributed 52 rain barrels to various Waltham residents! Thank you for helping our city manage our water supply & minimize storm-water runoff!

Though our discount order date has passed, you can still purchase rain barrels through The Great American Rain Barrel Company at full price here: <https://www.city.waltham.ma.us/recycl.../waltham-rainbarrels>



2,385

People Reached

198

Engagements

Boost Post



The City of Waltham ✓

...

Published by Abby Leigh [?] · April 22 · 🌐

Minimize storm-water runoff and start saving money by purchasing a discounted rain barrel! Deadline to order is May 28th. Use the coupon code "waltham10": <http://bit.ly/2lqBhma>



4,399

People Reached

499

Engagements

[Boost Post](#)



DID YOU KNOW the average person throws away 68lbs of clothing per year? Clothing and Housewares account for approximately 10% of the municipal waste stream. 85% of clothing does not get recycled or donated, it gets trashed.

This past August, the City of Waltham launched a new curbside recycling program for clothing and a variety of household goods. The program is in addition to our current recycling program. This free program is run by Simple Recycling in cooperation with Waltham's Recycling Department. It is not run by the Consolidated Public Works Department and does not require enrollment.

Simple Recycling's primary focus is on clothing and accessories, but they will also take small usable household discards (see list attached). This recycling initiative is part of the City's attempt to reduce Waltham's trash tonnage and reduce the amount of trash going to landfills. Every Waltham household has received a pink bag from Simple Recycling with details attached. Simply fill your pink bag and place it at your curb (at least 3ft away from your wheeled recycling cart) on your regularly scheduled recycling collection day. Pink bags should never be placed in or on your blue wheeled cart.

To learn more about Simple Recycling, or to order more bags, go to: <http://simplerecycling.com/>. Call 1-866-835-5068 with any questions.

W SIMPLE RECYCLING'S PINK BAG CURBSIDE COLLECTION PROGRAM W

Step 1

Receive free pink collection bags from Simple Recycling. Additional bags can be ordered at www.SimpleRecycling.com or by calling 1-866-835-5068. Please note: The City of Waltham's Recycling Department is not responsible for distributing additional pink collection bags.

Step 2

Residents fill pink collection bags with used clothing and a variety of home goods listed below:

Men's Clothing	Purses	Sleeping Bags
Women's Clothing	Hats	Silverware
Children's Clothing	Toys	Dishes
Shirts & Jackets	Blankets	Pots/Pans
Knitwear	Drapes/Curtains	Backpacks
Shoes	Pillows	

Step 3

Place the pink bags at their curb on their regularly scheduled recycling collection day, and at least 3 feet away from their wheeled carts. Pink bags should never be placed in or on the blue wheeled cart. These pink bags are the only bags allowed on city streets.

Step 4

Simple Recycling will collect the bags for recycling using a separate truck. Trucks are collected by EZ Disposal's trucks. If resident's pink bag is not picked up on their regular collection day, contact Simple Recycling via www.SimpleRecycling.com or by calling 1-866-835-5068. The City of Waltham is not responsible for collecting pink Simple Recycling bags.

LET YOUR CLOTHING BE
LOVED AGAIN





Looking to get rid of old tires, tv/computer monitors, bikes, books, etc? The Recycling Dept is hosting a Recycling & Collection event Sat, Oct 5th 9am-2pm at Nipper Maher Park - FREE to Waltham residents!

"More Than Words" is one of the many vendors who will be there. See more here: <http://bit.ly/2LAJLZh>

Saturday, October 5th 9 a.m. – 2 p.m.
Maher Park 65 Dartmouth St. Waltham, MA



CITY OF
WALTHAM
RECYCLING &
COLLECTION
EVENT

WALTHAM RESIDENTS ONLY - FREE
CY REQUIRED & ANY ITEM NOT LISTED
WILL NOT BE ACCEPTED

- Shred It - paper shredding (2 file boxes max per residence)
- Tires (no rims)
- CFL Bulbs, tubes (no long button batteries)
- Bikes not Bombs - bicycle \$20 tax-deductible donation (fray cost of shipping overseas) bikesnotbombs.org/help-out for donation guidelines
- More Than Words - books (no encyclopedias)
- Computer monitors, laptops (no computer cords, keyboards, towers)
- Waltham Lion's Club - electronics
- Simple Recycling - clothing, small household appliances
- Cell Phones for Soldiers - any model or condition
- Fire Extinguishers
- Propane Tanks - must be empty
- Scrap Metal

in Recycling Department <https://www.city.waltham.ma.us/recycling-dept>
Sarah Kelley, Recycling Coordinator at 781-314-3390 or email skelley@city.waltham.ma.us

RECORDS Donate
CD's, DVD's
Video Games
(no encyclopedias, VHS tapes)

WALTHAM RECYCLING
COLLECTION EVENT
SATURDAY, OCTOBER 5TH
DARTMOUTH ST. WALTHAM
9:00 A.M. – 2:00 P.M.



Waltham residents - Please make sure you're carefully screening what is put in your recycling carts! Feedback from our collection vendor, "EZ Disposal and Recycling", indicated that the biggest contaminants in Waltham are currently plastic bags and Styrofoam.

- **PLASTIC BAGS:** Plastic bags get stuck in recycling machinery! Please **DO NOT** put recyclables in a plastic bag & **DO NOT** put any plastic bags in your recycling carts. You can recycle plastic bags at local supermarkets: Market Basket, Hannafords (accepts all types - grocery, shopping, film packaging etc), Shaws (accepts only grocery bags with handles). For more info, visit <http://plasticfilmrecycling.org>

- **STYROFOAM:** NEVER put any Styrofoam in your recycling carts, large or small. The City does not take Styrofoam for recycling. Styrofoam can be put into the trash. Styrofoam packing peanuts can be dropped off at Mail Boxes Etc. 738 Main St, Waltham. All Styrofoam can be recycled at Conigliaro Industries in Framingham, MA for a fee (1-888-266-4425)

Please make sure to follow the guidelines printed on the top of your recycling carts and see more disposal options here:

<https://www.city.waltham.ma.us/.../disposal-index-recycling-t...>

DON'T BAG



Recyclables



NO PLASTIC BAGS IN RECYCLING

Thank you for recycling.



This sign funded by MassDEP.

RECYCLABLES ONLY

Please do not bag items. Place the following clean items in the cart.

Aluminum cans, foil & pie tins
latas y recipientes de aluminio

Tin or steel cans
latas de acero u hojalata

Cereal boxes, paper towels
cajas de cereal, toallas de papel

Paper, magazines, newspapers, junk mail, etc.
revistas, periódicos, correspondencia publicitaria, etc.

Plastic bottles & containers
botellas y envases de plástico

Rigid plastics
plásticos rígidos

• Carts must be clean
• Do not put...





The City of Waltham ✓



Published by Abby Leigh [?] · March 27 · 🌐

A reminder to residents to keep any food/liquid soiled items out of your recycling carts! Make sure to empty all containers before recycling & put any pizza boxes into your trash!



**EMPTY
ALL CONTAINERS
BEFORE RECYCLING.**

**NO FOOD
OR LIQUID
IN THE CART**

Food and liquid can ruin other recyclables.

1,124

People Reached

19

Engagements

Boost Post



The City of Waltham ✓



Published by Abby Leigh [?] · April 3 · 🌐

Recycling reminder 🌱 Only the cardboard that fits in your recycling cart with the lid fully closed will be collected for recycling. Please avoid leaving any cardboard at your curb next to your cart. Food spoiled cardboard, such as pizza boxes, should be thrown into the trash. Large quantities of cardboard can be dropped off in the dumpster in the Public Works Yard at 165 Lexington St.

See more in our brochure here: <http://bit.ly/2019-20RecyclingBrochure> (En español: <http://bit.ly/2019-20FolletoDeReciclaje>)



5,589

People Reached

1,037

Engagements

Boost Post



The City of Waltham ✓



Published by Abby Leigh [?] · July 31 · 🌐

We need your help keeping Waltham clean!

Please try to put all trash in bags, and then into barrels with tight fitting lids. Barrels should be kept clean and intact (no holes). Trash can also be placed in dumpsters with closed lids. Please do not leave any trash bags on city streets, as they are susceptible to rodents. As a reminder, plastic bags get stuck in recycling machinery. Please do not put any plastic bags of any kind in your recycling carts, only in trash barrels.

See rodent prevention tips from the Waltham Health Department here: <https://www.city.waltham.ma.us/health-depa.../rodent-control> and more on trash & recycling in Waltham here: <http://bit.ly/2019-20RecyclingBrochure>



6,114
People Reached

1,209
Engagements

Boost Post



The Waltham Public Works Department is launching a program July through August to raise recycling IQ & keep unwanted items out of resident's recycling carts! ♻️

A team of Summer Work student workers will be hired to implement the curbside feedback program. It will target households on recycling collection routes throughout the city. Sarah Kelley, Waltham's Recycling Coordinator, along with the Summer Works students will be lifting the lids of recycling carts daily as part of the program. If they find a large amount of plastic bags, trash or other items that do not belong in the recycling cart, they will tag the cart with an "oops tag" (see attached), which will signal EZ Disposal that there is contamination in the cart. Residents whose carts get tagged will need to dispose of the contamination before putting their carts out the following week on their regular scheduled recycling day.

"Contamination" is a word used to describe items not belonging in the recycling cart. Plastic bags are the biggest culprit, causing a halt in operations at recycling processing plants. Other ineligible items include food waste, Styrofoam, tangles and construction debris. These items can contaminate an entire load, as well as endanger workers on the processing line. These issues will result in additional charges and higher processing costs for the city.

For more info on what you can & can't toss in your recycling carts, see our brochure here: https://www.city.waltham.ma.us/.../2019-20_online_recycling_b...



Please leave these items out of your recycling cart!



Do not Bag Recyclables (no garbage)
No couteux en baches les recyclables ni les basaux



No Plastic Bags or Plastic Wrap (return to retail)
No les baches de plastic (retourner à la vente)



No Food or Liquid (empty all containers)
No les comidat ni liquides



No Clothing or Liners (drop-off only)
No les roques ni suberats



Please leave these items out of your recycling cart!



Do not Bag Recyclables (no garbage)
No couteux en baches les recyclables ni les basaux



No Plastic Bags or Plastic Wrap (return to retail)
No les baches de plastic (retourner à la vente)



No Food or Liquid (empty all containers)
No les comidat ni liquides



No Clothing or Liners (drop-off only)
No les roques ni suberats





The City of Waltham ✓



Published by Abby Leigh [?] · October 26, 2018 · 🌐

With the nor'easter coming in tomorrow, now would be a good time to make sure your catch basins/sewers are clear of debris to prevent any roadway flooding. Should you need any assistance during the storm, please use this directory: <https://www.city.waltham.ma.us/who-do-i-contact-for>

Here's a good overview of what to expect tomorrow: <http://bit.ly/2ELeMbB>



1,069

People Reached

44

Engagements

Boost Post



The City of Waltham ✓



Published by Abby Leigh [?] · January 11, 2018 · 🌐

With the warmer weather today & rain on the horizon for the weekend, it is important to make sure catch basins are clear to avoid any flooding! Here's an overview of what to expect these next few days from the The Boston Globe: <http://bit.ly/2Dmomxd>



1,648

People Reached

65

Engagements

Boost Post



The City of Waltham ✓



Published by Abby Leigh [?] · January 24 · 🌐

With heavy rain and warmer temps in the forecast today, please be on the lookout for snow covered catch basins/sewers! To prevent flooding on your street, please clear any snow from on top of and around the catch basin grates. Do not attempt to remove the grate, only the snow on top.

HELP WITH THE MELT!

LOCATE YOUR NEAREST CATCH BASIN

**Clear Snow and Debris
to Prevent Local Flooding**



1,679

People Reached

74

Engagements

Boost Post

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT B

STORMWATER PUBLIC PARTICIPATION

**Public Participation
Postings on Social Media and City's Clean Stormwater
Initiative Website**



The Waltham Engineering Department needs your input on our city's Stormwater Management Plan!

The City of Waltham Engineering Department, working with the Mayor and other Departments, has prepared and submitted a Stormwater Management Plan (Plan) to comply with USEPA's Municipal Stormwater Permit (NPDES MS4 Permit).

We are committed to improving quality of discharges from City's stormwater outfalls into the Charles River and other surface water bodies. Please review the Plan here: <https://www.city.waltham.ma.us/.../pages/stormwater-managemen...> and provide input to help the City with protecting and improving the City's surface waters here: <https://www.city.waltham.ma.us/.../contact-the-stormwater-team>

STORMWATER MANAGEMENT PLAN

CITY OF WALTHAM, MASSACHUSETTS



JUNE 2019



Prepared by:



**City Of Waltham**  @CityofWaltham

The Engineering Dept, needs input on our city's Stormwater Management Plan! We are committed to improving quality of discharges from City's stormwater outfalls into the Charles River and other surface water bodies. Review the plan & send us your feedback! <http://bit.ly/2mgHOXB>



JUNE 2019





News or Announcement *The Waltham Engineering Department needs your input on City's Stormwater Management Plan!* has been updated.

▼ Create Content

[Home](#)



The Waltham Engineering Department needs your input on City's Stormwater Management Plan!

POSTED ON: SEPTEMBER 23, 2019 - 2:49PM

The City of Waltham Engineering Department, working with the Mayor and other Departments, has prepared and submitted a Stormwater Management Plan (Plan) to comply with USEPA's Municipal Stormwater Permit (NPDES MS4 Permit). The City has committed to improving quality of discharges from City's stormwater outfalls into the Charles River and other surface water bodies. Please review the Plan here: <https://www.city.waltham.ma.us/clean-stormwater-initiative/pages/stormwater-management-plan> and provide input to help the City with protecting and improving the City's surface waters here: <https://www.city.waltham.ma.us/engineering/webforms/contact-the-stormwater-team>

Stormwater Workshops

Stormwater Workshop
Waltham - Engineering
1 Feb. 2017

SIGN-IN

<u>NAME</u>	<u>DEPT.</u>
Sam Bade	Stormwater Coordinator, SSV ENG.
John Martino	Engineering.
Jan McKenzie	Water / Sewer
Eric Rizzo	IT Services/GIS
Tim Kelly	Water Dept
Pat Azadi	Law Dept.
Sheryl Waddick	EM - Environmental Specialist
BERNIE MULLIN	EM DIRECTOR
BILL FORTE	BUILDING
Mike Garrin	Traffic Engineering
Phil Moser	Conservation
GERARD DUBOIS -	Conservation
BOB BAFFERTY	ENVIRONMENTAL PARTNERS GROUP
JOE PEDULLA	CITY OF WALTHAM, PURCHAS.
Michael Chiasson	CPW

Bill Doyle -	Core Comm
Patricia Cagle	Planning
Steve Casazza	Engineering



STORMWATER WORKSHOP

PREPARING FOR EPA'S NEW MS4 PERMIT

CITY OF WALTHAM

Engineering Department

Wednesday, February 01, 2017

WORKSHOP OUTLINE

- INTRODUCTIONS
- OVERVIEW & EFFECTIVE DATES
- PERMIT REQUIREMENTS
- STORMWATER COORDINATOR ROLE
- IDDE PROGRAM
- TECHNICAL ASSISTANCE & RESOURCES
- QUESTIONS & ANSWERS

JULY 1ST, 2017

PERMIT IS ACTIVE

- PREPARE NOTICE OF INTENT WITHIN 90 DAYS
- DEVELOP A STORMWATER MANAGEMENT PLAN W/IN 1 YEAR
- WORK ON A PHOSPHOROUS CONTROL PLAN *REDUCE LOADING BY 50%! DUE IN YEAR 5, IMPLEMENT YEAR 5-10.*

STORMWATER COORDINATOR

- Sam Bade, SSV Engineering
- Brief presentation by Sam Bade

NEW PERMIT vs EXISTING

- Prescriptive Tasks w/Specific Timelines
- Written Procedures, Updates and Reporting
- Additional City Departments
- Additional Resources – Personnel and \$\$

SIX MINIMUM CONTROLS

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Runoff Controls
5. Post Construction Stormwater Management
6. Pollution Prevention

MAJOR REQUIREMENTS

- Site Plan Review and Inspections – Development and Development
- Assess Street and Parking Design Standards
- Retrofit BMPs – Municipal Properties
- Evaluate GI/LID Design Standards
- **Phosphorus Control Plan**

PHOSPHORUS CONTROL PLAN (PCP)

1-5 years after permit effective date	5-10 years after permit effective date	10-15 years after permit effective date	15-20 years after permit effective date
Create Phase 1 Plan	Implement Phase 1 Plan		
	Create Phase 2 Plan	Implement Phase 2 Plan	
		Create Phase 3 Plan	Implement Phase 3 Plan

PHOSPHORUS CONTROL PLAN (PCP)

- Reduce Load by 50%
 - 1,461 kg/yr
- EPA Average Estimate - \$41,000/kg Removal
- \$60 Million
- Feasible ?

HELP & SUPPORT

- STORMWATER COORDINATOR
 - Assist City Departments – Stormwater Management Plan
 - Formulate BMPs

HELP & SUPPORT

- TECHNICAL ASSISTANCE AVAILABLE ON EPA WEBSITE
- “ “ “ ON MassDEP WEBSITE
- GENERAL INFORMATION – SEE CHARLES RIVER WATERSHED ASSOCIATION WEBSITE

WRAP UP

- QUESTIONS AND ANSWERS

MassDEP 604(b) GRANT PROJECT

**EMBASSY PARKING GARAGE
WALTHAM. MA**

STAKEHOLDER ENGAGEMENT
GREEN INFRASTRUCTURE STORMWATER RETROFITS

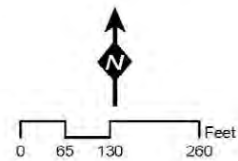
June 6, 2018

PRESENTATION OUTLINE

- INTRODUCTIONS
- MassDEP GRANT APPLICATION
- PROJECT GOALS
- EXISTING CONDITIONS
- OVERVIEW - GREEN INFRASTRUCTURE (GI)
- PROPOSED GI RETROFIT DESIGNS
- NEXT STEPS
- DISCUSSION



- Legend**
- Building Footprints
 - Paved Area
 - Paved Roads
 - Water Bodies
 - Upland
 - Wetland Area

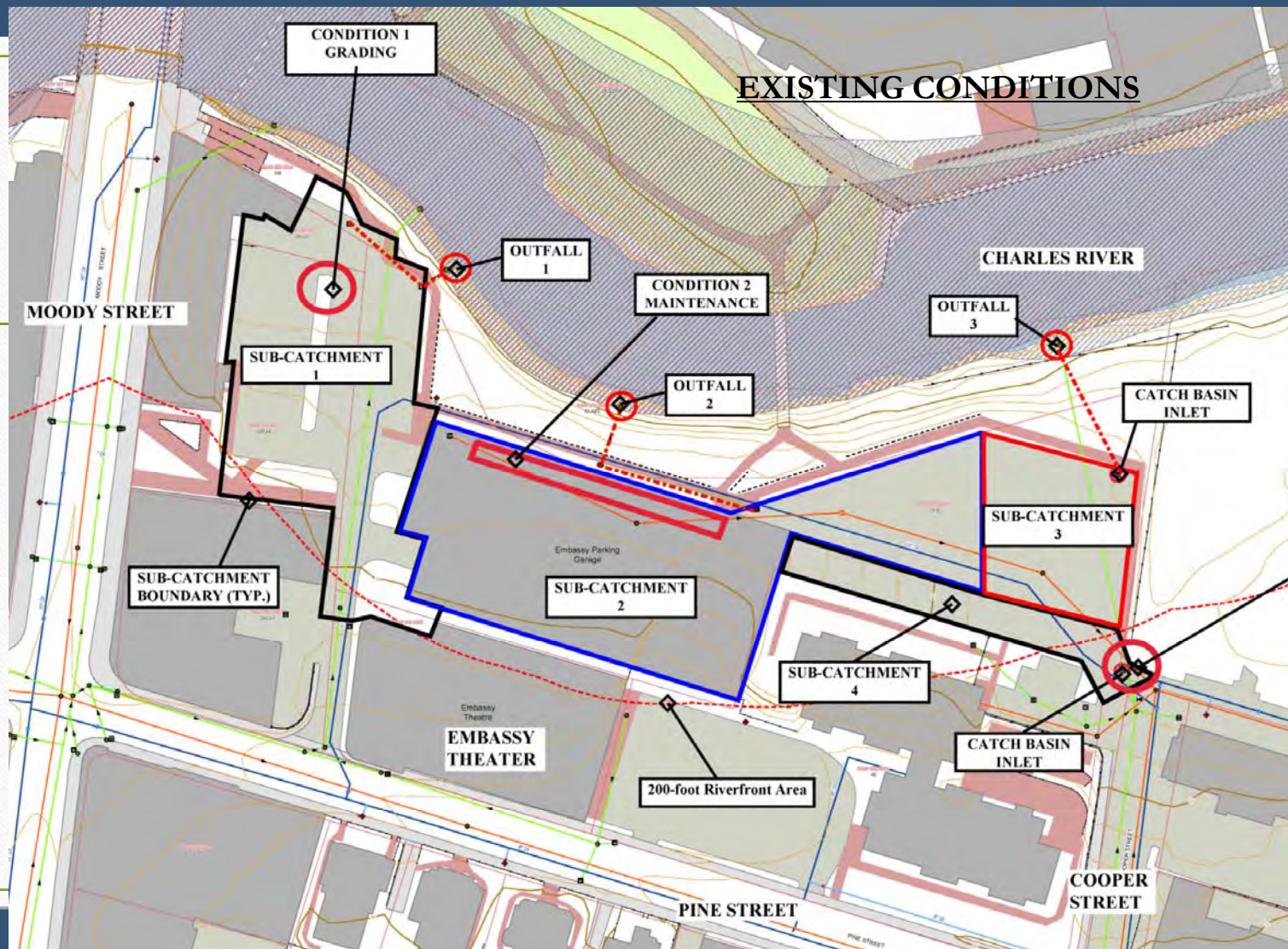


604B Grant Application
Proposed Project Sites
City of Waltham, MA



PROJECT GOALS

- Improve Stormwater Quality Discharges to Charles River
- MS4 Permit – 50% Phosphorus Load Reduction
- Preliminary Designs – Green Infrastructure Retrofits



EXISTING CONDITIONS



GREEN INFRASTRUCTURE

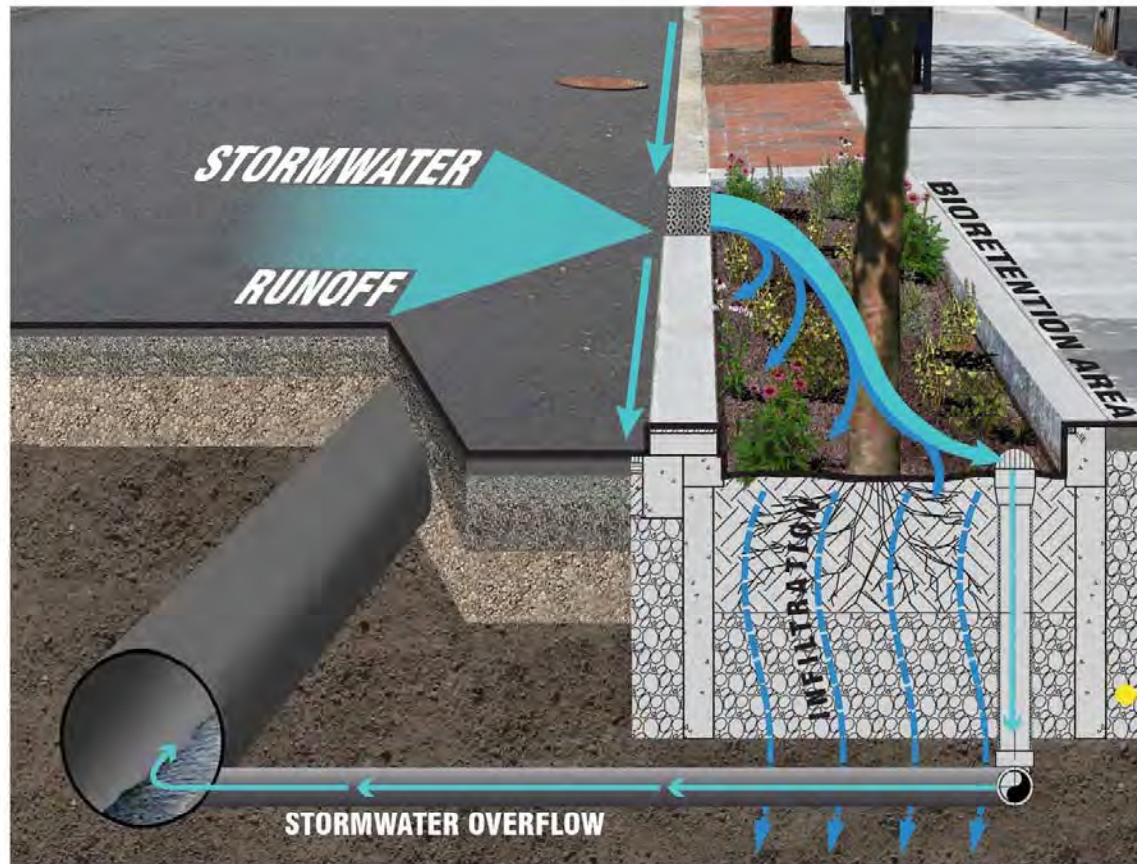
“Employs Processes to Mimic Predevelopment Conditions”
(Reduce Runoff Volume)

- *Storage and Infiltration* (allow water to slowly sink into the soil)
- *Filtration and Evaporation/Transpiration* with Native Vegetation
- *Rainwater Harvesting* Capture and Reuse

GREEN INFRASTRUCTURE

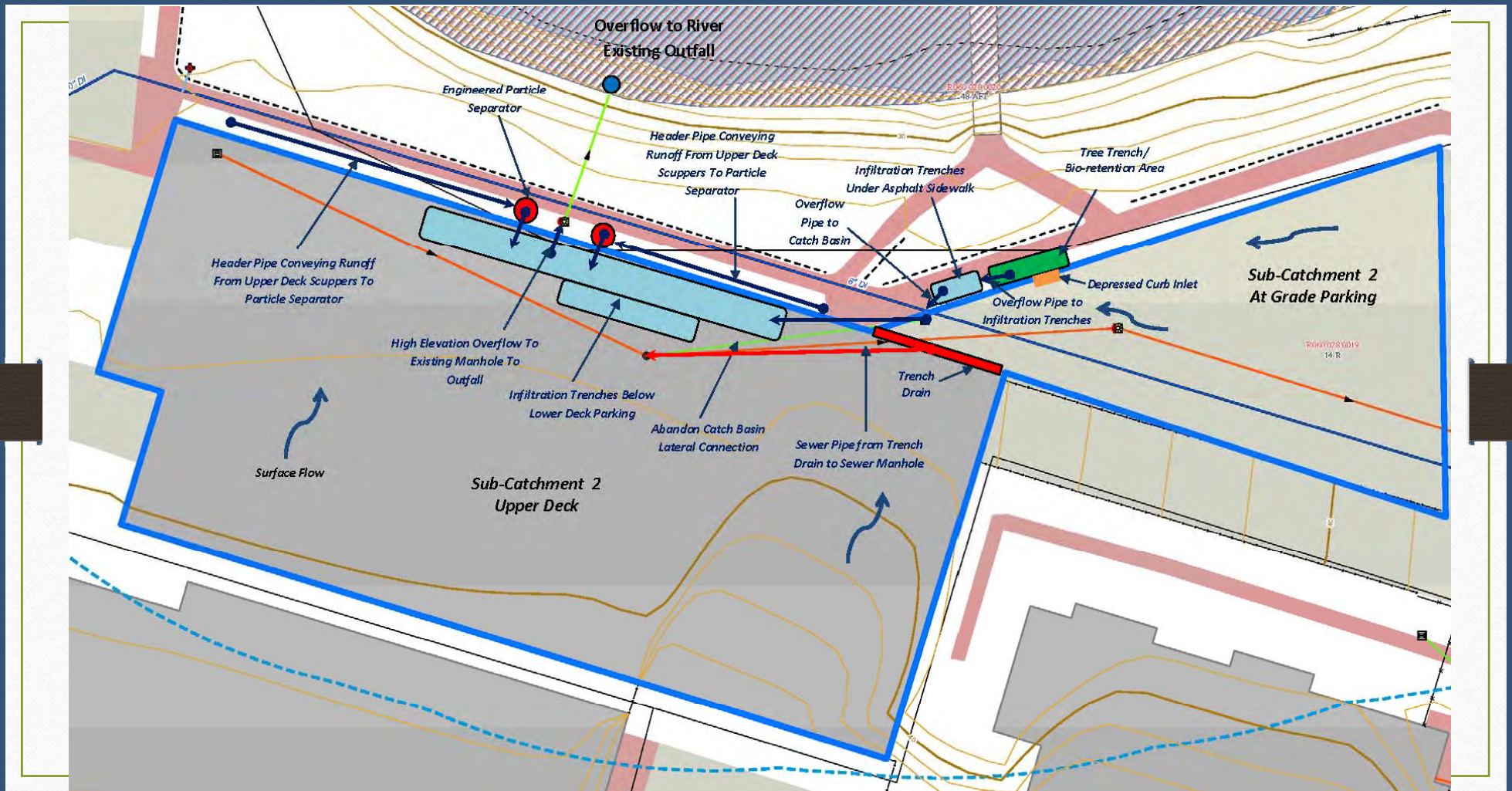
- Bioretention – Rain Gardens
- Porous Pavements
- Rain Barrels/Cisterns
- Green Roofs
- Gravel Wetlands
- Infiltration Systems
 - Gravel Trenches
 - Subsurface Infiltration
 - Tree Trench

BIORETENTION AREA



INFILTRATION SYSTEMS





SUBCATCHMENT 2



YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT C

EPA IDDE PROGRAM PROGRESS REPORT NO. 22, JULY 2019

City of Waltham, MA

Illicit Discharge Detection and Elimination (IDDE) Program

EPA IDDE Program Progress Report No. 22

July 2019

Prepared by EPG with

Oversight by

Stephen A. Casazza, PE

City Engineer



Quincy, MA • Woburn, MA • Hyannis, MA • Middletown, CT

envpartners.com

City of Waltham
Illicit Discharge Detection and Elimination Program

IDDE Program Progress Report No. 22

July 2019

1. Introduction and Program Approach

This document serves as the City of Waltham's Semi-Annual IDDE Progress Report of July 2019. It contains a description of program achievements since submission of the Semi-Annual IDDE Progress Report #21 dated January 2019.

The City of Waltham is under a United States Environmental Protection Agency (EPA) Administrative Order (dated November 9, 2004) to implement an Illicit Discharge Detection and Elimination (IDDE) Program. The IDDE Program's main goal is to progressively eliminate illicit connections or flows into the City's stormwater system in order to minimize contamination in the receiving water bodies within the City of Waltham. This will be accomplished through systematic water quality sampling and detailed investigations of the outfalls and contributing areas to locate the sources of these illicit connections and subsequently eliminate the contaminated discharges.

Environmental Partners Group Inc. (EP) is implementing the IDDE Program using a phased approach through investigations (closed circuit television inspection, manhole inspections, dye testing, etc.), manhole junction sampling and field investigations, design of construction repairs, and public bidding of work packages. **Appendix A** includes a schematic figure showing the status of the IDDE program in each drainage area.

1.1. CCTV Investigations

EP works with a closed circuit camera/television (CCTV) crew to inspect pipelines in areas of concern. With this approach, suspected contaminated pipe reaches were isolated and subsequently inspected with a CCTV as needed. After field inspections the CCTV videos were reviewed and further evaluated for contamination sources and repair methods.

1.2. Sampling and Field Investigations

Sampling of outfalls and junction manholes are conducted to locate potential illicit connections. CCTV inspections and dye testing are used to follow up samples indicating illicit connections. The City works from a "top down" approach in catchments for each outfall.

1.3. IDDE Construction Work Packages

The development of Construction Work Packages involves field investigation and design. The field investigation includes inspection of manholes and surrounding areas for potential illicit connections and sources of contamination, CCTV (camera) pipeline inspection, smoke testing and dye testing work. The design and biddable work packages are divided into two categories:

1. Excavation work:

- a. In some cases the excavation work must be completed before trenchless repairs can be completed.
- b. Design work included field inspection of drainage and sewer structures, topographic and utility surveys, review of existing infrastructure plans, coordination with local utilities including gas and electric, and development of full scale design plans and specifications.

2. Trenchless repairs:

- a. Trenchless technology repairs include cured-in-place-pipe liners, root removal, and manhole liners.
- b. Design work included CCTV inspections, review of CCTV video tapes, additional site inspection follow-up, coordination with the City's I/I consultant, and development of full contract documents ready for public bid.

Work packages are further described in the following sections.

2. Completed and On-Going Work

Work completed between January 1, 2019 and July 31, 2019 is presented below.

2.1. IDDE Investigation

In April 2019, Environmental Partners (EP) performed wet weather sampling at fourteen (14) locations within the Masters Brook Watershed in Waltham, Massachusetts. These locations were selected within the Sibley Brook (SIB) catchment area downstream of SIB-7 (SIB-3 to SIB-6), the Masters Brook (MB) catchment area downstream of MB-2, and the Masters Brook North (MBN) catchment area downstream of MBN-4 and MBN-5 following the elimination of upstream illicit discharges as a result of IDDE Work Package #2. Twelve (12) of the fourteen (14) locations were found to have sufficient flow to sample at the time of the site visit. These sampling location figures are attached in **Appendix B**.

The analytical results showed contaminants including E.coli and/or Ammonia Nitrogen above reporting thresholds at the outfall on Waverley Oaks Road (OF BB-14), and the junction manholes on Villa Street, Weston Street, and Cedarwood Avenue (SIB-6). Although these locations concentrations are still above the reporting threshold, they have shown a significant improvement in E.coli and Ammonia levels since Work Package #2 construction was completed in Spring 2018. All other sampling locations showed concentrations of contaminants below reporting thresholds from the April 2019 sampling event.

In June 2019, EP of performed follow-up sampling at junction manholes that had high ammonia and E.coli detections, as well as sampled surrounding key junction manholes on Cedarwood Avenue. All five (5) locations were found to have sufficient flow to sample at the time of the site visit. These locations are as follows:

- Cedarwood Avenue
 - R66_18450
 - R66_18455
 - R66_18460
 - R66_18470



- Virginia Road
 - R66_18490

A total of one (1) wet weather sampling event was conducted on June 11, 2019. **Appendix B** shows the locations of the five (5) junction manholes.

June 2019 sampling results from the Cedarwood Avenue location show that contaminants continue to diminish, but E.coli concentrations are still above the threshold of 12,000 MPN/100mL. Concentrations at R66_18450 and R66_18455 were 22,380 MPN/mL and 34,466 MPN/mL, respectively. The Virginia Road (R66_18490) sampling results, however, show an increase in E.coli and Ammonia concentrations since the April 2019 sampling event. Downstream junction manhole R66-18460 also had an E.coli concentration above the threshold, with a concentration of 92,222 MPN/100ML. Although these locations concentrations are still above the reporting threshold, they have shown a significant improvement in E.coli and Ammonia levels since Work Package #2 construction was completed in Spring 2018. The City will continue its IDDE investigations in this area to identify the source.

2.2. IDDE Work Packages

2.2.1.IDDE Work Package #2

The trenchless construction project (IDDE Work Package #2) work was bid in Fall 2017 and completed in Spring 2018. EP revisited all areas and conducted confirmatory sampling in April 2019. The results are summarized above.

The following project is currently under City review, following the completion of 100% design by EP:

- MBN-4; Jennings Road
 - Replace segments of 12-inch sewer and 15-inch drains, including manholes. The drains and sewers have been inspected via CCTV and are in deteriorated condition.
 - Existing Conditions Survey was conducted in November 2017.
 - Geotechnical Borings were conducted in December 2017.

The following projects are included in other contracts:

- CL-9; Juniper Hill Rd / Cliff Rd
 - The sewer has been lined with CIPP by an independent contractor as part of the City's I/I mitigation program.
- MB-2; Prospect Street
 - The excavation and replacement of a crushed drain will be included in the City's contract to replace the downstream drain in Prospect Street.

2.3 Outfall Monitoring

The Engineering Department continues to monitor the discharge, visually at Outfall 25 behind 190 River Street and Outfall 28 Elm Street Bridge at Charles River. Reports of any new discolored / cloudy discharge are followed up and investigated quickly by the City.

3. Status of Outfall Areas and Illicit Flow Removal

3.1 Work planned for 2019 – 2020

The attached schematic shows the status of the City's IDDE program in the Masters Brook Watershed. Fourteen (14) drainage areas have been cleared of illicit connections through dry weather and wet weather sampling. Outfall 28-A will be monitored visually because previous sampling did not indicate a consistent potential illicit connection. Two (2) areas in the Masters Brook Watershed are pending construction work packages. The remaining construction work is aimed at resolving previous sampling issues in other watersheds. EP will conduct additional field investigations for follow-up sampling and testing from previous IDDE investigations to identify and remove any illicit connections contributing to the high levels of bacteria found within SIB-6 (i.e. Cedarwood Avenue, Virginia Road).

Under the City's MS4 Program, all outfalls are required to be screened for water quality within the first three years of the permit, or by June 30, 2021. The City's updated stormwater data identifies a total of 360 MS4 outfalls (discharging structure to a waterbody). Environmental Partners will review the list of outfalls that have been ranked as high priority in the catchment ranking table provided in the IDDE plan to prioritize these for site visits. If an outfall has a flow or discharge during the time of the site visit, to be conducted during "dry-weather" conditions, a water sample will be collected and submitted for laboratory analysis at a Massachusetts DEP-Certified laboratory for analysis of chlorine, ammonia, surfactants, phosphorus, and bacteria (E.coli).

EP also plans on performing wet-weather sampling at the City's known Intermunicipal Connections (IMC) with neighboring MS4s. These locations will assist the City in identifying what is crossing the City's Municipal Boundary from the other drainage systems.

Recommendations are included in the following Table. Check marks (✓) indicate a completed task.

Status Update and Construction Contract Recommendations

IDDE Work Package #2	Investigate	Contract Type		Notes
		Excavation	Trenchless	
BB-6; Upton / Brookfield	✓		✓	CIPP included in the trenchless contract. Sampled April 2019.
BB-14; Canterbury / Candace	✓	✓	✓	Relocated sewer service lateral; CIPP sewer. Sampled April 2019.
BB-27; Pierce St / River St	✓		✓	CIPP Sewer; Repair manholes. Sampled April 2019.
MB-6; Irving St / Oak Hill Rd	✓		✓	Separated sewer/drain in manhole. CCTV of sewer completed. Sampled April 2019.

SIB-6; Weston St (RTE 20)	✓	✓		CCTV completed; Future project to excavate drain in easement: non-IDDE issue
BB-12; Barbara Rd & Beal Rd	✓	✓	✓	Sealed an illicit connection; Seal 3 DMH, 1 SMH, completed. Sampled April 2019.
IMC-11; Fuller St / Newton St	✓	✓	✓	#75 and #111 services repaired; Excavated 10' of sewer; Seal 4 SMHs, 1 DMH; CIPP sewer, completed. Sampled April 2019.
BB-23; Main St @ Heard & Newton	✓			City Engineer to contact previous consultant to determine location of defect and corrective action. Remedial work may have been performed.
2018/2019 Investigations				
CL, 190 River Street	✓			Investigation of outfall sheen was conducted in December 2018. Upstream direct connection located and removed. Continue to visually monitor.
MBN-4; Jennings Road	✓	✓		CCTV completed; Sewer replacement, broken drains, and manhole leaks will be included in an infrastructure replacement project. 100% design completed. City working on funding to proceed – estimated to be awarded in Fall 2019
MB-1; Prospect Street	✓	✓		Investigation of outfall sheen was conducted in October 2017. Drain to be repaired with other drain improvements. Continue to visually monitor.

28-A; Elm Street	✓	✓		Investigation complete. Temporary construction dewatering connection located and removed. Upstream direct connection located and removed. Continue to visually monitor.
------------------	---	---	--	--

4. Written IDDE Plan Development

4.1 Written IDDE Program

Based on the requirements of Section 2.3.4.6 of the MS4 General Permit, a written IDDE program draft for the City of Waltham has been updated in accordance with the milestones of part 2.3.4.6. The written IDDE program includes an outline of responsibilities and responsible parties for each task, the expected date that each task will be implemented, an updated storm drain outfall map, and the City's systematic protocol to detect and eliminate illicit discharges.

4.2 Initial Catchment Delineation

As part of the written IDDE plan, an initial assessment/ranking of outfall catchments was conducted. Catchment rankings are defined on a map of the City's drainage system, based on complaints, past water quality data, adjacent failing sewer systems, density of the surrounding area, and TMDL surface waters. In order to delineate the catchment areas, the City reviewed its stormwater drainage and sanitary sewer systems GIS data.

5. Summary

Appendix A includes the status schematic for a graphical presentation. The resolution of illicit connections to the drains has moved forward with the completion of the design of Trenchless Work Package 1 and the progression of the 100% design of the MBN-4/5 project at Jennings Road. Figures summarizing the sampling concluded in April and June 2019 are included in **Appendix B**. The City continues to respond quickly to citizen observations and reports of potential illicit connections to the drain system.

The next 6-month look-ahead schedule is attached in **Appendix C**.

Appendices

Appendix A –IDDE Program Status Schematic

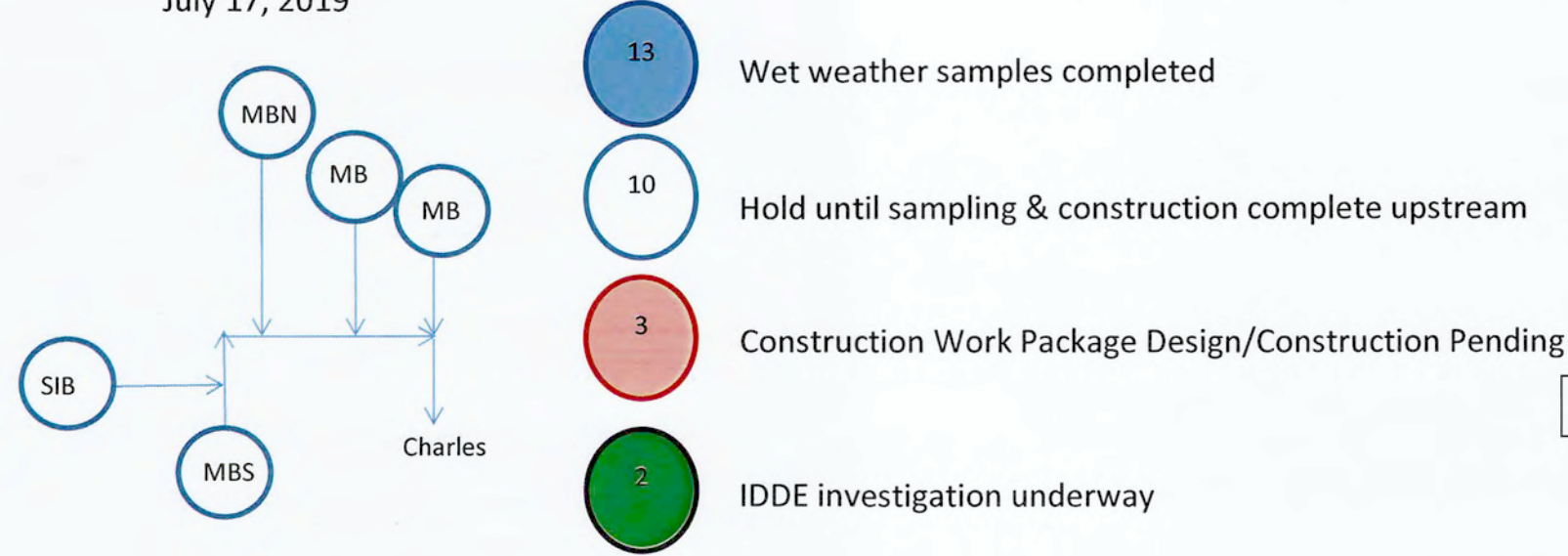
Appendix B – IDDE Investigation Figures

Appendix C – 6-Month Look-Ahead Schedule

Masters Brook Watershed and Additional Outfalls

IDDE Program Status Schematic

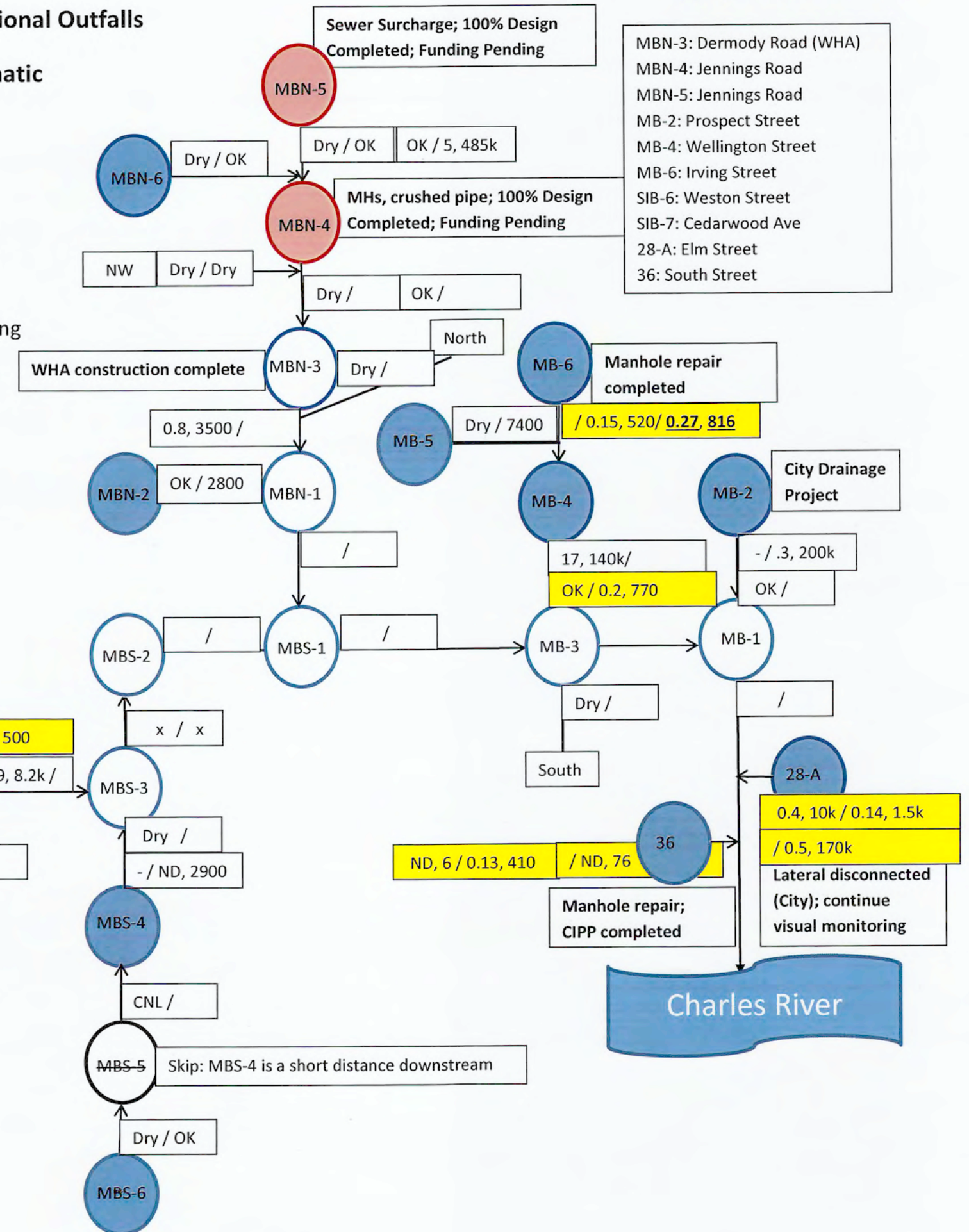
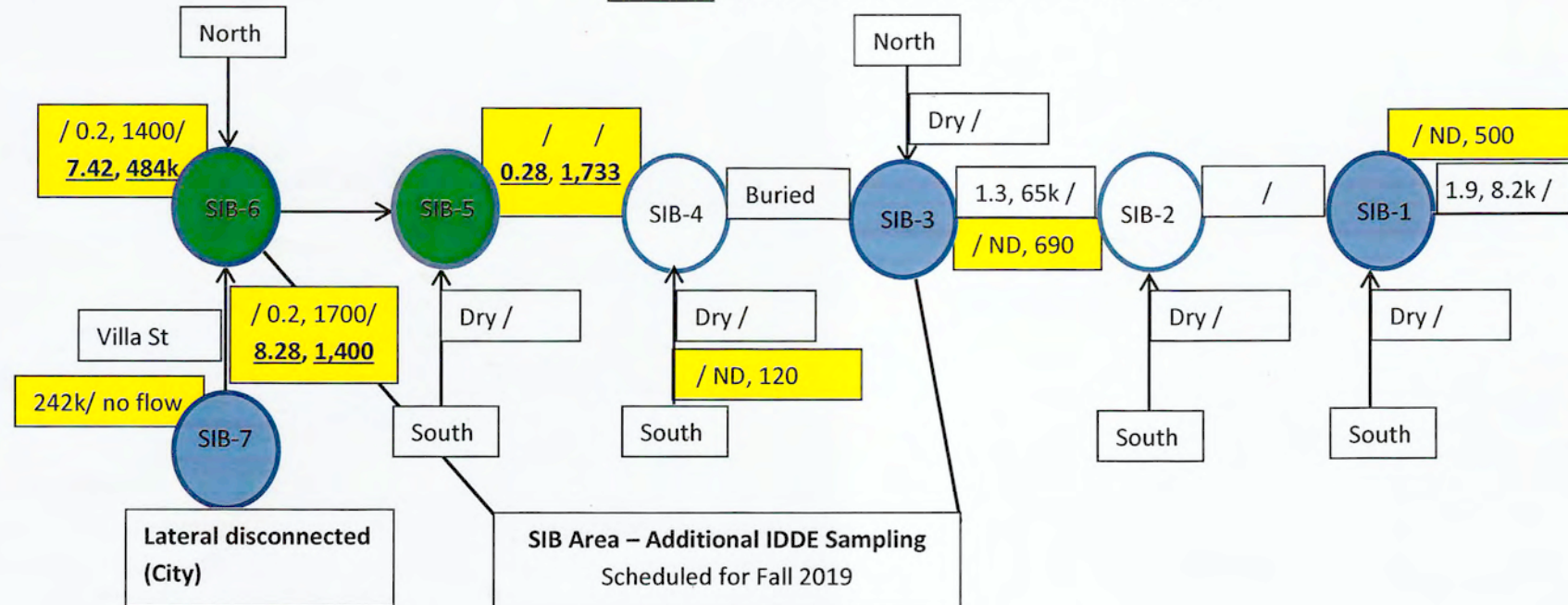
July 17, 2019

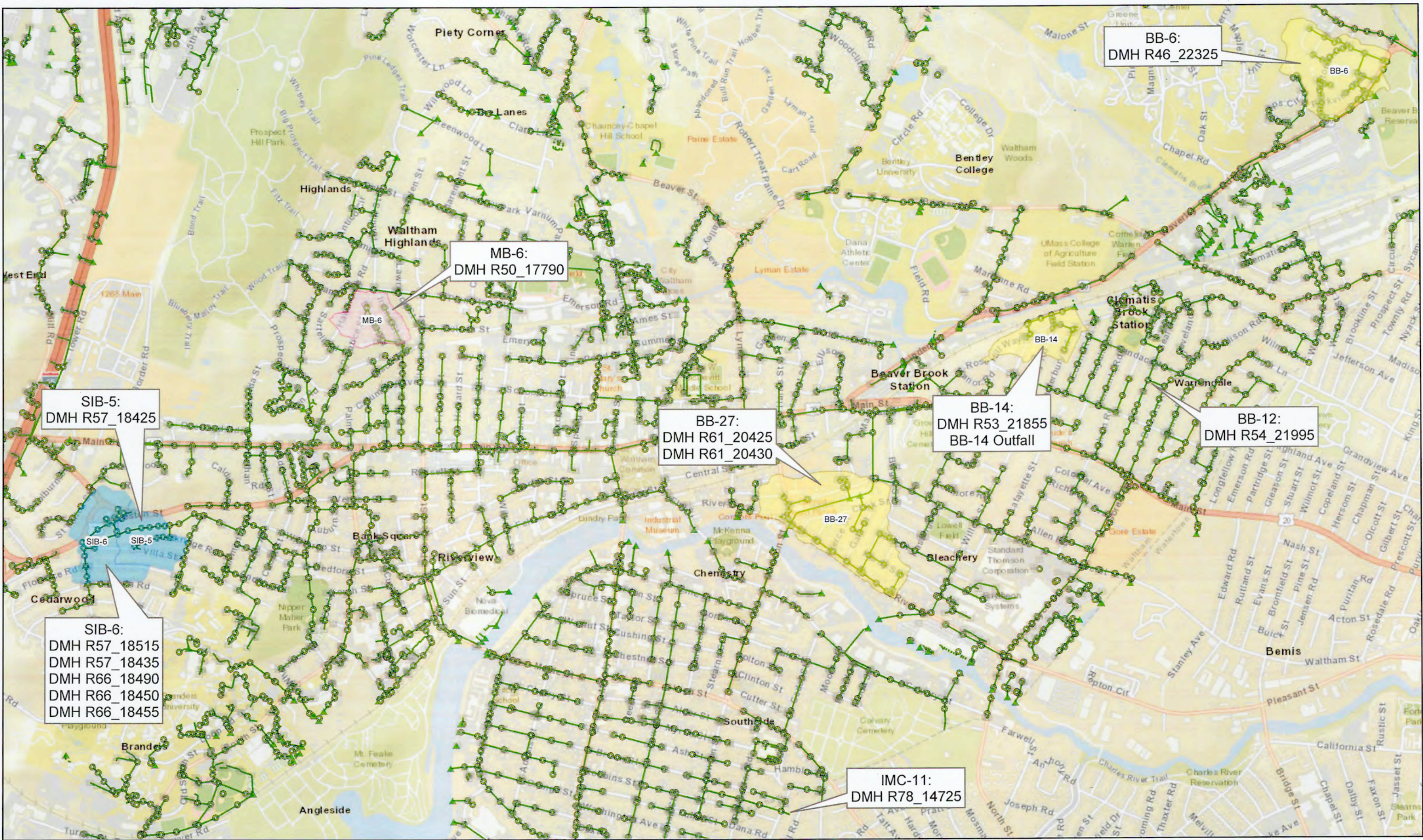


Dry / 1, 1700 Previous test results Dry / Wet weather: NH3, E. coli

OK / 1, 280k Test results 2016/2017/2019

North Inlet direction within drainage area





0 625 1,250 2,500 Feet



Environmental Partners
A partnership for engineering solutions. GROUP

**Figure 1: Wet Weather Sampling Locations
Waltham, MA
April 2019**



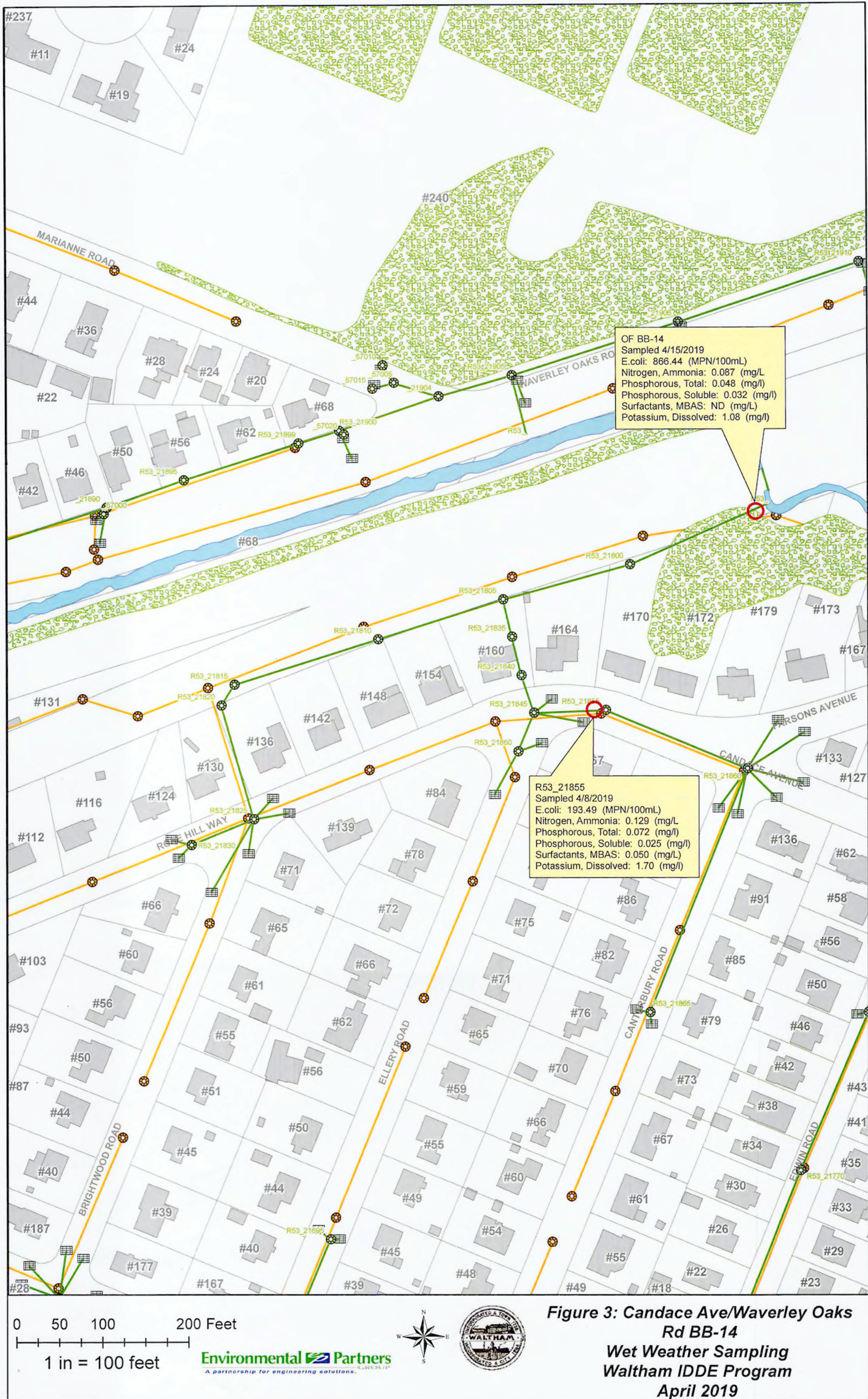


Figure 3: Candace Ave/Waverley Oaks Rd BB-14
Wet Weather Sampling
Waltham IDDE Program
April 2019







**Figure 6: Villa Street/Weston Street
SIB-5
Wet Weather Sampling
Waltham IDDE Program
April 2019**

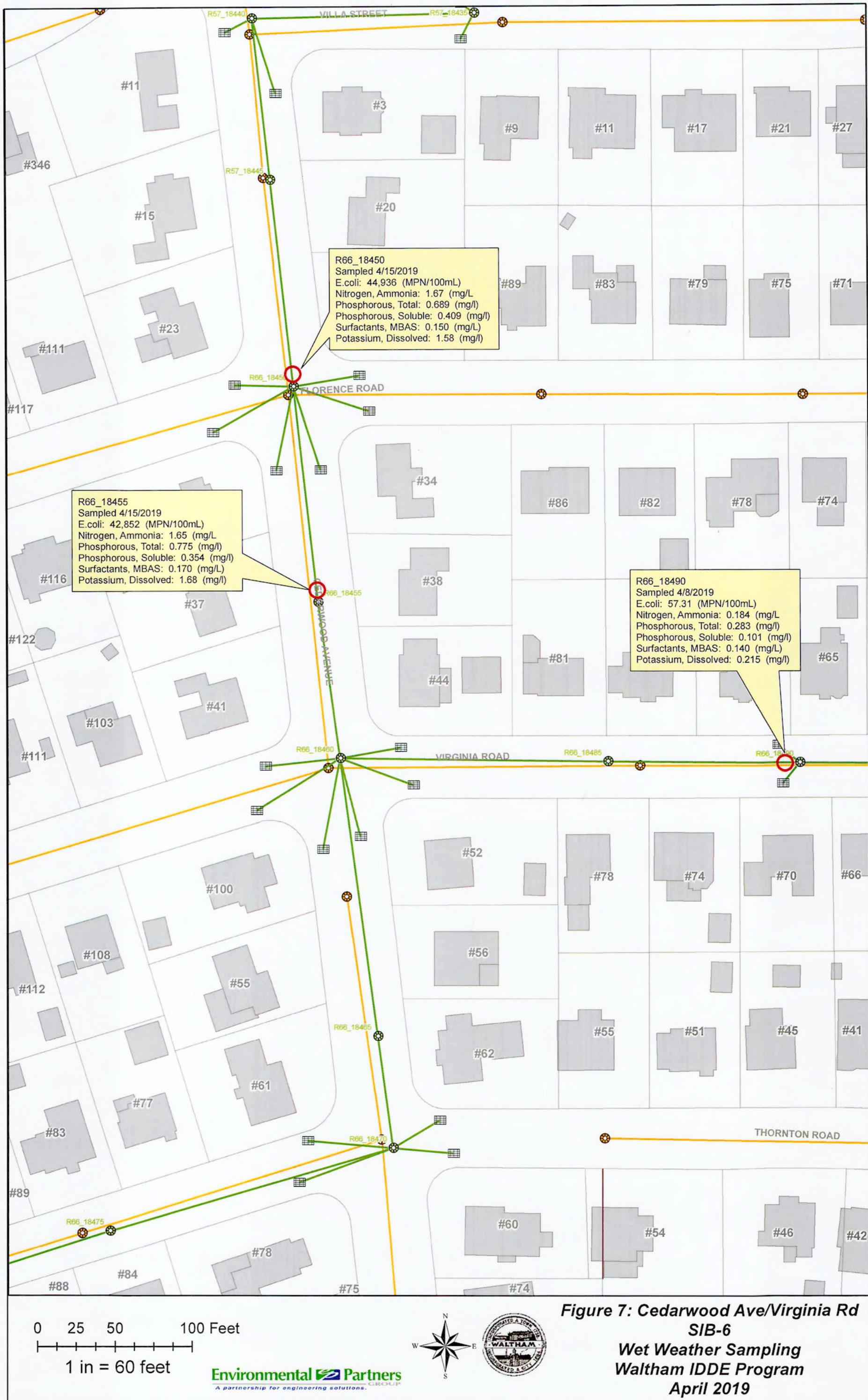
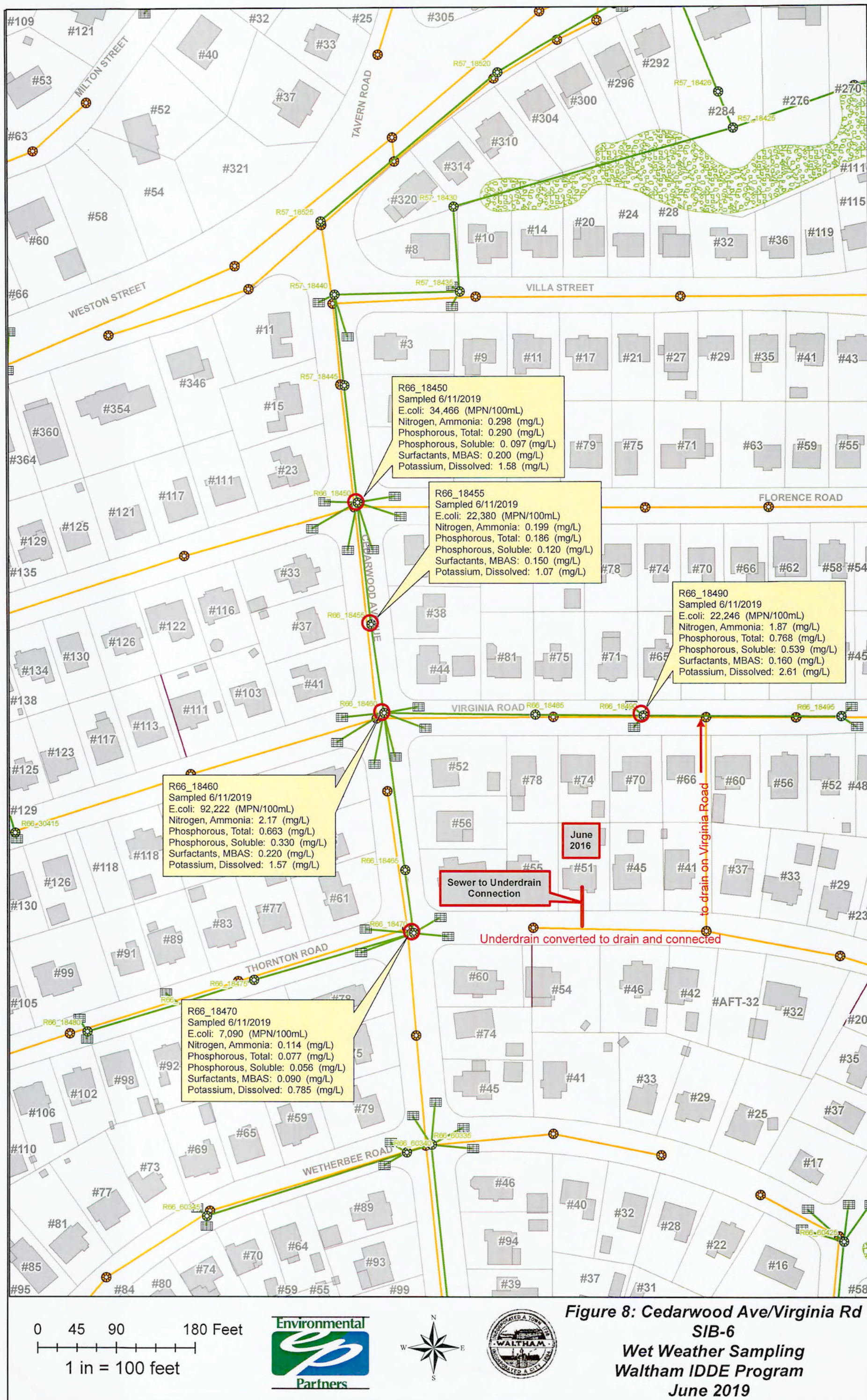


Figure 7: Cedarwood Ave/Virginia Rd
SIB-6
Wet Weather Sampling
Waltham IDDE Program
April 2019



City of Waltham, MA
EPA IDDE Program Six Month Look-Ahead Schedule
July 2019

Construction Work Packages		July				August				September				October				November				December			
Design	Jennings Road 100% Design Plans Completed - Funding Estimated to Begin Fall 2019																								
Construction	Trenchless Repairs																								
Field IDDE Program		July				August				September				October				November				December			
Investigations	Continue to visually monitor/ Follow-up Outfall 25 and Outfall 28 Trenchless Sibley Brook (SIB) and Masters Brook (MBN) follow-up sampling																								

Notes: Follow-up sampling will continue as needed to identify IDDE sources

Estimate of Illicit Flows Removed under the IDDE Program

Infiltration/Inflow Removed Under the Illicit Discharge Detection and Elimination (IDDE) Project (November 2011 - July 2013)

Illicit Sources Removed in Permit Year 8 (April 1st 2010 to March 31st, 2011)

Note: inflow rates for each repair indicated herein are estimated based on visual inspection, MassDEP's 310CMR Section 15.203; "System Sewage Flow design criteria", or the average dry weather peak infiltration per metered subsystem as indicated in Table 5-1 of the Sewer System Facilities Plan and Hydraulic Modeling Report by CDM dated April 2009.

1. **Stone Road:** 8-inch sewer rehab (cleaning & CIPP lining) of 265 linear feet (lf) or 0.40 inch-diameter-miles (idm) - completed in June 2010.
Estimated inflow removal: $20,639 \text{ (gpd/idm)} \times 0.40 \text{ idm} = \mathbf{8,255 \text{ gallons per day (gpd)}}$
2. **Porter Road:** 8-inch sewer rehab (cleaning & CIPP lining) of 145 lf (0.22 idm) and sealing of two sanitary manhole - completed in June 2010.
Estimated inflow removal: $3,076 \text{ (gpd/idm)} \times 0.22 \text{ idm} = \mathbf{677 \text{ gpd}}$
3. **Fuller Street:** Conversion of one common manhole to sanitary manhole - completed in June 2010.
Estimated inflow removal is indeterminate.
4. **Newton Street:** 6-inch sewer rehab (cleaning & CIPP lining) of 242 lf (0.275 idm) and sealing of two sanitary manholes – completed in June 2010.
Estimated inflow removal: $106 \text{ (gpd/idm)} \times 0.275 \text{ idm} = \mathbf{29.15 \text{ gpd}}$
5. **River Street:** 6-inch sewer rehab (cleaning & CIPP lining) of 260 lf or 0.30 idm) and sealing of one sanitary manhole – completed in June 2010.
Estimated peak inflow removal: $20,639 \text{ (gpd/idm)} \times 0.30 \text{ idm} = \mathbf{6,192 \text{ gpd}}$
6. **Main Street:** Removal of sanitary sewer cross-connection at uncapped roof drain within sanitary manhole – completed in June 2010.
Estimated inflow removal of 80.3 gpd based on the following assumptions:
 - Average inflow removal equal to 10% of total generated roof runoff
 - Average annual precipitation = 47 inches/year
 - Roof surface = 10,000 sq ft
 - Therefore the total annual roof runoff = **803 gpd**

7. **Parmenter and Cambria Streets:** 10-inch sewer rehab (cleaning & CIPP lining) of 277 lf or 0.52 idm, 8-inch sewer rehab (cleaning & CIPP lining) of 163lf or 0.25 idm), 6-inch sewer rehab (cleaning & CIPP lining) of 215 lf or 0.24 idm and sealing of one sanitary manhole – completed in October 2010.
Estimated inflow removal: $106 \text{ (gpd/idm)} \times 1.01 \text{ idm} = \mathbf{107.1 \text{ gpd}}$

8. **5 Brookway Road:** reconnection of the building sanitary lateral, which was connected to the drain, to the sanitary sewer in the same street –completed October 2010.
Estimated inflow removal of **330gpd**.

$$1 \text{ house} \times \frac{3 \text{ bedrooms}}{1 \text{ apartment}} \times \frac{110 \text{ gpd}}{\text{bedroom}} = \mathbf{330 \text{ gpd}}$$

9. **12 Calvary Street:** reconnection of the building sanitary lateral, which was connected to the drain, to the sanitary sewer in the same street- completed December 2010
Estimated inflow removal of 880gpd based on the following assumptions:

$$4 \text{ apartments} \times \frac{2 \text{ bedrooms}}{1 \text{ apartment}} \times \frac{110 \text{ gpd}}{\text{bedroom}} = \mathbf{880 \text{ gpd}}$$

**Total Illicit Flows Removed During PY8 (April 1st, 2010 through March 31st, 2011)
= 17,273 gpd = 6.30MGY**

Illicit Sources Removed in Permit Year 9 (April 1st 2011 through March 31st, 2012)

Note: Peak inflow rates for each repair indicated below are estimated based on visual inspection, MassDEP's 310CMR Section 15.203; "System Sewage Flow design criteria", or the average dry weather peak infiltration per metered subsystem as indicated in Table 5-1 of the Sewer System Facilities Plan and Hydraulic Modeling Report by CDM dated April 2009.

1. **Cherry Street**- replaced leaking sanitary lateral crossing drain.

- a. Estimated peak inflow removal: 0.1 gpm = **144gpd**

2. **Adams Street** – relocated compromised building sanitary lateral going through a drain manhole. Estimated peak inflow removal (assumed 25 apartments, average of 2 bedrooms per apartment and 4% of total generated sanitary flow reaches drain system):

$$25 \text{ apts} \times \frac{2 \text{ bedrooms}}{1 \text{ apartment}} \times \frac{110 \text{ gpd}}{1 \text{ bedroom}} \times 4\% = \mathbf{220 \text{ gpd}}$$

3. **Easement between Humboldt and Huntington Streets** (metered sub-system 7):

- a. 8-inch sewer rehab (cleaning & CIPP lining) of 310 linear feet (LF) or 0.47 inch-diameter-miles (idm). Completed in August 2011.

Estimated peak inflow removal: 3,076 (gpd/idm) \times 0.47 idm = **1445.7gpd**

4. **Beal Road** (metered sub-system 5):

- a. 8-inch sewer rehab (cleaning & CIPP lining) of 230 linear feet (LF) or 0.35 inch-diameter-miles (idm) - completed in September 2011.

Estimated peak inflow removal: 412 (gpd/idm) \times 0.35 idm = **144.2gpd**.

- b. Sealed two leaking sewer manholes (assumed 0.05gpm per manhole) = **144gpd** – Completed March 2012

5. **Candace Ave** (metered sub-system 5):

- a. 8-inch sewer rehab (cleaning & CIPP lining) of 355 linear feet (LF) or 0.54 inch-diameter-miles (idm) - completed in September 2011. Estimated peak inflow removal: 412 (gpd/idm) \times 0.54 idm = **222.5 gpd**.

- b. Sealed to leaking sewer manholes (assumed 0.05gpm per manhole) = **144gpd**. Completed March 2012.

- c. Sealed a leaking sanitary lateral crossing location. Estimated peak inflow removal: $0.1 \text{ gpm} = 144 \text{ gpd}$

6. **Ellison Park** (metered sub-system 10):

- a. 8-inch sewer rehab (cleaning & CIPP lining) of 245 linear feet (LF) or 0.37 inch-diameter-miles (idm) - completed in September 2011. Estimated peak inflow removal: $106 \text{ (gpd/idm)} \times 0.37 \text{ idm} = 39.2 \text{ gpd}$.

7. **Main Street** (metered sub-system 10):

- a. 10-inch sewer rehab (cleaning & CIPP lining) of 40 linear feet (LF) or 0.076 inch-diameter-miles (idm) - completed in September 2011. Estimated peak inflow removal: $106 \text{ (gpd/idm)} \times 0.076 \text{ idm} = 8.06 \text{ gpd}$.
- b. Sealed two leaking sewer manholes (assumed 0.02gpm per manhole) = **57.6gpd**.

Total Illicit Flows Removed During PY9 (April 1st, 2011 through March 31st, 2012)
= 2,713 gpd = 0.99MGY

Illicit Sources Removed in Permit Year 10 (April 1st 2012 to date)

1. **140 Trapelo Road:** reconnection of the building sanitary lateral, which was connected to the drain line, to the sanitary sewer line in the same street. Completed April 2012.

Estimated inflow removal of **330gpd**:

$$1house \times \frac{3 bedrooms}{1 apartment} \times \frac{110gpd}{bedroom} = 330gpd$$

2. Longfellow Road:

- a. Action: lining of 420 LF of 10-inch (0.79idm) and 15 feet of 8-inch (0.02idm) sanitary sewer and seal 3 sewer manholes.
- b. Estimated inflow removal: $0.81 \times 20,639(\text{gpd/idm}) = 16,773.9\text{gpd}$

Total illicit flows removed during PY10 (as of January of 2013): = 17,103.9 gpd = 6.24MGY

TOTAL ILLICIT FLOWS REMOVED UNDER THE IDDE PROGRAM (PY8 to PY10 as of July of 2013) = 6.30 + 0.99 + 6.24 = 13.53MGY

Identified Sources of Illicit Flow Pending Removal

1. Cliff Road (metered sub-system 12)

- Type of violation: E.Coli (2,400cfu/100mL)
- Action proposed: CIPP lining of 124 LF of 8-inch (0.19idm) sanitary sewer.
- Estimated inflow removal: $0.19 \times 4,216$ (gpd/idm) = 801 gpd
- Estimated construction date: Spring/Summer 2014.

2. River Street (metered sub-system 4)

- Type of violation: E.Coli (27,000cfu/100mL), Ammonia (2.32mg/L), Surfactants (0.10mg/L)
- Action proposed: CIPP lining of 175 LF of 8-inch (0.26idm) sanitary sewer.
- Estimated inflow removal: $0.26 \times 5,725$ (gpd/idm) = 1,488 gpd
- Estimated construction date: Spring/Summer 2014.

3. Candace Avenue (metered sub-system 5)

- Type of violation: E.Coli (1,300cfu/100mL), Ammonia (1.02mg/L), Surfactants (0.26mg/L)
- Action proposed: CIPP lining of 180 LF of 8-inch (0.27idm) sanitary sewer and redirect sanitary sewer lateral around drain manhole.
- Estimated inflow removal: 0.27×412 (gpd/idm) = 111 gpd
- Estimated construction date: Spring/Summer 2014.

4. Irving Street (metered sub-system 8)

- Type of violation (violation is at downstream system [MB-4]:
E.Coli (140,000cfu/100mL)
Ammonia: 16.7 mg/L
Surfactants: 0.55 mg/L
- Action proposed: common manhole separation at Oak Hill Road and Irving Street.
- Estimated inflow removal: unknown (suspected to activate in wet weather conditions)
- Estimated construction date: Spring/Summer 2014.

5. Hansen Road (metered sub-system 1314)

- Type of violation: E.Coli (3,500cfu/100mL), Ammonia (0.81mg/L)
- Action proposed: cleaning and CIPP lining of 135LF of 8-inch (0.20idm) sanitary sewer and 165LF of 12-inch storm drain (0.37 idm).
- Estimated inflow removal: $(0.20 + 0.37) \times 1,478$ (gpd/idm) = 842 gpd
- Estimated construction date: Spring/Summer 2014.

6. Weston Street (metered sub-system 1314)

- Type of violation: E.Coli (21,000cfu/100mL), Ammonia (0.53mg/L), Surfactants (0.12 mg/L).
- Action proposed: identify and eliminate potential illicit connections to the

- stoprm drain (assumed one illicit connection, pipe inaccessible)
- c. Estimated inflow removal:

$$1 \text{ house} \times \frac{3 \text{ bedrooms}}{1 \text{ apartment}} \times \frac{110 \text{ gpd}}{\text{bedroom}} = 330 \text{ gpd}$$

- d. Estimated construction date: Spring/Summer 2014.

7. Fuller Street (metered sub-system 9):

- Type of violation: E.Coli (11,000cfu/100mL).
- Action proposed: cleaning and CIPP lining of 637LF of 8-inch (0.96idm) sanitary sewer and seal three sewer manholes.
- Estimated inflow removal: $(0.96) \times 1,951 \text{ (gpd/idm)} = 1,639 \text{ gpd}$
- Estimated construction date: Spring/Summer 2014.

8. Beal Road (metered sub-system 5):

- Type of violation: E.Coli (69,000cfu/100mL), Ammonia (1.12mg/L).
- Action proposed: sealing one drain manhole and one sanitary manhole.
- Estimated inflow removal: unknown (suspected to activate when sanitary line surcharges).
- Estimated construction date: Spring/Summer 2014.

9. Ash Street (metered sub-system 9):

- Type of violation: E.Coli (2,000cfu/100mL)
- Action proposed: replacement of 740 LF of 6-inch (0.84idm) sanitary sewer and 3 sewer manholes.
- Estimated inflow removal: $0.84 \times 1,951 \text{ (gpd/idm)} = 1,639 \text{ gpd}$
- Estimated construction date: this project will be assigned to developers doing work in Waltham under the I/I mitigation program on an on-going basis. This source will source be targeted in the next reporting period.

10. Charles Street (metered sub-system 8):

- Type of violation: E.Coli (11,000cfu/100mL), Ammonia (0.90mg/L), surfactants (1.40mg/L)
- Action proposed: replacement of 300 LF of 6-inch (0.34idm) sanitary sewer and 2 sewer manholes.
- Estimated inflow removal: $0.34 \times 6,116 \text{ (gpd/idm)} = 2,085 \text{ gpd}$
- Estimated construction date: this project will be assigned to developers doing work in Waltham under the I/I mitigation program on an on-going basis. This source will source be targeted in the next reporting period.

11. Brown Street (metered usb-system 9):

- Type of violation: E.Coli (550 –sample 1- and 1,300cfu/100mL-sample 2)
- Action proposed: replacement of 260 LF of 6-inch (0.29idm) sanitary sewer and 2 sewer manholes.

- c. Estimated inflow removal: $0.29 \times 1,951 \text{ (gpd/idm)} = 565.8 \text{ gpd}$
- d. Estimated construction date: this project will be assigned to developers doing work in Waltham under the I/I mitigation program on an on-going basis. This source will source be targeted in the next reporting period.

Note: small violation of E.Coli values most likely due to background sources.
Construction work was proposed to help ameliorate sanitary system capacity.

12. Derby Street (metered usb-system 9):

- a. Type of violation: E.Coli (14,000cfu/100mL) and surfactants (0.25 mg/L)
- b. Action proposed: replacement of 200 LF of 6-inch (0.23idm) sanitary sewer and 1 sewer manholes.
- c. Estimated inflow removal: $0.23 \times 1,951 \text{ (gpd/idm)} = 448.7 \text{ gpd}$
- d. Estimated construction date: this project will be assigned to developers doing work in Waltham under the I/I mitigation program on an on-going basis. This source will source be targeted in the next reporting period.

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT D

PROPOSED STORMWATER MANAGEMENT RULES AND REGULATIONS

**STORMWATER MANAGEMENT RULES AND REGULATIONS FOR
DEVELOPMENT OR REDEVELOPMENT PROJECTS DISTURBING
ONE ACRE OR LARGER**

Section 1: Purpose

- (a) Regulation of discharges to the municipal separate storm sewer system (MS4) is necessary for the protection of the City of Waltham water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. Increased and/or contaminated stormwater runoff associated with developed land uses and the accompanying increase in impervious surface are major causes of:
 - (1) impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;
 - (2) contamination of drinking water supplies,
 - (3) erosion of stream channels;
 - (4) alteration or destruction of aquatic and wildlife habitat;
 - (5) flooding and;
 - (6) overloading or clogging of municipal catch basins and storm drainage systems.
- (b) Therefore, these Rules and Regulations establish stormwater management standards for the final conditions that result from development and redevelopment projects to minimize adverse impacts offsite and downstream which would be borne by abutters, residents and the general public.
- (c) The objectives of these Rules and Regulations are:
 - (1) To protect water resources;
 - (2) To require practices to retain stormwater flow on-site in newly developed and redeveloped sites in the City of Waltham in order to prevent flooding and erosion;
 - (3) To require practices that eliminate soil erosion and sedimentation and control the volume and rate of stormwater runoff resulting from land disturbance activities;
 - (4) To protect groundwater and surface water from degradation;
 - (5) To promote groundwater recharge;
 - (6) To prevent pollutants from entering the City of Waltham's municipal separate storm sewer system (MS4) and to minimize discharge of pollutants from the MS4;
 - (7) To ensure adequate long-term operation and maintenance of structural stormwater best management practices so that they work as designed;
 - (8) To ensure that soil erosion and sedimentation control measures and stormwater runoff control practices are incorporated into the site planning and design process and are implemented and maintained;
 - (9) To require practices to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

- (10) To comply with state and federal statutes and regulations relating to stormwater discharges; and
- (11) To establish the City of Waltham's legal authority to ensure compliance with the provisions of these Rules and Regulations through inspection, monitoring, and enforcement.

Section 2: Definitions

All terms in these Regulations shall have the same definitions as those contained in Article I, Chapter 25 "Stormwater Management" of the City of Waltham General Ordinances, as amended from time to time, and shall be incorporated by reference. Additional terms used in these Regulations shall be defined as follows:

- (a) **CHANGE IN LAND USE FOOTPRINT:** Any action that causes a change in the land's surface cover modifying the drainage characteristics of the site.
- (b) **DISTURBANCE OF LAND:** see **LAND DISTURBANCE** in Section 2 of Chapter 25 "Stormwater" of the City of Waltham General Ordinances
- (c) **GRUBBING:** The act of clearing land surface by digging up roots and stumps.
- (d) **OUTFALL:** The point at which stormwater flows out from a point source discernible, confined and discrete conveyance into waters of the Commonwealth.
- (e) **OUTSTANDING RESOURCE WATERS (ORWs):** Waters designated by Massachusetts Department of Environmental Protection as ORWs. These waters have exceptional sociologic, recreational, ecological and/or aesthetic values and are subject to more stringent requirements under both the Massachusetts Water Quality Standards (314 CMR 4.00) and the Massachusetts Stormwater Management Standards. ORWs include vernal pools certified by the Natural Heritage Program of the Massachusetts Department of Fisheries and Wildlife and Environmental Law Enforcement, all Class A designated public water supplies with their bordering vegetated wetlands, and other waters specifically designated.
- (f) **STORMWATER MANAGEMENT PLAN:** A plan required as part of the application for a Stormwater Management Permit. The Stormwater Management Plan shall clearly describe the measures and practices to be adopted in order to meet mandatory stormwater drainage and quality requirements after project completion.
- (g) **TSS:** Total Suspended Solids.
- (h) **RESPONSIBLE PARTIES:** Owner(s), persons with financial responsibility, and persons with operational responsibility of the constructed stormwater management system.

- (i) NOTICE TO PROCEED: Written authorization from the City Engineer to start or continue work.

Section 3: Authority

- (a) These Rules and Regulations are promulgated under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, the federal Clean Water Act, 40 CFR 122.34, and the Environmental Protection Agency NPDES MS4 General Permit requirements.
- (b) These Rules and Regulations are also promulgated pursuant to and in furtherance of the Article I, Chapter 16, "Sewers, Drains and Sewage Disposal", and Chapter 25 "Stormwater Management" of the City of Waltham General Ordinances. Specific authority is granted pursuant to Article I, Sections 25-4 and 25-20.

Section 4: Applicability

These Rules and Regulations apply to the following:

- (a) Activities that disturb an area equal to 1 acre or more of land or will disturb less than one acre of land but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one acre of land draining to the City of Waltham's municipal separate storm sewer system.
- (b) Any project that may result in an adverse impact to municipal property or natural resources in the opinion of the City Engineer
- (c) Exemptions
 - (1) Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation 310 CMR 10.04;
 - (2) Maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling;
 - (3) The construction of fencing that will not substantially alter existing terrain or drainage patterns;
 - (4) Construction of utilities other than drainage (gas, water, electric, telephone, etc.) which will not alter terrain or drainage patterns;
 - (5) As authorized in the Phase II Small MS4 General Permit for Massachusetts, storm water discharges resulting from the activities identified in Section 4 that are wholly subject to jurisdiction under the Wetlands Protection Act and demonstrate compliance with the Massachusetts Storm Water Management Policy as reflected in an Order of Conditions issued by the Conservation Commission are exempt from compliance with these Rules and Regulations.

Section 5: Administration

- (a) The City Engineer and the Stormwater Enforcement Agent (if different from the City Engineer) shall administer, implement and enforce these Rules and Regulations. Any powers granted to or duties imposed upon the City Engineer or the Stormwater Enforcement Agent may be delegated in writing to the designated agents.

Section 6: Permitting

- (a) Filing Application. The site owner or his agent shall file with the Engineering Department three (3) copies of a completed application package for a Stormwater Management Permit (SWMP). Permit issuance is required prior to commencement of any site altering activity. While the application can be submitted by a representative of the Applicant, the Applicant must be the owner of the site. The SWMP Application package shall include:
 - (1) A completed Application Form with original signatures of all owners;
 - (2) A list of abutters, certified by the Assessor's Office;
 - (3) Infiltration and Inflow (I & I) form with calculations and owner's signature;
 - (4) The Stormwater Management Plan as specified in Section 8;
 - (5) The Operation and Maintenance Plan as specified in Section 9;
 - (6) The Waste, Erosion and Sediment Control Plan as specified in Section 10 or the approved Stormwater Pollution Prevention Plan (SWPPP) for projects with a NPDES Construction General Permit
 - (7) A copy of the NPDES Construction General Permit and related documentation, if applicable;
 - (8) Payment of the application and review fees.

Section 7: Permit Application Review

- (a) Entry. Filing an application to obtain a SWMP grants the City Engineer, Stormwater Enforcement Agent, or their agent(s), permission to enter the site to verify the information in the application and to inspect for compliance with the resulting permit
- (b) Fee Structure. The Engineering Department shall obtain with each submission an Application Fee established by the City Engineer to cover expenses connected with the application review process. The City Engineer is authorized to retain a Registered Professional Engineer or other professional consultant to advise on any or all aspects of the submittal. Applicants must pay review fees before the review process may begin.
- (c) Actions. Action, rendered in writing, shall be taken by the City Engineer or its representatives within 45 days of receipt of the application and shall consist of either:
 - a. Approval of the Application based upon determination that the proposed plan meets the most up to date City of Waltham drainage and design criteria and effectively protects water resources.

- b. Approval of the Application subject to any conditions, modifications or restrictions required by the City Engineer which will ensure that the project meets the most up to date City of Waltham drainage and design criteria and effectively protects water resources.
- c. Disapproval of the Application based upon a determination that the proposed plan, as submitted, does not meet the most up to date City of Waltham drainage and design criteria or does not adequately protect water resources.
- (d) Failure of the City Engineer to take final action upon an Application within the time specified above shall be deemed to be approval of said Application. Upon certification by the City Clerk that the allowed time has passed without action, the City Engineer must issue a Notice to Proceed or SWMP.
- (e) Plan Changes. The Applicant must notify the City Engineer in writing of any proposed drainage change or alteration in the system authorized in the Notice to Proceed or SWMP before any change or alteration is made. If the City Engineer determines that the change or alteration is significant based on the most up to date City of Waltham drainage and design criteria and accepted construction practices, the City Engineer may require that an amended application be filed.
- (f) Project Changes. The Applicant or his/her agent, shall notify the City Engineer in writing of any change or alteration of a land-disturbing activity authorized in a Stormwater Management Permit before any change or alteration occurs. If the City Engineer determines that the change or alteration is significant, based on the design requirements listed in Section 8 and accepted construction practices, the City Engineer may require that an amended Stormwater Management Permit application be filed. If any change or deviation from the Stormwater Management Permit occurs during a project, the City Engineer may require the installation of interim measures before approving the change.
- (g) Project Completion. Within ninety (90) days of project completion, the Applicant shall submit to the City Engineer as-built plot plans and survey records showing all structural stormwater controls and treatment best management practices constructed at the site. The as-built plans shall show any deviations from the approved plans, if any, and be stamped and signed in ink by a MA Registered Land Surveyor. All proposed utility designs shall be stamped by a MA Registered Professional Civil Engineer. The as-built plans must be submitted prior to receiving an occupancy permit from the Building Department.

Section 8: Stormwater Management Plan

- (a) The Stormwater Management Plan shall contain sufficient information for the City Engineer to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant for reducing adverse impacts from stormwater. The Plan shall be designed to meet the Massachusetts Stormwater Management Standards as set forth in Part (b) of this section and the DEP Stormwater Management Handbook Volumes I and II and shall guarantee that the stormwater leaving the site after

construction is subject to the same water quality standards as applicable to the City of Waltham. The Stormwater Management Plan shall include :

- (1) A locus map,
- (2) Current deed (copy with registry stamp, book and page) and latest Registry Plan (with registry Stamp, Book and plan number). If none, state "no plan recorded". Copies of other Registry Plans used.
- (3) Building zone for the lot (if in two or more zones, show the zone line(s) mathematically on the plan with area in each zone). Calculate land use of the site on each zone.
- (4) Pre-construction and proposed land use.
- (5) The location(s) of existing and proposed easements with their width and area.
- (6) The location of existing and proposed utilities.
- (7) The site's existing & proposed topography with contours at one-foot intervals in areas where the topography differs from the existing, extending to 20 feet of said areas. Projects with no change in topography are exempt from this requirement.
- (8) The existing site hydrology.
- (9) A description & delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows.
- (10) All wetland resource areas shall be shown as flagged, located and presented to the Waltham Conservation Commission. A copy of the plan presented to the Conservation Commission, if applicable, shall be given to the Engineering Department after obtaining approval from the Conservation Commission and before getting approval from Engineering.
- (11) Flood Plain Zone with the Community Panel Number from the latest F.E.M.A. map and delineation of 100-year flood plains with elevations, if applicable
- (12) Estimated seasonal high groundwater elevation (November to April) in areas to be used for stormwater retention, detention, or infiltration.
- (13) The existing and proposed vegetation and ground surfaces with runoff coefficient for each.
- (14) A drainage area map showing pre and post construction watershed boundaries, drainage area and stormwater flow paths.
- (15) A description and drawings of all components of the proposed drainage system including:
 - (A) locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;
 - (B) all measures for the detention, retention or infiltration of water;
 - (C) all measures for the protection of water quality;
 - (D) the structural details for all components of the proposed drainage systems and stormwater management facilities;
 - (E) notes on drawings specifying materials to be used, construction specifications, and typicals; and
 - (F) expected hydrology with supporting calculations analyzed by a MA Registered Professional Engineer to show that peak rates of flow after development will not exceed those determined for existing conditions. Peak storm flow rates shall be determined for pre- and post-construction development conditions for the 10-yr,

25-yr, and 100-yr storm events. The post-development calculations must demonstrate that the designed system is capable of retaining/recharging on-site all drainage from a 100-year storm event with no connection to the system unless the City Engineer allows other alternatives due to exceptional site constraints, which must be verified;

- (G) Large developments shall consider the use of detention basins or underground storage tanks with flows to be discharged either on-site or off-site to existing waterways, with flows not to be discharged directly to existing municipal storm drainage systems unless allowed by the City Engineer under exceptional conditions. Smaller parcels may consider use of underground storage tanks with orifice regulated outflows.
 - (16) Proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable.
 - (17) Proposed water connection (with the size of main - must maintain 5 feet of cover), sewer connection (with the size of main and invert elevations) showing the two sewer manholes (upstream and downstream) in the street and proposed drainage system. All invert elevations must be shown. Necessary details for water and sewer systems shall be shown. Sewer laterals may not tie into manholes and must tie in to a main directly in front of the lot (if not available the main must be extended by owner with an approved plan and profile).
 - (18) Lots that do not comply with current zoning are to be accompanied by a letter from the City of Waltham Law Department stating that the lot has been approved for old lot status (prior to 1952) and/or reduced frontage requirements.
 - (19) List all grants, waivers, variances, conditions, etc., given to the lot together with the granting authority and date.
 - (20) Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization,
 - (21) A maintenance schedule for the period of construction, and
 - (22) Any other information requested by the City Engineer.
- (b) Plot plans shall meet the following criteria and include the following:
- (1) All plot plans submitted to the Engineering Department shall be on 8½" x 11½", 11"x 17", or 24" x 36" paper or mylar with a ½" border. All plans will be done in a compatible ink and will be drawn to a scale of 1 inch = 20 feet or 1 inch = 40 feet. A proposed site plan MAY NOT be substituted for a plot plan or survey record (as-built site plan).
 - (2) North Arrow in the upper left hand corner (pointing towards the top of the sheet). Street numbers (if existing) shown inside the building.
 - (3) The North American Vertical Datum of 1988 (NAVD) must be used for any elevation information on the plan. A benchmark must be shown on the plan. All lot lines (even contiguous lot lines) with bearings, distances (to the nearest one-hundredth foot), central angles, radii and arcs. The North American Datum of 1983 for horizontal control shall be used with a coordinate shown of at least one corner and a disc supplied in AutoCAD (current version) of the plan.

- (4) Street names with width and whether "public" or "private". Lot numbers and lot areas (to the nearest square foot).
- (5) All plans shall clearly indicate the erosion control measures proposed to protect adjacent wetlands and/or municipal storm drainage systems.
- (6) All plans that include a proposed water service line(s) shall show the design water flow for the service and the proposed water meter size. Single and two-family dwellings are exempt from this requirement and shall be fitted with a 5/8-inch meter.
- (7) All plans showing or requiring a fire service line shall show a connection to a City of Waltham main. No connections shall be made to water service lines or combinations thereof. The owner shall install the fire service from the main to the building and shall be responsible for the fire service connection in its entirety for perpetuity. Three gate configurations with tees are required for larger fire services as determined by the City Engineer.
- (8) All buildings (existing and proposed) with all building dimensions (existing and proposed) and all offset distances to street lines and property lines must be to the nearest one hundredth [0.00] of a foot. The location of the main entrance to all buildings shall be noted.
- (9) Lot coverage and the F.A.R. (floor area ratio) and height of building shall be shown on the plan. All impervious areas are to be shown.
- (10) Plot plans for new construction must show curb cuts (see Consolidated Public Works requirements) with curb returns and curbing. Drives (not to exceed 10% grade), parking (including all treated areas), and proposed elevations of the following: top of foundation (and garage floor), back of walk (street line) at the drive, gutter line and the center of the existing street opposite the drive.
- (11) Proposed water connections (with the size of main), sewer connections (with the size of main and invert elevations) showing the two sewer manholes (upstream and downstream) in the street and proposed drainage system shall be shown. All invert elevations along with necessary details for water and sewer systems must be clearly shown.
- (12) All plans shall be prepared with a title block in the lower right-hand corner which identifies the project by title and location, name and address of the owner, the engineer with address and phone number, surveyor with address and phone number, scale of the plan, date of the plan and date of the survey. The title block shall also have a place for the name and initials of (1) the designer, (2) the draftsman and (3) the checker and the date each task was completed. The Engineering Department will not review plans which have not been reviewed and/or checked by the design engineer prior to submittal.
- (13) All wetland areas shall be shown as flagged, located and presented to the Waltham Conservation Commission.
- (14) All plot plans and survey records (as-built site plans) will be stamped and signed in ink by a MA Registered Land Surveyor. The plan, stamp and signature must be original. All proposed utility designs, and as-built utilities as to design, shall be stamped by a MA Registered Professional Civil Engineer.
- (15) All plans must be followed by a survey record (as-built site plan) at the time of final inspection (survey record to be certified by a MA Registered Land Surveyor and stating the date of the record field survey). The survey record will show all the items

in numbers 10 and 11 above as built and must be an original in ink with an original stamp and signature. All as built plans (final), with the exception of one & two families, will be accompanied by an AutoCad disc (latest version). All plans/lots other than those having a single or a two family dwelling shall comply with ALTA/ACSM standards.

(c) Standards. The Stormwater Management Plan shall prove that the project meets the Standards of the Massachusetts Stormwater Management Policy as amended from time to time, which are as follows:

- (1) No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.
- (2) Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.
- (3) Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge rate from the pre-development or existing site conditions, based on soil types.
- (4) For new development, stormwater management systems must be designed to remove 80% of the average annual load (post development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:
 - (A) Suitable nonstructural practices for source control and pollution prevention are implemented;
 - (B) Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and
 - (C) Stormwater management BMPs are maintained as designed.
- (5) Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs (see Stormwater Management Volume I: Stormwater Policy Handbook). The use of infiltration practices without pretreatment is prohibited.
- (6) Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas (see Stormwater Management Volume I: Stormwater Policy Handbook). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.
- (7) Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable.
- (8) Erosion and sediment controls must be implemented to prevent impacts during disturbance and construction activities.
- (9) All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.
- (10) When one or more of the Standards cannot be met, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

Section 9: Operation and Maintenance Plan

- (a) An Operation and Maintenance plan (O&M Plan) is required at the time of application. The maintenance plan shall be designed to ensure compliance with the City of Waltham's Stormwater Ordinance and the Massachusetts Surface Water Quality Standards, 314, CMR 4.00. The City Engineer shall make the final decision of what maintenance option is appropriate in a given situation. The City Engineer will consider natural features, proximity of site to water bodies and wetlands, extent of impervious surfaces, size of the site, the types of stormwater management structures, and potential need for ongoing maintenance activities when making this decision. The Operation and Maintenance Plan shall remain on file with the Engineering Department and shall be an ongoing requirement. The O&M Plan shall include:

- (1) The name(s) of the owner(s) for all components of the system
- (2) Maintenance agreements that specify:
 - (A) The names and addresses of the person(s) responsible for operation and maintenance
 - (B) The person(s) responsible for financing maintenance and emergency repairs.
 - (C) A Maintenance Schedule for all drainage structures, including swales and ponds.
 - (D) A list of easements with the purpose and location of each.
 - (E) The signature(s) of the owner(s).

(b) Stormwater Management Easement(s).

- (1) Stormwater management easements shall be provided by the property owner(s) as necessary for:
 - (A) access for facility inspections and maintenance,
 - (B) preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event.
 - (C) direct maintenance access by heavy equipment to structures requiring regular cleanout.
- (2) The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

(c) Operation and Maintenance Plan Requirements

- (1) The Operation and Maintenance Plan shall include a schedule of all the preventative and corrective measures necessary to maintain the designed level of service of the constructed stormwater management system. This log, to be filed by the Owner or its representative, will include, but is not limited to, repairs and replacements to the structure; removal of sediment, debris or trash; cleaning of pipes, manholes, or other structures; sweeping of impervious surfaces; restoration of eroded areas; snow and ice removal.
- (2) The Operation and Maintenance Plan and the maintenance log shall be retained by the Owner or designated person on-site and shall be made available, upon request, to City Officials at all times.

- (3) One (1) digital copy and one (1) hard copy of the maintenance log describing maintenance and operation activities performed in the last calendar year shall be submitted to the Engineering Department no later than February 1st of each year.

(d) Changes to Operation and Maintenance Plans

- (1) The owner(s) of the stormwater management system must notify the City Engineer of changes in ownership or assignment of financial responsibility.
- (2) The maintenance schedule in the Maintenance Agreement may be by mutual agreement of the City Engineer and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility of the constructed stormwater management system.

Section 10: Waste, Erosion, and Sediment Control Plan

- (a) The Waste, Erosion and Sediment Control Plan shall describe the different measures the Owner will execute, operate, and maintain in order to properly manage and dispose of wastes generated during construction, prevent erosion, and prevent sediment from reaching neighboring waterbodies or the City's stormwater system. Erosion and sediment control best management practices described in the plan shall adhere to the recommendations in the *Massachusetts Erosion and Sediment Control in Urban and Suburban Areas Report* by the Massachusetts Department of Environmental Protection. The plan shall be prepared, stamped and signed by a Massachusetts Registered Professional Engineer (P.E.), a Certified Professional in Erosion and Sediment Control (CPESC), or a Massachusetts Registered Landscape Architect.
- (b) The Waste, Erosion and Sediment Control Plan shall include, at a minimum, the following sections:
 - (1) Project description: this section will include a general, concise description of the project, nature of the project, intended use of built facilities after project completion, project location, total project size in acres, anticipated surface (in acres) of disturbed land during construction, and type of land disturbances.
 - (2) Project site description: this section will include, at a minimum, a brief narrative description and a plot plan of the project site emphasizing significant aspects that may affect erosion and sediment control such as average slope, location of steeper areas, current land cover (exposed or vegetated), current drainage conditions, proximity to waterbodies, and presence or absence of buffer zones around waterbodies. The site description shall clearly identify areas within the project zone that may be susceptible to erosion due to initial land conditions.
 - (3) Adjacent areas: this section will briefly describe areas surrounding the project site and a plan. The description and plan will clearly show land cover, land use, and drainage

conditions. This section should describe if the flow from adjacent areas will receive or contribute flow to the project site.

- (4) Soil description: a brief description of the soils will be included in the Waste, Erosion and Sediment Control Plan. The soil evaluation should focus on drainage conditions of the project area with special emphasis on the soil layer(s) that will get exposed during site grading activities. Expected drainage response of exposed soil layers during and after rain events as well as groundwater flow shall be included in this section. Vegetal growth potential should also be included in this section if applicable.
- (5) Description of proposed Best Management Practices: all the proposed best management practices will be briefly described in this section. Location and time of implementation will also be described here. A plan clearly showing the location of proposed BMP will also be submitted.
- (6) Implementation schedule: this section consists of a detailed schedule of BMP installation and expected duration and frequency of operation.
- (7) Operation and Maintenance Plan during construction: this section shall describe periodic maintenance and assessment activities to ensure the adopted practices continue to be effective throughout the construction phase of the project. System operation requirements and water quality sampling programs (if applicable) will also be described here.
- (8) A log indicating the different executed waste, sediment and erosion control activities shall be kept on-site at all times and made available to the City Officials at all times. This log will indicate adopted control measures and evaluate their condition on a weekly basis as well as their effectiveness before and after significant storm events. One (1) hard and one (1) digital copy of the summary report shall be submitted to the Engineering Department on a monthly basis.

Section 11: Surety

- (a) The City Engineer may require the Applicant to post before the start of land disturbance or construction activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by the Law Department, and be in an amount deemed sufficient by the City Engineer to ensure that the work will be completed in accordance with the permit. If the project is phased, the City Engineer may release part of the bond as each phase is completed in compliance with the permit, but the bond may not be fully released until the City Engineer has received the final inspection report as required by Section 14 and issued a Certificate of Completion.

Section 12: Inspections

- (a) The Applicant shall contact the City Engineer for an inspection at each of the following project stages:

- (1) Initial Site Inspection: prior to approval of any plan.
 - (2) Erosion Control Inspection: to ensure erosion control practices are in accord with the filed plan.
 - (3) Bury Inspection: prior to backfilling of any underground drainage or stormwater conveyance structures.
 - (4) Final Inspection. After the stormwater management system has been constructed and before the surety has been released, the applicant must submit a record plan detailing the actual stormwater management system as installed. The City Engineer or its representative shall inspect the system to confirm its "as-built" features. This inspector shall also evaluate the effectiveness of the system in an actual storm. If the inspector finds the system to be adequate he shall so report to the City Engineer, who will issue a Certificate of Completion.
- (b) If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Stormwater Management Plan, it shall be corrected by the Applicant before the performance guarantee is released. If the Applicant fails to act, the City of Waltham may use the surety bond to complete the work. Examples of inadequacy shall be limited to: errors in the infiltrative capability, errors in the maximum groundwater elevation, failure to properly define or construct flow paths, or erosive discharges from basins.

Section 13: Waivers

- (a) The City Engineer may waive strict compliance with any requirement of these Rules and Regulations promulgated hereunder, where:
- (1) such action is allowed by federal, state and local statutes and/or regulations,
 - (2) is in the public interest, and
 - (3) is not inconsistent with the purpose and intent of these Rules and Regulations.
- (b) Any applicant may submit a written request to be granted such a waiver. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict application of the Rules and Regulations does not further the purposes or objectives of these Rules and Regulations.

Section 14: Certificate of Completion

- (a) The City Engineer will issue a letter certifying completion upon receipt and approval of the final inspection reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with these Rules and Regulations.

Section 15: Enforcement

- (a) The City Engineer, Stormwater Enforcement Agent or an authorized agent shall enforce these Rules & Regulations in furtherance of Article I, Sections 16 and 25 of the City of Waltham General Ordinances. Such enforcement shall include, but not be limited to, violation notices and enforcement orders. Further, the Stormwater Enforcement Agent or authorized agent may seek injunctive relief in a court of competent jurisdiction to restrain a person from continued violations of or enforce compliance with these Rules and Regulations or of any notices, orders or written approvals or to compel a person to abate or remediate the violation(s).

Section 16: Fines/Penalties

In addition to other means of enforcement available for violations of these regulations, including, but not limited to, where applicable, the provisions of Sec. 1-13(a) of the General Ordinances, violations may be penalized, as provided by G.L. chapter 40, section 21D, pursuant to the non-criminal disposition provisions of Sec. 1-13(b) of the General Ordinances.

Section 17: Severability

- (a) If any provision, paragraph, sentence, or clause of these Rules & Regulations shall be held invalid for any reason, all other provisions shall continue in full force and effect.

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT E

2018 HARDY POND TREATMENT

Annual Report
2018 Aquatic Management Program
Hardy Pond
Waltham, MA

Prepared by: SÖLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

Prepared for: Waltham Consolidated Works
c/o Stew LaCrosse, Sarah Kelley
165 Lexington Street
Waltham, MA 02452

Submitted on: November 30, 2018

Introduction

In accordance with the existing aquatic plant management contract between the City of Waltham and SÖLitude Lake Management for Hardy Pond, the following document serves to provide a summary of the survey results, treatment and harvesting program, and management recommendations for the 2019 season.

All work performed at Hardy Pond this season was conducted in accordance with the current Order of Conditions (OOC) issued by the Conservation Commission (DEP #316-0552) and the MA DEP – Office of Watershed Management issued License to Apply Chemicals (#18018).

A chronology of this year's management and brief description of events is as follows:

2018 Program Chronology

- Received MA DEP License to Apply Chemicals03/28/18
- Early season pre-treatment survey, water quality sampling05/02/18
- Herbicide / algaecide treatment05/25/18
- Post-treatment survey, water quality sampling07/23/18

Early Season Pre-Treatment Survey

On May 2, a SÖLitude biologist conducted the pre-treatment survey to assess the distribution and abundance of aquatic vegetation, specifically curlyleaf pondweed (*Potamogeton crispus*) to determine the most appropriate treatment approach. Overall, curlyleaf pondweed growth was scattered, in varying densities throughout the littoral zone of the pond, occupying approximately 50-75% of the water column at the time of the survey. Other native vegetation consisted of other pondweed species (*Potamogeton* spp.) and some waterlilies (*Nymphaea* & *Nuphar* spp.) were rising within the water column. Water chestnut (*Trapa natans*) and Eurasian watermilfoil (*Myriophyllum spicatum*) were not present.

At the time of the pre-treatment survey, water quality samples were also collected. Results are provided in the table below (Table 1).



Herbicide Treatment

Based on conditions observed during the pre-treatment survey, treatment of submersed aquatic vegetation and algae was conducted on May 25 by SŌlitude's state licensed applicators. Prior to treatment, the Waltham Conservation Commission was notified, and water-use restriction signs were posted around the shoreline of the pond.

Due to shallower water conditions, treatment was conducted using a small jonboat equipped with a low-pressure pump system in which the herbicide was diluted onboard in a mixing tank with pond water and applied subsurface via trailing hoses. A GPS unit was used to ensure real-time tracking of the boat within the treatment areas. Diquat herbicide and a copper-based algaecide were applied to the areas of submersed nuisance growth and algae, respectively. At no time during the treatment were adverse impacts to fish or other aquatic organisms either observed or reported.

Hand Harvesting Efforts

Hand harvesting of water chestnut was conducted on June 6 and June 27 by SŌlitude specialists. Similar to historical conditions, the efforts were focused on the edges of the pond, specifically the western half leading up to the northern cove.

Post-Treatment Inspection

On July 23, a post-treatment inspection of Hardy Pond was conducted to assess the treatment's impacts and successes, as well as the overall aquatic vegetation composition and distribution. Consistent with prior years, waterlilies and watershield (*Nymphaea* spp., *Nuphar* spp., *Brasenia schreberi*) were observed in varying density patches along most of the pond's shoreline. Other vegetation consisted of various pondweeds at healthy densities throughout the pond. Waterweed (*Elodea canadensis*) was observed within the shallower, northwestern cove growing at moderate densities.

Water quality samples were again collected at the time of the post-treatment survey. Results are in the table below (Table 1).

Water Quality Sampling

A comprehensive water quality program was conducted again this year, encompassing general indicative parameters to assess the overall water quality of the pond, as well as parameters to analyze for presence of metals. Results were relatively consistent with those from 2015 for all parameters. The results are shown in the table below and brief explanations of desirable ranges and how they apply to Hardy Pond's results follow.

**Table 1.** 2018 Water Quality Sampling Results

Parameter	Units	05/02		07/23	
		Inlet	Middle	Inlet	Middle
E. coli	colonies/100mL	5.0	7.0	98	11
Alkalinity	mg CaCO ₃ /L	33.6	30.8	51.0	46.9
Salinity	SU	ND	ND	ND	ND
Total dissolved solids	mg/L	620	630	730	760
Total suspended solids	mg/L	ND	ND	28.0	10.0
Ammonia	mg/L	ND	ND	0.159	ND
Nitrate	mg/L	ND	ND	ND	ND
Total Kjeldahl nitrogen	mg/L	0.660	0.663	2.12	1.06
Total phosphorus	mg/L	0.064	0.027	0.350	0.059
Surfactants	mg/L	0.050	ND	ND	ND
Metals					
Arsenic, total	mg/L	ND	ND	0.013	0.015
Barium, total	mg/L	0.057	0.056	0.085	0.071
Cadmium, total	mg/L	ND	ND	ND	ND
Chromium, total	mg/L	ND	ND	ND	ND
Lead, total	mg/L	ND	ND	ND	ND
Mercury, total	mg/L	ND	ND	ND	ND
Selenium, total	mg/L	ND	ND	ND	ND
Silver, total	mg/L	ND	ND	ND	ND

E. coli: Coliform bacteria are an indicator of the presence of human or animal waste inputs. In general, acceptable levels in “swimmable waters” for total coliform bacteria are less than 1000 organisms per 100 mL; the current E. coli standard in swimmable waters is less than 235 colonies per 100 mL. All E. coli samples resulted within the desirable limits.

Alkalinity: Alkalinity is a measure of the buffering capacity of a waterbody against acid additions such as acid rain and pollution, which can be detrimental to fish and other aquatic organism populations. The alkalinity levels within the pond were generally low, between 25-40 mg CaCO₃/L. These levels of alkalinity are considered to be low, but are common for waterbodies within this region.

Solids

Total dissolved solids: This is the sum of ions in the water. It does not indicate specific sources, but gives a more general idea of water quality. Its components are comprised of inorganic salts and some organic matter dissolved in water. Ultimately, it comes from both sources within the lake and the watershed surrounding the pond, and will be higher after a wind or rain weather event as it brings in sewage, run-off, wastewater and natural sources. Road salts can be a large contributor. Currently, 500 mg/L is the Secondary Drinking Water Standard, and all results from the pond this season were above that threshold.



Total suspended solids: This is comprised of material that can be caught and/or removed with a filter. Total suspended solids are often related to the color of the water sample and are made up of plant/animal matter, wastewater, sewage, silt. All sample results were either non-detect or had low values.

Ammonia: Ammonia is a transitional byproduct of the conversion from organic nitrogen to nitrate and is relatively short-lived in oxygen rich environments. There should be little to no detectable ammonia in surface pond water, although it may be anticipated in the bottom layer of deep, stratified lakes. All of the samples from the pond detected very low levels of ammonia, most being non-detect.

Nitrate: Nitrate nitrogen is usually the most prevalent form of inorganic nitrogen in the water and results from such things as natural aerobic bacterial activity and fertilizer use. For most waterbodies, levels of nitrate over 0.3 mg/L are considered elevated. The values observed were all below this threshold at non-detect.

Total Kjeldahl Nitrogen: Total Kjeldahl Nitrogen (TKN) is a measure of the nitrogen contained in organic compounds, such as proteins and amino acids, and as ammonia. It is created from biological growth and decomposition. A concentration of 1.0 mg/L or below is considered desirable. The July samples were both above this threshold and could be a result of increased runoff prior to sampling.

Phosphorus: This is generally considered the limiting nutrient for plant and algae growth. Concentrations of 0.03 mg/L are considered sufficient enough to stimulate algae blooms or excessive plant growth. The results from this year's phosphorus analysis were all above the desirable threshold, with the exception of the May middle sample. However, these results only illustrate a snapshot of continually fluctuating phosphorus levels, which can come from both external and internal sources.

Arsenic: The EPA limit in drinking water is 0.010 mg/L, which both July samples were greater than. Sources of arsenic in water can stem from natural sources, such as rocks, soil, water, air and man-made sources, tanning practices and electronic devices.

Barium: The EPA limit in drinking water is 2 mg/L; all samples resulted in less than the limit. Sources of barium include mineral deposits, drilling wastes, copper smelting, and motor vehicle part manufacturing.

Cadmium: The EPA limit in drinking water is 0.005 mg/L; all samples were non-detect. Cadmium comes from weathering/erosion, and anthropogenic sources such as: fertilizer, mining, car combustion, smelting, municipal effluent, and runoff.

Chromium: The EPA limit in drinking water is 0.1 mg/L; all samples were non-detect. Sources of chromium include rocks and volcanic activity.

Lead: The EPA has an action limit of 0.015 mg/L; all samples were non-detect. Lead can enter freshwater from many man-made sources such as mining and manufacturing.

Mercury: The EPA limit in drinking water is 0.002 mg/L; all samples were non-detect. Most mercury in waterbodies is a result of atmospheric input.

Selenium: The EPA limit in drinking water is 0.05 mg/L; all samples were non-detect. Selenium naturally occurs in sedimentary rocks, shale, coal and soils, but also can enter from mining, power plants and agriculture.



Silver: Drinking water standard is 0.1 mg/L; all samples were non-detect. Silver is usually naturally occurring, but typically is produced as a byproduct of other precious metals.

Ongoing Management Recommendations

Results of the pre- and post-management inspections suggest that the 2018 herbicide treatment was successful in reducing distribution and density of nuisance pondweed species. In 2019, we recommend continued treatment of these species with diquat and a copper-based algaecide for treatment of filamentous algae. We also recommend sample collection of microscopic algae for cyanobacteria (blue-green algae) testing. Certain species emit toxins which can be potentially harmful to humans, pets and wildlife. If sample results come back positive for those species and at high levels, we recommend treatment utilizing copper sulfate. This will both decrease the amount of toxin producing cyanobacteria within the waterbody as well as restore clarity to the water column. If phosphorus results continue to increase in future years, it is worth considering conducting an aluminum sulfate treatment; this product binds with available phosphorus within the water column as it sinks and deactivates it. By doing so, this reduces the available phosphorus for plant and algae species and can potentially mitigate future cyanobacteria blooms.

To effectively continue management in the future, it would be helpful if some of the rocks at the boat launch could be moved out of the way. The shallow, flat launch already makes launching the treatment boat difficult. For us to continue utilizing the most effective methods of application via trailered boats, removal or moving of these rocks would be helpful, as well as promote more trailered boat recreation within the pond.

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT F

GREEN INFRASTRUCTURE PARKING LOT GUIDANCE DOCUMENT

GREEN PARKING LOT GUIDANCE DOCUMENT



GREEN PARKING LOTS

The City of Waltham, along with the Charles River Watershed Association (CRWA) and SSV Engineering Incorporated, developed a general green infrastructure retrofit design for the Embassy Parking Lot. This retrofit design serves to improve aesthetics, reduce the phosphorous load by 50% and improve the quality of storm water discharging into the Charles River. The installation of small, strategically located bioretention areas and infiltration trenches helps to reduce phosphorous load and improve stormwater quality. This project serves as a model for public and private adaptation of parking lots throughout the City of Waltham.



Example of a small bioretention area called a rain garden. Stormwater flows from the parking lot into the garden where vegetation absorbs some of the storm-water and excess nutrients in it.

CHARLES RIVER NUTRIENT TOTAL MAXIMUM DAILY LOAD

The Charles River currently receives roughly double the phosphorus pollution it should. Phosphorus is a nutrient that acts like a fertilizer to the plants and algae in the river, causing them to grow out of control and alter the natural balance of the ecosystem. A total maximum daily load (TMDL) or pollution budget study conducted for the Charles River found that most of the phosphorus pollution is brought to the river in stormwater runoff (Figure 1). Phosphorus is found in detergents, fertilizers, deicers, and is a by-product of combustion engine exhaust. Densely developed cities like Waltham have a high concentration of phosphorous sources, and when there is stormwater there is phosphorus runoff! The TMDL study calls for a 65% reduction in phosphorus in stormwater coming off of densely developed land. Green infrastructure systems, particularly infiltrating systems, are far more efficient at removing phosphorus when compared to traditional stormwater infrastructure.

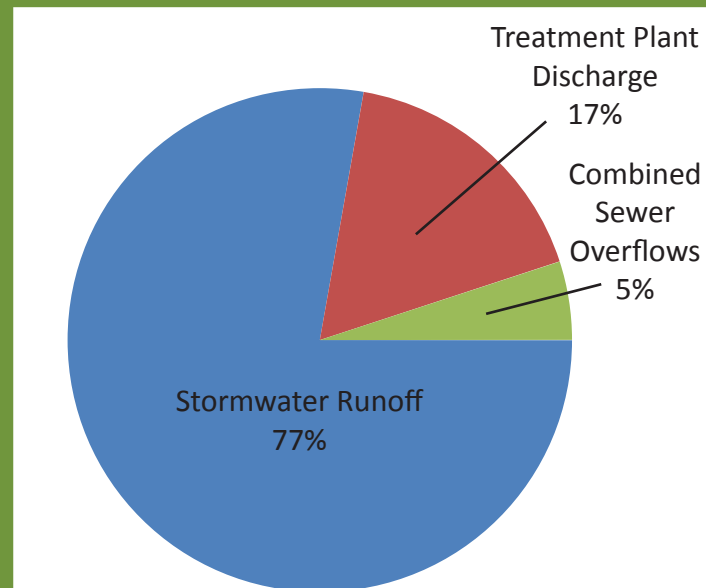


Figure 1: Annual Phosphorous Load to the Charles River By Source Category (as determined by the Charles River Nutrient TDML).

IMPACTS OF PARKING LOTS

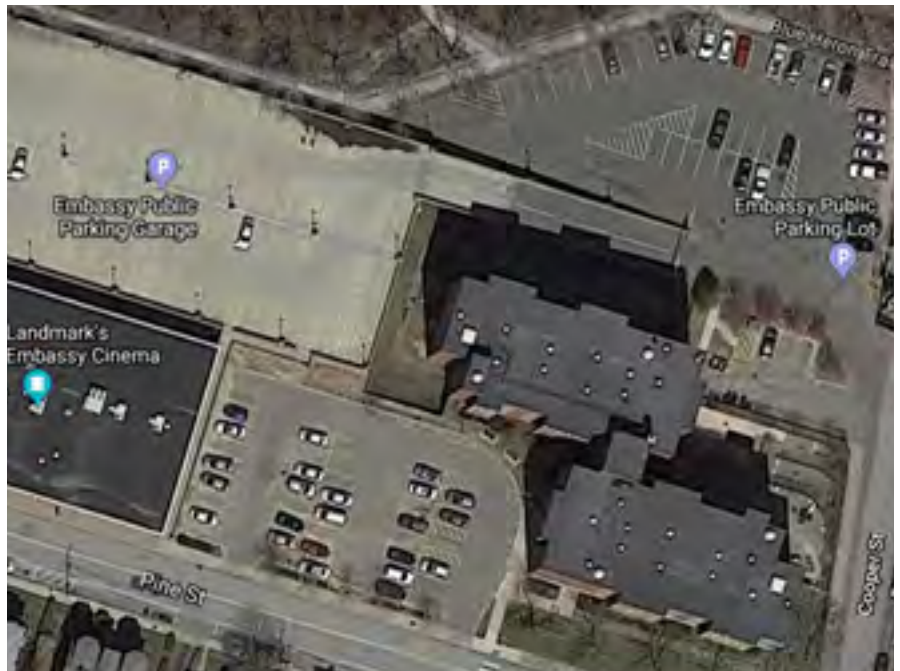
Traditional parking lots are made of asphalt which is an impervious surface that absorbs heat. Water that runs over asphalt does not permeate into the soil and picks up pollutants as a result. The uninfiltreated stormwater quickly makes its way to the nearest body of water, negatively effecting water quality and increasing chances of flooding. Runoff from parking lots contain oils, pesticides, fertilizers, and other pollutants that have a negative impact on the surrounding ecosystem. Since asphalt is black, parking lots contribute heavily to the heat island effect. The heat island effect causes urban areas to be several degrees hotter than they should be due to high levels of dark surfaces.



Image of stormwater puddled in a parking lot that will produce runoff containing pollutants absorbed from the surface of the asphalt.

EMBASSY PARKING LOT

The goal for retrofitting the Embassy Parking Lot with a stormwater management system is to reduce the phosphorous load by 50% and improve stormwater quality discharging into the Charles River. A field investigation was conducted to understand the current flow paths for the parking lot. All of the locations of catch basins and outlets were determined and delineated on a site plan. Green infrastructure retrofits were designed in order to increase stormwater storage and infiltration and encourage filtration. With the addition of green infrastructure, the runoff from the Embassy Parking Lot would be greatly reduced and would contain fewer



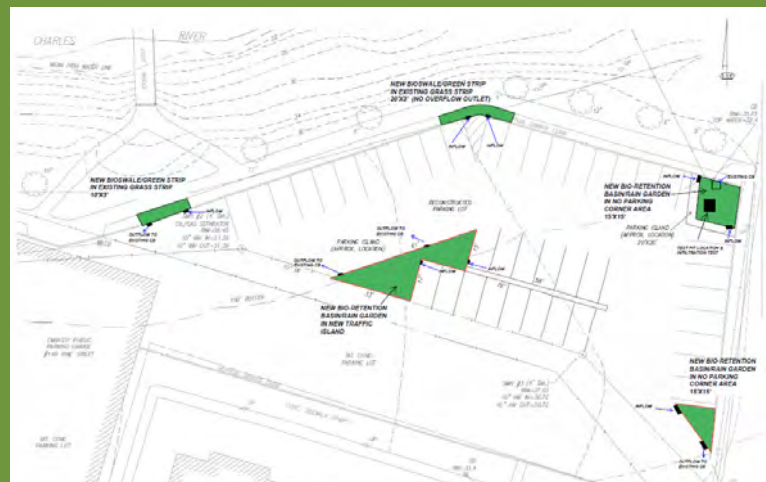
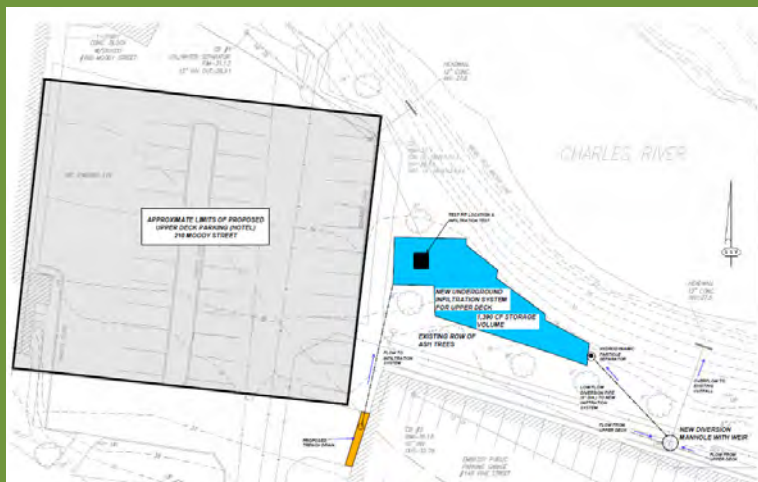
GREEN INFRASTRUCTURE FOR PARKING LOTS

Bioretention Area: One of the most common stormwater management techniques for parking lots. A bioretention area consists of a depressed curb inlet, which leads into a permeable patch of land full of plants. The plants serve to clean the water and the permeability allows for some of the stormwater to be absorbed into the ground.

Infiltration Trench: A trench designed to absorb and retain stormwater runoff, allowing gradual permeation over a longer period of time. Infiltration trenches work best if all the runoff passes through, so they are located underground with an infiltration drain leading to them. This technique greatly reduces the amount of stormwater that gets into the drainage system and helps with groundwater recharge.

Porous Pavement: Porous pavement is designed to be semi-permeable to allow for some stormwater infiltration. Underneath the porous pavement lays a stone reservoir which allows for temporary storage of stormwater. The two most popular types of porous pavement are porous asphalt and porous concrete. Porous asphalt can be used in any climate whereas porous concrete is more effective in hot climates. Porous pavements are highly effective at removing pollutants and reducing stormwater because they can be installed over relatively large areas.

PROPOSED RETROFIT DESIGNS



THE CITY OF WALTHAM AND CRWA

The City of Waltham:

Founded in 1736, The City of Waltham is a community committed to sustainability and stormwater management. Through outreach, education, monitoring, and green infrastructure construction, the City of Waltham has already reduced the amount of stormwater getting into the Charles River significantly. The city's partnership with the Charles River Watershed Association will take their existing stormwater management programs to a new level and help to increase water quality of the Charles River even further.



Charles River Watershed Association:

One of the country's oldest watershed organizations, Charles River Watershed Association (CRWA) was formed in 1965 in response to public concern about the declining condition of the Charles River. CRWA initiatives and advocacy work over the last five decades have dramatically improved the quality of water in the watershed and fundamentally changed approaches to water resource management. Today CRWA is protecting, preserving and enhancing the entire Charles River watershed through science, advocacy, and the law. Our strong science and engineering research and advocacy promote smart environmental policies. CRWA's work promotes resilient communities and a healthy river ecosystem.

YEAR 1 ANNUAL REPORT

**Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018 – June 30, 2019**

CITY OF WALTHAM, MASSACHUSETTS

ATTACHMENT G

SOP – STORMWATER TREATMENT SYSTEMS INSPECTIONS

SOP 9: INSPECTING CONSTRUCTED BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are policies, procedures and structures designed to reduce stormwater pollution, prevent contaminant discharges to natural water bodies, and reduce stormwater facility maintenance costs. Constructed BMPs are permanent site features designed to treat stormwater before infiltrating it to the subsurface or discharging it to a surface water body.

This Standard Operating Procedure provides a general summary of inspection procedures for eight common constructed BMPs, including:

1. Bioretention Areas and Rain Gardens
2. Constructed Stormwater Wetlands
3. Extended Dry Detention Basins
4. Proprietary Media Filters
5. Sand and Organic Filters
6. Wet Basins
7. Dry Wells
8. Infiltration Basins

This SOP is based on the Massachusetts Stormwater Handbook and is not intended to replace that document. This SOP is also not intended to replace the Stormwater BMP Operation and Maintenance (O&M) Plan required by the Massachusetts Wetlands Protection Act, Order of Conditions.

Bioretention Areas and Rain Gardens

Bioretention areas and rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch and planted with dense native vegetation. There are two types of bioretention cells:

1. Filtering bioretention area: Areas that are designed solely as an organic filter; and
2. Exfiltration bioretention area: Areas that are configured to recharge groundwater in addition to acting as a filter.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule: Bioretention Areas and Rain Gardens

Activity	Time of Year	Frequency
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a bioretention area or rain garden. This would prevent required water quality treatment and the recharge of groundwater.

Constructed Stormwater Wetlands

Constructed stormwater wetlands maximize the pollutant removal from stormwater through the use of wetland vegetation uptake, retention and settling. Constructed storm water wetlands must be used in conjunction with other BMPs, such as sediment forebays.

Inspection & Maintenance

Regular inspection and maintenance are important to prevent against premature failure of bioretention areas or rain gardens. Regular inspection and maintenance of pretreatment devices and bioretention cells for sediment buildup, structural damage and standing water can extend the life of the soil media.

Maintenance Schedule, Constructed Stormwater Wetlands: Years 0-3

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Record and Map:	Year round	Annually
Types and distribution of dominant wetland plants	Year round	Bi-Annually
Presence and distribution of planted wetland species	Spring	Annually
Presence and distribution of invasive species	Fall and Spring	Bi-Annually
Indications other species are replacing planted wetland species	Spring	Annually
Percent of standing water that is not vegetated	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed
Stability of original depth zones and micro-topographic features		
Accumulation of sediment in the forebay and micropool and survival rate of plants		

Maintenance Schedule, Constructed Stormwater Wetlands: Years 4-Lifetime

Activity	Time of Year	Frequency
Inspect for invasive species and remove if present	Year round	Monthly
Clean forebays	Year round	Annually
Clean sediment in basin/wetland system	Year round	Once every 10 years
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and Spring	Bi-Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace all media and vegetation	Late Spring/Early Summer	As Needed

When failure is discovered, excavate the bioretention area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation and mulch the surface.

Never store snow within a constructed stormwater wetland. This would prevent required water quality treatment and the recharge of groundwater.

Extended Dry Detention Basins

Extended dry detention basins are designed to control both stormwater quantity and quality. These BMPs are designed to hold stormwater for at least 24 hours, allowing solids to settle and to reduce local and downstream flooding. Pretreatment is required to reduce the potential for overflow clogging. The outflow

may be designed as either fixed or adjustable. Additional nutrient removal may be achieved by a micropool or shallow marsh.

Inspection & Maintenance

Annual inspection of extended dry detention basins is required to ensure that the basins are operating properly. Potential problems include: erosion within the basin and banks, tree growth on the embankment, damage to the emergency spillway and sediment accumulation around the outlet. Should any of these problems be encountered, necessary repairs should be made immediately.

Maintenance Schedule: Extended Dry Detention Basins

Activity	Time of Year	Frequency
Inspect basins	Spring and Fall	Bi-Annually, and during and after major storms
Examine outlet structure for clogging or high outflow release velocities	Spring and Fall	Bi-Annually
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually
Remove trash and debris	Spring	Bi-Annually
Remove sediment from basin	Year round	At least once every 5 years

Proprietary Media Filters

Media Filters are designed to reduce total suspended solids and other target pollutants, such as organics, heavy metals or nutrients, which are sorbed onto the filter media, which is contained in a concrete structure. The substrate used as filter media depends on the target pollutants, and may consist of leaf compost, pleated fabric, activated charcoal, perlite, amended sand in combination with perlite, and zeolite. Two types of Media Filters are manufactured: Dry Media Filters, which are designed to dewater within 72 hours; and Wet Media Filters, which maintain a permanent pool of water as part of the treatment system.

Inspection & Maintenance

Maintenance in accordance with the manufacturer's requirements is necessary to ensure stormwater treatment. Inspection or maintenance of the concrete structure may require OSHA confined space training. Dry Media Filters are required to dewater in 72 hours, thus preventing mosquito and other insect breeding. Proper maintenance is essential to prevent clogging. Wet Media Filters require tight fitting seals to keep mosquitoes and other insects from entering and breeding in the permanent pools. Required maintenance includes routine inspection and treatment.

Maintenance Schedule: Proprietary Media Filters

Activity	Time of Year	Frequency
Inspect for standing water, trash, sediment and clogging	Per manufacturer's schedule	Bi-Annually (minimum)
Remove trash and debris	N/A	Each Inspection
Examine to determine if system drains in 72 hours	Spring, after large storm	Annually
Inspect filtering media for clogging	Per manufacturer's schedule	Per manufacturer's schedule

Sand and Organic Filters

Sand and organic filters, also known as filtration basins, are intended for quality control rather than quantity control. These filters improve water quality by removing pollutants through a filtering media and settling pollutants on top of the sand bed and/or in a pretreatment basin. Pretreatment is required to prevent filter media from clogging. Runoff from the filters is typically discharged to another BMP for additional treatment.

Inspection & Maintenance

If properly maintained, sand and organic filters have a long design life. Maintenance requirements include raking the sand and removing sediment, trash and debris from the surface of the BMP. Over time, fine sediments will penetrate deep into the sand requiring replacement of several inches or the entire sand layer. Discolored sand is an indicator of the presence of fine sediments, suggesting that replacement of the sand should be completed.

Maintenance Schedule: Proprietary Media Filters

Activity	Frequency
Inspect filters and remove debris	After every major storm for the first 3 months after construction completion. Every 6 months thereafter.

Wet Basins

Wet basins are intended to treat stormwater quality through the removal of sediments and soluble pollutants. A permanent pool of water allows sediments to settle and removes the soluble pollutants, including some metals and nutrients. Additional dry storage is required to control peak discharges during large storm events, and if properly designed and maintained wet basins can add fire protection, wildlife habitat and aesthetic values to a property.

Inspection & Maintenance

To ensure proper operation, wet basin outfalls should be inspected for evidence of clogging or excessive outfall releases. Potential problems to investigate include erosion within the basin and banks, damage to the emergency spillway, tree growth on the embankment, sediment accumulation around the outlet and the emergence of invasive species. Should any of these problems be encountered, perform repairs immediately. An on-site sediment disposal area will reduce sediment removal costs.

Maintenance Schedule: Wet Basins

Activity	Time of Year	Frequency
Inspect wet basins	Spring and/or Fall	Annually (Minimum)
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-Annually (Minimum)
Remove sediment, trash and debris	Spring through Fall	Bi-Annually (Minimum)
Remove sediment from basin	Year round	As required, but at least once every 10 years

Dry Wells

Dry wells are used to infiltrate uncontaminated runoff. These BMPs should never be used to infiltrate stormwater or runoff that has the potential to be contaminated with sediment and other pollutants. Dry wells provide groundwater recharge and can reduce the size and cost required of downstream BMPs or storm drains. However, they are only applicable in drainage areas of less than one acre and may experience high failure rates due to clogging.

Inspection & Maintenance

Proper dry well function depends on regular inspection. Clogging has the potential to cause high failure rates. The water depth in the observation well should be measured at 24 and 48 hour intervals after a storm and the clearance rate calculated. The clearance rate is calculated by dividing the drop in water level (inches) by the time elapsed (hours).

Maintenance Schedule: Dry Wells

Activity	Frequency
Inspect dry wells	After every major storm for the first 3 months after construction completion. Annually thereafter.

Infiltration Basins

Infiltration basins are designed to contain stormwater quantity and provide groundwater recharge. Pollution prevention and pretreatment are required to ensure that contaminated stormwater is not infiltrated. Infiltration basins reduce local flooding and preserve the natural water balance of the site, however high failure rates often occur due to improper siting, inadequate pretreatment, poor design and lack of maintenance.

Inspection & Maintenance

Regular maintenance is required to prevent clogging, which results in infiltration basin failure. Clogging may be due to upland sediment erosion, excessive soil compaction or low spots. Inspections should include signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, riprap condition, sediment accumulation and turf health.

Maintenance Schedule: Infiltration Basins

Activity	Time of Year	Frequency
Preventative maintenance	Spring and Fall	Bi-Annually
Inspection	Spring and Fall	After every major storm for the first 3 months after construction completion. Bi-annually thereafter and discharges through the high outlet orifice.
Mow/rake buffer area, side slopes and basin bottom	Spring and Fall	Bi-Annually
Remove trash, debris and organic matter	Spring and Fall	Bi-Annually

INSPECTION OF BIORETENTION AREAS / RAIN GARDENS

General Information

BMP Description	Bioretention Area / Rain Garden		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for soil erosion and repair	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Inspect for invasive species and remove if present	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mulch void areas	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove dead vegetation	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace dead vegetation	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Prune	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Years 0-3 of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	

In addition, the following information should be recorded and mapped at least once per year:

- Types and distribution of dominant wetland plants
- Presence and distribution of planted wetland species
- Presence and distribution of invasive species
- Indications other species are replacing planted wetland species
- Percent of standing water that is not vegetated
- Replace all media and vegetation
- Stability of original depth zones and micro-topographic features
- Accumulation of sediment in the forebay and micropool and survival rate of plants

INSPECTION OF CONSTRUCTED STORMWATER WETLANDS
Year 4 - Lifetime of Operation

General Information

BMP Description	Constructed Stormwater Wetland		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for invasive species and remove if present	Monthly	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Clean forebays	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Clean sediment in basin/wetland system	Once every 10 years	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mulch void areas	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove dead vegetation	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace dead vegetation	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Prune	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Replace all media and vegetation	As Needed	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF EXTENDED DRY DETENTION BASINS

Inspections should be conducted bi-annually, and during and after major storm events.

General Information

BMP Description	Extended Dry Detention Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Examine outlet structure for clogging or high outflow release velocities	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mow upper stage, side slopes, embankment and emergency spillway	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash and debris	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove sediment from basin	At least once every 5 years	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF PROPRIETARY MEDIA FILTERS

General Information

BMP Description	Media Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Inspect for standing water, trash, sediment and clogging	Bi-Annually (minimum)	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash and debris	Each Inspection	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Examine to determine if system drains in 72 hours	Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Inspect filtering media for clogging	Per manufacturer's schedule	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF SAND AND ORGANIC FILTERS

Inspections should be conducted after every major storm event for the first 3 months following completion, then every 6 months thereafter.

General Information

BMP Description	Sand/Organic Filter		
BMP Location			
Media Type			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Remove sediment, trash, and debris	Every 6 months	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Rake sand	Every 6 months	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF DRY WELLS

Regular inspections should be conducted after every major storm event for the first 3 months following completion, then annually thereafter.

General Information

BMP Description	Dry Well		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			
Describe condition of dry well at time of inspection			

After a major storm event, the water depth in the observation well should be measured at 24 and 48 hour intervals and the clearance rate calculated.

INSPECTION OF WET BASINS

Inspections should be conducted after every major storm event for the first 3 months following completion, then biannually thereafter.

General Information

BMP Description	Wet Basin		
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			
Describe condition of wet basin at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
Preventative maintenance	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Mow/rake buffer area, side slopes and basin bottom	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Remove trash, debris and organic matter	Bi-Annually	Yes <input type="checkbox"/> No <input type="checkbox"/>	
Inspect and clean pretreatment devices	Every other month and after every major storm event	Yes <input type="checkbox"/> No <input type="checkbox"/>	

INSPECTION OF OTHER BMP

General Information

BMP Description			
BMP Location			
Inspector's Name			
Date of Inspection		Date of Last Inspection	
Start Time		End Time	
Type of Inspection: Regular <input type="checkbox"/> Pre-Storm Event <input type="checkbox"/> During Storm Event <input type="checkbox"/> Post-Storm Event <input type="checkbox"/>			
Describe the weather conditions at time of inspection			

Specific Information

Maintenance Activity	Maintenance Frequency	Is Status of BMP Satisfactory?	Corrective Action Needed
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	
		Yes <input type="checkbox"/> No <input type="checkbox"/>	