

REPORT

Stormwater Management Program Plan
(SWMPP)

Providence, Rhode Island



September 21, 2020



Table of Contents

| | |
|--|-----------|
| Section 1 - Introduction | 1 |
| Background | 1 |
| Stormwater Management Program Plan (SWMPP) | 1 |
| Minimum Control Measures | 2 |
| RIDEM Consent Agreement | 2 |
| Stormwater Management Program Team | 2 |
| Watershed Inventory | 3 |
| Section 2 - Minimum Control Measures | 11 |
| MCM 1 – Public Education and Outreach | 11 |
| MCM 2 – Public Involvement and Participation | 13 |
| MCM 3 – Illicit Discharge Detection and Elimination (IDDE) Program | 16 |
| MCM 4 – Construction Site Stormwater Runoff Control | 20 |
| MCM 5 – Post Construction Stormwater Management in New Development and Redevelopment | 22 |
| MCM 6 – Pollution Prevention and Good Housekeeping in Municipal Operations | 24 |
| Section 3 - TMDLs and Water Quality Limited Waters | 27 |
| Bacteria/Pathogens Impairment | 27 |
| Phosphorus Impairment | 27 |
| Dissolved Oxygen Impairment | 29 |
| Dissolved Metals Impairment | 30 |
| Section 4 - Evaluation and Assessment Reporting | 31 |
| Revisions to the SWMPP | 31 |
| Reporting Requirements | 31 |
| Annual Reporting | 32 |
| Record Keeping | 32 |
| Tables | |
| Table 1.1: Impaired Waters | 4 |
| Table 1.2: Rare/Endangered Species | 6 |
| Table 1.3: Land Use | 9 |
| Table 2.1: MCM 1 Summary of BMPs | 11 |
| Table 2.2: MCM 2 Summary of BMPs | 13 |
| Table 2.3: MCM 3 Summary of BMPs | 16 |
| Table 2.4: MCM 4 Summary of BMPs | 20 |
| Table 2.5: MCM 5 Summary of BMPs | 22 |
| Table 2.6: MCM 6 Summary of BMPs | 24 |

Figures

| | |
|-------------------------------|----|
| Figure 1.1: Impaired Waters | 5 |
| Figure 1.2: Wetlands | 7 |
| Figure 1.3: Natural Resources | 8 |
| Figure 1.4: Land Use | 10 |
| Figure 3.1: TMDL Zoning | 28 |

Appendices

| | |
|------------|--|
| Appendix A | 2004 "Phase II Stormwater Management Plan" Summary |
| Appendix B | RIDEM Consent Agreement |
| Appendix C | Public Education and Outreach Flyers |
| Appendix D | List of Groups, Programs for Schools and Partnership Opportunities |
| Appendix E | Teaching Resources |
| Appendix F | City Ordinance Section 25-83 – Illicit Discharge Detection and Elimination |
| Appendix G | Illicit Discharge Detection and Elimination (IDDE) Plan |
| Appendix H | Interconnection Notification Process |
| Appendix I | Municipal Training Materials |
| Appendix J | City Ordinance Article VII. Soil Erosion and Sediment Control |
| Appendix K | City Ordinance Article VI. Post-Construction Stormwater Control |

Section 1 – Introduction

Background

On December 8, 1999, the U.S. Environmental Protection Agency (USEPA) promulgated Phase II of its National Pollution Discharge Elimination System (NPDES) stormwater regulations. Phase I of the USEPA stormwater program established regulations for stormwater discharges from municipal separate storm sewer systems (MS4s) in municipalities with populations of 100,000 or greater, construction activities disturbing five or more acres of land, and ten categories of industrial facilities. The City of Providence was not required to seek permit coverage under Phase I because the population served by the combined sewer system decreased the population served by the separate sewer system to below 100,000. The Phase II Final Rule expands the Phase I program by requiring smaller communities with MS4s in urbanized areas to implement programs and practices to control polluted stormwater runoff through the use of NPDES permits.

The City of Providence is one of thirty-three Rhode Island municipalities located completely or partially in an Urbanized Area automatically designated under the Phase II program. In Rhode Island, Phase II regulated communities were required to apply for a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit in 2004 which was issued by Rhode Island Department of Environmental Management (RIDEM). These communities are required to reduce the discharge of pollutants from their storm sewer systems to the “maximum extent practicable” to protect water quality.

Stormwater Management Program Plan (SWMPP)

The SWMPP describes and details the activities and measures that will be implemented by the City of Providence (City or permittee) to meet the terms, conditions and/or intent of the MS4 General Permit (herein referred to as the “permit”). The SWMPP describes the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term. The main elements of the SWMPP are divided into six minimum control measures which can generally be summarized as:

- (1) a public education program in order to bring general awareness and affect public behavior causing stormwater pollution,
- (2) an opportunity for the public to participate and provide comments on the stormwater program
- (3) a program to effectively find and eliminate illicit discharges within the MS4
- (4) a program to effectively control construction site stormwater discharges to the MS4
- (5) a program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and
- (6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

Minimum Control Measures

Per Section IV of the MS4 General Permit, MS4s must implement a SWMPP that includes the following six (6) minimum control measures (MCMs).

- MCM 1: Public Education and Outreach
- MCM 2: Public Involvement/Participation
- MCM 3: Illicit Discharge Detection and Elimination (IDDE)
- MCM 4: Construction Site Stormwater Runoff Control
- MCM 5: Post-Construction Stormwater Management
- MCM 6: Pollution Prevention/Good Housekeeping

As required by the MS4 General Permit, there are specific actions that must be undertaken to reduce stormwater pollution. These actions are called Best Management Practices (BMPs). The following plan outlines these BMPs, the measurable goal for each BMP, the deadline for development and implementation of BMPs, and the responsible party for implementing the BMP. Each of these measures are detailed in the next section of this SWMPP.

The Permit Year (PY) corresponds to each regulatory year starting on January 1, 2004.

Original BMPs developed for the six minimum measures as part of the “Phase II Stormwater Management Plan” dated March 2004 are included in **Appendix A**.

RIDEM Consent Agreement

On March 3, 2017 the RIDEM issued a notice of violation (NOV) to the City of Providence for non-compliance with the RIPDES general permit. In response to the NOV, RIDEM and the City entered into the Consent Agreement (CA) on March 7, 2017. A copy of the CA is included in **Appendix B**. The CA includes specific requirements in support of both MS4 permit and TMDL requirements, with specific requirements to update the SWMPP to incorporate the IDDE Plan, procedures for review of development and redevelopment projects and post-construction stormwater runoff controls and ordinance.

Stormwater Management Program Team

The Department of Public Works (DPW) is the primary Department within the City of Providence (City) that will oversee the implementation of the City’s MS4 program. Additional City Department will also be required to comply with the various MCMs and standard operating procedures (SOPs) that are developed under this program. To coordinate various planning activities associated with the permit, an MS4 coordinator has been identified to oversee and support interdepartmental coordination and communication.

SWMPP Coordinator

| | | | |
|--------|-----------------------|-------------|--|
| Name: | Craig Hochman | Department: | Public Works |
| Title: | Deputy Chief Engineer | Email: | CHochman@providenceri.gov |
| Phone: | (401)680-7515 | | |

Watershed Inventory

Existing Water Resources

Four watersheds drain through Providence: the Pawtuxet, Woonasquatucket, Moshassuck, and Providence & Seekonk. Significant water resources in the City of Providence include:

- The realignment of the Woonasquatucket River along its natural course forms the center of Waterplace Park and has transformed the Woonasquatucket River into a center for urban canoeists and kayakers.
- The Moshassuck River has been realigned with the Woonasquatucket and Providence Rivers for the creation of Waterplace Park.
- Traditionally, the Seekonk River served as a transportation route between Narragansett Bay and the industrial mills on the Blackstone. Today, it is home to the nation's oldest rowing club (the Narragansett Boat Club) as well as a growing amount of fish and wildlife.

It should be noted that other significant water resources exist in Providence as small, unnamed ponds, watercourses and wetlands. Some of these are isolated while others are located along stream lengths. See **Figures 1.2 - Wetlands** and **1.3 - Natural Resources**.

Impaired Waters

The Office of Water Resources of the RIDEM has prepared a list of impaired waters in Rhode Island in compliance with section 303(d) of the federal Clean Water Act (CWA). These impaired waters are defined as those that do not meet State of Rhode Island Water Quality standards. RIDEM is required to develop Total Maximum Daily Loads (TMDLs) for each of these waters. The purpose of the TMDLs is to identify the capacity of a surface water to assimilate pollutants without impacting its designated uses (e.g. fishable, swimmable) as well as meet the State Water Quality Standards. While many of the TMDLs are anticipated to focus on point sources of pollution, more recent TMDLs require more intensive stormwater controls to more aggressively reduce sources of stormwater pollution from what was intended for the Phase II program.

The surface waters within Providence identified on the RIDEM Section 303(d) List of Impaired Waters, issued in 2016 and amended in 2018, are:

- Mashapaug Pond
- Moshassuck River
- Providence River
- Roger Williams Park Ponds
- Seekonk River
- Upper Narragansett Bay
- West River
- Woonasquatucket River

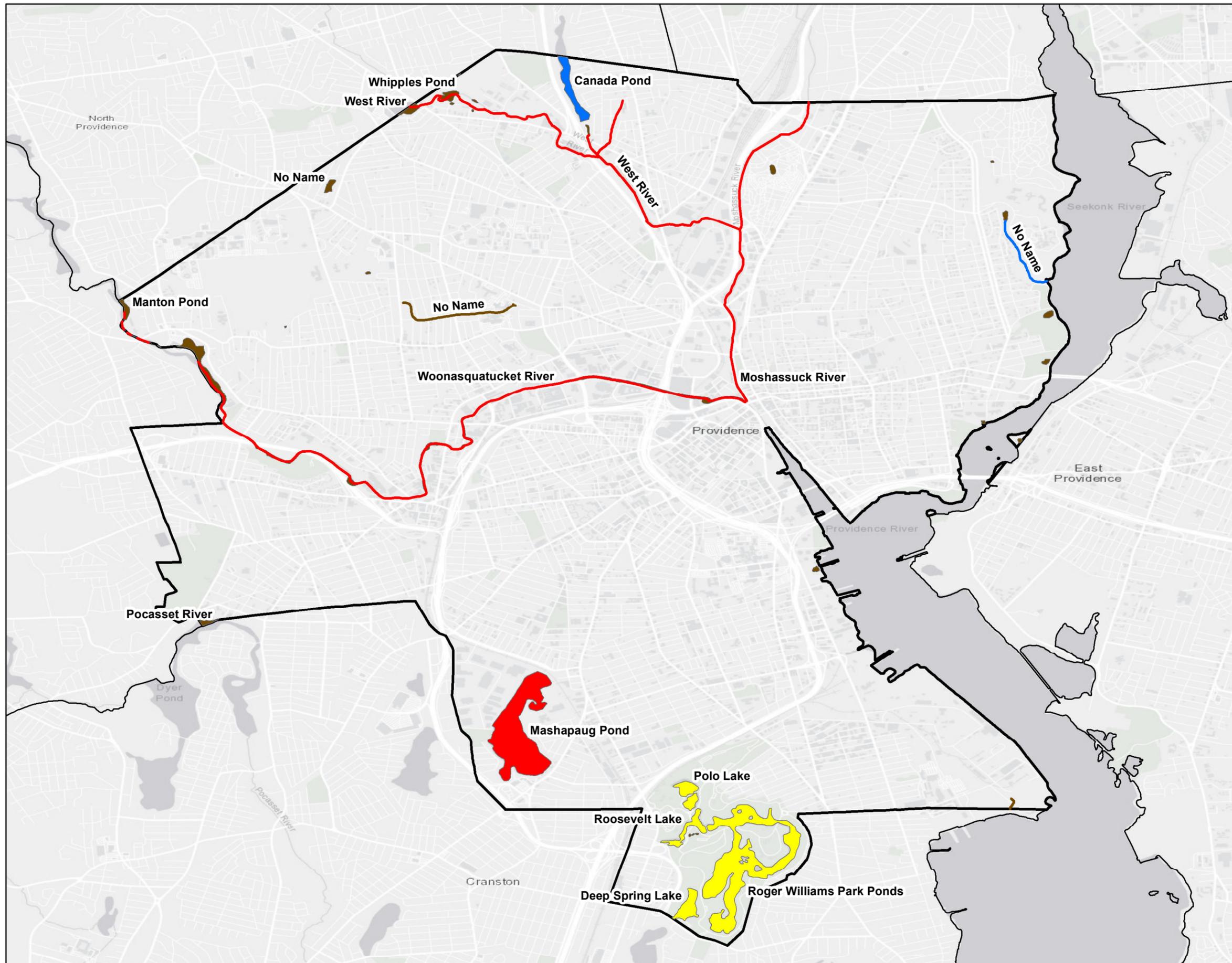
The cause(s) of the impairment, TMDL level of implementation, and the TMDL priority ranking for these waters are summarized in **Table 1.1** and depicted in **Figure 1.1-Impaired Waters**.

TABLE 1.1 - IMPAIRED WATERS

| Waterbody Name (Identification #) | Cause of Impairment | Category ^a |
|---|--|-----------------------|
| Mashapaug Pond | | |
| (RI0006017L-06) | Excess Algal Growth, Dissolved Oxygen, Phosphorus (Total), Fecal Coliform | Category 4A |
| Moshassuck River | | |
| (RI0003008R-01A, RI0003008R-01B & RI0003008R-01C) | Enterococcus | Category 4A |
| (RI0003008R-01A & RI0003008R-01B) | Benthic-Macroinvertebrate Bioassessments | Category 5 |
| Providence River | | |
| (RI0007020E-01B) | Nitrogen (Total), Dissolved Oxygen, Fecal Coliform | Category 5 |
| Roger Williams Park Ponds | | |
| (RI0006017L-05) | Excess Algal Growth, Dissolved Oxygen, Phosphorus (Total), Fecal Coliform | Category 4A |
| (RI0006017L-05) | Non-Native Aquatic Plants | Category 4C |
| Seekonk River | | |
| (RI0007019E-01) | Nitrogen (Total), Dissolved Oxygen, Fecal Coliform | Category 5 |
| Upper Narragansett Bay | | |
| (RI0007024E-01) | Nitrogen (Total), Dissolved Oxygen, Fecal Coliform | Category 5 |
| West River | | |
| (RI0003008R-03A & RI0003008R-03B) | Enterococcus | Category 4A |
| (RI0003008R-03B & RI0003008R-03B) | Benthic-Macroinvertebrate Bioassessments | Category 5 |
| Woonasquatucket River | | |
| (RI0002007R-10A) | Zinc | Category 4A |
| (RI0002007R-10B & RI0002007R-10C) | Fecal Coliform | Category 4A |
| (RI0002007R-10D) | Copper, Lead, Zinc | Category 4A |
| (RI0002007R-10B, RI0002007R-10C & RI0002007R-10D) | Non-Native Aquatic Plants | Category 4C |
| (RI0002007R-10A) | Enterococcus | Category 5 |
| (RI0002007R-10B) | Mercury, Non-Native Aquatic Plants | Category 5 |
| (RI0002007R-10C) | Dioxin (including 2,3,7,8-TCDD), Mercury, Non-Native Aquatic Plants, Dissolved Oxygen, Polychlorinated biphenyls | Category 5 |

Source: RIDEM 303(d) List of Impaired Waters

- Category 1 Waterbody meets all water quality standards for all designated uses.
- Category 2 Waterbody attains some uses; insufficient data available to assess other uses.
- Category 3 Insufficient data available to assess any uses.
- Category 4A Impaired or threatened and a TMDL has been completed.
- Category 4C Impairment not caused by a pollutant (e.g. aquatic invasive species).
- Category 5 Impaired or threatened for one or more uses and requires a TMDL.



Legend

Municipalities

Categories - Water Body Segments

- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A - Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL is required
- Not categorized

City of Providence, Rhode Island



Figure 1.1 - Impaired Waters

Stormwater Management Program Plan

Spring 2020

0 1,500 3,000 6,000 Feet

1 inch = 3,500 feet



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Wetlands

Approximately 93 acres of the City are classified as wetland areas. These wetlands cover approximately 1% of the City’s land area depicted on **Figure 1.2-Wetlands**. These wetland areas are generally located along river courses and ponds.

State Licensed Beaches

There is no state licensed bathing beach in the City of Providence.

Rare Species Habitat

It is important to note where stormwater discharges are likely to impact habitats containing sensitive species. Information pertaining to threatened and endangered species was collected via coordination with Paul Jordan, Supervising GIS Specialist, at RIDEM.

Natural Heritage Areas

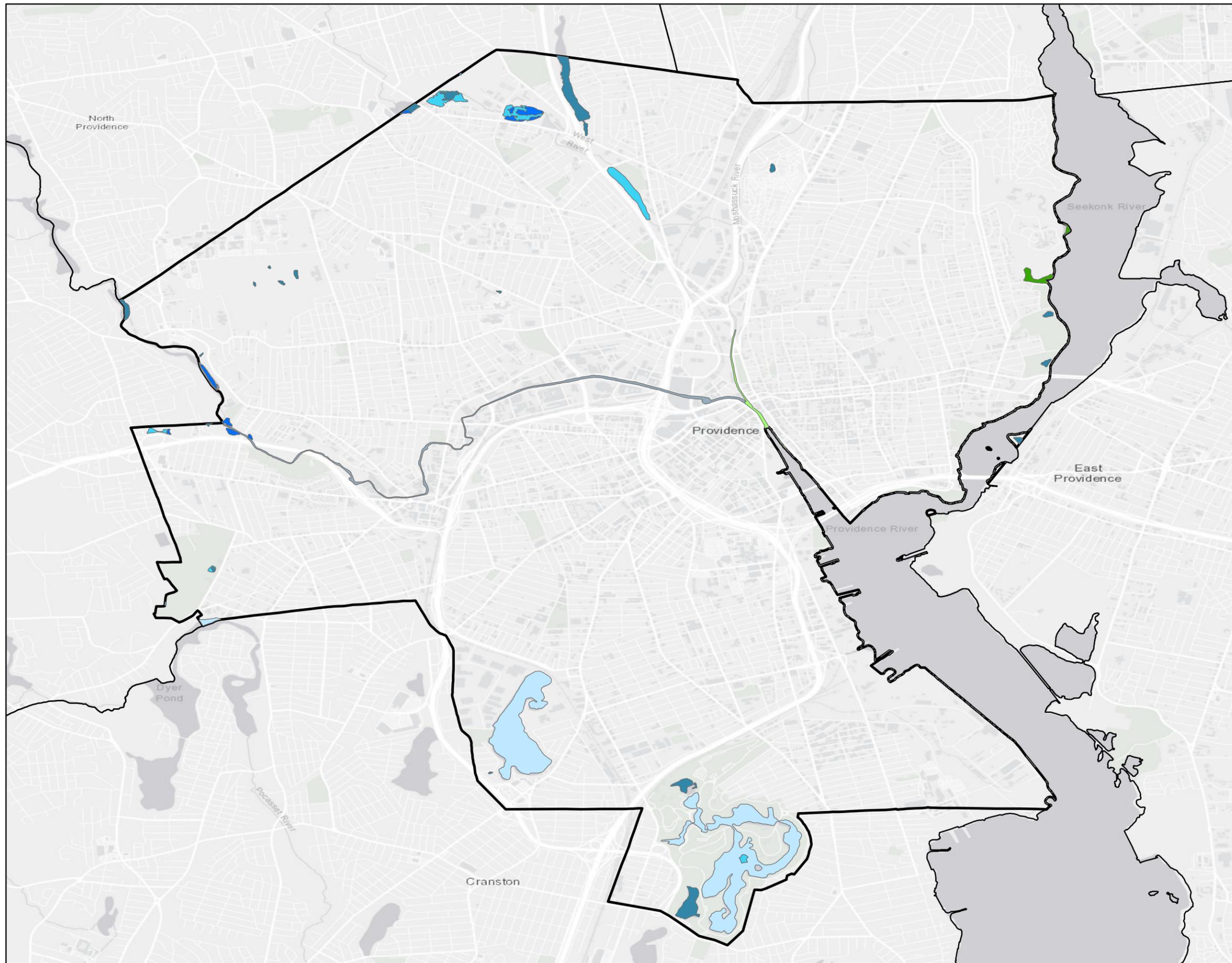
Natural Heritage Areas are identified by RIDEM within the RIGIS database. These areas are regulated under the RIPDES permit with respect to stormwater and allowable non-stormwater discharges during construction that may potentially affect a listed or proposed to be listed endangered or threatened species or critical habitat. There are five Natural Heritage Areas located within the City of Providence.

The listed species and their current Natural Heritage status are summarized in **Table 1.2** below. See **Figure 1.3-Natural Resources** for the natural resources within the City of Providence.

TABLE 1.2 - RARE/ENDANGERED SPECIES

| Species | Status |
|--|---|
| Peregrine Falcon (<i>Falco peregrinus</i>) | State Endangered and Federally Threatened |
| Northern Long-eared Bat (<i>Myotis septentrionalis</i>) | Threatened |
| Common Night Hawk (<i>Chordeiles minor</i>) | Concern |
| Honewort or Wild Chervil (<i>Cryptotaenia canadensis</i>) | Special Concern |
| Purple, Waxy, or Skunk Meadow-rue (<i>Thalictrum revolutum</i>) | State Endangered |
| American Pennyroyal or Pudding-grass (<i>Hedeoma pulegioies</i>) | Special Concern |
| Whorled Milkweed (<i>Asclepias verticillata</i>) | Special Concern |
| Salt Reedgrass or Big Cordgrass (<i>Spartina cynosuroides</i>) | Special Concern |

Source: RIDEM



Legend

-  Municipalities
- Wetland Type**
-  Estuarine and Marine Deepwater
-  Estuarine and Marine Wetland
-  Freshwater Emergent Wetland
-  Freshwater Forested/Shrub
-  Freshwater Pond
-  Lake
-  Riverine

City of Providence, Rhode Island



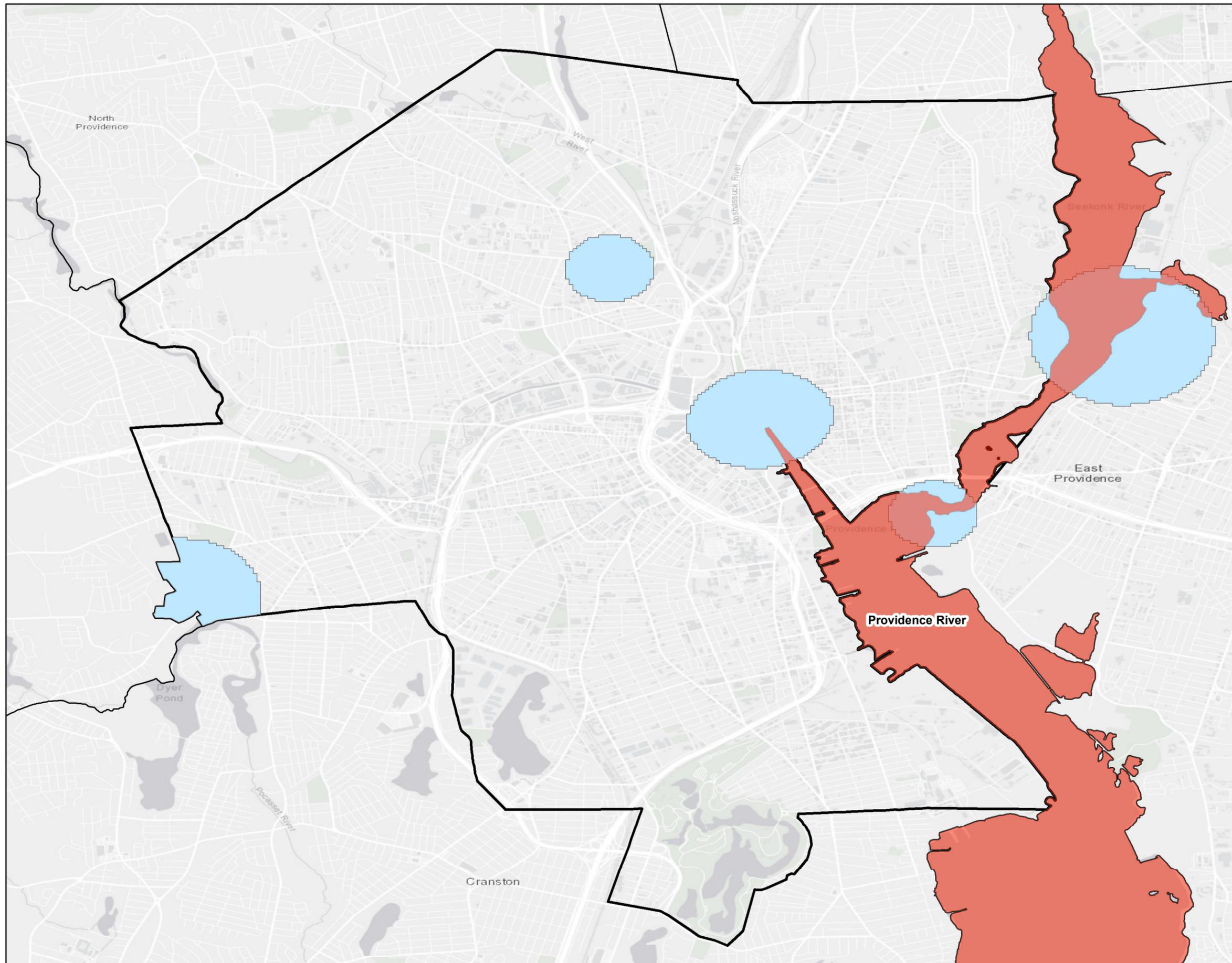
Figure 1.2 - Wetlands
 Stormwater Management Program Plan
 Spring 2020

0 1,500 3,000 6,000 Feet

1 inch = 3,500 feet



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Legend

- Municipalities
- Natural Heritage Areas
- Shellfish Harvest Restrictions**
- Approved
- Conditional Closure
- Not Assessed - Shellfishing Prohibited
- Seasonal Closure
- Shellfishing Prohibited

City of Providence, Rhode Island



Figure 1.3 - Natural Resources

Stormwater Management Program Plan

Spring 2020

0 1,500 3,000 6,000 Feet

1 inch = 3,500 feet



Land Use

Land use directly affects the potential for stormwater pollution and the types of pollutants found in stormwater. Different land uses expose different pollutants to stormwater. For example, residential land uses often result in higher nutrient (nitrogen and phosphorous) concentrations in runoff due to the use of fertilizers while metals concentrations are often higher in runoff from commercial areas due to traffic.

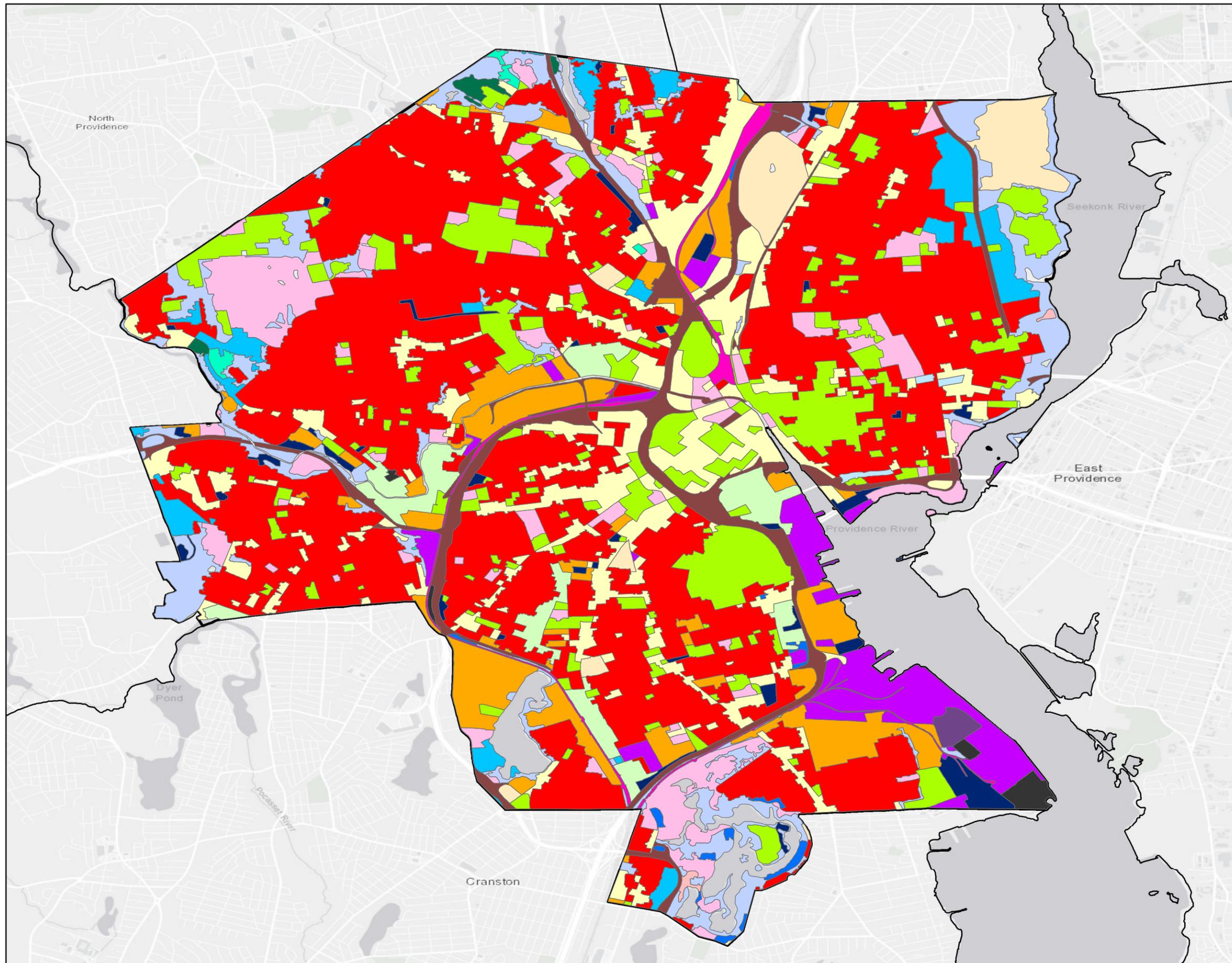
Based on Rhode Island Geographic Information Systems (RIGIS) mapping, Providence consists almost entirely of high-density residential land uses. Large commercial and industrial developments also exist, including development along Route 95 and the Blackstone and Moshassuck Rivers. Given the location of the developed areas in Providence, in part along impaired waters in the city, there is significant potential for stormwater quality impacts.

In order to design an effective stormwater management plan, it is essential to describe the land uses and percentages thereof, for the land uses in the city. **Table 1.3** and **Figure 1.4-Land Use** identifies the land uses in Providence based on data available from RIGIS.

TABLE 1.3 - LAND USE

| Land Use | Acreage | Percent of Total Land |
|---------------------------------|---------|-----------------------|
| Brushland | 12.1 | 0.06 |
| Cemeteries | 332 | 1.60 |
| Commercial | 1331 | 6.39 |
| Commercial/Residential Mixed | 320 | 1.54 |
| Deciduous Forest | 932 | 4.48 |
| Developed Recreation | 743 | 3.57 |
| High Density Residential | 7812 | 37.5 |
| Industrial | 892 | 4.28 |
| Institutional | 1217 | 5.85 |
| Medium Density Residential | 23.1 | 0.11 |
| Medium High Density Residential | 1988 | 9.54 |
| Mixed Forest | 34.5 | 0.17 |
| Other Transportation | 417 | 2.00 |
| Railroads | 176 | 0.85 |
| Roads | 3978 | 19.1 |
| Transitional Areas (urban open) | 29.4 | 0.14 |
| Vacant Land | 235 | 1.13 |
| Waste Disposal | 51.2 | 0.25 |
| Water | 266 | 1.28 |
| Water and Sewage Treatment | 26.8 | 0.13 |
| Wetlands | 12.4 | 0.06 |
| TOTAL | 5,661 | 100% |

Source: RIGIS



Legend

□ Municipalities

Land Use

- | | |
|------------------------------|---------------------------------|
| Brushland | Medium Density Residential |
| Cemeteries | Medium High Density Residential |
| Commercial | Mixed Forest |
| Commercial/Industrial Mixed | Other Transportation |
| Commercial/Residential Mixed | Railroads |
| Deciduous Forest | Roads |
| Developed Recreation | Transitional Areas |
| High Density Residential | Vacant Land |
| Industrial | Waste Disposal |
| Institutional | Water & Sewage Treatment |

City of Providence, Rhode Island



Figure 1.4 - Land Use

Stormwater Management Program Plan

Spring 2020

0 1,500 3,000 6,000 Feet

1 inch = 3,500 feet



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Section 2 – Minimum Control Measures

MCM 1 – Public Education and Outreach

The objective of MCM 1 – Public Education and Outreach included in IV.B.1 of the Permit is to implement a public education and outreach program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on local water bodies and the steps that can be taken to reduce stormwater pollution. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that the pollutants in stormwater are reduced. Additionally, public education will improve the City's ability to gain support to implement this program as well as secure required funding. **Table 2-1** summarizes the BMPs proposed for MCM 1.

The effectiveness of the BMP's identified for MCM 1 shall be evaluated and reported on an annual basis. The effectiveness of BMP's shall be tracked and adjusted to optimize performance. Measurable metrics shall be developed for each BMP utilizing the measurable goal(s).

Table 2-1: MCM 1 Summary of BMPs

| BMP | Description | Target Audience | Responsible Department | MCM Date |
|-----|--|--------------------------|---|----------|
| 1-1 | Stormwater Awareness Social Media Campaign | Residential | DPW, Sustainability, Parks & Recreation | Annually |
| 1-2 | Stormwater Website | Residential & Commercial | DPW, Parks and Sustainability | Annually |
| 1-3 | Strategies to Inform the Public | Residential | DPW | Annually |
| 1-4 | Partnerships | Commercial & Industrial | DPW, Parks and Sustainability | Annually |

The following describes each BMP and defines the measurable goal for each BMP for MCM 1.

BMP 1-1: Stormwater Awareness Social Media Campaign

Description:

The City will include a minimum of one social media push annually about general stormwater awareness in the City. Social Media examples include Twitter, Facebook, etc. Posts will include simple language with the basic information necessary for residents to determine how to prevent stormwater pollution and the importance of citizen involvement. Examples of social media posts are included in **Appendix C**. Messages should encourage proper pet and solid waste management, proper lawn and good housekeeping practices, and discouraging litter and debris disposal.

Measurable Goals: Number of social media hits received on each post

BMP 1-2: Stormwater Website

Description:

Includes link to materials such as the RI Stormwater Solutions, Rhode Island Department of Environmental Management and the Rhode Island Department of Transportation Stormwater pages. Link to other important City and State pages will be included. Specific issues will be highlighted on this page, including examples of activities that City residents may follow. Messages should encourage proper pet and solid waste management, proper lawn and good housekeeping practices, and discouraging litter and debris disposal.

Measurable Goal(s): Number of hits on the website.

BMP 1-3: Strategies to Inform the Public

Description:

Annually review the City's public education and outreach strategies and amend/develop strategies to inform the public (visitors, employees, residents) on how to become involved in the stormwater program. Develop strategies for topics and media to be used. Available teaching resources are included in **Appendix E**.

Measurable Goals: Strategy decided, information packaged for chosen media(s), and distributed to the public

BMP 1-4: Partnerships

Description:

Develop strategies to utilize partnerships with other governmental and non-governmental entities. One existing partnership that will continue is with the Providence Stormwater Innovation Center (website: <https://www.stormwaterinnovation.org/>). The City will continue to partner with the Stormwater Innovation Center to provide public outreach and education opportunities such as: stormwater trainings, stormwater BMP monitoring, and installation of stormwater BMPs throughout Roger Williams Park and other sites within the City. Other potential partnerships and relevant programs are included in **Appendix D**.

Measurable Goal: Meetings held with other community groups (governmental and non-governmental) to develop and implement strategies

MCM 2 – Public Involvement and Participation

The objective of MCM 2 – Public Involvement and Participation will provide the City the opportunities to engage the public to participate in the review and implementation of the SWMP.

Table 2-2 summarizes the BMPs proposed for MCM 2.

Table 2-2: MCM 2 Summary of BMPs

| BMP | Description | Target Audience | Responsible Department | MCM Date |
|-----|---|-----------------|---|----------|
| 2-1 | Public Review of the Stormwater Management Program | Residential | DPW, Sustainability, Parks & Recreation | Annually |
| 2-2 | Public Participation in Stormwater Management Program | Residential | DPW, Sustainability, Parks & Recreation | Year 1 |
| 2-3 | Storm Drain Marking | Residential | DPW | Annually |
| 2-4 | Stormwater Committee | Stakeholders | DPW | Annually |
| 2-5 | City Cleanup | Residential | City Council and DPW | Annually |
| 2-6 | 311 Hotline | Residential | Mayors Center for City Services and DPW | Annually |
| 2-7 | Rain Barrel Program | Residential | Sustainability and DPW | Annually |

The following describes each BMP and defines the measurable goal for each BMP for MCM 2.

BMP 2-1: Public Review of Stormwater Management Program

Description:

The Stormwater Management Program will be publicly available on the City website for review prior to submission to RIDEM. A public hearing, if requested, will be conducted on the program to allow citizens an opportunity to provide input on the program that is ultimately implemented by the City.

Measurable Goal: SWMPP available for review, City to solicit and incorporate feedback from the public annually

BMP 2-2: Public Participation in Stormwater Management Program

Description:

The public and community groups will be notified for involvement in the stormwater program. The City's Office of Sustainability will work with the public with respect to public participation by existing volunteer programs that are offered by local and regional groups. Potential groups are included in **Appendix D**. The Stormwater Coordinator will post electronic copies of the Annual Reports and the SWMPP on the City's stormwater website.

Measurable Goals: Annual coordination with the Office of Sustainability and the Parks Department with respect to public participation in stormwater activities. The number of hits and views of the stormwater documents on the City's website.

BMP 2-3: Storm Drain Marking

Description:

Develop a storm drain marking program. Markers will be made on catch basins with "Don't Dump" messages, including stenciling, stickers, spray painting, murals, etc. Markers will be prioritized for catch basins that discharge to impaired watersheds, including the Woonasquatucket River, Moshassuck River, Mashapaug Pond, and West River. Scouts, students, businesses, and residents will be contacted for assistance. This can be completed in conjunction with BMP 6-3: Catch Basin Cleaning.

Measurable Goal(s)

Held in the Spring. Program developed, volunteers organized, number of basins marked.

BMP 2-4: Stormwater Committee

Description:

Develop a stormwater committee comprised of City Department representatives to evaluate and implement the plan addressing the public education/outreach component (MCM 1 and MCM 2) of the program. This committee could assist the City with recruiting and coordinating resources, like Save the Bay, to implement recommended measures. The committee must meet a minimum of once per year and will coordinate with the City's Environmental Sustainability Task Force. Members can include representatives from other departments, including Parks and Recreation, Planning, Sustainability, and Inspections and Standards.

Measurable Goal: Committee developed and maintained.

BMP 2-5: City Cleanup

Description:

Sponsor or co-sponsor and support cleanup projects throughout the City. Cleanups will provide an opportunity for volunteers and residents to assist in the prevention of unwanted materials entering the storm drainage system and ultimately local waterbodies.

Measurable Goal(s) Program developed; volunteers organized; amount of materials retrieved during the cleanup.

BMP 2-6: 311 Hotline System and Website Application

Description:

The City utilizes a 311 phone number and web application to allow residents to report any issues. The public will be able to use this existing hotline to report problems and violations regarding stormwater management. This includes washing of dumpsters that discharges to storm drains.

Measurable goal(s): Number of reports.

BMP 2-7: Rain Barrel Program

Description:

The Office of Sustainability partners with the Woonasquatucket River Watershed Council to host a Rain Barrel Workshop as part of the SustainPVD Fair. Information will be provided to consumer on how to install and maintain it.

Measurable goal(s): Number of rain barrels distributed.

MCM 3 – Illicit Discharge Detection and Elimination (IDDE) Program

The objective of MCM 3 is to implement a formal and prioritized IDDE program in accordance with Permit Part 2.3.4 and best practices to systematically find and eliminate illicit sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges.

Table 2-3 summarizes the BMPs proposed for MCM 3.

Table 2-3: MCM 3 Summary of BMPs

| BMP | Description | BMP Completion Status | Responsible Department | MCM Date |
|-----|---|----------------------------|------------------------|-----------|
| 3-1 | Map of Storm Sewer System | Outfall mapping - complete | DPW | Year 2 |
| | | GIS System mapping | | Year 10 |
| 3-2 | IDDE Legal Authority | Complete | DPW | Year 1 |
| 3-3 | IDDE Program | IDDE Plan - complete | DPW | 2017 (CA) |
| | | IDDE investigations | | Ongoing |
| 3-4 | Dry Weather Outfall Screening | Complete | DPW | Year 3 |
| 3-5 | Illicit Discharge Reporting and Documentation | Ongoing | DPW | Annually |
| 3-6 | IDDE Public Education and Training | Ongoing | DPW | Annually |

The following describes the BMPs proposed to address compliance with MCM 3 and the measurable goals associated with each BMP.

BMP 3-1: Map of Storm Sewer System

Description:

The City has mapped their stormwater outfalls and the majority of their stormwater system to the maximum extent practicable to satisfy the MS4 Permit requirement. The City has compiled a map of existing storm sewer outfalls in Providence based on existing municipal mapping and its ongoing geographic information system (GIS) project. This program included the following elements:

- Reviewed existing municipal records, drainage mapping, aerial photography, orthophotos, the City’s GIS system, and field surveys to identify known outfall locations. This information was supplemented with municipal DPW staff knowledge to identify outfall locations. The locations were inputted into the GIS data base in order to provide locations for the outfall inspections.
- During outfall inspections, the outfalls were located by geographic positioning system (GPS). The location was recorded in a GIS format in order to develop a Stormwater Outfall data layer.

- During outfall inspections, additional elements (size, material, condition, photos, etc.) were recorded on an on-going basis. These elements should be recorded during maintenance of drainage structures, dry weather surveys, and installation of new storm drains.

Measurable Goals: Outfalls, receiving waters open channels, conveyances, municipal owned stormwater treatment structures, identification of impairments and initial catchment delineations were mapped within 2 years of the permit's effective date. Outfall spatial locations, pipes, manholes, catch basins, refined catchment delineations, municipal sanitary sewer system, and municipal combined sewer system will be mapped within 10 years of the permit's effective date.

BMP 3-2: IDDE Legal Authority

Description:

The City currently has a municipal ordinance that prohibits non-stormwater discharges to watercourses or the City's MS4. Following a review of the City's existing ordinances, the following sections of the City's ordinances have been identified as regulating or otherwise controlling unauthorized discharges to the City's MS4 and regulated water bodies.

§ 25-73 Building and Sewer Connections

Part A of this section requires that all sewer work must be done only after obtaining appropriate permits from the City. Part D of this section lists the application requirements for permits to perform work on sewers within the City limits as well as costs for the permits and inspections.

§ 25-74 Construction Requirements for Public Sewers and Drains

Part A (1) of this section requires that wastewater from a property connecting to a sewer shall not be discharged through groundwater to receiving waters.

§ 25-75 Use of Public Sewers

Part A (2) requires that all unpolluted waters must be discharged to drains specifically designated as storm drains or combined sewers. And that any industrial cooling water may only be discharged only after all reasonable attempts have been taken to reduce the temperature and any pollutants associated with the water. Part B requires that all commercial or industrial businesses discharging to a storm drain must apply for a permit from the RIDEM and the USEPA. All applications must be in conformance with NPDES requirements.

§ 25-79 Certain Persons Authorized to Construct and Repair Sewers and Drains

Part D of this section requires that only authorized persons may be permitted to construct sewers to ensure compliance with the other sections of this article. Part F of this section lists all authorized persons.

§ 25-80 Offenses Enumerated

Part D of this section requires that if any sewer repair, construction or connection is performed in violation of any of the sewer related ordinances, the director may order those who performed the work to uncover any pipes to afford the director an opportunity to inspect the work.

§ 12-57 Littering

Part A of this section requires that no person may dump, deposit, drop, throw, or leave any litter on public or private property in the City including any body of water.

§ 12-80 Penalties for Littering Violations

This section lists the fines required for different littering offences.

The City Ordinance, *Sec. 25-83 – Illicit Discharge Detection and Elimination* is provided as **Appendix F**.

Measurable Goal: Adoption and enforcement of City Ordinances

BMP 3-3: IDDE Program

Description:

A prioritized IDDE program will be implemented and enforced across the City where required. Priority watersheds such as the Mashapaug Pond, Mosshasuck River, Roger Williams Park Ponds, Woonasquatucket River, and West River will be given precedence due to the pathogen impairments for these waters. Complaints associated with illicit discharges will be directed to the DPW to be logged and appropriate actions taken. Suspected illicit connections will be investigated so that the source is identified and scheduled for removal. Enforcement actions may involve the Police or RIDEM.

The City's IDDE Plan was developed in 2017 and approved by RIDEM on January 3, 2018. The City is currently implementing the IDDE Plan, investigating priority outfalls, conducting field inspections of drainage systems, identifying illicit connections and removing illegal connections. The IDDE Plan is included as **Appendix G**.

The City initiated their IDDE program in 2017. In accordance with the City's 2017 Consent Agreement (CA), IDDE field investigations were performed in 2018-2019 for the three priority outfalls as specified in the CA: Mosh13, Seek01, and SD6 (also called Mash02) and three additional priority outfalls based on dry weather screening: Mosh06, Woon02 and Woon44. Based on recommendations from the IDDE field investigations at all six outfalls, follow up CCTV investigations were conducted in 2020.

Measurable Goals: Implement and enforce the IDDE program according to the milestones set in the MS4 permit, CA and other regulatory/enforcement documents as required. Record the total number of illicit connections found.

BMP 3-4: Dry Weather Outfall Screening

Description:

All known outfalls and interconnections were inspected for the presence of dry weather flow, in accordance with their initial ranking developed under the Priority Ranking of Outfalls/ Interconnections and written SOPs. Dry weather flow was sampled in accordance with permit requirements and analyzed for the presence of illicit discharges.

The City conducted dry weather inspections in 2007 and 2018. A summary of the dry weather screening program is presented in the “Dry Weather Outfall Sampling Results” Technical Memorandum dated June 27, 2018.

Measurable Goal: Screening was completed in accordance with written procedures and permit conditions. Screening was completed in 2018, within three years of the effective permit start date.

BMP 3-5: Illicit Discharge Reporting and Documentation

Description:

If illicit discharges are detected from other physically interconnected MS4s, the City will report the finding to RIDEM and the owner of the illicit discharge. The City will provide informal correspondence with the municipality if an illicit discharge is expected or found in another municipality. If an illicit discharge is expected or found within the RIDOT system, the City will provide a formal letter describing the illicit connection. For illicit discharges identified from a private source, the City will notify the private owner and work with them to remove the illicit discharge. An interconnection notification process has been established and is included in **Appendix H**.

Measurable Goal: Number of illicit discharges reported to other MS4 owners and RIDEM.

BMP 3-6: IDDE Public Education and Training

Description:

Public education and municipal employee training programs will inform about hazards associated with illegal discharges and improper disposal of waste. This practice will be performed annually and will be reported in the City’s Annual Report. Representatives from the Parks and Recreation, Highway, and Public Works Departments will be required to complete this training. The Parks and Recreation Department currently holds an annual training for illicit discharges. IDDE training materials are included in **Appendix I**.

Measurable Goal: Education materials developed include illicit discharge awareness. Materials developed and employees trained.

MCM 4 – Construction Site Stormwater Runoff Control

Typical construction activities have significant potential to impact surface water quality in the State by creating the potential for sediment, construction materials, waste and other pollutants to be transported to surface waters by wind or stormwater runoff. Part 2.3.5 of the permit requires regulated municipalities to develop, implement, and enforce a program to reduce pollutants in stormwater runoff to MS4s from construction projects that result in a land disturbance of greater than or equal to one acre. Sites smaller than this would still require a permit if the land is part of a plan that alters a total area of greater than one acre, such as a subdivision.

Table 2-4 summarizes the BMPs proposed for MCM 4.

Table 2-4: MCM 4 Summary of BMPs

| BMP | Description | Responsible Department | MCM Date |
|-----|---|---|----------------|
| 4-1 | Sediment and Erosion Control Ordinance | DPW and Policy and Operations | Completed 2017 |
| 4-2 | Permit Tracking Procedures | Building Official | Annually |
| 4-3 | Site Plan Review Procedures | DPW and Department of Inspections and Standards | Ongoing |
| 4-4 | Site Inspections and Enforcement of Sediment and Erosion Control Procedures | Department of Inspections and Standards | Ongoing |
| 4-5 | Public Participation | Department of Inspections and Standards | Annually |

The following describes the BMPs proposed to address compliance with MCM 4 and the measurable goals associated with each BMP.

BMP 4-1: BMP: Sediment and Erosion Control Ordinance

Description:

Develop, introduce, and adopt an ordinance to require sediment and erosion control and control of other wastes at construction sites. The “Rhode Island Soil Erosion and Sediment Control Handbook” (as amended), serves as the minimum standard for the City. The City of Providence developed and adopted a Soil Erosion and Sediment Control Ordinance in 2017. Article VII. Soil Erosion and Sediment Control is presented in **Appendix J**. Requirements for all construction projects are defined in the ordinance.

Measurable Goals: Ordinance developed.

BMP 4-2: Permit Tracking Procedures

Description:

Issue and track permits for all construction projects resulting in land disturbance of greater than 1 acre to ensure compliance with erosion and sediment control ordinance. Current tracking procedures will be reviewed and amended as necessary to comply with this program.

Measurable Goals: Number of permits issued and tracked. Current procedures will be reviewed, improved procedures will be developed and implemented.

BMP 4-3: Site Plan Review Procedures

Description:

Procedures were developed for reviewing plans and Stormwater Pollution Prevention Plans (SWPPP) for construction projects resulting in a land disturbance of 1 to 5 acres based on the MS4 permit and less than 1 acre based on the City requirements. Coordination procedures will be developed and implemented for the site plan and SWPPP review process for developments with land disturbance of greater than 5 acres when SWPPPs are required to be submitted to the State for review and approval of construction activity.

Measurable Goals: Number of plans and SWPPPs reviewed.

BMP 4-4: Site Inspections and Enforcement of Sediment and Erosion Control Procedures

Description:

Written procedures outlining site inspections and enforcement of sediment and erosion control measures will be implemented as part of the Building Inspector's regular site inspection procedures. Construction operators shall be required to implement a sediment and erosion control program and submit periodic self-certifications to the City.

Measurable Goals: The current procedures will be reviewed; the improved procedures will be developed and implemented. Staff trained; number of construction site inspections and number of occurrences per site. Procedure developed; number of non-compliant construction sites referred to RIDEM.

BMP 4-5: Public Participation

Description:

Public comment and information regarding new development projects and construction runoff-related impacts will be directed to the Building Department where these complaints will be logged. The Building Department will review these complaints upon receipt and determine the appropriate action to take. Develop procedures for receipt and consideration of information submitted by the public.

Measurable Goal: Procedure developed. Number of complaints logged and responded to.

MCM 5 – Post Construction Stormwater Management in New Development and Redevelopment

The RIPDES’s Phase II Stormwater management regulations require regulated municipalities to develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb one acre or more of land and discharge into the municipality’s MS4. Section 2.3.6 of the permit requires permittees to develop a program to ensure that controls are in place that would prevent or minimize water quality impacts.

Table 2-5 summarizes the BMPs proposed for MCM 5.

Table 2-5: MCM 5 Summary of BMPs

| BMP | Description | Responsible Department | MCM Date |
|-----|--|---|----------|
| 5-1 | Post Construction Ordinance | DPW and City Council | Complete |
| 5-2 | Site Plan Review | DPW and Department of Inspections and Standards | Ongoing |
| 5-3 | Low Impact Development (LID) Redevelopment Opportunities | DPW, Department of Planning and Development | Ongoing |
| 5-4 | Site Inspections | Department of Inspections and Standards | Ongoing |
| 5-5 | Post-Construction Ordinance – Operations & Maintenance | DPW | Ongoing |
| 5-6 | As-Built Plans | DPW, Department of Planning and Development | Ongoing |

The following describes the BMPs proposed to address compliance with MCM 5 and the measurable goals associated with each BMP.

BMP 5-1: Post-Construction Ordinance

Description:

Develop, introduce, and adopt an ordinance to address post construction runoff from new development and redevelopment projects. The City’s Post-Construction Stormwater Control Ordinance will require BMP designs based upon the *Rhode Island Stormwater Design and Installation Standards Manual* (as amended).

The City developed and adopted a post-construction ordinance in 2017. **Appendix K** provides a copy of the City’s Article VI. – Post-Construction Stormwater Control Ordinance.

Measurable Goal: Ordinance developed.

BMP 5-2: Site Plan Review

Description:

Procedures for pre-application meetings and site plan review will be developed. Review 100% of plans and SWPPPs for development projects resulting in land disturbance greater than 20,000 square feet. Procedures will be developed for coordination of local and State post-construction stormwater management reviews. Violations may be issued for non-compliance with the terms of

the approved plans or any action related to the sale of land in an unapproved subdivision or land development project. Procedures will be consistent with the *State of Rhode Island Stormwater Design and Installation Manual* (as amended).

Measurable Goal: Procedures developed; number of plans and SWPPPs reviewed.

BMP 5-3: Low Impact Development (LID) Redevelopment Opportunities

Description:

The City shall identify opportunities for redevelopment that include LID measures in order to direct growth, improve water quality and protect sensitive areas. Non-structural BMPs and LID measures shall be considered as part of redevelopment projects. The City's 2014 revised Zoning Ordinance includes parking minimums and elimination of lots in specific areas in order to decrease impervious area and encourage LID projects. The revised Zoning Ordinance also requires redevelopment of parking lots to include a pervious planting strip and other stormwater quality requirements to reduce stormwater runoff.

Measurable Goal: LID projects.

BMP 5-4: Site Inspections

Description:

The Department of Inspections and Standards will periodically inspect construction sites after final stabilization. Inspections will be performed by the Building Inspector as a part of his regular inspection and maintenance duties. The Department of Inspections and Standards will prioritize sites of concern and include those sites in periodic inspections to ensure proper maintenance of implemented BMPs. As part of this, the City could require specified projects to submit annual maintenance records. Consider development of an electronic database to track BMP maintenance, complaints and inspections.

Measurable Goal: Number of construction sites inspected.

BMP 5-5: Post-Construction Ordinance – Operation & Maintenance (O&M)

Description:

The ordinance developed under BMP 5-1 includes post construction O&M inspection and record keeping requirements (See **Appendix K**) related to enforcement of long-term O&M of post-construction runoff controls. DPW shall track O&M activities required by others as part of the site development process (developers, condominium organizations, etc.) and conduct O&M activities required by the City.

Measurable Goal: O&M Plans submitted, activities by others and City inspections conducted.

BMP 5-6: As-Built Plans

Description:

As-built plans will be submitted to the City following the end of construction. As-built plans will state deviation from the construction plans or lack thereof.

Measurable Goal: Number of plans received.

MCM 6 –Pollution Prevention and Good Housekeeping in Municipal Operations

The goal of pollution prevention and good housekeeping is to minimize the pollutants that enter the MS4 prior to being discharged to surface waters of the state from municipally owned streets, parking lots, and facilities such as vehicle/fleet maintenance garages. This permit requirement (Part 2.3.7) largely consists of properly maintaining existing infrastructure such as roads and drainage structures as well as implementing appropriate pollution control practices at municipal facilities.

Table 2-6 summarizes the BMPs proposed for MCM 6.

Table 2-6: MCM 6 Summary of BMPs

| BMP | Description | Responsible Department | MCM Date |
|-----|--|---|----------|
| 6-1 | BMP Inventory | DPW and Parks | Year 5 |
| 6-2 | Structural BMP O&M Procedures | DPW and Parks | Year 5 |
| 6-3 | Catch Basin Cleaning Program | DPW | Ongoing |
| 6-4 | Street Sweeping Program | DPW | Ongoing |
| 6-5 | Floatables Reduction Program | DPW | Ongoing |
| 6-6 | Stormwater Awareness Training | DPW, Sustainability, Parks and Planning/Development | Annually |
| 6-7 | Hazardous Materials Handling and Storage | DPW, Sustainability, Parks and Planning/Development | Annually |
| 6-8 | Geese Management Program | Parks | Ongoing |

The following describes the BMPs proposed to address compliance with MCM 6 and the measurable goals associated with each BMP.

BMP 6-1: BMP Inventory

Description:

Identify and list locations and description of all structural BMPs owned or operated by the City. This inventory includes the BMPs installed at Roger Williams Park as part of the Consent Agreement requirements.

Measurable Goal: Number of structures identified.

BMP 6-2: Structural BMP Operations and Maintenance Procedures

Description:

Formalize procedures for inspections, cleaning, and repair of detention/retention basins, storm sewers, catch basins and other stormwater BMPs. The City's Parks Department currently uses Green Cities and Survey123 to manage and track O&M activities of their stormwater BMP's.

Measurable Goals: Identify the structures tributary to the system. Conduct a catch basin sediment accumulation pilot program. Establish a routine inspection and maintenance program. Maintain records of inspections conducted, number of structures cleaned, approximate volume of material collected.

BMP 6-3: Catch Basin Cleaning Program

Description:

Formalize current catch basin inspection and cleaning program. DPW trucks will be equipped with a tracking system to track catch basins that have been cleaned and record problem structures. During the first year of the permit, inspect all MS4 regulated catch basins and treatment structures to document the location and physical condition. All MS4 regulated catch basins will be inspected annually and cleaned as necessary unless documentation supporting a different frequency of cleaning is submitted to RIDEM as part of the Annual Report. Maintain records, including the amount of sediment and debris removed, of all cleaning and inspections for the City's storm sewer system to allow easy reference by street and to identify potential problem areas.

Storm drain outfalls and catch basins are not typically inspected for erosion nor do they receive preventive maintenance. The Sewer Department corrects problems as they are reported either by residents or by the crew cleaning the catch basin.

Measurable Goals: Formalized existing program; number of catch basins inspected and cleaned.

BMP 6-4: Street Sweeping Program

Description:

Formalize current street sweeping program. The City will continue to sweep all roads and streets once per year and priority catchment areas more frequently. Areas that conduct events will be able to request extra sweeping if necessary. DPW staff will report work on paper forms and manually enter into GIS to track work performed and record problem areas. DPW staff will observe road shoulders during road work projects. If erosion or pavement deficiencies are observed, the crew will record it. DPW will then schedule repairs and appropriate methods for stabilization including riprap or vegetative stabilization. Street sweeping maps and schedules to inform residents will be posted on the City social media page, to be performed alongside BMP 1-1: Stormwater Awareness Social Media Campaign.

Measurable Goal: Procedures implemented and developed.

BMP 6-5: Floatables Reduction Program

Description:

Develop program for controls to reduce floatables and other pollutants from the MS4. This program will be based on a review of current catch basin grates and their ability to bypass flows to a curb inlet, as well as observation of outfalls to determine locations with the greatest potential for floatables. Note areas that collect sediment or trash rapidly during sweeping operations as part of the record keeping process. These areas should then be further investigated to determine the source of the pollutants (e.g., erosion, poor waste handling operations, or construction activities). The City currently implements an extensive network of trash and recycling receptacles in City parks and sidewalks and will further utilize these repositories. The City will continue to dispose of wastes removed from the MS4 in accordance with applicable State requirements.

Measurable Goals: Program developed; volume of wastes collected and disposed.

BMP 6-6: Stormwater Awareness Training

Description:

Incorporate stormwater awareness training into existing training for equipment operators and mechanics (Heath & Safety, Right to Know). Modify existing training program for equipment operators to include operation of equipment to prevent pollution, record keeping and proper storage of sweepings.

Measurable Goals: Training completed; educational materials distributed.

BMP 6-7: Hazardous Materials Handling and Storage

Description:

Post prominently displayed emergency action plans in areas where hazardous materials are used or stored in the event of spills or accidents. Provide easily accessible equipment or materials to properly minimize the impacts of spills. Also provide response training and instructions on proper disposal of cleanup waste. Perform annual training and practice drills to reinforce proper emergency action and to determine weaknesses in current operations or to develop new BMPs. Conduct a detailed inspection annually of the City's maintenance garages to identify proper connection to the sewage system, potential pollution sources and take appropriate action to address the problem. Training materials are provided in **Appendix H**.

Measurable Goals: Training completed; inspections completed.

BMP 6-8: Geese Management Program

Description:

Maintenance of the geese population within the City's parks is an important program that helps decrease the potential water quality impacts from geese. The City's Parks Department currently performs geese management activities such as: egg adding, enhancement of shoreline plantings and geese population control. This program shall be continued to maintain a healthy geese population within the City's parks.

Measurable Goals: Monitoring of the geese population.

Section 3 – Total Maximum Daily Loads (TMDL) and Water Quality Limited Waters

The Rhode Island 303(d) List of Impaired Waters Final 2016 Report identified impairments within the City’s receiving waters. The impairments to be addressed include Bacteria/Pathogens, Phosphorus, Dissolved Oxygen, and Dissolved Metals. **Figure 1.1 Impaired Waters** shows the water bodies within the city with impairments and **Figure 3.1-TMDL Zoning** shows the waterbodies and their TMDL designations. The statewide TMDLs include bacteria and pathogens. Not all impaired receiving waters have a TMDL developed. It should be noted that recommendations within each TMDL are not currently part of the MS4 Permit requirements.

The MS4 Permit has additional requirements for stormwater discharges to impaired waterbodies based on the Rhode Island 303(d) List of Impaired Waters. The following sections summarize the currently planned actions to be taken to address compliance with the MS4 Permit.

Bacteria/Pathogens Impairment

The Roger Williams Park Ponds (RI00006017L-05), Mashapaug Pond (RI00006017L-06), and West River (RI0003008R-03B)¹ are covered in the *2011 Rhode Island Statewide TMDL for Bacteria Impaired Waters*. The Woonasquatucket River is covered in the *2007 Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals TMDL*.

Annual Requirements

Outfall Priority Ranking

Rank outfalls to impaired receiving waters as high priority for prioritization of implementation of the IDDE Program:

- The Assessment and Priority Ranking of Outfalls/Interconnections was completed under the IDDE program (BMP 3-4) and included this criterion.

Public Education and Outreach

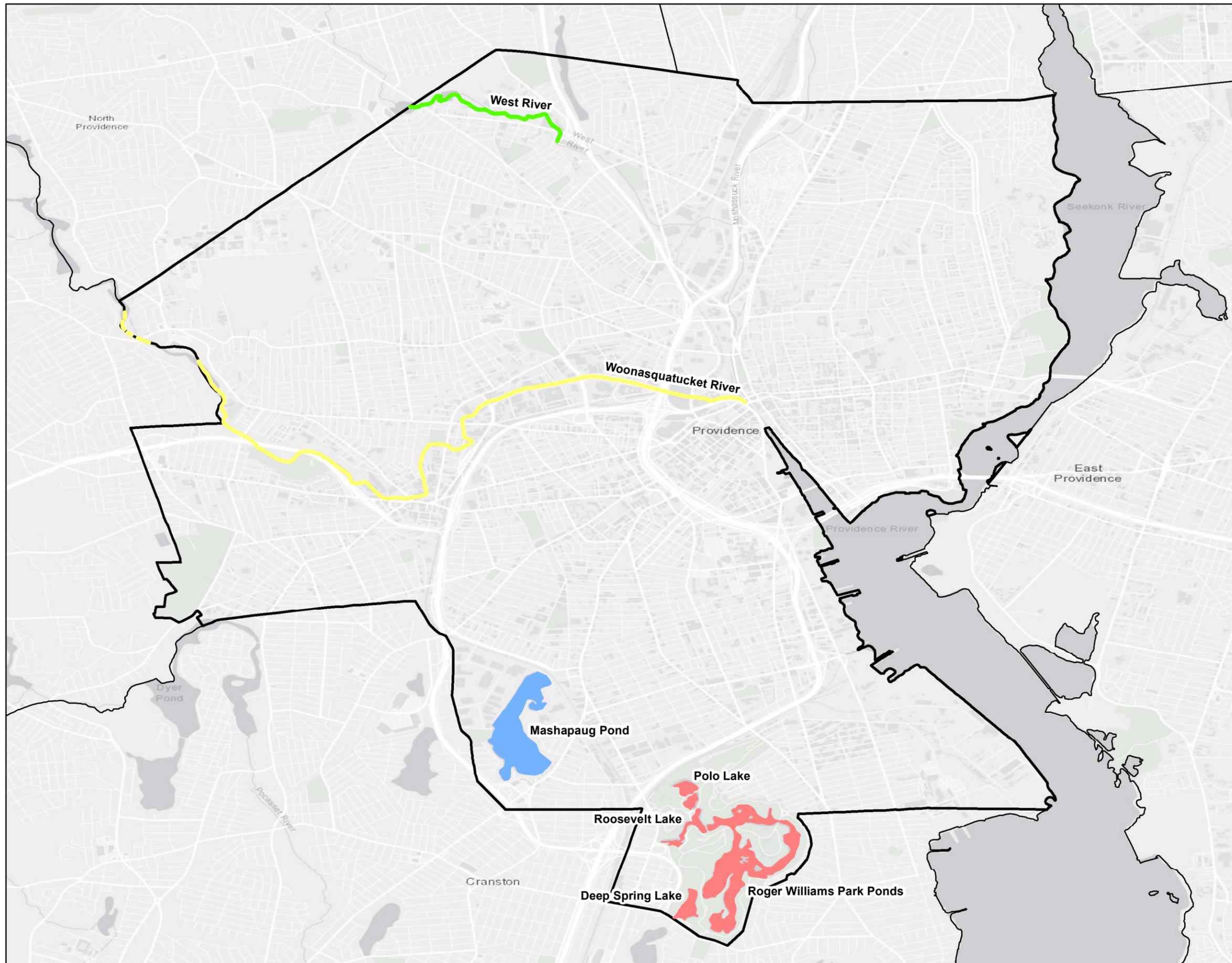
Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate:

- An annual message encouraging the proper management of pet waste (BMP 1-1 and BMP 1-2) will be implemented.

Phosphorus Impairment

The Roger Williams Park Ponds (RI0006017L-05) are covered in the *2007 TMDL for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island*. Mashapaug Pond (RI0006017L-06) is covered in the *2007 TMDL for Dissolved Oxygen and Phosphorus*.

¹Note only a portion of the West River is covered in the *2011 Rhode Island Statewide TMDL for Bacteria Impaired Waters*



Legend

- Municipalities
- TMDL for Bacteria & Dissolved Metals
- TMDL for Bacteria
- TMDL for Bacteria, Phosphorus & Dissolved Oxygen
- TMDL for Bacteria & Phosphorus

City of Providence, Rhode Island



Figure 3.1 - TMDL Zoning

Stormwater Management Program Plan

Spring 2020

0 1,500 3,000 6,000 Feet

1 inch = 3,500 feet



**CDM
Smith**

Annual Requirements

Public Education and Outreach

Annual message encouraging proper waterfowl waste management.

- An annual message encouraging the proper management of waste (BMP 1-1 and BMP 1-2) will be implemented.

Outfall Priority Ranking

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking:

- The Assessment and Priority Ranking of Outfalls/Interconnections completed under the IDDE program (BMP 3-4) includes this criterion.

New Land Development and Redevelopment Operations

Land development and redevelopment projects must employ stormwater controls to prevent net increase in pollutants:

- New development and redevelopment projects will be closely monitored during and after construction per MCM 4 and MCM 5.

Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Increase street sweeping frequency of all municipal owned streets and parking lots (primarily within the MS4, secondary in the combined system) to a schedule to target areas with potential for high pollutant loads:

- Street sweeping (BMP 6-4) will be performed on all municipal-owned street and parking lots a minimum of once per year.

Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50% full; clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings:

- Catch basins will be inspected and maintained per BMP 6-3.

Dissolved Oxygen Impairment

Mashapaug Pond (RI0006017L-06) is covered in the *2007 TMDL for Dissolved Oxygen and Phosphorus*.

Annual Requirements

Outfall Priority Ranking

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking:

- The Assessment and Priority Ranking of Outfalls/Interconnections completed under the IDDE program (BMP 3-4) includes this criterion.

New Land Development and Redevelopment Operations

Land development and redevelopment projects must employ stormwater controls to prevent net increase in pollutants:

- New development and redevelopment projects will be closely monitored during and after construction per MCM 4 and MCM 5.

Dissolved Metals Impairment

The Woonasquatucket River is covered in the *2007 Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals TMDL*.

Annual Requirements

Public Education and Outreach

Annual message encouraging proper pet and solid waste management, proper lawn and good housekeeping practices, and discouraging litter and debris disposal.

- An annual message encouraging the proper management of all waste (BMP 1-1 and BMP 1-2) will be implemented.

Outfall Priority Ranking

Rank outfalls to these receiving waters as high priority for IDDE implementation in the initial outfall ranking:

- The Assessment and Priority Ranking of Outfalls/Interconnections completed under the IDDE program (BMP 3-4) includes this criterion.

Stormwater Management in New Development and Redevelopment

Stormwater management systems designed on commercial and industrial land use area draining to the water quality limited waterbody shall incorporate designs that allow for shutdown, isolation and/or containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event:

- The current City's regulatory mechanisms will be updated to include this requirement.

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:

- Street sweeping (BMP 6-4) will be performed on all municipal-owned street a minimum of once per year.

Prioritize inspection and maintenance for catch basins to ensure that no sump shall be more than 50% full; clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings:

- Catch basins will be inspected and maintained per BMP 6-3.

Section 4 – Evaluation and Assessment Reporting

Revisions to the Stormwater Management Program

The City must annually evaluate the compliance of its stormwater management program with the conditions of the general permit. The evaluation must consider the appropriateness of the selected BMPs in efforts towards achieving the defined measurable goals. The stormwater management program and associated plan may be changed in accordance with the following provisions:

Changes adding (but not subtracting or replacing) components, controls or requirements to the Plan may be made at any time upon written notification to RIDEM. Changes replacing an ineffective or infeasible minimum control measure BMP, specifically identified in the SWMPP, with an alternative BMP may be requested and coordinated with RIDEM at any time.

RIDEM may require changes to the Plan as needed to:

- Address impacts on receiving water quality caused or contributed to by discharges from the MS4,
- To include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements, or
- To include such other conditions deemed necessary to comply with the goals and requirements of the Clean Water Act.
- Include a revised scope of work and implementation schedule necessary to comply with the TMDL requirements.

Reporting Requirements

The City is required to comply with specific evaluation/assessment reporting requirements under the Permit. These requirements include:

Assessment of Program

- The status of compliance with permit conditions;
- An assessment of the appropriateness of selected BMPs;
- Progress toward achieving the measurable goals for each minimum control measure;
- Progress towards meeting the requirements for the control of storm water identified in an approved TMDL;

Data Collection

- Results of any information collected and analyzed;

- Newly identified physical interconnections with other small MS4s;

Public Comment

- Date of annual notice and copy of public notice for review of plan;
- Summary of public comments received in the public comment period of the draft annual report and planned responses or changes to the program;

Annual Reporting

The City must submit an annual report that summarizes information regarding stormwater management activities during the previous calendar year and planned activities for the upcoming calendar year. The initial report was due one year from the effective date of the general permit and annually thereafter. RIDEM's RIPDES Storm Water Program provides a report format each year to be utilized by all regulated MS4s. The City will utilize the RIDEM report format as requested and will evaluate their program and submit a report by the RIDEM deadline each year. The annual report form addresses all the required elements listed above.

Record Keeping

All records required by the general permit must be kept for a period of three years. Records include information used in the development of the stormwater management program, any monitoring, copies of reports, and all data used in the development of the notice of intent.

Records need to be submitted to RIDEM only when specifically requested by the permitting authority. The City must make this plan and records relating to the general permit available to the public.

Appendix A

2004 “Phase II Stormwater Management Plan”

Summary

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

This table identifies how the Plan complies with the General Permit (RIR040000) requirements for the six minimum best management practices. While this report identifies many alternatives, the items that the City has committed to are specified in this table.

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|------------------|---|--|---|--|--|
| IV.G.1 | Submit Annual Report to RIDEM | City Council | Annual Report completed | March 10 of every permit year (commencing 2005) | As discussed in Section 10.2 of the SWMPP. |
| 1. | Public Education and Outreach | | | | |
| IV.B.1.b.1 and 5 | Distribute Stormwater Awareness Package (Neighbor to Neighbor) | DPW | Materials complied. Information distributed. Number of packages distributed (distributed with Recycle Bins, copies at City Hall and Library). | Start distributing media by: 3/10/2005 | As discussed in Section 3.4 of the SWMPP. Example educational materials for potential use included in Appendix A . |
| IV.B.1.b.1 and 5 | Distribute stormwater flyer to residents. | DPW | Flyer distributed annually. | Media distributed by: 3/10/2005 | As discussed in Section 3.0 of the SWMPP. Example educational materials for potential use included in Appendix A . |
| IV.B.1.b.1 and 5 | Continue school programs and meet with local school officials annually to identify past activities and upcoming curriculum. | DPW | Annual meeting. | Meeting held by January each permit year | Continue educational programs as discussed in Section 3.2 of the SWMPP. |
| IV.B.1.b.1 and 5 | Make the Stormwater Management Plan available to the General Public | DPW | Make plan available at City Hall and in schools. Consider putting the plan on the City's web site. | A copy of SWMPP and NOI was made available in 2004 | |
| IV.B.1.b.2 | Develop strategies to inform public (visitors, employees, residents) on how to become involved in stormwater program. Develop strategy for topics and media to be used. | DPW | Strategy decided, information packaged for chosen media(s). Information distributed to the public. | Strategy developed by: 3/10/2005 and implemented in following years. | Opportunities are discussed in Section 3.2 of the SWMPP. |
| IV.B.1.b.2 | Develop strategies to utilize partnerships with other governmental and non-governmental entities. | DPW | Meeting(s) held with other community groups (governmental and non-governmental). Strategy developed. | Strategy developed by: 3/10/2005 and implemented in following years | Potential partners discussed in Section 3.2 of the SWMPP. |
| IV.B.1.b.3 | Potential target audiences are described in Section 3.3.2 of the SWMPP. | DPW | List developed. | Developed by: 3/10/2004 and reviewed annually | |
| IV.B.1.b.4 | Potential target pollutant sources are discussed in Section 3.3.3 of the SWMPP. | DPW | List developed. | Developed by 3/10/2004 and reviewed annually | |
| IV.B.1.b.7 | Evaluate the success of this minimum measure. | City Council, DPW | Annual Report completed | March 10th of every permit year (commencing 2005) | As discussed in Section 10.0 of the SWMPP. |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|-------------------------|--|---|---|--|---|
| 2. | Public Participation | | | | |
| IV.B.2.b.1 | SWMPP was developed by stormwater committee that included DPW representatives. Plan was also made available to public comment and public noticed. A public meeting was held during the preparation of the SWMPP. | DPW | SWMPP available for review | The SWMPP was made available to the public for review prior to submission to RIDEM | Copy of Public Notice for the public meeting is available from the DPW Director. |
| IV.B.2.b.2.i | Potential target audiences are described in <u>Section 3.3.2</u> of the SWMPP. | DPW | List developed. | Developed by: 3/10/2004 and reviewed annually. | |
| IV.B.2.b.2.ii | Include public involvement in the City's stormwater program. | DPW | Community groups contacted. Number of public activities. | Review annually | <u>Section 4.2</u> includes current public involvement activities that exist within the City. |
| IV.B.2.b.2.ii | Develop local stormwater committee to continue to develop and implement the Plan. | City Council | Committee developed and maintained. | Developed by 9/10/2004 | |
| IV.B.2.b.2.ii | Conduct annual Stormwater Plan meeting for the public. | DPW | Conduct annual meeting. | Meeting conducted prior to March of every permit year (commencing 2005). | |
| IV.B.2.b.2.ii | Develop storm drain stenciling program. | DPW | Program developed, volunteers organized, basins stenciled. | Organized the program by 2004 and Began stenciling by 2005 | |
| IV.B.2.b.2.ii | Sponsor and support cleanup projects. | DPW | Program developed, volunteers organized, | Organized program by 2004 and Began cleanups by 2005 | |
| IV.B.2.b.2.iii | Provide adequate public notice prior to submitting the annual report. Allow the public to comment and review report. | City Council, DPW | Annual Report made available at a specified community location. Public meeting held annually. | Meeting conducted prior to March of every permit year (commencing 2005). | |
| IV.B.2.b.2.iii | Provide a written summary of responses for all significant comments. | City Council, DPW | Comments reviewed, written response made available to public (if necessary) | As needed | |
| IV.B.2.b.4 | Evaluate the success of this minimum measure. | DPW | Annual Report completed | March of every permit year (commencing 2005). | As discussed in <u>Section 10.0</u> of the SWMPP. |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|------------------|--|--|--|---|---|
| 3 | Illicit Discharge Detection and Elimination | | | | |
| IV.B.3.b.1 | Develop an outfall map including locations of all outfalls (GPS) and names of receiving waters. | DPW | Mapping completed, consider integration of asset management system. Identify names and locations of all receiving waters. | Completed outfall mapping | As discussed in Section 5.2 and Section 5.4 of the SWMPP. |
| IV.B.3.b.2 | Implement outfall tagging program to identify and number outfall pipes (optional if GIS mapping is available for all outfalls in MS4). | DPW | Number of outfalls tagged. Survey of outfalls completed. Number of outfall tags maintained (if installed). | Completed outfall tagging program | As discussed in Section 3.4.1 and Section 5.4 of the SWMPP. |
| IV.B.3.b.3 | Additional elements shall be recorded on an on-going basis. At a minimum, field notes will be made on municipal plat maps to plot the location of additional elements that will also be used to prepare outfall mapping. These additional elements will be recorded during maintenance of drainage structures, dry weather surveys and installation of new storm drains. | DPW | Procedures developed and implemented. | Procedures developed by 12/2006 (partially completed) | Mapping discussed in Section 5.2 and Section 5.4 of the SWMPP. |
| IV.B.3.b.4 | Develop and introduce an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non stormwater discharges into the system. Section 5.3 and Section 5.4 of the SWMPP identifies alternatives for the City to accomplish this. | City Council | Draft language and legal review. Conduct informational meetings as necessary. | Developed and introduced an IDDE ordinance | As discussed in Section 5.3 of the SWMPP. The City's IDDE Ordinance is included in Appendix B . |
| IV.B.3.b.4 | Adopt an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non stormwater discharges into the system. | City Council | Submit and schedule for vote at City Council Meeting. Regulatory mechanism in place. | Adopted an IDDE ordinance in 2005 | As discussed in Section 5.3 of the SWMPP. The City's IDDE Ordinance is included in Appendix B . |
| IV.B.3.b.5.i. | Area that drains to the Moshassuck, West, Woonasquatucket, Seekonk, and Providence Rivers and Roger Williams Park Ponds will be first priority given the pathogen impairment for these waters. | DPW | Investigations identified, prioritized, conducted. Suspected illicit connections investigated. Source identified and scheduled for removal. Enforcement actions taken or referred to other entity such as police or RIDEM. | Program implemented by: 12/2007 | As discussed in Section 5.4 of the SWMPP. |
| IV.B.3.b.5.ii | Complaints associated with illicit discharges will be directed to the DPW where these complaints will be logged. DPW will review these complaints upon receipt and determine the appropriate action to take. | DPW | Number of complaints logged and responded to. | Complaint procedures developed by: 07/2017. | |
| IV.B.3.b.iii | Procedures for tracing sources of illicit discharges are detailed in Section 5.4.3 of the SWMPP. | DPW | Number of illicit connections detected. | Procedures completed Procedures updated in amended IDDE Plan (07/2017) | |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

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|-------------------------|---|---|---|---|--|
| IV.B.3.b.iv | The process for removing illicit discharges is defined in the IDDE Plan. | DPW | Sources identified and removed. | Adopted by: 12/2005 IDDE Plan Amended (07/2017) | The IDDE Plan defines this process which was approved as part of its adoption. |
| IV.B.3.b.v | The illicit discharge and detection program will be evaluated and assessed annually prior to the preparation of the Annual Report. This will consist of reviewing the areas evaluated, findings, whether changes in procedures and priorities need to be made. A summary of this evaluation will be included in the Annual Report. | DPW | Completion of annual review. | March of every permit year (commencing 2005). IDDE Plan Amended (07/2017) | |
| IV.B.3.b.5.vi | Inspect all catch basins in the City at least once. Maintain records of all inspections and corrective actions required and completed. This activity will be coordinated with the recording requirements as stipulated in IV.B.3.b.3 and cleaning activities required in IV.B.6. During these inspections, odors or flow and any other observations will be noted and reported for the purposes of determining whether illicit discharges should be investigated discharging to those structures. | DPW | Number of catch basins inspected. Records maintained. Number of corrective measures required and completed. | Inspections completed by: 12/2007 Catch basin investigations are included as part of the amended IDDE Plan (07/2017) | |
| IV.B.3.b.5.vii | Perform dry weather surveys in accordance with procedures established in Section 5.4 of the report. Perform surveys in accordance with standards stipulated in the General Permit. | DPW | Two sampling events completed. | Surveys completed by: 12/2007 Dry weather screening is included as part of the amended IDDE Plan (07/2017) | |
| IV.B.3.b.7 | If illicit discharges are detected from other physically interconnected MS4s, the City will report the finding to the owner of the illicit discharge. | DPW | Number of illicit discharges reported to other MS4 owners. | Process in place by: 12/2006 Process updated in amended IDDE Plan (07/2017) | |
| IV.B.3.b.8 | Unauthorized non-stormwater discharges that are deemed appropriate to continue discharging to the storm drain system will be referred to the RIPDES program for appropriate action. Process will follow procedures developed by the RIPDES program for such a review. | DPW | Number of illicit discharges referred to RIDEM. | Process in place by: 12/2006. | |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|-------------------------|--|---|--|--|---|
| IV.B.3.b.9 | Public education and municipal employee training programs will inform about hazards associated with illegal discharges and improper disposal of waste. | DPW | Ensure that educational materials developed include illicit discharge awareness. Materials developed and | Materials selected, distribution commenced 12/2007 | As discussed in <u>Section 3.0</u> and <u>Section 5.4</u> of the SWMPP. |
| IV.B.3.b.10 | All actions taken to detect and address illicit discharges will be recorded in both field notes as well as on outfall mapping prepared for IV.B.3.b.1. | DPW | Submittal of findings in Annual Report. | March of every permit year (commencing 2005). | |
| IV.B.3.b.12 | Evaluate the success of this minimum measure. | City Council, DPW | Annual Report completed | March of every permit year (commencing 2005) | As discussed in <u>Section 10.0</u> of the SWMPP. |

**EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island**

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|-------------------------|---|---|--|---|---|
| 4 | Construction Site Runoff Control | | | | |
| IV.B.4.b.1 and 3 | Develop and introduce an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites. <u>Section 6.3</u> and <u>Section 6.4</u> of the SWMPP identifies alternatives for the City to accomplish this. The <u>Rhode Island Soil Erosion and Sediment Control Handbook</u> (as amended) will serve as the minimum standard. | City Council | Draft language and legal review. Conduct informational meetings as necessary. | Developed and introduced a Sedimentation and Erosion Control Ordinance by 12/2004 | The City's Sedimentation and Erosion Control Ordinance is included in <u>Appendix D</u> . |
| IV.B.4.b.1 | Adopt an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites. | City Council | Submit and schedule for vote at City Council Meeting. Regulatory mechanism in place. | Adopted a Sedimentation and Erosion Control Ordinance by 12/2005 | As discussed in <u>Section 6.3</u> of the SWMPP. |
| IV.B.4.b.2 | Issue and track permits for all construction projects resulting in land disturbance of greater than 1 acre to ensure compliance with erosion and sediment control ordinance. Permit issuance procedures will be defined in the ordinance. Current tracking procedures will be reviewed and amended as necessary to comply with this program. | Building Official | Review current procedures. Improved procedure developed and implemented. Number of permits issued and tracked. | Developed by: 12/2005 | As discussed in <u>Section 6.2</u> and <u>Section 6.3</u> of the SWMPP. |
| IV.B.4.b.4 | Procedures for reviewing plans and SWPPPs for construction projects resulting in land disturbance of 1-5 acres, not reviewed by other State programs will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2. | DPW, City Council | Ordinance developed. Number of plans and SWPPPs reviewed. | Develop by: 12/2004 100% reviewed by: 12/2006 | As discussed in <u>Section 6.3</u> and <u>Section 6.4</u> of the SWMPP |
| IV.B.4.b.5 | Develop procedures for coordination of site plan and SWPPP review when relying on State program review of construction activity. | DPW, City Council | Procedure developed. | Procedures implemented by: 12/2005 | |
| IV.B.4.b.6 | Public comment and information regarding new development projects and construction runoff related impacts will be directed to the Building Department where these complaints will be logged. The Building Department will review these complaints upon receipt and determine the appropriate action to take. Develop procedures for receipt and consideration of information submitted by the public. | Building Department | Procedure developed. Number of complaints logged and responded to. | Complaint procedures implemented by: 12/2006. | |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|-------------------------|--|---|---|---|---|
| IV.B.4.b.7 | Procedures for site inspection and enforcement of erosion and sediment control measures and other measures for control of wastes at construction sites will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2. | City Council | Review current procedures. Improved procedure developed and implemented. | Procedures implemented by: 12/2005 | As discussed in Section 6.3 and Section 6.4 of the SWMPP. A sample of a contractor self-inspection report is included in Appendix H . |
| IV.B.4.b.7 | Inspect 100% construction twice (1st during construction, 2nd after final stabilization) | Building Department | Staff trained. Number of construction sites inspect and number of occurrences per site. | Start: 12/2005 | |
| IV.B.4.b.8 | Develop procedures for referral to the State of non-compliant construction site operators. | DPW, City Council | Procedure developed. Number of non-compliant construction sites referred to RIDEM. | Process in place by: 12/2005 | |
| IV.B.4.b.10 | Evaluate the success of this minimum measure. | City Council, DPW | Annual Report completed | March 10 th of every permit year (commencing 2005) | As discussed in Section 10.0 of the SWMPP. |

**EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island**

| Permit Reference | Minimum Control Measure Best Management Practice (BMP) Description | Potential Responsible Party/Department | Measurable Goal | Proposed Schedule | Comments |
|-------------------------|--|---|--|---|--|
| 5 | Post-Construction Runoff Control | | | | |
| IV.B.5.b.1, 2 and 8 | The City will rely on the <u>State of Rhode Island Stormwater Design and Installation Manual</u> (as amended) as a standard to address stormwater runoff from new development and redevelopment projects. | DPW | Program developed, priority areas specified. | A program was put in place by 12/2005 | As discussed in <u>Section 7.0</u> . The City Ordinance is included in <u>Appendix E</u> . |
| IV.B.5.b.3 | Procedures for pre-application meetings and site plan review (coordinate IV.B.4.b.4) will be developed as part of the development of new ordinances as described in IV.B.5.b.9. | DPW | Procedures developed, number of pre-application meetings held. | Process adopted: 12/2005 | As discussed in <u>Section 7.0</u> . |
| IV.B.5.b.4 | Review 100% of plans and SWPPPs for development projects resulting in land disturbance greater than 1 acre, not reviewed by other State programs (coordinate with IV.B.4.b.4). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9. | DPW | Number of plans and SWPPPs reviewed. | Started: 12/2005 | |
| IV.B.5.b.5 | Procedures for coordination of local and State post-construction stormwater management reviews. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9. | DPW, City Council | Procedures developed. | Process adopted: 12/2005 | |
| IV.B.5.b.6 | New industrial discharges proposed to discharge to the storm drain system will be referred to the RIPDES program for review and approval. Process will follow procedures developed by the RIPDES program for such a review. | DPW, City Council | Number of activities referred to RIDEM. | Process in place by: 12/2005 | |
| IV.B.5.b.7 | When the City's Comprehensive Plan of Development is updated, opportunities for smart growth such as in-fill development, direct growth to identified areas, and protect sensitive areas will be identified. Additionally, non-structural BMPs as described in the <u>State of Rhode Island Stormwater Design and Installation Manual</u> (as amended) will be considered. Public education will include discussion of ways to limit runoff. | DPW, City Council | Items developed and distributed. | Materials selected, distribution commenced by 12/2007 | As discussed in <u>Section 3.0</u> and <u>Section 7.3</u> . |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

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|-------------------------|---|---|--|--|--|
| IV.B.5.b.7 and 9 | Develop and introduce an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects. State standards will be included by reference. <u>Section 7.3</u> and <u>Section 7.4</u> of the SWMPP identifies alternatives for the City to accomplish this. | City Council | Draft language and legal review. Conduct informational meetings as necessary. | Developed and introduced a Post Construction Stormwater Control Ordinance in 12/2004 | As discussed in <u>Section 7.2</u> , <u>Section 7.3</u> , and <u>Section 7.4</u> . The City's ordinance is included in <u>Appendix E</u> . |
| IV.B.5.b.9 | Adopt an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects. | City Council | Submit and schedule for vote at City Council Meeting. Regulatory mechanism in place. | Adopted a Post Construction Stormwater Control Ordinance in 12/2005 | As discussed in <u>Section 7.2</u> , <u>Section 7.3</u> , and <u>Section 7.4.2</u> . The City's ordinance is included in <u>Appendix E</u> . |
| IV.B.5.b.10 | Inspect 100% construction sites after final stabilization (coordinate with IV.B.4.b.7). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9. | Building Department | Number of construction sites inspected. | Started in 12/2005 | As discussed in <u>Section 7.3</u> . |
| IV.B.5.b.11-12 | Adopt by-law or regulations with language and enforceable mechanism for long term operation and maintenance of post-construction runoff controls. Include language will provide DPW authority to ensure proper operation and maintenance of all BMPs tributary to the storm sewer system. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9. | City Council | By-law or regulation developed. Submit and schedule for vote at City Council Meeting. Voted and adopted. | Adopted by-law regulations 12/2005 | As discussed in <u>Section 7.3</u> and <u>Section 7.4</u> . Suggested BMP operation and maintenance guidelines are included in <u>Appendix F</u> . |
| IV.B.5.b.14 | Evaluate the success of this minimum measure. | DPW | Annual Report completed | March of every permit year (commencing 2005) | As discussed in <u>Section 10.0</u> of the SWMPP. |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

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|------------------|---|--|--|---|--|
| 6 | Pollution Prevention and Good Housekeeping in Municipal Operations | | | | |
| IV.B.6.b.1.i | Identify and list locations and description of all structural BMPs owned or operated by the MS4. | DPW | Number of structures identified. | Initial list: 3/2004 Update: March 10th of every year. | As discussed in <u>Section 8.2.2</u> of the SWMPP. |
| IV.B.6.b.1.ii | Formalize procedures for inspections, cleaning and repair of detention/retention basins, storm sewers, and catch basins. The City is already conducting these tasks. | DPW | Identify the structures tributary to the system. Conduct a catch basin sediment accumulation pilot program. Establish a routine inspection and maintenance program. Maintain records of inspections conducted, number of structures cleaned, approximate volume of material collected. | Developed in 12/2005 | As discussed in <u>Section 8.7</u> of the SWMPP. |
| IV.B.6.b.1.iii | Formalize current catch basin inspection and cleaning program. All catch basins will be inspected annually and cleaned as necessary unless documentation supporting a different frequency of cleaning is submitted to RIDEM as part of the Annual Report. | DPW | Formalized existing program. Number of catch basins inspected and number cleaned. | Developed by: 12/2005 Annually commencing 12/2006 | As discussed in <u>Section 8.7</u> of the SWMPP. |
| IV.B.6.b.1.iv | DPW staff will observe road shoulders during road work projects. If erosion is observed, the crew will report it to its manager. DPW will then schedule repairs and appropriate methods for stabilization including riprap or vegetative stabilization. | DPW | Procedures implemented developed | Developed in 12/2005 | |
| IV.B.6.b.1.vi | Formalize current street and road sweeping program. City will continue to sweep all roads and streets once per year. | DPW | Maintain records of curb-miles swept, approximate volume of material collected. | Formalized in 12/2006 Annually commencing 12/2006 | As discussed in <u>Section 8.7</u> of the SWMPP. |
| IV.B.6.b.1.vii | Develop program for controls to reduce floatables and other pollutants from the MS4. This program will be based on a review of current catch basin grates and their ability to bypass flows to a curb inlet, as well as observation of outfalls to determine locations with the greatest potential for floatables. A pilot program is proposed to evaluate the effectiveness of any floatable reduction strategy. | DPW | Program developed, volume of wastes collected and disposed. | Program developed by: 12/2005. | |
| IV.B.6.b.1.viii | City will continue to dispose of wastes removed from the MS4 in accordance with applicable State requirements. | DPW | Waste disposed of properly. | Reviewed annually | As discussed in <u>Section 8.7</u> of the SWMPP. |

EXECUTIVE SUMMARY
STORMWATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
CITY OF PROVIDENCE
Providence, Rhode Island

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| IV.B.6.b.2 | Operations under MS4s legal control that have the potential to introduce pollutants into the stormwater system are addressed in <u>Section 8.0</u> . | DPW | | Completed by: 3/2004 | |
| IV.B.6.b.3 | Industrial facilities owned and operated by MS4s that have stormwater discharges associated with industrial activities have been listed on the NOI. | DPW | Facilities identified on NOI. | Completed by: 3/2004 | |
| IV.B.6.b.4 | Operation and maintenance and good housekeeping practices and BMPs for municipal operations have been identified in <u>Section 8.0</u> . | DPW | Continue to implement | Implementation by: 3/2006 | As discussed in <u>Section 8.7</u> of the SWMPP. |
| IV.B.6.b.6 | Incorporate stormwater awareness training into existing training for equipment operators and mechanics (Heath & Safety, Right to Know) | DPW, City Council | Training completed. Educational materials distributed. | Procedures developed: 12/2006 | As discussed in <u>Section 8.7</u> . |
| IV.B.6.b.7 | Develop procedures to incorporate water quality improvements into flow management projects. | DPW, City Council | Procedures developed | Procedures developed: 12/2007 | |
| IV.B.6.b.8 | Develop procedures for implementing proper erosion and sediment and water quality controls for all construction projects undertaken by the City. | DPW, City Council | Procedures developed | Procedures developed: 12/2006 | |
| IV.B.6.b.8 | Include a list of planned capital improvements in the Annual Report. | DPW, City Council | Meeting held to discuss municipality's needs. Improvements assessed and listed. | March of every permit year (commencing 2005) | |
| IV.B.6.b.10 | Evaluate the success of this minimum measure. | City Council, DPW | Annual Report completed | March of every permit year (commencing 2005) | As discussed in <u>Section 10.0</u> of the SWMPP. |

Appendix B

2017 RIDEM Consent Agreement

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE OF COMPLIANCE AND INSPECTION

In Re: City of Providence

File Nos.: OCI-WP-16-40 X-ref
RIPDES RIR040005

CONSENT AGREEMENT

A. INTENT & PURPOSE

This Agreement is entered by and between the Rhode Island Department of Environmental Management's Office of Compliance & Inspection ("RIDEM") and the City of Providence ("Providence"). This Agreement is entered in accordance with Section 42-17.1-2 *et seq.* of the Rhode Island General Laws ("R.I. Gen. Laws") for the purpose of resolving the alleged violations set forth in a Notice of Violation ("NOV") issued to Providence by the RIDEM on 3 March 2017.

B. STIPULATED FACTS

- (1) WHEREAS, on 19 December 2003, the RIDEM issued Rhode Island Pollutant Elimination System ("RIPDES") General Permit Number RIR040000 entitled "Storm Water Discharge from Small Municipal Separate Storm Sewer Systems and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s" (the "General Permit").
- (2) WHEREAS, the General Permit authorizes the discharge of stormwater from small municipal separate storm sewer systems ("MS4s") that are operated by municipalities.
- (3) WHEREAS, on 18 March 2004, Providence obtained coverage under the General Permit through the submission of a Notice of Intent ("NOI") and Stormwater Management Program Plan ("SWMPP") to the RIDEM.
- (4) WHEREAS, for the purposes of this Agreement, the separate storm sewer system covered under the General Permit means the system as defined in Rule 31(b)(19) of the RIDEM's *Regulations for the Rhode Island Pollutant Discharge Elimination System*, except for the system that serves those roadways that are private roads and are listed and attached hereto and incorporated as Attachment A or state roads as defined by RI Gen. Laws Chapter 24-8, as amended. Attachment A may be amended by mutual agreement of the parties in writing.

- (5) WHEREAS, the parties agree that stormwater controls implemented by Providence to address the Total Maximum Daily Load ("TMDL") entitled "Total Maximum Daily Load For Dissolved Oxygen and Phosphorus, Mashapaug Pond, Rhode Island-September 2007" (the "Mashapaug Pond TMDL") will fulfill Providence's responsibilities¹ to address bacteria for the Mashapaug Pond portion of the TMDL entitled "Rhode Island Statewide Total Maximum Daily Load, September 2011" (the "Statewide Bacteria TMDL").
- (6) WHEREAS, the RIDEM received a copy of a report entitled "Roger Williams Park Ponds, Water Quality Management Plan", dated June 2013, that was prepared by the Horsley Witten Group et al (the "RWPP Plan"). The executive summary is attached hereto and incorporated herein as Attachment B.
- (7) WHEREAS, on 3 March 2017 the RIDEM issued a NOV to Providence alleging certain violations of Rhode Island's Water Pollution Act, the RIDEM's *Water Quality Regulations* and the RIDEM's *Regulations for the Rhode Island Pollutant Discharge Elimination System*. The violations pertained to the failure to comply with the General Permit.
- (8) WHEREAS, in lieu of proceeding with an administrative adjudicatory hearing on the NOV and to affect a timely and amicable resolution of the NOV, the RIDEM and Providence hereby agree that it is in the best interest of the parties and in the public interest to resolve the issues raised in the NOV.
- (9) WHEREAS, the RIDEM finds that this Agreement is a reasonable and fair settlement and adequately protects the public interest in accordance with Rhode Island's Water Pollution Act and the RIDEM's *Water Quality Regulations* and the RIDEM's *Regulations for the Rhode Island Pollutant Discharge Elimination System*.
- (10) WHEREAS, on 2 March 2017, the City Council for Providence reviewed the terms and conditions of this Agreement and determined the same to be fair and reasonable, in the best interest of Providence, and contains appropriate and meaningful actions to improve water quality in the community, and duly authorized the Mayor to execute this Agreement on behalf of Providence and perform and undertake any and all necessary actions to further implement and comply with the terms and conditions contained herein.

¹ This terminology reflects the RIDEM's position that meeting the Mashapaug Pond TMDL will encompass any bacteria requirement incorporated in the Statewide Bacteria TMDL. As of the date of this Consent Agreement, the RIDEM has not provided notice of the applicability of the Statewide Bacteria TMDL. The parties acknowledge that RIDEM could provide such notice at any point in time, triggering compliance requirements for Providence. While the Statewide Bacteria TMDL is not presently in effect, the parties have negotiated in good faith to achieve the results which would otherwise be mandated if Providence had received official notice of that TMDL.

C. AGREEMENT

- (1) **JURISDICTION** – The RIDEM has jurisdiction over the subject matter of this Agreement and has personal jurisdiction over Providence. Providence has the legal authority and has been duly authorized to enter into this Agreement.
- (2) **FORCE and EFFECT** – This Agreement shall have the full force and effect of a final compliance order issued after a full hearing on the merits pursuant to the Administrative Procedures Act, R.I. Gen. Laws Section 42-35-1 et seq. and R.I. Gen. Laws Section 42-17.7-1 et seq. from which no timely appeal was taken, and which is enforceable in Superior Court in accordance with R.I. Gen. Laws Section 42-17.1-2(21)(vi).
- (3) **APPLICATION** – The provisions of this Agreement shall apply to and be binding upon the RIDEM, Providence and its agents, servants, employees, successors, and assigns and all persons, firms and corporations acting under, through and for Providence in the performance of work relating to or impacting the requirements of this Agreement.
- (4) **CONDITIONS** –
 - (a) Providence shall complete the following actions to comply with the Order section of the NOV:
 - (i) Implement the requirements of the General Permit as follows.
 1. **By 31 March 2017**, submit to the RIDEM a downspout disconnection program that is consistent with the recommendations in the RWPP Plan that provides public awareness and outreach, a manual with options for the commercial or residential property owners, and annual demonstration pilot projects (the "Downspout Disconnection Program");
 2. **By 31 March 2017**, submit to the RIDEM a paper based street sweeping tracking system that is sufficient to document the date, location, and miles of sweeping of all roads (the "Street Sweeping Tracking System");
 3. **Upon approval of the Street Sweeping Tracking System by the RIDEM and annually thereafter**, implement the Street Sweeping Tracking System;
 4. **By 31 March 2017**, submit the MS4 Annual Report to the RIDEM for calendar year 2016. Annually thereafter, submit the MS4 Annual Report to the RIDEM by March 10th of each year. The MS4 Annual Report shall be developed in a manner that fulfills the General Permit and include all the information within the document entitled "Compliance Reporting Requirements", which is attached hereto and incorporated herein as Attachment C;

5. **By 31 March 2017**, submit to the RIDEM an Illicit Discharge Detection and Elimination ("IDDE") Plan for screening and monitoring of MS4 outfalls and interconnections, investigation of sub-catchment areas, and removal of illicit discharges that is consistent with this Agreement and a document entitled "EPA New England Bacterial Source Tracking Protocol Draft January 2012", which is attached hereto and incorporated herein as Attachment D. Providence shall amend its SWMPP to incorporate the revised IDDE Plan within 6 months of the RIDEM's approval. The IDDE Plan must include, but is not limited to, the requirements, guidelines, procedures, and deadlines in the document entitled "IDDE Plan Requirements", which is attached hereto and incorporated herein as Attachment E;
6. **By 31 March 2017**, establish and maintain an inventory of municipally-owned structural controls (both baseline existing conditions and as they are constructed) and establish procedures to ensure adequate maintenance practices are followed;
7. **Within 3 Months of the RIDEM's approval of the IDDE Plan**, initiate the investigation of high priority outfalls and portions of the MS4 identified in a document entitled "IDDE Investigation Priorities List, City of Providence, March 2016", which is attached hereto and incorporated herein as Attachment F. Investigations shall be completed in accordance with the timeframes in the approved IDDE Plan;
8. **By 30 June 2017**, submit an amended SWMPP to the RIDEM (the "Amended SWMPP") that includes procedures for review of all new land development projects and all redevelopment projects to address the following:
 - a. Applicability thresholds and permit application requirements;
 - b. Incorporation of strategies to reduce runoff volume through low impact development and green infrastructure;
 - c. Ensuring adequate long-term operations and management;
 - d. Coordination of State and local land development permits; and
 - e. Performance criteria for impaired waterbodies to ensure that new development projects result in no net increase of total phosphorous or bacteria and redevelopment projects reduce total phosphorous and bacteria to the maximum extent practicable;
9. **By 30 June 2017**, submit to the RIDEM electronically in an ArcGIS compatible format, using RI State Plane Coordinate system - feet, NAD1983, a GIS map of Providence's combined, sanitary and storm sewer systems, identifying the extent of the regulated area and the MS4, and including description of how the map was developed;

10. **By 30 June 2017**, develop a Geo-spatial database system to record and report IDDE complaints, investigations, and remedial measures taken;
11. **By 30 June 2017**, complete dry weather surveys during the January-April timeframe of the outfalls that are attached hereto and incorporated herein as Attachment G. Providence must document visual and olfactory observations and include in these inspections sampling for the parameters listed in Attachment E, Part B and as required by the General Permit;
12. **Within 6 months of the RIDEM's approval of the Amended SWMPP**, adopt ordinances that are consistent with the Amended SWMPP to address post-construction runoff from new development and redevelopment projects and submit to the RIDEM the ordinances and a letter from the City Solicitor certifying that the ordinances were duly adopted and provides the authority for Providence to carry out the requirements of the General Permit (the "Ordinances"). At a minimum, the Ordinances must address applicability, exemptions, performance standards, application requirements, and penalties for failure to properly operate and maintain best management practices;
13. **By 10 March 2018 and annually thereafter**, provide to the RIDEM a report of the results of the IDDE investigations, the revised ranking of priorities, and the revised implementation schedule with the MS4 Annual Report in accordance with Attachment C;
14. **By 30 June 2018**, implement the Ordinances;
15. **By 30 June 2019, and annually thereafter**, inspect all catch basins and manholes for sediment accumulation and clean as necessary. Increased inspections and maintenance should be considered. After at least 2 consecutive years of operational data has been collected, Providence may submit a request for approval for a lesser frequency of inspection based on evidence indicating the system does not require annual cleaning;
16. **By 31 December 2019**, establish and maintain an inventory of privately-owned structural controls (as they are constructed) and establish procedures to ensure adequate maintenance practices are followed;
17. **By 31 December 2019**, develop and implement a Geo-spatial database system to record and report MS4 maintenance (street sweeping, inspection and cleaning of structures, and asset management), and implement a means to record the same data electronically through a GPS contracted system;

18. **By 30 June 2020**, submit to the RIDEM electronically in an ArcGIS compatible format, using RI State Plane Coordinate system - feet, NAD1983, a GIS map of Providence's combined, sanitary and storm sewer systems. The map shall include, but not be limited to, locations of all outfalls, receiving waters, catch basins, manholes, pipes, culverts, swales, and ditches that contribute drainage to Providence's outfalls. Providence shall field verify flow direction and connectivity by, at a minimum, visual observation of the invert elevation of pipes connected to each catch basin, and determine the connectivity of each catch basin with the ultimate discharge/outfall. Providence will use good faith efforts to identify the location of all interconnections between existing public and private drainage systems and with other MS4s (for example, the Rhode Island Department of Transportation and the City of Cranston); and
 19. **By 30 June 2020**, inspect all city-owned catch basins and manholes for illicit connections and non-stormwater discharges and document the results of these inspections;
- (ii) Implement the recommendations in the RWPP Plan in accordance with the requirements below:
1. Complete the following projects identified and described in the RWPP Plan: RWP-3B; RWP-6; RWP-17/18; RWP-26; and RWP-28. As of the date of entry of this Agreement, Providence has completed said projects and shall receive load reduction credits as determined in accordance with a document entitled "Methodologies for Calculating Pollutant Load Reductions Achieved for Structural Stormwater Controls and Enhanced Non-Structural BMPs and Methodologies for Calculating Runoff Volume Reduction and Peak Flow Attenuation Factors for the Impervious Cover Standard", which is attached hereto and incorporated herein as Attachment L;
 2. For the Lower Watershed, complete the non-structural and structural controls by the end of the fiscal year set forth in a document entitled "Proposed Projects in Roger Williams Park", which is attached hereto and incorporated herein as Attachment H;
 3. **By 31 December 2017**, for the Upper Watershed, complete a feasibility and impact study of modifications to the weir box located within the discharge channel/pipe system from Mashapaug Pond;
 4. **By 31 December 2018**, for the Lower Watershed, implement pavement management, parking requirements, modified shoreline access, and park maintenance practices, such as geese management, leaf litter pick-up, eliminating the use of phosphorus fertilizers, and maintenance of structural stormwater controls;

5. For the Providence Portion of the Lower and Upper Watersheds that contribute flow to the MS4 (including portions interconnected to stormwater drainage systems owned by others) implement the programmatic non-structural controls as follows:
 - a. **By 31 December 2017 and annually thereafter**, complete street sweeping at least twice annually;
 - b. **By 30 June 2017 and annually thereafter** conduct a pollution prevention program targeted at businesses and residents that informs the community on how to become involved in the stormwater program. At a minimum, the program must:
 - i. Establish partnerships with governmental, non-governmental entities, and private land owners to develop programmatic and outreach strategies;
 - ii. Host an annual convening with partners and stakeholders; and
 - iii. Ensure that education and outreach materials are available online and accessible via Providence's website;
 - c. **Upon approval of the Downspout Disconnection Program by the RIDEM and annually thereafter**, conduct the Downspout Disconnection Program. If the approval is issued prior to 31 December 2017, Providence shall conduct the program beginning on 31 December 2017;
- (iii) **By 31 December 2020**, submit to the RIDEM a TMDL Implementation Plan ("IP") and a Scope of Work ("SOW") for the waterbody segments listed in the table below. Such SOW shall meet the requirement for a scope of work set forth in the TMDLs for each listed waterbody segment;

| Waterbody Name and Location | Pollutant | Applicable TMDL |
|------------------------------------|------------------|--|
| Mashapaug Pond ¹ | Phosphorus | Mashapaug Pond TMDL |
| Roger Williams Park Ponds | Phosphorus | Phosphorus to Address 9 Eutrophic Ponds in Rhode Island - September 2007 |
| Roger Williams Park Ponds | Bacteria | Statewide Bacteria TMDL |

- (iv) **By 31 December 2022**, submit to the RIDEM a TMDL IP and an SOW for the waterbody segments listed in the table below. Such SOW shall meet the requirement for a scope of work set forth in the TMDLs for each listed waterbody segment;

| Waterbody Name and Location | Pollutant/s | Applicable TMDL |
|------------------------------------|------------------------------|---|
| Woonasquatucket River | Copper, Lead, Zinc, Bacteria | Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals - April 2007 |
| West River | Bacteria | Statewide Bacteria TMDL |

- (v) The TMDL IPs required in Paragraphs C(4)(a)(iii)-(iv) shall meet the requirements of the document entitled, "TMDL Implementation Plan Requirements", which is attached hereto and incorporated herein as Attachment I, and include the following requirements.
1. All recommendations and requirements in the TMDLs consistent with the assumptions and recommendations of those TMDLs that apply to Providence;
 2. For each waterbody segment, Providence shall select a combination of structural stormwater controls and enhanced non-structural Best Management Practices ("BMPs") that collectively achieve the most stringent level of control for pollutant load reduction requirements in the heavy metals and phosphorous TMDLs as listed in a document entitled "Providence Percent Reduction TMDL Loads", which is attached hereto and incorporated herein as Attachment J, to the maximum extent practicable, unless the RIDEM approves an alternative level of control;
 3. For each waterbody segment with a bacteria TMDL, Providence shall select a combination of structural stormwater controls and enhanced non-structural BMPs that collectively achieve the "Impervious Cover Standard," which is attached hereto and incorporated herein as Attachments K, to the maximum extent practicable, unless the RIDEM approves an alternative level of control;
 4. An assessment of the pollutant load reductions achieved and an assessment of compliance with the requirements in Attachment J and Attachment K. Providence shall use the procedures specified in Attachment L to calculate the pollutant removal, runoff volume reduction, and peak flow attenuation achieved by structural

stormwater controls and enhanced non-structural BMPs, unless the RIDEM approves an alternative methodology;

5. Implementation of all planned enhanced non-Structural BMPs within 3 months of approval by the RIDEM, except those that require council approval which would be implemented within 6 months, for enhanced non-structural BMPs that are not implemented on a seasonal basis, or no later than the next implementation season following the approval for enhanced non-structural BMPs that are implemented on a seasonal basis. Implementation of all enhanced non-structural BMPs shall continue annually thereafter or as specified in the approved TMDL IP;
6. A schedule for implementation of the proposed structural stormwater controls, including interim design milestones and proposed construction start and completion dates. In developing the schedule, Providence shall target completion of higher priority projects within 4 years of the RIDEM's approval and all projects within 8 years of the RIDEM's approval of the TMDL IP. Providence shall provide an explanation of its schedule, including the prioritization of projects and the rationale for the schedule. In developing the schedule, Providence will consider constructing the controls as part of other planned infrastructure improvement projects, and comply with the objective of providing for consistent progress over time in completing construction of the controls; and
7. TMDL Implementation Plan amendments. If, in the course of design or construction work and associated efforts, Providence concludes that a particular structural control proposed in a TMDL IP is infeasible, Providence shall explain the reasons for its conclusion and, to the maximum extent practicable, propose alternate structural controls and/or enhanced non-structural BMPs to replace the infeasible structural control. If, in the course of design or construction work and associated efforts, Providence concludes that the level of control that a particular structural control will provide is substantially less than was estimated in the current TMDL IP, Providence shall explain the reasons for its conclusion and, to the maximum extent practicable, propose additional structural controls and/or enhanced non-structural BMPs to compensate for the decrease. In either case, Providence shall submit the documentation of its conclusions and its proposals for alternate or additional controls in proposed TMDL IP amendment/s. For alternate or additional controls, the proposed TMDL IP amendment/s shall include the information specified in Parts 9, 12, and 13 of Attachment I. The proposed TMDL IP amendment/s shall be submitted as soon as possible, but no later than the due date of the next annual MS4 Annual Report following Providence's conclusion that a particular

proposed TMDL IP structural control is infeasible or will provide substantially less control than was estimated in the TMDL IP;

- (vi) Providence shall propose an amendment to its SWMPP to incorporate RIDEM-approved TMDL IPs (including Operation and Maintenance ("O&M") Plans) within 30 days following RIDEM's approval of each TMDL IP. The SWMPP may be amended by incorporating the TMDL IPs by reference. A list of the TMDL IPs incorporated by reference shall be provided in the MS4 Annual Report. Providence shall implement the TMDL IPs, including the O&M Plans, in accordance with the schedules included in the approved TMDL IPs, as approved by the RIDEM, which schedules may be modified pursuant to Paragraph D (10) below; and
 - (vii) For new construction or re-construction by Providence, where the newly constructed or re-constructed infrastructure will discharge any pollutants of concern to an Impaired Water Body Segment directly or indirectly, Providence shall implement structural stormwater controls and may implement enhanced non-structural BMPs that will, to the maximum extent practicable, support the achievement of the pollutant load reduction and other requirements of Paragraph C(4)(a)(v). Providence will also consider the implementation of structural stormwater controls in connection with pavement management and other infrastructure development projects that are not new construction or re-construction, including, but not limited to, preservation projects such as mill & overlay, level & overlay, thin overlay, in-place recycling, and reclamation projects, and repair of existing drainage system components at the same line and grade, and, if practical, implement them as part of such projects.
- (b) The schedules, reports and other documents that Providence is required to submit to the RIDEM in accordance with Paragraph C(4)(a) above are subject to the RIDEM's review and approval. Upon review, the RIDEM shall provide written notification to Providence either granting formal approval or stating the deficiencies therein. Within a reasonable period of time to be proposed by the RIDEM, but within no fewer than 14 business days of receiving a notification of deficiencies, Providence shall submit to the RIDEM revised schedules, reports, documents or additional information necessary to correct the deficiencies.
 - (c) Upon the RIDEM's approval of the schedules, reports and other documents, Providence shall complete all work required in accordance with the approved schedule.
 - (d) Penalty - In lieu of a penalty for non-compliance, and in consideration that the NOV issued in this matter was not prosecuted or that any determination of liability was reached on the merits, and in further consideration that the parties agree an amicable resolution is in the best interest of the public and will more effectively preserve and enhance the environmental quality of Providence's

water bodies, a series of supplemental environmental projects shall be initiated and carried out by Providence, as set forth in Attachment O, which is attached hereto and incorporated herein. For each supplemental environmental project ("SEP"), Providence shall be given a credit for the SEP (the "SEP Credit").

- (i) **By 1 July 2017**, Providence shall complete SEP #1 entitled Education Signage. Providence estimates this SEP is \$10,000. Providence shall receive a credit of \$10,000 for this SEP;
 - (ii) **By 1 February 2018**, Providence shall complete SEP #2 entitled Irving Avenue Seekonk River Revitalization. Providence estimates this SEP is \$68,000 to \$150,000. Providence shall receive a credit of \$150,000 for this SEP; and
 - (iii) **By 1 July 2018**, Providence shall complete SEP #3 entitled Restoration of Riverside Park. Providence estimates this SEP is \$55,000. Providence shall receive a credit of \$55,000 for this SEP.
- (e) If Providence fails to timely complete a SEP, the RIDEM shall notify Providence that it intends to rescind the SEP Credit. Within 14 days of Providence's receipt of written notification by the RIDEM that the RIDEM intends to rescind the SEP Credit, Providence shall either complete the SEP or demonstrate that good cause exists for the delay in completing the SEP. If Providence fails to complete the SEP or does not demonstrate good cause for the delay within said 14 days, Providence shall, within 10 days of Providence's receipt of a written notification from the RIDEM, submit to the RIDEM a check in the amount of the SEP Credit after which Providence shall be under no further obligation to complete the SEP.
- (f) Penalties that Providence agrees to pay in this Agreement are penalties payable to and for the benefit of the State of Rhode Island and are not compensation for actual pecuniary loss.
- (g) In the event that Providence fails to remit to the RIDEM a payment on or before its due date, that payment will be considered late and Providence will be in default. If the payment is not received within 30 days of its due date, interest shall begin to accrue on the entire unpaid balance at the rate of 12 percent per annum. Interest will accrue at this rate beginning with the day after the due date specified in this Agreement until such date all past due installment payments and interest owed are remitted. Interest shall be calculated using the following generally established accounting principle:

Interest due = (number of days late/365) x (0.12) x (amount of unpaid balance)

(h) All penalty payments shall be in the form of a check payable to the R.I. General Treasurer-Water and Air Protection Account. All payments shall be delivered to:

Chief, RIDEM Office of Compliance and Inspection
235 Promenade Street
Providence, RI 02908-5767

D. COMPLIANCE

- (1) EFFECT OF COMPLIANCE – Compliance with and fulfillment of this Agreement shall be deemed to resolve all issues raised in the NOV.
- (2) RELEASE FROM REQUIREMENTS OF THE AGREEMENT – Upon the RIDEM’s determination that Providence has satisfactorily complied with the requirements of this Agreement expressed as “annually thereafter”, Providence is released from its responsibility to continue to comply with said provisions under this Agreement.
- (3) FAILURE TO COMPLY – In the event that Providence fails to comply with items specified in Paragraphs C(4)(a), (b) or (c) of the Agreement, Providence shall pay a stipulated penalty of \$500 per month for each and every month during which the noncompliance continues, except that the RIDEM may, for good cause shown, defer or reduce such penalty. The payment of a penalty in accordance with this section shall not preclude the RIDEM from seeking any other appropriate remedy (e.g., injunctive relief in Superior Court).
- (4) COMPLIANCE WITH OTHER APPLICABLE LAWS – Compliance with the terms of this Agreement does not relieve Providence of any obligation to comply with any other applicable laws or regulations administered by, through or for the RIDEM or any other governmental entity.
- (5) ADDITIONAL ENFORCEMENT ACTIONS – Upon a determination by the Director that there is a threat to the public health or the environment, or upon discovery of any new information, the RIDEM reserves the right to take additional enforcement actions as provided by statute or regulation, including, but not limited to, the issuance of “Immediate Compliance Orders” as authorized by R.I. Gen. Laws Section 42-17.1-2(21). This Agreement shall not restrict any right to hearing or other right available by statute or regulation that Providence may have regarding any new enforcement action commenced by the RIDEM after the execution of this Agreement.

- (6) FUTURE ACTIVITIES AND UNKNOWN CONDITIONS – This Agreement shall not operate to shield Providence from liability arising from future activities, as of the date of execution of this Agreement.
- (7) SCOPE OF THE AGREEMENT – The scope of the Agreement is only violations alleged in the NOV.
- (8) NOTICE AND COMMUNICATION – Communications regarding this Agreement shall be directed to:

David E. Chopy, Chief
RIDEM Office of Compliance and Inspection
235 Promenade Street
Providence, RI 02908-5767
(401) 222-1360 ext. 7400

Mary E. Kay, Executive Legal Counsel
RIDEM Office of Legal Services
235 Promenade Street
Providence, RI 02908-5767
(401) 222-6607 ext. 2304

Leah Bamberger, Director of Sustainability
City of Providence
25 Dorrance Street
Providence, RI 02903
(401) 421-7740

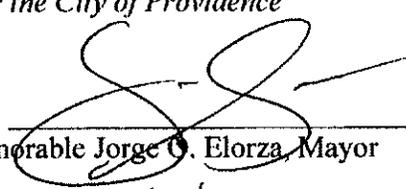
Jeffrey Dana, City Solicitor
City of Providence
25 Dorrance Street
Providence, RI 02903
(401) 680-5333

All communications regarding compliance with this Agreement shall be forwarded to the above-referenced addressees by certified mail.

- (9) DEFERRAL – The Director may, for good cause shown, defer any of the compliance dates prescribed herein. Good cause for deferral of any compliance date shall be forwarded to the RIDEM in writing at least 15 days prior to the prescribed deadline.
- (10) AMENDMENT – The Agreement may be amended by mutual agreement of the parties in writing.
- (11) EFFECTIVE DATE – This Agreement shall be deemed entered as of the date of execution by all parties.

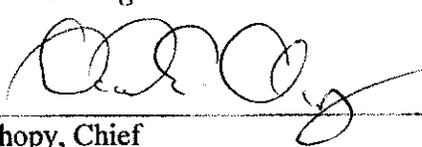
IN WITNESS WHEREOF, the undersigned consent to this Agreement in substance and in form.

For the City of Providence

By: 
Honorable Jorge O. Elorza, Mayor

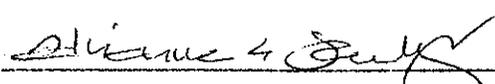
Dated: 3/6/17

For the State of Rhode Island Department of Environmental Management

By: 
David E. Chopy, Chief
Office of Compliance and Inspection

Dated: 3/7/17

Approved as to form and correctness:


Adrienne Southgate, Deputy City Solicitor

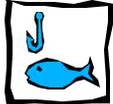
Appendix C

Public Education and Outreach Flyers

10 THINGS YOU CAN DO TO IMPROVE WATER QUALITY IN RHODE ISLAND



There are many streams and rivers that flow through our backyards and drain into ponds, lakes, bays and ultimately the ocean. Pollutants such as animal feces, fertilizer, oil, hazardous waste, road sand, and grease on the land can be washed into our waters, but we can reduce this type of pollution. Here is a list of 10 things you can do to help clean our local waterways.



1. Learn about your local waters. Everyone lives in a **watershed**, which is the drainage area to a local waterbody (think of washing everything in a sink down the drain and the drain is your local river or stream). Figure out what waters are closest to you and where they flow. Learn about local animal life and plants that live in and around these waters. Check out DEM's website to find out more about your watershed at www.state.ri.us/dem/topics/water.htm



2. Don't feed ducks! Although you may enjoy feeding geese, ducks, gulls and other waterfowl, remember that they too contribute to the same type of pollution that limits swimming and shellfishing. One bird dropping can contaminate 10,000 gallons of water. Bread and other human food are bad for bird's digestive tracts too. Feeding

waterfowl can also attract larger bird populations and may cause some birds to stop migrating.



3. Pick up after your pets. Dog waste and feces from other warm-blooded animals pollute local waterways and are larger polluters than you may think. This type of pollution contributes to the closing of beaches and shellfish beds all over the state. Pick up your pet's waste and deposit it in a trash can.



4. Inspect septic systems. Approximately 1/3 of the state uses some form of septic system for sewage disposal. Failing septic systems or cesspools are a major source of pollution to ground water and local reservoirs. What you flush directly affects the water we drink and the waters where we fish, swim and boat. If you have a septic system inspect it regularly, pump and repair it as needed. If you have a cesspool, replace it. For more information on maintaining a healthy septic system the **Septic System Checkup Handbook** is available online at www.state.ri.us/dem/pubs/regs/regs/water/isdsbook.pdf or call for a copy at 222-6822.



5. Avoid over-fertilizing your lawn. During rain storms, **nutrients** from lawn fertilizer can be washed off lawns and paved areas into local waters. This type of pollution contributes to **eutrophication**, a process that causes nuisance algal blooms and

reduction of habitat and oxygen levels for many aquatic organisms. This leads to a decline in fish and shellfish populations, and reduces the diversity of fish in our waters. Get your soil tested to see if it really needs more fertilizer and if so, use as little as necessary. Read the label on fertilizer packages, apply according to directions, and clean-up any fertilizer left on paved areas. Also, reduce your lawn area by planting native, more drought-tolerant plants that are better adapted for the environment, and can act as buffers to prevent runoff from your lawn. For more information and fact sheets, log onto the **University of Rhode Island Cooperative Extension Home*A*Syst** website at www.uri.edu/ce/wq.



6. Minimize the use of hazardous products and **recycle** as much as possible. Cleaning and other household products contain many hazardous chemicals. Try to use the least harmful products available. Learn how to dispose of household hazardous chemicals properly by calling the **RI Resource Recovery program** at 942-1430 x 241 or visit them online at www.rirrc.org. The RIRRC website also has recycling information. Recycling helps to conserve natural resources and reduces the amount of refuse sent to landfills. Start a compost bin and buy products made with or packaged in recycled material to reduce waste further. Consult your town for **recycling** guidelines and check the RIRRC website listed above.



7. Get involved. Volunteer.

Help with clean-up efforts or be a volunteer water monitor. Participate in local activities that benefit the environment. Find out if there is a watershed council near you. A list is available on DEM's website at www.state.ri.us/dem/topics/water.htm. If your watershed does not have an association, start one! Other statewide non-profit organizations also need volunteers. For more information check out the websites for Save the Bay at www.savebay.org and URI's Watershed Watch at www.uri.edu/ce/wq/. Every little bit you do counts! **Speak out.** Attend public meetings that pertain to water quality. Your participation makes the statement that your community is concerned about local waterways. Public involvement is imperative if your local and state public servants are to help you make large-scale improvements in your watershed. If you see a problem in your area or want something done, say something! If you don't have time to attend meetings, call or contact a city or town official, a state representative, or DEM.



8. Conserve water. If you are

connected to a public sewer, conserving water will help reduce the discharge from your wastewater treatment facility into local waters. Water conservation helps prevent septic system failures. To learn more about conserving water, visit the RI Water Resources Board at www.wrb.state.ri.us.



9. Pump it, don't dump it! If you own a sailboat or a motorboat have your holding tank emptied at one of the local pumpout stations around Rhode Island. For a list of **pumpout locations** call **222-3961** or visit www.state.ri.us/dem/maps/static/pumpmap.jpg. Also, if you have an old engine on your motor boat, look into updating it to a new 2-cycle or 4-cycle engine. They are cleaner for the environment and more efficient, which means they are lighter on your wallet!



10. Get out! Get out on the

water. Swim, sail, surf, kayak, fish, windsurf, boat, shellfish, go birding or walk along the shore. Explore the waters near your home or visit other parts of the state. For information about beach closures, contact the Department of Health **Beach Hotline** at **222-2751** or online at www.health.state.ri.us/topics/bathing.htm. For information on **shellfish bed closures**, call DEM at **222-3961**. Make it a point to enjoy the benefits of living near the water, and while you're out there keep an eye out for problems or pollution sources. **To file an environmental complaint with DEM** (which can be anonymous), call: **222-1360**.

Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street, Providence, RI 02908-5767
Phone (401) 222-6800
www.state.ri.us/dem/



V. Masson April 2003

10

SIMPLE THINGS YOU CAN DO TO HELP CLEAN RHODE ISLAND WATERS



Forty percent of Rhode Islanders get their drinking water from groundwater or small local reservoirs. Outdated cesspools and failing septic systems are a major source of pollution to these water supplies. What you flush down your toilet directly affects the water you drink and the waters you fish, swim, and boat in.

CONVENTIONAL SEPTIC SYSTEMS

When properly designed, installed, and maintained, septic systems help keep your water supply safe. They replenish groundwater, and they are considered a permanent disposal option. All septic systems need regular maintenance. It is much less expensive to keep them operating properly through regular inspections and pumping than to replace them if they fail. With proper care a conventional septic system can be long lasting and cost effective.

There are two major parts to a conventional septic system

THE SEPTIC TANK

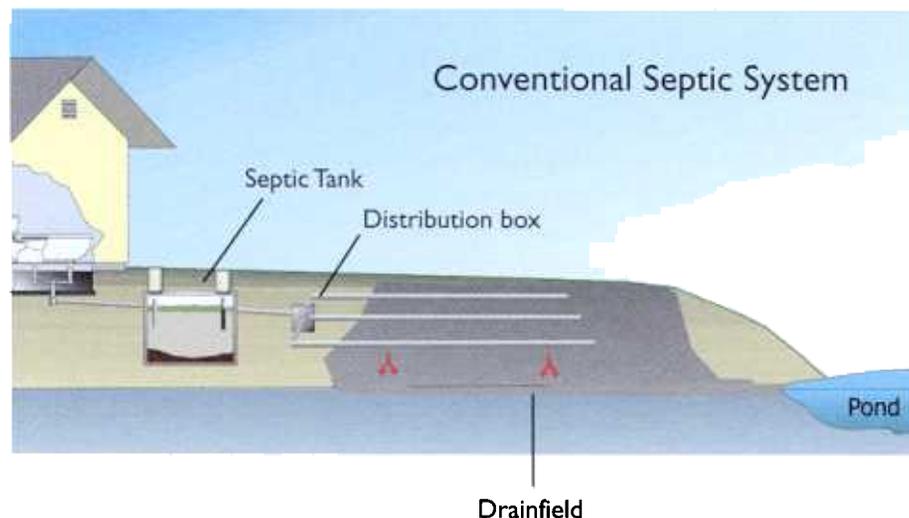
The septic tank separates solids from liquid before sending wastewater to the drainfield. A layer of sludge settles at the bottom and a layer of scum forms at the top, so only the clearest wastewater goes into the ground. Keeping solids in the tank and out of the drainfield is the best way to prolong system life.

Modern Tank features include:

- Water tightness, solids gradually build up and must be pumped out regularly.
- Access risers allow easy entry for inspection and pumping.
- A low cost effluent filter to help keep solids in the tank and protect your drainfield.

What YOU can do.

- Inspect your septic system regularly
- Pump and repair it as needed
- If you have a cesspool, plan to replace it

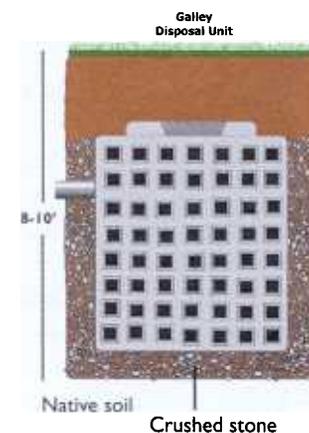
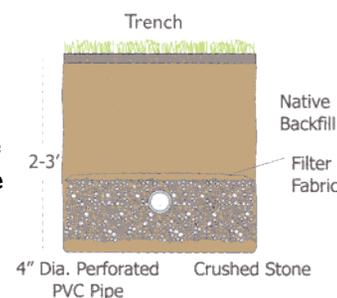


THE DRAINFIELD

Drainfields distribute the wastewater to the soil. Two types commonly used are disposal trenches and leaching chambers.

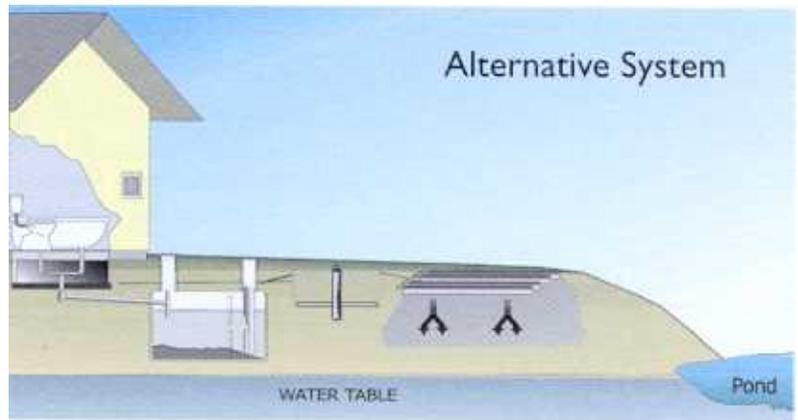
A **Trench**-type drainfield consists of two or more parallel stone-lined ditches, each with a perforated pipe that allows incoming liquid wastewater to seep into the soil. A distribution box located between the tank and the drainfield splits wastewater flow to the different lines.

Leaching chambers are bottomless concrete box-like structures with open, grated sides. Two types are commonly used. "Galleys" are 4ft. x 4ft. X 4ft. units installed as deep as 10 feet below ground. "Flow diffusers" are shallow 8ft. X 4ft. x 18in. units. Both types of seepage pits are generally installed in a series of three or more. Liquid effluent flows directly from the tank into the seepage pit where it seeps out the side walls and bottom.



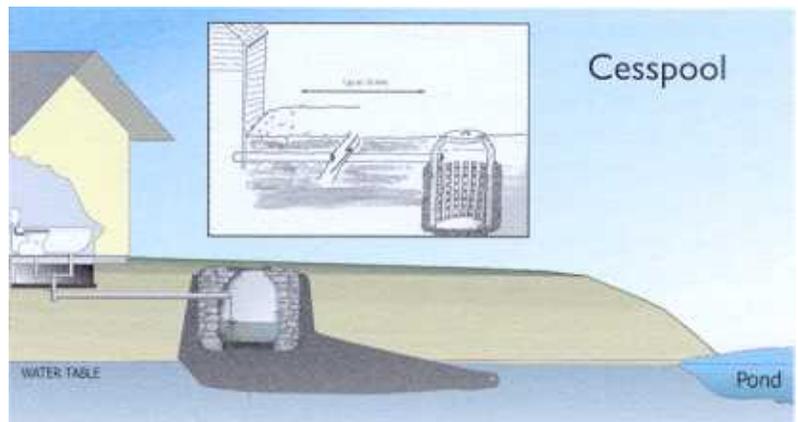
ALTERNATIVE SEPTIC SYSTEM

New technologies treat wastewater before it reaches groundwater. These alternative systems provide one or more extra treatment steps than conventional systems. Enhanced treatment systems offer solutions for difficult sites and environmentally sensitive areas.



CESSPOOLS

A cesspool is nothing more than a covered pit that receives wastewater and allows it to drain into the surrounding soil. This might be a stone-walled pit, perforated concrete chamber, or leaking steel tank. Although still in common usage, cesspools don't treat wastewater. Solids and liquids seep directly through the soil into the groundwater. This poses a threat to surrounding bodies of water and nearby wells. Not sure what's in your backyard? Chances are you have a cesspool or other substandard system if your house was built before 1970.



FAILING SEPTIC SYSTEMS

Septic systems fail when wastewater is unable to seep into the ground. Common causes of failure are:

- Overloading with too much water.
- Improper disposal of solids or grease.
- Tank full of solids, drainfield clogged with solids.
- High water table flooding the drainfield.
- Broken pipes, tree roots disrupting system, or other damage.

Your system may be failing if you have:

- Sluggish drains or odor
- Wastewater backups into house
- Squishy patches above drainfield
- Lush grass above drainfield

Even if you don't notice any problem, your system can still be polluting groundwater. In very sandy or wet soils wastewater may reach the groundwater too quickly. Leaking tanks or broken pipes allow wastes to seep into groundwater without treatment.

Even new systems can fail due to faulty design or poor installation. Common causes are use of unwashed stone or poor-quality gravel fill, improperly sealed tank seams and plugs, and soil compaction or structural damage by heavy equipment driven over the system.



FIND OUT WHAT'S IN YOUR BACKYARD

To keep drinking water safe, and maintain property values, many RI towns require regular system maintenance. Financial assistance may be available for repairs. Contact your town hall to learn more. For technical information contact URI Cooperative Extension at 401-874-4558/5950 or <http://www.uri.edu/ce/wq>.

Cooperative Extension in Rhode Island provides equal opportunities in programs and employment without regard to race, color, national origin, sex, or preference, creed or disability. This publication is supported by URI Cooperative Extension, College of the Environment and Life Sciences, University of Rhode Island. Partial funding for this project provided by CSREES, Project 92- EWQI-1-1040, and the EPA Block Island/Green Hill Pond Watershed National Community Decentralized Wastewater Treatment Demonstration Project, Clean Water Act section 319, and the RI Department of Environmental Management.





Stormwater Pollution Found in Your Area!

This is not a citation.

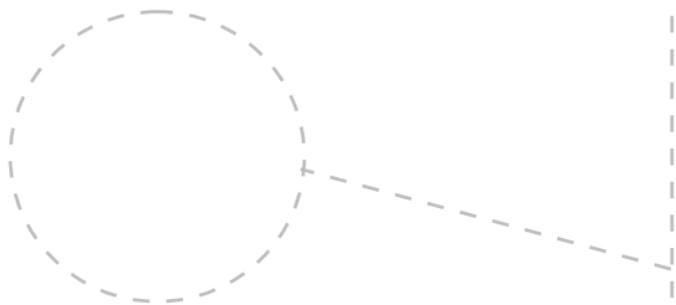
This is to inform you that our staff found the following pollutants in the storm sewer system in your area. This storm sewer system leads directly to

-
- Motor oil
 - Oil filters
 - Antifreeze/transmission fluid
 - Paint
 - Solvent/degreaser
 - Cooking grease
 - Detergent
 - Home improvement waste (concrete, mortar)
 - Pet waste
 - Yard waste (leaves, grass, mulch)
 - Excessive dirt and gravel
 - Trash
 - Construction debris
 - Pesticides and fertilizers
 - Other
-



For more information or to report an illegal discharge of pollutants, please call:





Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. As it flows, it can pick up debris, chemicals, dirt, and other pollutants and deposit them into a storm sewer system or waterbody.

Anything that enters a storm sewer system is discharged *untreated* into the waterbodies we use for swimming, fishing, and providing drinking water.

Remember: Only Rain Down the Drain

To keep the stormwater leaving your home or workplace clean, follow these simple guidelines:

- ◆ Use pesticides and fertilizers sparingly.
- ◆ Repair auto leaks.
- ◆ Dispose of household hazardous waste, used auto fluids (antifreeze, oil, etc.), and batteries at designated collection or recycling locations.
- ◆ Clean up after your pet.
- ◆ Use a commercial car wash or wash your car on a lawn or other unpaved surface.
- ◆ Sweep up yard debris rather than hosing down areas. Compost or recycle yard waste when possible.
- ◆ Clean paint brushes in a sink, not outdoors. Properly dispose of excess paints through a household hazardous waste collection program.
- ◆ Sweep up and properly dispose of construction debris like concrete and mortar.



Keep Our Streams

Clean!



*Storm Drains
lead to fresh water!*

■ Street Litter, Plastics, and Leaves

Be mindful of litter, NEVER throw litter down into storm drains. Keep catch basins free of debris and leaves.

■ Fertilizers

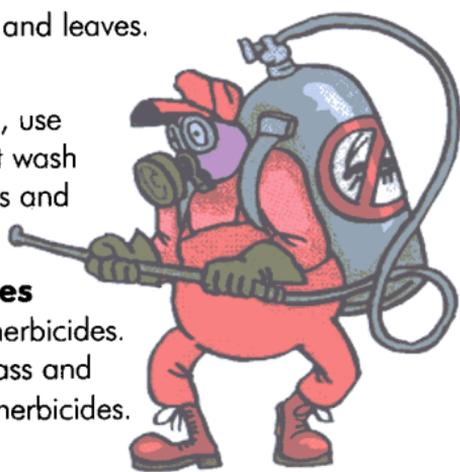
Avoid use of fertilizers. If needed, use organic fertilizers. Sweep, do not wash any fertilizers or soil off driveways and walkways.

■ Pesticides and Herbicides

Minimize use of pesticides and herbicides. Use natural alternatives. Trim grass and remove weeds by hand without herbicides.

■ Pet Waste

Dispose of pet waste by flushing it down the toilet, burying it, or discarding it into a plastic bag and place in your trash.



■ Yard Waste

Do not allow soil, leaves or grass clippings to accumulate on your driveway, sidewalk or in the street. Compost yard waste and use on your soil.

■ Motor Oil

Never pour used motor oil down the drain. Take it to a local service station to be recycled.

■ Anti-Freeze

Take used Anti-Freeze to a service station for recycling.

Never mix Anti-Freeze with any other substance.



■ Paint

Donate old paint to local groups. Dispose of oil and lead based paints at the designated household hazardous waste collection center, Bondi's Island Landfill. Appointments are available by calling 787-7840.

■ Household Hazardous Waste

Do not pour hazardous waste down any drain or discard with regular trash.

Contact your Springfield Solid Waste Office (787-7840) to learn how to properly dispose of hazardous waste. Use natural or less toxic alternatives.



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Water/Sewer Commission



Protecting Water Quality from **URBAN RUNOFF**

Clean Water Is Everybody's Business

In urban and suburban areas, much of the land surface is covered by buildings and pavement, which do not allow rain and snowmelt to soak into the ground. Instead, most developed areas rely on storm drains to carry large amounts of runoff from roofs and paved areas to nearby waterways. The stormwater runoff carries pollutants such as oil, dirt, chemicals, and lawn fertilizers directly to streams and rivers, where they seriously harm water quality. To protect surface water quality and groundwater resources, development should be designed and built to minimize increases in runoff.

How Urbanized Areas Affect Water Quality Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grasslands traps rainwater and snowmelt and allows them to filter slowly into the ground. In contrast, impervious (nonporous) surfaces like roads, parking lots, and rooftops prevent rain and snowmelt from infiltrating, or soaking, into the ground. Most of the rainfall

The most recent National Water Quality Inventory reports that runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries and the third-largest source of impairments to surveyed lakes.

Did you know that because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size?

and snowmelt remains above the surface, where it runs off rapidly in unnaturally large amounts.

Storm sewer systems concentrate runoff into smooth, straight conduits. This runoff gathers speed and erosional power as it travels underground. When this runoff leaves the storm drains and empties into a stream, its excessive volume and power blast out streambanks, damaging streamside vegetation and wiping out aquatic habitat. These increased storm flows carry sediment loads from construction sites and other denuded surfaces and eroded streambanks. They often carry higher water temperatures from streets, roof tops, and parking lots, which are harmful to the health and reproduction of aquatic life.

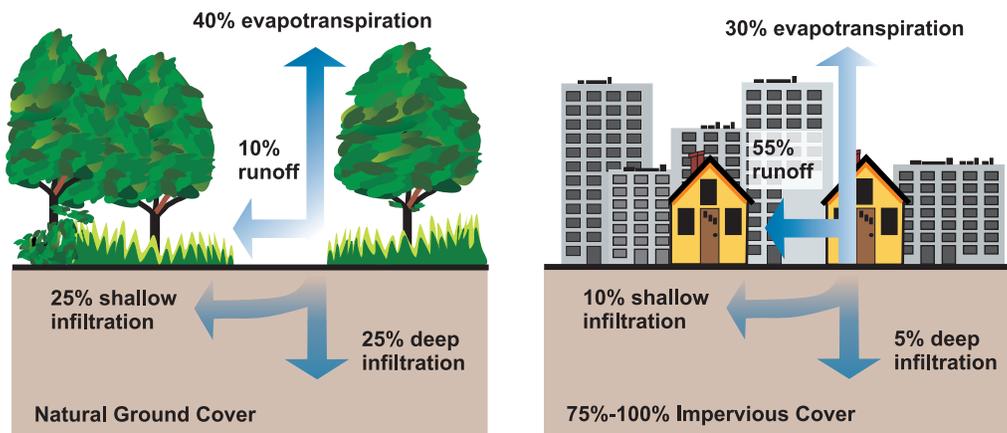
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot survive when these conditions prevail.

Increased Pollutant Loads

Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. The pollutants include:

- Sediment
- Oil, grease, and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria, and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles, and other sources
- Thermal pollution from dark impervious surfaces such as streets and rooftops

These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe and unpleasant.



Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

Managing Urban Runoff

What Homeowners Can Do

To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns. Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose. Instead of disposing of yard waste, they can use the materials to start a compost pile. And homeowners can learn to use Integrated Pest Management (IPM) to reduce dependence on harmful pesticides.

In addition, households can prevent polluted runoff by picking up after pets and using, storing, and disposing of chemicals properly. Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed. Drivers can also avoid impacts from car wash runoff (e.g., detergents, grime, etc.) by using car wash facilities that do not generate runoff. Households served by septic systems should have them professionally inspected

and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.

Controlling Impacts from New Development

Developers and city planners should attempt to control the volume of runoff from new development by using low impact development, structural controls, and pollution prevention strategies. Low impact development includes measures that conserve natural areas (particularly sensitive hydrologic areas like riparian buffers and infiltrable soils); reduce development impacts; and reduce site runoff rates by maximizing surface roughness, infiltration opportunities, and flow paths.

Controlling Impacts from Existing Development

Controlling runoff from existing urban areas is often more costly than controlling runoff from new developments. Economic efficiencies are often realized through approaches that target “hot spots” of runoff pollution or have multiple benefits, such as high-efficiency street sweeping (which addresses aesthetics, road safety,

and water quality). Urban planners and others responsible for managing urban and suburban areas can first identify and implement pollution prevention strategies and examine source control opportunities. They should seek out priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Local governments are encouraged to take lead roles in public education efforts through public signage, storm drain marking, pollution prevention outreach campaigns, and partnerships with citizen groups and businesses. Citizens can help prioritize the clean-up strategies, volunteer to become involved in restoration efforts, and mark storm drains with approved “don’t dump” messages.



Related Publications

Turn Your Home into a Stormwater Pollution Solution!

www.epa.gov/nps

This web site links to an EPA homeowner’s guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas

www.epa.gov/owow/nps/urbanmm

This technical guidance and reference document is useful to local, state, and tribal managers in implementing management programs for polluted runoff. Contains information on the best available, economically achievable means of reducing pollution of surface waters and groundwater from urban areas.

Onsite Wastewater Treatment System Resources

www.epa.gov/owm/onsite

This web site contains the latest brochures and other resources from EPA for managing onsite wastewater treatment systems (OWTS) such as conventional septic systems and alternative decentralized systems. These resources provide basic information to help individual homeowners, as well as detailed, up-to-date technical guidance of interest to local and state health departments.

Low Impact Development Center

www.lowimpactdevelopment.org

This center provides information on protecting the environment and water resources through integrated site design techniques that are intended to replicate preexisting hydrologic site conditions.

Stormwater Manager’s Resource Center (SMRC)

www.stormwatercenter.net

Created and maintained by the Center for Watershed Protection, this resource center is designed specifically for stormwater practitioners, local government officials, and others that need technical assistance on stormwater management issues.

Strategies: Community Responses to Runoff Pollution

www.nrdc.org/water/pollution/storm/stoinx.asp

The Natural Resources Defense Council developed this interactive web document to explore some of the most effective strategies that communities are using around the nation to control urban runoff pollution. The document is also available in print form and as an interactive CD-ROM.

For More Information

U.S. Environmental Protection Agency
Nonpoint Source Control Branch (4503T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

www.epa.gov/nps

As stormwater flows over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt, and other pollutants. Stormwater can flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water. Polluted runoff is the nation's greatest threat to clean water.



By practicing healthy household habits, homeowners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater. Adopt these healthy household habits and help protect lakes, streams, rivers, wetlands, and coastal waters. Remember to share the habits with your neighbors!

Healthy Household Habits for Clean Water

Vehicle and Garage

- Use a commercial car wash or wash your car on a lawn or other unpaved surface to **minimize** the amount of dirty, soapy water flowing into the storm drain and eventually into your local waterbody.



- Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Clean up **spilled fluids** with an absorbent material like kitty litter or sand, and don't rinse the spills into a nearby storm drain. Remember to properly dispose of the absorbent material.

- Recycle** used oil and other automotive fluids at participating service stations. Don't dump these chemicals down the storm drain or dispose of them in your trash.

Lawn and Garden

- Use pesticides and fertilizers **sparingly**. When use is necessary, use these chemicals in the recommended amounts. Avoid application if the forecast calls for rain; otherwise, chemicals will be washed into your local stream.
- Select **native** plants and grasses that are drought- and pest-resistant. Native plants require less water, fertilizer, and pesticides.
- Sweep up** yard debris, rather than hosing down areas. Compost or recycle yard waste when possible.

- Don't overwater your lawn. Water during the **cool** times of the day, and don't let water run off into the storm drain.
- Cover piles of dirt and mulch being used in landscaping projects to prevent these pollutants from blowing or washing off your yard and into local waterbodies. **Vegetate** bare spots in your yard to prevent soil erosion.

Home Repair and Improvement

- Before beginning an outdoor project, locate the nearest storm drains and **protect** them from debris and other materials.
- Sweep up** and properly dispose of construction debris such as concrete and mortar.
- Use hazardous substances like paints, solvents, and cleaners in the **smallest amounts possible**, and follow the directions on the label. Clean up spills **immediately**, and dispose of the waste safely. Store substances properly to avoid leaks and spills.
- Purchase and use **nontoxic, biodegradable, recycled, and recyclable** products whenever possible.
- Clean** paint brushes in a sink, not outdoors. Filter and reuse paint thinner when using oil-based paints. Properly dispose of excess paints through a household hazardous waste collection program, or donate unused paint to local organizations.
- Reduce** the amount of paved area and increase the amount of vegetated area in your yard. Use native plants in your landscaping to reduce the need for watering during dry periods. Consider directing downspouts away from paved surfaces onto lawns and other measures to increase infiltration and reduce polluted runoff.



Pet Care

- When walking your pet, remember to **pick up** the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Swimming Pool and Spa

- **Drain** your swimming pool only when a test kit does not detect chlorine levels.
- Whenever possible, drain your pool or spa into the **sanitary** sewer system.
- Properly store pool and spa chemicals to **prevent** leaks and spills, preferably in a covered area to avoid exposure to stormwater.

Septic System Use and Maintenance

- Have your septic system **inspected** by a professional at least every 3 years, and have the septic tank **pumped** as necessary (usually every 3 to 5 years).
- Care for the septic system drainfield by **not** driving or parking vehicles on it. Plant only grass over and near the drainfield to avoid damage from roots.
- Flush responsibly. Flushing household chemicals like paint, pesticides, oil, and antifreeze can **destroy** the biological treatment taking place in the system. Other items, such as diapers, paper towels, and cat litter, can **clog** the septic system and potentially damage components.

Storm drains connect to waterbodies!

Internet Address (URL) • [HTTP://www.epa.gov](http://www.epa.gov)
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer,
Process Chlorine Free Recycled Paper



For more information, visit
www.epa.gov/nps/stormwater
or
www.epa.gov/nps

Remember: Only rain down the drain!



Make your home
The
SOLUTION
TO STORMWATER
POLLUTION!

A homeowner's guide to healthy habits for clean water



Take the Stormwater Runoff Challenge

Across:

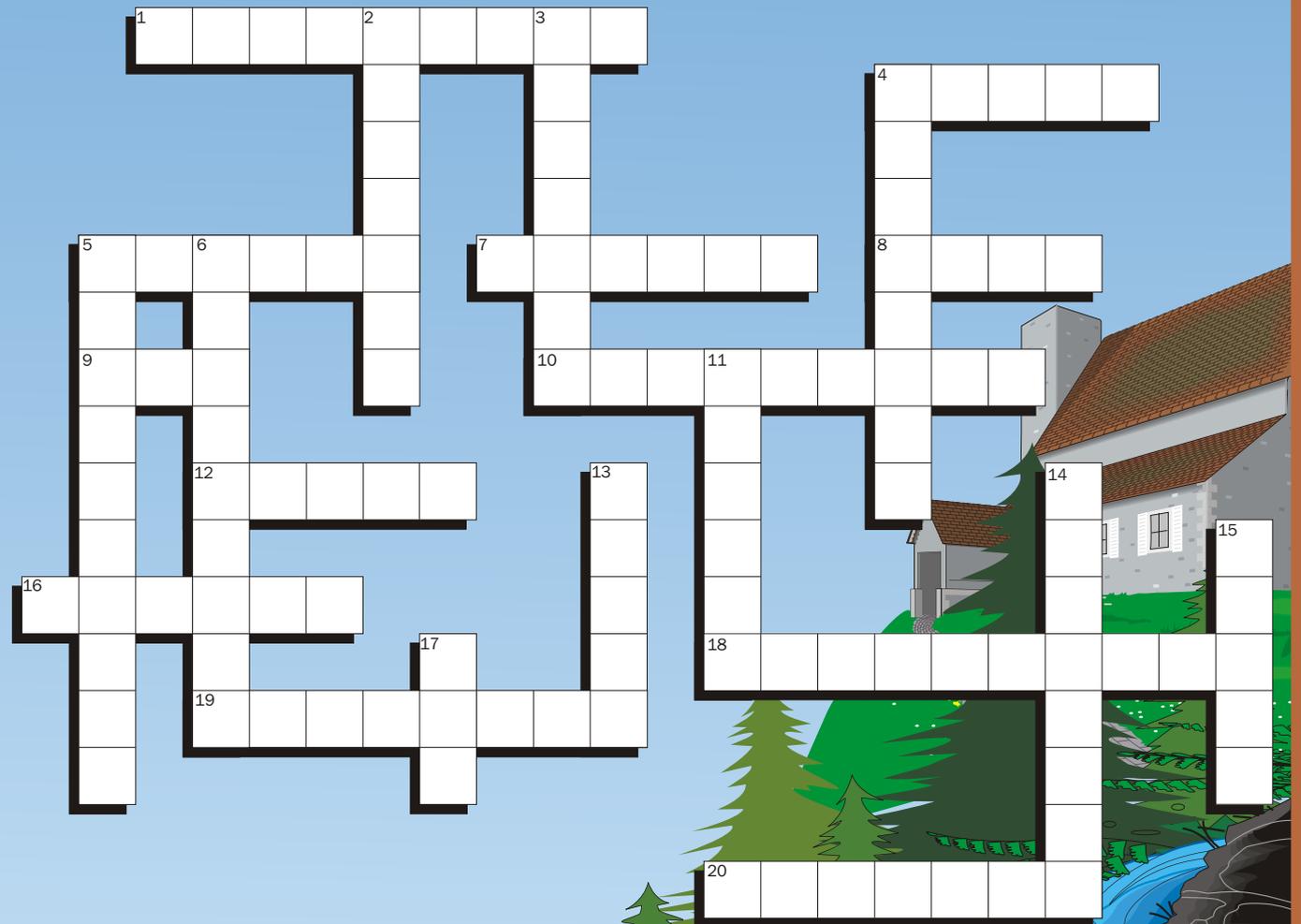
- 1) The area of land that drains into an estuary, lake, stream, or groundwater is known as a _____.
- 4) The _____ of speeding boats can erode shorelines.
- 5) Maintaining your _____ tank will help to prevent bacteria and nutrients from leaking into groundwater and surface waters.
- 7) Wetland plants act like a natural water _____, removing harmful pollutants from stormwater runoff.
- 8) Leave your grass clippings on your _____ to reduce the need for commercial fertilizers.
- 9) A single quart of motor _____, if disposed of improperly, can pollute 2 million gallons of water.
- 10) Fertilizers and animal wastes contain _____ that "feed" algae and other aquatic plants harmful to water quality.
- 12) Polluted runoff from both rural and _____ sources has a significant impact on water quality.
- 16) Storm _____ don't always connect to sewage treatment plants, so runoff can flow directly to rivers, lakes, and coastal waters.
- 18) Follow directions carefully when applying _____ on your lawn—more isn't always better.
- 19) Polluted runoff (also called _____ source pollution) comes from so many places that it's hard to "pinpoint" a source.
- 20) Yard and vegetable food waste are suitable additions to a _____ pile.

Down:

- 2) Don't dump used motor oil into storm drains. _____ it!
- 3) _____ of soil from barren land can cloud nearby streams.
- 4) _____ prevent flooding, improve water quality, and provide habitat for waterfowl, fish, and wildlife.
- 5) Marking "Do Not Dump, Drains to Bay" on a _____ is one way to educate people about polluted runoff.
- 6) Excess sediment, nutrients, toxics, and pathogens are all types of runoff _____.
- 11) Polluted _____ is the nation's #1 water quality problem.
- 13) The cattail is one wetland _____ that helps purify polluted runoff.
- 14) Too much _____ in water can harm aquatic life.
- 15) Proper crop and animal management on _____ helps to control water pollution.
- 17) _____ impact development helps control stormwater pollution through conservation approaches and techniques.

Choices:

- | | | |
|------------|-----------|-------------|
| compost | nonpoint | sediment |
| drains | nutrients | septic |
| erosion | oil | storm drain |
| farms | plant | urban |
| fertilizer | pollution | wakes |
| filter | recycle | watershed |
| lawn | runoff | wetlands |
| Low | | |



For more information, please visit EPA's
Polluted Runoff web site at www.epa.gov/nps

Appendix D

List of Groups, Programs for Schools and Partnership Opportunities

Appendix D

List of Groups, Programs for Schools and Partnership Opportunities

School Programs

Providence schools have a required science curriculum in grades six through eight. To varying extents these curricula address environmental awareness and pollution prevention in accordance with the American Association for the Advancement of Science Project 2061 Benchmarks. These are national standards for science education. The following provides more information about environmental education or non-point source pollution education programs that are taught in Providence School District.

In Providence, teachers are encouraged to create connections between class content and real-world applications. For environmental awareness and pollution prevention education this includes field trips to Central Landfill, Field's Point Wastewater Treatment Facility, and various river and bay boat tours. Students have also been involved with water sampling activities in connection with URI and other agencies as part of science fair project research. Many schools also offer Science Olympiad Teams and student research opportunities that incorporate environmental issues. To varying degrees, outside organizations have also brought presentations to the schools throughout the years.

Citizen's Groups

Several organizations exist that either currently provide public education resources on stormwater quality issues or could provide a public outreach avenue in developing stormwater awareness and developing partnerships with the public. The organizations that have the best potential to support future stormwater education programs in Providence are the following:

Audubon Society of Rhode Island

Since 1897, the Audubon Society of Rhode Island (ASRI) has maintained and cherished a century-long tradition of excellence in environmental advocacy, education and conservation. Due to ASRI's efforts, thousands of acres of state land are secure as wildlife refuges and thousands of children benefit from educational programs and nature camps. As environmental problems do not discriminate, the policies and programs of ASRI seek to better the environmental health of Rhode Island and all of its inhabitants by reaching out to children, concerned citizens, and the government. The ASRI has partnerships with the RI Conservation Districts, RIDEM, USEPA, Woonasquatucket Watershed Council, Water Use Stakeholders Group, Wood-Pawcatuck Watershed Association, Environmental Council, Sierra Club and Clean Water Action. The ASRI offers many student programs at various locations throughout the state:

- **"Bay Animals Like It Clean and Salty"** which focuses on the Narragansett Bay and how pollution affects the plants and animals that live in it,
- **"Watershed Walks"** where students will learn the basics about a watershed and of the importance of water. This program includes that sampling of a watershed.
- **"Everything's Connected"** investigates the connections between all living things. The students learn how the earth recycles and our connection to the earth's health.
- **"Get the Drift and Bag It"** is an international beach cleanup event effort every September.

The Audubon's Nature Center and Aquarium is located at 1401 Hope Street, Bristol, RI 02809, (401) 949-5454 ext. 3118, and their headquarters are located at 12 Sanderson Road, Smithfield, RI 02917, (401) 949-5454 ext. 3000, www.asri.org.

Blackstone Valley Tourism Council

The Blackstone Valley Tourism Council (BVTC) is the state designated regional tourism development agency for the Northern Rhode Island Tourism District. It is a non-profit corporation and registered as an educational organization. BVTC has worked to develop, promote and expand the economic and community development base for the cities and towns in Rhode Island's Blackstone River Valley, while improving the region's quality of life, environment, and historic preservation. The Blackstone River Watershed Council is the division of the BVTC that focuses on the environment and offers exciting and exceptional interpretive services to educators and others. Environmental studies include hands on testing of water quality and learning about the interaction of nature and wildlife. BVTC owns and operates two US Coast Guard certified passenger river vessels offering seasonal American Heritage River Tours of the Blackstone River in Rhode Island. More information about the BVTC can be found at www.blackstonevalleytourismcouncil.org and contacted at (401) 724 2200 or info@tourblackstone.com.

Blackstone River Valley National Heritage Corridor

The U.S. Congress established the Blackstone River Valley National Heritage Corridor (BRVNHC) in 1986 to recognize the region's special place in American History. Located between Worcester, Massachusetts and Providence, RI, BRVNHC stretches for 46 miles along the full course of the Blackstone River and is an affiliated area of the National Park System. A unifying commission works in partnership with individuals, businesses, organizations, numerous local and two state governments, and the National Park Service to protect the Valley. BRVNHC supports several Ranger Environmental Education Programs to schools throughout the Blackstone River Watershed. These programs educate students of all ages about stormwater run-off, how our activities impact a watershed, and how to evaluate the health of a river. More information about the BRVNHC can be found at www.blackstoneheritagecorridor.org and contacted at (508) 234-4242 or mail@blackstoneheritagecorridor.org.

Friends of the Moshassuck

The Friends of the Moshassuck was formed to be an advocate for the river through clean-up efforts and making it more accessible to residents and visitors. They consist of a board and directors and people who live in the neighborhoods along the river and are in the process of becoming a non-profit corporation. Many of their recent efforts and projects are outlined in [Section 4.0](#) (Public Participation/Involvement). The Friends of the Moshassuck have an informational flier about the river that they distribute. Greg Garritt can be contacted at (401) 331-0529, gerritt@mindspring.com, www.themoshassuck.org for more information about this organization.

Native Plant Trust

The Native Plant Trust (formerly known as the New England Wild Flower Society) is the oldest plant conservation organization in the United States, promoting the conservation of temperate North American plants through key programs: Conservation, Education, Research, Horticulture. They do not focus their efforts on any one watershed or town but are an available resource for New England towns. NEWFS's offers educational programs which are both online and in person that are informative to both children and adults. They also offer certificate programs, class visits, workshops and symposiums. Classes and field studies are offered through the year. The Rhode Island Chapter, known as the "Rhode Island Wild Plant Society" can be contacted at P.O. Box 888 North Kingstown, RI 02852, (401) 789-7497, or office@riwps.org. Their website is located at www.riwps.org.

Providence Neighborhood Planting Program

The Providence Neighborhood Planting Program (PNPP) is a tree planting partnership between the City, the Mary Elizabeth Sharpe Street Tree Endowment, the Helen Walker Raleigh Tree Care Trust, and the people of Providence. More than 400 participating groups have been involved with this program. Newsletters from the Mayor's office provides updated information about PNPP and other environmental initiatives around the

City, such as Earth Day Clean-ups and volunteer seed planting. PNPP can be contacted at (401) 368-5380 or info@pnpp.org at www.pnpp.org.

Rhode Island Green Infrastructure Coalition

The Green Infrastructure Coalition (GIC) includes non-profit organizations, city planners, designers, builders, architects, and state and local policymakers that work together to promote nature-based solutions for cleaning stormwater runoff pollution. Green infrastructure provides benefits besides flood control, such as recharging groundwater reserves, reducing urban heat islands, improving habitats and providing recreational spaces in urban areas. The GIC works to provide solutions for runoff pollution by creating projects, leveraging policy in state and municipal governments, and educating others about the movement of rain, snow, and resulting stormwater through the urban and suburban environment. More information can be found at www.greeninfrastructureeri.org or by contacting Meg Kerr at mkerr@asri.org or Lauren Carson at lcarson.ericd@gmail.com.

Save the Bay

Save the Bay (STB) is a non-profit organization that advocates for laws and policies to protect Narragansett Bay, provides public education and outreach programs, sponsors Bay cleanup projects, coordinates the efforts of volunteers, interns, and staff to protect and restore the environmental quality of Narragansett Bay and its watershed.

STB provides outreach programs for a fee that include on-site presentations that use models, puppet shows, and hands-on activities for children and adults to learn about marine habitats, wildlife, and the effects of pollution. STB also offers field trips and uses its educational program vessels to introduce children and families to Narragansett Bay. STB also offers a Storm Drain Marking Project to schools and scout/youth groups that involves students in storm drain mapping, cleaning the areas around catch basins, placing “Don’t Dump, Drains to River” markers on catch basins, and handing out informational pamphlets to the homes within the project area. Students learn about preventing stormwater pollution and educate the community about illicit discharges.

STB’s Headquarters are located at 100 Save the Bay Drive, Providence, RI 02905, (401) 272-3540, www.savebay.org.

USEPA’s Urban Environmental Initiative

The Urban Environmental Initiative (UEI) is a pilot program launched in 1995 under the USEPA in Region 1, New England, to address environmental and public health problems in urban cities. The UEI facilitates community based environmental protection in Connecticut, Massachusetts, and Rhode Island. The UEI program takes an active role in listening to community needs and concerns, identifying projects, and providing resources to implement projects that make measurable improvements in public health and the quality of the urban environment. In Providence, UEI’s involvement started with a conference on rats to gauge public priorities in urban environmental and public health issues, which launched into the creation and development of a Mayor’s level task force targeting vacant lots. UEI supports collaboration on urban environmental and public health issues between a wide range of stakeholders in Providence. Using similar approaches as developed for vacant lots and lead poisoning, UEI is expanding its work to tackle contamination in urban rivers, asthma, and open/green space. For more information about UEI’s efforts in providence please visit <https://www3.epa.gov/region1/eco/uep/ri/index.html> or for contact information please visit <https://www.epa.gov/aboutepa/forms/contacting-epa-new-england>.

Woonasquatucket River Watershed Council

The Woonasquatucket River Watershed Council (WRWC) was formed as part of a successful effort to have the Woonasquatucket River designated one of the American Heritage Rivers. WRWC has helped to implement USEPA’s and RIDEM’s Watershed Approach model and makes a continuous effort to revitalize the river with the six communities in its watershed. WRWC works closely with local partners businesses, non-profit organizations, and state and federal agencies to advance local goals.

WRWC can provide educational mapping about the Woonasquatucket River Watershed. They assist STB with their Storm Drain Marking Program. They also teach over 500 students from grades K-12 on how to become Woono River Hero's as well as the "Dos and Don'ts of the Woonasquatucket". Some additional programs include Fish in the Classroom for elementary school students, River Adventures after school for middle school students and Environmental leaders for high school students. WRWC is located in the Monohasset Mill Bldg., 45 Eagle St, Suite 202, Providence, RI 02909, (401) 861-9046, www.wrwc.org.

YouthBuild Providence

YouthBuild Providence is an educational program designed to provide 16- to 24-year-old Providence residents a second chance at earning their General Education Development (GED) diploma while learning valuable occupational and life management skills. They use construction training, leadership development, and academic preparation as tools to teach the values of discipline, integrity, and work. YouthBuild Providence is a supported project of the Providence Plan, a private, non-profit 501(c)(3) organization. The Providence Plan works on a number of different projects that aim to revitalize Providence and its neighborhoods. YouthBuild Providence is an organization that could potentially help with environmental projects, especially those that would assist Providence's DPW. Currently, YouthBuild Providence and The Providence Plan have close ties City Hall and the Providence Department of Planning and Development. For more information on YouthBuild Providence, contact (401) 273-7528 or their website at www.ybprep.org.

Regional, State and National Groups

There are a number of educational resources available for homeowners and businesses such as stormwater guidance documents, programs for children, and educator training workshops. Many of the education and outreach materials developed can, in many cases, eliminate the need for Providence to develop its own materials. Some of the available resources are listed below.

Adopt Your Watershed

As described in the public education and outreach section of this report, the USEPA has created this campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality in their watershed. The networking and training resources available from this program can help educators, communities, or private citizens improve water quality and implement their local stormwater program through education and participation.

American Rivers

American Rivers is a national, non-profit, conservation organization dedicated to protecting and restoring healthy natural rivers and the variety of life they sustain for people, fish, and wildlife. They provide innovative solutions to improve river health; raise awareness among decision-makers; serve and mobilize the river conservation movement; and are collaborating with their partners to develop a national "river agenda." This will create a unified vision for improving river health across the country. Along with conservation efforts, they promote public awareness about why healthy rivers matter for fish and wildlife, kayakers, canoeists, and anglers, and for our communities as a whole. American Rivers works closely with grassroots river and watershed groups across the country. Staff members also collaborate with other conservation groups, local citizens and businesses, and various federal, state, and tribal agencies to build coalitions and provide technical support. Their website provides educational resources for kids and teachers, and a tools and links page. For more information, please visit <http://www.americanrivers.org/>.

Boy and Girl Scouts of America

Boys and girls may be involved in Scout programs from ages 5 through 17 and are supervised by adult volunteers. Scouts are involved in various community service projects and can be beneficial to implementing outfall identification, storm drain marking, and river cleanup projects or environmental awareness outreach programs. Coordination with local Scout leaders is necessary to implement any activity with their group. The Boy Scouts have eight District Executives that meet monthly to discuss possible projects. The Girl Scouts have Field Coordinators and Service Managers in every town. Distributing

information about the impacts of polluted stormwater on our environment, the city's Phase II program, and the capacity in which boy and girl scouts can help their community are first steps to promote participation.

The Boy Scouts provides its youth with a conservation program designed to be incorporated throughout the Scouting program and teaches awareness and understanding of conservation as a wise and intelligent management of natural resources. The conservation "Good Turn" program is an opportunity for scouts to join with conservation and environmental organizations (federal, state, local, and private) to carry out a conservation "Good Turn" in their home communities. The Boy Scouts also provide an outdoor adventures program of which their "Leave No Trace" policy plays a key role. In Rhode Island, scouts have participated in many activities in their communities including storm drain marking projects with Save the Bay and Earth Day cleanups in the Blackstone Valley and Woonasquatucket River Greenway.

The Girl Scouts are offering partnership initiative called Linking Girls to the Land. This initiative encourages girls to become involved in conservation and natural resource issues and careers on a national and local level. The Water Drop Patch, a facet of Linking Girls to the Land, is a project jointly developed by the United States Environmental Protection Agency and the Girl Scout Council of the Nation's Capital (GSCNC). The participants gain hands-on skills in water management and resource conservation. The Girl Scouts are also offering a new program called GirlFACTS (Girls, Families, and Communities Together in Science), which offers two related activities entitled "geology rocks" and "weather wise". The Girl Scouts have also been involved in Earth Day community clean-ups and Save the Bay's Storm Drain Marking Project.

The Girl Scouts of Rhode Island office is located at 125 Charles Street, Providence, RI 02904, (401) 331-4500 or (800) 331-0149 and may be found at www.gsri.org. The Boy Scouts of America Narragansett Council office is located at 10 Risho Avenue East Providence, RI 02914 and may be found at www.narragansettbsa.org.

Environmental Council of Rhode Island

The Environment Council of Rhode Island (ECRI), Rhode Island's affiliate of the National Wildlife Federation, is an association of groups and individuals that includes the Southern Rhode Island Conservation District, Save the Bay, Rhode Island Public Research Interest Group, and many others. ECRI has established the ECRI Education Fund (EdFund) to "enhance the long-term stewardship of Rhode Island's natural resources." EdFund solicits and manages government and foundation grants to support its research and education initiatives that include developing media and programs to educate the public about environmental health and natural resource restoration. ECRI may be contacted at P.O. Box 9061, Providence, RI 02940, (401) 621-8048 www.environmentcouncilri.org.

Give Water a Hand

This is a national watershed education program of the University of Wisconsin Environmental Resources Center. Support for Give Water a Hand is provided by National Fish and Wildlife Foundation, the U.S. Department of Agriculture, CSREES and NRCS designed to involve young people in local environmental service projects (www.uwex.edu/erc/gwah/). The program provides guidance to students on how to complete an environmental service project and the basic information necessary to understand their watershed. Free guides are available on the internet, but printed copies require printing and shipping fees. The publications are the youth Action Guide (also in Spanish) and the teacher's Leader Guidebook.

Narragansett Bay Commission

The Narragansett Bay Commission (NBC) was created in 1980 to correct and reverse a major municipal pollution problem that threatened the quality of Narragansett Bay. NBC now owns and operates RI's two largest wastewater treatment facilities, which they have successfully upgraded and maintained to improve the bay. The Field's Point Plant is the larger of the two and serves Providence, North Providence, Johnston, and portions of Cranston and Lincoln. NBC also owns the 60+ miles of sewer pipes and 30+ combined sewer overflows (CSOs) that service this area. The CSOs discharge to the Woonasquatucket River, the Providence River, the Moshassuck River, and the West River tributary to the Moshassuck.

NBC's efforts to improve the bay go beyond operating Providence's sewer system and wastewater treatment plant. They also have several public education and outreach projects, including tours of the Field's Point Plant open to students and the general public. Every year NBC staff educates over five hundred elementary school students and teachers from ten school districts located in the NBC service area through the Watershed Explorers program (NBCWE). For more information about NBC's tours and educational programs contact the Public Affairs Office at (401) 461-8848 ext. 377 or nbcpr@narrabay.com

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is a federal agency that works hand-in-hand with the people of Rhode Island to improve and protect their soil, water and other natural resources. For decades, private landowners have voluntarily worked with NRCS specialists to prevent erosion, improve water quality and promote sustainable agriculture. This includes helping landowners develop conservation plans, create and restore wetlands, restore and manage other natural ecosystems as well as advise on stormwater remediation, nutrient and animal waste management, and watershed planning. NRCS provides several educational resources including tip sheets on topics like nutrient management and multi-media information on topics like backyard conservation. Conservation Programs offered and assisted by NRCS can be found at <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/>.

More information about NRCS can be found at <http://www.nrcs.usda.gov/>, while Rhode Island programs can be researched at <http://www.ri.nrcs.usda.gov/> or by calling (401) 828-1300, then press 1. Cassius Spears at (401) 822-8833 is the contact for the Northern Rhode Island NRCS EQIP Program. Diane Petit at (401) 822-8843 is the State Public Affairs Specialist.

New England Interstate Water Pollution Control Commission

The New England Interstate Water Pollution Control Commission (NEIWPC) provides educational programs, promotes participation in water quality restoration programs, and supplies outreach materials. NEIWPC is involved with many projects in the region that currently includes developing outreach strategies and products for the Narragansett Bay Estuary Program with RIDEM. Highlights of the offerings are the NEIWPC website ([www. http://www.neiwpc.org/](http://www.neiwpc.org/)), an Environmental Training Center, youth programs, newsletters such as L.U.S.T.LINE, informational brochures, workshops, and technical advice.

Northern Rhode Island Conservation District

The Northern Rhode Island Conservation District (NRICD) is a non-profit, quasi-public organization that functions as a facilitator for meeting the needs of the local land user in the conservation of soil, water and other related resources. NRICD's mission is to foster a community-based, locally led approach for the stewardship of northern Rhode Island's natural resources through educational campaigns and outreaches into local communities, as well as providing technical assistance to Providence County constituents. The NRICD has established partnerships with the Woonasquatucket and Blackstone Watershed Councils as well as the Rhode Island Watershed Partnership Coordinating Council. The NRICD's District Office is located at 2283 Hartford Avenue, Johnston, RI 02919 (401) 934-0840.

Providence Water Supply Board

The purpose of the PWSB is to supervise, manage and control water collection, storage, purification, and distribution systems of the City of Providence and other areas within its jurisdiction; and to protect and conserve the water supply. The PWSB has practiced aggressive watershed management and source protection since its establishment in 1915 and protects the raw water sources before they can be polluted. The PWSB works with the NRICD to educate students about their watershed. The Scituate Reservoir Watershed Education Program engages students, local residents and stakeholders in order to learn more about the reservoir. More information about this program can be found at www.Landwatersconnection.org. For more information about PWSB's education and outreach programs please visit <http://www.provwater.com/> or contact at (401) 521-6300, 125 Dupont Drive, Providence RI 02907.

Rhode Island Department of Transportation

The Rhode Island Department of Transportation (RIDOT) is a government organization that designs, constructs, and maintains the state's surface transportation system. Rhode Island holds a strong association between the amount of impervious area in a watershed and the impaired waterbodies within that watershed. As RIDOT continues to increase impervious area through roadway improvements, they must be aware of the changes in hydrology and water quality that develop. RIDOT is working with allocated funding over a 10-year period to ensure compliance with the Clean Water Act. Remediation measures will be performed to reduce stormwater pollution flowing into the Narragansett Bay and hundreds of lakes, ponds and rivers throughout the state of Rhode Island.

RIDOT develops watershed plans in the priority watersheds, which are strategies for achieving water quality goals in that area based on its designated uses. A watershed approach encompasses entire natural drainage areas instead of municipal boundaries, which provides an opportunity to collaborate with Providence, among other municipalities, to develop and implement those plans.

Rhode Island Water Resources Board

The RI Water Resources Board and the RI Water Resources Board Corporate are established by Chapter §46-15 of the RI General Laws. The General Assembly recognized that Rhode Island's water resources are among the State's most valuable-if not the most valuable-of all its natural resources. Together, these two agencies of government support the proper development, protection, conservation and use of the state's water resources while providing for economic development and protection for the environment. The RI Water Resources Board Administrative Offices are located at the Rhode Island Department of Environmental Management, Division of Statewide Planning, 235 Promenade Street, Suite 230, Providence, RI 02908. Acting General Manager, Kathleen M. Crawley can be contacted at kathleen.crawley@doa.ri.gov.

Roger Williams Park Zoo

The Roger Williams Park Zoo (Zoo) is described as the ultimate living classroom. The Zoo's education department offers many exciting programs for people of all ages. On-site programs include Zoo camps, Preschool and After-school Adventures, Overnights, and Family Adventures. The Zoo provides educational efforts for various age groups from preschool to college and university, as well as for the whole family. Families and organizations can also work with the Zoo to tailor a program that matches their needs. The Zoo's Education Department Program Registrar can be contacted at 401-785-3510 ext.358, or send an e-mail to programs@rwpzoo.org.

Southern Rhode Island Conservation District

The Southern Rhode Island Conservation District (SRICD) is a non-profit, quasi-public organization that functions as a facilitator for meeting the needs of the local land user in the conservation of soil, water and other related resources. The mission of the SRICD is to promote and achieve a healthy environment and sustainable use of natural resources for the people of the State of Rhode Island, now and for the future, by coordinating partners to provide technical, educational and financial resources.

SRICD is located at URI East Farm Fisheries Building #50, East Farm Road, South Kingston RI and has a website at <https://www.sricd.org/>. For more information contact Gina Fuller, at (401) 500-0422 or via email at sricd.info@gmail.com. Board Meetings are the 4th Monday each month and are open to the public.

University of Rhode Island

There are several outreach programs offered by the University of Rhode Island's (URI) Cooperative Extension Service that may be beneficial to the City for its stormwater education outreach program. The university's programs include:

- **URI Nonpoint Education for Municipal Officials (NEMO)** - This program offers training in the science, management, and regulation of water resources for community leaders and volunteer board members. Its goal is to provide decision makers with the skills and resources to identify

local water quality problems and to adopt effective pollution controls. Educational programs are provided throughout the year. For more information contact Lorraine Joubert, URI NEMO at (401) 874-2138 or refer to their website at web.uri.edu/nemo.

- **Rhode Island Home*A*Syst** - A consortium of educational projects in twenty-five states, this project focuses on educating and training residents in the community on environmental and health risks inside and outside their homes. The program includes topics on stormwater management, hazardous material storage and handling, and yard and garden care. The Coordinator of the URI Home*A*Syst, Alyson McCann, can be contacted at (401) 874-5398 and alyson@uri.edu or refer to their website web.uri.edu/safewater.
- **Water Watch Program (URI WWP)** - This program works with local governments, watershed, tribal, and other organizations to assess water quality by recruiting and training volunteers to become citizen scientists. They offer several training programs with their main focus on performing water quality monitoring. WWP offers supplemental training programs as part of their water quality program. The Shoreline Survey Training teaches participants to observe water quality, natural and constructed features, identify sources of pollution, and how to record observations on large scale maps and standardized data sheets while along a section of the shore. Aquatic Plant Identification and Mapping is a multi-session training course on identifying and mapping New England aquatic plants using field keys. Tributary Monitoring and Habitat Assessment is a multi-session training course on conducting intensive habitat assessments and monitoring of streams and rivers. More information about the URIWW Program is available at <http://web.uri.edu/watershedwatch>, or contact Elizabeth Herron, Program Director, at (401) 874-4552 or emh@uri.edu.

U.S Environmental Protection Agency

The Office of Wastewater Management (OWM) provides technical resources to persons responsible for designing and implementing BMPs recommended to achieve the goals of the six minimum control measures. These resources are available electronically at USEPA web sites. While the resources provide some background to the development of the Phase II regulations, they are largely oriented to municipalities and organizations that are developing stormwater management plans as opposed to the general public.

The Office of Water has created "Surf Your Watershed", a campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality (<https://www.epa.gov/waterdata/surf-your-watershed>). The program provides a resource for communities or groups to network with other groups nationwide and can enable a community to share, develop or utilize successful strategies from existing programs. The resources available include training courses and publications offered by the Watershed Academy to assist with implementing stormwater programs.

Appendix E

Teaching Resources

Appendix E

Teaching Resources

Teachers in the Providence school system have a number of resources and periodicals available to them that focus on environmental issues including water quality. Some of these resources are:

Active Watershed Education (AWESome!) Program

The Northern Rhode Island Conservation District (NRICD) can provide the AWESome! Program to any school system in Rhode Island. This program can easily be altered for different types of watersheds. This curriculum includes discussion of the following applicable topics:

- **"What is a Watershed?"** demonstrates how water enters and flows through a watershed. Students learn how to read topographic maps and delineate watershed boundaries, and locate locations of interest (i.e., home, school, etc.).
- **"Water Resources"** demonstrates the importance of ground and surface water. Experiments illustrate how an aquifer supplies water to wells and reservoirs. The session also emphasizes the interconnection between wetlands, groundwater, and surface water.
- **Effects of Land on the Watershed"** s discussion and demonstrations to illustrate how different land uses impact the watershed. Through the use of a model, students see how infiltration and runoff of rainwater are affected by three different lands: pavement, row crops and pasture.
- **"Cultural Resources in the Watershed"** introduces the students to the history of the watershed and how land in the watershed has changed through time.
- **"Introduction to Water Quality Issues"** is a current development proposal that could adversely impact the watershed to introduce students to environmental issues. Students are assigned to one of many interest groups supporting various sides of the issue.
- **"Non-point Sources of Pollution"** defines and identifies major sources of non-point source pollution in the watershed. A discussion of best management practices (BMP's) to control non-point source pollution is followed by a field trip to local farms and shopping areas where BMP's have been implemented.
- **"Farms in The Watershed: A Field Trip"** demonstrates best management practices to minimize non-point source pollution from farms. Students are taken to a variety of farms, including dairy, poultry, turf, and organic vegetable operations.

The NRICD's District Office is located at 2283 Hartford Avenue, Johnston, RI 02919 (401) 934-0840 and online at <https://www.nricd.org/>. For more information on AWESome! and other NRICD educational programs contact Molly Allard at 401-934-0840.

Catch the Science Bug

Catch the Science Bug was created by Kim Bent as a traveling science program, bringing hands-on science activities to Boston-area elementary schools. Its mission is to excite and educate students about science and how it affects everyday aspects of life. Their Traveling Programs feature interactive inquiry-based methods of presentation to enable students to take part in the learning process. Students learn by predicting outcomes, observing, comparing, experimenting and drawing conclusions through hands-on activities. Appropriate math concepts are also integrated. All programs are designed in accordance with the National Science Standards, the Massachusetts Science and Technology Curriculum Frameworks, and the Benchmarks on the Way to Environmental Literacy.

Catch the Science Bug offers a range of programs that are tailored for students in Pre-kindergarten to grade 8. They also offer scibug science camps which is a weeklong science camp for grades K-5.

Catch the Science Bug is also on TV and can be found at PBS Rhode Island channel 36.2 or Comcast channel 294. More information about available education programs can be found at www.sciencebug.org and by contacting 508-854-1681 or info@sciencebug.org.

EARTHWATCH

This magazine is produced bimonthly by the organization of the same name to link business, science, and the community in search of environmental solutions. Contact information: 1380 Soldiers Field Road, Ste. 2700, Boston, MA 02135, e-mail: info@earthwatch.org, 1-(800) 776-0188.

Green Teacher

This magazine is produced by and for educators to enhance environmental and global education at all grade levels. It is produced four times per year and contains approximately fifty pages of ideas, activities, perspective articles, reports of what successful teachers, parents, and schools are doing, activities for various grade levels, evaluations of new books, kits, games and other resources. Green Teacher may be contacted at info@greenteacher.com, (613) 475-4925 or 1-(888) 804-1486.

Healthy Water, Healthy People

Healthy Water, Healthy People is an innovative water quality education program sponsored by Project WET and the Hach Scientific Foundation, which offers hands-on activity guides, testing kits, and training. Healthy Water, Healthy People is for anyone interested in learning and teaching about contemporary water quality education topics. The goal of the program is to raise the awareness and understanding of water quality topics and issues and their relationship to personal, public, and environmental health. Healthy Water, Healthy People will help educators address science standards through interactive activities that interpret water quality concepts and promote diverse learning styles, with foundations in the scientific method.

The program comes with educator guides for the fourth grade through university level age students as well as testing kits and manuals. The Healthy Water, Healthy People Testing Kits yield in-depth information about eleven water quality parameters. The water quality testing kits include all materials and equipment needed for field and classroom analysis of water samples for chemical, physical, and biological parameters.

For more information about the Healthy Water, Healthy People program visit their website at <https://www.projectwet.org/what-we-do/publications/guides/healthy-water-healthy-people-water-quality-educators-guide>.

President's Environmental Youth Awards

The President's Environmental Youth Awards is a program that recognizes young people across America for projects that demonstrate their commitment to the environment. Winners of regional certificates in the program are evaluated against winners in other USEPA regions. The national winner receives a plaque issued by the President of the United States at an USEPA awards ceremony. Participants of completed projects will receive a certificate signed by the President. Projects can include a variety of topics focused on environmental issues and environmental science. Participation in this awards program can be a mechanism to promote student interest in other education or participation programs.

Project WET

Project WET (Water Education for Teachers) is a national nonprofit water education program for educators and young people located on the campus of Montana State University. The goal of Project WET is to facilitate and promote the awareness, appreciation, knowledge and stewardship of water resources through the development and distribution of classroom ready teaching aids and through the establishment of Project WET programs. It is active in all 50 states, the District of Columbia, the U.S. islands and select provinces of Canada.

Certified Project WET facilitators conduct free workshops where educators, community leaders and natural resource managers receive instruction in the use of Project WET materials. A workshop lasts six hours and participants receive the highly acclaimed Project WET Curriculum and Activity Guide. Workshop participants are then encouraged to integrate activities from the Guide into the existing school curriculum or other appropriate forums. This guide is a 500-page publication filled with over 90 innovative, interdisciplinary activities for grades K – 12, most of which are hands-on.

Designed to coincide with state and national standards, the Guide addresses the following content areas: water has unique physical and chemical characteristics; water is essential for all life to exist; water connects all Earth systems; water is a natural resource; water resources are managed; water resources exist within social contexts; water resources exist within cultural contexts.

Please contact Kimberly Sullivan of RIDEM, (401) 539-0019, for more information about this program.

USEPA Environmental Education (EE)

The on-line EE provides teachers with technical background, curriculum and activities information, and workshops on a variety of environmental topics. This resource is useful in providing educators with the tools to teach students in grades K-12. The EE web page is www.epa.gov/education/. More information on educational resources, including having USEPA employees provide talks and presentations at public events or in schools, may be obtained from the USEPA Region 1 (New England) office located at 5 Post Office Square, Suite 100, Boston, MA 02109-3912, or Kristen Conroy at conroy.kristen@epa.gov.

The Environmental Education Grant Program was developed to provide financial support for projects that “design, demonstrate or disseminate environmental education practices, methods or techniques.” Multiple organizations are eligible to apply for grant funds.

USEPA Student Center

USEPA’s Student Center web site provides information and activities for students to learn more about surface water ecosystems, environmental laws, and pollution. The site is located at www.epa.gov/students/. There is also the Explorers’ Club web page for younger students with games, activities and documents on the basics of environmental education.

Appendix F

City Ordinance, Section 25-83 – Illicit Discharge Detection and Elimination

Sec. 25-83. - Illicit discharge detection and elimination.

- (a) *Illicit discharges.* Illicit discharges to the municipal storm sewer system are comprised of non-stormwater discharges that are expressly prohibited from the municipal storm sewer system unless the discharges have received all required federal, state and local permits including the Rhode Island Pollutant Discharge Elimination System (RIPDES) or is included in one (1) of the following categories of discharges: discharges which result from the washdown of vehicles at retail dealers selling new and used automobiles where no detergents are used and individual residential car washing; external building washdown where no detergents are used; the use of water to control dust; fire fighting activities; fire hydrant flushing; natural springs; uncontaminated groundwater; dechlorinated pool discharges; air conditioning condensate; lawn watering; potable water sources including waterline flushing; irrigation drainage; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled materials have been removed) and where detergents are not used; discharges from foundation or footing drains where flows are not contaminated with process materials such as solvents, or contaminated by contact with soils where spills or leaks of toxic or hazardous materials have occurred; uncontaminated utility vault dewatering; dechlorinated water line testing water; hydrostatic test water that does not contain any treatment chemicals and is not contaminated with process chemicals.
- (b) *Right of entry.* To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the director of public works and/or his/her designated representative may enter upon privately owned property for the purpose of performing their duties under this section. He/she may make or make cause for such examinations, surveys or sampling as the city deems reasonably necessary.
- (c) *Notification of spills.* Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials, which are resulting or may result in unauthorized discharges or pollutants discharging into stormwater, the storm drain system, or waters of the state from said facility, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of a hazardous material said person shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). In the event of a release of non-hazardous materials, said person shall notify the authorized enforcement agency no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the authorized enforcement agency within five (5) business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three (3) years. Nothing in this section shall preclude any owner/lessee from compliance with relevant provisions of the Rhode Island Clean Water Act, R.I.G.L. § 46-12-1 et seq. or other applicable laws or regulations.
- (d) *Enforcement.* If an illicit discharge to the municipal storm system is detected, the owner shall cease the discharge within seven (7) calendar days from notice. Any owner who fails and/or refuses to cease a discharge within seven (7) calendar days from notice shall be fined up to seventy five dollars (\$75.00), and each day following notice during which said discharge continues shall constitute a separate offense. The city also may charge the owner any costs associated with the removal or repair of damage resulting from the discharge. In addition, any continuing discharge after notice shall be deemed, and is hereby declared to be, a public nuisance and the city solicitor is hereby empowered to institute an action for an injunction, abatement or any other appropriate action to prevent, enjoin or abate such nuisance. The remedies provided for herein shall be cumulative and not exclusive and shall be in addition to any other remedies provided by law.
- (e) *Discharge of waste.* Any individual or other party is prohibited from discharging waste, including construction waste, building material, truck washout, chemicals, litter, sanitary wastes or other waste into the city right-of-way, storm drain or other city property. If such discharge is detected, the owner shall cease the discharge within ten (10) calendar days from notice. Any owner who fails and/or

refuses to cease such a discharge within ten (10) calendar days from notice shall be fined up to two hundred dollars (\$200.00), and each day following notice during which said discharge continues shall constitute a separate offense. The city also may charge the owner any costs associated with the removal or repair of damage resulting from the discharge. In addition, any continuing discharge after notice shall be deemed, and is hereby declared to be, a public nuisance and the city solicitor is hereby empowered to institute an action for an injunction, abatement or any other appropriate action to prevent, enjoin or abate such nuisance. The remedies provided for herein shall be cumulative and not exclusive and shall be in addition to any other remedies provided by law.

(Ord. 2005, ch. 05-56, §§ 1—4, 12-1-05)

Appendix G

Illicit Discharge Detection and Elimination (IDDE) Plan

Illicit Discharge Detection and Elimination (IDDE) Plan



City of Providence, RI

January 3, 2018



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Table of Contents

| | |
|--|------------|
| Section 1 Introduction | 1-1 |
| 1.1 MS4 Program & Consent Agreement..... | 1-1 |
| 1.2 Illicit Discharges..... | 1-2 |
| 1.3 Allowable Non-Stormwater Discharges..... | 1-3 |
| 1.4 Receiving Waters and Impairments | 1-3 |
| 1.5 IDDE Program Goals & Timeline..... | 1-5 |
| 1.6 Legal Authority..... | 1-7 |
| 1.7 Statement of Responsibilities..... | 1-7 |
| Section 2 Ranking and Prioritization of Stormwater Infrastructure | 2-1 |
| 2.1 Prioritization of Infrastructure..... | 2-1 |
| 2.2 Infrastructure Prioritization Ranking..... | 2-7 |
| Section 3 Dry Weather Screening..... | 3-1 |
| 3.1 Dry Weather Survey Standard Operating Procedures..... | 3-1 |
| 3.1.1 Weather Conditions | 3-1 |
| 3.1.2 General Procedure..... | 3-1 |
| 3.1.3 Field Equipment | 3-2 |
| 3.1.4 Sample Collection and Analysis | 3-3 |
| 3.2 Interpreting Sampling Results | 3-6 |
| 3.3 Follow-up Ranking..... | 3-8 |
| Section 4 IDDE Investigations..... | 4-1 |
| 4.1 Catch Basin Investigations..... | 4-1 |
| 4.1.1 Catch Basin IDDE Inspection Standard Operating Procedure | 4-1 |
| 4.2 Catchment Investigations..... | 4-1 |
| 4.2.1 Structure Investigation Standard Operating Procedures | 4-1 |
| 4.2.2 Source Isolation and Confirmation..... | 4-4 |
| Sandbagging | 4-4 |
| Smoke Testing..... | 4-4 |
| Dye Testing..... | 4-5 |
| CCTV/Video Inspection | 4-5 |
| Optical Brightener Monitoring..... | 4-5 |
| IDDE Canines..... | 4-6 |
| 4.3 Illicit Discharge Removal..... | 4-6 |
| 4.4 Follow-up Actions..... | 4-7 |
| Section 5 Compliance Reporting..... | 5-1 |
| 5.1 Water Quality Screening Results..... | 5-1 |
| 5.2 Catch Basin & Structure Investigation Results..... | 5-2 |
| 5.3 Illicit Discharge Reports | 5-2 |
| 5.4 Illicit Discharge Removal..... | 5-2 |
| 5.5 IDDE Plan | 5-4 |

List of Figures

| | |
|--|-----|
| Figure 2-1: 2017-2018 Providence Dry Weather Outfall Inspection Timeframe..... | 2-2 |
| Figure 3-1: PPCP Target Compounds, Uses, and Reporting Limits..... | 3-6 |
| Figure 4-1: Dry Weather Insepction Scenario | 4-3 |
| Figure 4-2: Procedure for Illicit Discharge Removal..... | 4-6 |

List of Tables

| | |
|---|-----|
| Table 1-1 Providence, RI Impaired Receiving Waters..... | 1-4 |
| Table 2-1 Preliminary Categorization..... | 2-1 |
| Table 2-2 Evaluation Characteristics Information Sources & Scoring Criteria | 2-6 |
| Table 3-1 Field Equipment – Dry Weather Outfall Screening and Sampling..... | 3-2 |
| Table 3-2 Sampling Parameters and Analysis Methods | 3-4 |
| Table 3-3 Required Analytical Methods, Detection Limits, Hold Times, and Preservatives..... | 3-5 |
| Table 3-4 IDDE Screening Thresholds | 3-6 |
| Table 3-5 Olfactory and Visual Screening Thresholds | 3-7 |

Appendices

Appendix A Consent Decree and Relevant Attachments

Appendix B Storm System Mapping

Appendix C IDDE Ordinance

Appendix D Prioritization and Ranking List

Appendix E Water Quality Analysis Instructions, User’s Manuals and Standard Operating Procedures

Section 1

Introduction

This Illicit Discharge Detection and Elimination (IDDE) Plan is intended to address how the City of Providence (City) will screen and monitor its Municipal Separate Storm Sewer System (MS4) outfalls and interconnections; inspect the MS4 for illicit connections and non-stormwater discharges; respond to complaints, investigate areas of the MS4, and remove the sources of illicit connections and non-stormwater discharges.

This Plan has been divided into the following sections:

- Section 1 – Introduction
- Section 2 – Ranking and Prioritization of Stormwater Infrastructure
- Section 3 – Dry Weather Screening
- Section 4 – IDDE Investigations
- Section 5 – Compliance Reporting

1.1 MS4 Program & Consent Agreement

This IDDE Plan has been developed in accordance with the Consent Agreement between the City and Rhode Island Department of Environmental Management (RIDEM), signed March 7, 2017; the Rhode Island Pollutant Discharge Elimination System (RIPDES) *General Permit for Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s) and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s* dated December 2003, hereafter referred to as the “MS4 General Permit”; and the Environmental Protection Agency (EPA) New England’s draft *New England Bacterial Source Tracking Protocol* dated January 2012.

The MS4 General Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management)
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

A copy of the Consent Agreement between the City and RIDEM has been included as **Appendix A**. In addition to other conditions required to be met, the Consent Agreement and its attachments includes specific actions and deadlines related to implementation of an IDDE program. Notably, information specifically relevant to the development of this IDDE Plan includes Attachment C – Compliance Reporting Requirements, Attachment D – EPA New England Bacterial Source Tracking Protocol (Draft – January 2012), Attachment E – Illicit Discharge Detection and Elimination (IDDE) Plan Requirements, and Attachment F – IDDE Investigation Priorities List.

1.2 Illicit Discharges

An “illicit discharge” is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges listed in Part I.B.3 of the MS4 General Permit or pursuant to an EPA National Pollutant Discharge Elimination System (NPDES) permit.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor wash water or old household products, in many cases due to a lack of understanding on the part of the property owner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 General Permit unless the permittee, EPA or RIDEM identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Car wash runoff that does not use detergent from residential or automobile retail dealers
- Potable water sources including water line flushing
- External building wash waters without detergents
- Water to control dust
- Firefighting activities
- Fire hydrant flushing
- Natural Springs
- Rising ground waters
- Uncontaminated Pumped groundwater
- Uncontaminated ground water infiltration
- Dechlorinated swimming pool discharges
- Air conditioning condensation
- Foundation or footing drains where detergents are not used
- Irrigation Drainage
- Dechlorinated water line testing
- Street wash waters where spills or leaks or hazardous materials have not occurred (unless spills have been removed)
- Uncontaminated utility vault dewatering
- Water from Crawl Space Pumps
- Lawn watering
- Hydrostatic test water

If these discharges are identified as significant contributors to the MS4 and mix with stormwater, they must be considered an “illicit discharge” and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the receiving waters for the City of Providence that have been categorized as “impaired” by the *Final 2014 303(d) List of Impaired Waters* produced by RIDEM. Impaired waters are waterbodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat. This includes waterbodies that are designated under the 303(d) list as:

- Category 4a – TMDL has been completed. Waterbodies will be placed in this subcategory once all TMDLs for the waterbody have been developed and approved by the United States Environmental Protection Agency (US EPA).
- Category 5 – Impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL. This category constitutes the 303(d) list of waters impaired or threatened by a pollutant(s) for which one or more TMDL(s) are needed.

Table 1-1 Providence, RI Impaired Receiving Waters

| Waterbody Name | Waterbody ID | Category | Impairment(s) | Associated Approved TMDL |
|----------------------------------|----------------|----------|--|---|
| Roger Williams Park Ponds | RI0006017L-05 | 4A | Dissolved Oxygen, Phosphorus, Excess Algal Growth, Non-Native Aquatic Plants, Bacteria | TMDLs for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island (September 2007) RI Statewide TMDL for Bacteria Impaired Waters – Roger Williams Park Ponds Watershed Summary (September 2011) |
| Mashapaug Pond | RI0006017L-06 | 5 | Excess algal growth, Dissolved Oxygen, Phosphorus, Bacteria & PCB in Fish Tissue | TMDL for Dissolved Oxygen and Phosphorus, Mashapaug Pond, Rhode Island (September 2007) RI Statewide TMDL for Bacteria Impaired Waters – Mashapaug Pond Watershed Summary (September 2011) |
| West River | RI0003008R-03B | 5 | Benthic-Macroinvertebrate Bioassessments, Bacteria | RI Statewide TMDL for Bacteria Impaired Waters – West River Watershed Summary (September 2011) |
| West River | RI0003008R-03C | 5 | Benthic-Macroinvertebrate Bioassessments, Bacteria | N/a |
| Woonasquatucket River | RI0002007R-10C | 5 | Bacteria, Benthic-Macroinvertebrate Bioassessments, Dioxin, Mercury, Non-native aquatic plants, Dissolved Oxygen, PCBs, and Mercury and PCB in Fish Tissue | Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals TMDL (April 2007) |
| Woonasquatucket River | RI0002007R-10D | 5 | Bacteria, Benthic-Macroinvertebrate Bioassessments, Copper, Dioxin, Lead, Mercury, Non-Native Aquatic Plants, Dissolved Oxygen, PCBs, Zinc, and Mercury and PCB in Fish Tissue | Woonasquatucket River Fecal Coliform Bacteria and Dissolved Metals TMDL (April 2007) |
| Seekonk River | RI0007019E-01 | 5 | Nitrogen, Bacteria, and Dissolved Oxygen | N/a |
| Providence River | RI0007020E-01B | 5 | Nitrogen, Bacteria, and Dissolved Oxygen | N/a |
| Runnins River | RI0007021R-01 | 5 | Bacteria, Benthic-Macroinvertebrate Bioassessments, Lead, and Dissolved Oxygen | Fecal Coliform TMDL for the Runnins River, Rhode Island (August 2002) |

1.5 IDDE Program Goals & Timeline

The goals of this IDDE program are to find and eliminate illicit discharges to the municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components:

- Mapping and delineation of the MS4 system
- Ranking and prioritization of stormwater infrastructure
- Dry weather screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Tracking and record keeping

The timeline for implementing this work is dependent on required deadlines included in the MS4 General Permit and Consent Agreement. The following incorporates those required deadlines and includes estimates for the anticipated completion date of additional tasks. This schedule will be updated as needed to reflect any changes to the IDDE program.

- **March 31, 2017:** Submit IDDE Plan to RIDEM for review and comment.
- **Within 3 Months of RIDEM's approval of the IDDE Plan:** Prioritize stormwater infrastructure and initiate investigation of High Priority Investigation Target stormwater infrastructure. Stormwater infrastructure will be re-prioritized annually and as needed thereafter.
- **Within 6 Months of RIDEM's approval of the IDDE Plan:** Amend the Providence Stormwater Management Program Plan (SWMPP) to incorporate the revised IDDE Plan.

- **June 30, 2017:**

- Complete initial delineation of sewer and stormwater system mapping into the following:

| | |
|----------------------------|--|
| “Stormwater – MS4” | Collects and conveys stormwater to waters of the U.S. |
| “Stormwater-Combined” | Collects stormwater runoff, sewage, and industrial wastewater that is typically transported to a treatment plant but can overflow into the waters of the U.S. during large storm events. |
| “Stormwater-Non-Regulated” | Privately owner stormwater collection system. |

| | |
|-------------------------|--|
| “Wastewater-Sanitary” | System of underground pipes that carries sewage to a wastewater treatment plant to be filtered, treated, and discharged. |
| “Wastewater – Combined” | Collects stormwater runoff, sewage, and industrial wastewater in one pipe and is transported to the treatment plant to be filtered, treated, and discharged. |

A hard copy of the most recent stormwater mapping will be maintained as **Appendix B** of this Plan.

- Complete an initial catchment delineation of all areas regulated under the MS4 General Permit.
- Complete initial dry weather screening program.
- Develop a geo-spatial database system to record and report IDDE complaints, investigations, and remedial measures taken.
- **March 10, 2018:** Submit to RIDEM a report of the results of the IDDE investigation, the revised ranking of priorities and the revised implementation schedule with the MS4 Annual Report. Submittal will occur annually thereafter.
- **June 30, 2019:** Complete a series of web and mobile applications to support the tracking and visualization of stormwater and wastewater maintenance activities, as well as track progress on illicit discharge investigations.
- **June 30, 2020:**
 - Complete field verification and GPS-locating of stormwater infrastructure within MS4-regulated areas, including stormwater manholes, catch basins, culverts, swales, and ditches.
 - Complete structure inspection and connectivity mapping of stormwater infrastructure within MS4-regulated areas. Structure inspection will include a visual inspection for illicit connections and non-stormwater discharges.
 - Complete mapping of interconnections between existing public and private stormwater systems and with other MS4s.
- **June 30, 2024:** Complete catchment investigations for illicit connections and illicit discharges in catchment areas ranked as High Priority Investigation Target.
- **June 30, 2027:** Complete catchment investigations illicit connections and illicit discharges in all catchment areas.

The procedures and timelines associated with removal of an illicit connection or illicit discharge once it has been identified is outlined in Section 4 – IDDE Investigations.

1.6 Legal Authority

The City of Providence currently has an established IDDE ordinance promulgated in 2005 as Chapter 25, Article 5, Section 25-83- Illicit discharge detection and elimination. The ordinance specifically:

1. Defines what an illicit discharge constitutes.
2. Establishes the Director of Public Works or his/her designated representative with authority to enter properties to examine, survey, or sample in regards to illicit connection detection.
3. Requires any person responsible for a facility or operation that know or suspect illicit spills or dumping to the MS4 to notify the City's authorized enforcement agency. Specifically, this section of the ordinance requires that hazardous spill be reported immediately to emergency officials, non-hazardous to be reported within five business days by phone, and if the spill is from a commercial or industrial site that a written record of the spill and actions to prevent to be kept on file for 3 years after such spill.
4. Provides enforcement, steps to eliminate, cash penalties and other sanctions for illicit discharges and discharge of waste including but not limited to building material, truck washout, chemicals, litter, sanitary wastes, etc.

A full copy of the ordinance is included as **Appendix C**.

1.7 Statement of Responsibilities

The City of Providence Director of the Department of Public Works (DPW) is responsible for implementing this IDDE program pursuant to the regulations referenced in Section 1.1. The DPW Director is responsible for designating duties and assigning further responsible parties.

Section 2

Ranking and Prioritization of Stormwater Infrastructure

The purpose of this section is to provide the tools to rank the City’s stormwater infrastructure – including outfalls and interconnections – in order to prioritize screening and investigating for potential illicit discharges. Stormwater infrastructure is defined as any drainage outfall, interconnection, catch basin, manhole, structure, or best management practice (BMP) that is evaluated for evidence of illicit connections.

2.1 Preliminary Categorization

The first step in the overall prioritization of the City’s system is a preliminary categorization of all outfalls based on recent information. The City conducted an initial dry weather screening in 2006-2007. Results from the initial screening along with *Attachment F – IDDE Investigation Priorities List* and *Attachment G – January-April Dry Weather Outfall Inspections* of the Consent Agreement were used to conduct the preliminary categorization (See **Figure 2.1**). All outfalls were placed in one of the following three categories:

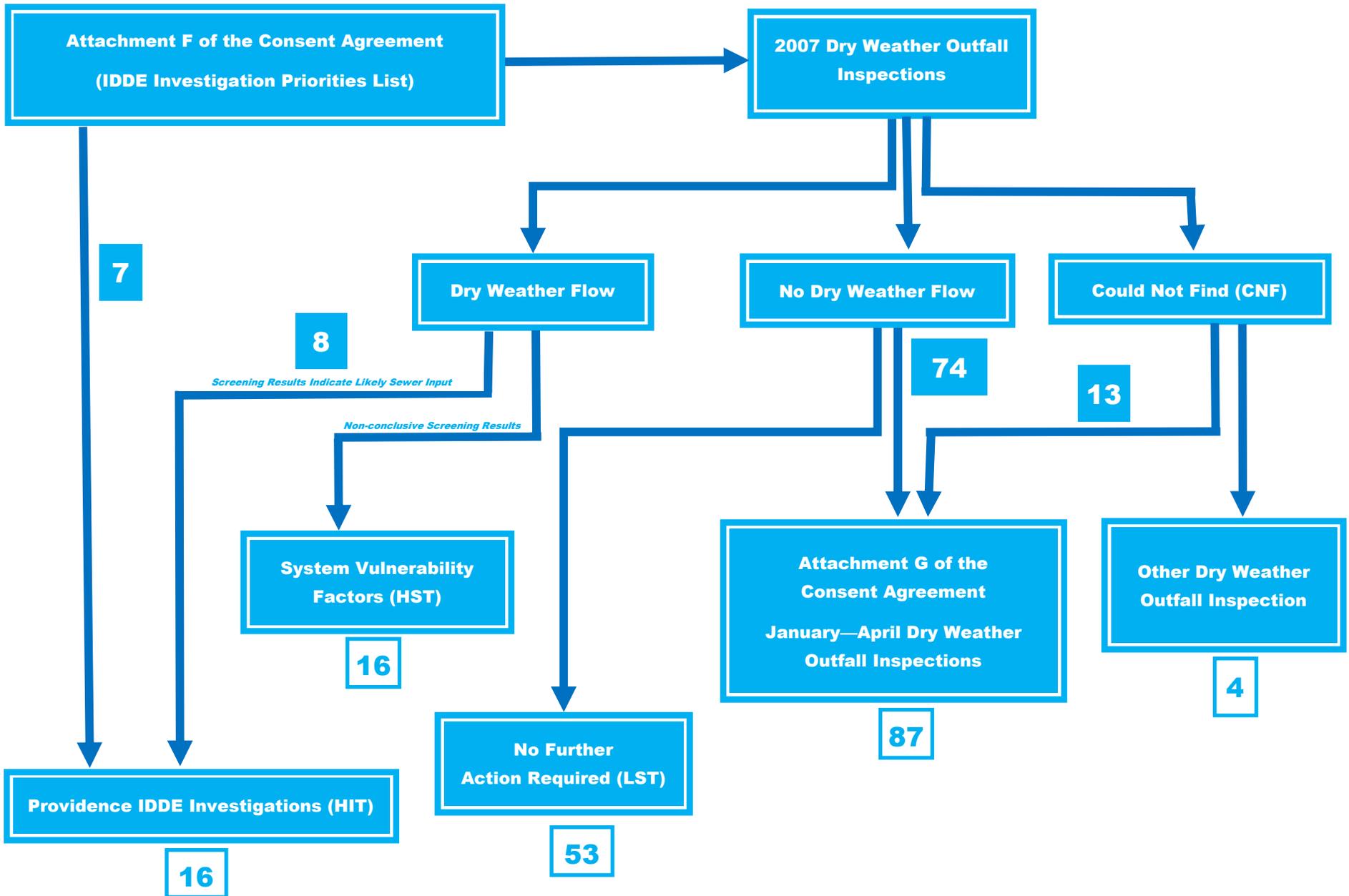
- Category 1– IDDE Program - *High Priority Investigation Target, HIT*
- Category 2– System Vulnerability Factors
- Category 3 – 2017-2018 Dry Weather Screening

Outfalls with dry weather flow during the initial dry weather screening were put under one of two categories. If the results from the sampling indicated signs of sewer input they also were categorized as Category 1 outfalls. If the sampling results were non-conclusive then they were identified as Category 2 outfalls. Category 2 outfalls require an evaluation of System Vulnerability Factors (SVF) to determine if the outfall is a High Priority Screening Target (HST) or a Low Priority Screening Target (LST). Outfalls with no dry weather flow during the initial dry weather screening were either identified as Category 2 outfalls if they were not included in the list of outfalls presented in Attachment G or Category 3 outfalls if they were included. If an outfall was not found during the initial dry weather inspection it was categorized as a Category 3 outfall. Attachment F of the Consent Agreement included a priority list of outfalls to be investigated. These outfalls were automatically categorized as Category 3 outfalls. **Table 2.1** provides a summary of the initial categorization results. **Appendix D** includes the categorization of each outfall.

Table 2-1 Preliminary Categorization

| Category | Outfalls |
|------------------|----------|
| Category 1 (HIT) | 9 |
| Category 2 | 57 |
| Category 3 | 110 |

Figure 2.1 - 2017-2018 Providence Dry Weather Outfall Inspection Timeframe



The preliminary categorization provided a basis for the 2017-2018 dry weather screening in response to the Consent Agreement. Category 3 outfalls will be dry weather screened during the January-April timeframe as specified in the Consent Agreement. Category 2 outfalls will be evaluated upon approval of the IDDE Plan. Category 1 outfalls will be investigated once GIS mapping is completed in the outfall tributary area. GIS mapping is anticipated to commence in the Fall 2017. Priority will be put on areas tributary to the 9 Category 1 outfalls. Following the 2017-2018 dry weather inspections a more detailed process provided below under Section 2.2 should be used in prioritizing outfalls.

2.2 Prioritization of Infrastructure

The following describes an infrastructure inventory and priority ranking process that should be used to assess illicit discharge potential based on existing information. Following the initial evaluation, the inventory and prioritization will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

The infrastructure inventory will identify each structure, record its location and conditions, and provide a framework for tracking inspections, screenings and other IDDE program activities. Stormwater infrastructure will be classified into one of the following categories:

High Priority Investigation Target (HIT): Stormwater infrastructure with known or suspected illicit discharges based on any of the following information:

1. Prior screening results indicate sewer input or industrial discharges based on olfactory or visual evidence, including but not limited to olfactory or visual evidence or observations encountered during the dry weather surveys of outfalls and inspections of catch basins; and/or sampling results that exceed thresholds as follows:
 - a. Bacteria and any of the other listed thresholds¹ (with the exception of pH and conductivity are exceeded); or
 - b. Bacteria threshold is exceeded and pharmaceuticals have been detected in elevated concentrations or visual evidence of sewer or excessive odor have been observed; or
 - c. Surfactants or ammonia thresholds are exceeded and chlorine has been detected; or
 - d. Conductivity and pH thresholds are exceeded.
2. Citizen complaint of illicit discharge as appropriate.
3. Notification by RIDEM, EPA, or an interconnected MS4 of presence of suspect illicit discharge as evidenced by the pollutant threshold criteria listed above.
4. Evidence of potential illicit discharges discovered as a result of other activities including but not limited to: mapping, construction, maintenance, and cleaning and repair of catch basins and manholes.

¹ Thresholds are discussed in Section 3 – Dry Weather Screening

5. Outfalls that were identified in EPA-approved TMDLs.
6. Outfalls identified in the March 7, 2017 Consent Agreement, including:
 - a. Outfall SD-6 (i.e., the outfall to Mashapaug Pond at Lakeview Drive, Providence)
 - b. Outfalls and interconnections between its MS4 and the RIDOT MS4 in the Olneyville area of Providence, and Kinsley Avenue and Promenade Street

High Priority Screening Target (HST): Stormwater infrastructure where the following condition is met:

1. Any structure with previously identified dry weather flows where the results of the analysis cannot conclusively determine that the dry weather flow consisted only of stormwater or where one or more of the System Vulnerability Factors (SVFs) listed below exists within the catchment area.

If none of the following SVFs exists within the stormwater infrastructure's catchment area the structure should be prioritized as LST.

- a. History of Sanitary Sewer Overflows (SSOs), including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- b. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
- c. Inadequate sanitary sewer level of service resulting in regular surcharging, customer back-ups, or frequent customer complaints
- d. Common or twin-invert manholes serving storm and sanitary sewer alignments
- e. Common trench construction serving both storm and sanitary sewer alignments
- f. Crossings of storm and sanitary sewer alignments
- g. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
- h. Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through inflow/infiltration analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations
- i. Areas formerly served by combined sewer system
- j. Any sanitary sewer and storm drain infrastructure greater than 40 years old in medium and densely developed areas

- k. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance)
- l. History of multiple RIDEM actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance)

Low Priority Screening Target (LST): Stormwater infrastructure with very low or no potential for illicit discharges. This category is limited to:

- Stormwater infrastructure in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land; or
- Stormwater infrastructure that has been thoroughly examined for the presence of sewer input. In order to meet this criterion, examination must exhaust all methods described in this IDDE Plan and demonstrate no evidence of potential illicit sources.

2.3 Scheduling

The following characteristics will be used to dictate scheduling of investigations and screening. Additional relevant characteristics, including location-specific characteristics, may be considered, but must be documented in this IDDE Plan.

- Waterbodies that receive a discharge from the MS4 and are drinking water supplies, shell fishing areas, beaches or waters used for contact recreation.
- Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved TMDLs applicable to Providence, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.
- Density of generating sites – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers, car washes; gas stations; garden centers; and industrial manufacturing areas.
- Age of surrounding development and infrastructure – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.
- Sewer conversion – Catchments that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
- Historic combined sewer systems – Catchments that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.

- Density of aging septic systems – septic systems 30 years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
- Catchments with documented SSOs.
- Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.

Table 2-2 below summarizes the scoring criteria and information sources that will be used to evaluate the characteristics. Stormwater infrastructure is given a score of 0 to 3 for each characteristic (where a score of 3 indicates the highest priority). The scores for all the characteristics are summed together for a total priority score, which will dictate priority for screening and investigations.

Table 2-2 Evaluation Characteristics Information Sources & Scoring Criteria

| Stormwater Infrastructure Evaluation Characteristic | Information Source | Scoring Criteria |
|---|---------------------------------------|-----------------------------------|
| Discharges to drinking water supplies, shellfishing areas, beaches or waters used for contact recreation | GIS Maps | Yes = 3 (High Priority) No = 0 |
| Water quality limited or TMDL receiving water¹ | Impaired Waters List | Poor = 3 Fair = 2 Good = 0 |
| Density of generating sites² | Land Use, Federal & State databases | High = 3 Medium = 2 Low = 1 |
| Age of surrounding development and infrastructure³ | Land Use, Record Drawings | High = 3 Medium = 2 Low = 1 |
| Sewer conversion | Record Drawings, City Staff | Yes = 3 No = 0 |
| Historic combined sewer systems | Record Drawings, City Staff | Yes = 3 No = 0 |
| Density of Aging Septic Systems | Land Use, Record Drawings, City Staff | Yes = 3 No = 0 |
| SSO Catchment Areas | SSO records, City Staff | Yes = 3 No = 0 |
| Culverted Streams | Storm Sewer Maps, City Staff | Yes = 3 No = 0 |

1. Poor = Waters with approved TMDLs; Fair = Water quality limited waterbodies; Good = No water quality impairments
2. High = >10 sites, Medium = 3 to 10 sites, Low = <3 sites
3. High = Industrial area or sewer system >40 years old, Medium = 20 to 40 years old, Low = < 20 years old

2.4 Infrastructure Prioritization Ranking

The result of the stormwater infrastructure prioritization ranking is included in **Appendix D**. The score shown in the “Total Score” column indicates the infrastructure’s relative priority based on the criteria described in Section 2.2. The “Investigation Schedule” column contains an anticipated time frame for performing IDDE investigations. Schedules were developed based on the priority ranking of stormwater infrastructure and scheduling requirements in the MS4 General Permit and Consent Agreement.

Appendix D will be updated annually at a minimum, and when additional information becomes available.

Section 3

Dry Weather Screening

Dry weather flow is a common indicator of potential illicit connections. All outfalls and interconnections, as well as relevant stormwater infrastructure, will be inspected for the presence of dry weather flow based on the most current priority ranking. Dry weather screening will start with HST outfalls and end with LST outfalls, according to the schedule developed under the previous section.

3.1 Dry Weather Survey Standard Operating Procedures

The following standard operating procedures (SOP) should be used when implementing the dry weather screening program. If during the course of implementing the program changes to the SOP are believed to be necessary, this section will be updated and redistributed to relevant parties.

3.1.1 Weather Conditions

A dry weather period is a time interval during which less than 0.1 inch of rain is observed across a minimum of 72 hours. Unlike wet weather sampling, dry weather inspections are not intended to capture a “first flush” of stormwater discharge, rather they are intended to identify any/all discharges from a stormwater outfall during a period without recorded rainfall.

For purposes of determining dry weather conditions, program staff will use precipitation data from KPVD Theodore Francis Green State Airport. If KPVD is not available or not reporting current weather data, then KTAN Taunton Municipal Airport will be used as a back-up.

For the purposes of this IDDE Plan, dry weather sampling conducted to comply with the MS4 General Permit and Consent Agreement may only be performed between January 1st to April 30th and between July 1st to October 31st.

3.1.2 General Procedure

The dry weather screening SOP consists of the following general steps:

1. Identify stormwater infrastructure to be screened/sampled based on initial priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see **Table 3-1** for list of field equipment)
3. Conduct the outfall inspection during dry weather:
 - a. Identify and photograph the outfall
 - b. Record the inspection information and outfall characteristic. It is anticipated that all inspection information will be recorded using tablets.
 - c. Look for and record visual/olfactory evidence of pollutants

4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), mark the infrastructure as either HIT or HST based on the strength of evidence and the prioritization criteria presented in Section 2.1 and follow the procedures laid out for these prioritization categories laid out in Section 3.3.
6. Input results from screening and sampling into database. Update the stormwater infrastructure priority ranking with pertinent information.
7. Track and report all screening data as required in Section 5.

3.1.3 Field Equipment

Table 3-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 3-1 Field Equipment – Dry Weather Outfall Screening and Sampling

| Equipment | Use/Notes |
|--|--|
| Tablet | To record information from dry weather inspection and sampling |
| Chain of Custody Forms | To ensure proper handling of all samples |
| Pens/Pencils/Permanent Markers | For proper labeling |
| Nitrile Gloves | To protect the sampler as well as the sample from contamination |
| Flashlight/headlamp w/batteries | For looking in outfalls or manholes, helpful in early mornings as well |
| Cooler with Ice | For transporting samples to the laboratory |
| Personal Protective Equipment (PPE) | Reflective vest, Safety glasses and boots at a minimum |
| GPS Receiver | For taking spatial location data |
| Water Quality Sonde | If needed, for sampling conductivity, temperature, pH |
| Water Quality Meter | Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine |
| Test Kits | Have extra kits on hand to sample more stormwater infrastructure than are anticipated to be screened in a single day |
| Label Tape | For labeling sample containers |
| Sample Containers | Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers). |
| Pry Bar or Pick | For opening catch basins and manholes when necessary |
| Sandbags | For damming low flows in order to take samples |
| Hand Pump | For sampling of low and/or stagnant flows |
| Small Mallet or Hammer | Helping to free stuck manhole and catch basin covers |
| Utility Knife | Multiple uses |
| Measuring Tape | Measuring distances and depth of flow |
| Safety Cones | Safety |
| Hand Sanitizer | Disinfectant/decontaminant |

| Equipment | Use/Notes |
|---|---|
| Zip Ties/Duct Tape | For making field repairs |
| Rubber Boots/Waders | For accessing shallow streams/areas |
| Distilled Water | For rinsing sampling equipment to prevent crossover contamination |
| Trash Bags | For disposing of incidental trash |
| Paper Towels | For cleaning and drying equipment |
| Plastic Jugs | For storage of sampling kits until proper disposal |
| Bucket | For carrying supplies |
| Sampling Pole/Dipper/Sampling Cage | For accessing hard to reach outfalls and manholes |

3.1.4 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and tablet
2. Put on protective gloves (nitrile/latex/other) before sampling
3. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
4. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled (not for bacteria sampling)
5. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see Table 3-2)
6. Place laboratory samples on ice for analysis of bacteria
7. Fill out chain-of-custody form for laboratory samples
8. Deliver samples to designated laboratory within six hours of sample collection
9. Dispose of used test strips and test kit ampules properly
10. Decontaminate all testing personnel and equipment

During sampling the following protocols shall be followed:

- Do not eat, drink or smoke during sample collection and processing
- Do not collect or process samples near a running vehicle
- Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
- Never touch the inside surface of a sample container or lid, even with gloved hands.

- Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
- Collect samples while facing upstream (for outfall samples within a waterbody) and so as not to disturb water or sediments in the outfall pipe or ditch.
- Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
- Do not allow any object or material to fall into or contact the collected water sample.
- Replace and tighten sample container lids immediately after sample collection.
- If Pharmaceutical and Personal Care Product (PPCP) samples are being collected, extreme care must be taken in order to avoid contamination of the sample. No caffeine products should be consumed prior to sampling and applications (e.g., sunscreen, bug spray) should be minimized.

In the event that a structure or outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instrumentation are recommended for all parameters except indicator bacteria. Field kits need to have appropriate detection limits and ranges. **Table 3-2** lists the sampling parameters, available field instrumentation for obtaining parameters and field test kits that are recommended for sampling. Analytic procedures and user's manuals for field test kits and field instrumentation are provided in **Appendix E**. If field test kits and field instrumentation changes over the course of the program, Appendix E will be updated accordingly.

Table 3-2 Sampling Parameters and Analysis Methods

| Analyte or Parameter | Instrumentation (Portable Meter) | Field Test Kit |
|---------------------------------|--|--|
| Ammonia | CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II | CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips LaMotte 5864-01 |
| Surfactants (Detergents) | CHEMetrics™ I-2017 | CHEMetrics™ K-9400 and K-9404 Hach™ DE-2 |
| Chlorine | CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II | Hach™ CN-80 ² Kit |
| Conductivity | CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450 Hach™ Pocket Pro + | NA |

| Analyte or Parameter | Instrumentation (Portable Meter) | Field Test Kit |
|--|---|----------------|
| Temperature | YSI Pro30 YSI EC300A Oakton 450 Hach™ Pocket Pro + | NA |
| Salinity | YSI Pro30 YSI EC300A Oakton 450 Hach™ Pocket Pro + | NA |
| Temperature | YSI Pro30 YSI EC300A Oakton 450 Hach™ Pocket Pro + | NA |
| pH | Oakton Waterproof pH Testr® Hanna pHep® pH Meter EXTECH Waterproof pH Pen | NA |
| Indicator Bacteria: Fecal Coliform (freshwater), Enterococcus (saline water), and coliphage | EPA certified laboratory procedure | NA |
| PPCP | EPA certified laboratory procedure | NA |

Table 3-3 below lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

Table 3-3 Required Analytical Methods, Detection Limits, Hold Times, and Preservatives²

| Analyte or Parameter | Anticipated Method of Detection | Reporting Limits | Max. Hold Time | Preservation |
|--|---------------------------------|--|----------------------|------------------------------|
| Ammonia | Field Kit | Detection Limit (DL): 0.05 mg/L | Immediate | None Required |
| Surfactants | Field Kit | DL: 0.01 mg/L | Immediate | None Required |
| Chlorine | Test Strip | DL: 0.02 mg/L | Immediate | None Required |
| Temperature | Field Meter | 0 to 40°C | Immediate | None Required |
| pH | Field Meter | 0 to 10 units | Immediate | None Required |
| Conductivity | Field Meter | 0.2 µs/cm | Immediate | None Required |
| Indicator Bacteria: Fecal Coliform Enterococcus Coliphage | Laboratory Sample | <i>Fecal Coliform</i> 1 cfu/100mL 1 MPN/100mL <i>Enterococcus</i> 1 cfu/100mL 1 MPN/100mL <i>Coliphage</i> – 1 PFU/100mL | 6 hours (to lab) | Cool ≤10°C (Place on Ice) |
| PPCP | Laboratory Sample | Varies | 7 days to extraction | Cool ≤10°C (Place on Ice) |

² SM = Standard Method

3.2 Interpreting Sampling Results

Unless otherwise approved by RIDEM, the IDDE pollutant screening thresholds shown in **Table 3-4** will be used as guidelines for determining the necessity for further investigation. Screening values that exceed these thresholds may be indicative of pollution and/or illicit discharges.

Table 3-4 IDDE Screening Thresholds

| Pollutant | Screening Threshold |
|--|---|
| Bacteria - Fecal Coliform | In excess of 400 most probable number per 100 milliliters |
| Bacteria - Coliphage | Equal to or greater than 50 plaque forming units per 100 milliliters |
| Bacteria - Class AA, A, B, B1, B(a), or B1(a) waters – Enterococcus | Greater than 61 colony forming units per 100 milliliters (cfu/100ml) |
| Bacteria - Class SA, SA(b), SB, SB1, SB(a), or SB1(a) waters – Enterococcus | Greater than 104 cfu/100 ml |
| Surfactants | Equal to or greater than 0.25 milligrams per liter (mg/l) via field kits, or 0.1 mg/l via laboratory analysis |
| Ammonia | Equal to or greater than 0.5 mg/l |
| Chlorine | Greater than non-detect (0.02 mg/l detection limit) |
| pH | Less than or equal to 5 standard units or greater than 9.0 standard units |
| Conductivity | Greater than or equal to 2,000 microSiemens per centimeter |

These thresholds apply to all dry and wet weather samples taken over the course of the IDDE program. If additional parameters are determined to be needed over the course of the program, a narrative with justification on why the parameter was chosen must be developed and submitted during annual compliance reporting. Examples of additional parameters may include Pharmaceutical and Personal Care Product (PPCP) analysis, which may be helpful where more conclusive source identification is necessary.

Figure 3-1 contains typical target compounds, uses, and reporting limits of typical PPCP parameters.

Additionally, olfactory or visual evidence can provide sufficient evidence of sewer input. **Table 3-5** includes a description of common observations that may indicate the presence of an illicit connection.

| Target Compound | Major Use | RL (ng/L) | Daily Dose (ng) |
|-----------------|--|-----------|-------------------------|
| Caffeine | Natural Stimulant | 5.0 | 200,000,000 |
| 1,7-DMX | Metabolite of caffeine | 2.5 | N/A |
| Acetaminophen | Pain Reliever | 2.5 | 650,000,000 |
| Carbamazepine | Anti-depressant / bi-polar Anti-convulsant (epilepsy) | 0.5 | 100,000,000 |
| Primidone | Anti-epilepsy drug (AED) | 5.0 | 100,000,000 |
| Atenolol | Beta Blocker High Blood Pressure | 2.5 | 50,000,000 |
| Cotinine | Metabolite of Nicotine | 0.5 | 3,500-7,200 (ng/mL) |
| Urobilin | By-product of hemoglobin breakdown (mammals) | 5.0 | 1,300,000 ng/g in feces |
| Azithromycin | Antibiotic | 1.6 | 200,000,000 |

Figure 3-1: PPCP Target Compounds, Uses, and Reporting Limits

Table 3-5 Olfactory and Visual Screening Thresholds

| Parameter | Observations | Possible Likely Associated Flow Source |
|--|---------------------------------------|--|
| Odor | Sewage | Stale sanitary wastewater, especially in pools near outfalls |
| | Sulfur (rotten eggs) | Industries that discharge sulfide compounds or organics (meat packers, canneries, dairies, etc.). Also could be petroleum related "high-sulfur" fuels |
| | Rancid (sour) | Food preparation facilities (restaurants, hotels, etc.) |
| | Oil and gas | Petroleum refineries or many facilities associated with vehicle maintenance or petroleum product storage |
| | Chlorine | Pool discharges, washing activities |
| | Sweet/fruity | Washing activities |
| | Sharp, pungent (chemicals) | Hazardous waste |
| Color | Yellow | Chemical plants, textile and tanning plants |
| | Brown | Meat packers, printing plants, metal works, stone and concrete, fertilizers, petroleum refining facilities, construction sites, and glass cutting |
| | Green | Chemical plants, textile facilities, algae/plankton bloom, antifreeze (fluorescent green), fertilizer |
| | Red | Meat packers, metal works, iron floc (bacterium) |
| | Gray | Dairies, food processing, sewage, concrete wash-out |
| | Red, Purple, Blue, Black | Fabric dyes, inks from paper and cardboard manufacturers |
| Turbidity | Cloudy | Sanitary wastewater, concrete or stone operations, fertilizer facilities, automotive dealers |
| | Opaque | Food processors, lumber mills, metal operations, pigment plants |
| Floatable Matter | Oil sheen, grease | Petroleum refineries or storage facilities and vehicle service facilities, restaurants |
| | Sewage | Sanitary wastewater |
| Deposits & Stains | Sediment | Construction site erosion |
| | Oily | Sanitary wastewater |
| Vegetation | Excessive growth | Food product facilities, fertilizers, farming agricultural use |
| | Inhibited growth, stressed vegetation | High stormwater flows, beverage facilities, printing plants, metal product facilities, drug manufacturing, petroleum facilities, vehicle service facilities and automobile dealers |
| Pipe Benthic Growth | Brown | Elevated nutrient level, possibly from sewage or fertilizers |
| | Orange/Red | High iron and manganese concentration, not typically associated with illicit discharges |
| | Green | Elevated nutrient level, possibly from sewage or fertilizers |
| Damage to Stormwater Infrastructure | Concrete cracking | Industrial flows, chemicals |
| | Concrete spalling | |
| | Peeling Paint | |
| | Metal corrosion | |

As discussed in Section 2, stormwater infrastructure will be automatically classified as HIT if any combination of the following thresholds are crossed:

- a. Olfactory or visual evidence of sewer input is present; or
- b. Bacteria and any of the other listed thresholds (with the exception of pH and conductivity are exceeded); or
- c. Bacteria threshold is exceeded and pharmaceuticals have been detected in elevated concentrations or visual evidence of sewer or excessive odor have been observed; or
- d. Surfactants or ammonia thresholds are exceeded and chlorine has been detected; or
- e. Conductivity and pH thresholds are exceeded.

3.3 Follow-up Ranking

Based on the information gathered during dry weather screenings, the initial stormwater infrastructure priority ranking will be updated and infrastructure will be re-prioritized. Infrastructure where relevant information was found indicating sewer input or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources.

In cases where there is an obvious discharge that clearly exceeds the set thresholds, the stormwater infrastructure will be considered to be HIT and re-prioritized for further investigation based on information gathered during the dry weather screening. Catchment investigations will be performed in all HIT catchments. Scheduling of the catchment investigations will be based on the ranking of the re-prioritized infrastructure.

In cases where the results of the dry weather sampling are inconclusive and the stormwater infrastructure is determined to meet the criteria for HST, the following procedures will be followed:

1. Re-visit stormwater infrastructure during dry weather conditions and re-sample if flow is present. Re-prioritize the infrastructure based on the results of the sampling.
2. If dry weather flow is not present during the dry weather re-visiting, inspect and sample the infrastructure during wet weather conditions. Wet weather sampling will be performed for the parameters listed in Table 3-2. Re-rank the infrastructure based on the results of the wet weather sampling.

In cases where dry weather flow was not observed and there are no physical indicators of an illicit discharge, the stormwater infrastructure should be classified as LST.

Section 4

IDDE Investigations

Following dry weather screening of stormwater infrastructure, IDDE investigations will be performed in catchments with potential for illicit discharges and any structures designated as HIT (whether screened or not). The purpose of the IDDE investigations is to collect sufficient information to identify the source of sewer input and act to remove it from the stormwater system.

4.1 Catch Basin Investigations

The City regularly visits its catch basins for the purposes of cleaning, inspecting, and repairing defects. These regular visits present an opportunity to identify potential illicit discharges and minimize some of the work associated with implementing a catchment investigation.

4.1.1 Catch Basin IDDE Inspection Standard Operating Procedure

During the course of inspecting catch basins, the City shall:

1. Examine the catch basin for signs of illicit connections and non-stormwater discharges
2. Track and report evidence of illicit discharges
3. Coordinate the results of catch basin inspections with the overall IDDE Plan and stormwater system mapping efforts

In situations where an illicit connection is identified, follow up actions shall conform to the scope and deadlines outlined in Section 4.3 below. Appropriate follow-up actions may include water sampling and testing, coordination of the removal of illicit discharges, inspection of adjacent properties, and reporting.

4.2 Catchment Investigations

Once stormwater infrastructure with evidence of illicit discharges has been identified, various methods can be used to trace the source of the potential discharge within the catchment area. Catchment investigation techniques include but are not limited to review of maps historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate stormwater infrastructure catchments to trace the source of potential illicit discharges.

Catchment investigations will be performed for all stormwater infrastructure that is classified as HIT. Investigation techniques will be tailored using professional judgment on what is most appropriate for the specific catchments.

4.2.1 Structure Investigation Standard Operating Procedures

The first step in implementing the catchment investigations is a dry weather inspection of structures. The drainage network in the suspected catchment area will be inspected by

systematically and progressively observing, sampling and evaluating key junction manholes and catch basins to determine the approximate location of suspected illicit discharges or SSOs. All structures will be linked to specific outfalls as part of the system-wide mapping.

Concurrent with implementation of this Plan, the City is performing system-wide mapping and inspection of its stormwater infrastructure. The results of those inspections, as well as the catch basin inspections outlined in Section 4.1, should be reviewed prior to starting a structure investigation in a catchment area.

Several important terms related to the dry weather manhole and catch basin inspection program are defined as:

- **Junction Manhole or Catch Basin** is a manhole, catch basin or other type of structure with two or more inlets accepting flow from two or more MS4 alignments. The inlets to these structures are solely from private storm drains, individual catch basins, or they are not considered junction structures for these purposes.
- **Key Junction Manholes or Catch Basins** are those junction structures that can represent one or more junction structures without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction structure as a key junction manhole or catch basin would not affect the City's ability to determine the possible presence of an upstream illicit discharge. A junction manhole or catch basin may be excluded if located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, field crews will systematically inspect key junction manholes and catch basins during dry weather for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes and catch basins in the storm drain network to isolate and eliminate illicit discharges.

The manhole and catch basin inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction structures along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall

For most catchments, inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advanced preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once an

inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes and catch basins will proceed as follows:

1. Structures will be opened and inspected for visual and olfactory evidence of illicit connections, as described in Table 3-5.
2. Where visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole or catch basin will be flagged for further upstream manhole and catch basin investigation and/or isolation and confirmation of sources.
3. Subsequent key junction manhole and catch basin inspections will proceed until the location of the suspected illicit discharges or SSOs can be isolated to a pipe segment between two structures.
4. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole and catch basin sampling.

An example scenario is shown below on **Figure 4-1**. Key Junction Manholes 1 and 3 showed evidence of an illicit discharge. Since Key Junction Manhole 6 does not show evidence of illicit discharge, the source is most likely located between manholes 3 and 6. Therefore, manholes 4 and 5 should be investigated. The results of the investigation should narrow down the location to between two manholes. For example, if there is no evidence of illicit discharges in manhole 4, the source can be presumed to be within the pipe between manhole 4 and Key Junction 3

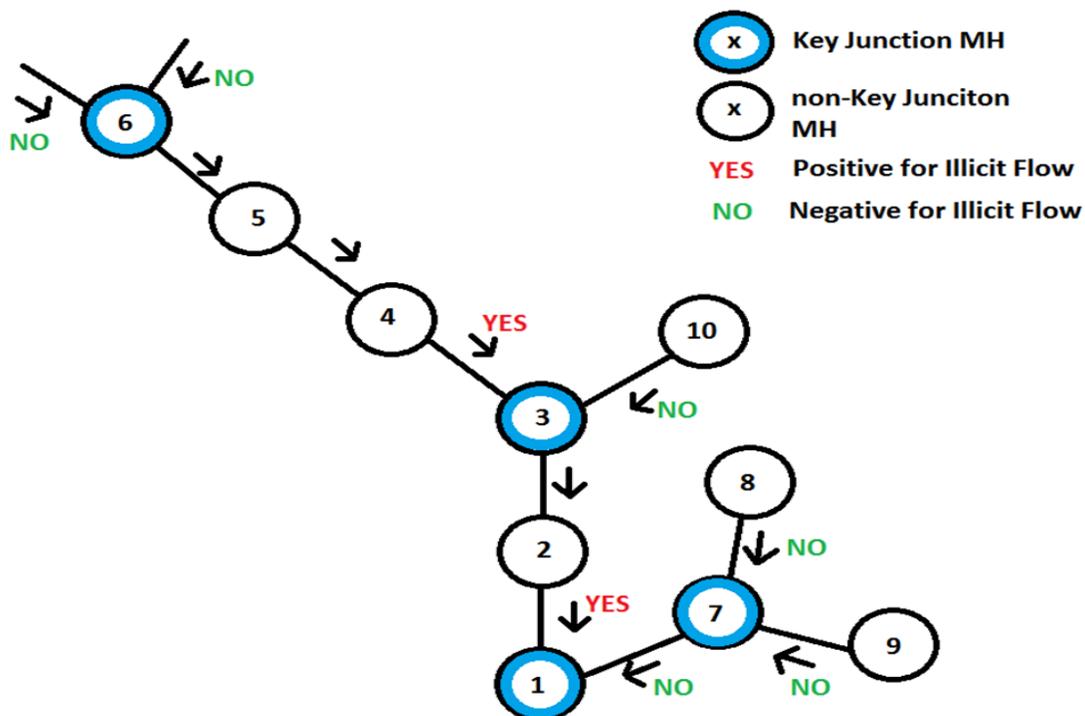


Figure 4-1: Dry Weather Inspection Scenario

4.2.2 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two structures, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below.

Prior notification is an important aspect of a detailed source investigation program. Prior to performing any of the inspection methods listed above notifications will be sent to property owners in the affect area.

Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes or catch basins to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole and catch basin makes this method both time-consuming and somewhat limiting.

Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are place in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not

emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

4.3 IDDE Investigation Deadlines

When the specific source of an illicit discharge is identified, the City will exercise its authority as necessary to require its removal. At a minimum, the following steps will be taken:

1. The City will initiate and assess an IDDE investigation within 90 days of identifying or being made aware of the presence of a potential illicit discharge into or from the MS4 based upon receiving any of the following information:
 - a. Stormwater infrastructure with screening results that indicate sewer input or industrial discharges;
 - b. Citizen complaint of illicit discharge as appropriate;
 - c. Notification by RIDEM, EPA, or an interconnected MS4 of presence of suspect illicit discharge as evidenced by the pollutant threshold criteria listed above; and
 - d. Evidence of potential illicit discharges discovered as a result of other activities including but not limited to: mapping, construction, maintenance, and cleaning and repair of catch basins and manholes.

The Office of the City Engineer shall be responsible for initiating and recording the start date of the IDDE investigation.

2. The Office of the City Engineer will then be responsible for completing the IDDE investigation within 180 days of the initiation by either 1) identifying a point of entry from a specific location or address that contributes wastewater or other illicit flow to the MS4 or 2) documenting that an illicit discharge does

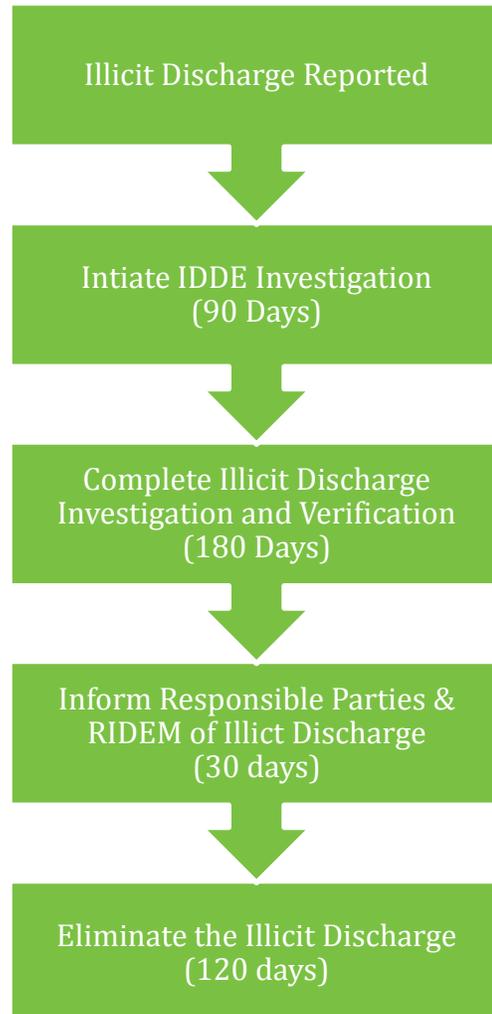


Figure 4-2: Procedure for Illicit Discharge Removal

not exist, unless not feasible. In the event that these discharges are not investigated within 180 days, the Office of the City Engineer will establish a schedule for completing the IDDE investigation as expeditiously as possible.

3. Next, the Office of the City Engineer will identify and notify all parties responsible for the illicit discharge and RIDEM within 30 calendar days of the date of verification³ of the source, and require immediate cessation of improper disposal practices in accordance with its legal authorities.
4. Following verification of the discharge, the Office of the City Engineer will ensure that Illicit discharges to the MS4 are eliminated within 120 days of the date of verification. Where elimination of an illicit discharge within 120 days of its verification as an illicit discharge is not possible, the Office of the City Engineer will take all reasonable and prudent measures to minimize the discharges of pollutants to and from its MS4 and establish an expeditious schedule for its elimination.

Section 5 describes the documentation and reporting of illicit discharge removal that is required for compliance with the MS4 General Permit and Consent Agreement.

4.4 Follow-up Actions

Upon removal of all identified illicit discharges within a catchment area, the Office of the City Engineer will ensure that the relevant stormwater infrastructure is re-prioritized as HST. Dry and wet weather sampling in accordance with the procedures in Section 3 will be completed within 120 days of removal of the source after a verified illicit discharge to the MS4 has been eliminated to confirm that all illicit discharges have been eliminated. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation. If confirmatory screening indicates no evidence of additional illicit discharges, stormwater infrastructure will be classified as LST.

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each stormwater infrastructure will be re-prioritized for screening and scheduled for on-going screening once every five years. On-going screening will consist of dry and wet weather screening consistent with Section 3. All sampling results will be reported annually.

³ The date of verification of an illicit discharge is defined as the date that the City identifies a point of entry from a specific location or address that contributes wastewater or other illicit flow to the MS4.

Section 5

Compliance Reporting

As part of its Consent Agreement with RIDEM, the City is required to submit a compliance report for the previous calendar year. This report is required to document efforts associated with the IDDE Program, as demonstrated in Attachment C – Compliance Reporting Requirements of the Consent Agreement. The following section details the information related to the IDDE program that must be included within the annual report.

The results of the IDDE Program will be tracked as documented below and in previous sections. In addition, a database that centralizes the various tracking documents will be developed and maintained as a central information source on the status of IDDE investigations, schedules, priority ranking, and follow up actions.

5.1 Water Quality Screening Results

Reporting for the dry weather screening program includes the total number of outfalls, interconnections, and other stormwater infrastructure screened in dry and wet weather, and the results of all screening and sampling completed. The results shall include:

1. Date of visit
2. Number of outfalls surveyed (that year and in total)
3. Catch basins, manholes, and interconnections screened
4. Identifier
5. Location (latitude and longitude)
6. Receiving water
7. Water body segment name and identification
8. Weather conditions at the time of sampling
9. Precipitation in the previous 72 hours
10. Results of field observations (visual and odorous);
11. Field screening results (meters, kits, and strips)
12. Results of all analyses.

In addition, the City will report the results of the work to determine whether there are any interconnections between the MS4 and other MS4s. The City will also report any indirect discharges to other MS4s and the results of screening at any such MS4 interconnections.

All data sent to RIDEM as part of compliance reporting with the Consent Agreement will be submitted electronically using an excel spreadsheet. An excel template for this reporting is available from RIDEM. Reporting shall include all information and data for the current reporting period and the entire cumulative reporting period to date.

5.2 Catch Basin & Structure Investigation Results

The catch basin and structure investigations for illicit connections and non-stormwater discharges conducted during regular maintenance operations and mapping programs will include reporting on the following:

1. Structures inspected
2. Map showing the area investigated, structures inspected with structure and pipe IDs, interconnection and catchment delineations, and next steps
3. Date inspected
4. Narrative of investigation efforts
5. Findings and corrective actions taken/or required
6. Confirmation that all structures have been inspected at least once

This information will be presented in a tabular form, except for the map, and will be submitted electronically to RIDEM with the annual compliance report.

5.3 Illicit Discharge Reports

The City will record and report a description of:

1. Citizen complaints of illicit discharges
2. Reports of illicit discharges from RIDEM
3. Internal referrals for IDDE evaluation based upon catch basin inspections or during other construction or maintenance work

In the case that one of these reports were made and investigation was not initiated, the City will provide reasons for not moving forward.

5.4 Illicit Discharge Removal

Each year's annual compliance report will include a description of all IDDE investigations performed, including:

1. A description of what information prompted the investigation (e.g., IDDE screening, a catch basin inspection, citizen complaint, etc.)
2. Date that information was received

3. Date the IDDE investigation was initiated and completed
4. Outcome of the IDDE investigation
5. Documentation and reasoning if an outfall or parts of a system are excluded from an IDDE investigation

In cases where an IDDE investigation was not completed within the 180 days of initiation of the investigation, the following will be provided:

1. A list of all IDDE investigations that were not completed within 180 days of initiation of the investigation
2. A schedule for completing each such IDDE investigation
3. An explanation as to why the schedule will ensure that the IDDE investigation is completed as expeditiously as possible
4. For each IDDE investigation provided in a previous report, specify whether the schedule was adhered to and, if not, the reasons for the delay

Documentation of all the illicit discharges verified through the end of the calendar year will include the following:

1. The date the illicit discharge was verified
2. The dates RIDEM was notified of the illicit discharges
3. The date(s) the owner of the illicit discharges was notified
4. List of illicit discharged verified but not removed with 120 days of verification, with explanation
5. Schedules for removal of each illicit discharge that was not removed within 120 days of verification and an explanation as to why the schedule will ensure the illicit discharge is eliminated as expeditiously as possible
6. For each schedule for the removal of an illicit discharged listed in the previous report, specification of whether or not the City is complying with the schedule and, if not, the reasons for the delay
7. The actions taken to eliminate the illicit discharges and dates on which they were executed
8. The date illicit discharge was eliminated
9. The dates and results of dry and wet weather surveys to confirm removal of illicit discharges

5.5 IDDE Plan

The compliance report shall include an amended IDDE Plan that incorporates a revised ranking and prioritization of screening and investigations of infrastructure and a revised implementation schedule.

Appendix H

City of Providence – Interconnection Notification Process

PROCESS FOR NOTIFICATION OF INTERCONNECTION WITH ABUTTING COMMUNITY, OTHER MS4S OR INSTITUTIONS

I. Identification of Interconnection During Stormwater Mapping Initiative

- a. During mapping of the City's stormwater collection system, on the discovery of an apparent interconnection to or from the City's system, the following data shall be obtained:
 - i. Spatial location of the connection (GIS format)
 - ii. Identify how the connection is made (e.g., manhole, catch basin, other)
 - iii. type and size of the connection
 - iv. direction of flow
 - v. source (or destination) of the connection

- b. This information will be distributed directly to the abutting community or MS4

| | | |
|-------------------------|--|--|
| Pawtucket | Mr. Andrew Silvia, P.E. <i>Chief of Project Development</i> | (401) 728-0500 x279 asilvia@pawtucketri.com 250 Armistice Boulevard Pawtucket, RI 02860 |
| North Providence | Mr. Louis Lanni <i>Director of Sanitation (DPW)</i> | (401) 233-1400 llanni@northprovidenceri.gov 1951 Mineral Spring Avenue North Providence, RI 02904 |
| Johnston | Mr. Bernard J. Nascenzi <i>Deputy Director of Public Works</i> | (401) 231-4000 x4163 bnascenzi@cox.net 100 Irons Avenue Johnston, RI 02919 |
| Cranston | Mr. Edward Tally <i>Environmental Program Manager</i> | (401) 780-3173 ETally@CranstonRI.org City of Cranston, Department of Public Works 869 Park Avenue Cranston, RI 02910 |

RI Department Ms. Allison Hamel
of *Principal Environmental*
Transportation Scientist

(401) 479-1202
allison.hamel@dot.ri.gov
360 Lincoln Ave.
Warwick, RI 02888

- c. In the case where the interconnection is related to one of the institutions within the City, contact shall be made to the appropriate facilities department.
- II. Identification of Interconnection During IDDE Screening
- a. During the screening process for illicit discharges into the City's stormwater collection system, if all information leads to a conclusion that the source of an illicit connection is associated with an interconnection, the City, or its agent, shall promptly notify the appropriate community, MS4 or institution, as identified above.
 - b. The agency contacted shall be provided with the location where the illicit connection was detected and the evidence leading to that determination.

Appendix I

Municipal Training Materials

Preventing Stormwater Pollution

Public Works Facilities and Properties

Providence,
Rhode Island

DATE



**CDM
Smith**

Content

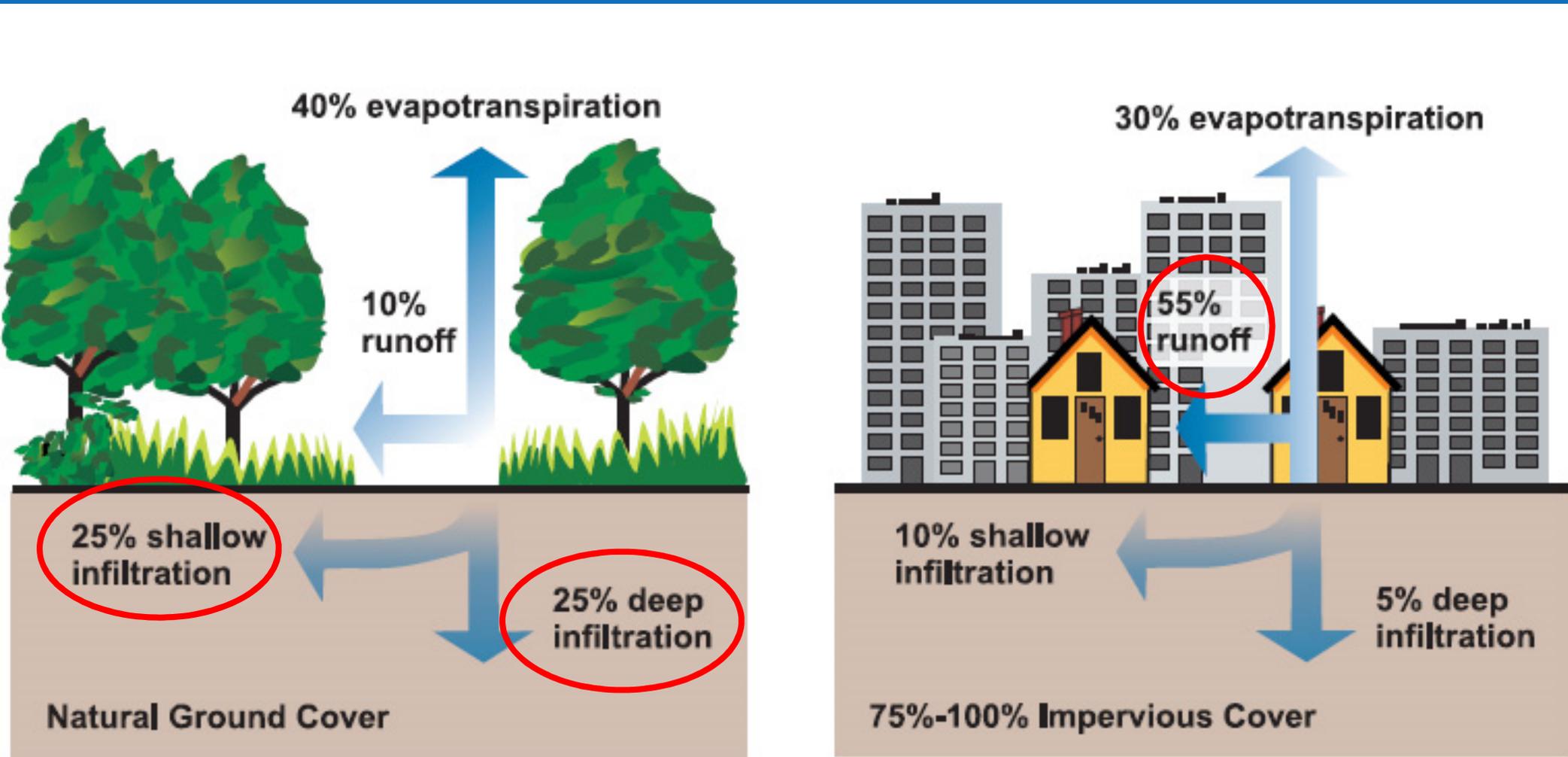
- Stormwater Pollution
- RI DEM Municipal Separate Storm Sewer System (MS4) Permit
- Six Minimum Control Measures (MCM)





Stormwater Pollution

Natural Environment vs. Development



Stormwater Pollution

Stormwater can pick up:

- Road sand and salt
- Construction site sediment
- Fertilizers and pesticides
- Animal waste
- Oil and grease
- Litter



Pollutants discharge to nearby waterbodies without treatment



Municipal Operations that can Impact Stormwater Quality

- **Street Sweeping** - Collects sediment and prevents it from entering water bodies
- **Catch Basin Inspection & Cleaning** – Removes pollutants, prevents them from entering water bodies
- **Storm Drain and Street Repair/Maintenance**
- **Outfall Inspections** - Keeps storm drains operating properly
- **Municipal Facility Management**
- **Municipal Construction Projects** – Ensures proper sedimentation & erosion control measures
- **Landscape & Park Maintenance**
- **Stormwater BMP Maintenance**
- **Municipal Employee Training**



Picture Credits: Vacuum Truck Exchange, United Contractors, Mill City Times



Municipal Stormwater Hotspots

Sites that produce high levels of stormwater pollutants and/or present a high risk for spills, leaks or illicit discharges

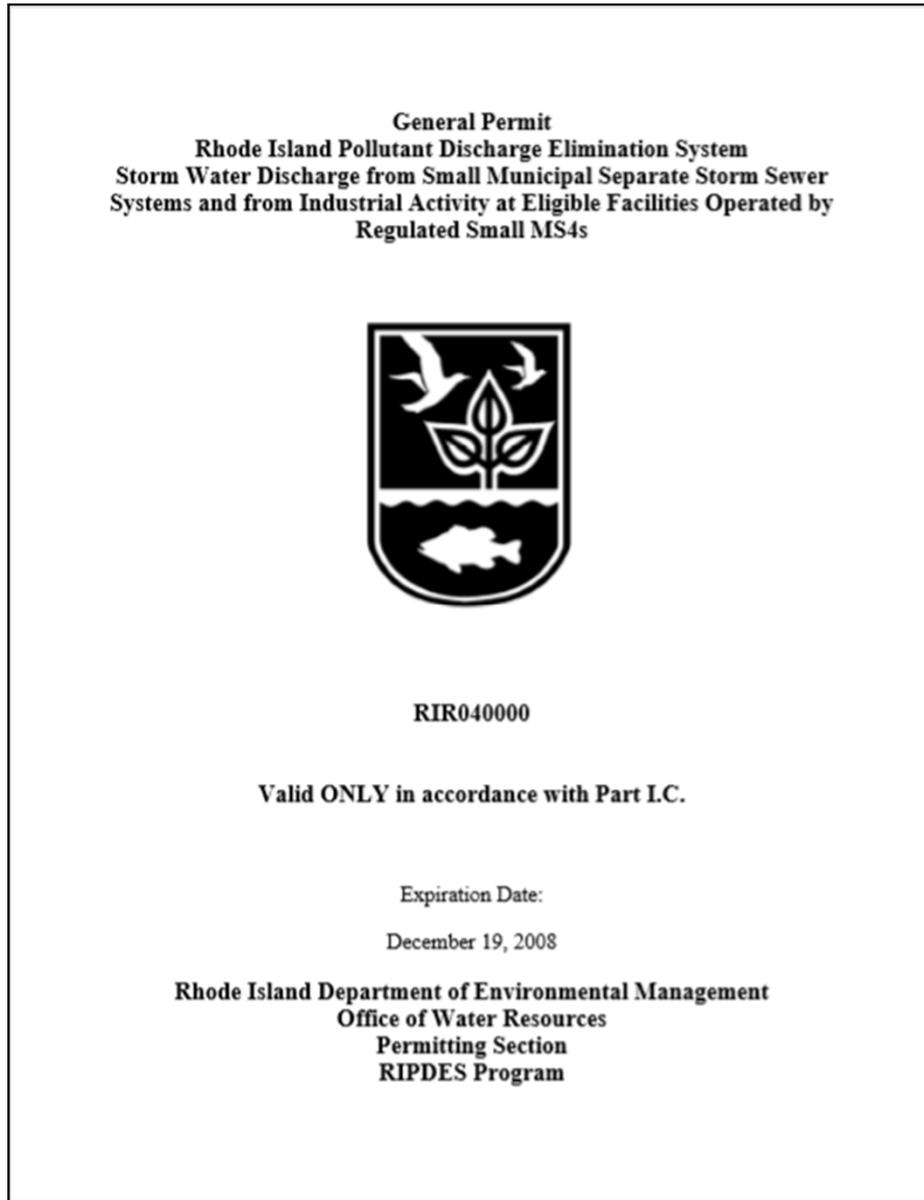


- Public Works Yards
- Vehicle/Equipment Storage
- Maintenance Yards
- Water and Wastewater Treatment Facilities
- Public Buildings
- Public Parks
- Public Golf Courses
- Public Swimming Pools



RI DEM Municipal Separate Storm Sewer System (MS4) Permit

Rhode Island Regulations



2003

- RIDEM issued Phase II Municipal Separate Storm Sewer (MS4) Permit
- Included 33 RI small MS4's – including Providence

2017

- RIDEM issued a Notice of Violation (NOV) to the City for non-compliance with the MS4 Permit
- City entered into the Consent Agreement (CA) that included specific stormwater MS4 requirements



DEM Municipal Separate Storm Sewer System (MS4) Permit

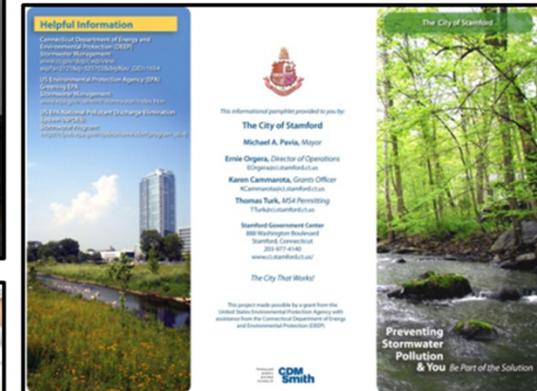
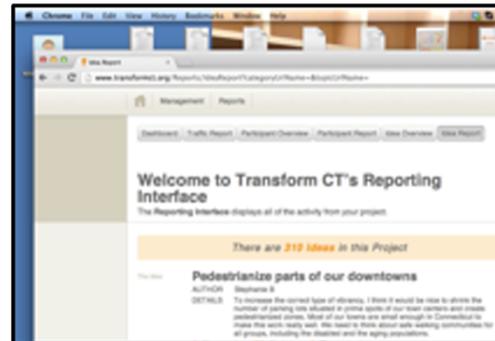
Six Minimum Control Measures (MCM):

-   Public education and outreach
-   Public involvement/participation
-   Illicit discharge detection & elimination
-   Construction site stormwater runoff control
-   Post-construction stormwater management
-   Pollution prevention/good housekeeping

MCM 1 - Public Education and Outreach

Implement Public Education Program

- Develop Program
- Implement Program
- Evaluate Effectiveness
- Taylor Program



MCM 2 - Public Involvement/Participation

Include Public participation and involvement

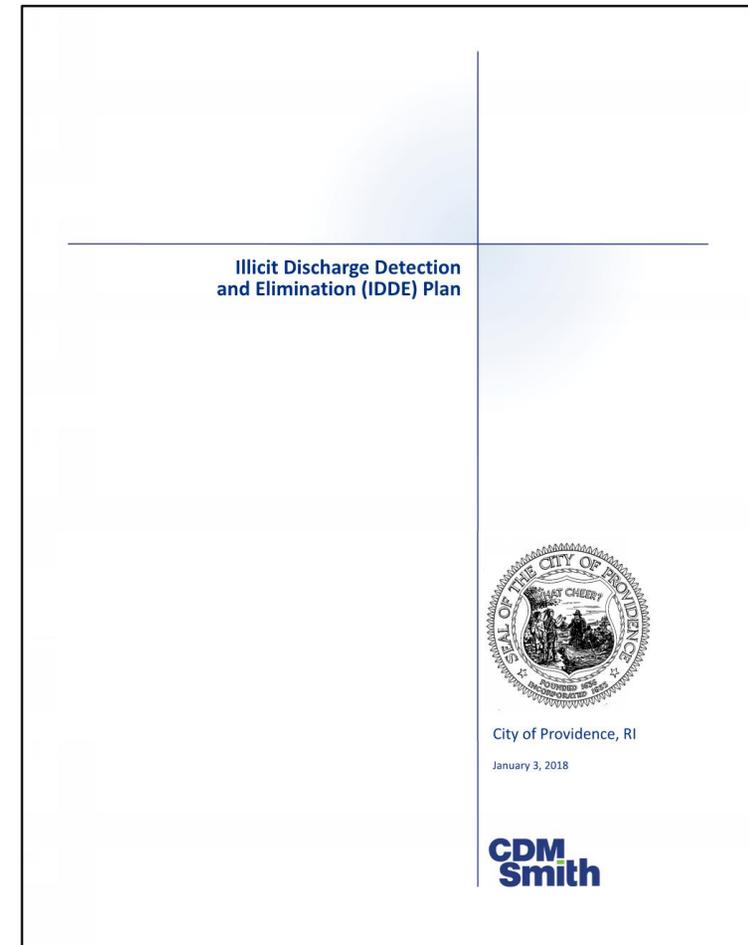
- Comply with Public Notice Requirements
- Continue Stormwater Committee Meetings
- Encourage Businesses and Organizations Participation



MCM 3 - Illicit Discharge Detection and Elimination (IDDE) Program

Develop a formal written IDDE Program

- **Develop Outfall Mapping**
- **Develop Citizen Reporting Program**
- **Establish Legal Authority**
- **Develop Record Keeping**
- **Outfall Dry Weather Screening**



MCM 4 - Construction Site Runoff Control

Develop implement and enforce a program to reduce pollutants during construction

- **Implement & Enforce Land Use Regulations**
- **Review Site Plans for Stormwater Quality**
- **Conduct Site Inspections**
- **Implement Procedures for Public Comment**



MCM 5 - Post-Construction Stormwater

Develop a program to ensure stormwater controls are in place after construction

- **Establish Low Impact Development (LID) Authority**
- **Enforce LID**
- **Implement Long-term Maintenance Plans**
- **Post Construction Ordinance**



MCM 6 - Pollution Prevention/Good Housekeeping

Develop programs to properly maintain existing infrastructure

- **Inventory of Municipal Stormwater BMP's**
- **Develop O&M Procedures for Stormwater BMP's**
- **Develop & Implement Employee Training Program**
- **Implement MS4 Property Operations Maintenance**
- **Develop & Implement Infrastructure Repair Program**
- **Develop & Implement Street Sweeping Program**
- **Develop & Implement Catch Basin Cleaning Program**





MCM 3 – Illicit Discharge Detection and Elimination (IDDE)

IDDE Program

Illicit Discharges

Any discharge to a MS4 that is not composed **entirely** of stormwater except discharges pursuant to a NPDES permit

Allowed Activities:

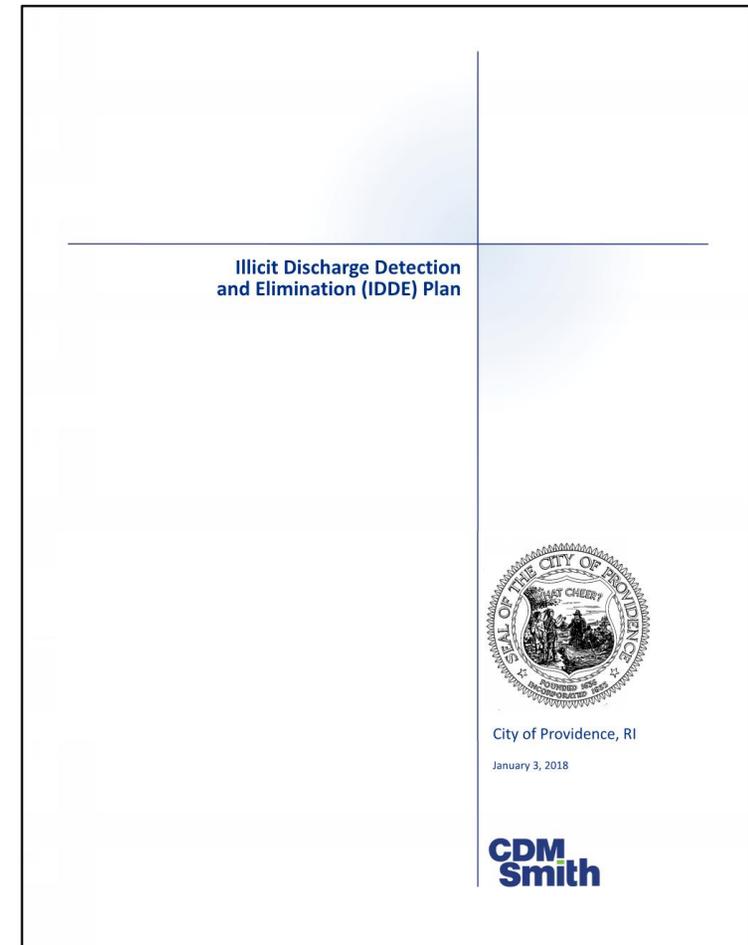
- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents
- Fire fighting activities



IDDE Program

Purpose & Goal: Identify Illicit Connections

- Dry weather outfall sampling
- Resident and employee notifications
- Drainage system investigations
- Removal of illicit connections



Recognizing Illicit Discharges

Direct Connection



Sewage, Industrial, Commercial Cross-Connection



Straight Pipe Connection

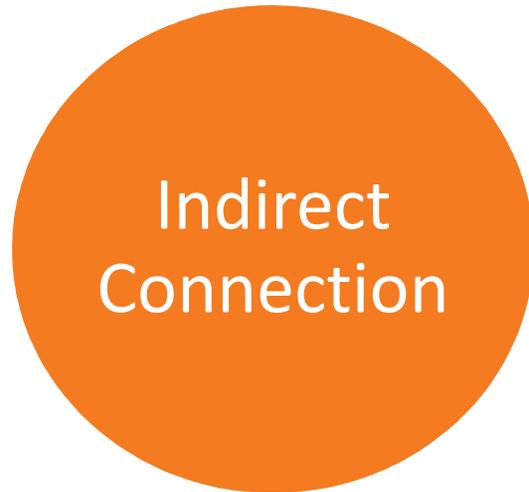


Washing Machine Connection

Picture Credit: City of Fayetteville



Recognizing Illicit Discharges



Spills



Dumping



Outdoor Washing



Cross-Contamination from Broken Sewer

Picture Credits: Forsyth County News, Water Encyclopedia, SEMSWA, Harris Water Main



Recognize Illicit Discharges - Industrial



Looks like: Oils/vehicle fluids, grease, soaps/detergents, unnatural colors

Smells like: Sulfur (rotten eggs), rancid-sour, oil and gas, sweet/fruity, sharp chemical smell

Other signs: Opaque/cloudy water, suds, excessive vegetation growth, chemical damage to drain pipe

Caused by: Direct pipe connections, spills, illegal dumping, washing vehicles



Picture Credits: Prince William County Government, City of Durham, Clemson University, City of Superior, WI

Recognize Illicit Discharges - Construction



Looks like: Heavy sediment/turbidity, uncovered materials

Other signs: Brown or cloudy water, trash



Caused by: Improper construction controls

Recognize Illicit Discharges – Residential



Looks like: Dog poop, lawn clippings, draining chlorinated swimming pools, fertilizers, motor oil

Other signs: Trash, small amounts of hazardous materials

Caused by: Improper disposal by residents



Recognize Illicit Discharges – Town Operations

- Cover Deicing Materials
- Use Covered Dumpsters
- Protect Stock Piles
- Minimize Material Transfers
- Store Chemicals Inside



Picture Credits: Vermiculite Pallet, Scranton Gillette Communications, Lake County, IL



Recognize Illicit Discharges – Sanitary Sewer Overflows



Definition: A discharge of untreated sanitary wastewater from a municipal sanitary sewer

Looks like: Sanitary flow exiting a City sewer

Caused by: Blockage of sewer lines, I/I during rainfall, malfunctioning pump station, broken sewer line

Example Situations



An uncovered dumpster is parked next to a catch basin



Suds/detergents are seen inside a catch basin during regular maintenance



A resident complains of a sewage smell in a nearby stream



A stream turns fluorescent green downstream of an industrial facility

Should it be reported as a potential illicit discharge?

Yes!

Yes!

Yes!

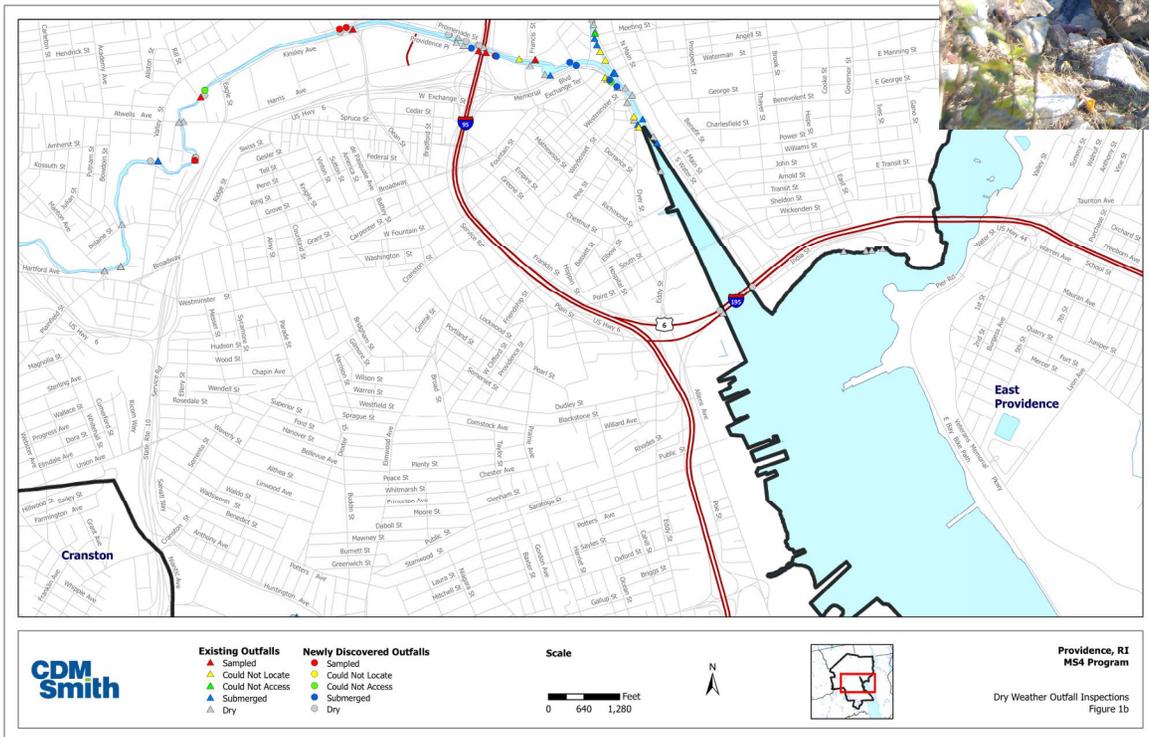
Yes!

Outfall Screening

Dry Weather Inspections

Document conditions

Sample flow



IDDE Investigations

- Conduct drainage system investigations
- Work up the system checking for flow and sampling for:
 - ✓ Temperature
 - ✓ pH,
 - ✓ Salinity
 - ✓ Conductivity
 - ✓ Dissolved Oxygen
 - ✓ Ammonia
 - ✓ Surfactants
 - ✓ Chlorine
- Identified potential pipe segments:
 - ✓ CCTV inspection
 - ✓ Dye testing





MCM 6 – Pollution Prevention / Good Housekeeping

Good Housekeeping



Maintain regular sweeping and clean-up activities

Regularly pick up and dispose of garbage and waste material



Promptly clean up spilled materials to prevent pollution runoff

Material Storage

Plainly Label All Containers

Keep
Storage Area
Containers
Organized

Keep unused products in
original containers

Keep an
inventory of all
materials

Routinely check
outdoor
equipment and/or
containers for
leaks

Store bulk materials
and tires under roofs or
tarps

Store waste
materials in
covered
dumpsters

Material Handling

- Identify materials which are considered to be toxic and hazardous
- Discuss proper handling procedures for toxic and hazardous substances
- Keep containers closed except while in use
- Use self-closing spigots & nozzles for dispensing fluids from bulk containers
- Pour & mix products in well ventilated area over a spill pallet
- Place drip pans beneath hose/pipe connections
- Clean up excess and spills
- Minimize transfer during wet conditions



Material Inventory Control

Track how materials are stored and handled at the facility

Identify which materials and activities pose the most risk to the environment

Properly dispose of unusable material in a timely fashion

Order appropriate amounts



What Might Spill

What might spill:

- Petroleum Products
- Antifreeze
- Paints/Paint Thinners
- Vehicle/Equipment Fluids
- Fertilizers/Pesticides
- Salt, Sand, Gravel
- Asphalt Patching
- Sweepings

Why we should be concerned:

- Many are toxic
- Environmental - Clog fish gills, smother eggs, etc.
- Fertilizers increase algae bloom
- State & Federal Regulations



Picture Credits: Boswell Engineering, EPA, Resource Venture

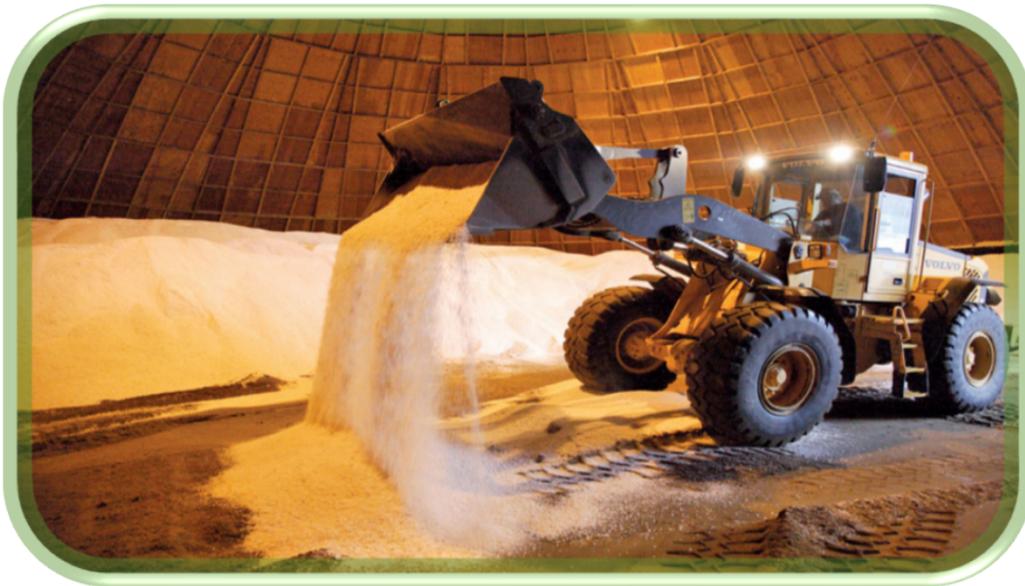
Spill Prevention

- Designate material storage areas away from drain inlets and flow areas
- Store dry chemicals and bagged materials on pallets
- Provide secondary containment for liquids
- Conduct frequent inspections to check for damaged or leaking containers
- Keep storage areas clean and organized
- Provide adequate coverage/protection for materials on-site
- Keep chemicals in existing containers and properly labeled



Deicing Materials

- Store on flat surface
- Ensure adequate space for piles
- Store on an impermeable pad
- Store in a building or under cover
- Control runoff



Picture Credits: Vermiculite Pallet, Scranton Gillette Communications, Lake County, IL



Conclusion

What can you do?



Report Illicit Discharges



Talk to Residents



Participate in the MS4 and IDDE Programs



Educate Peers



Questions?



Appendix J

City Ordinance – Article VII. Soil Erosion and Sediment Control

ARTICLE VII. - SOIL EROSION AND SEDIMENT CONTROL

Sec. 5-101. - Purpose.

The city council hereby finds that excessive quantities of soil are eroding from certain areas that are undergoing development for non-agricultural uses such as housing developments, industrial areas, recreational facilities and roads. This erosion makes necessary costly repairs to gullies, washed out fills, roads, and embankments. The resulting sediment clogs the stormwaters and road ditches, muddies streams, and deposits silt in ponds and reservoirs. Sediment is considered a major water pollutant.

The purpose of this article is to prevent soil erosion and sedimentation from occurring as a result of non-agricultural development within the city by requiring proper provisions for water disposal, construction waste disposal and the protection of soil surfaces during and after construction, in order to promote the safety, public health and general welfare of the city.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-102. - Applicability.

This article shall be applicable to any situation involving any disturbance to the terrain, topsoil or vegetative ground cover upon any property within the city after determination of applicability by the building official or his/her designee based upon criteria outlined in section 5-103 below. Compliance with the requirements as described herein shall not be construed to relieve the owner/applicant of any obligations to obtain necessary state or federal permits.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-103. - Determination of applicability.

It shall be unlawful for any person to disturb any existing vegetation, grades, and contours of land in a manner, which may increase the potential for soil erosion without first applying for a determination of applicability from the building official or his/her designee. Upon determination of applicability, the owner/applicant shall submit a soil erosion and sediment control plan for approval by the building official or his/her designee, as provided in section 5-104. The application for determination of applicability shall describe the location, nature, character, and time schedule of the proposed land disturbing activity in sufficient detail to allow the building official or his/her designee to determine the potential for soil erosion and sedimentation resulting from the proposed project. In determining the applicability of the soil erosion and sediment control ordinance to a particular land disturbing activity, the building official or his/her designee shall consider site topography, drainage patterns, soils, proximity to watercourses, and other such information as deemed appropriate by the building official or his/her designee. A particular land disturbing activity shall not be subject to the requirements of this article if the building official or his/her designee finds that erosion resulting from the land disturbing activity is insignificant and represents no threat to adjacent properties or to the quality of any coastal feature or watercourse, as defined herein. The current "Rhode Island Soil Erosion and Sediment Control Handbook," U.S. Department of Agriculture Soil Conservation Service, state department of environmental management, and state conservation committee shall be consulted in making this determination.

No determination of applicability shall be required for the following:

- (1) Construction, alternation or use of any additions to existing single family or duplex homes or related structures, provided the grounds coverage of such addition is less than one-quarter ($\frac{1}{4}$) acre, and such construction, alteration and use does not occur within one hundred (100) feet of

any watercourse or coastal feature, and the slopes at the site of land disturbance do not exceed ten (10) percent.

- (2) Use of a home or community garden.
- (3) Excavations for improvements other than those described in subsection (1) above which exhibit all of the following characteristics:
 - a. Does not result in a total displacement of more than fifty (50) cubic yards of material; and
 - b. Has no slopes steeper than ten (10) feet vertical in one hundred (100) feet horizontal or approximately ten (10) percent; and
 - c. Have all disturbed surface areas promptly and effectively protected to prevent soil erosion and sedimentation.
- (4) Grading, as a maintenance measure, or for landscaping purposes on existing developed land parcels or lots, provided that all bare surfaces are immediately seeded, sodded or otherwise protected from erosive actions and all of the following conditions are met:
 - a. The aggregate of areas of such activity does not exceed two thousand (2,000) square feet; and
 - b. The change of elevation does not exceed two (2) feet at any point; and
 - c. The grading does not involve a quantity of fill greater than eighteen (18) cubic yards; except where fill is excavated from another portion of the same parcel and the quantity does not exceed fifty (50) cubic yards.
- (5) Grading, filling, removal, or excavation activities and operations undertaken by the city under the direction and supervision of the director of public works for work on streets, roads, or right-of-way dedicated to public use, provided, however, that adequate and acceptable erosion and sediment controls are incorporated in engineering plans and specifications are employed. Appropriate controls shall apply during construction as well as after the completion of these activities. All such work shall be undertaken in accordance with the performance principles provided for in subsection 5-105(c) and such standards and definitions as may be adopted to implement said performance principles.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-104. - Provisions of plan; procedures.

- (a) *Plan*. To obtain approval for a land disturbing activity as found applicable by the building official or his/her designee under section 5-103, an applicant shall first file an erosion and sediment control plan signed by the owner of the property, or authorized agent, on which the work subject to approval is to be performed. The plan or drawings, as described in section 5-105 of this article, shall include proposed erosion and sediment control measures to be employed by the applicant or the applicant's agent.
- (b) *Plan review*. Within five (5) business days of the receipt of a completed plan, the building official or his/her designee shall send a copy of the plan to the review authorities which may include the public works department, parks department, and/or the planning department for the purpose of review and comment. The building official or his/her designee may also within the above time frame, submit copies of the plan to other local departments or agencies, including the conservation district that services their county, in order to better achieve the purpose of this article. Failure of the aforementioned review authorities to respond within twenty-one (21) calendar days of their receipt of the plan shall be deemed as no objection to the plan as submitted.

The time allowed for plan review shall be commensurate with the proposed development project, and shall be done simultaneously with other reviews.

- (c) *Plan approval.* The building official or his/her designee shall take action in writing either approving or disapproving the plan with reasons stated within ten (10) calendar days after the building official or his/her designee has received the written opinion of the aforementioned review authorities.

In approving a plan, the building official or his/her designee may attached such conditions deemed reasonably necessary by the aforementioned review authorities to further the purposes of this article. The conditions pertaining to erosion and sediment control measures and/or devices, may include, but are not limited to, the erection of walls, drains, dams, and structures, planting vegetation, trees and shrubs, furnishings, necessary easements, and specifying a method of performing various kinds of work, and the sequence or timing thereof. The applicant/owner shall notify the building inspector or his/her designee in advance of his or her intent to begin clearing and construction work described in the erosion and sediment control plan. The applicant shall have the erosion and sediment control plan on the site during grading and construction.

(d) *Appeals.*

- (1) *Administrative procedures.* If the ruling made by the building official or his/her designee is unsatisfactory to the applicant/owner, the applicant/owner may file a written appeal. The appeal of plans for soil erosion and sediment control shall be to the zoning board of review or other appropriate board of review, as determined by the city council and shall be governed by the appellate procedure applicable thereto. Appeal procedures shall follow current requirements for appeal to the boards above. During the period in which the request for appeal is filed, and until such time as a final decision is rendered on the appeal, the decision of the building official or his/her designee shall remain in effect.
- (2) *Expert opinion.* The official or his/her designee, the zoning board of review or other board of review, may seek technical assistance on any soil erosion and sediment control plan. The expert opinion must be made available in the office of the building official or his/her designee as a public record prior to the appeals hearing.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-105. - Soil erosion and sediment control plan.

- (a) *Plan preparation.* The erosion and sediment control plan shall be prepared by a registered professional engineer, or certified landscape architect or a soil and water conservation society certified erosion and sediment control specialist. Five (5) copies of the plan shall be submitted to the building official or his/her designee.
- (b) *Plan contents.* The erosion and sediment control plan shall include sufficient information about the proposed activities and land parcels(s) to form a clear basis for discussion and review and to assure compliance with all applicable requirements of this article. The plan shall be consistent with the data collection, data analysis, and plan preparation guidelines in the current "Rhode Island Soil Erosion and Sediment Control Handbook," prepared by the U.S. Department of Agriculture, Soil Conservation Service, state department of environmental management, and state conservation committee. At a minimum, the plan shall contain:
- (1) A narrative describing the proposed land disturbing activity with the soil erosion and sediment control measures and stormwater management measures to be installed to control erosion that could result from the proposed activity. Supporting documentation, such as a drainage area, existing site, and soil maps shall be provided as required by the building official or his/her designee.
- (2) Construction drawings illustrating, in detail, existing and proposed contours, drainage features, and vegetation; limits of clearing and grading, the location of soil erosion and sediment control and stormwater management measures, detail drawings of measures; stockpiles and borrow areas; sequence and staging of land disturbing activities; and other such information needed for construction.

- (3) Other information or construction plans and details as deemed necessary by the building official or his/her designee for thorough review of the plan prior to action being taken as prescribed in this article. Withholding or delay of such information may cause the building official or his/her designee to judge the application as incomplete and may constitute grounds for disapproval.
- (c) *Performance principles.* The contents of the erosion and sediment control plan shall clearly demonstrate how the principles, outlined below, have been met in the project design and are to be accomplished by the proposed development.
 - (1) The site selected shall show due regard for natural drainage characteristics and topography.
 - (2) To the extent possible, steep slopes shall be avoided.
 - (3) The grade of slopes created shall be minimized.
 - (4) Post development runoff rates should not exceed predevelopment rates, consistent with other stormwater requirements which may be in effect. Increases in stormwater runoff shall be retained and recharged as close as feasible to its place of origin by means of detention ponds or basins, seepage areas, subsurface drains, infiltration chambers, porous paving, or similar technique.
 - (5) Original boundaries, alignment, and slopes of water-courses within the project locus shall be preserved to the greatest extent feasible.
 - (6) In general, drainage shall be directed away from structures intended for human occupancy, municipal or utility use, or similar structures.
 - (7) All drainage provisions shall be of such a design and capacity so as to adequately handle stormwater runoff, including runoff from tributary upstream areas, which may be outside the locus of the project.
 - (8) Drainage facilities and controls shall be installed as early as feasible during construction, prior to site clearance, if possible.
 - (9) Fill adjacent to water courses should be avoided. If there is no viable alternative, fill shall be protected from erosion. Vegetative stabilization with minimal rip-rap and/or gabions is the preferred method. Vertical structures, including retaining walls, should not be used unless the applicant can clearly demonstrate there will be no adverse impacts resulting from this method of stabilization.
 - (10) Temporary vegetation and/or mulching shall be used to protect bare areas and stockpiles from erosion during construction; the smallest areas feasible shall be exposed at any one (1) time; disturbed areas shall be protected during the non-growing months, November through March.
 - (11) Permanent vegetation shall be placed immediately following final grading.
 - (12) Trees and other existing vegetation shall be retained whenever feasible; the area within the dripline shall be fenced or roped off to protect trees from construction equipment.
 - (13) In the city's residential neighborhoods, it is strongly recommended that sidewalks should be separated from the curb by a permeable strip whenever possible, provided there is a uniform appearance. The permeable strip shall be soil, mulch, vegetation or porous paving. At no time should the sidewalk be less than four (4) feet. Sidewalks in excess of six (6) feet in width are strongly discouraged under normal circumstances.
 - (14) All areas damaged during construction shall be resodded, reseeded, or otherwise restored. Monitoring and maintenance schedules, where required, shall be predetermined.
 - (15) All construction wastes shall be handled, stored, and disposed of in accordance with applicable local, state, and federal laws.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-106. - Approval; expiration; renewal.

(a) *In general.*

- (1) Every approval granted herein shall expire at the end of the time period set forth in the conditions. The developer shall fully perform and complete all of the work required within the specified time period.
 - (2) If the developer is unable to complete the work within the designated time period, he or she shall, at least thirty (30) calendar days prior to the expiration date, submit a written request to the building official or his/her designee for an extension of time, setting forth the reasons underlying the requested time extension. If in the discretion of the building official or his/her designee the extension is warranted, the building official or his/her designee may grant an extension of time up to a maximum of one (1) year from the date of the original deadline. Subsequent extensions under the same conditions may be granted at the discretion of the building official or his/her designee.
- (b) *Maintenance of measures.* Maintenance of all erosion-sediment control devices under this article shall be the responsibility of the owner. The erosion-sediment control devices shall be maintained in good condition and working order on a continuous basis. Watercourses originating and located completely on private property shall be at the responsibility of the owner to their point of open discharge at the property line or at a communal watercourse within the property.
- (c) *Liability of applicant.* Neither approval of an erosion and sediment control plan nor compliance with any conditions of this article shall relieve the owner/applicant from any responsibility for damage to persons or property, nor impose any liability upon the city for damages to persons or property.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-107. - Inspections.

- (a) *Periodic inspections.* The provisions of this article shall be administered and enforced by the building official or his/her designee. All work shall be subject to periodic inspections by the building official or his/her designee. All work shall be performed in accordance with an inspection and construction control schedule approved by the building official or his/her designee, who shall maintain a permanent file on all of his/her inspections. Upon completion of the work, the developer or owner(s) shall notify the building official or his/her designee that all grading, drainage, erosion and sediment control measures and devices, and vegetation and ground cover planting has been completed in conformance with the city's approval, submitted plans, specifications, conditions, and other applicable provisions of this article.
- (b) *Final inspection.* Upon notification of the completion by the owner, the building official or his/her designee shall make a final inspection of the site and shall prepare a final summary inspection report of its findings, which shall be retained in the department of inspections in the department of public works permanent inspections file.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-108. - Noncompliance.

- (a) *In general.* If, at any stage the work-in-progress and/or completed work under the terms of an approved erosion and sediment control plan does not conform to the plan, a written notice from the building official or his/her designee to comply shall be transmitted by certified mail to the owner. The notice shall set forth the nature of the temporary and permanent corrections required and the time limit within which corrections shall be completed as set forth herein.

(b) *Penalties.*

- (1) *Revocation or suspension of approval.* The approval of an erosion and sediment control plan under this article may be revoked or suspended by the building official or his/her designee and all work on the project halted for an indefinite time period by the building official or his/her designee after written notification is transmitted to the developer for one (1) or more of the following reasons:
 - a. Violation of any condition of the approved plan, or specifications pertaining thereto;
 - b. Violation of any provision of this article or any other applicable law, article, rule, or regulation related to the work or site of work; and
 - c. The existence of any condition or the performance of any act constituting or creating a nuisance, hazard, or endangerment to human life or the property of others, or contrary to the spirit or intent of this article.
- (2) Whenever there is a failure to comply with the provisions of this chapter, the city shall have the right to notify the applicant/owner that he or she has five (5) calendar days from the receipt of notice to temporarily correct the violations and thirty (30) calendar days from receipt of notice to permanently correct the violations. Any applicant/owner who fails and/or refuses to temporarily correct the violation within five (5) calendar days from notice and/or to permanently correct a violation within thirty (30) calendar days from notice shall be fined up to seventy five dollars (\$75.00) for every two thousand (2,000) square feet of property area or a portion thereof, for each day following notice during which the violation continues shall constitute a separate offense. The city also shall then have the right to take whatever actions it deems necessary to correct the violations and to charge the applicant/owner for any and all costs associated with such action. In addition, any violation continuing thirty (30) calendar days after notice shall be deemed, and is hereby declared to be, a public nuisance and the city solicitor is hereby empowered to institute an action for an injunction, abatement or any other appropriate action to prevent, enjoin or abate such nuisance. The remedies provided for herein shall be cumulative and not exclusive and shall be in addition to any other remedies provided by law.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Sec. 5-109. - Definition of selected terms.

Applicant: Any person, corporation, or public or private organization proposing a development which would involve disturbance to the natural terrain as herein defined.

Coastal feature: Coastal beaches and dunes, barrier beaches, coastal wetlands, coastal cliffs, bluffs, and banks, rocky shores, and manmade shorelines as defined in "The State of Rhode Island Coastal Resources Management Program" as amended June 28, 1983.

Construction wastes: Solid and/or liquid wastes generated from the site development process. This includes, but is not limited to, discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes.

Cut: An excavation. The difference between a point on the original ground and a designated point of lower elevation on the final grade. Also, the material removed in excavation.

Development project: Any construction, reconstruction, demolition, or removal of structures, roadways, parking, or other paved areas, utilities, or other similar facilities, including any action requiring a building permit by the city.

Erosion: The removal of mineral and/or organic matter by the action of wind, water and/or gravity.

Excavate: Any act by which earth, sand, gravel, rock or any other similar material is dug into, cut, quarried, uncovered, removed, displaced, relocated or bulldozed, and shall include the conditions resulting therefrom.

Fill: Any act by which earth, sand or other material is placed or moved to a new location above-ground. The fill is also the difference in elevation between point of existing undisturbed ground and a designated point of higher elevation of the final grade. Fill also includes material added to an excavation.

Land disturbing activity: Any physical land altering activity which includes such actions as clearance of vegetation, moving or filling of land, removal or excavation of soil or mineral resources, or similar activities.

Runoff: The surface water discharge or rate of discharge of a given watershed after rainfall or snowfall and including seepage flows that do not enter the soil but runoff the surface of the land. Also, that portion of water that is not absorbed by the soil, but runs off the land's surface.

Sediment: Solid material, both mineral and/or organic, that is in suspension, being transported or has been moved from its site of origin by wind, water, and/or gravity as a product of erosion.

Soil erosion and sediment control plan: The (approved) document required before any person(s) may cause disturbance to the natural terrain within the city as herein regulated. Also, herein referred to as erosion and sediment control plan, approved plan.

Watercourses: The term watercourse shall be held to mean any tidewater or coastal wetland at its mean high water level, and any freshwater wetland at its seasonal high water level, including but not limited to, any river, stream, brook, pond, lake, swamp, marsh bog, fen, wet meadow, or any other standing or flowing body of water. The edge of the watercourse as herein defined shall be used for delineation purposes.

(Ord. 2005, ch. 05-55, § 1, 12-1-05)

Appendix K

City Ordinance – Article VI. Post-Construction Stormwater Control

ARTICLE VI. - POST-CONSTRUCTION STORMWATER CONTROL

Sec. 5-81. - Purpose.

Unmitigated stormwater from areas altered by development may pose public health and safety threats. Potential contaminants in stormwater runoff may include suspended solids, nitrogen, phosphorus, hydrocarbons, heavy metals, pathogenic organisms (bacteria and viruses), and road salts.

This article establishes the administrative mechanisms necessary for the city to ensure proper stormwater management. This article is written to work in conjunction with current state regulations.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-82. - Applicability.

This article shall apply to all development and redevelopment occurring within the city. No person shall engage in land development activities without receiving approval from the building official or his/her designee, unless specifically exempted by section 5-83 of this article.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-83. - Exemptions.

The following activities do not require written approval pursuant to this article, unless the developer or redeveloper is within three hundred (300) feet of a watercourse, as defined in the soil erosion and sediment control ordinance:

- (1) Any development or redevelopment on lots less than twenty thousand (20,000) square feet in size located in C1, C2, C4, D1, D2, M1, M2, W1, W2, and W3 zoning districts.
- (2) Any complete project that disturbs less than one (1) acre not including projects less than one (1) acre that are part of a larger common plan of development or sale that propose more than one (1) acre of disturbance.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-84. - Submissions and approvals.

In accordance with section 5-82 of this article, all persons must obtain approval from the building official or his/her designee prior to engaging in any land development activities, unless exempted by section 5-83 of this article. To obtain approval applicants must demonstrate compliance with all policy, standards and requirements of this article to the satisfaction of the building official or his/her designee. Applicants may demonstrate compliance via submission of materials and documentation including but not limited to a stormwater management plan, site plan, and maintenance agreement in accordance with this article. Plans will be reviewed in conjunction with site plan review by the planning board.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-85. - Technical standards.

All applicants are required to develop and submit a stormwater management plan. All stormwater management plans must address stormwater management on a site-by-site basis and all requirements of this article. All stormwater management practices shall be consistent with the "Rhode Island Stormwater Design and Installation Standards Manual" and the "Rhode Island Soil Erosion and Sediment Control Handbook," as amended.

- (1) *Performance standards.* Stormwater management plans shall incorporate best management practices (BMPs) for water quality control, which in combination are demonstrated to reduce the average annual total suspended solids in post-development runoff by eighty (80) percent. Development in drinking water supply watersheds or watersheds where impaired waters as defined by the state's 303(d) list exist may be held to higher standards.
- (2) *Disallowed stormwater best management practices (BMPs).* The placement of detention basins and other stormwater structures within a floodplain shall be avoided. If there is no alternative, the applicant must show what effects, if any, the tailwaters created by the floodplain will have on the outflow and effective storage capacity of the detention facility.
- (3) *Facilitation of maintenance.* Facilities that require maintenance shall be designed to minimize the need for regular maintenance, facilitate required maintenance, and ensure accessibility of components that require maintenance. At a minimum, all stormwater management plans must incorporate BMPs with appropriate maintenance design in accordance with the "Rhode Island Stormwater Design and Installation Standards Manual," as amended; or the "Rhode Island Soil Erosion and Sediment Control Handbook," as amended.
- (4) *Flood protection.* Stormwater management plans shall demonstrate that a proposed project provides for protection of life and property from flooding and flood flows. Water quantities must be controlled in accordance with the "Rhode Island Stormwater Design and Installation Standards Manual," as amended, or a municipally approved regional stormwater management plan for the watershed in which the project site is located. Stormwater management plans shall demonstrate incorporation of the following standards into the proposed project:
 - a. Control and maintenance of post-development peak discharge rates from the two-year, ten-year, twenty-five-year, and one hundred-year storm events and predevelopment levels.
 - b. Downstream analysis of the one hundred-year storm event and control of the peak discharge rate for the one hundred-year storm to mitigate significant downstream impacts.
 - c. Discharge from any stormwater facility must be conveyed through properly constructed conveyance system to provide for non-erosive flows during all storm events. The proposed stormwater conveyance system consisting of open channels, pipes, and other conveyance devices shall at a minimum accommodate the runoff from a twenty-five-year storm event. The stormwater conveyance system must provide for non-erosive flows to receiving waters.
- (5) *Surface water and groundwater.* Stormwater management plans shall demonstrate that during development and post-development, all receiving waters will be recharged in a manner closely resembling predevelopment conditions and that the developed site will retain hydrologic conditions that closely resemble those prior to disturbance. Predevelopment conditions are defined as those conditions existing at the site (precursor to the currently proposed development) at the time of adoption of this article. For redevelopment of previously developed sites, every effort shall be made to model the conditions prior to the presence of non-permeable surfaces (building or infrastructure) and/or fill.

New development located in watersheds that contain an impaired waterbody with TMDLs for total phosphorous and/or bacteria shall not create a net increase of the respective pollutant(s) of concern. Redevelopment watersheds that contain an impaired waterbody with TMDLs for total phosphorous and/or bacteria shall provide a reduction of the respective pollutant(s) of concern to the maximum extent practicable. Proposed BMPs in these areas should have a pollutant removal rating of good to fair based on the Rhode Island Stormwater Design and Installation Standards Manual, as amended, for the pollutant(s)

of concern or should be approved by the City Engineer with verified documentation. The City's TMDL Zoning Map (June 2017) identifies watersheds with TMDLs for total phosphorous and/or bacteria as follows:

Zone A – No TMDL

Zone B – TMDL for Bacteria

Zone C – TMDL for Total Phosphorous and Bacteria

This map should be utilized when identifying if the above applies to a new development or redevelopment project. The City has the authority to monitor and inspect BMPs at any point to ensure they meet the standards specified in the Rhode Island Stormwater Design and Installation Standards Manual, as amended or the approved verified documentation.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-86. - Maintenance requirements for best management practices (BMPs).

- (a) *Routine maintenance and repair procedures.* Preventative maintenance procedures are required to maintain the intended operation and safe condition of the stormwater management facility by greatly reducing the occurrence of problems and malfunctions. To be effective, preventative maintenance shall be performed on a regular basis and include such routine procedures as training of staff, periodic inspections, grass cutting elimination of mosquito breeding habitats, and pond maintenance. Disposal of sediment and debris must occur on a regular basis (unless otherwise specified within an approved plan), at suitable disposal sites or recycling sites and shall comply with applicable local, state and federal regulations. Corrective maintenance procedures are required to correct a problem or malfunction at a stormwater management facility and to restore the facility's intended operation and safe condition. Based upon the severity of the problem, corrective maintenance must be performed on an as-needed or emergency basis and include such procedures as structural repairs, removal of debris, sediment and trash removal, erosion repair, snow and ice removal, fence repair, mosquito extermination, and restoration of vegetated and non-vegetated linings.
- (b) *General maintenance standards for stormwater best management practices (BMPs).* Maintenance design and maintenance procedures for all stormwater BMPs shall be in accordance with the "Rhode Island Stormwater Design and Installation Standards Manual," as amended, or the "Rhode Island Soil Erosion and Sediment Control Handbook," as amended as well as in accordance with manufacturer's recommendations. Stormwater management plans shall demonstrate appropriate maintenance design and procedures for each proposed best management practice. A maintenance schedule for each type of BMP must be included in the stormwater management plan. These schedules shall list the frequency and type of maintenance operations necessary along with the legally responsible party's name, address, and telephone number. If the stormwater drainage facility is to be deeded to the city the applicant must obtain a letter from the city or its designee acknowledging maintenance responsibility and intent of ownership.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-87. - Stormwater management plans.

- (a) *Calculations.* In addition to the information required for the site plan the following information must also be included with the application, where applicable.
 - (1) The area of each sub-watershed as identified on final site plans.

- (2) The area of impervious surfaces (including all roads, driveways, rooftops, sidewalks, etc.) for each sub-watershed as identified in the "Rhode Island Stormwater Design and Installation Standards Manual," as amended.
 - (3) Weighted curve numbers, (CN) as determined by the SCS TR-55 method, for each sub-watershed as identified in the "Rhode Island Stormwater Design and Installation Standards Manual," as amended.
 - (4) Invert elevations for all applicable BMPs. In addition, the elevations for permanent and/or flood pool stages, including peak discharge rates for each stage, within all basins are required.
 - (5) The total volume capacity for all flood control and water quality BMPs (e.g., infiltration basin, detention basins, wet ponds, etc.). Volumes must be segregated into permanent and flood pool stage volumes where applicable. Furthermore, the volumes of all sediment storage (basins, forebays, etc.) area must also be provided.
 - (6) Predevelopment and post-development peak discharge rates and runoff volumes for the two-year, ten-year, twenty-five-year, and one hundred-year frequency storm events for each sub-watershed. The water quality volume must also be calculated for each sub-watershed. All relevant variables such as curve numbers and time of concentration, along with the supporting computations and worksheets must be included.
- (b) *Narrative description.* As part of the stormwater management plan, the applicant shall include a discussion of the protection of environmental resource functions and values. The following outline is provided as guidance for preparing a narrative description for the stormwater management plan. Depending on the size and scope of the proposed project, the amount of information required by the permitting agency may vary, therefore, it is advised to consult the appropriate permitting agency for specific requirements.
- (1) Site description—general topography, soil types, current vegetative composition and relative abundance, existing infrastructure, and/or adjacent properties, identification of major resources (e.g., wetlands, groundwater, surface waters, etc.), name of receiving water(s), potential water quality and/or hydrologic impacts on resources.
 - (2) Site input data—watershed characteristics, area of all impervious surfaces, total area of site, annual mean rainfall, runoff coefficients, curve numbers for various land uses, peak discharge rates.
 - (3) Land use planning and source control plan.
 - (4) Best management practices (BMPs)—identify the type of BMP(s) employed both during and post construction and justification for selection, including any deviation from the "Rhode Island Stormwater Design and Installation Standards Manual," as amended, and the potential effect on pollutant removal efficiency.
 - (5) Technical feasibility of BMPs including sizing, location, hydraulic and environmental impacts. Alternatives, which were considered but determined not to be feasible, should also be discussed.
 - (6) Maintenance schedule of BMPs to be used, both during and post construction including the frequency of inspections and maintenance.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-88. - Maintenance agreements.

Maintenance agreements shall provide written, contractual documentation, which demonstrates compliance with this article and legal arrangements for the upkeep of stormwater facilities to assure their functionality and safety in accordance with this article.

The owner or responsible person shall maintain "as-built" plans of any stormwater management practices located on-site after final construction is completed. The plans must show the final design specifications for all stormwater management facilities and must be certified by a professional engineer.

Maintenance agreements, which describe all maintenance schedules and requirements, must be developed for each stormwater management facility unless the facility is dedicated to and accepted by the city.

- (1) *Recognition of municipal inspection requirements.* Maintenance agreements shall include a reasonable and regular schedule for the city, or designee, to conduct on-site inspection of the functionality and safety of the stormwater management facilities. Inspection schedules shall be based on the complexity and frequency of maintenance needs and shall be subject to the approval of the city. At a minimum, the maintenance frequency should be in accordance with the "Rhode Island Stormwater Design and Installation Standards Manual," as amended.
- (2) *Record keeping for maintenance activities.* Maintenance agreements shall include provisions for maintenance record keeping. All activities conducted in accordance with a maintenance agreement must be recorded in a work order and inspection log. Timely updates of the log shall be the responsibility of the stormwater management facility owner or other responsible party pursuant to this article. Review of the maintenance and inspection log shall be completed by the city, or designee, to determine the effectiveness of operation, maintenance and safety activities. Reviews shall occur as part of each on-site inspection. Additional reviews may be made as deemed appropriate by the city or designee.
- (3) *Responsibility for maintenance to assure functionality and safety.* Appropriate maintenance to assure functionality and safety of stormwater management facilities shall be the responsibility the owner or may be assumed by another party via a written contractual arrangement in accordance with this article.
- (4) *Alterations to maintenance agreements.* Any alterations in maintenance responsibility or alterations to maintenance agreements must be reviewed and approved by the building official or his/her designee. If portions of the land serviced by a stormwater management facility are to be sold, written contractual arrangements shall be made to pass all responsibility of the maintenance agreement to the purchaser and shall be subject to review and approval of the building official or his/her designee. All alterations to maintenance agreements shall be recorded in accordance with this article.
- (5) *Recordation of maintenance agreements.* All maintenance agreements and alterations to maintenance agreements shall be recorded in the land evidence records of the city. Copies of all maintenance agreements and alterations to maintenance agreements shall be included in stormwater management plans. Recordation of maintenance agreements in accordance with this article shall be the responsibility of the owner.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-89. - Application fees.

The city shall be empowered to collect fees from permit applicants, which are commensurate with the cost of administering this article.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Sec. 5-90. - Enforcement.

The city shall have the authority and discretion to invoke penalties and/or impose a lien whenever a stormwater management facility is not implemented, operated, and/or maintained in accordance with its approval and this article. Any penalty invoked shall be in accordance with this section.

- (1) *Notification of violation.* In the event that the stormwater management facility becomes a danger to public safety or public health, is in need of maintenance, or has not been maintained in accordance with the maintenance agreement, the city shall notify the responsible person in writing by certified mail. Upon receipt of that notice, the responsible person shall have five (5) calendar days to temporarily correct the violations and thirty (30) calendar days to complete maintenance and permanently repair the facility in a manner that is approved by the municipality. If the responsible person fails or refuses to perform such maintenance and repair, the municipality may immediately proceed to do so and enforce penalties and/or liens as described herein.
- (2) *Enforcement of penalties and liens.* Any applicant/owner who fails and/or refuses to temporarily correct the violation within five (5) calendar days from notice and/or to permanently correct a violation within thirty (30) calendar days from notice shall be fined up to seventy five dollars (\$75.00), and each day following notice during which the violation continues shall constitute a separate offense. The city also may charge the applicant/owner any costs associated with the removal or repair of damage resulting from the violation. In addition, any violation continuing thirty (30) calendar days after notice shall be deemed, and is hereby declared to be, a public nuisance and the city solicitor is hereby empowered to institute an action for an injunction, abatement or any other appropriate action to prevent, enjoin or abate such nuisance. The remedies provided for herein shall be cumulative and not exclusive and shall be in addition to any other remedies provided by law.
- (c) *Hearing.* Any owner or responsible party, receiving a written notice of violation, shall be given an opportunity, within a reasonable time frame, for a hearing before the zoning board of review to state their case. If evidence indicates that a violation has not occurred, the zoning board of review shall revoke the notice of violation.

(Ord. 2005, ch. 05-54, § 1, 12-1-05)

Secs. 5-91—5-100. - Reserved.

