Tighe&Bond

STORMWATER UTILITY FEASIBILITY STUDY

SUBMITTED TO

City of Concord, New Hampshire

February 2020

Section 1 Stormwater Utility Overview

Section 2 Concord's Stormwater Program

Section 3 Stormwater Funding Alternatives

Section 4 Making the Case for a Dedicated Stormwater Fund

Section 5 Preliminary Rate Structure Assessment

List of Figures

List of Tables

Appendices

Section 1
Stormwater Utility Overview

The intent of this Study is to provide local decision makers with relevant information pertaining to creating a Stormwater Utility as a funding mechanism for the current and future stormwater programs in the City of Concord, NH. A Stormwater Utility would provide the City with a sustainable long-term funding source to address existing and future costs related to maintaining and upgrading aging drainage infrastructure and flood protection, while more equitably distributing stormwater costs across all entities that benefit from the City's stormwater infrastructure.

Tighe & Bond, in coordination with the City of Concord and project partners Raftelis Financial Consultants (Raftelis), prepared this Stormwater Utility Feasibility Study to:

- Provide general information on Stormwater Utilities and alternative available funding options;
- Make a compelling case for the implementation of a Stormwater Utility;
- Identify relevant state and federal laws pertaining to stormwater programs;
- Summarize the City's current and future stormwater program needs, priorities, and costs;
- Present additional information necessary for the City to further assess the feasibility of a Stormwater Utility;
- Describe the next steps and timelines for implementation.

Part of this planning process included reviewing Concord's current stormwater expenditures, estimating future stormwater-related costs, and summarizing the options for funding these costs. This assessment considers Concord's current stormwater-related costs, as well as the anticipated costs associated with funding additional planned capital projects.

The City formed a Working Group of municipal staff to discuss key aspects of funding the stormwater program. The Group is comprised of City staff from a broad cross-section of departments to provide technical, financial, and organizational information and guide the Stormwater Utility assessment. The current Working Group members include:

- David Cedarholm, City Engineer
- Thomas Aspell, Jr., City Manager
- Brian LeBrun, Deputy City Manager for Finance
- Carlos Baia, Deputy City Manager for Community Development
- Chip Chesley, General Services Director
- Jeff Hoadley, General Services Deputy Director
- Jim Major, General Services Highways and Utilities Superintendent
- Heather Shank, City Planner
- Martha Drukker, Associate Engineer

- Ying Zhou, GIS Coordinator
- Amy Duquesnoy, GIS Analyst

Tighe & Bond held a kickoff meeting with the Working Group on January 17, 2019 and a progress meeting on October 30, 2019. In addition, discussion with members of the Working Group took place via phone and email for technical questions throughout the planning process.

1.1 What is a Stormwater Utility?

Stormwater utilities in the United States are very common. 41 states have stormwater utilities and many large states have hundreds of these systems in place, especially in areas prone to storms. Figure 1-1 demonstrates the distribution of stormwater utilities throughout the U.S. as of 2016. Additional information about characteristics of select Stormwater Utilities throughout the U.S. is available from the Black & Veatch *2018 Stormwater Utility Survey*[1].

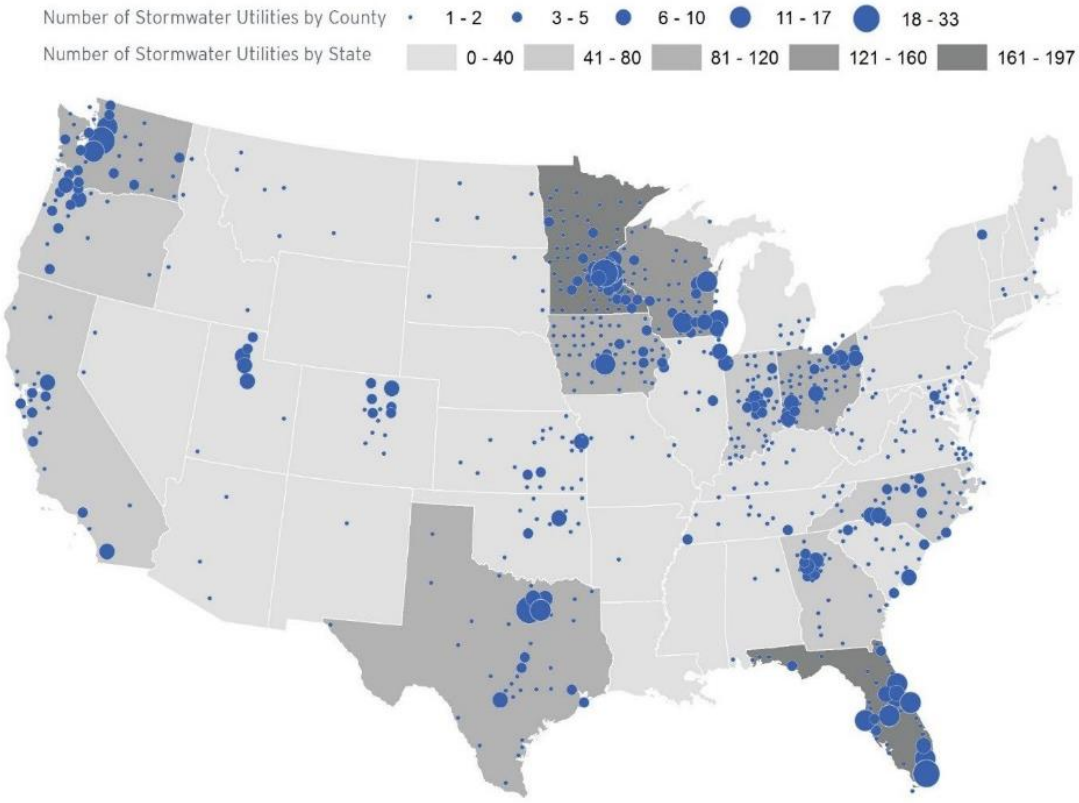


Figure 1-1 Stormwater Utilities in the U.S. [2]

A Stormwater Utility is similar to the funding mechanism for both water and sewer utilities, in that it creates a fund and provides a dedicated and stable source of revenue to finance local services. This revenue is created through a structure of user fees. However, unlike

[1] Black & Veatch *2018 Stormwater Utility Survey* URL: https://www.bv.com/sites/default/files/18%20Stormwater%20Utility%20Survey%20Report%20WEB.pdf
[2] The Brookings Institution analysis of Western Kentucky University (WKU) 2016 stormwater utility survey data, URL: https://www.brookings.edu/blog/the-avenue/2017/09/21/as-flood-risks-intensify-stormwater-utilities-offer-a-more-resilient-solution/

water and sewer utilities where flow can be metered, stormwater runoff cannot be directly measured and therefore is typically estimated using impervious area (pavement, roof tops, and other hard surfaces) as a surrogate measurement for flow.

Stormwater fees are most often, but not exclusively, calculated based on the amount of stormwater generated on a property due to impervious cover. Therefore, the owner of a business with a large parking area would pay more than the owner of a typical residential home.

The relationship between increased impervious cover, degraded water quality, and increased stormwater runoff is well established in scientific literature. Expansion of impervious cover within a watershed can increase stormwater runoff volumes. These increased runoff rates heighten flooding frequency, expand the floodplain, and diminish baseflow, which is the portion of streamflow that comes from groundwater and not runoff. The Center for Watershed Protection developed an Impervious Cover Model (ICM) that demonstrates this relationship between impervious cover and water (stream) quality. ICM predictions are general and may not fully apply to every stream but serve as a good rule of thumb. Factors such as stream gradient, stream order, stream type, age of watershed development, prior land use and past management practices can and will make some streams differ from these predictions.

The general relationship between impervious cover in a watershed and stream quality is shown in the ICM below in Figure 1-2.

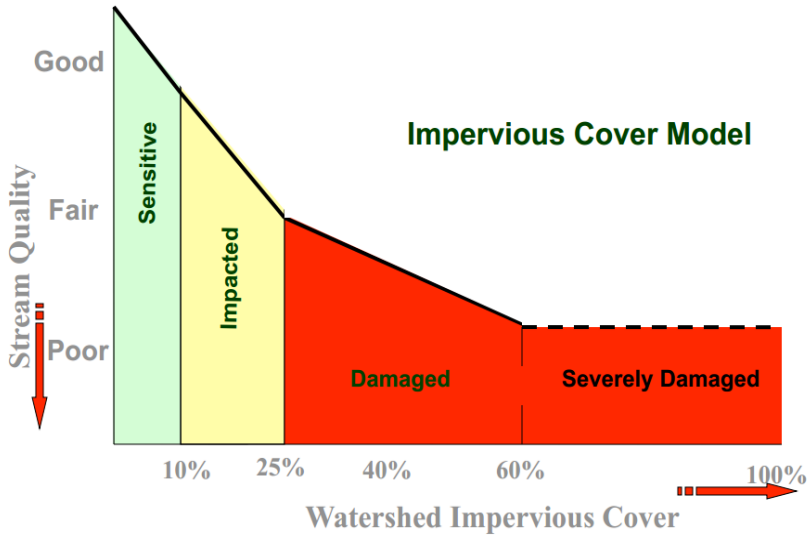


Figure 1-2 Center for Watershed Protection's Impervious Cover Model

While this substitution of impervious cover as a surrogate for stormwater flow is a common basis for generating stormwater fees, some communities have used other methods to determine fees. These methods are dependent upon which stormwater program components are generating the most costs.

For example, Northampton, MA generates a small portion of its fees from gross land area because of their robust flood mitigation needs and levy system. The impervious surface area and pervious surface area of a parcel are multiplied by runoff coefficients. The products of these are summed and that is defined as the hydraulic acreage for each parcel.

The hydraulic acreage is then used as the fee-determining factor instead of using impervious cover alone. Further detail regarding Northampton's stormwater utility is provided in Section 1.5.1.

1.2 Benefits of a Stormwater Utility

An important distinction between stormwater fees and real estate taxes is that fees are user based and are tied to stormwater management services provided by the utility, whereas taxes are not tied to specific services. Stormwater Utilities do not compete for funding with other tax-funded programs and services such as Police, Fire, Schools, or other Public Services. However, municipal properties are typically assessed a fee under a Stormwater Utility that would be paid from the General Fund.

Once a Stormwater Utility is established, all of the revenue is dedicated to a separate utility fund. The dedicated funds can be used for stormwater operations, maintenance, capital improvements, planning, and permitting. Funds can pay for all related program expenses, including staff salaries, equipment and supplies, software, outside contractors, administration and overhead costs, and more.

Other benefits of a Stormwater Utility include the following:

- Fees can be made geographically specific.
- Funds raised by the utility to manage stormwater are no longer needed from the General Fund.
- Tax-exempt properties (such as schools, government buildings, churches, medical facilities) that do not contribute to the General Fund pay towards the City's costs of managing stormwater under a utility. This is an important consideration for Concord, as approximately 24% of the impervious cover in the City is located on tax-exempt properties.
- Utilities are flexible and can adapt to changing program and funding needs over time. They can also fund all aspects of the program.
- Utilities provide transparency and accountability, since the budget is based on services provided.

1.3 Typical Drivers for Creating a Stormwater Utility

Communities across the country are electing to establish Stormwater Utilities in order to provide stable and dedicated funding for their stormwater management programs.

Some of the drivers to establish a Stormwater Utility include:

- Flooding problems and complaints;
- Aging infrastructure;
- Insufficient funding;
- The need to consolidate or coordinate responsibilities that were previously dispersed among several City departments and divisions;
- Regulatory mandates such as Total Maximum Daily Loads (TMDLs) and EPA's Phase II Small Municipal Separate Storm Sewer System (MS4) Requirements;

- Potential lawsuits from watershed groups;
- Development opportunities/pressures;
- The need for programs that are comprehensive, cohesive, and consistent year-to-year;
- The importance of protecting recreational areas and public open space to preserve the local economy and quality of life;
- Aesthetic and "green" demands and desires;
- Need to create an integrated approach to address Combined Sewer Overflows (CSOs); and
- Address drought and water supply protection.

In response to these drivers, numerous communities in New England have adopted a Stormwater Utility as their primary revenue source to manage local stormwater obligations. In some cases, the Stormwater Utility became the primary revenue source for the heavy financial burden of a CSO Long-term Control Plan (e.g., Portland, ME and Chicopee, MA) and/or local flood control (e.g., Northampton, MA). More detail on these utilities is provided in Section 1.5.

1.4 Enabling Legislation

In New Hampshire, Stormwater Utility regulations are set forth in **Title X, Chapter 149-I**. Section 6 of this law authorizes the formation of a Stormwater Utility to collect fees for stormwater management; in particular to address flood and erosion control, water quality management, ecological preservation, and annual pollutant load contained in stormwater discharge. Municipalities that establish stormwater utilities must also offer credits or fee abatements (see Section 5.7 of this Study for additional information about stormwater credits). As stated in Section 6-c, *government property and non-profit organizations shall be subject to the fee structure*.

Section 10-a of this law regulates how the funds collected by a Stormwater Utility can be stored and spent. The money cannot be stored in the municipality's General Fund and can only be spent on stormwater-related activities. The law also requires the governing body to estimate the anticipated revenue it will receive from the Stormwater Utility, and to communicate this information to the public through the municipal budget.

1.5 Examples from New England

The first Stormwater Utility in New England was adopted by Chicopee, MA in 1998, and since that time more than 20 New England communities have adopted Stormwater Utilities as a mechanism for collecting revenue for stormwater-related costs. Most of the communities offer a credit system for properties that implement and maintain stormwater management techniques. A few communities also offer credits for elderly residents and to property owners who participate in stormwater education programs. Appendix A includes a detailed summary of each utility in New England as of June 2019.

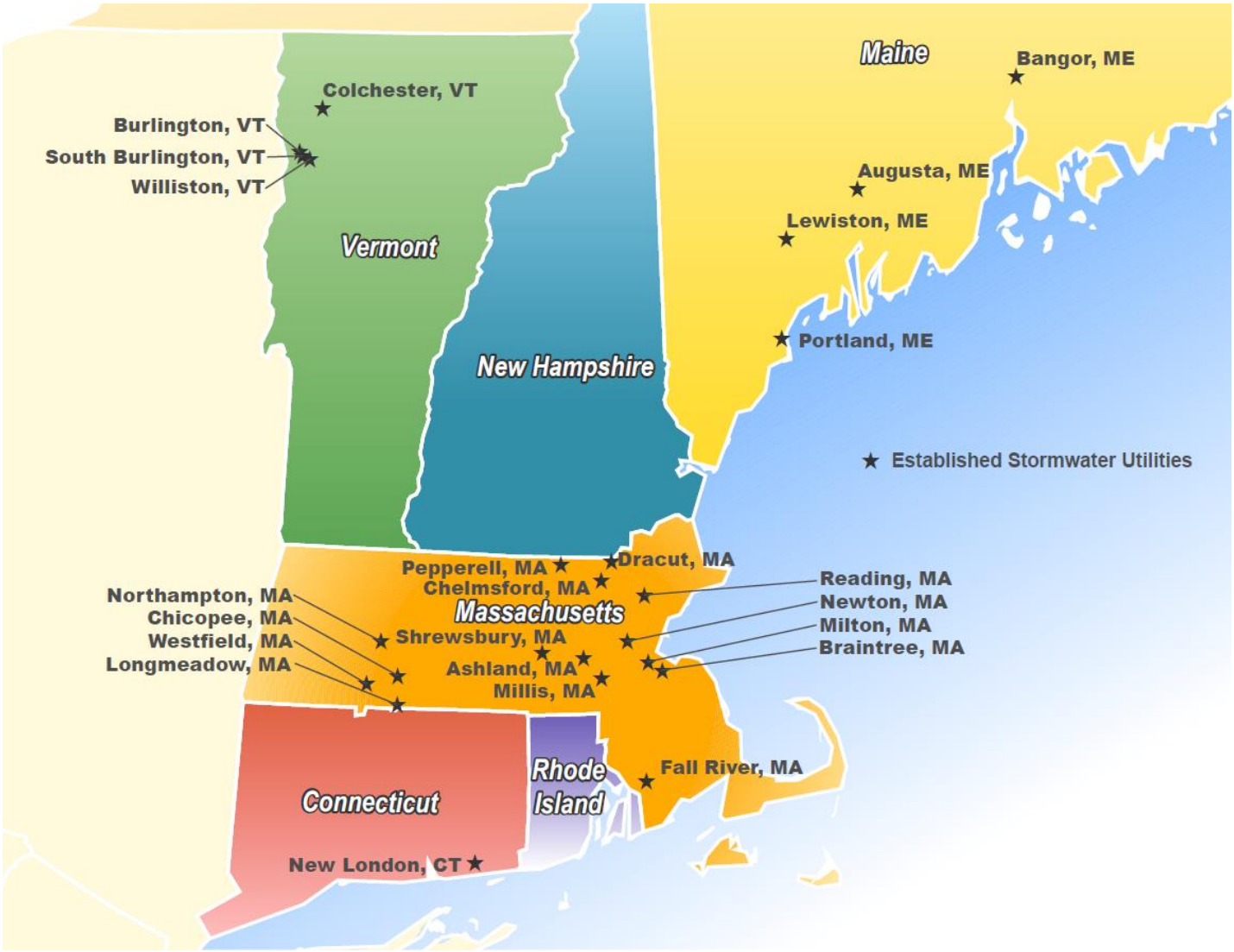


Figure 1-3 Stormwater Utilities in New England as of June 2019

As shown in Figure 1-3 and Appendix A, there are currently no communities in New Hampshire that have adopted a stormwater utility. While multiple cities have completed feasibility studies[3] to determine whether a utility is appropriate, none have continued through adoption and implementation of the utility. If the City decides to move forward with implementing a stormwater utility at the conclusion of this study, **Concord could be the first municipality in New Hampshire to adopt a stormwater utility.**

[3] New Hampshire Department of Environmental Services. *New Hampshire Stormwater Utility Feasibility Studies*. URL: https://www.des.nh.gov/organization/divisions/water/stormwater/utilities.htm#feasibility .

Figure 1-4 includes a timeline of adoptions for New England stormwater utilities. The past few years have seen a substantial increase in adoption of utilities throughout New England, largely driven by increased requirements in EPA's Small MS4 General Permit for EPA Region 1 communities.

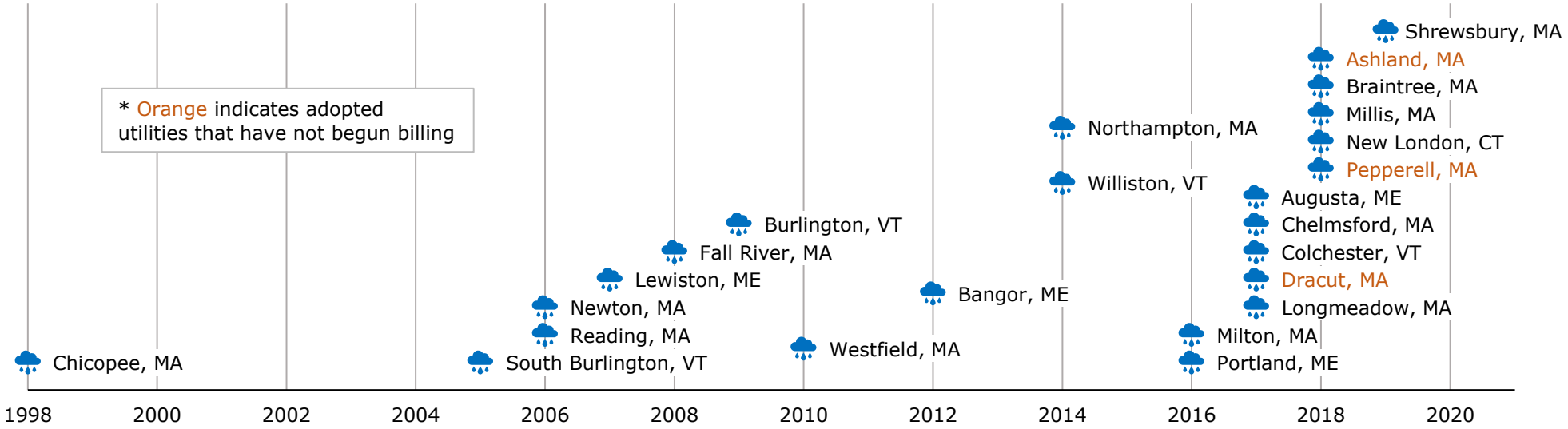


Figure 1-4 Timeline of Stormwater Utility Adoption in New England as of June 2019

Each of these stormwater utilities was structured slightly differently to accommodate community-specific environmental or political drivers. For example, Chicopee's utility was established in response to CSO challenges. Reading decided to fund its Stormwater Management Program using both the General Fund and a stormwater fee. All stormwater activities that Reading was previously completing before the adoption of a Stormwater Utility Bylaw continue to be funded though the General Fund, while all new funding comes from the new Stormwater Utility. Other examples of rate structure alternatives are presented in Section 5 of this Study.

To demonstrate how the other New England municipal stormwater utilities compared with Concord, a summary of demographics for each municipality was compiled and is summarized in Appendix A. We have provided additional details for multiple communities in Sections 1.5.1 through 1.5.4 to illustrate the range of fee structure magnitude and complexity.

1.5.1 City of Northampton, MA

The City of Northampton City Council voted in March 2014 to adopt a Stormwater & Flood Control Utility. The formula for billing is based on runoff coefficients for impervious and pervious area, 0.95 and 0.10 respectively, to account for runoff from all land uses. The impervious surface area is multiplied by 0.95, the pervious surface area is multiplied by 0.1 and the sum of these products is the hydraulic acreage for each parcel. The billing rate per square foot of hydraulic acreage is calculated by dividing the approved annual budget by the total billable hydraulic acreage in the City.

For residential parcels (one to three family homes) bills are based on average impervious area and pervious areas in a four-tiered system. Each tier is grouped by impervious area and contains approximately 25% of the total residential parcel count. For all other properties (e.g., large residential, commercial, industrial, tax-exempt), bills are based on the actual areas of pervious and impervious areas on the property, with a cap of 1-acre billable pervious area. The utility also captures a few large institutional properties such as Smith College, with approximately 150 acres of land that otherwise would not contribute local taxes.

Northampton provides credits and incentives to reduce costs for rate payers[4]:

- Rain barrel discount program (incentive)
- One-time credits to residents for construction of rain gardens or porous driveways
- Credits for property owners subject to their own MS4 general permit
- Commonly owned, undeveloped properties credit
- Drainage system maintenance and performance credits for non-residential, large residential, and residential subdivision properties
- Dedicated stormwater management property credit
- Senior and low-income credits
- Protected land credits (agriculture, forestry, and open space)
- Education credit for public and private institutions

1.5.2 Greater Augusta Utility District, ME

The Greater Augusta Utility District (GAUD) established a stormwater fee for the purpose of financing a stormwater management division and operating, maintaining, and upgrading the storm drain system. The fee structure consists of a flat fee for residential properties and a fee based on amount of impervious surface for commercial and other non-residential properties. The GAUD fee also includes an additional charge for specific stormwater system components, as they assess a $50.89 monthly charge for each catch basin that is located on the property for commercial, industrial, and municipal properties. All properties within the District, including properties owned by the State of Maine, pay a fee for stormwater.

[4] City of Northampton Credit and Incentive Policy for Stormwater and Flood Control Utility. Revised 2015. URL: https://www.northamptonma.gov/DocumentCenter/View/4776/Stormwater-Credit-Policy_rev2015_final?bidId=

1.5.3 City of Portland, ME

The City of Portland has had a Stormwater Utility in place since 2016. Their rate structure applies a monthly fee based on amount of impervious area on the property, which applies to all properties, including residential and commercial. This structure bases stormwater utility charges on each property's impact on the system, allowing impervious area to be the only factor determining a property's monthly fee.

Portland practices a stormwater credit policy in which properties may receive a stormwater monthly fee reduction for practices that mitigate their impact on the City's stormwater system. These credits can be achieved by properties which design, implement and maintain an independent on-site stormwater facility or system which has been approved by the City. The system must reduce or eliminate the impact of the property's impervious area on the City's overall stormwater system.

1.5.4 Town of Milton, MA

In 2015, the Town of Milton recognized the current funding for NPDES compliance was inadequate and determined a dedicated Stormwater Utility was the most desirable type of funding source to meet their needs. The Town approved the creation of a stormwater utility at the February 2016 Town Meeting. Initially, both the residential and non-residential parcels were assessed a fee based on the amount of impervious surface on the parcel. Residential fees were later divided into multiple tiers. The funds generated by the stormwater fee are deposited into a separate utility fund and are used for NPDES stormwater management programs and administration.

1.5.5 Conclusions

The examples described in the previous sections demonstrate a range of options for stormwater utility structures that New England communities have adopted over the past decade:

- The Town of Milton's rate structure accounts for a wide range of single-family residential property layouts and imperviousness.
- The City of Northampton's stormwater fee allows generation of revenue from the substantial tax-exempt properties in the City. This rate structure is complex and accounts for gross land area.
- The Greater Augusta Utility District stormwater fee structure is based on ERUs for residential and commercial properties. A flat fee is assessed to residential properties and a scaled fee based on impervious area and the quantity of catch basins is assessed to non-residential properties.
- The City of Portland's stormwater fee structure is consistent for commercial and residential properties, as all properties are billed based on impervious area. All parcels are evaluated equally.

Concord can look to these communities for more lessons learned in detail if the City chooses to proceed with a Stormwater Utility.

Section 2
Concord's Stormwater Program

Concord is the capital city of New Hampshire, located in Merrimack County approximately 15 miles north of Manchester. It is abutted by Boscawen and Canterbury to the north, Loudon and Pembroke to the east, Hopkinton to the west, and Bow to the south.

According to the U.S. Census Bureau 2013-2017 American Community Survey 5-Year Estimates, Concord is home to approximately 43,000 residents in 18,500 households. The median household income for the City of Concord is $61,000, and the average household size is 2.32. Concord is the third largest city in New Hampshire and has a population density of 676 people per square mile.

There are approximately 670 tax-exempt parcels in the City, including conservation areas, schools, non-profits, religious properties, and municipal, state, and federal properties. The tax-exempt parcels account for approximately 24% of the City's total impervious cover.

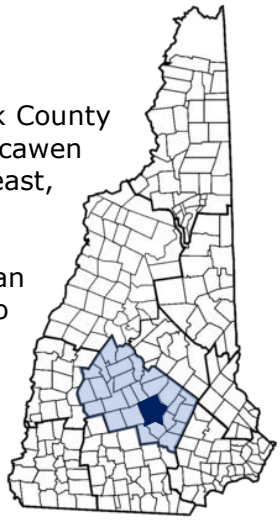


Figure 2-1
Location of Concord, New Hampshire

2.1 Concord's Current Stormwater Management Program

Concord's stormwater management program is managed within the General Services (Public Works) and Engineering Services Divisions. Currently, stormwater management tasks are carried out by various City departments and boards, including General Services, Engineering Services Division, Planning Division, and Conservation Commission.

The City has many capital and operating expenses related to stormwater management, including:

- Program Administration: management, oversight, labor, and customer service for the existing stormwater infrastructure
- Engineering: stormwater master planning, existing stormwater system inspection, permitting assistance, system design and repairs, etc.
- Operations and Maintenance: cleaning catch basins, street sweeping, erosion control measures maintenance, spot repairs, etc.
- Capital Improvements: scheduling and prioritization of major and minor improvement projects, including engineering assistance and project management

Unlike other New Hampshire municipalities of this population and level of urbanization, Concord is not yet regulated under EPA's Small MS4 General Permit. Additionally, there are no combined sewer overflows or significant water quality challenges that require substantial resources.

Figure 2-2 displays the City of Concord's organizational structure. The titles in **blue** share responsibility for implementation of the City's stormwater program.

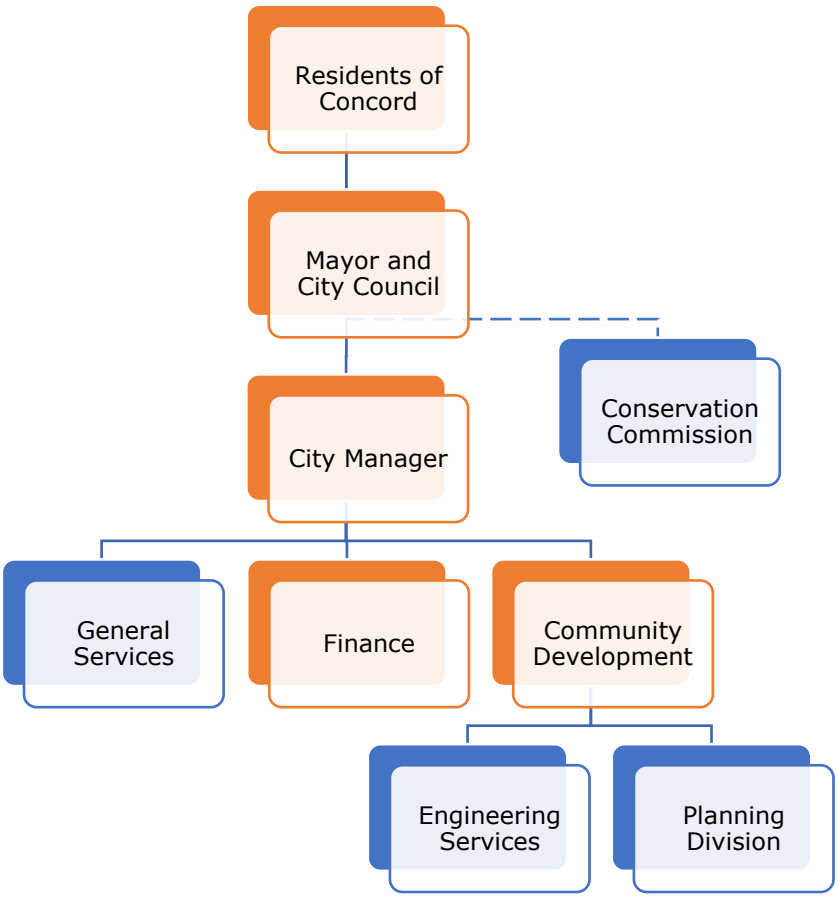


Figure 2-2 Concord's Organizational Structure

The following table lists the stormwater-related roles and responsibilities for City departments:

Table 2-1
Stormwater Program Responsibilities by City Department

General Services	Community Development	
	Engineering Services	**Planning Division**
• Administration • Drainage system maintenance • Ongoing inspection and repairs • Emergency repairs • Street sweeping • Catch basin cleaning • Snow removal • Leaf collection • Tree planting	• Administration • Capital projects • Inspections • Permitting, design, and management of infrastructure improvements	• Permitting • Liaison to and obtains input from Conservation Commission as needed

2.2 Stormwater Program Funding Approach and Costs

Current and future stormwater program costs must be examined and understood prior to establishing a stormwater utility so the utility provides adequate funding and the fee structure is fair and logical.

2.2.1 Current Program Costs

Tighe & Bond has compiled and reviewed the City's current stormwater program expenditures. The City provided a number of documents detailing historic program costs. Data reviewed includes annual operating budgets, capital improvement plans, and labor hours incurred by the General Services and Engineering Services Divisions. Appendix B provides a detailed breakdown of the past six years of stormwater program expenditures. The average annual program expenditures for Fiscal Year 2014 (FY14) through FY19 is $925,000 for both the capital and operating budgets.

To be consistent with current City practices, a small percentage of the total program cost was carried each year to account for the City Administration Fee that is incurred by all Special Revenue Funds, the General Fund, and Enterprise Funds in Concord.

City staff and outside consultant time is necessary to address stormwater management, and specifically to:

- Complete all necessary operation and maintenance. General Services personnel currently complete street sweeping, catch basin cleaning, and other maintenance, but the City does not have the capacity to address other public works priorities. Additionally, the City would like to be more proactive in the catch basin cleaning program but cannot currently staff this effort.
- Manage mapping and map updates associated with new construction and to document inspection and evaluation measures.
- Review and approve development and redevelopment projects City-wide for consistency with local code governing construction site runoff control and post-construction stormwater management. Conduct inspections and, as needed, enforcement for these projects.

The City currently funds stormwater management activities through the General Fund or the General Services special funds. Budget for specific activities are defined through development of annual operating budgets. Costs also include staff time from various departments. As part of this effort, the General Services budget was assessed to develop an estimate of the current operation and maintenance costs related to stormwater activities. Budgets for current and future capital stormwater projects were also used to identify funding necessary for improving drainage performance and water quality.

2.2.2 Anticipated Future Program Costs

Tighe & Bond used the historic budget data provided to project future stormwater expenditures, as well as information from the annual capital improvement plans. We made a number of assumptions about the future costs of the program, including the following items.

- The City does not wish to increase the current level of service or expenditures significantly. However, the current capital improvement plan is based on City planning, and shows an increased capital budget in upcoming years. Specific

stormwater-related projects requested by Engineering Services and the Highway Department from the FY19 Capital Improvement Program are included in the Historic and Projected Stormwater Expenditures table in Appendix B. It should be noted that these requests may not have been fully funded in the FY19 budget.

- An annualized cost was carried for the existing vactor truck purchased for $465,000 in FY14, until FY24 when the purchase of a new vactor truck is planned (assumed $500,000). The annualized cost for this equipment increases starting in FY24.
- An annualized cost was carried for the existing sweeper purchased in FY02 (assumed $200,000), until FY17 when a new sweeper was purchased for $262,000. The annualized cost for this equipment increases starting in FY17.
- An annualized cost was carried for a vehicle and equipment replacement program for City vehicles currently used for stormwater purposes. This budget was developed using information provided by General Services, including vehicle and equipment purchase date, approximate cost, average service life, and percent used on stormwater.
- A portion of the cost for the City's existing street tree planting program was carried starting in FY20.
- An annual increase of 2.5% for most Operating Budget line items starting in FY20 due to inflation.

Note that the Water and Wastewater Enterprise Funds in Concord pay a "Right-of-Way Transaction Fee" to the General Fund. This fee is collected because the utilities occupy the City streets, and the funds are intended for use in maintaining the streets and paving. The fee is based on the length and width of pipes within the municipal right-of-way. Including this fee in the City's Stormwater Utility was discussed with the project Working Group. However, since the drainage system itself and stormwater maintenance activities directly improve the right-of-way (i.e., collects stormwater runoff, alleviates flooding, street sweeping), it was determined that this fee should not be included in the Stormwater Utility.

Appendix B provides a summary of the future stormwater program expenditures. The average annual program expenditure for FY20 through FY24 is $1,562,000 for both the capital and operating budgets.

Table 2-2 provides a comparison of historic versus projected future costs for Concord's stormwater management program. This is a 69% increase in the current program budget, which reflects the increased level of service required to complete the City's currently unfunded needs, as well as planned future capital projects.

Table 2-2
Summary of Current and Projected Future Stormwater Expenditures

	Historic Expenditures Annual Average FY14-FY19	Projected Expenditures Annual Average FY20-FY24
Capital Costs	$620,000	$1,228,000
Operating Costs	$300,000	$326,000
City Administration Fee	$5,000	$8,000
Total Costs	**$925,000**	**$1,562,000**

Section 3
Stormwater Funding Alternatives

Municipalities employ a number of methods to fund stormwater programs, including non-cash resources (e.g., available educational materials or volunteers), one-time cash resources (e.g., grants, loans, bonds), or ongoing revenue (e.g., general fund from property taxes, user fees from a utility).

Note that writeups for some of the funding options in the following sections were paraphrased from the April 2007 *City of Concord, NH Stormwater Master Plan* and more detailed information can be found therein.[5]

3.1 General Fund

The General Fund receives revenue from sources such as local property taxes, licenses and permits, Federal and State shared taxes, payments in lieu of taxes (PILOTs), and fines. Most municipal services are funded from the General Fund, and additional funding is provided by utility fees, such as the water and sewer use fees. There are many competing municipal programs and activities funded by the General Fund, including schools, roads, and public safety, which are generally a high priority. Historically, stormwater funding has come second to other high priority activities, and the General Fund typically does not have the capacity for increased stormwater needs.

Since the main revenue source for the General Fund is property taxes, the annual revenue may vary. Additionally, there are many tax-exempt properties in Concord that do not contribute to the General Fund.

3.2 Village Districts

The NH Revised Statutes Annotated (RSA) 52 allows the formation of Village Districts to provide specialized services. A District may be located within a portion of one community or a portion of multiple communities. All properties that fall within the District must receive a direct benefit of the specialized service. Village Districts can be established for purposes of flood control, fire extinguishment, drainage, irrigation systems, shade tree maintenance, sanitary collection and wastewater treatment, roads, impoundment of water, potable water, and others. Funding for Village Districts is raised by taxes within that District. Each property owner within the District is eligible to vote when a special election is called for to establish a Village District, adopt a budget, issue debt, establish a tax rate, and/or make an amendment to the District's size, rules of incorporation, or services provided through the District.

To raise funding for stormwater management with a Village District, the purpose of the District would be installing, operating, and maintaining drainage infrastructure to control flooding, minimize water quality degradation, and to eliminate SSO conditions if they exist. Properties within the District are assessed a tax, which is committed to the municipality's tax collector. The funding raised is distributed to the District's treasurer by the municipality's treasurer.

[5] City of Concord, NH Stormwater Master Plan. April 2007. URL: https://www.concordnh.gov/DocumentCenter/View/1619/Storm-Water-Master-Plan?bidId=

A document developed by the NH Department of Revenue Administration was published in 2016 which provides more information about the establishment and purpose of Village Districts.[6]

Establishing a Village District may maintain an unequal burden of cost, similar to raising funds through the General Fund, because fees are assessed based on property value rather than a property's contribution to runoff. If establishing a Village District is a desirable option to fund stormwater management in the City, additional research on implementation will be required to determine the next steps.

3.3 Sewer Use Fees

Many communities in New England use their Sewer Enterprise Fund for stormwater management when the term "sewer" was broadly defined as wastewater and drainage in the local code to establish the Enterprise Fund. This funding mechanism is problematic because it disproportionately puts the stormwater management cost burden on high sewer users instead of properties that generate the most runoff (e.g., a big box store will have a low sewer bill but may generate substantial runoff from acres of impervious area for roof and parking).

While there are many similarities between the requirements of a sanitary sewer management program and a stormwater management program, such as structural improvements, routine maintenance activities, and administrative costs, there are additional costs to a stormwater management program that are not captured. Sewer rates would have to be increased to meet the additional expenses of stormwater management.

Advantages of funding stormwater activities through the sewer utility include having staff readily available for routine maintenance and having similar organizational requirements, which would make billing simple. However, sewer fees can be unstable due to variations in water consumption (e.g., less revenue for stormwater, water, and sewer during a drought). Additionally, the burden of the fee does not necessarily correlate with the impact users have on the drainage system because stormwater runoff from does not relate to consumption of water use and the sewer fee. Properties with high water usage (and therefore higher sewer fees) will carry the bulk of the expense for stormwater charges as opposed to properties that have a high percentage of impervious cover.

3.4 Stormwater Utility

As described in Section 1, establishing a Stormwater Utility provides a dedicated and stable source of revenue through a structure of user fees to finance local stormwater management. Stormwater fees are most often calculated based on the amount of impervious cover on a property. Higher amounts of impervious cover result in increased stormwater impacts and higher stormwater fees.

Unlike many of the other funding options presented in this Section, a dedicated Stormwater Utility would generate revenue from the Federal, state, and other tax-exempt properties located in Concord. These properties would be assessed a fee that directly reflects the stormwater runoff generated by the properties, and their contribution to the Fund would correlate to their impact on the drain system.

[6] Village Districts Frequently Asked Questions. December 2016. URL: https://www.revenue.nh.gov/mun-prop/municipal/documents/village-faqs.pdf

3.5 Funding Alternatives Comparison

Each of the methods discussed in this Section has advantages and disadvantages, with unique legal issues. Table 3-1 provides a side-by-side comparison. Development of a user fee system (i.e., Stormwater Utility) has many advantages over other alternatives, including equitability and stability.

Table 3-1
Stormwater Funding Alternatives Comparison

	Advantages	Disadvantages
General Fund (Property Taxes, etc.)	• Flexible funding • Existing mechanism • Simple to explain and administer • Stable revenue	• Does not provide fairest allocation of stormwater costs • Must compete for funding • Customers can't mitigate stormwater costs
Village Districts	• Stable revenue for portion of City	• Not City-wide – revenue generated can only be used in the District • Complicates tax payments • Complicated decision making
Sewer Use Fees	• Ease of implementation • Existing staff • Ease of billing	• Does not provide fairest allocation of stormwater costs • Water consumption is not related to stormwater program expenditures
Stormwater Utility	• Rates can be set at a level that fully funds program • Flexible funding • Fair: based on cost of service and demand • Customers can mitigate fees • Tax-exempt properties share cost of services	• More administratively intensive • Requires more effort to explain

Section 4
Making the Case for a Dedicated Stormwater Fund

The most critical element in developing a Stormwater Utility is to successfully demonstrate its need in order to obtain the public support required. Developing a sustainable program sufficient to meet Concord's goals of an equitable funding source and improved infrastructure performance will have a significant cost, so a case must be clearly communicated to convince stakeholders and citizens to support the local stormwater program.

Tighe & Bond worked with the City Working Group to identify the following drivers for the City of Concord's implementation of a dedicated Stormwater Utility.

4.1 Sustainable Funding

When stormwater has to compete for dollars from the General Fund, many other services and projects with broad public support take precedence for funding, which can result in deferred planning, maintenance, and capital improvements for Concord's drainage system. For example, as the City improves its schools, roadways, bridges, and open space, these projects are funded by the General Fund. The City is planning a number of large capital improvement projects, including projects from multiple City departments, which will require expenditures from the General Fund. These capital improvement projects are not necessarily stormwater-related, and the funding required for the projects competes with funding needed for the City's stormwater management program. For these reasons, Concord has not always been able to fully fund the stormwater program using tax funding, and there have been capital projects and needed drainage system maintenance that have been deferred year after year. The implementation of a stormwater fee will allow the City to plan strategically to consistently meet future revenue requirements of the stormwater program without competing for allowances from the General Fund.

4.2 Equitable Distribution of Costs

Due to the State of New Hampshire's tax structure (i.e., no sales tax or income tax), property taxes provide most of Concord's revenue. While tax funding is an existing mechanism that is the easiest to explain and administer, approximately 670 parcels within the City of Concord are tax-exempt. These properties benefit from the City's drainage system, but they do not contribute any funding to the stormwater program. As the State capital, Concord has many tax-exempt State government and institutional properties. In total, tax-exempt properties account for approximately 24% of the City's total impervious cover and have a substantial impact on the drainage system and stormwater runoff in the densely developed downtown area.

Each taxpayer's contribution is related to property value instead of being based on the property's contribution to stormwater program cost drivers. A stormwater fee is usually considered the fairest way to share the cost of this public service.

The stormwater fund may allow for a credit system where customers may reduce their individual fee by making improvements to their property that reduce the City's stormwater obligations. This structure rewards property owners who help to decrease the overall

burden on the stormwater system and, by extension, the City's stormwater-related capital and operating expenses. More information on credit systems is provided in Section 5.7.

4.3 Drainage System Operation and Maintenance

The City of Concord separated its combined sewer system (where pipelines carried both rainwater runoff and sanitary sewage) in the 1980s by installing new sanitary sewer lines. This early action saved the City millions in future costs. For example, Manchester and Nashua have spent hundreds of millions in separation with EPA oversight over the past 20 years with much more work on the horizon. The existing combined pipes in Concord were converted to storm drain lines. Portions of the drainage infrastructure are more than 100 years old. As is typically the case throughout New England, water and sewer infrastructure operation and maintenance take precedence over drainage system maintenance. Concord has historically maintained drain pipes, culverts, and stream channels in response to a flooding or water quality issues. There is a backlog of system inspections, assessments, and maintenance needs as well as drainage improvement projects.

A dependable funding source is required to support a proactive asset management approach to the operation and maintenance program. Funding regular operation and maintenance activities, drainage repairs, studies, and capital projects will help extend the service life of the City's drainage infrastructure and save future costs. Additionally, identifying critical infrastructure needs before an emergency situation is cost-effective and protects public health and the environment.

Installation of new infrastructure to detain/retain and treat runoff in the developed areas of Concord will help address flooding issues and water quality. System performance is critical with ever increasing impervious area created through development combined with more severe weather events. It may be necessary to upgrade some drainage infrastructure in order to prevent flooding and other impacts to homes, businesses, public buildings, and other public infrastructure such as roads bridges and utilities.

Implementing a Stormwater Utility would help alleviate the monetary burden placed on the City General Fund, and the City would have a dedicated revenue stream for proactive stormwater management that will save the City money in the long-term.

4.4 Water Resources and Recreation

It is anticipated that Concord will soon be regulated by the EPA under the Small MS4 General Permit program. The City should begin to consider water quality impairments for local waterbodies to prepare for the General Permit requirements. Preparing for the program now will defray program costs significantly once Concord becomes a regulated community.

As shown in the ICM in Section 1.1, there is a well-documented and widely accepted connection between the conversion of pervious areas (forests and fields) to impervious areas (pavement, roof tops, and other hard surfaces) causing surface water degradation and an increase in stormwater quantity. Impacts include increases in the peak flow, resulting in flooding and erosion problems, and increased transport of pollution that negatively impacts public health, recreation, and the environment.

Concord is located within the Merrimack River and Contoocook River Watersheds. Water resources throughout the City are used for water recreation such as swimming, boating, and fishing. Additionally, the City's drinking water is supplied by Penacook Lake and Contoocook River. However, there are a number of concerns related to Concord's receiving waters, including streams, ponds, and wetlands, that stormwater discharges into from the drainage system and pervious surfaces.

The impacts of various pollutants in stormwater runoff in water quality are described in Table 4-1. Text included in this table is adapted from the California Stormwater Quality Association Stormwater Best Management Practice (BMP) Handbook for New Development and Redevelopment[7], as the concepts described in the Handbook are applicable everywhere.

Table 4-1
Pollutant Impacts on Water Quality

Sediment 	Sediment is a common component of stormwater and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.
Nutrients 	Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes and are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.
Bacteria and Viruses 	Bacteria and viruses are common contaminants of stormwater. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.

[7] California Stormwater Quality Association Stormwater BMP Handbook for New Development and Redevelopment source:
https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook

Table 4-1
Pollutant Impacts on Water Quality

Oil and Grease 	Oil and grease include a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants, and waste oil disposal.
Metals 	Metals including lead, zinc, cadmium, copper, chromium, and nickel are commonly found in stormwater. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.
Organics 	Organics may be found in stormwater at low concentrations. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.
Pesticides 	Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. As pesticide use has increased, so too have concerns about the adverse effects of pesticides on the environment and human health. Accumulation of these compounds in simple aquatic organisms, such as plankton, provides an avenue for biomagnification through the food web, potentially resulting in elevated levels of toxins in organisms that feed on them, such as fish and birds.
Gross Pollutants 	Gross Pollutants (trash, debris and floatables) may include heavy metals, pesticides, and bacteria in stormwater. Typically resulting from an urban environment, industrial sites and construction sites, trash and floatables may create an aesthetic "eye sore" in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in streams, lakes, and estuaries, sometimes causing fish kills.

Table 4-1
Pollutant Impacts on Water Quality

Vector Production

Vector production (e.g., mosquitoes, flies, and rodents) is frequently associated with sheltered habitats and standing water. Unless designed and maintained properly, standing water may occur in treatment control BMPs for 72 hours or more, thus providing a source for vector habitat and reproduction (Metzger, 2002).

There are several waterbodies in Concord that are considered "impaired," which means the waterway does not meet the Clean Water Act's designated uses for fishing, swimming, and/or drinking due to water pollution. EPA's 303(d) list for NH includes multiple waterbodies in Concord impaired for Escherichia coli, pH, chloride, aluminum, dissolved oxygen, non-native aquatic plants, fishes bioassessments in streams, chlorophyll-a, benthic-macroinvertebrate bioassessments in streams, and cyanobacteria hepatotoxic microcystins. Many of the pollutants of concern listed here are directly associated with stormwater runoff, such as bacteria, dissolved oxygen, and metals.

Improving stormwater management practices and increasing drainage system operation and maintenance will reduce the instances of stormwater runoff containing pollutants of concern. This in turn improves local water quality, improves aquifer recharge for adequate water supply, and protects public health and the environment.

Section 5
Preliminary Rate Structure Assessment

5.1 Impervious Areas and ERUs

Tighe & Bond's project partner, Raftelis, completed a stormwater fee rate base and equivalent residential unit (ERU) estimate. This section discusses observations and assumptions made on the source data and describes the resulting estimate.

5.1.1 Source Data and Assumptions

Raftelis received a GIS geodatabase with the following data from the City of Concord:

- City (feature class)
- Buildings (feature class)
- Pavement (feature class)
- Lots (feature class)
- Zoning (feature class)
- Streets (feature class)
- Tax Data (table)
- Zoning Types (table)

Raftelis checked the underlying data for common issues such as duplicate identifiers and stacked features. There were very few data integrity issues. Two sets of Lots with duplicate LotIDs were merged to make LotID a unique identifier.

Lots were used as the base unit for estimating the rate base. That is, **the estimate was developed assuming that each lot (or each eligible lot) would be charged a stormwater fee**. Though the majority of lots appear to represent tax parcels, there are some lots that reflect building footprints, and the City may prefer not to treat them as independent units.

The rate base estimate is founded on the total area of impervious cover on Lots with valid LotIDs (i.e., Buildings and Pavement). Together, the Buildings and Pavement layers are a fairly good representation of the impervious area on the ground. Features without valid LotIDs are flagged in the source data as roads, water, or similar. It is assumed that the City will not include impervious cover resulting from municipal and state roadways in the stormwater fee.

Raftelis noted some instances where the 2017 aerial imagery (available through the GRANIT web service) is slightly different than the mapped impervious surfaces, which are likely areas where changes have occurred recently (i.e., new roadways or buildings). Raftelis deemed the data sufficiently accurate and up-to-date to estimate the rate base without making any adjustments or editing the impervious areas captured.

5.1.2 Development of ERU Estimate

For the City of Concord,
1 ERU = 2,760 SF

The ERU estimate was developed as follows:

1) Link tax data to lots (with impervious surface area) on LotID to establish Land Use Description. Where multiple tax record matched a single Lot, the first value was used.
2) Assume the following Land Use Descriptions are single family residential (SFR) types, based on description and similarity in development. This results in 9,999 SFR properties in total.

Table 5-1
Single Family Residential Property Types

Property Type	Quantity
Single family home	7,679
Manufactured home	1,023
Two family home	894
Three family home	201
Single family residential on waterfront	163
Single family residential on waterfront (mobile home)	3
Single family residential – vacant lot	1
Single family residential – no land value	2
Single family residential on golf course	32
Single family residential with accessory dwelling unit	1
Total	**9,598**

3) Using only SFR properties with impervious surfaces greater than 300 square feet (9,132 in total), find the median value and establish that as the ERU.

The median value of SFRs with measured impervious area greater than 300 square feet is 2,760 square feet. This is the ERU estimate for the City of Concord based on the GIS data provided.

5.1.3 Rate Base Estimate

The rate base estimate was developed using the ERU value and, as a default, applying the following policies:

1) Set each SFR property as 1 ERU.
2) Establish the number of ERUs (in whole or in part) for each non-single family residential (NSFR) parcel by dividing the impervious area on each parcel by the ERU value and rounding up to the nearest integer. Only NSFR parcels with more than 300 square feet of impervious area were assumed to be billable to avoid billing for impervious features on other lots that are unintentionally intersected by lot lines.

The default rate structure assumptions described above produces a *flat* rate structure for SFR properties and a *per ERU* structure for NSFR properties as follows:

Table 5-2
Rate Base Estimate

	Count		ERUs/Units	
SFR	9,598	69%	9,598	25%
NSFR	4,359	31%	28,677	75%
	13,957	100%	**38,275**	100%

This rate base estimate assumes that each NSFR parcel with more than 300 square feet of impervious surface area is billed a stormwater fee. The City may opt to exempt some parcels or implement other billing policy decisions that would impact the number of billable units. A complete list of the NSFR properties by land use code, and the associated impervious cover and estimated ERUs, is located in Appendix C.

As noted in Section 1.4 of this Study, government property and non-profit organizations would be subject to the stormwater fee, per the NH enabling legislation. It is possible that, in the future, the State of NH could adopt legislation exempting NH government properties from stormwater fees. If this were to occur, approximately 3,400 ERUs (or 9% of the rate base) would be "removed" from the estimate for NSFR properties. This would shift the rate base distribution to approximately 28% for SFR and approximately 72% for NSFR.

5.2 Rate Structure Overview

There are a variety of fee structures in use for the stormwater utilities established in New England and several examples were provided in Section 1 and Appendix A. Likewise, there are nearly endless ways to customize Concord's fee structure with the goal of assessing an impervious cover-based fee for a fair fee related to cost drivers. Rate structures are generally considered to be equitable and fair as long as there is a reasonable connection between the fee and the demand placed on the drainage system.

As described in Section 1, most stormwater utilities use impervious area as the basis for determining fees. However, there are multiple options for establishing a rate structure, as detailed in the following sections. The general categories of fee structure are as follows:

Flat Fee: Each property owner pays the same fixed amount regardless of actual use of stormwater management services. This is more common for residential properties due to administrative simplicity.

Graduated or Tiered Fee: Properties are categorized by ranges of amount of impervious area. All properties within a category are charged the same fee, but the fee is different for each category. An ERU may be used to determine the fee for each category. Tiered fees are most commonly used for non-residential properties due to administrative challenges.

Proportional Fee: The impervious area of each property is measured, an equivalent impervious unit is determined, and a rate per impervious unit is applied. This approach provides a direct correlation between amount of service provided and benefit conferred to the individual property and the fee charged. While this is considered the most equitable, there is potential for very large fees and the

impervious area measurement must be accurate in anticipation of individual property owners disputing their bill.[8]

Many stormwater fee structures use a combination of these approaches.

5.2.1 Example: Flat Fee for SFR and Proportional Fee for NSFR

An **ERU** is the median amount of impervious cover on a typical residential lot

The key data required to establish a stormwater fee is impervious cover per parcel. Generally, rate payers understand that building structures, paved areas, and other impervious surfaces generate an increased quantity and decreased quality of stormwater runoff. An ERU represents the median amount of impervious cover on a typical residential parcel and is commonly used to simplify system accounting. Using this value as a common denominator, an ERU equivalent is calculated for non-residential parcels by dividing the impervious area of each parcel by the residential value. This is a common method of establishing a stormwater fee structure as it is easily understood by most ratepayers. For example, if a property has five times more impervious cover than the typical residential property, they would have five times the ERU and would pay five times the fee charged a typical residential property. See Figure 5-1 for an illustration of this concept.

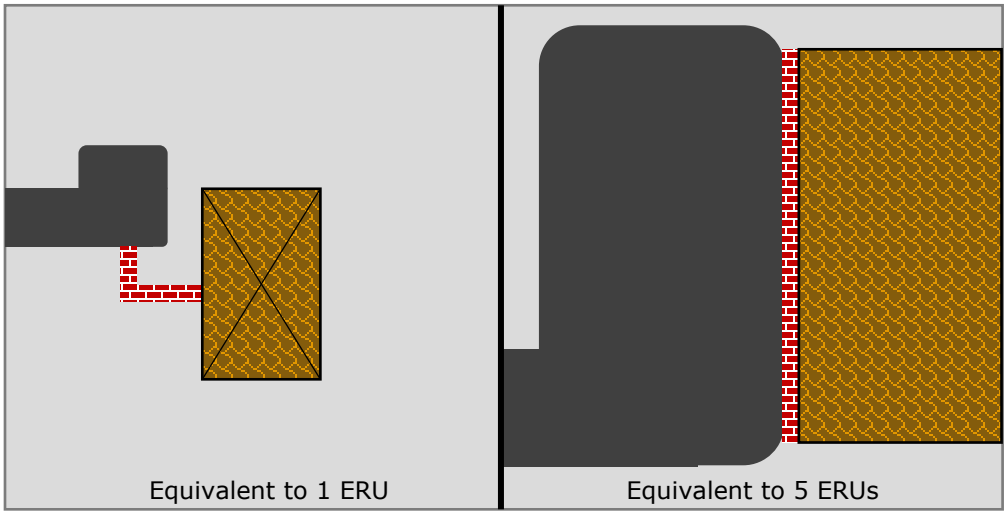


Figure 5-1 Illustration of the ERU Concept

An accurate analysis of impervious cover is essential to develop the ERUs for each parcel. For example, the median impervious area for single family residential parcels in the City would be used as the base ERU. This value is based on a calculation of each parcel's impervious cover using geographic information system (GIS) spatial data showing parcel boundaries, impervious area, and assessor's data. The total ERUs for non-residential properties are calculated by dividing the impervious area by the ERU of a single-family residential parcel.

To calculate an average ERU in Concord, the City can use the existing impervious area GIS information, such as buildings, pavement, and streets. Depending on the breakdown of impervious cover and mean and median ERU per single family lot, there are many

[8] *Rate Structure for Stormwater Remediation Fee: Evaluation of Options for Carroll County*. June 12, 2013. URL: http://ccgovernment.carr.org/ccg/lrm/stateinitiatives/swmfee/finalreport.pdf

different structures of an ERU-based stormwater fee that the City may elect to choose. In addition, a separate ERU-based stormwater fee may be charged for commercial, multi-family residential, industrial, and tax-exempt parcels based on the breakdown of those land use types. See Section 5.1 for the ERU analysis completed for the City of Concord.

Taking into account the projected cost of the City's stormwater management program, as discussed in Section 2.2, we determined that a minimum annual revenue of $1,562,000 is needed. **To meet this desired revenue, the estimated stormwater utility fee per ERU is just over $40 annually.** It is important to recognize this is only one of many stormwater fee scenarios and the annual cost will need to be further evaluated as part of developing the utility.

Table 5-3
Estimated Stormwater Utility Fees per ERU

Desired Revenue *(see Table 2-2 and Appendix B)*	$1,562,000
Concord's ERU *(see Section 5.1.2)*	2,760 SF
Total Billable ERUs *(see Table 5-2)*	38,275
Estimated Fee per Billable ERU*	$42.52 per year per ERU $3.55 per month per ERU

*The estimated fee assumes a 96% collection rate.

To account for the variability in this preliminary calculation, we assumed the total number of ERUs for billable accounts in Concord could increase or decrease by ten percent. The following figure shows the range in the estimated amount of revenue that could be generated with an impervious-based fee, accounting for the expected uncertainty. This range for a fee of $3.55 per month per ERU is approximately $1,467,000 to $1,794,000 per year.

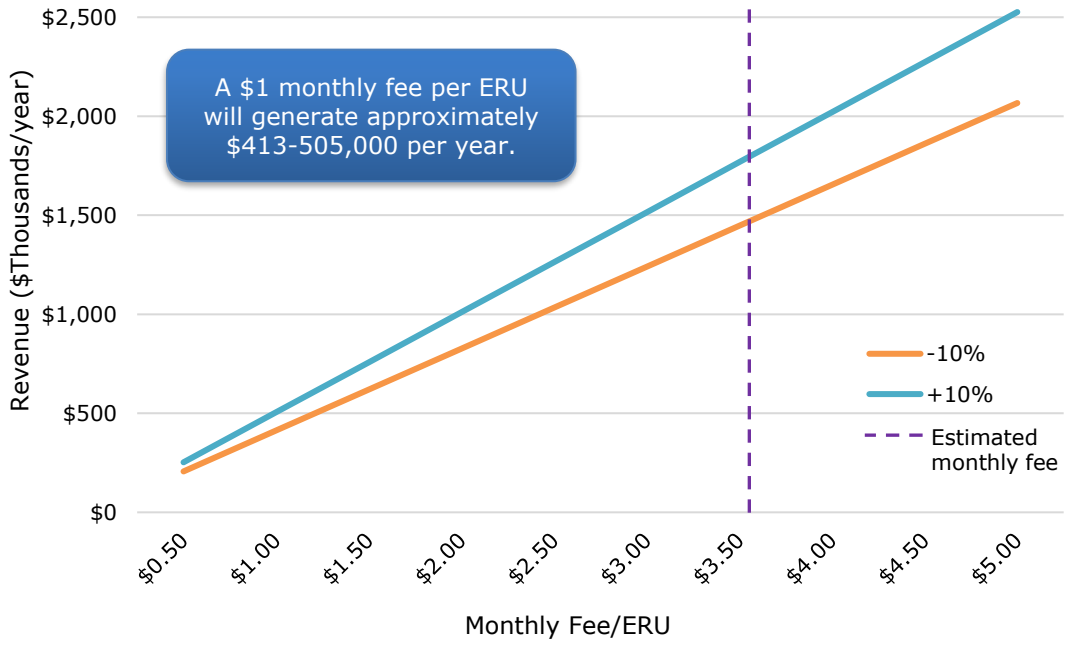


Figure 5-2 Estimated Revenue Range Example

5.3 Rate Structure Options

To account for the wide range of potential fees at the customer level, there are other methods to limit the fee variability such as setting a maximum fee for non-residential properties, using a distributed fee that uses the square root of the proportional calculations, developing a declining block rate structure, or using Intensity of Development as a weighing factor in addition to impervious area. Municipalities throughout New England practice these methods. The City should note that capping or otherwise lowering the fee for some properties will increase the fee for others, so these policy decisions should be carefully considered.

5.3.1 Impervious Area Plus Gross Area

This method for establishing stormwater rates incorporates both the impervious and gross areas of a property. Although impervious area is the primary contributor to stormwater runoff, the total property area (impervious area plus gross area) also influences the level of runoff from a property. For example, even undeveloped land contributes a small amount of runoff to the drainage system, especially during large rain events.

Therefore, this method includes both impervious area and gross area in the rate. However, the fee must be calculated to reflect the cost of service for each parameter; impervious area has a larger impact on the drainage system than gross area and therefore would be charged a higher rate. This method requires additional data and more detailed analysis to set up the fee.

Including gross area in the rate enables the City to charge a fee for undeveloped property. This can increase the revenue generated by the utility. However, charging a fee for undeveloped land can be confusing to ratepayers, as there may be a perception that "green space" should not be charged.

5.3.2 Intensity of Development (ID)

Although the ERU analysis is widely used in the development of a stormwater utility, another option for basing stormwater fees on the impervious cover of a parcel is known as the Intensity of Development (ID). For this analysis, the impervious area of a lot is calculated and divided by the total lot size. This percentage is the parcel's ID. The lots are then placed into categories based on their ID. For example, a lot with 0% is considered vacant or undeveloped, a lot with 1% to 20% is considered lightly developed, and so forth. Each category can be charged a particular rate per parcel area. Lower levels of development are charged a lower rate.

As this method accounts for stormwater runoff generated by both impervious and pervious area, it can be more equitable than the ERU method. However, unless there is a broad range of ID categories, parcels are not billed in direct proportion to the runoff generated. There is also potential for high fees for small parcels with high percentages of impervious area with this method, which may overly burden smaller residences in Concord.

5.4 Other Considerations

Potential Tax Relief. As an entirely new revenue stream, the fees generated by an impervious cover-based stormwater fee will offset some or all stormwater expenditures currently funded by the General Fund. Since these funds have historically come from either the General Fund or General Services operating budget, the new revenues will reduce the

impact of stormwater costs on the General Fund. This could result in a tax decrease or, more likely, a deferred or reduced tax increase.

Accuracy of Impervious Area Measurement. It is important to note that GIS data is not survey-level quality and, in the context of Stormwater Utility feasibility, is only useful as a broad planning tool. The calculation of parcel area and impervious areas using the City's available GIS results in approximations that are only adequate to understand potential scenarios on a City-wide scale. Additional work to refine GIS data may be needed for stormwater fee discussions and ultimately for implementation. Property owners may appeal based on accuracy of impervious area calculated and the fee assessed, resulting in more administrative costs for the City early on to process these requests. This is particularly true for the Proportional Fee, but property owners that fall on the line between categories using the Graduated Fee may also appeal their fee.

5.5 Fee Versus Tax Funding for Select Properties

Figure 5-3 shows the general distribution of Concord's current source of revenue from property taxes. Note that no revenue is collected from tax-exempt properties under this scenario. However, if a stormwater fee is adopted and impervious cover is considered, the burden is shifted dramatically, as shown in Figure 5-4. SFR properties would account for one-quarter of the revenue, as opposed to three-quarters under property tax funding. Tax-exempt properties would contribute to the revenue, and NSFR properties would account for approximately half of the revenue. This demonstrates the more equitable distribution of cost under a stormwater fee, and how the revenue distribution closely matches the percent impervious area in Concord.

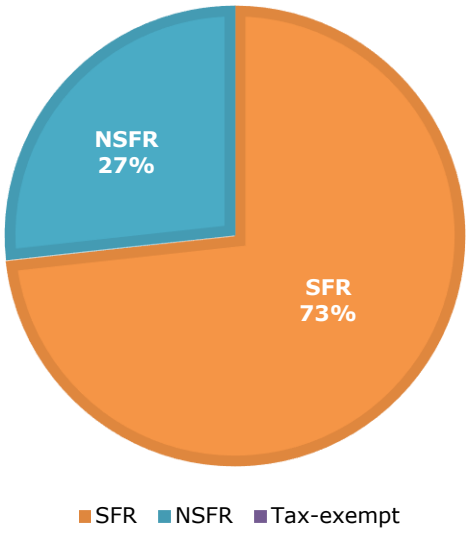


Figure 5-4 Revenue Distribution from Property Taxes

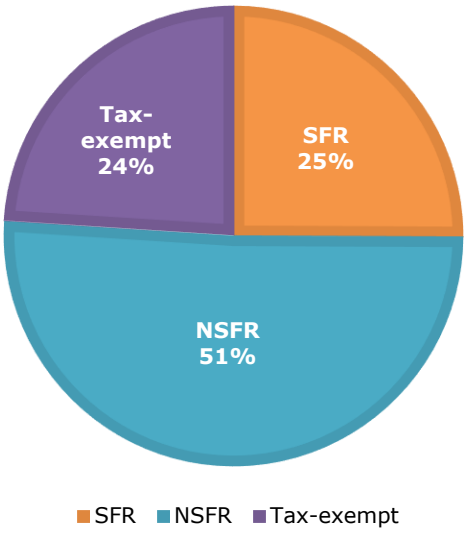


Figure 5-3 Revenue Distribution from Stormwater Fee

Appendix D compares, for a variety of properties throughout Concord, the estimated stormwater fee and an estimated tax increase to fund the future stormwater program. For each of the 12 properties in Appendix D, which in some cases includes more than one individual lot, the identified property is shown with a blue border. Measured impervious surfaces within the property are shown in a translucent blue, and the total impervious area in square feet and ERUs is listed below the figures. Also listed below the figures are:

- The estimated annual stormwater fee, based on the ERUs of measured impervious area and the estimated rate per ERU (calculated above),
- The estimated taxable value, which is the real property tax value of all lots in the property that are not tax-exempt, and
- The estimated annual tax portion to fund the future stormwater program. This is the increase in City real property taxes that the property owner might expect to see in order to fully fund the future stormwater program through real property taxes. It does not include taxes currently paid by the property owner to fund the stormwater program or any other public programs, or other increases that might be necessary for funding other programs. The current stormwater program accounts for approximately 2.4% of the tax base, and the future stormwater program is expected to account for approximately 3.9% of the tax base. Therefore, the value in Appendix D is an approximately 69% increase above the portion of the property's real property tax that is currently allocated to the stormwater program.

These figures highlight the marked difference in stormwater funding for properties of different types, especially tax-exempt properties.

5.6 Billing Mechanisms

There are three main options for billing a stormwater fee:

1. Adding stormwater as a new service onto existing water or sewer bills

General Services issues a monthly utility bill for water and sewer. However, many properties in the City are not serviced by municipal water or sewer and therefore do not receive a monthly utility bill. If the City decided to complete stormwater billing through the existing utility bill, the properties without water and sewer service would begin to receive a new bill with a stand-alone stormwater fee. Adding the stormwater fee to the utility bill system would allow the City to mirror existing policies for collection and non-payment practices.

2. Adding stormwater as a new fee onto existing property tax bills

After consulting with City's Legal Department, a stormwater fee could be added to the existing tax bills. However, a stand-alone billing practice would still need to be developed to capture the large amount of tax-exempt properties in Concord that currently do not receive a tax bill. Additionally, adding the stormwater fee to the tax bill can cause confusion, as it would not be a new tax, but rather a fee for service.

3. Creating a separate, stand-alone billing arrangement where stormwater bills would be conveyed separately from other taxes or fees

Based on the challenge associated with setting up a stand-alone bill and the low collection rate found in other municipalities with this arrangement, this option is not recommended for Concord. Options one and two typically have a much higher collection rate. Note that

separate stand-alone bills might be created by the utility billing system, the tax billing system, or a separate entity, though the mechanics and ramifications of each are different.

5.7 Stormwater Credits

Once a Stormwater Utility and associated rate structure has been established, the City can evaluate whether to institute a credit system. Credit systems are very customized to each community and offer property owners an opportunity to lower their Stormwater Utility fee. The system is developed based on factors such as:

- The actual impact stormwater control measures or BMPs implemented on a property have on reducing the City's stormwater management program requirements and costs,
- The administrative capacity of staff to administer the credit program (i.e., annual inspections of BMPs),
- The political will to offer more or fewer credit opportunities, and
- The pre-existence of stormwater control measures required to comply with development standards.

If a system is implemented, credits can be provided for onsite stormwater management with low impact development (LID) and other types of "green" infrastructure and sustainable design. Typical Stormwater Utility credits run between 25% and 75% of the stormwater assessment when a credit is applied. Examples of practices used by stormwater utilities that qualify for credits including dry wells, infiltration chambers, detention ponds, and bioretention basins. Credits are generally not given for sump pumps or water filtration systems.

Credits are often limited to commercial, industrial, and larger residential properties. Single family residential properties are generally smaller and have less impervious area and stormwater management practices implemented on these properties would only provide a small benefit to the drainage system. Additionally, the cost of preparing a credit application and ensuring annual compliance could be significantly higher for a single family residential customer than the total cost of the stormwater fees over several years.

Some municipalities choose to provide other types of discounts, such as a reduced rate for elderly residents, low-income credits, protected land (which could include agricultural land, forest land, and/or open space) credits, and educational credits for public and/or private institutions. Some communities provide credits to property owners who participate in a stormwater education program.

The list below includes some examples of credit policies for municipalities throughout New England:

- **Bangor, ME** credit application: https://www.bangormaine.gov/content/2037/1885/1913/default.aspx
- **Burlington, VT** *Stormwater Credit Manual*: https://www.burlingtonvt.gov/sites/default/files/DPW/Stormwater/Stormwater%20Credit%20Manual.pdf

- **Colchester, VT** *Stormwater User Fee Credit Manual*: https://colchestervt.gov/DocumentCenter/View/4524/Final_SWCredit_Manual_Adopted_5-2-19
- **Lewiston, ME** *Storm Water Utility Fee Schedule and Credit Policy*: https://www.lewistonmaine.gov/DocumentCenter/View/545/078-StormWaterFeeScheduleAndCreditPolicy?bidId=
- **Longmeadow, MA** non-residential *Stormwater Abatement Application*: https://www.longmeadow.org/DocumentCenter/View/4101/NON-RESIDENTIAL-Storm-Water-Abatement-application

  Longmeadow, MA residential *Stormwater Credit Application*: https://www.longmeadow.org/DocumentCenter/View/4102/RESIDENTIAL-Storm-Water-Credit-Application---Senior-Needs-Legally-Blind-Disabled-Veteran
- **Newton, MA** *Instructions and Guidelines for Stormwater Fee Abatements*: http://www.newtonma.gov/civicax/filebank/blobdload.aspx?t=57424.08&BlobID=92372
- **Northampton, MA** *Credit and Incentive Policy for Stormwater and Flood Control Utility*: https://www.northamptonma.gov/DocumentCenter/View/4776/Stormwater-Credit-Policy_rev2015_final?bidId=
- **Portland, ME** *Stormwater Credit Manual - Stormwater Service Charge*: https://www.portlandmaine.gov/DocumentCenter/View/9714/Credit_Manual_7_2015-no-apps?bidId=
- **Reading, MA** *Stormwater Abatements*: https://www.readingma.gov/engineering-division/pages/stormwater-abatements
- **Shrewsbury, MA** *Stormwater Management Credit Policy*: https://shrewsburyma.gov/DocumentCenter/View/4666/Stormwater-Management-Credit-Policy

Section 6
Public Education and Stakeholder Outreach

Education and outreach are an essential part of the process as the City of Concord evaluates the development of a Stormwater Utility. Stakeholders should have the opportunity to learn about why the City is evaluating a Stormwater Utility, how fees will be established, and how it will impact stakeholders, as well as voice concerns during the process. Providing information and opportunities for input proactively will help the City develop the best possible structure for the Stormwater Utility and be aware of hurdles to public support early in the process.

This Section provides recommendations for the City's outreach plan, including target audience, messages, and methods as well as an example schedule of public outreach activities City staff can undertake to coincide with the anticipated schedule to develop and adopt a stormwater fee.

6.1 Overall Outreach Strategy

A robust and well-designed public involvement and education program is essential to engage stakeholders from the start. Transparency builds trust and leads to public support of a project that is responsive to the community's concerns and interests. The City's outreach program during evaluation of a Stormwater Utility should be a two-way process: The City will need to provide target audiences with information about the project and the public, stakeholders, and decision makers will provide valuable input that will inform the assessment and recommendations.

Outreach should be conducted in phases, beginning with elevating general awareness of stormwater management benefits and challenges then later presenting the revenue requirements to meet the City's goals and the funding alternatives for consideration. Along the way, the City should pay close attention to gaps in general understanding of the stormwater program and funding alternatives as well as possible barriers to implementation that need to be addressed. Both the outreach strategy and technical recommendations may need to be modified in response to this important feedback, which will ultimately help the City successfully meet program goals and public expectations.

6.1.1 Stormwater Fee Goals and Drivers

The City is evaluating a Stormwater Utility as an additional revenue source to help fund stormwater management and infrastructure. As described in Section 4 of this Study, key drivers for the City at the outset of this initiative include:

- A large amount of tax-exempt properties concentrated in a dense downtown area,
- Flooding and system performance concerns, and
- The costs associated with proactively maintaining aging infrastructure.

The City is particularly interested in equitably funding their stormwater program while maintaining a "net zero" increase in spending.

As the stormwater funding process continues, the City Working Group should reaffirm that these are key drivers, compile supporting facts and data, and confirm that this message resonates with various stakeholders.

6.1.2 Target Audiences and Stages of Outreach

The City will need to inform and seek input from both internal and external audiences. An often-underestimated barrier to establishing a stormwater utility is the fact that achieving stormwater goals often requires a paradigm shift; it can be hard to convince people that that proactively funding capital projects will bring about a tangible return on investment.

Internal Outreach

- **City Working Group**: It will be important for the City Working Group to build consensus about why a Stormwater Utility makes sense for Concord and develop a compelling case. This group should be comprised of City staff from a broad cross-section of departments to provide technical, financial, and organizational information and guide the Stormwater Utility assessment. The current Working Group members are listed in Section 1 of this Study.
- **City Leadership and Decision Makers**: It is critical that the education and outreach starts at City Hall. Several members of the City staff are already engaged in the process through the project Working Group, but performing outreach to those not directly involved is an important step. City Councilors, department heads, and staff must agree to support the initiatives of the program and help present recommendations to the public. A meeting should be held with members of the City's Fiscal Policy Advisory Committee (FPAC) to explain the purpose of a Stormwater Utility, the overall expenses of the City's stormwater program, and how a stormwater fee may be set and collected. Support from the FPAC will be essential to moving the process forward in Concord.

External Outreach

- **Community Stakeholders**: An effective Stormwater Utility outreach program will seek to engage stakeholders with a wide-range of interests and varying opinions. Stakeholders should include residents, businesses, government representatives, and institutions that will be impacted differently by various funding alternatives for stormwater management. The City should also look to include environmental and watershed advocates.
- **General Public**: Finally, the general public will need to be included in outreach efforts in an effort to build political support for the City's stormwater program.

These target audiences will need to be informed and consulted at various stages of this process, as illustrated in the table below and described in detail herein.

Table 6-1
Phases of Outreach for Internal and External Audiences

	Internal	External
Phase 1 (Now)	• Identify stormwater challenges and opportunities • Develop materials/media for external outreach	• Laying the Groundwork: What is stormwater? Explain City services and program.

Table 6-1
Phases of Outreach for Internal and External Audiences

	Internal	External
Phase 2 (as fee development progresses)	• Purpose/Benefits of long-term funding program • Identify program drivers and compelling case • Details of recommended funding program	• Program Development Phase: Revenue requirements and funding alternatives. • What is the fee structure? Why a fee?

6.2 Target Audiences and Messages

In developing an appropriate outreach and education plan, the target audiences for outreach need to be defined. Each target audience will have different concerns, and input from each audience will be valuable in the development of the Stormwater Utility. The outreach messages can be tailored to be appropriate to each of the target audiences. Education on the issues posed by stormwater is a critical aspect of the education and outreach campaign, as many stakeholders may not be informed on the implications of stormwater.

6.2.1 City Officials and Staff

City officials and staff are the first stakeholder group to be targeted for outreach. Beyond the City Working Group, there are many members of the City staff who could potentially be impacted by a Stormwater Utility, as well as the City Council who will ultimately vote on the issue. City officials and staff should be engaged through meetings with PowerPoint presentations to explain the issue and provided with the opportunity for input during these meetings. A general outline of meetings is provided in Section 6.4, Schedule of Outreach.

6.2.2 Residents

Residents are the largest stakeholder group for outreach. Many of Concord's residents are not aware of the significant investment the City makes in their stormwater infrastructure and the benefits it provides. Outreach to residents should include descriptions of the stormwater projects the City has completed and plans to complete, emphasis on the "net zero" increase in spending, and highlight the shift in the burden of funding stormwater management away from tax payers. In addition, residents may be concerned about flooding in their neighborhoods and the City can emphasize how projects funded by the stormwater fee can help alleviate flooding. Significant outreach to residents can be accomplished through the use of a City web page dedicated to stormwater, as well as providing opportunities at public meetings for residents to voice concerns. Examples of outreach materials that can be used to educate residents appear in Appendix E.

6.2.3 Tax-Exempt Property Owners

There is a significant amount of tax-exempt property in Concord, including state-owned property, City-owned property, nonprofit, religious, and charitable organizations. Tax-exempt property owners should be eductated about the Stormwater Utility early in the process in order to inform them of the potential impacts to them. Many educational materials developed for a residential audience would also be appropriate for the tax-exempt property owner audience. Real numbers for potential fees should be shared with this audience early in the process in order to receive feedback on the implications and

ability to pay the fee. Direct outreach to individual property owners is appropriate for this audience in order to solicit feedback from the largest property owners who have the potential to be impacted the most significantly.

6.2.4 Commercial Property Owners/Developers

According to Concord's Master Plan, the City promotes balanced development. There are also a number of existing commercial properties in Concord. These property owners and developers interested in new development have the potential to be impacted by a Stormwater Utility. Similar to the direct outreach to tax-exempt property owners, the City should consider directly targeting the largest commercial property owners with a mailing to inform them of opportunities to provide input on the evaluation process. Outreach should include estimates of potential fees as well as general background information on the City's stormwater system similar to the other audiences. Examples of outreach messages crafted specifically for commercial property owners appear in Appendix E.

6.3 Outreach Methods

The City should utilize multiple outlets for outreach to reach a broad audience during the process of developing a Stormwater Utility. Various forms of media should be used to advertise public meetings and opportunities for input from residents, businesses, and other stakeholders. A well-planned outreach campaign with an established procedure for stakeholders to provide input will put the City in the best position for success.

In advance of public meetings, outreach materials, including a website and fact sheet, should be developed. These materials may be able to address questions and concerns early in the outreach process, as well as help to inform the public and provide maximum transparency.

6.3.1 City Council and City Department Meetings

Prior to holding public meetings, the City should work to educate City Council members and members of the staff. It is important that City officials understand the implications of a stormwater fee and are prepared to answer questions as the process moves forward. A first meeting should be held with members of the City's FPAC with a presentation to explain the purpose of a Stormwater Utility, the overall expenses of the City's stormwater program, and how a stormwater fee may be set and collected. Following the meeting with the FPAC, there should be a presentation at a City Council meeting to educate all members of City Council about the process being undertaken.

The City should conduct ongoing internal education by providing email updates to City officials with the developed web page and fact sheet prior to distribution to the public.

6.3.2 Stormwater Utility Development Workshops

The City should hold Stormwater Utility Development Workshops to explain the proposed Stormwater Utility to stakeholders and gather input. This Feasibility Study would be a key document to supplement the discussions. Stakeholders to be involved in this group will be decision makers including the Mayor and City Council members, as well as other citizens and local opinion leaders.

The City should consider making these meetings open to the public to allow for additional input, and/or broadcasting these meetings on the local access channel, ConcordTV.

The timing of the first of these meetings should be following the education of City officials, but still early enough in the process to allow for public input. The goal of the first workshop should be to obtain initial input on the concept of a stormwater fee and the vision for Concord's stormwater program. A subsequent workshop should present the potential rate structure options to obtain early guidance and feedback. If the City chooses to continue with development of a stormwater fee, additional workshops can be held for targeted feedback.

6.3.3 Newspaper Articles

The City should consider a press release to local newspapers (including the Concord Monitor) regarding the timing of Stormwater Utility Development Workshops. Examples of an article from Dover, NH and a press release from Portsmouth, NH are included in Appendix E.

6.3.4 Web Page

The City should develop a page on the City's website to host information regarding the proposed Stormwater Utility. Public meeting announcements can be added to this web page as well as fact sheets and other materials developed during the outreach campaign. In addition, the website should include a link to the 2007 Stormwater Master Plan and other stormwater-related documents to help stakeholders understand the components of the current stormwater program in Concord. Links to websites for NH Department of Environmental Services (DES) and EPA should also be included. Examples of stormwater websites include the Cities of Portsmouth, Dover, and Manchester, NH.[9]

6.3.5 Fact Sheet

During the development of the proposed Stormwater Utility, a fact sheet should be developed for distribution at public meetings and online. This fact sheet could be in FAQ (frequently asked questions) format. Examples of fact sheets from other stormwater utilities are included in Appendix E. Examples of potential fees are a key piece of information to include in the fact sheet, as well as general explanations of a Stormwater Utility and the City's stormwater infrastructure.

6.3.6 Mailings

To better inform stakeholders broadly about the proposed Stormwater Utility and public meetings regarding the development of the Fund, the City should consider a direct mailing to residents. As part of direct outreach to the largest commercial and tax-exempt property owners, the City should consider a mailing early in the process to these stakeholders prior to public meetings and workshops in order to provide an opportunity for feedback before the fees are finalized.

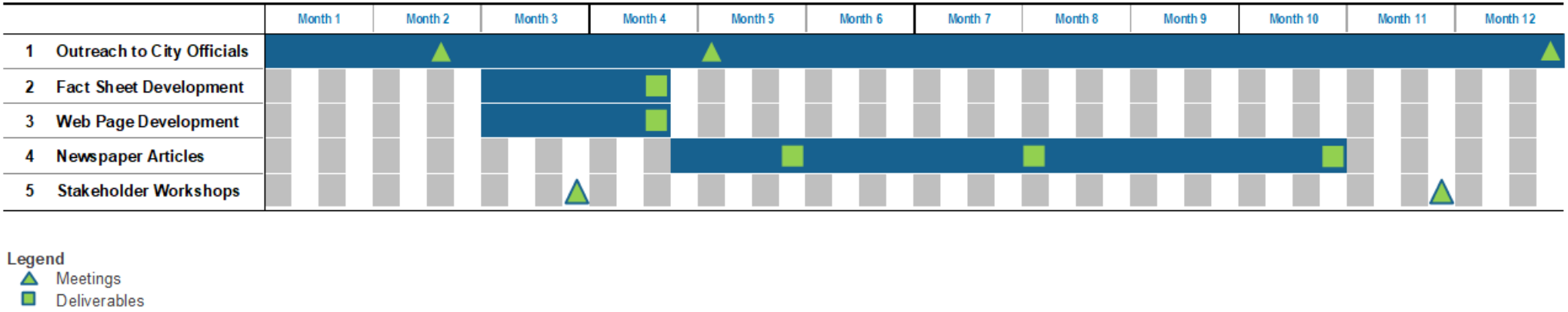
A flyer, fact sheet, or other mailing could be included in a water and sewer utility bill or tax bill to save on additional postage and mailing costs. A mailing would be appropriate to all billed properties prior to the first billing if the City decides to move forward with the Stormwater Utility.

[9] Portsmouth, NH: https://www.cityofportsmouth.com/publicworks/stormwater
Dover, NH: https://www.dover.nh.gov/government/city-operations/planning/stormwater/index.html
Manchester, NH: https://www.manchesternh.gov/Departments/Environmental-Protection/Stormwater

6.4 Schedule of Outreach

The table below includes an example schedule of public education and outreach for Concord's stormwater utility development. The actual schedule of outreach will be determined after additional input is received from City officials (i.e., FPAC) and legal review.

Table 6-2
Proposed Outreach and Education Schedule



Section 7
Conclusions and Recommendations

Through the research and input obtained in this Study, it is clear that the City would benefit from a stable source of revenue for the stormwater program. In order to provide a stormwater program with the desired level of service that includes proactive operation, maintenance, and repair/replacement of drainage infrastructure; ongoing street sweeping and catch basin cleaning programs; and necessary capital improvement projects; the City can expect its stormwater-related expenditures to increase approximately 69% in the next five years. A dedicated Stormwater Utility is a fair and equitable way to generate long-term revenue to address this increase in needed funding. **Implementing a Stormwater Utility would help alleviate the monetary burden placed on the City's General Fund and would provide a dedicated revenue stream for proactive stormwater management that will save the City money in the long-term.**

To continue moving forward with the Stormwater Utility, we recommend that the City take the following steps:

- **Gain the FPAC's Support.** Meet with the FPAC to present and discuss the preliminary results of this stormwater feasibility study. If the FPAC is favorable towards developing a stormwater utility, continue with the next steps. Technical considerations and refinement of the stormwater rate structure and billing mechanism presented herein can be completed concurrently with the next steps and the outreach and education campaign.
- **Establish, Define, and Organize the Structure of Stormwater Utility.** Develop details of the utility, including program policies, strategies, and organization and staffing approach.
- **Refine Financial Analysis.** Further investigate and refine financial details and funding opportunities. Define annual revenue generation and determine what utility revenue will and will not cover.
- **Refine Rate Structure.** Decide the level of detail needed in an impervious surface analysis of Concord and gather this data if it exceeds what is presented herein. Analyze the data to refine the average impervious cover for residential (ERU) and other land use types and use this information to develop a rate structure.
- **Establish a Billing and Database Management System.** Develop a stand-alone or use an existing billing program to distribute bills and track the payments that are made.
- **Adopt a Stormwater Utility Ordinance.** Because utilities involve collection of fee-for-service by municipalities, it is necessary to develop and adopt a local regulatory code. This code is typically similar in structure to code for sewer or water supply authorities. Concord can use language from the numerous example ordinances and bylaws available from communities throughout New England, ranging from modifications to existing sewer or drainage bylaws to creation of separate Stormwater Utility code. The code may include a Credit System.
- **Implement the Stormwater Utility.** Once all the prior steps have been completed, the Concord Stormwater Utility may be implemented. The City will need to develop new workflows and responsibilities for administration, data management, customer service, and credit/abatement requests.

Appendix A

New England Stormwater Utility Survey

Appendix A
New England Stormwater Utility Survey

Tighe&Bond

	Chicopee, MA	South Burlington, VT	Newton, MA	Reading, MA	Lewiston, ME	Fall River, MA
Established	1998	2005	2006	2006	2007	2008
Effective Annualized Single-Family Rate	$100.00	$80.28	$75.00	$40.00	$60.00	$160.00
Billing Frequency	Quarterly	Monthly	Annually	Quarterly	Annually	Quarterly
Rates	• Single family: $25/qtr • Multi-family, industrial, commercial: $0.45/1,000 SF/qtr • Min fee: $25/qtr Max fee: $160/qtr	• Single family: $6.69/month • Duplexes: $3.35/month • Triplexes: $2.23/month • All other properties: Tiered structure based on ERUs outlined in the fee calculation flowchart	• Residential (1-4 family): $75/yr • Non-residential: Tiered fee based on impervious area Tier 1 (IA < 5,000 SF) $250/yr to Tier 13 (IA ≥ 500,000 SF) $5,000/yr	• Undeveloped: no fee • Single/two-family: $10/qtr • Multi-family, commercial, industrial: $10/3,210 SF impervious/qtr	• Single family/mobile home: $60/year • Duplex: $90/year • Mixed Use: 40% of impervious on parcel subject to Single family rate; 60% assessed according to calculation below • Other property types: $60/year for less than 2,900 SF; $0.0616 per SF over 2,900	• Residential: $40/qtr • Multi-family, commercial, industrial: $40/2,800 SF impervious/qtr
Equivalent Residential Unit (ERU)	2,000 SF	2,700 SF	2,600 SF	2,552 SF	2,900 SF	2,800 SF
Annual Revenue	$1,500,000 (2012)	Unknown	$1,750,000 (2012)	$357,000 (2012)	Unknown	$4,660,000 (2012)
Discounts and Credits	• *Rain Smarts Rewards* includes a stormwater fee reduction of 50% in exchange for improved stormwater management practices by property owners	• Stormwater Treatment Practice Credit - non-single family residential, up to 50% based on type of practices implemented • Education Credit – elementary, middle and high schools 10% credit on fee • NPDES Permit Credit – properties holding other NPDES permits eligible for 10% • Maximum credit: 50%	• Commercial, large residential, institutional, industrial: Max credit of 25% for 50% or more impervious area mitigated • Small residential: 25% credit for 50% or more impervious area mitigated	• Single/two-family: Up to 50% credit for properties with infiltration systems or other means to reduce runoff • Commercial, industrial, multi-family: Up to 50% credit for properties with stormwater treatment and infiltration systems	• City Stormwater System Impact: if stormwater on a parcel does not impact the City's stormwater management system – maximum of 100% credit dependent on how much of the impervious surface drains to system • Permit Improvements: Stormwater mitigation credit exceeding city/state permit up to 35 percent • Private Road: up to 100 percent credit for private roads over 100 feet	• Non-residential only: up to 25% of total fee for onsite stormwater management
2017 Population	55,515	18,773	88,994	25,769	36,211	89,420
2010 Average Household Size	2.28	2.19	2.50	2.64	2.26	2.27
2017 Median Household Income	$48,866	$66,197	$133,853	$114,354	$39,890	$39,328
Source of Information	Rates: City Website Credits: PVPC	Rates: Fee Calculation Flowchart Credits: Credit Manual	Rates: City Website Credits: Fee Abatement Guide	Rates & Credits: Town Website		Rates: City Website

Note that the data presented here is for informational purposes only and is based on publicly available information as of June 30, 2019. No detailed interviews with municipal staff took place as part of the preparation of this table.

Appendix A
New England Stormwater Utility Survey

	Burlington, VT	Westfield, MA	Bangor, ME	Northampton, MA	Williston, VT	Milton, MA
Established	2009	2010	2012	2014	2015	2016
Effective Annualized Single-Family Rate	$79.20	$20.00	$22.00	$66.18	$51.00	$32.00
Billing Frequency	Monthly	Quarterly	Annually	Annually	Monthly	Annually
Rates	• Single family: $6.60/month • Duplex: $6.56/month • Triplex: $7.56/month • Other properties: $2.47 per 1,000 SF impervious/month	*FY20 rates:* • Residential: $7.50/qtr • Non-residential: $0.02/SF impervious/yr with max fee based on impervious area $1,200 (80,000 SF < IA ≤ 150,000 SF) $2,100 (IA > 150,000 SF)	• - Properties <3,000 SF impervious: $22/yr • - $11/yr for each additional 1,000sqft impervious area	• Single to three-family: Tiered fee based on impervious area Tier 1 (IA < 2,250 SF) $66.18/yr to Tier 4 (IA > 4,276 SF) $268.13/yr • Large residential and non-residential: Based on hydraulic (impervious and pervious) area x $0.02366/SF	• Billing based on ERUs which are each $4.25/month • Single family: 1 ERU • Non-single family residential: tiered structure based on impervious percentage	• Single-family: Tiered fee based on impervious area Tier 1 (IA < 2,075 SF) $32/yr to Tier 4.3 (IA ≥ 15,896 SF) $468/yr • Other residential and non-residential: $1.88/100 SF impervious/yr
Equivalent Residential Unit (ERU)	2,670 SF	N/A	3,111 SF	N/A	4,000 SF	2,600 SF
Annual Revenue	$1,945,581 (2019)	$690,000 (2020)	Unknown	$2,000,000 (Capped in Ordinance)	Unknown	$794,000 (2017)
Discounts and Credits	• Credit system for commercial and industrial properties only which have facilities or controls in place to store/treat runoff OR undergo water education curricula • Maximum credit: 50%	• Ordinance authorizes establishment of credit policy	• Credits given to properties with >4,000 SF of impervious area for incorporation of stormwater BMP	• Credits available for properties with BMPs or mitigation, undeveloped property, educational programs, and on a need-based basis. Multiple credits may be given to eligible properties • Incentives available to encourage conservation and reduce runoff	• Credits given to non single family properties that design, construct and maintain stormwater treatment practices, • Credits given to permitted MS4s (10%) • Elementary/middle schools can apply for an education credit (10%) • Maximum credit: 50%	• Regulations authorize establishment of a credit system
2017 Population	42,453	41,700	32,237	28,593	9,341	27,527
2010 Average Household Size	2.19	2.49	2.10	2.12	2.47	2.75
2017 Median Household Income	$47,140	$48,866	$40,071	$62,838	$81,540	$126,000
Source of Information	Rates: City Website Credits: Credit Manual	Rates: Ordinance	Credits: Application Rates: City Website	Rates: City FAQs Credits: Credit Manual	Rates: Stormwater Customer Service Manual Credits: Credit Manual	Rates: City Website

Appendix A
New England Stormwater Utility Survey

	Portland, ME	Greater Augusta Utility District, ME	Chelmsford, MA	Colchester, VT	Dracut, MA	Longmeadow, MA
Established	2016	2017	2017	2017	2017	2017
Effective Annualized Single-Family Rate	$75.60	$99.60	$40.00	$52.00	$90.00	$27.00
Billing Frequency	Monthly	Monthly	Annually	Annually	Not established as of May 2019	Monthly
Rates	• All Parcels: $6.30/mo for each 1,200 SF of impervious area	• ERU is $8.30/mo (2019 proposed rate is $12.56) • Single family: 1 ERU • Multi-family: 0.5 ERU x number of units • Mobile homes: 0.5 ERU • Condo units: 0.75 ERU • Commercial: 1 ERU plus $50.89/mo for each catch basin	• Single/two-family: $40/yr • Other residential and non-residential: Tiered fee based on impervious area Tier 1 (IA < 5,000 SF) $250 to Tier 18 (1.1Million ≤ IA < 1.2Million SF) $8,000	• Single-family (includes duplex and triplex) residential: $52/yr with a maximum fee of $520/yr • Commercial: fee based on impervious area $52/ERU/yr	Not established as of May 2019 Anticipated: • Residential: $85-95/yr • Non-residential: Based on impervious area	• Residential: $2.25/mo • Non-residential: fee based on impervious area
Equivalent Residential Unit (ERU)	3,200 SF (note that fee is not ERU based)	2,700 SF	N/A	4,356 SF	Unknown	3,400 SF
Annual Revenue	$5,205,375 (2017)	$1,625,525 (2017 estimate)	$998,449 (2019)	$730,000 (Proposed 2017)	Unknown	$1,800,000 (2017)
Discounts and Credits	• Credits given to properties with an approved on-site stormwater facility which reduces the impact of the property's impervious area	• Fee is decreased for commercial properties with storage detention	• Credits offered for those who take care of their stormwater by infiltrating it or by discharging it into a wetland, waterbody or municipal system.	• "Stormwater Treatment Practice" (STP) credit of up to 50% applied to non-single-family properties which maintain STP that meet treatment standards	• Credits will be available for properties with BMPs or mitigation	• Credit policy approved August 2018 • Includes credits for education, stormwater BMPs, and on a need-based basis
2017 Population	66,715	18,626	35,067	17,309	31,113	15,876
2010 Average Household Size	2.07	2.08	2.53	2.41	2.69	2.66
2017 Median Household Income	$51,430	$40,181	$106,432	$68,021	$86,697	$112,831
Source of Information	Rates & Credits: City Website	Rates: GAUD Website	Rates & Credits: Fee Schedule & Credit Policy	Rates: Town Website Credits: Stormwater User Fee Credit Manual	Rates & Credits: NMSC	Rates & Credits: 2017 Town Meeting Minutes

Appendix A
New England Stormwater Utility Survey

Tighe&Bond

	Ashland, MA	Braintree, MA	Millis, MA	New London, CT	Pepperell, MA	Shrewsbury, MA
Established	2018	2018	2018	2018	2018	2019
Effective Annualized Single-Family Rate	$35.00	$25.00	$33.00	$30.00	$60.00	$90.00
Billing Frequency	Quarterly	Quarterly	Annually	Quarterly	Quarterly	Quarterly
Rates	• Single Family: $35/year (billed quarterly) • Commercial/apartments: $0.080/100SF of impervious area	• Single family: $6.25/qtr • Multi-family: $6.25/qtr with max fee $6/unit/qtr • Non-residential: Divided into quartiles based on impervious area and billed on a tiered structure with max fee $730/qtr	• All properties billed annually based on impervious area: 0-199 SF $0 200-1,499 SF $33 1,500-2,499 SF $66 2,500-3,499 SF $99 • One additional billing unit for each additional 1,000 SF over 3,499 SF	• Residential: Tiered fee based on impervious area < 1,000 SF: $7.50/qtr > 3,000 SF: $37.50/qtr • Other residential and non-residential: $7.50/1,000 SF impervious area/qtr with minimum fee of $7.50/qtr	• All parcels: $15/qtr	• Residential: Tiered fee based on impervious area Tier 1 (IA ≤ 5,000 SF) $90/yr to Tier 3 (IA > 10,000 SF) $325/yr • Other residential and non-residential: Tiered fee based on impervious area Tier 1 (IA ≤ 5,000 SF) $90 to Tier 10 (IA > 300,000 SF) $7,500 • Undeveloped vacant parcels: $45/yr
Equivalent Residential Unit (ERU)	Unknown	2,780 SF	3,100 SF	1,000 SF	N/A	3,200 SF
Annual Revenue	Unknown	$630,000 in year 1 with gradual increase to $1,500,000	$500,000 (approx.)	$1,870,000	Unknown	$1,800,000
Discounts and Credits	• None published	• None published	• Bylaw authorizes establishment of a Stormwater Utility Credit Manual	• None published	• In development as of May 2019	• Up to 50% credits for property owners who undertake specific actions that exceed the minimum requirements of local stormwater management guidelines
2017 Population	17,478	37,156	8,144	27,147	12,049	36,716
2010 Average Household Size	2.59	2.76	2.59	2.30	2.74	2.62
2017 Median Household Income	$120,309	$87,500	$100,230	$37,331	$90,029	$100,640
Source of Information	2018 Town Meeting EPA webinar May 14, 2019	Rates: Billing Table & Factsheet	Rates: Rate Guide	Rates: Stormwater Ordinance	Rates: Town Website	Rates & Credits: Town Website

Appendix B

Historic and Projected Stormwater Expenditures

Appendix B
Historic and Projected Stormwater Expenditures

Stormwater Activity	Historic Expenditures FY14	FY15	FY16	FY17	FY18	FY19
Capital Budget						
CIP #571: I-93/Horseshoe Pond Drainage Improvements	$ -	$ 120,000	$ -	$ -	$ -	$ -
CIP #479: Storm Water Enterprise Mechanism	$ -	$ -	$ -	$ -	$ -	$ 60,000
CIP #83: Storm Water Improvements	$ -	$ -	$ 400,000	$ 550,000	$ 540,000	$ 775,000
CIP #78: Drainage Repairs as part of Highway Improvement Program	$ 35,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 150,000
Street Tree Planting Program *(Plan to fund in future program)*						
Vactor Truck *(Annualized Budget)*	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000
Street Sweeper *(Annualized Budget)*	$ 20,000	$ 20,000	$ 20,000	$ 27,000	$ 27,000	$ 27,000
Other Vehicles & Equipment Replacement Program *(Annualized Budget)*	$ 58,000	$ 58,000	$ 58,000	$ 58,000	$ 58,000	$ 58,000
Subtotal - Capital Budget	**$ 155,000**	**$ 325,000**	**$ 605,000**	**$ 762,000**	**$ 752,000**	**$ 1,112,000**
Operating Budget						
Catch Basins						
Clean Catch Basin Tops	$ 15,348	$ 12,779	$ 18,885	$ 19,594	$ 16,559	$ 16,633
Install Drywell/Catch Basin	$ 2,384	$ 4,826	$ 1,149	$ 8,511	$ 1,999	$ 3,774
Catch Basin Maintenance Repair	$ 93,305	$ 76,155	$ 118,418	$ 68,786	$ 118,046	$ 94,942
Sweeping						
Spring Cleanup Street Sweeping	$ 45,000	$ 48,000	$ 48,000	$ 49,200	$ 50,380	$ 51,700
Spot Sweeping	$ 14,722	$ 21,377	$ 17,525	$ 19,717	$ 13,187	$ 17,306
Sweeping Sidewalks	$ 9,710	$ -	$ 2,576	$ 3,402	$ 11,974	$ 5,532
Drain System						
Install Under-Drain Pipe	$ -	$ 3,007	$ 25,828	$ -	$ 975	$ 5,962
Culverts	$ 5,275	$ 6,169	$ 30,759	$ 18,473	$ 8,403	$ 13,816
Ditching	$ 5,012	$ 27,125	$ 48,913	$ 18,037	$ 22,579	$ 24,333
TV/Investigation Storm Maint.	$ 34,322	$ 58,912	$ 88,908	$ 84,633	$ 58,815	$ 65,118
Subtotal - Operating Budget	**$ 226,000**	**$ 259,000**	**$ 401,000**	**$ 291,000**	**$ 303,000**	**$ 300,000**
Subtotal Capital and Operating Budgets	**$ 381,000**	**$ 584,000**	**$ 1,006,000**	**$ 1,053,000**	**$ 1,055,000**	**$ 1,412,000**
City Administration Fee *(0.5% Subtotal)*	**$ 2,000**	**$ 3,000**	**$ 5,100**	**$ 5,300**	**$ 5,300**	**$ 7,100**
Total Expenditures	**$ 383,000**	**$ 587,000**	**$ 1,012,000**	**$ 1,059,000**	**$ 1,061,000**	**$ 1,420,000**

Appendix B
Historic and Projected Stormwater Expenditures

Stormwater Activity	Projected Expenditures FY20	FY21	FY22	FY23	FY24	Historic Expenditures Annual Average FY14-FY19	Projected Expenditures Annual Average FY20-FY24
Capital Budget							
CIP #571: I-93/Horseshoe Pond Drainage Improvements	$ 500,000	$ 500,000	$ -	$ 400,000	$ -	$ 20,000	$ 280,000
CIP #479: Storm Water Enterprise Mechanism	*Budget needed to finalize and adopt Stormwater Utility TBD*					$ 10,000	
CIP #83: Storm Water Improvements	$ 300,000	$ 100,000	$ 650,000	$ 1,250,000	$ 1,250,000	$ 378,000	$ 710,000
CIP #78: Drainage Repairs as part of Highway Improvement Program	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 88,000	$ 100,000
Street Tree Planting Program *(Plan to fund in future program)*	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000		$ 10,000
Vactor Truck *(Annualized Budget)*	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 45,000	$ 42,000	$ 43,000
Street Sweeper *(Annualized Budget)*	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 27,000	$ 24,000	$ 27,000
Other Vehicles & Equipment Replacement Program *(Annualized Budget)*	$ 58,000	$ 58,000	$ 58,000	$ 58,000	$ 58,000	$ 58,000	$ 58,000
Subtotal - Capital Budget	**$ 1,037,000**	**$ 837,000**	**$ 887,000**	**$ 1,887,000**	**$ 1,490,000**	**$ 620,000**	**$ 1,228,000**
Operating Budget							
Catch Basins							
Clean Catch Basin Tops	$ 17,049	$ 17,475	$ 17,912	$ 18,360	$ 18,819	$ 17,000	$ 18,000
Install Drywell/Catch Basin	$ 3,868	$ 3,965	$ 4,064	$ 4,165	$ 4,270	$ 4,000	$ 5,000
Catch Basin Maintenance Repair	$ 97,316	$ 99,748	$ 102,242	$ 104,798	$ 107,418	$ 95,000	$ 103,000
Sweeping							
Spring Cleanup Street Sweeping	$ 51,700	$ 52,993	$ 54,317	$ 55,675	$ 57,067	$ 49,000	$ 55,000
Spot Sweeping	$ 17,738	$ 18,182	$ 18,636	$ 19,102	$ 19,580	$ 18,000	$ 19,000
Sweeping Sidewalks	$ 5,670	$ 5,812	$ 5,958	$ 6,106	$ 6,259	$ 6,000	$ 6,000
Drain System							
Install Under-Drain Pipe	$ 6,111	$ 6,264	$ 6,420	$ 6,581	$ 6,745	$ 6,000	$ 7,000
Culverts	$ 14,161	$ 14,515	$ 14,878	$ 15,250	$ 15,631	$ 14,000	$ 15,000
Ditching	$ 24,941	$ 25,565	$ 26,204	$ 26,859	$ 27,531	$ 25,000	$ 27,000
TV/Investigation Storm Maint.	$ 66,746	$ 68,414	$ 70,125	$ 71,878	$ 73,675	$ 66,000	$ 71,000
Subtotal - Operating Budget	**$ 306,000**	**$ 313,000**	**$ 321,000**	**$ 329,000**	**$ 337,000**	**$ 300,000**	**$ 326,000**
Subtotal Capital and Operating Budgets	**$ 1,343,000**	**$ 1,150,000**	**$ 1,208,000**	**$ 2,216,000**	**$ 1,827,000**	**$ 920,000**	**$ 1,554,000**
City Administration Fee *(0.5% Subtotal)*	**$ 6,800**	**$ 5,800**	**$ 6,100**	**$ 11,100**	**$ 9,200**	**$ 5,000**	**$ 8,000**
Total Expenditures	**$ 1,350,000**	**$ 1,156,000**	**$ 1,215,000**	**$ 2,228,000**	**$ 1,837,000**	**$ 925,000**	**$ 1,562,000**

Appendix C

Estimated Non-Single Family Residential ERUs by Land Use

Appendix C

Estimated Non-Single Family Residential ERUs by Land Use

Land Use Description	Number of Lots	Total Lot Area	Total Impervious Area (SF)	Estimated ERUs	Average ERUs per Lot
	99	239,531,654.91	1,288,713.4	466.9	4.7
AC LND IMP MDL-00	45	15,379,295.46	122,054.8	43.9	1.0
AC LND IMP MDL-01	3	1,666,550.58	28,577.3	10.4	3.5
AIRPORT MDL-96	2	41,975.32	41,622.9	15.1	7.6
APT 4-7UNT MDL-01	221	4,735,600.22	1,067,173.4	386.9	1.8
APT 4-7UNT MDL-94	10	131,915.17	63,946.4	23.1	2.3
APT 8+ UP MDL-94	13	365,512.39	189,340.5	68.7	5.3
APT CO-OP	1	183,373.48	56,356.6	20.4	20.4
APT OVER 8 MDL-01	5	32,586.24	18,038.4	6.6	1.3
APT OVER 8 MDL-94	56	16,645,123.58	3,484,982.4	1,262.5	22.5
AUTO REPR MDL-01	1	57,796.82	30,729.1	11.1	11.1
AUTO REPR MDL-95	3	88,221.86	43,418.8	15.7	5.2
AUTO REPR MDL-96	19	1,032,645.58	583,487.9	211.5	11.1
AUTO S S&S MDL-94	1	41,401.36	31,024.0	11.2	11.2
AUTO S S&S MDL-96	2	100,979.77	55,909.1	20.3	10.2
AUTO V S&S MDL-94	1	18,508.14	14,275.3	5.2	5.2
AUTO V S&S MDL-96	20	2,403,239.56	1,609,010.2	582.9	29.1
BANK BLDG MDL-00	1	131,062.43	111,938.4	40.6	40.6
BANK BLDG MDL-94	21	989,293.26	414,578.7	150.0	7.1
BOARDNG HS MDL-94	10	292,367.26	54,586.1	19.9	2.0
BOWLING	1	60,182.04	47,094.4	17.1	17.1
CAR WASH MDL-96	6	435,760.86	183,656.7	66.6	11.1
CHARITABLE MDL-00	8	6,755,845.15	872,405.8	316.1	39.5
CHARITABLE MDL-01	17	5,755,148.30	171,840.8	62.3	3.7
CHARITABLE MDL-06	4	219,416.85	159,796.3	57.9	14.5
CHARITABLE MDL-94	59	8,631,761.60	1,555,723.3	563.8	9.6
CHARITABLE MDL-96	6	262,897.25	120,381.0	43.6	7.3
CHURCH ETC MDL-00	8	123,727.74	21,786.4	7.9	1.0
CHURCH ETC MDL-01	5	268,445.81	56,020.9	20.3	4.1
CHURCH ETC MDL-94	6	470,318.96	97,473.4	35.2	5.9
CHURCH ETC MDL-96	33	3,006,066.02	1,041,680.4	377.4	11.4
CITY MDL-00	230	145,057,403.44	1,242,649.8	448.5	2.0
CITY MDL-94	19	35,798,072.92	4,305,910.3	1,560.0	82.1
CITY MDL-96	18	34,716,519.92	1,502,971.6	544.2	30.2
CITY PARK MDL-00	1	23,404.92	3,614.1	1.3	1.3
COM GRN HS MDL-96	4	7,865,917.96	186,840.2	67.8	17.0
COMM BLDG MDL-00	2	257,379.13	9,227.0	3.3	1.7
COMM BLDG MDL-01	14	434,541.34	91,558.6	32.9	2.4
COMM BLDG MDL-94	15	1,606,762.91	164,462.1	59.4	4.0
COMM BLDG MDL-96	2	736,389.91	131,732.1	47.7	23.9
COMM WHSE MDL-00	1	3,197.09	2,486.9	0.9	0.9
COMM WHSE MDL-94	2	641,820.25	386,307.6	140.0	70.0
COMM WHSE MDL-96	24	2,848,587.24	1,163,583.6	421.8	17.6
CONDO MDL-00	22	192,560.82	45,572.0	16.5	0.8
CONDO MDL-05	1	7,852.74	2,490.4	0.9	0.9
CONDO NL MDL-00	8	7,534.24	-	-	-
CONDO NL MDL-05	643	2,470,113.54	1,699,218.1	618.5	1.0
CONDOMAIN	380	1,583,848,270.67	3,947,876.8	1,429.8	3.8
CONV FOOD MDL-94	26	1,603,006.19	645,103.7	233.6	9.0
CONV FOOD MDL-96	1	42,290.23	15,352.2	5.6	5.6
COUNTY MDL-00	1	93,774.05	46,642.3	16.9	16.9
COUNTY MDL-94	2	20,740.17	16,720.8	6.1	3.1
COUNTY MDL-96	1	10,291.70	10,283.8	3.7	3.7
DAY CARE MDL-01	1	2,105,921.77	165,188.9	59.9	59.9
DAY CARE MDL-94	2	54,111.59	17,524.3	6.4	3.2
DEVEL LAND MDL-00	32	6,862,415.89	335,551.3	121.4	3.8
DORMITORY MDL-94	-	-	-	-	-
EDUC BLDG	1	61,440.97	28,918.4	10.5	10.5

Appendix C

Estimated Non-Single Family Residential ERUs by Land Use

Land Use Description	Number of Lots	Total Lot Area	Total Impervious Area (SF)	Estimated ERUs	Average ERUs per Lot
ELEC PLANT MDL-00	3	1,296,489.39	190,576.1	69.0	23.0
ELEC PLANT MDL-94	1	408,579.89	223,663.6	81.0	81.0
ELEC ROW	19	29,952,222.49	74,636.1	26.9	1.4
ELECSUBST MDL-96	1	1,968,067.28	-	-	-
ELECSUBSTA MDL-00	6	3,249,331.66	60,079.9	21.9	3.7
EX CON EASE	4	6,932,817.20	22,558.9	8.2	2.1
EX CU CON EASE	3	2,065,414.99	-	-	-
EXEMPT-NL MDL-00	62	2,470,508.99	169,287.4	61.3	1.0
EXEMPT-NL MDL-01	1	1,473.26	1,139.0	0.4	0.4
EXEMPT-NL MDL-94	-	-	-	-	-
EXEMPT-NL MDL-96	2	75,900.99	75,847.3	27.5	13.8
FACTORY MDL-00	1	137,642.86	88,514.8	32.1	32.1
FACTORY MDL-94	1	612,819.55	306,369.1	111.0	111.0
FACTORY MDL-96	26	6,670,652.24	2,286,622.0	828.5	31.9
FARM BLDGS MDL-00	2	3,109,719.47	87,891.3	31.9	16.0
FARM EX	5	2,996,800.55	13,270.0	4.7	0.9
FARM REC EX	2	4,853,702.07	-	-	-
FARM W/SPI REC	2	3,135,482.57	105.7	-	-
FARMLAND	40	118,974,893.69	397,334.8	143.8	3.6
FARMLAND REC	17	23,881,113.59	69,959.8	25.3	1.5
FARMLAND W/SPI	5	3,925,782.77	1,992.9	0.7	0.1
FIRE MDL-96	4	173,680.68	71,978.4	26.1	6.5
FRATNL ORG	4	400,320.28	110,064.4	39.9	10.0
FUNERAL HM MDL-94	4	157,871.79	49,384.1	17.9	4.5
FUNERAL HM MDL-96	1	140,623.59	14,806.9	5.4	5.4
GAS PLANT MDL-96	3	604,399.91	29,846.2	10.8	3.6
GAS ROW	2	150,083.83	-	-	-
GAS ST SRV	4	109,796.18	56,569.4	20.4	5.1
GAS SUBSTA MDL-96	4	574,475.07	16,305.7	5.8	1.5
GOLF CRSE MDL-00	1	326,431.01	2,089.6	0.8	0.8
GOLF CRSE MDL-94	1	5,639,190.43	121,376.9	44.0	44.0
GYMS	2	39,998.40	7,885.5	2.9	1.5
HDWD	8	6,488,739.56	7,184.7	2.6	0.3
HDWD EX	3	6,218,052.61	2,668.9	1.0	0.3
HDWD MGD	1	9,553,832.57	23,281.1	8.4	8.4
HDWD REC	2	2,720,819.08	-	-	-
HDWD REC EX	1	2,215,723.90	-	-	-
HEALTH SPA	4	443,588.58	224,111.8	81.3	20.3
HOSP PVT	1	38,802.13	38,471.4	13.9	13.9
HOTELS MDL-94	3	267,939.54	152,797.9	55.3	18.4
HOTELS MDL-96	2	190,023.29	123,070.1	44.6	22.3
HRDWARE ST MDL-94	1	4,508.80	2,726.5	1.0	1.0
HRDWARE ST MDL-96	3	1,372,584.59	985,601.3	357.1	119.0
HSNG AUTH MDL-94	7	380,939.16	136,691.3	49.5	7.1
IND BLDG MDL-00	-	-	-	-	-
IND BLDG MDL-96	5	939,075.80	404,187.9	146.4	29.3
IND CONDO MDL-06	8	1,071,384.58	553,078.6	200.3	25.0
IND LD DV	20	7,979,265.86	208,089.1	75.5	3.8
IND LD PO	5	1,159,783.11	2,946.5	1.0	0.2
IND LD UD	5	345,562.50	8,255.1	3.0	0.6
IND OFFICE MDL-94	2	278,578.98	114,208.0	41.4	20.7
IND OFFICE MDL-96	5	8,086,809.68	547,493.1	198.3	39.7
IND WHSES MDL-94	1	299,359.10	168,991.8	61.2	61.2
IND WHSES MDL-96	21	6,885,870.55	2,379,063.6	861.8	41.0
LOUDON	13	6,795,692.96	101.6	-	-
MANUF HM PK MDL-00	93	59,786,377.54	525,122.1	190.2	2.0
MANUF HM PK MDL-01	1	1,104.18	1,088.4	0.4	0.4
MANUF HM PK MDL-94	27	24,523,244.77	682,634.4	247.4	9.2

Appendix C

Estimated Non-Single Family Residential ERUs by Land Use

Land Use Description	Number of Lots	Total Lot Area	Total Impervious Area (SF)	Estimated ERUs	Average ERUs per Lot
MANUF HM PK MDL-96	1	1,064,243.15	238,153.6	86.3	86.3
MANUF HOME	22	590,492.06	46,678.9	16.9	0.8
MANUF HOME MDL-00	9	8,036.24	4,148.1	1.6	0.2
MISC IMPRV	4	190,682.84	27,776.4	10.0	2.5
MOTELS	4	332,745.60	139,958.5	50.7	12.7
MOVIE THTR	1	396,730.79	209,325.9	75.8	75.8
MULTI FAM WTR FT	4	211,318.06	28,555.0	10.4	2.6
MULTI HSES MDL-01	33	3,006,987.59	199,529.6	72.7	2.2
NEOC EXEMP MDL-00	6	290,823.60	39,955.3	14.5	2.4
NEOC TAX MDL-00	3	132,388.24	81,192.4	29.4	9.8
NEOC TAX MDL-06	1	11,437.42	11,437.4	4.1	4.1
NEOC TAX MDL-94	11	1,089,890.39	613,029.0	222.0	20.2
NEOC TAX MDL-96	4	207,358.03	138,667.7	50.3	12.6
NURSING HM	2	282,675.73	111,558.6	40.4	20.2
OFF CONDO MDL-06	18	227,347.46	114,377.5	41.4	2.3
OFF CONDO MDL-94	1	3,795.00	3,795.0	1.4	1.4
OFFICE BLD	1	15,252.29	10,751.0	3.9	3.9
OFFICE BLD MDL-06	1	128,703.66	71,143.8	25.8	25.8
OFFICE BLD MDL-94	183	10,898,134.93	4,351,557.8	1,576.4	8.6
OFFICE BLD MDL-96	2	431,788.93	301,419.1	109.3	54.7
OFFICE/APT MDL-94	11	90,162.79	55,594.5	20.2	1.8
OPEN SPACE	40	17,886,265.47	147,090.6	53.1	1.3
OTH IN REC	3	1,328,290.09	35,066.4	12.7	4.2
OTH MTR SS MDL-00	1	29,813.52	2,632.8	1.0	1.0
OTH MTR SS MDL-94	1	163,879.26	134,022.4	48.6	48.6
OTH MTR SS MDL-96	14	2,793,665.59	786,335.0	285.1	20.4
OTHER	63	76,240,706.80	57,232.7	20.5	0.3
OTHER EX	7	14,513,312.53	-	-	-
OTHER MGD	5	4,243,725.29	259.4	-	-
OTHER REC	17	49,478,130.77	49,990.1	18.1	1.1
OTHER REC EX	2	3,053,817.69	12,899.6	4.7	2.4
OTHR OUTDR	1	79,371.93	6,701.7	2.4	2.4
PARK GAR	-	-	-	-	-
PARK LOT MDL-00	54	865,820.56	566,039.2	205.2	3.8
PARK LOT MDL-94	1	94,274.25	82,408.5	29.9	29.9
PEN V EX MDL-96	2	351,784.45	17,925.9	6.5	3.3
PEN V TAX MDL-94	1	91,962.98	14,723.0	5.3	5.3
PEN V TAX MDL-96	1	5,558.32	5,118.8	1.9	1.9
POT DEVEL	18	3,642,920.95	41,613.4	15.0	0.8
PR IND RES MDL-96	2	675,865.12	98,116.7	35.6	17.8
PRI COMM MDL-01	49	8,646,617.38	518,701.1	187.8	3.8
PRI COMM MDL-94	32	3,645,506.67	264,917.0	96.0	3.0
PRI COMM MDL-96	1	13,445.61	7,349.0	2.7	2.7
PRI RES MDL-01	42	1,877,893.93	192,405.1	69.5	1.7
PRIV SCHOOL MDL-00	5	7,515,962.91	172,704.1	62.6	12.5
PRIV SCHOOL MDL-01	5	6,140,649.08	31,825.0	11.5	2.3
PRIV SCHOOL MDL-94	9	27,868,582.31	237,196.2	85.8	9.5
PRIV SCHOOL MDL-96	2	1,080,426.21	32,072.4	11.7	5.9
PROF BLDG MDL-94	23	2,383,140.26	751,626.2	272.3	11.8
PUB-SCHOOL MDL-00	7	120,687.95	13,757.8	5.0	0.7
PUB-SCHOOL MDL-01	2	3,735,754.91	7,448.4	2.7	1.4
PUB-SCHOOL MDL-94	18	13,720,321.07	1,802,148.0	653.0	36.3
PUB-SCHOOL MDL-96	3	261,566.09	128,813.4	46.7	15.6
RAD/TV TR	1	691,341.41	3,811.7	1.4	1.4
R-D FACIL	7	1,574,843.79	477,014.7	172.8	24.7
RELIGIOUS MDL-00	8	712,827.95	58,441.7	21.3	2.7
RELIGIOUS MDL-01	10	158,105.93	25,814.3	9.4	0.9
RELIGIOUS MDL-94	7	5,031,806.72	1,139,663.1	412.9	59.0

Appendix C

Estimated Non-Single Family Residential ERUs by Land Use

Land Use Description	Number of Lots	Total Lot Area	Total Impervious Area (SF)	Estimated ERUs	Average ERUs per Lot
RELIGIOUS MDL-96	2	179,071.44	69,456.2	25.1	12.6
RES ACLNDV	231	86,956,447.15	387,572.5	139.7	0.6
RES ACLNPO	32	8,552,277.62	124,609.9	44.9	1.4
RES ACLNUD	82	19,254,368.24	31,583.9	11.0	0.1
REST/CLUBS MDL-94	53	2,390,844.94	1,419,310.8	514.1	9.7
RETAIL/APT MDL-94	33	353,886.90	252,705.6	91.5	2.8
RETAIL/OFF MDL-94	7	91,423.12	65,046.4	23.6	3.4
ROCK MINE MDL-94	1	7,509,549.92	363,544.2	131.7	131.7
ROCK MINE MDL-96	1	1,669,928.12	10,278.1	3.7	3.7
RTL CONDO MDL-06	4	103,971.72	78,492.8	28.4	7.1
RTL GAS ST	2	378,074.48	104,909.7	38.0	19.0
RTL OIL ST MDL-96	2	346,695.60	163,182.3	59.2	29.6
SAND&GRAVL MDL-96	1	2,379,660.50	295,189.0	107.0	107.0
SB EXEMPT MDL-96	1	57,165.28	39,727.5	14.4	14.4
SB TAX MDL-94	20	167,556.83	138,487.7	50.2	2.5
SB TX OFC CND MDL-06	1	23,230.91	19,507.4	7.1	7.1
SB TX RET CND MDL-06	2	24,500.58	23,790.3	8.6	4.3
SHOPNGMALL MDL-94	15	6,397,645.60	4,053,373.0	1,468.5	97.9
STATE-NH MDL-00	88	76,170,735.38	2,135,165.8	773.0	8.8
STATE-NH MDL-01	10	2,169,492.55	49,867.0	18.0	1.8
STATE-NH MDL-94	51	16,077,640.84	3,885,006.6	1,407.5	27.6
STATE-NH MDL-96	43	86,938,734.92	3,382,753.4	1,225.6	28.5
STORE/SHOP	1	3,688.73	3,671.3	1.3	1.3
STORE/SHOP MDL-01	2	10,339.60	3,577.7	1.3	0.7
STORE/SHOP MDL-94	83	6,396,069.67	3,953,081.5	1,432.4	17.3
STORE/SHOP MDL-96	37	4,188,955.87	1,121,279.1	406.2	11.0
TEL X STA MDL-96	6	78,731.45	28,099.6	10.1	1.7
TENNIS CLB	1	43,613.71	4,629.6	1.7	1.7
TENNIS ODR	1	230,773.46	8,786.9	3.2	3.2
THEATER	1	9,043.62	9,036.7	3.3	3.3
TRK TERM MDL-96	2	119,467.91	89,862.7	32.6	16.3
TURTLE POND	23	1,466,407.96	38,733.4	14.2	0.6
UNDEV LAND	6	3,907,835.69	56,308.1	20.5	3.4
UNPROD WET	2	58,366.46	-	-	-
UNPROD WET REC	2	840,033.43	2,787.7	1.0	0.5
US GOVT	2	387,408.44	188,517.1	68.3	34.2
W PINE	29	28,596,483.36	17,668.1	6.5	0.2
W PINE EX	21	39,755,641.28	20,360.2	7.3	0.3
W PINE MGD	26	44,686,344.40	59,072.5	21.4	0.8
W PINE MGD EX	2	4,649,783.17	44,391.5	16.1	8.1
W PINE MGD REC	7	20,625,002.95	39.4	-	-
W PINE REC	19	23,967,969.67	20,013.4	7.3	0.4
W PINE REC EX	3	3,876,204.72	24,354.5	8.8	2.9
TOTAL:	**4,359**	**3,292,733,654**	**79,157,753**	**28,677**	**2,874**

Appendix D

Example Stormwater Fees for Properties in Concord

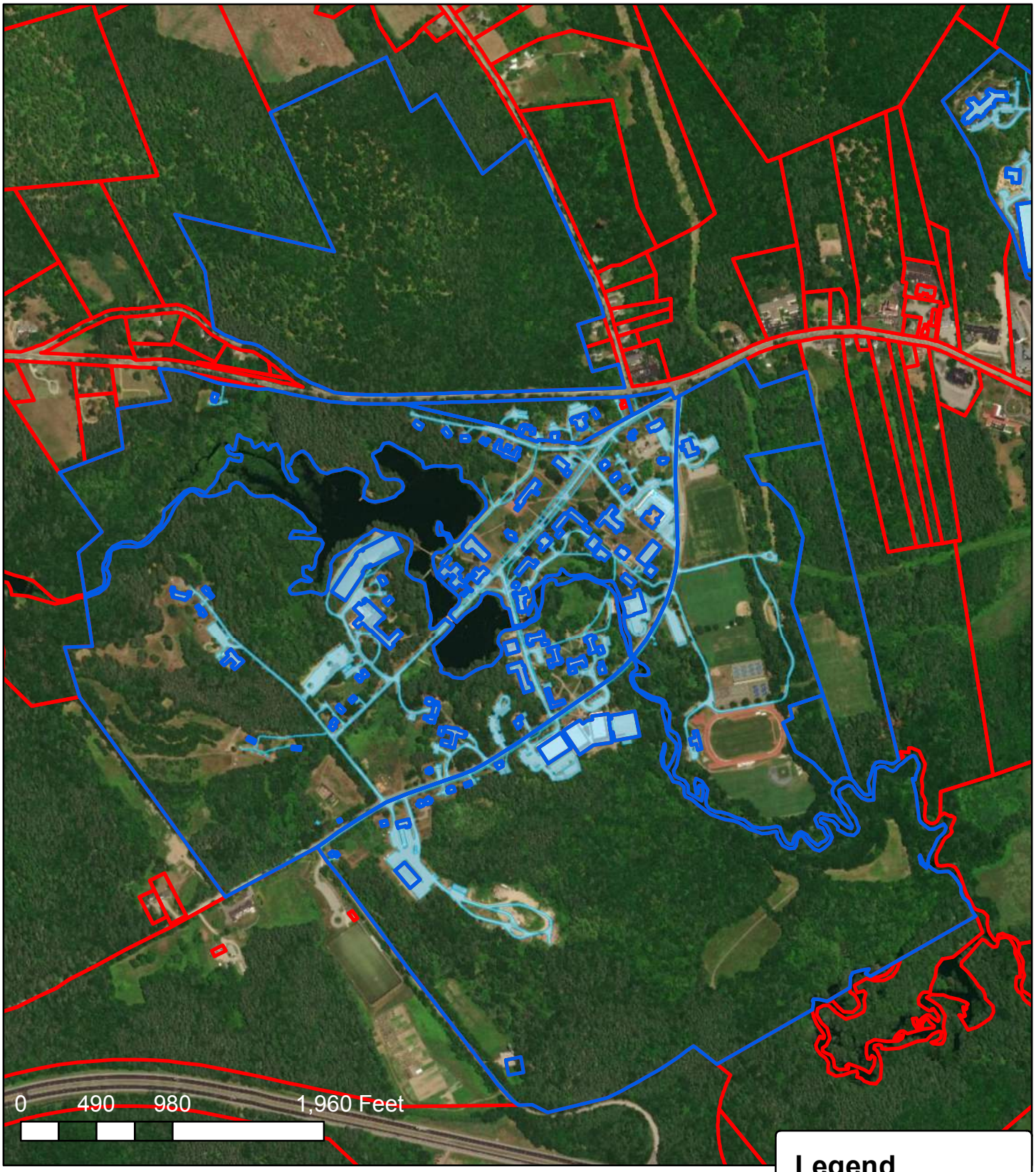
Hotel Concord

Lot ID: 100817
Total Imp. Area: 13,142 sf, 5 ERUs
Estimated Annual Stormwater Fee: $212.60
Estimated Taxable Value: $13,931,500.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $5,433.29

St. John's Church

Lot IDs: 10566, 10596, 10677, 10704
Total Imp. Area: 110,605 sf, 41 ERUs
Estimated Annual Stormwater Fee: $1,743.32
Estimated Taxable Value: $0.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $0.00

St. Paul's School

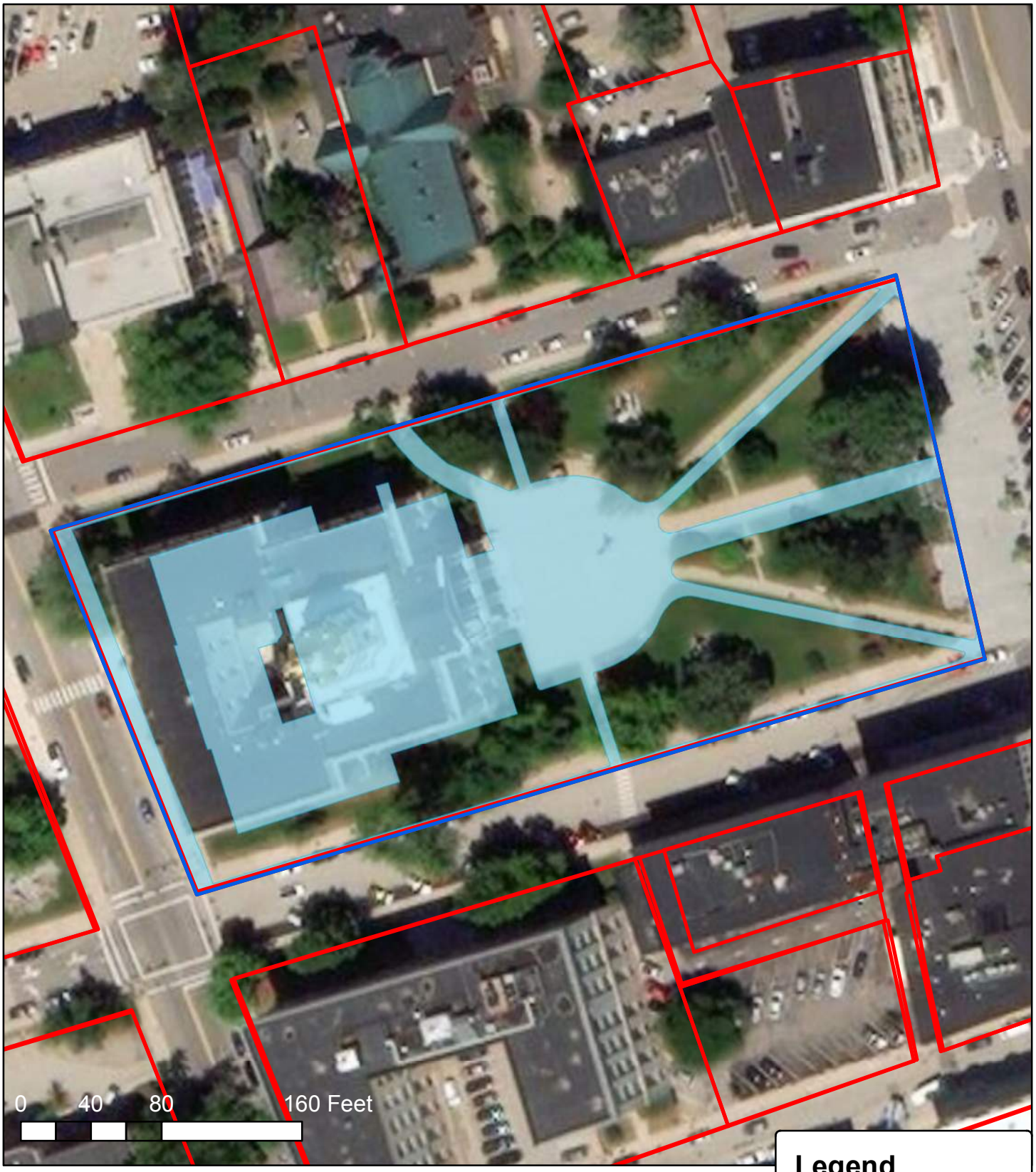


Lot IDs: (See list on next page)
Total Imp. Area: 1,599,097 sf, 580 ERUs
Estimated Annual Stormwater Fee: $24,661.60
Estimated Taxable Value: $13,662,050.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $5,328.20

St Paul's School

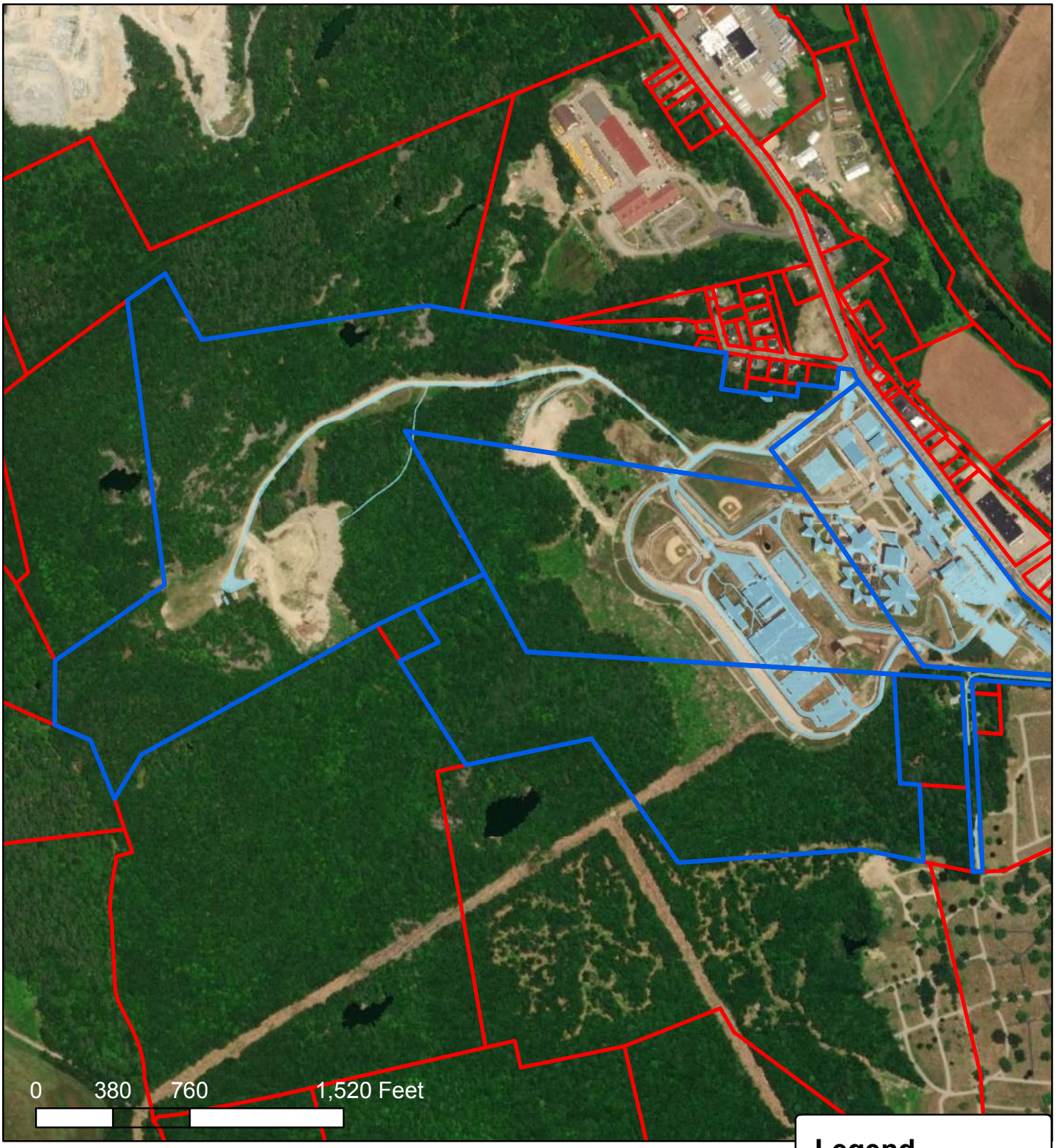
Lot IDs: 10110, 10928, 100662, 100663, 100665, 100667, 100673, 101164, 101165, 101166, 101167, 101168, 101169, 101170, 101171, 101172, 101173, 101174, 101175, 101176, 101177, 101178, 101179, 101180, 101181, 101182, 101183, 101184, 101185, 101186, 101187, 101188, 101189, 101190, 101191, 101192, 101195, 101196, 101197, 101198, 101199, 101200, 101201, 101202, 101203, 101204, 101205, 101206, 101207, 101208, 101209, 101210, 101211, 101212, 101213, 101215, 101216, 101217, 101218, 101219, 101220, 101221, 101222, 101223, 101224, 101225, 101226, 101227, 101228, 101229, 101230, 101231, 101232, 101233, 101234, 101235, 101236, 101237, 101238, 101549, 101611, 101612, 101614, 102122,

State House



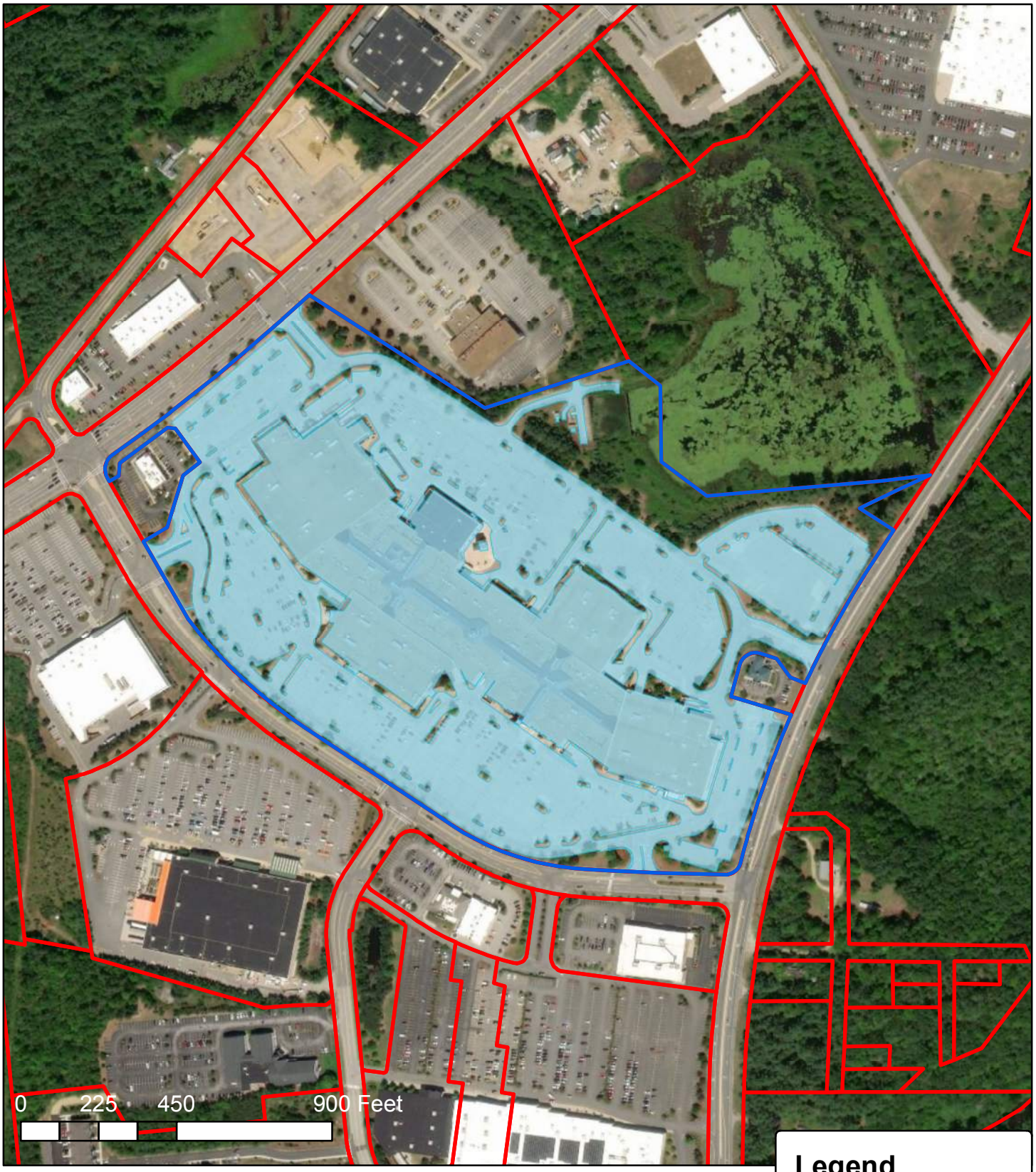
Lot ID: 9394
Total Imp. Area: 47,301 sf, 18 ERUs
Estimated Annual Stormwater Fee: $765.36
Estimated Taxable Value; $0.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $0.00

State Prison



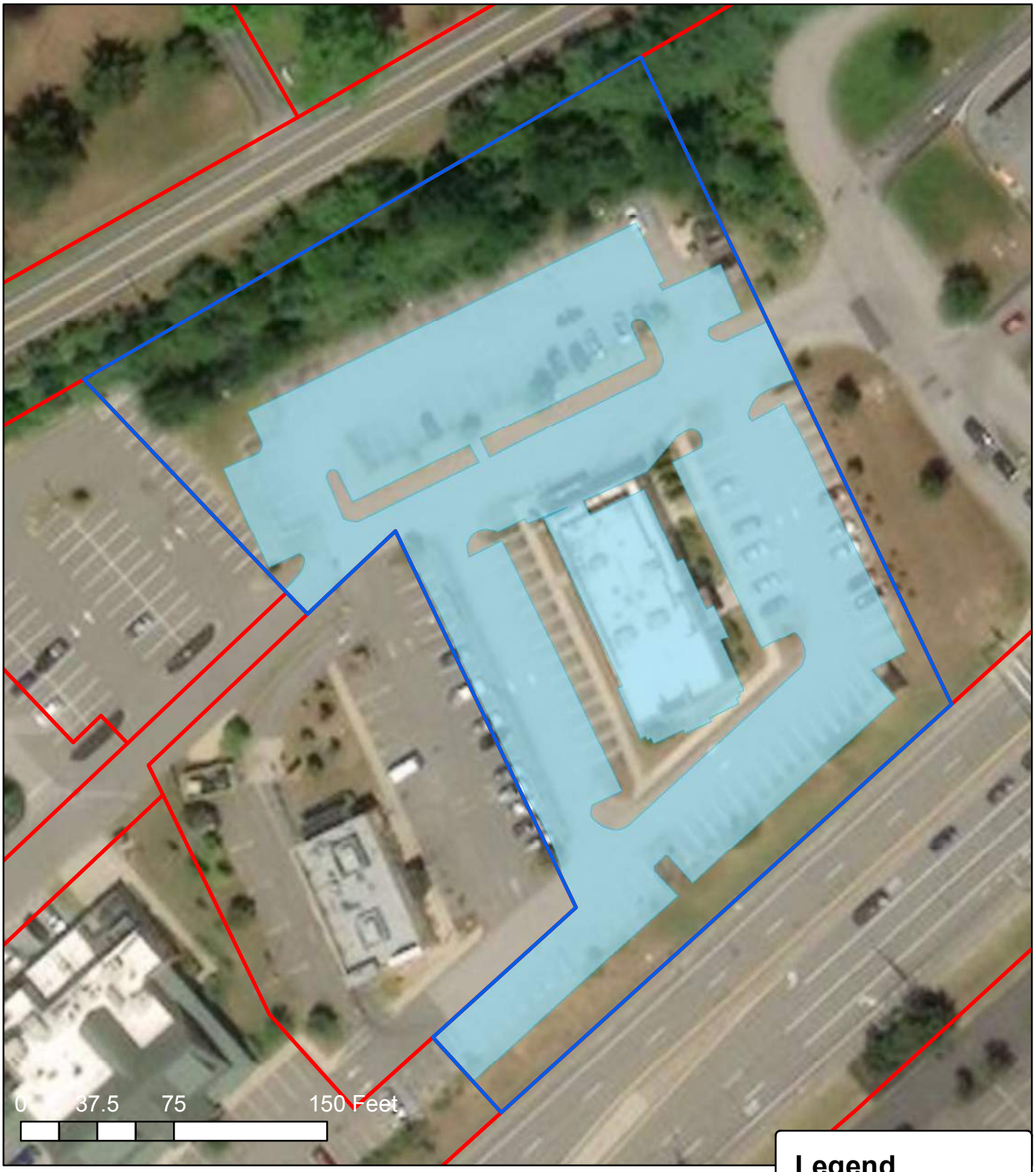
Lot IDs: 2368, 3945, 6615, 6705
Total Imp. Area: 848,332 sf, 308 ERUs
Estimated Annual Stormwater Fee: $13,096.16
Estimated Taxable Value: $0.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $0.00

Steeplegate Mall



Lot ID: 2374
Total Imp. Area: 1,703,115 sf, 618 ERUs
Estimated Annual Stormwater Fee: $26,277.36
Estimated Taxable Value: $9,500,000.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $3,705.00

Typical Commercial Property



Lot ID: 6604
Total Impervious Area: 54,621 sf, 20 ERUs
Estimated Annual Stormwater Fee: $850.40
Estimated Taxable Value: $1,651,100.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $643.93

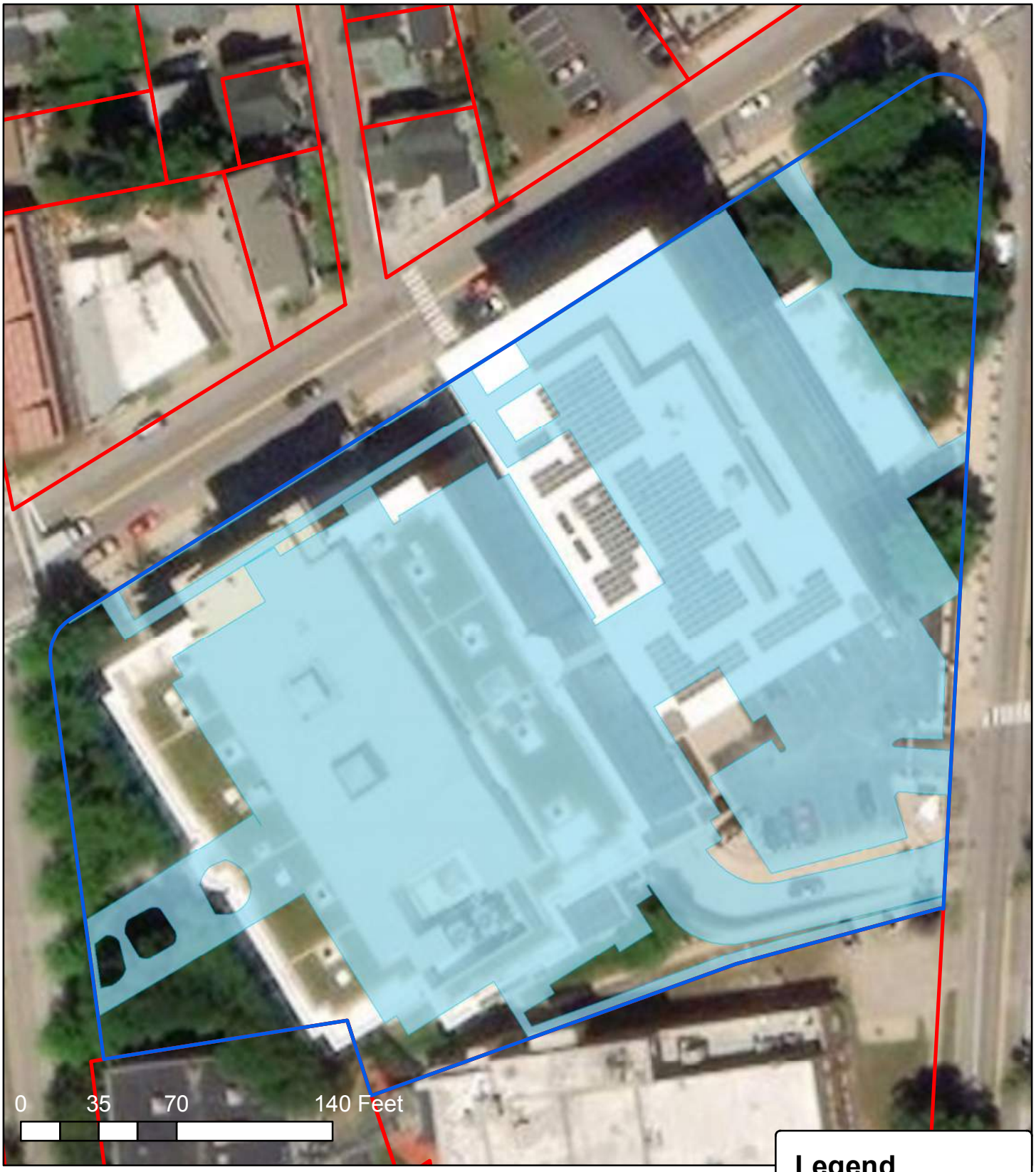
Typical Multifamily Residential Property

Lot ID: 101358
Total Imp. Area: 19,959 sf, 8 ERUs
Estimated Annual Stormwater Fee: $340.16
Estimated Taxable Value: $872,100.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $340.12

Typical Single Family Property

Lot ID: 100522
Total Imp. Area: 2,761 sf, 1 ERU
Estimated Annual Stormwater Fee: $42.52
Estimated Taxable Value: $307,100.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $119.77

US District Court



Lot ID: 10165
Total Imp. Area: 81,962 sf, 30 ERUs
Estimated Annual Stormwater Fee: $1,275.60
Estimated Taxable Value: $0.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $0.00

Holiday Inn

Lot IDs: 8960, 8974
Total Imp. Area: 79,286 sf, 29 ERUs
Estimated Annual Stormwater Fee: $1,233.08
Estimated Taxable Value: $6,299,300.00
Estimated Annual Tax Portion to fund
Future Stormwater Program: $2,456.73

Appendix E

Public Education Outreach Materials

Examples of Residential Messages

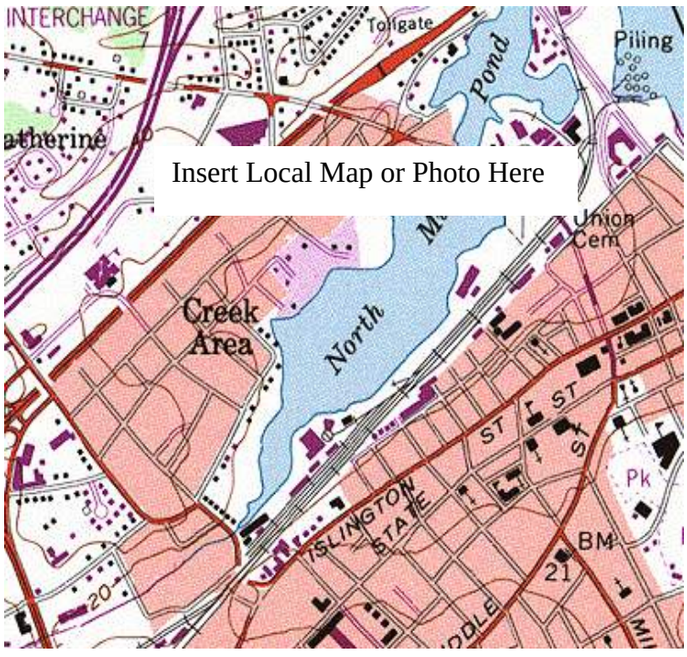
Alternatives to Dumping your Yard Waste:

- Drop off your leaf and yard waste at Municipal Info Here for composting. Call Phone # Here for more information.
- Start backyard composting. Visit for a free “how-to” brochure.
- Use a mulch mowing lawnmower, so that you will not have dispose of the grass clippings.

For More Information Contact:

- Town Contact Info Here.

In an effort to protect wetlands and water bodies the NH legislature passed a law (*RSA 482-A:3, I*) that prohibits filling streams and wetlands with waste materials, including yard waste.



THE INFORMATION ON THIS CARD IS PROVIDED TO YOU THROUGH THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES WATERSHED ASSISTANCE SECTION, 6 HAZEN DRIVE, CONCORD, NH 03301 PHONE: 603/271-7889
http://www.des.state.nh.us/wmb/was/

Living on a healthy pond helps keep your property value up.

Please do not dump your leaves, grass clippings, or brush in or near

Waterbody Name

Decaying yard waste kills aquatic animals in streams

Leaf piles and grass clippings decompose in streambeds or ponds and lakes by using the oxygen that other organisms such as dragonfly larvae, crabs, and fish need to live.

Yard waste on waterbody banks smothers natural vegetation

Leaves or grass dumped on shorelines, block sunlight and smother the natural plant life that provides food and cover to animals such as turtles, ducks, chipmunks, and deer.

Dumping yard waste contributes to stream algae and odors

Seepage from the leaves and grass piles on the banks slowly makes its way into the water. The algae eat the nutrients and form large, green mats on the surface of the water. These unsightly mats give off odors and also use oxygen as they decay.

Dumping yard waste in or near streams is against the law!

The final reason not to dump your yard waste in or near Your Waterbody Here is because it is against the law. RSA 482-A:3.

Drawings Courtesy David M Carroll

Your Logo Here

Alternatives to dumping your yard waste are on the other side

EVERY DROP

Small Changes. Big Difference.

We love our dogs! But dog waste carries harmful bacteria that can make our waters unsafe for drinking or swimming. So always pick it up and throw it in the trash!

EVERY DROP

Small Changes. Big Difference.

Take the Pledge to Scoop the Poop!

Visit **stateofourestuaries.org/everydrop/petpledge** or just scan the QR code to let your town know that you're doing your part by scooping the poop!

Many NH towns have over 1,000 dogs living in them, and each dog "goes" once or twice a day. That's a lot of poop! Not only is it gross when it's left around, but it can be dangerous. Harmful bacteria and parasites - such as Giardia or Salmonella - that lives in pet waste, can come in contact with other people and pets or wash into nearby waterways or storm drains. **Picking up our dog's waste and throwing it out is a small change that can make a big difference in keeping our waters clean.**

5 Small Changes that Make a Big Difference:

1. Always carry a plastic bag when you walk your dog.
2. Always pick up that poop.
3. Always dispose of it in a trashcan.
4. Never put bagged or unbagged waste in a storm drain.
5. Take the Pledge to tell your town you're making a difference!

Rain Barrel

A rain barrel captures rainwater from your roof to reduce runoff from your property and provide you with water for lawns, gardens, and indoor plants to use in dry weather.

Sizing and Design

STEP 1. **Observe your roof runoff.** Note where you have existing roof gutter downspouts, roof valleys or edges that drain large amounts of water.

STEP 2. **Calculate the runoff volume.** To determine how many rain barrels you need and whether you should designate an area to direct the rain barrel overflow, you need to know the volume of water the barrels will receive during a typical rain storm. Most storms in New Hampshire produce one inch or less of rain so designing for a 1-inch storm will capture most of the runoff volume as long as the barrels are emptied between storms.

Complete steps a. through d. to calculate runoff volume.

a. Calculate the square footage of the drainage area:

   DRAINAGE AREA LENGTH (ft) X DRAINAGE AREA WIDTH (ft) = DRAINAGE AREA (ft^2)

b. If multiple areas will be directed to the rain barrel, calculate the square footage of each and add them together .

c. Find the volume of stormwater from the total drainage area for a 1-inch storm by dividing the drainage area by 12 to convert the inch to feet:

   TOTAL DRAINAGE AREA (ft^2) ÷ 12 INCHES = STORMWATER VOLUME (ft^3)

d. Most rain barrels give the holding capacity in gallons. Convert the cubic feet to gallons by multiplying by 7.48.

   STORMWATER VOLUME (ft^3) X 7.48 GALLONS = STORMWATER VOLUME (gallons)

EQUIPMENT & MATERIALS

- Purchased or home-made rain barrel (food grade)
- Downspout diverter (purchased or made)
- Shovel
- Cinder block or other elevated base
- Level

OPTIONAL

- Soaker hose
- Crushed stone
- Mulch
- Splash guard

STEP 3. **Determine how many rain barrels are needed.** Attempt to capture the volume from a one-inch storm.

STORMWATER VOLUME (gallons) ÷ RAIN BARREL STORAGE CAPACITY (gallons) = NUMBER OF RAIN BARRELS NEEDED

STEP 4. **Address the overflow.** Be sure to note where the overflow will go during large storms. Avoid directing the overflow next to building foundations. Plan to use a splash guard, install a soaker hose, or build a slight swale to direct overflow away from your home and into an area where it can be absorbed, such as a naturally vegetated area, a rain garden, or dry well.

TIP: If more than one rain barrel will be needed to capture a one-inch storm:

- *Rain barrels can be linked together so that the overflow from one goes into the next.*
- *You can plan to capture smaller storms and designate an area to receive overflow.*

Installation

STEP 1. **Level the area.** Once you have determined where you want your rain barrels to go, level the ground surface. You can use crushed stone or mulch to stabilize the ground.

STEP 2. **Install blocks or stand.** Elevating the rain barrel is necessary to allow room for a watering can, bucket, or hose attachment under the spigot. Elevating the barrels will also create stronger water pressure. Place the blocks or other materials to create a stand on the leveled ground and recheck for level. Adjust as needed to achieve level.

TIP: Your rain barrel must be secured on a firm, level surface. A full, 55-gallon rain barrel weighs over 400 pounds.

STEP 3. **Connect the downspout to the rain barrel.** Flow diverters allow you to easily direct flow from your gutter downspout into your rain barrel during warm seasons. They can be closed during winter month, which allows your gutter to operate normally. To install the diverter, temporarily place the rain barrel on the blocks to mark where the diverter needs to be installed. Cut the gutter with a hand saw and install the diverter per the instructions, at a height that allows the water to flow from the diverter into the barrel. If not using a flow diverter, the gutter downspout can be directed or connected directly to the barrel.

STEP 4. **Install the rain barrel.**

a. Place the rain barrel on the blocks or stand.

b. Direct flow from gutter downspout or diverter into the barrel.

c. Cover the open top of the rain barrel with screen to prevent mosquitoes from breeding in the standing water and to reduce the amount of debris entering the barrel. Most rain barrels that you purchase pre-made will come with a screened cover.

d. Direct the overflow hose from the rain barrel to a vegetated area or another stormwater practice, where it can soak into the ground.

Maintenance

INSPECT: Check after storms to determine how soon you need to empty the barrel. Remember that a rain barrel only works if it has space to contain more water.

EMPTY: Empty the rain barrel between storms or, at a minimum, when full. The water can be used on perennial gardens, house plants, and other non-potable or non-drinking water needs. Carefully consider what you water with your rain barrel. This water has the potential to contain pollutants from your roof that you may not want to come in contact with vegetables or other edible crops.

CLEAN: Keep the screen clear of debris and clean with a soft brush as needed. Periodically clean out the inside of the barrel if debris has collected. Keep gutters and downspouts clean and clear to prevent debris, such as leaves and pine needles from entering the rain barrel.

WINTER STORAGE: It is recommended in New Hampshire that you completely empty your rain barrel and store it indoors through freezing winter months. When the rain barrel is removed for the season, the gutters and downspouts should be returned to their normal function to drain the roof during winter storms. This can be done by closing or removing the diverter and extending the downspout back to the ground.

Build Your Own Rain Barrel

Pre-made rain barrels are available in many sizes and styles. They range in price from $50 to over $200. To save money, you can make your own rain barrel out of a food grade drum and plumbing parts that you can find at most hardware stores. An internet search of "How do I make a rain barrel" will result in a long list of how-to sites and videos like this one http://www.instructables.com/id/Rainwater-harvesting-Rain-Barrel-DIY/?ALLSTEPS#step1. Whatever instructions you follow, we recommend using a food grade drum and avoiding trash barrels, which may not be sturdy enough to stand up to the pressure of being full of water.

Design References

Vermont Department of Environmental Conservation. *Low Impact Development Guide for Residential and Small Sites*. December 2010.

Media Tool Kit: Flyer
Flyer can be used for media and public

Pet Waste and Water Quality:

It's Not Just on the Lawn, It's in Your Water

What is the problem?
Scooping your pooch's poop isn't just a courtesy for those walking behind you; it is also the healthy and environmentally sound thing to do. Pet waste can be a significant source of water pollution. When pet waste is not properly disposed, it can be carried by rain or snow runoff directly into nearby waterbodies or into storm drains. Storm drains in streets and neighborhoods usually flow directly to a stream, river, or estuary without any treatment. Untreated animal fecal matter and wastes can become a source of harmful bacteria and nutrients in water. Just as we don't want human sewage in our water, it is important to prevent pet waste from being carried into our waterways because of negligence.

What you can do:

You can follow these easy steps to be part of the solution to pet waste contamination.

1. The first step is to **always carry a plastic bag** with you when you walk your dog. Re-using an old newspaper delivery bag or plastic grocery bag works well.
2. Using the bag like a glove, you can then pick up the pet waste, turn the bag inside out around the waste, seal the bag, and **dispose of it in a trash can**. You can also flush un-bagged pet waste down the toilet.
3. **Don't place the bagged or un-bagged pet waste in a storm drain** or hose the pet waste towards storm drains as they drain directly to a stream, river, lake or other waterbody.
4. If you have a large yard, you may **bury un-bagged pet waste** in the yard at least 5 inches in the ground and away from vegetable gardens and waterways.

Are you risking your health?
People are at risk of getting sick from drinking or swimming in water contaminated by pet waste. Dogs can be significant hosts of disease causing organisms, including Giardia and Salmonella, which are protozoan and bacterial infections transmitted to humans by animals. Some swimming beaches and shellfish beds in New Hampshire are commonly shut down due to bacteria contamination.

The latest research
The environmental impact of dog waste has gone unrecognized for decades. Scientists recently developed a new lab technique of fingerprinting DNA to match bacteria found in the water to the bacteria from specific animals, including humans and domestic animals. Using this type of forensic science, New Hampshire scientists have found that dogs are a significant contributor of bacteria in several New Hampshire surface waters.

Other neighborhood water pollutants
Dog waste is only one of many pollutants from our neighborhoods that add to water pollution. Lawn fertilizers, motor oil, driveway sand and salt, and soapy water from washing cars in driveways commonly end up in streams and lakes.

Tell friends and neighbors about the affect of animal waste on the environment and our health. Encourage them to clean up after their pets and to dispose of the pet waste properly.

For more information
Contact ...

Stormwater Pollution Prevention Guide
FOR HOMEOWNERS

The U.S. Environmental Protection Agency estimates that contaminants in stormwater runoff cause over half of the pollution in our nation's waterways.

Stormwater pollution begins when rain or snowmelt washes over pavement and other impervious surfaces, picks up contaminants, and flows down stormdrains to the waterways we rely on for drinking and recreation.

Common pollutants include antifreeze, detergents, fertilizers, gasoline, household chemicals, motor oil, paints, pesticides, pet waste, road salt, solvents, and yard waste

HELP KEEP OUR WATERWAYS CLEAN!

Please check the back of this page for tips on preventing stormwater pollution.
It's easier than you think!

Stormwater pollution *is the toxic mix of bacteria, chemicals, metals, nutrients and other contaminants that washes over pavement and other impervious surfaces and flows down stormdrains to the waterways we rely on for drinking and recreation.*

Let's work together to keep our waterways clean.

Learn more at **www.neponsetstormwater.org**

neponset stormwater partnership

Distributed by: _____

PICK-UP AFTER YOUR DOG

*Dog waste carries high levels of harmful **E. coli bacteria** and other pathogens, and is a major contributor to local water pollution.*

- Pick up the poop! Always carry a **plastic bag** when you walk your dog, and dispose of pet waste in a **trash can.**

LAWN & GARDEN

- Choose **organic lawn chemicals** whenever possible.

  Use lawn chemicals sparingly and never use more than the directions call for.

- Sweep up **dry chemical spills** and dispose in trash.
- Don't pile **yard waste** near streams, wetlands, or stormdrains.
- Start a **compost pile.**
- Don't allow irrigation to **spray onto pavement.** Water that ends up on the pavement contributes to polluted runoff, and is wasted.
- Make sure that your **landscaper / irrigation contractor** follows rules for preventing stormwater runoff.
- Redirect **downspouts** toward grassy areas, trees and shrubs, so that runoff from your roof can soak into the ground.
- Use **pervious materials** in landscape designs. Bricks, pavers and stones allow water to slowly filter into the ground.
- Set a **rain barrel** under your downspout to capture water for another use.
- Plant **rain gardens** to help filter and soak up water before it runs onto the street.

HOMES / BUSINESSES

- Use the **least toxic** products available for cleaning, etc.
- Avoid **liquid chemical spills** such as oil, gasoline, antifreeze, paint, etc. on paved areas.

  *If a liquid chemical spill occurs, clean with rags or absorbent material such as **sand or kitty litter.** Sweep up absorbents and dispose of in the trash.*

- Never use a **hose** to wash down the driveway or sidewalk. This washes pollutants into storm drains, and is a waste of water.
- Dispose of household hazardous waste through your local **DPW / Household Hazardous Waste Program.**
- Never pour **washwater or chemicals** down stormdrains.
- Store chemicals in **leak proof containers** inside a building or shed, or under cover, away from rainwater.
- **Avoid oversalting** walkways and driveways in the winter, and use non-toxic products whenever possible.
- Sweep up all **construction areas** on a regular basis and dispose of debris in the trash.

WASHING CARS AND BOATS

- Park your vehicle in a spot where the soap will run off onto **grass,** rather than into the street and down the stormdrain. If practical, park your vehicle on your lawn when washing it.
- Use **organic or mild soaps** and detergents.
- Never clean or pressure wash the **undercarriage of a car** at home. The oil, grease and other pollutants from this activity can contaminate shallow groundwater.
- Always use a **hose nozzle with a trigger,** and shut it off when you're not using it to conserve water
- Skip the home treatment and **wash your car professionally,** but use a car wash that recycles its water!

AUTOMOTIVE REPAIR

- Store automotive parts, such as batteries, engines, transmissions, and parts that may have oily or greasy residue on them, under cover and off the ground, to **minimize rainwater contact.** Rainwater can wash pollutants off these parts and into stormdrains.
- Collect all used oil, antifreeze, and other vehicle fluids in contain ers with tight fitting lids and **recycle at a local service station.**

SWIMMING POOLS AND HOT TUBS

- Never **discharge pool water** directly into a storm drain.
- Dechlorinate pool, hot tub or spa water with **neutralizing chemicals,** if water is to be discharged into the ground. If water cannot be dechlorinated, it must be collected by a pool maintenance company.

For more information on hazardous waste disposal, call your local Department of Public Works.

*For more information on reducing stormwater pollution, visit **www.neponsetstormwater.org***

neponset stormwater partnership

Distributed by: _____

EPA
United States
Environmental Protection
Agency

EPA 841-F-03-003

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.

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?

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 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.

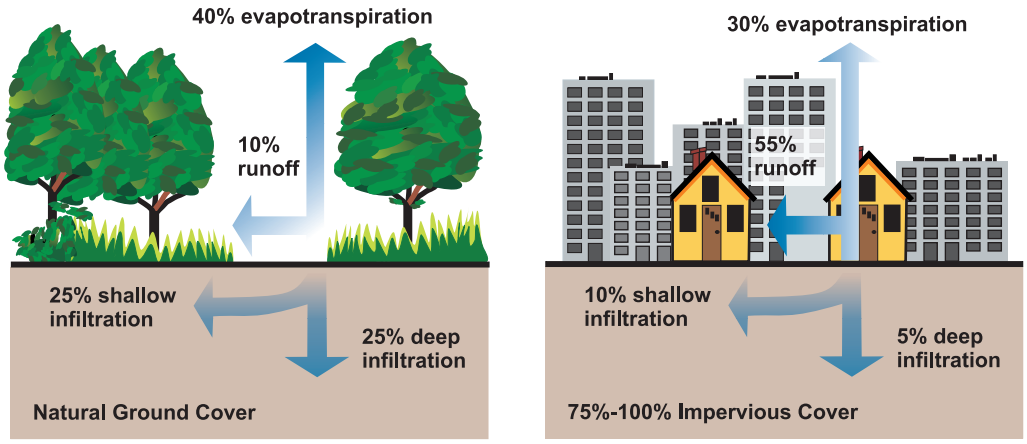
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot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

February 2003

Don't Leaf Canton's Water to Chance This Fall!

Fall leaves and yard waste can cause pollution and flooding when dumped or stored near wetlands, waterways or stormdrains.

Did you know, fallen leaves are loaded with natural fertilizer, which can cause water pollution that harms people and animals?

Dumped leaves can also block stormdrains and waterways, causing flooding.

Keep Canton's waterways clean and healthy this fall with a few simple steps.

- **Never** dump leaves in wetlands or waterways
- Bag leaves in paper bags for disposal by the town (details on back)
- Or compost your yard waste at home in an area away from wetlands and stormdrains
- Keep paved areas and stormdrains clear of leaves
- Make sure your lawn service is properly disposing of all your waste

More tips at www.YourCleanWater.org/leaves

neponset stormwater partnership

The Neponset Stormwater Partnership (NSP) is a program managed by the Neponset River Watershed Association on behalf of ten member communities. NSP aims to increase the effectiveness of municipal stormwater management programs through regional cooperation and resource sharing.

Steps to Properly Dispose of Yard Waste in Canton

It is Illegal to dump or store yard waste within 30 feet of a pond, stream or wetland in Canton.

Yard waste is not allowed in trash-bins for curbside collection

The Canton Yard Waste Recycling Facility is located at 99 Pine Street.

2018 regular season hours:
April 2–Dec. 16
Mon–Sat. 7:30am–4pm.

Winter hours:
Dec. 19, 2018–April 1, 2019
Wed.–Sat. 7:30am–4pm

- Residents are required to obtain and display a Yard Waste Recycling sticker on the passenger side front windshield of participating vehicles.
- Residents may purchase an annual yard waste sticker at the Yard Waste Recycling Center on Pine St. or at the Public Works Department Office, located at 801 Washington St. on the lower level of the building.
- The fee for a Yard Waste sticker is $10. Proof of residency and a license plate number of the participating vehicle is required each year for a permit.
- No commercial vehicles are allowed.

Yard waste includes: Leaves, grass, dead flowers or plants, hedge clippings, wood chips, tree trimmings or pruning's 4 inches in diameter or less.

- No poison ivy, bamboo, oak, sumac, diseased, infected, invasive plants, roots, or stumps will be accepted.
- ALL BAGS must be EMPTIED. Once emptied, biodegradable bags may be placed at the designated area.

Canton Public Works Office
801 Washington St.
Mon. 8am–5pm, Tues. to Fri. 8am–4pm
781-575-6650

Working Together to Prevent Stormwater Pollution

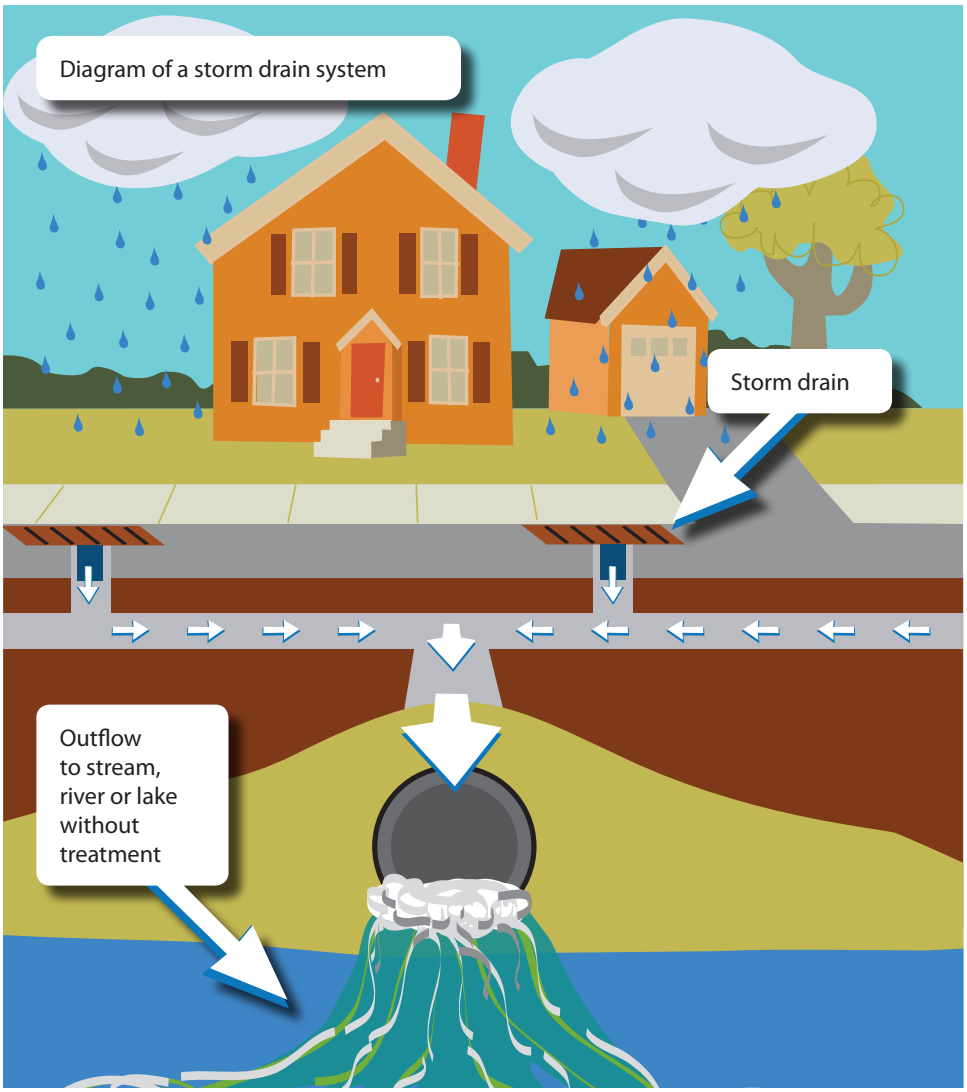
Many towns in Massachusetts are covered with acres of pavement and concrete.

When rain hits these hard surfaces, it washes pollutants like pet waste, bacteria, oil, litter, fertilizer, and grass clippings into storm drains.

Stormdrains lead to streams. Water and pollution that flow into them is NOT treated—it goes directly into streams and ponds, affecting the health of drinking water, wildlife and recreation.

Your town has partnered with neighboring towns through the Neponset Stormwater Partnership to work toward cleaner waterways. We are committed to meeting new stricter water pollution standards issued by the U.S. Environmental Protection Agency for towns in Massachussetts.

More at YourCleanWater.org.



Report dumping or get free advice on stormwater issues
Call the NSP Stormwater Hotline (781) 575-0354 x300 or the Canton Cons Com (781) 821-5035

Stormwater pollution is a **problem in our community.**

What is stormwater pollution?

Stormwater pollution occurs when heavy rain or snow melt washes pollutants down stormdrains, and into our streams, rivers, ponds and lakes.

Stormwater runoff carries dangerous bacteria and chemicals that **affect the cleanliness and health** of the water that we rely on for drinking and recreation.

Common pollutants include: Antifreeze, Detergents, Fertilizers, Gasoline, Household Chemicals, Motor Oil, Paints, Pesticides, Pet Waste, Road Salt, Solvents, Yard Waste.

Learn more at
www.nepwater.org

neponset stormwater partnership

Stormwater pollution can come from everyday sources we use around our home.

Stormwater pollution is a **neighborhood problem** *and we need your help to prevent it!*

A few changes in behavior can make a big difference in local water quality:

- Pick up pet waste and dispose of in the trash.
- Use lawn chemicals sparingly (and use organic fertilizers and pesticides whenever possible).
- Sweep up excess fertilizer, pesticide, ice melt and chemical spills.
- Keep stormdrains clear of grass clippings and other yard waste.
- Don't allow irrigation to spray onto paved areas.
- Use pervious materials such as bricks, pavers and stones in your landscape designs. Avoid pavement and solid concrete.
- Plant rain gardens to help filter and soak up water, and divert rain gutters to flow to gardens, shrubs, or the lawn.

Learn how we are working to improve water quality in our town. **www.nepwater.org**

neponset stormwater partnership

The Neponset Stormwater Partnership aims to reduce the cost and increase the effectiveness of municipal stormwater management programs through regional cooperation and resource sharing.

For more information, contact Neponset River Watershed Executive Director, Ian Cooke, cooke@neponset.org (781) 575-0354 x305


When you wash your car
in the driveway...
It's like washing
it in the river!
YOU can make the difference.
Wash your car on the grass instead of the street.
Or take it to the car wash.
All the soap and oil runs down your driveway
to a storm drain and pollutes the
Merrimack River.
Photo Credits: river photo: MRWC; car wash photo:
www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-to-curbing-stormwater-pollution/

Worried about flooding?

Plant trees in your neighborhood!

Trees soak up water and reduce flooding.

Photo Credits: Flood: http://gatogato.com/images/2006/lowell_flood_2006.html; Tree planting: American Spirit, Dreamstime.com

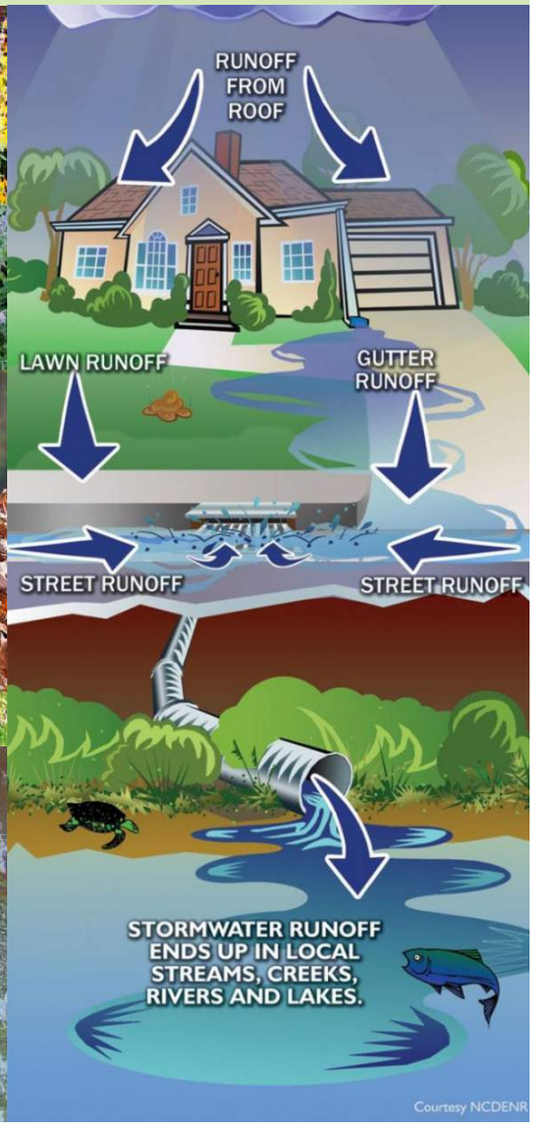

We All Deserve Clean Water...
Together, We Can Make It Happen
Keep trash out of our storm drains!
Photo credits: boy fishing: Palangsi: Dreamstime.com; River: MRWC


Keep Your Family Healthy
Your drinking water comes from the Merrimack River...
Don't dump anything into the storm drains!
Photo Credits: drinking water: Hughstoneian, Dreamstime.com; river: MRWC

Examples of Commercial Messages

LANDSCAPERS: Help keep waterways clean in your town

Stormwater pollution *is the bacteria, chemicals, metals, nutrients and other contaminants that wash over land and pavement, then down stormdrains and into our waterways—affecting the cleanliness and health of the water that we rely on for drinking and recreation.*



Take simple steps now to prevent stormwater pollution:

- Use lawn chemicals sparingly. Never use more than what is recommended on the package.
- Use organic fertilizers and pesticides.
- Sweep up excess chemical spills and store products in leak proof containers.
- Keep stormdrains clear of grass clippings and yard waste.
- Plant rain gardens to help filter and soak up water.
- Encourage homeowners to divert rain gutters toward shrubs, gardens or lawn to reduce runoff.
- Make sure that sprinklers are watering lawns and gardens—not sidewalks, driveways, or the street.
- Use pervious materials such as bricks, pavers and stones in landscape designs.
- Speak to local conservation agents to learn more about EPA regulated stormwater pollution by-laws.

neponset stormwater partnership

We're working with your town to reduce stormwater pollution. More at **www.nepwater.org**

An important message from your DPW.

Neponset Stormwater Partnership
2173 Washington St.
Canton, MA 02021

Stamp
goes
here

Prevent stormwater pollution in our community.

What is stormwater pollution?

Stormwater pollution occurs when heavy rain or snow melt washes pollutants down stormdrains, which then travels untreated into our streams, rivers, ponds and lakes.

Stormwater runoff carries dangerous bacteria, nutrients, metals, and chemicals that **affect the cleanliness and health** of the water that we rely on for drinking and recreation.

Runoff is regulated because of the significant impact on water quality, and the federal EPA will soon be imposing requirements on municipal stormwater systems, which may be very costly for towns to implement.

Minimizing the pollutants that run off of your property and into stormdrains may reduce the need for towns to raise revenue to comply with these new federal rules.

Taking low cost actions now may result in significant future savings for you in the future.

Follow the simple tips inside this flyer to reduce stormwater pollution at your business. Reduce pollution from:

- general cleaning, both indoors and outdoors;
- maintenance and cleaning of dumpsters and disposal areas;
- materials storage;
- spills;
- usage of cleaners and solvents;
- landscaping and irrigation;
- snow and ice removal.

In addition to statewide rules, you may be required to meet additional local stormwater control regulations. Check with your local town officials or conservation committee for more information.

neponset stormwater partnership

Learn more about preventing stormwater pollution.
www.nepwater.org

Common Pollutants Include: *Antifreeze, Detergents, Fertilizers, Gasoline, Household Chemicals, Motor Oil, Paints, Pesticides, Pet Waste, Road Salt, Solvents, Yard Waste*

Green Grass & Clear Water

Water quality friendly lawn care and fertilizer recommendations for northern New England

According to a recent survey, it's likely that you and your neighbors believe having a lawn that is safe for the environment is very important.[1] However, some lawn care practices can create water quality problems. Excess nutrients (including nitrogen and phosphorous found in fertilizers) that run off our properties into local waterbodies can trigger algal blooms that cloud water and rob it of oxygen.

Many of us enjoy the time we spend working on our lawns and are willing to try new practices as long as our lawns continue to look nice.[1] Here are some easy practices for creating and maintaining a truly healthy lawn that is both attractive and safer for the environment.

For additional resources, please visit:

www.extension.unh.edu/tags/home-lawn-care

Simple Recommendations for Every Lawn

1. Choose the Right Grass Seed

Consider limiting lawn area to locations where grass will grow easily and will actually be used for outdoor activities.

Choose grass varieties that require less maintenance. For northern New England, choose seed mixes with higher percentages of turf-type tall fescues, compact-type fall fescues and/or fine fescues. Choose mixes with smaller percentages of Kentucky bluegrass and/or perennial ryegrass.

In shaded areas, select shade-tolerant turf grasses like fine-leaf and tall fescues.

Up to 10% of total seed mix can be white clover to help fix nitrogen in soil naturally. Avoid clover if anyone in the household is allergic to bee stings.

2. Don't Overwater

If irrigating, 1" of water per week is typically enough. Overwatering can lead to runoff and leaching of contaminants into groundwater.

3. Test Your Soil

To have your soil tested, please visit this site: **extension.unh.edu/programs/soil-testing-services** Sometimes adjusting the soil pH or organic matter are the only treatments needed to improve a lawn. If the soil test results come back as acceptable but your lawn is not, then check for other problems like pest infestations.

4. Mow Smart

Mow grass 3" or higher. Cut no more than 1/3 of the blade to encourage longer, stronger turf grass roots. Leave the clippings after mowing to provide a source of slow-release nutrients. NEVER dispose of clippings in drainage areas, storm drains, wetlands or water bodies!

Recommendations for Lawns that Need Fertilizer

1. Determine How Much to Apply

Measure the dimensions of the area where you plan to apply. The square footage of the area will determine how much fertilizer to purchase and use.

Only use what you need. Nearly half of homeowners mistakenly use the entire bag whether it is needed or not.[1] Seal and store opened fertilizer bags in an airtight container or share excess with others.

Lawns older than 10 years usually need less nitrogen than newer lawns, especially if the clippings are left, so apply only half of the amount directed on the bag. Only apply more if there's no improvement over time in turf color and density. Staying under four applications per season at this reduced rate helps keep the overall application at the recommended level[2] for water friendly practices.

Lawns less than 10 years old may need the full amount of nitrogen as indicated on the fertilizer instructions. Apply less than four times per year.

2. Know When & Where to Apply

Avoid applying fertilizers mid-summer when turf growth naturally subsides or before a big rain when it can run off into nearby waterways or leach into ground water.

In northern New England, apply no earlier than spring green-up and no later than mid-September to ensure the proper soil temperature for grass to take up the nutrients.

Know your local and state laws related to fertilizer application. For example, do not apply any fertilizers within 25 feet of water bodies in New Hampshire.

3. Choose the Right Fertilizer

Avoid combination products that include both pesticide and fertilizer unless confident you need both. Unnecessary applications of fertilizers and pesticides can lead to soil and water contamination.

Select lawn fertilizers with low or no phosphorus unless your soil test indicates otherwise. The fertilizer formula (e.g., 20-0-15) tells the relative percentages of nitrogen (N), phosphorous (P) and potassium (K).

3. Choose the Right Fertilizer, cont.

Slow release formulations (>50% water insoluble nitrogen – WIN) are generally preferable. Only use quick release products when there is a need to grow turf very quickly, for example to prevent erosion of bare soil during a new seeding. Check the product label to see what type of nitrogen it contains.

Organic fertilizers are typically slow release and contain micronutrients that are beneficial to soil. They are not petroleum-based like most synthetic fertilizers. Overapplying any type of fertilizer or over-irrigating fertilized turf can lead to water quality problems.

For more information:

www.extension.unh.edu/tags/home-lawn-care

Contact:
UNH Cooperative Extension Education Center
329 Mast Road, Suite 115
Goffstown, NH 03045
answers@unh.edu
(877) 398-4769

Authors:
Julia Peterson
Water and Marine Resources Extension Specialist
N.H. Sea Grant/UNH Cooperative Extension
julia.peterson@unh.edu
(603) 862-6706

Margaret Hagen, Retired Field Specialist in Agricultural Resources, Hillsborough County

[1]Survey references from:
Changing Homeowner's Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds: the Report of Findings from Social Science Research. Eisenhauer, B.W. and B. Gagnon. 2008.
USDA CSREES project # 2006-51130-03656

[2]Recommendations adapted from:
New England Regional Nitrogen and Phosphorus Fertilizer and Associated Management Practice Recommendations for Lawns Based on Water Quality Considerations. 2008. Karl Guillard (ed.). Turfgrass Nutrient Management Bulletin B-0100. College of Agriculture and Natural Resources, University of Connecticut.
USDA CSREES project # 2006-51130-03656.

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under Agreement No. 2006-51130-03656. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Designed by: Rebecca Zeiber, NHSG science writer. Publication #: UNHMP-IS-SG-13-27

Maintenance Guide
for small businesses

Follow these best practices to help keep our water clean.

TOPIC	BEST PRACTICE
Dumpsters Keep dumpster areas free from litter, debris, and sediments. 	• Schedule regular waste pick-ups. • Keep dumpsters and waste bins covered. Anything in an uncovered dumpster or trash bin is vulnerable to the weather, and can wash into nearby stormdrains during wet weather. • Never wash dumpsters with a hose. If cleaning is needed, contact the leasing company. • Check dumpsters regularly for leaks, and replace if necessary.
Cleaning Outdoor Areas 	• Dry sweep paved areas on a regular basis, including parking lots, patios, dumpster areas. • Do NOT use a hose to wash down pavement. • Dispose of debris in waste containers only. Do not sweep trash, yardwaste, sand, salt or ice melt chemicals into the gutter or stormdrain. • Avoid over-salting in the winter, and sweep up any excess or spills.
General Cleaning 	• Don't pour wash water or chemicals down a stormdrain. • Dispose of wash water down a sanitary sewer. (sink or toilet). • Be sure to store all chemicals in appropriate containers that don't leak. • Any excess chemical spills, especially outdoors, should be swept up immediately. • Use cleaning products that are non-toxic to vegetation and wildlife.
Landscaping You can save time and money, and prevent stormwater runoff by making a few simple changes to your routine. Talk to your landscaper about ways to prevent excessive use of lawn chemicals and irrigation runoff. 	• Limit the use of lawn chemicals and always follow directions. • Test your grass before adding fertilizer. Why pay for services and materials that you may not need? Have your soil tested at the UMass Extension: http://extension.umass.edu/landscape/ • Use organic fertilizer whenever possible. Organic or slow-release nitrogen fertilizer causes less harm to water. Also make sure to use fertilizer with no or low phosphorus—phosphorus causes algae growth. *Fertilizers are made of nutrients, such as nitrogen and phosphorus. When it rains, these nutrients are carried by stormwater into the nearest water body. Too many nutrients in water can cause algae to grow, which can deplete oxygen and hurt aquatic wildlife - and make boating, fishing and swimming unpleasant.*
Irrigation Before you begin to irrigate, keep in mind that just one inch of water per week from rain/irrigation is enough to keep a lawn green. 	To avoid water loss, evaporation, and runoff: • Avoid irrigating when it's windy. The best time to water is early morning. • Make sure that sprinkler heads are pointed at the lawn and not the pavement - adjust and fix heads as necessary. • Upgrade to a moisture sensor to ensure irrigating only when needed, and avoid using old-fashioned irrigation timers.
Hardscapes Patios, sidewalks, and driveways are examples of hardscapes that may cause stormwater runoff, depending on what type of materials are used to build them. 	• Keep all asphalt and concrete to a minimum and whenever possible, use bricks, pavers, or stone to create pathways and patios. • Use sand (not concrete) between bricks, to allow water to percolate through the seams, rather than runoff into stormdrains.
Storage of Materials 	• All chemical cleaners, road salt, fertilizers, pesticides, and gas and oil for machinery, should be stored in appropriate containers that don't leak. • Any excess chemical spills should be swept up immediately.

We're working with your town to reduce stormwater pollution.

Learn more at **www.nepwater.org**

neponset stormwater partnership

Neponset Stormwater Partnership
2173 Washington St.
Canton, MA 02021

An important message from your DPW.

Stamp
goes
here

Prevent stormwater pollution in our community.

What is stormwater pollution?

Stormwater pollution occurs when heavy rain or snow melt washes pollutants down stormdrains, which then travels untreated into our streams, rivers, ponds and lakes.

Stormwater runoff carries dangerous bacteria, nutrients, metals, and chemicals that **affect the cleanliness and health** of the water that we rely on for drinking and recreation.

Runoff is regulated because of the significant impact on water quality, and the federal EPA will soon be imposing requirements on municipal stormwater systems, which may be very costly for towns to implement.

Minimizing the pollutants that run off of your property and into stormdrains may reduce the need for towns to raise revenue to comply with these new federal rules.

Taking low cost actions now may result in significant future savings for you in the future.

Follow the simple tips inside this flyer to reduce stormwater pollution at your business. Reduce pollution from:

- general cleaning, both indoors and outdoors;
- maintenance and cleaning of dumpsters and disposal areas;
- materials storage;
- spills;
- usage of cleaners and solvents;
- landscaping and irrigation;
- snow and ice removal.

In addition to statewide rules, you may be required to meet additional local stormwater control regulations. Check with your local town officials or conservation committee for more information.

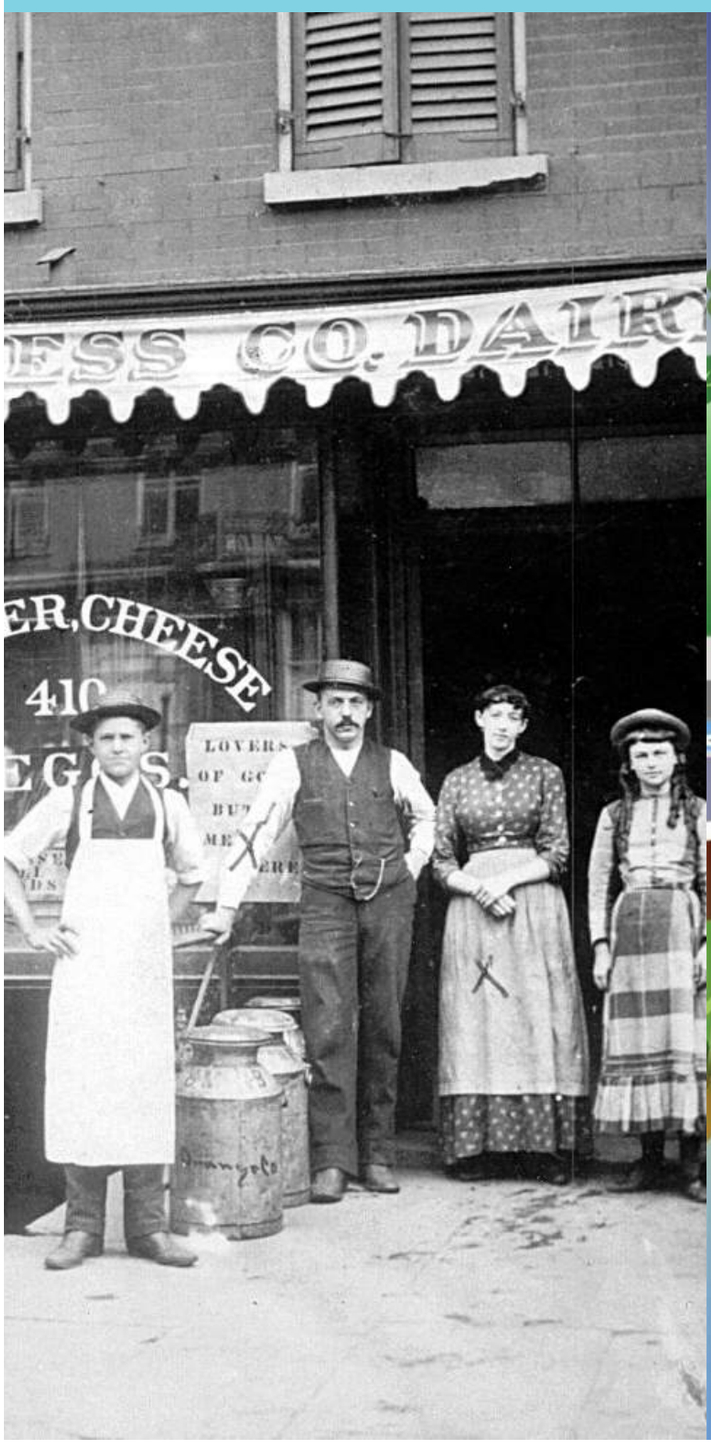
neponset stormwater partnership

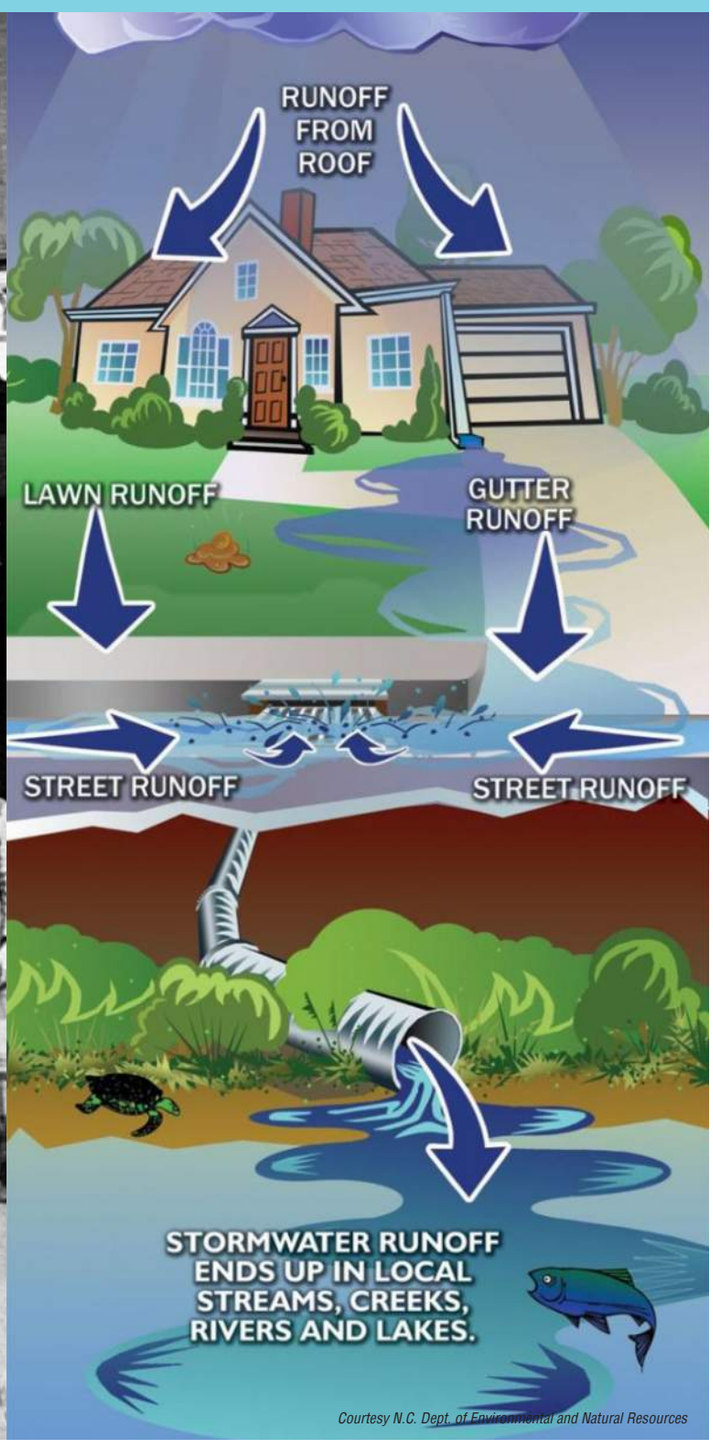
Learn more about preventing stormwater pollution.
www.nepwater.org

Common Pollutants Include: *Antifreeze, Detergents, Fertilizers, Gasoline, Household Chemicals, Motor Oil, Paints, Pesticides, Pet Waste, Road Salt, Solvents, Yard Waste*

Help keep waterways clean in your town

When rain water flows over lawns, gardens, and impervious surfaces—and does not seep into the ground—it carries pollutants such as bacteria, nutrients, metals, and chemicals into local waterways, affecting the cleanliness and health of the water that we rely on for drinking and recreation. We call this water ***stormwater pollution.***





Anything that washes down a stormdrain can affect our waterways. Common pollutants include: Antifreeze, Detergents, Fertilizers, Gasoline, Household Chemicals, Motor Oil, Paints, Pesticides, Pet Waste, Road Salt, Solvents, Yard Waste

Take simple steps now to **prevent stormwater pollution:**

- Keep dumpster areas swept clean of litter, debris and sediments—and keep them covered. Schedule regular pick-ups.
- Sweep parking lot, walkways and patios on a regular basis. Do not use a hose to wash down pavement.
- Keep stormdrains clear of debris and landscaping materials.
- Avoid excessive salting in the winter, and sweep up spills.
- Pour washwater down a sanitary sewer (sink or toilet), never down a stormdrain.
- Use non-toxic cleaning products and organic lawn chemicals.
- Water lawns and gardens only. Don't allow irrigation to spray onto pavement.

nsp
neponset stormwater partnership

We're working with your town to reduce stormwater pollution. More at **www.nepwater.org**

Example Newspaper Articles

City Council to hold workshop on stormwater utility study

Department Posting:Community Services

posted on:01/04/2011

The City Council will discuss the results of a stormwater utility feasibility study at a workshop on Wednesday, Jan. 5, 2011. The workshop follows a special meeting at 7 p.m. in Council Chambers at City Hall.

The City Council last year formed the Ad-hoc Stormwater Utility Feasibility Study Committee and charged the group with assessing the City's options for meeting new, more stringent Environmental Protection Agency restrictions on the discharge of stormwater and determining whether the creation of a stormwater utility is necessary.

The study committee weighed several options presented by GHD, an environmental consulting firm hired by the City. The study was funded by a New Hampshire Department of Environmental Services grant.

Maintaining the stormwater system under the current system costs Dover taxpayers approximately $900,000 each year, including personnel and infrastructure costs. In order to comply with the new standards mandated by the EPA, the City anticipates needing an additional $250,000 to $300,000 per year to manage stormwater. To cover the costs of maintaining the stormwater system, implementing necessary upgrades, complying with additional mandatory permitting requirements and administering the stormwater program, the committee is recommending the City Council create a stormwater utility that will generate $1.2 million in fiscal year 2012. If the utility is created, the average residential user would pay between $7 and $8 per month. Over a period of six years, the fees would be adjusted to generate $2 million annually, which is the estimated amount needed to fund a 100-year replacement plan for the existing stormwater system, or one percent of the system per year.

If a stormwater utility is created, the operation and maintenance of the stormwater system will no longer be derived from the general fund, which will result in fewer tax dollars needed for stormwater activity. As with water and sewer bills, tax-exempt properties would be affected by the fee.

The City Council also has the option to forgo the creation of a stormwater utility and raise the additional $300,000 from property taxes.

The committee's additional recommendations include billing single-family residences at a flat rate, allowing for a credit system and not charging for undeveloped or vacant property; including stormwater charges with water and sewer bills; and phasing in the stormwater charge over a six-year period.

The committee is also recommending several steps to implement the plan, including the preparation and adoption of a utility formation ordinance; assembling a committee to advise on implementation of the plan; launching a public outreach campaign; completing additional mapping of impervious land within the City; developing formal rate policies; refining the financial plan; developing a credit manual; drafting billing procedures; and adopting formal rules for the utility.

Portions of the City's stormwater system date back to the 1800s and are in dire need of replacement. Other sections are old, and although functional, will need to be replaced in the near future. The City's stormwater infrastructure includes 650 manholes, 65 miles of pipe, 204 discharge locations, 101 miles of open drainage, 140 culverts and 2,857 catch basins.

"While our focus was on stormwater, the committee was keenly aware that the cost impacts being imposed on us affect the community as a whole," said City Councilor Jan Nedelka, who chaired the committee. "We strove to balance the impact on Dover's taxpayers, the downtown core, future expansion, existing commercial and industrial usage, farm use, and land conservation. What became very clear was that while there is a cost associated with meeting these new EPA mandates, the punitive financial cost of not complying was far greater. It was also clear that Dover can choose a solution that best fits our community, or it will be chosen

for us -- without local consideration."

The full report will be available soon on the City's website at http://www.dover.nh.gov. All of the committee's meetings have been televised on Channel 22. Meeting minutes and documentation can also be found online at the City's website.

The final meeting of the Ad-hoc Stormwater Utility Feasibility Study Committee can be seen on Channel 22 in Dover at the following times: Sunday at 6 p.m., Monday at 12 p.m., Tuesday and Wednesday at 6 a.m., Thursday at 12 p.m., and Friday and Saturday at 12 a.m. In addition, the meeting is available for on-demand viewing online at http://www.vimeo.com/17906304.

CITY OF PORTSMOUTH

"STORMWATER 101" SESSION PLANNED WEDNESDAY

Dec. 15, 2011 For more info: Dave Allen, Deputy DPW Director, 766-1421

PORTSMOUTH – With the federal government imposing tighter restrictions on how the City of Portsmouth deals with stormwater -- rainwater flowing off public and private streets, driveways, roofs, yards and open spaces -- City officials will hold a "Stormwater 101" information session for the public Wednesday (Dec. 14).

The session, which begins at 7 p.m. in the Library's Levenson Room, will address Portsmouth's ongoing stormwater program, future options to reduce pollution, and the costs to implement.

More than one-quarter of Portsmouth is covered by surfaces impervious to rainwater, such as parking lots, roads and driveways. Studies have found that percentages above 10% can contribute to degradation of the quality of surrounding water bodies due to a lack of natural soil filtration or groundwater recharge.

"The Environmental Protection Agency is imposing more regulations on how we deal with our stormwater runoff," said Dave Allen, deputy Department of Public Works director and head of the City's water and sewer division. "This session will address the complexity and what needs to get done from the viewpoint of our capital and operational needs for our stormwater system in order to meet these tighter standards."

After providing background on the definitions of stormwater, the session will focus on the federal government's Clean Water Act Phase 1 and Phase II Regulations. This will include permit requirements, Portsmouth's

efforts to meet them -- such as its recent stormwater study; the City's long-term control plan; and how to fund improvements.

The City has been working with the New Hampshire Department of Environmental Services (DES) to develop future plans for its stormwater system. "Clean water is a vital resource to Portsmouth's way of life, economy, property values and tourism. This session will provide information about the City's critical stormwater infrastructure and ways to keep it functioning to protect water quality," said Barbara McMillan, DES Watershed Outreach Coordinator. "This is a great opportunity for local residents and businesses to have input into how their water resources are preserved."

# # #

The Stormwater 101 Presentation is at:
http://www.cityofportsmouth.com/publicworks/stormwater/stormwater101-121211.pdf

Example Stormwater Utility Fact Sheets

Milton Stormwater Utility Fact Sheet

What Is a Stormwater Utility?

Milton is facing new federal requirements to reduce the amount of polluted stormwater runoff it discharges to waterways. This will require the Town to increase its investment in stormwater infrastructure.

While Milton is required to incur these increased costs, it does have choices about how to fund the work.

The Town currently funds stormwater infrastructure through property taxes. One alternative for funding stormwater infrastructure is through a **stormwater utility**, which is based on *user fees* for the amount of hardened or **impervious surface**—such as parking lots, driveways and buildings—that cause stormwater runoff on each parcel.

Like water and sewer fees, a stormwater utility allocates costs based on the amount of use, in this case, the amount of stormwater being generated.

Reasons to Consider a Utility Rather Than Continuing to Rely on the Property Tax

Equity: In Milton, **94%** of property tax revenue comes from residential property, but these properties account for only **79%** of the Town's impervious cover. Many of the properties in town with the most impervious cover pay no property tax.

Transparency: Fees added to the stormwater enterprise fund **could be used only for stormwater**, would be consolidated in one account, and would automatically roll over for future use if there was a surplus.

Accountability: Just as with water and sewer, the stormwater utility budget must be reviewed by the Selectmen and Warrant Committee, **and approved by Town Meeting annually**.

Consistency: Fee-based revenues provide consistent funding for long-term investments and annual maintenance needs, thus **reducing long-term costs**.

Incentives: A stormwater utility encourages property owners to reduce impervious cover. Over time, this **reduces pollution, flooding, and the Town's costs.**

How Much Impervious Cover Does Milton Have?

Property Type	# of parcels w/im-perv	Average imperv (SF)	Total imperv (acres)	% of total imperv in Milton
Single Family <2,600 SF imperv	3,563	2,030	166	19%
Single Family >2,600 SF imperv	3,563	5,139	420	48%
Other Residential	755	6,307	109	12%
Commercial	112	15,962	41	5%
Tax Exempt	230	27,394	145	16%

What is Polluted Stormwater Runoff?

Developed areas like Milton include many parking lots, buildings, roadways and other hardened "impervious surfaces." When it rains, water runs off impervious surfaces and picks up pet waste, oil, sand, fertilizers, and other pollutants. It then flows into gutters and storm drains, which discharge it directly into the nearest waterway.

Polluted stormwater runoff is the single largest source of pollution to Milton's ponds and waterways.

Impervious surfaces are also a major factor in flooding problems. Everyone who owns or uses any impervious surfaces, contributes to the creation of stormwater runoff and everyone depends on Milton's stormwater system to prevent streets and homes from being flooded.

What Is Stormwater Infrastructure?

Milton's stormwater infrastructure collects runoff from all over town through a network of **3,776 storm drain inlets, more than 1,000 manholes, more than 80 miles of pipe, and 178 discharge points**. The system discharges directly into local waterways, which are themselves a critical part of Milton's stormwater system.

How is Milton's Infrastructure Maintained?

Milton must actively maintain its stormwater system through tasks such as: street sweeping, storm drain inlet cleaning, inspection and repair of pipes, manholes, and storm drain inlets, upgrading treatment facilities, issuing permits for stormwater discharges on private property, and many other activities.

Milton's Current Stormwater Budget

The costs of stormwater management are spread across many town departments and there is no estimate that covers all these costs. However, many of Milton's stormwater activities are carried out by the **Department of Public Works (DPW)** which estimates the cost of its current program is **$865,000 per year** when debt service on capital projects is included.

How is Milton's Stormwater Regulated?

Since 2003, the US Environmental Protection Agency (EPA) has issued Milton a permit to discharge storm-water. The 2003 permit has not reduced widespread water pollution problems due to stormwater in MA. As a result, EPA is issuing a new permit with much stricter requirements which will be more expensive.

Anticipated Cost Increase

The DPW estimates it will **need an additional $120,000** to comply with the new EPA permit during the first year and they expect these costs to increase further as more requirements take effect in future years.

What Does the Town Meeting Article Do?

The proposed Town Meeting article amends Milton's existing stormwater bylaw to **establish a stormwater enterprise fund**, and **directs the Selectmen to establish a fee structure** to collect the amount of funding authorized by Town Meeting each spring.

The DPW would be responsible for administering the program, and the stormwater fee would become an additional line item on the quarterly water/sewer bill.

What Happens If the Article Is Adopted?

There would be a series of steps to create the utility if the proposed article is adopted:

1. The Selectmen would send the proposed budget for the stormwater utility ($705,000) to the ***Warrant Committee for review***.
2. The ***Selectmen would hold public hearings*** on the proposed rate structure, and regulations governing operation of the stormwater utility. These would be finalized before the May Town Meeting.
3. The stormwater utility budget would be ***submitted for approval or rejection by Town Meeting in May*** with the budgets for all other Town departments.
4. Finally, Town staff would take the budget (if any) approved by Town Meeting, plug it into the rate structure adopted by the Selectmen, and set up their computer systems to add an additional line item to the quarterly water/sewer bills.

How Much Would Be Raised Via the Fee?

The Selectmen have indicated that they will ask the spring Town Meeting to approve a budget of **$705,000** for the first year. This includes **$509,000** of existing direct costs, **$121,000** of new direct costs for the new permit requirements, and **$75,000** of indirect costs. The Selectmen are not planning to include the cost of debt service for existing stormwater capital improvement projects ($281,000/yr). Also excluded are costs in departments other than the DPW.

What Properties Would Be Covered?

The fee would apply to all parcels that have impervious cover except for public roadways. This would include residential and commercial properties as well as nonprofit and tax exempt properties. It would also apply to parcels owned by the state government and town.

Has This Been Done in Other Places?

Stormwater utilities are common across the country, with **more than 1,400 in operation**. They are less common in MA but at least nine communities have implemented or authorized a utility already including: **Reading, Newton, Gloucester, Fall River, Yarmouth, Westfield, Chicopee, Northampton, and Canton**.

How Would the Fee Be Calculated?

The basic "rate" for a stormwater fee is calculated by dividing the amount to be raised ($705,000), by the total area of impervious cover in the town excluding public roadways (38,576,071 square feet). ***This equals 46 cents per 100 square feet of impervious per quarter.***

How Would the Fee Be Structured?

The Selectmen are proposing that **commercial, government, nonprofit and multi-family residential parcels**—about 1,100 parcels in all—be charged based on the number of square feet of impervious cover on each parcel using the basic rate of 46 cents, per quarter per 100 square feet.

To simplify administration, the Selectmen are proposing that the 7,000+ **single family parcels in town be divided into two groups or "tiers,"** those with more than 2,600 square feet of impervious and those with less than 2,600 square feet of impervious. Homes in each of these tiers would be charged for the average amount of impervious cover within their tier using the same basic rate of 46 cents per 100 square feet per quarter. This creates a simple flat rate for the two categories of single family parcels.

What Would the Typical Fees Look Like?

The proposed rate structure would be finalized by the Selectmen based on input they collect during required public hearings. The total amount of funding to be raised would be determined by Town Meeting in May. See the tables below for sample fees based on the proposed fee structure and a budget of $705,000.

Quarterly Fees For Single Family Homes

Property Type	Flat Fee
Single Family < 2,600 SF impervious	$9
Single Family > 2,600 SF impervious	$23

Quarterly Fees For Other Property Types

Based on measured impervious cover for each lot

Property Type	25% of lots pay less than	50% of lots pay less than	75% of lots pay less than	Fee for largest lot
Multi-Family Resident	$12	$15	$19	$1,513
Commercial	$14	$28	$68	$1,085
Tax Exempt	$1	$23	$83	$2,167

For More Information

This fact sheet was developed by the **Neponset River Watershed Association** (NepRWA) and the **Metropolitan Area Planning Council** (MAPC) as part of a technical assistance agreement requested by the Town of Milton. Technical questions can be directed to Ian Cooke (cooke@neponset.org or 781-575-0354x305) or Julie Conroy (jconroy@mapc.org or 617-451-2770x749).

BRAINTREE STORMWATER UTILITY FACT SHEET

Joseph C. Sullivan, Mayor

What Is a Stormwater Utility?

Braintree is facing new federal requirements to reduce the amount of polluted stormwater runoff it discharges to waterways. This will require the Town to increase its investment in stormwater infrastructure without any funding by the federal government.

While Braintree is required to incur these increased costs, it does have choices about how to fund work.

The Town currently funds stormwater infrastructure through property taxes. One alternative for funding stormwater infrastructure is through a **stormwater utility**, which is based on *user fees* for the amount of hardened or **impervious surface**—such as parking lots, driveways and buildings—that cause stormwater runoff on each parcel.

Like water and sewer fees, a stormwater utility allocates costs based on the amount of use, in this case, the amount of stormwater being generated.

Reasons to Consider a Utility Rather Than Continuing to Rely on the Property Tax

Equity: In Braintree, **62%** of property tax revenue comes from residential property, but these properties account for only 46**%** of the Town's impervious cover. Many of the properties in town with the most impervious cover pay no property tax.

Transparency: Fees added to the stormwater enterprise fund **would be used only for stormwater**, would be consolidated in one account, and would automatically roll over for future use if there was a surplus.

Consistency: Fee-based revenues provide consistent funding for long-term investments and annual maintenance needs, thus **reducing long-term costs**.

Incentives: A stormwater utility encourages property owners to reduce impervious cover. Over time, this **reduces pollution, flooding, and the Town's costs.**

How Much Impervious Cover Does Braintree Have?

Property Type	# of Parcels w/ Imp	Average Imperv (SF)	Total Imperv (acres)	% of total Imperv in Town
Single Family	10182	2760	762	40
Multifamily 4+	116	46710	124	6
Commercial	425	55419	541	28
Industrial	135	76579	237	12
exempt	784	15564	280	14

What is Polluted Stormwater Runoff?

Developed areas like Braintree include many parking lots, buildings, roadways and other hardened "impervious surfaces." When it rains, water runs off impervious surfaces and picks up pet waste, oil, sand, fertilizers, and other pollutants. It then flows into gutters and storm drains, which discharge it directly into the nearest waterway.

Polluted stormwater runoff is the single largest source of pollution to Braintree's ponds and waterways.

Stormwater Runoff is a Major factor in flooding. *Impervious surfaces are also a major factor in flooding problems. Everyone who owns or uses any impervious surfaces contributes to the creation of stormwater runoff. Given everyone depends on Braintree's stormwater system it is critical the impacts be minimized.*

What is Stormwater Infrastructure?

Braintree's stormwater infrastructure collects runoff from all over town through a network of 3,887 storm drain inlets, more than 2,135 manholes, more than 98 miles of pipe, and 261 discharge points. The system discharges directly into local waterways, which are themselves a critical part of Braintree's stormwater system.

How is Braintree's Infrastructure Maintained?

Braintree must actively maintain its stormwater system through tasks such as: street sweeping, storm drain inlet cleaning, inspection and repair of pipes, manholes, and storm drain inlets, upgrading treatment facilities, issuing permits for stormwater discharges on private property, and many other activities.

Braintree's Current Stormwater Budget

The costs of stormwater management are spread across many town departments and there is no estimate that covers all these costs. However, many of Braintree's stormwater activities are carried out by the **Department of Public Works (DPW)** which estimates the cost of its current limited program is about **$600,000 per year** when equipment and capital projects are included.

How is Braintree's Stormwater Regulated?

Since 2003, the US Environmental Protection Agency (EPA) has issued Braintree a permit to discharge stormwater. The 2003 permit has not reduced widespread water pollution problems due to stormwater in MA. As a result, EPA is issuing a new permit with much stricter requirements which will be more expensive for the Town to comply.

Anticipated Cost Increase

The DPW estimates it will **need an additional $750,000 per year** to comply with the new EPA permit and provide the resources needed as these requirements fully take effect in the next few years.

What Does the Ordinance change Do?

The proposed stormwater Ordinance amends Braintree's existing regulations as required by federal law through the EPA. By establishing these required regulations we are **establishing a stormwater enterprise fund to pay for the costs of the program**, and **Town Council has approved the fee structure** to collect the amount of funding required.

The DPW is now responsible for administering the program, and the stormwater fee is now an additional line item on the quarterly water/sewer bill.

What was the process for Ordinance Adoption?

There was a series of steps to create the utility for the ordinance to be approved:

1. ***Public outreach was provided*** on the proposed stormwater regulations, rate structure, and regulations governing operation of the stormwater utility. These were submitted prior to the May Town Council Meeting.

2. The stormwater utility budget was ***submitted for approval or rejection by Town Council in May*** with the budgets for all other Town departments.

3. Finally, Town staff has since taken the budget approved by Town Council, plugged it into the rate structure recommended and set up a billing system to add an additional line item to the quarterly water/sewer bills.

How Much Will Be Raised Via the Fee?

The Mayor requested the Town Councilors approve a budget of **$630,000** for the first year. Additional funding may be requested in the future. The full costs for compliance are estimated to be **$1,500,000.** The full costs include **$600,000** of existing direct costs, **$750,000** of new direct costs for the new EPA permit requirements and system updates, as well as **$150,000** of indirect costs (i.e. employee benefits). Excluded are costs in departments other than the DPW.

What Properties Would Be Covered?

The fee will apply to all parcels that have impervious cover except for public roadways. This would include residential and commercial properties as well as nonprofit and tax exempt properties. It will also apply to parcels owned by the state government and town.

Has This Been Done in Other Places?

Stormwater utilities are common across the country, with **more than 1,400 in operation**. They are less common in MA but at least eleven communities have implemented or authorized a utility already including: **Canton, Chelmsford, Chicopee, Fall River, Gloucester, Milton, Reading, Newton, Northampton, Westfield and Yarmouth.**

How is the Fee Calculated?

The basic "rate" for a stormwater fee is calculated by dividing the amount to be raised ($630,000), by the total area of impervious cover in the town excluding public roadways (84,696,462 square feet). ***This equals approximately 23 cents per 100 square feet of impervious or $6.25 a quarter per Equivalent Runoff Unit (ERU).*** The ***ERU*** was calculated as noted below.

How Would the Fee Be Structured?

The Mayor proposed that **commercial, government, nonprofit and multi-family residential parcels**—about 1,460 parcels in all—be charged based on the number of square feet of impervious cover on each parcel using the basic rate of $6.25 per quarter per ERU.

To simplify administration, the Mayor proposed that the 10,000+ **single family parcels in town be charged the same rate.** The average square feet of impervious area for single family residential properties were determined to be 2,780. This square footage was set as the Equivalent Runoff Unit (ERU) and will be used for the base rate for all properties. Both single residential properties and multifamily properties with up to 3 units will be charged a flat rate of 1 ERU or $6.25 per quarter in the first year and additional funding depending on need could be requested in the future.

What Would the Typical Fees Look Like?

The proposed rate structure was finalized by the Mayor's office based on input collected during required public hearings. The total amount of funding to be raised was approved by Town Council in May. See the tables below for sample fees based on the proposed fee structure and a budget of $630,000.

Quarterly Fees for Single Family Homes

Property Type	Flat Fee
Single Family	$6.25
Multifamily (1 to 3)	$6.25

Quarterly Fees for Other Property Types

Based on measured impervious cover for each lot

Property Type	25% of lots pay less than	50% of lots pay less than	75% of lots pay less than	Fee for largest lot
Multi Family (4+)	$6.25	$6.25	$9.6	$6/res. unit
Commercial	$11	$25	$78	$730
Industrial	$7	$74	$213	$730
Tax Exempt	$6.25	$6.25	$38	$730

There is a graduated cap of $730/Quarter for non-residential properties.

Middletown Stormwater Utility Fact Sheet

What is a Stormwater Utility?

Middletown is dealing with aging stormwater infrastructure, water quality issues, and is facing new federal requirements to reduce the amount of polluted stormwater runoff it discharges to waterways. These challenges will require the Town to increase its investment in stormwater infrastructure, operations, and maintenance.

While Middletown has infrastructure needs and is required to meet regulatory requirements that results in increased costs, it does have choices about how to fund the work.

The Town currently funds stormwater infrastructure through property taxes. One alternative for funding stormwater infrastructure is through a stormwater utility, which charges user fees based on the amount of hardened or impervious surface—such as parking lots, driveways and buildings—that generate stormwater runoff from developed properties.

What is Polluted Stormwater Runoff?

Developed areas like Middletown include many parking lots, buildings, roadways and other hardened "impervious surfaces." When it rains, water runs off impervious surfaces and picks up pet waste, oil, sand, fertilizers, and other pollutants. It then flows into gutters and storm drains, which discharge it directly into the nearest waterway.

Polluted stormwater runoff is the single largest source of pollution to Middletown's ponds and waterways.

Impervious surfaces are also a major factor in flooding problems. Everyone who owns or uses any impervious surfaces, contributes to the creation of stormwater runoff and everyone depends on Middletown's stormwater system to prevent streets and homes from being flooded.

How Much Impervious Surface Does Middletown Have?

Property Type	Number of Developed parcels	Total Impervious Area (IA) (sq. ft.)	% of Total IA
Residential	4,852	21,125,100	44%
Town Property	38	2,517,200	5%
Other Non - Residential	865	24,922,000	51%

Like water and sewer fees, a stormwater utility allocates costs more equitably based on the amount of stormwater being generated by the amount of impervious surface on the property.

Reasons to Consider a Utility Rather Than Continuing to Rely on the Property Tax

Equity: In Middletown, 60**%** of property tax revenue comes from residential property, but these properties account for only 44% of the Town's impervious cover. Some properties in town with significant impervious cover pay no property tax since they are tax-exempt. Also, stormwater needs do not correlate with property value.

Transparency: Utility fees added to the stormwater enterprise fund could be used only for stormwater, would be consolidated in one account, and would automatically roll over for future use if there was a surplus.

Accountability: Just as with water and sewer, the stormwater utility budget must be reviewed and approved by the Town Council.

Consistency: Fee-based revenues provide consistent funding for long-term investments and annual maintenance needs, thus **reducing long-term costs** and unexpected expenditures.

Incentives: A stormwater utility encourages property owners to reduce impervious cover and manage stormwater on-site, which reduces their fee. Over time, this **reduces pollution, flooding, and the Town's costs**.

What is Stormwater Infrastructure?

Middletown's stormwater infrastructure collects runoff from all over town through a network of **1,200 catch basins, more than 2,000 manholes, more than 90 miles of roadway drainage, and 57 discharge outlets**. The system discharges directly into local waterways, which are themselves a critical part of Middletown's stormwater system. Much of the runoff collected in these systems discharges to the reservoirs that provide drinking water for Middletown.

How is Middletown's Infrastructure Maintained?

Middletown must actively maintain its stormwater system through tasks such as: street sweeping, storm drain inlet cleaning, inspection and repair of pipes, manholes, and storm drain inlets, upgrading treatment facilities, issuing permits for stormwater discharges on private property, inspecting detention ponds and many other activities.

How is Middletown's Stormwater Regulated?

Since 2003, the US Environmental Protection Agency (EPA) through the RI Department of Environmental Management (RIDEM) has issued Middletown a permit to discharge municipal stormwater. That permit regulates the operation and maintenance of the system and requires minimum controls to manage stormwater quality. The original permit is still in effect while a new permit is being developed. It is expected that the new permit will have much stricter water quality protection requirements, which will be more expensive.

Middletown's Current Stormwater Budget

The costs of stormwater management are spread across several town departments and there is no budget line item that covers all these costs. However, many of Middletown's stormwater activities are carried out by the Department of Public Works (DPW) which estimates the cost of its current program at $467,000 per year.

Anticipated Cost Increase

The DPW estimates it will need an additional $650,000 to properly maintain and upgrade the Town's stormwater system, invest in capital improvements, and comply with their permit over the next year. The DPW expects these costs to continue each year and increase over time as more requirements take effect in future years.

What Does the Stormwater Management District Ordinance Do?

The proposed ordinance establishes a stormwater management district that will be funded by fees paid into a stormwater enterprise fund. This approach complies with RI state law and the procedures that need to be followed to set up a stormwater utility fee in Middletown.

The DPW would be responsible for administering the program and the annual stormwater fee would become an additional line item on the real estate tax bill.

What Happens When the Ordinance is Adopted?

Upon adoption, the Town Council would formally approve the annual stormwater rate, allow the tax department to add stormwater to the tax billing system, and set a date for delivering the first bills. The Council would also approve development of a credit manual to allow property owners to apply for fee reductions if they employ stormwater management features on their land.

What Properties Would Be Covered?

The fee would apply to all developed properties that have impervious cover except for public roadways, State property, and US Navy property. This would include residential and commercial properties as well as nonprofit and tax exempt properties. It would also apply to parcels owned by the town.

Has This Been Done in Other Places?

Stormwater utilities are common across the country, with **more than 1,600 in operation**. They are less common in New England, but 15 communities have implemented utilities in the surrounding states including: Chicopee, Fall River, Gloucester, Milton, Newton, Northampton, Reading, and Westfield, MA; Burlington, South Burlington, and Williston, VT; and Augusta, Bangor, Lewiston, and Portland, ME. This number has grown quickly in recent years.

How Would the Fee Be Calculated?

The basic "rate" for a stormwater fee is calculated by dividing the annual amount of revenue to be raised by the total impervious area available on all billable developed property in Town. The individual fee will be based on how many billing units a property contains – for every 1,000 square feet of impervious area on your property (rooftops, driveways, stone patios) you are assigned one billing unit. The preliminary rate has been determined to be $26.35 per 1,000 square feet. So a property with approximately 3,000 square feet of impervious area, would pay for 3 billing units or 3 x $26.35 = $79.05 per year.

How Would the Fee Be Structured?

The Town is proposing that all properties including **residential**, **commercial, government, and nonprofit**—about 5,765 developed parcels in all—be charged based on the number of square feet of impervious cover on each parcel using the basic rate of $26.35 per year per 1,000 square feet.

What Would the Typical Fees Look Like?

The proposed rate structure and fees will be finalized by the Town based on input they collect during required public hearings on the ordinance. Sample fees will be calculated using the proposed fee structure and the current five-year program plan and this information will be made available to the public in the future.

For More Information

Questions can be directed to the Director of Public Works, Tom O'Loughlin, at (401) 846-2119 or toloughlin@middletownri.com. More information may also be found on the town's website at www.publicworks.middletownri.com.

City of Northampton
Stormwater and Flood Control Utility FAQs

What is stormwater?

Stormwater is the runoff from rainfall and snowmelt. During major storms an astonishing amount of water must be managed by our infrastructure. Water is collected by street drains and culverts throughout the city, and then redirected into our local brooks and water bodies. Stormwater picks up debris and pollutants along the way. Impervious surfaces, such as rooftops, driveways, and parking lots create the most runoff.

What stormwater infrastructure does the City own and maintain?

The City owns and maintains almost 5,000 catch basins, 114 miles of storm drain pipe, 326 outfalls, and 190 culverts. Construction of this system began over 100 years ago, and in many areas the pipes are now too small. Some areas of the City have chronic drainage problems and failing infrastructure. The value of the City's existing drainage system is approximately $200 million.

What Flood Control Facilities were built to protect the City?

In 1940 the Army Corps of Engineers built our flood control system to protect Northampton from the Connecticut and Mill Rivers. The Connecticut River portion consists of a 1-mile long levee, 3 concrete floodwalls, a powerful pump station and an emergency generator. The Mill River section includes a 2,300 foot levee, a floodwall, the South Street Control Structure and the 2-mile long Mill River diversion channel. In exchange for the Federal government building these structures, the City agreed to assume all maintenance and operation expenses.

Why has the City created a new Utility Fee for Stormwater and Flood Control?

In the past, the money for maintaining our Flood Control and Stormwater Drainage Systems has come from the General Fund (i.e. from Property Taxes). Over the years, the City has minimized expenses by deferring maintenance and postponing new projects. This has led to an aging system neglected too long. In addition, two things have happened recently that compel the City to begin spending more money:

1. The Army Corps of Engineers has mandated that the City undertake several repair and maintenance projects for our flood control system. They also want us to initiate several engineering studies that have the potential to identify additional needs. Preliminary estimates show that it will require more than $1 million to meet these immediate requirements.

2. The second part involves the storm drains that run below our streets. The City is awaiting the release of our new Environmental Protection Agency (EPA) Stormwater Permit. This permit allows the City to discharge stormwater into streams and brooks around the city. The new permit will require the City to increase our level of maintenance, to upgrade parts of the drainage system, and to begin monitoring stormwater outfalls.

These new requirements necessitate a new source of funding. The City's General Fund simply does not have adequate money to meet our stormwater obligations. In March 2014, the Northampton City Council passed a new ordinance that created a new Stormwater and Flood Control Utility.

What projects will the Stormwater and Flood Control Utility fee fund this year?

The FY 2015 budget includes the cost of following projects: flood control levee repair, levee certification (engineering analyses), a pump-station upgrade study, River Road Retaining Wall repairs, Eastern Avenue drainage reconstruction, and Hinckley Street drainage reconstruction. In the near future other drainage system upgrades will be needed across the City. Moving forward, the annual revenue requirement for flood control and stormwater drainage, including both operations and capital projects, will be in the range of $1.5-2.0 million per year.

What is the stormwater and flood control utility billing formula?

Similar to a water or sewer fee, a stormwater and flood control fee is a fee for service. One advantage of a fee system is that all property owners will participate, *including the non-profit sector and City properties*. All land produces runoff. In particular, impervious areas such as paving and buildings have the most impact on stormwater runoff. The billing formula sets runoff coefficients for impervious surface (0.95) and pervious surface (0.1). A cap of 1 acre was set for billable pervious area.

For a given property, the utility will calculate the amount of impervious and pervious surface. These totals will be multiplied by the runoff coefficients to calculate the property's net hydraulic area. This number is then multiplied by a rate to calculate the annual charge. The billing rate (annual budget) is approved each year by the City Council.

What does this mean for homeowners?

There are roughly 6,600 smaller residential properties (1-3 family) in Northampton. Under the billing formula these properties are divided into four groups based on the impervious surface area on each property. All properties within each group pay the same fee. This standard fee is calculated based on the average impervious and pervious areas for all properties within each group. Based on the annual budget of $1,980,056, the annual residential fees are estimated to be:

$63.94 (impervious area less than 2,250 square feet (sf))
$91.05 (impervious area 2,250 – 3,056 sf)
$125.61 (impervious area 3,056 – 4,276 sf)
$259.07 (impervious area greater than 4,276 sf)

What about costs to businesses, non-profits and other non-residential properties?

For the approximately 4,460 non-residential and larger residential properties (4 or more units), fees will be calculated individually based on the actual amount of impervious and pervious area for each property.

Is there an opportunity to get a credit on a bill?

A credit program provides property owners an opportunity to apply for credits. Starting July 1, 2014, credits are available for small residential stormwater improvements (rain gardens and porous driveways), construction and maintenance of larger stormwater best management practices, protected open land, commonly owned undeveloped properties and educational programs. Senior (needs-based), low income, and protected land credits are automatically applied based on documentation by the Northampton Assessor's Office. All other credits require submission of an application and other documentation. Additional information about credits can be found on the website or at the DPW Office.

What is the schedule for implementation?

The City Council passed the Stormwater & Flood Control Utility Ordinance on March 20, 2014 and a new stormwater and flood control fee is being implemented for Fiscal Year 2015. Quarterly bills will be sent to property owners with their Water and Sewer bills. However, for this first implementation year, first and second quarter bills will be consolidated on the second quarterly bill starting October 1, 2014.

Need more information?

- Visit the website: http://ma-northampton.civicplus.com/726/Stormwater-Flood-Control-Utility
- Detailed questions: call, email, or come in

City of Northampton
Department of Public Works
125 Locust Street
Northampton, MA 01060

James R. Laurila, P.E., City Engineer
Phone: (413) 587-1570
Email: JLaurila@Northamptonma.gov